MIRROR BRAINS — *Mind*

Neuroscience and Philosophy.

An initiation 2020.

Ronny Verlet

Mind — BRAIN MIRROR

3/22/13

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Ronny.Verlet@gmail.com

FOREWORD

Science publishes yearly 2 million papers in more than 28000 journals to disseminate scientific knowledge controlled by peer reviews. No doubt, Science engineers shape the world's physical environment. Science also blows Mental clouds in the high sky of Philosophy. Together, Science and Philosophy feed Cognition. Quantity wise, Philosophy does not attract the scholar crowds of the material intellect. Still, hundreds of thousand people philosophical minded people yearly consult the website PhilPapers and merge 2 million ideas to feed new concepts. The frontier between Science and Philosophy is 'what is Life?'. The question lives since the rise of human consciousness. The answer still is a turbulent stream of rhetoric, emotions, religion, ethics, evolution, and ideas of the hunted truth. Twenty-first age of Science reinforces its dikes with Neuro-science, while Philosophy shores its side with concepts of the Mind. Forty thousand neuroscientists produce 20000 scientific papers per year. There exist two databases of neuro databases, which, according to Wikipedia, has 50 registered storages of big data capturing neuroscience. Nearly any branch of Science has a

neuro-version like cognitive neuroscience, affective -molecular, behavioral, cellular neuroscience, molecular, clinical, evolutionary neuroscience, and many more. All the knowledge is encoded in big data, which only computer networks can digest. We, humans, have a small brain capacity to accumulate Cognition in comparison to the digital cloud. Our asset is to follow the instincts, and emotions that motivate our actions. Computers and machinery never get instincts and emotions because these notions belong to the Mind.

In this publication, I try to convert my understanding of the many specialist brain-mind concepts in a language suitable for the lay Mind. Doing so needs the explanation of some advanced scientific concepts that frame the current understanding of the brain-mind discussions and its evolution.

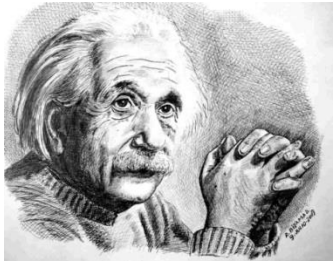
I am indebted to the global Mind, which provides all data in open sources. An individual can scan only a minuscule part of the science-backed papers. Assisted Intelligence helps to access, retrieve from raw material ideas and merge them in yet another concept. I do not know whom to thank and give credit for the intuition that guided me in the creation of this publication, as no computer will ever create Artificial Intuition.

FORMAT

We think in images and language. Language is rather slow and ambiguous in the transfer of meaning. To make the transition of knowledge more productive, I try to catch most ideas in images and infographic layouts. Keep in mind Einstein's words: ' If I can't picture it, I do not understand it.' Cognition today combines many new scientific concepts, which urges me to insert at occasions tutorial-style texts to underpin the ideas.

ATTRIBUTION

Scholar publications bulge from inserted peer text links to their ideas and criticism. Much text goes to protect against claims of plagiarism. I do not follow this course, as this publication is purely informative. I praise all the authors who inspired me in building cognitive on the subjects. Reference is given to the essential books and papers so that the reader can study the sources.



IF I CANNOT PICTURE IT, I CANNOT UNDERSTAND IT.

Albert Einstein. Scientist.

MAN'S MIND CANNOT UNDERSTAND THOUGHTS WITHOUT IMAGES OF THEM.

Thomas Acquinas.
Philosopher, Theologian.

CONTENT

INTRODUCTION.

Dear reader, unless you are a computer algorithm in search of words, word combinations, and sentences, we share many things. I call our common assets Cognition and Consciousness. People assign Cognition and Consciousness to the privileges of human beings in the animal world. I contest this: even a single cell organism has the Cognition to feed and reproduce and is conscious of threat and opportunity. The humans claim they surpass the animals by being mindful of their Consciousness. Is mindful different from conscious? Were the Neanderthalers as conscious as we are now? Are you more conscious than me? When does consciousness start in our life? What is the difference between Consciousness, the Mind, and Cognition? These questions no longer belong to the language games of the philosophers, Science claims the answers.

Science and especially the neurosciences, quantum computing, and algorithmic network intelligence take the ambition to explain the Conscious in technical terms. Remarkable is that in mind-brain discussions, more scientists and brain surgeons turn philosophical than philosophers take up to study the physical brain. One exception is Henri Bergson (1858 - 1944), who studied neuro-science when it was still at its infant stage. Bergson's intellectual deductions match, to a great extent, the physical models of brain and

consciousness of today. Bergson reduces the cloud of publication available today on consciousness to the simple statement that consciousness is a co-extensive feature of life. Life is action to stay alive, and to perform the task it builds on Memory. Memory is the cumulative experience of past actions, anticipates, and prepares for future work.

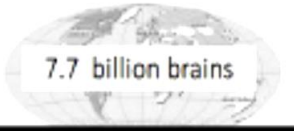
From this simplification, it is logical that Evolution and Cognition scaffold the neuro-sciences. Evolution is the past story of the development of life and as such of consciousness. The cumulative experience anchored in mental models and language determines the action of individuals and societies. Individual life, in the broad sense, cover from simple organic cells to the human body. This organic complex material structure generates the life function appropriate to any specific species. Science describes some of the life functions in physical and chemical terms but refrains from the mysterious spirit that drives the whole process.

One spirit is the human desire for the creation of new things and ideas. The arrow of time is such an idea. We question if our intellect is only an evolutionary try and error for a better position in the material world, or is the engine a ghost Intuition? The power of conscious reflection reveals the patterns of how we build cognition on repetition and transcendence. Transcendence, in this context, is the transfer of a sign via a carrier to give it another meaning. The cognitive revolution started when the homo sapiens

developed new ways of thinking and communication that fostered strong social ties. Spoken phantasy and imagination nurtured the creation of fictive creatures like gods. The Devine took possession of time and space and anchored the signs in graphical symbols and art. Repetition of this process in space and time elevates language to means of communication and social coherence. This is the way how the human species come to dominate the life world.

The ideas compiled in this publication asks for some unlearning and learning of new scientific concepts. A fundamental topic is about Time. In everyday language, the word 'time' points to an aura of different meanings; time is a Babylonian word swirling around the ideas of repetition and duration. New intellectual disciplines are probability, relational frames, chaos, and quantum mechanics. A basic understanding of these disciplines is required to grasp knowledge of the brain and its mental operations. I try my best to bring across my mental images in the knowledge of the Brain and the Mind.

The human Mind grow first in evolution by improving COMMUNICATION by LANGUAGE. Now, 7.7 billion human brains enhance communication with an Artificial Material Mind, which seems primitive compared to the biological brain operating one Trillion times better measured by energy efficiency. By 2030, the Artificial Material Mind will double, but we might run out of the energy to support that growth.

 **ARTIFICAL MIND**	10.10 ^{20} byte or 0.4 % of the global Brain capacity.	**10. 10 ^{20} Watt/y** or 10% of global electricity consumption	ANNO 2020 CEREBRAS CS-1 SUPERCOMPUTER **250 Kg** versus brain of 1.4 Kg Consumption of 20000 W/h versus brain with 20 W/h Processing 9 10^{12} byte versus brain with 50 10^{12} byte
 **GLOBAL MIND**	**4. 10 ^{23} byte**	**1.4 10 ^{12} Watt/year**	
 **BRAIN MIND**	**50. 10 ^{12} byte**	**1 person consumes 20 Watt/hour or 20 % of the body energy consumption**	
	DATA CAPACITY	**POWER CONSUMPTION**	

Humankind expanded its global biological byte capacity by 0.4 %, at the cost of 10 % of global electricity consumption. Will the depletion of energy resources limit the technological brain capacity?

1 A SHORT HISTORY OF COGNITION.

The only laws of matter are those fabricated by our Mind, and the laws of the mind are fabricated by matter. James Clerk Maxwell.

The chief character of the mind is to be constantly be describing itself.
Henri Focillon..

What is Cognition?

Cognition is "the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses." [Wikipedia]. In this way, Wikipedia is part of my Cognition. Reading a definition does not provide Cognition; it points into a direction to guide your thoughts. You have to make an effort to acquire an opinion about an idea; you cannot buy insight or comprehension. The word 'insight' is the dichotomy idea of 'outside,' which suggests the description of outer observables. Insight demands for how it works, where it comes from, where does it go, why such, and not so? You need to labor intellect to acquire cognition, which is different from intuition. Intuition suggests that some mysterious power provides insight. Both ideas, cognition, and

intuition are mental expressions. The cognition of Cognition is the knowledge of the MIND. The Mind is a cloud of dynamically arranged concepts filled with feelings, senses, and mental data that express life itself.

The cognition of the Mind brings together many domains of knowledge like linguistics, neuroscience, psychology, philosophy, anthropology, biology, logic, and computer science. These are all strictly scientific disciplines, which means that you follow the scientific ritual of hypothesis, experiments, reproduction, logical deduction, and consistency with other ideas and over time. From this view, cognition of the Mental seldom can be labeled as scientific because the mind is a moving target.

You cannot repeat the events observed from Evolution, so you cannot experience Evolution. All you can do is search for patterns of appearances. Philosophy only charms by consistency in thought. Psychology tries hard to experiment and create concepts, but seldom the ideas last a few generations. Biology and Neuroscience made a quantum leap step in the last century thanks to the efforts to stick to the scientific ritual. The MIND, as a holistic and mystic idea, has retreated by the cognition of NEUROSCIENCE. However, is it so? Science shivers when it hears the word feeling, and that is what the BRAIN produces to shape the Mind. You can claim that the Mind creates the material brain to support the Mind. Let's keep far away from these philosophical speculations and focus on the Cognition.

In the recent decennia, Cognition gets a considerable boost by Artificial Cognition Intelligence and its handling of Big Data, which helps a lot to understand the functioning of the brains. However, in the end, we question if Artificial Intelligence is just a mimic of

the brain itself. Finally, we conclude that the cognition of the brain and mind is simply the summation of all cognition acquired in Evolution.
The end conclusion of my journey through the Mind is that all the time, we look into a mirror, which is a philosophical statement to say: *we do not know what the mind is because we are the Mind.*

The Mind is a product of Evolution. The Mind creates Evolution. The Mind holds all cognition. The journey along Evolution is fascination. Neurosciences add a new dimension to the human cognition. Neuroscience is explosive when measured by the number of neuroscientists. The progress of the cognition of the mind is lesser, although significant efforts go to the concept of Consciousness. We treat the brain as the hardware, and the mind becomes the wetware, a term in biology for software. The split hardware-software is the traditional dichotomous grounding of knowledge. Dichotomy is a mental model of thought based on the language of opposites like –light exists because of the dark. Neuroscience constructs its models on this common framework, which is probably a limitation, and one day the language of quantum mechanics and wave descriptions will fit the purpose better.

The sapiens describe the cognitive progress called Evolution, holding the historical accounts of the beliefs, religions, art, and even the mental models explaining the lifeworld. The understanding of this lifeworld has ever increased in content and complexity In one direction. In the other sense, the complexity broadens over the interrelations of all phenomena. The sapiens organize the primarily phantasy in what they call CONCEPTS.

Let me remind you that Science also embraces similar secrecies as Religion holds. Science is based on the ritual of Logic from which mathematics is derived. In the Christian religion, there is the fictional Holy Spirit as the variable X. Also, Science is populated with ghost concepts. A point in space and a line defined as the connection between two points are fictional. Even space and time are phantasies. Our life is organized in space and with time, but nobody can tell what these things are. All that we can agree upon is that these fictional notions help to explain 'change and motion,' which we experience all the time and everywhere (I just used the words time and space again). On this kind of super fiction of the sapiens thrives the reality of a high-technologic digitized society.

Concepts evolve with the progress of cognition and change names accordingly. Some are just a shift of older models like the grace of God, which drives the world, is now converted to energy. The atom, a few decades ago, was a miniature solar system and is now a bundle of vibrating ghosts that appear as particle or waves depending who looks at them. Logic is the new God who knits the minds of the people. Just as there is no logic in God and that Logic does not know how to make Logic logical, so Science remains magical as well. Somewhere in the sapiens' fairy mind, a paradigm shift occurs, which becomes the Cognition of the Conscious. At one moment, the sapiens question their own questioning and think about thinking. That moment is a breaking point in the Evolution of the species. This moment is comparable to the experience when a newborn discovers herself in a mirror.

The conscious of the Conscious is a milestone in the Evolution.

Before I explain what Neuroscience produces about Conscious, let's follow first the trajectory of Evolution of Cognition. Evolution is a historical account. Activating history is a conscious moment, which means that events from the past are updated according to the cognition of the moment, making history unpredictable. New cognition interprets facts differently. Moreover, we cannot go back in time and experience or feel the past 'now.' What I see or read or hear about Napoleon or Jesus Christ happens in the 'now moment.' I relate a presentation of data from a past timeframe with the knowledge I possess now. This is how the brain works: relating consequent data frames. We call a 'now' moment the act of referring two data sheets in a timeline of conscious happenings. This sounds like technical philosophy what will become clear when we discuss in detail the brain operation.

We interpret humankind differently than our ancestors did. The humans are no longer the creature made by an Almighty God but the product of Evolution as a bundled complexity of biological hardware powered with information and data handling. This view is a modern concept that will change in due time, as all cognition does. One of the most stable concepts on which our cognition builds is the idea of Time and Space and its combination to describe change and movement.

Already early in the waking of conscious, people question who they are and with what purpose. God did not answer. The intellect tried then to split the human being into a body and a soul. In modern terms, the soul is called the Mind. The dissection of the body did not reveal the place where the soul hides, but resulted in a high precision map of how the body performs and how we reproduce.

Today, Science puts the question: what is cognition? The technical and philosophical answers are complicated. The philosophers add the burden of using old-styled language while the modern folks are educated with infographic language, which is concise and illustrative what makes the transfer of knowledge more productive. The ancient Greeks were the first to question the operation of the mind and the nature of knowledge. When psychology became an intellectual discipline in the mid-nineteenth century, the initial focus was on measurable behavior by experiment. Only mid the twentieth century, neuro cognition surpassed psychology and covers now a broad field of what we guess that the Mind does.

I have tried to read the many books I consulted on neurosciences from a different angle, which start with the models of Chaos and Rhythm.

Do not search for the tree of Logic in the brain because it does not operate in this way. The only logic in neuroscience is the link to Evolution, which is a Chaos process on its own. The brain is simply the mirror of Evolution.

The tentative conclusion of my journey through the Mind is that *all the time, we are looking into a mirror,* which is a philosophical statement to say: we do not know what the mind is

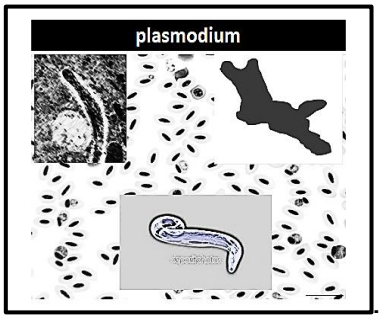
because we are the Mind.

The journey along Evolution is fascination. Neurosciences add a new dimension to Cognition. We start with the first Mind process of PERCEPTION.

1.1 THE PROCESS OF PERCEPTION.

To be is to be perceived.	Henri Bergson.
Reality is perception.	Berkeley.

Perception is a fundamental evolutionary life function, which is the first life function of any biological entity. I provide a simplified account of perception first, which I elaborate later. A most simple and well documented organic life form is the Slime Mold, belonging to a category called Plasmodium. Plasmodium represents some 200 types of parasite single-cell organisms from which malaria is best known (1). The most basic type is a mold that hardly has a body shape but which can adapt its loose form to fulfill its life functions.



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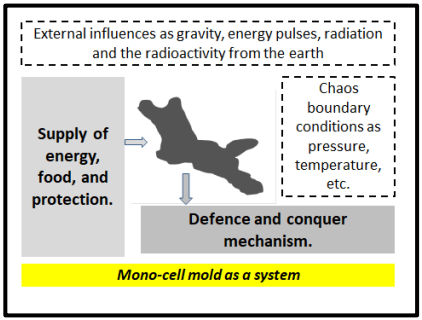

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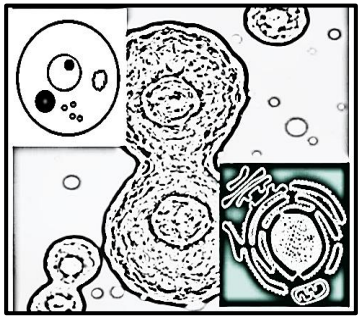
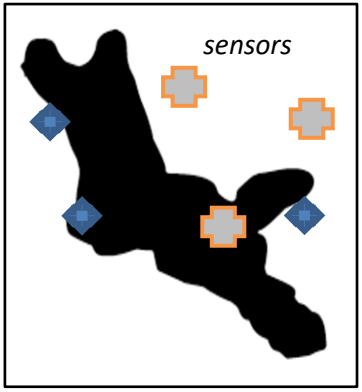


3

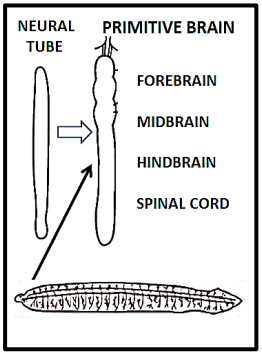
The essential life functions serve to harvest energy and food, to defend from predators or hostile environment and to multiply (2). These tasks develop from autonomous cells with specific molecular patterns that correspond to functionals tasks. This pattern formation is an essential step in the development of organs with specialist functionality. The slime mold has no brain or nervous system, which means that molecular organization and its physical and chemical characteristics constitute the life function. The bodily function of slime mold is to adapt its shape only.



The PERCEPTION function is its surface covered with electrical-magnetic-light-chemical sensors scanning to scan the environment. The organism manages simultaneous inputs of different types. The theory of complex systems tells that under these circumstances, the whole is maximumly stressed and offers the most flexible and creative solutions. Decision making is dynamic, starting with the scanning to detect **patterns.** IMMUNOLOGY is fundamentally an affair of **pattern recognition.**

The complexity in Evolution increases and the sensory and motoric functions specialize for ever more features and better coordination, which leads to the BRAIN and NERVE SYSTEM. During Evolution, the slime mold changed shape to minimize the surface

prone to attack and efficient coverage of sensors. The tube shape provides flexibility to move, which a tail and a head enhance. The head concentrates defense, sensors, and the intake of food and energy.



The first appearance of a brain is a neural tube that developed into a primitive brain. The other body parts specialize in the vital function. The forebrain senses (the smell as a chemical function) and coordinates the senses with movement function in the midbrain. Food, energy, and waste management is the hindbrain. This organic structure the amphioxus species, the simplest living chordate. The central nerve is a neural tube with sensory nerves and motoric cell tubes for simple movements.

The biological evolution of the slime mold's life functions is also mirrored as a footprint in the NEURONS of the brain and nervous system. A neuron (like a slime mold) has many in- and outputs. The inputs do not lead to immediate response but are weighted in frequency and intensity, and the neuron only fires action when a pattern is recognized. The neuron, as such, is a complexity acting in a critical stage with many possible outcomes. More on complexities follow later. The neurons and the connectome, including the nerve system, form the BRAIN.

The body comes under the control of the brain, which is fundamentally a center of ACTION. The brain is mostly represented as the medium of Representation of all life functions. Henri Bergson contests this statement and claims that the main task of the brain is ACTION, and Perception is a tool for Action only. Perception needs the brain for the control of the sensory and the motoric system and the decision making.

Now, as an initiation, follow some psychological and philosophical observations. We perceive MATTER and not ghosts. Matter becomes, in this way, an aggregate of IMAGES. We are CONSCIOUS of an IMAGE of matter, which we scientifically describe with terms like dimension, color, weight, etc. We call the total of images a REPRESENTATION. We do not represent all things, we select and omit some. Representations belong to the **MIND.** We omit things of no interest to our needs, which means that the image is formed in the OBJECT and not in the Brain. It is the object that holds meaning and purpose. The object now belongs to a MIND outside the body. The task of the nervous system serves to receive stimulation and provide motoric actions as broad as possible, and not to hold and steer a Mind. Perception means possible action, indeterminate action. Pure Perception does not exist as it turns to a Representation that is biased by AFFECTION. Affection can only influence Perception with the involvement of MEMORY. *The Representation in the Object is outside the body, while the affection is inside. This theory of Henri Bergson rightly puts the question of where is then the MEMORY?*

As the Brain is an action center, past actions are memorized in the brain as BODILY HABITS, and as independent RECOLLECTIONS. So, one memory REPEATS, and the other

IMAGINES. Useful Memories appear in a CONSCIOUS duration and grasp the past in the present as RECOGNITION. CONSCIOUSNESS serves the body as the center of the action by synthesizing the laps of past, present, and future duration. The conclusion from this reasoning is that the Present is in the Action.

Because of the action, the motoric function of the brain is primarily the Recognition fitness for use. We have to find Memory, therefore firstly, in the motoric structure of neurons and wiring of the brain. Pure Memory is. ATTENTION followed by INHIBITION as an action-adaptation of the body. At this stage, the Bergson model sounds quite philosophical. Later, when we study the functioning of the brain, it proves very plausible. We retain that Pure Perception, Memory, and Memory Image always come together in a Trinity.

Now that we acquired some theoretical fundamentals of PERCEPTION let's make a mental map from our most developed sense, VISION.

Looking at an object or a scene is performed in 2 modes. The information received is being processed for survival and adaptation first, and then for meaning (Semiotics).

Mode **1**: I observe a targeted view.

Mode **2**: The target perceives me.

When the view is a new environment, then the observer starts a Darwinian mind cycle for survival and adaptation. I illustrate this cycle in the chapter on the Mind. When the view is another person, then a unique process begins. In mode 2, the target triggers in my mind images linked to specific details of what I see; while I suppress other details.
The scene (Mind) reads my inner thoughts and prepares the brain to take action.
" ***To perceive the World is to co-perceive oneself*** **"** The viewing is an iterative process until a stable *mental* picture emerges, or it concludes a *mental compromise for relevance*. The viewer differentiates (asks for details) and integrates the inputs (tries to make sense of the data). This goes on until the perception reaches a stable *view*, which is called an IMAGE. Take the next image from the magazine Revolution Art.

We differentiate the image and pick out some elements in a priority, upon which we re-integrate its parts to a new image that fits best the needs of our psyche. In some cases, people do not manage to re-integrate the parts of the picture and can make no sense of a whole. The person will focus on a specific part or element and get obsessed with, called PARANOIA.

The process of iteration is interrupted, and no stable and balanced .meaning or sense is reached. Mostly a blockage during infant life occurred, or the EGO developed in unbalance, creating a self-image out of touch with the real person.

1.2 THE PROCESS OF THINKING.

Cognition results from guided conscious thinking. Unconscious processes are reflection, routine behavior, mechanical movement, dream, and beliefs. I explain the ideas of consciousness after familiarization with the brain's operation. Thinking is a conscious act. A thought does not act but is a state, such as what we remember from a dream. Thinking is a process with a fixed, repetitive procedure emerging from the brain structure, and the thinking brain operation remains mysterious. Thinking became the ritual which provides the humans the tool of fantasy and imagination. In modern terms, we call this ritual LOGIC. The belief of the sapiens in Logic is so strong that it becomes the doctrine of rationality.
Logic is a ritual in a flowing mental procession. A ritual is a behavioral pattern that addresses a mental issue in sequential order. The purpose of a ritual is to bring the subject to a higher spiritual level. Logic operates on different platforms, like in mathematics. Language also works according to a form of logic.
In everyday language, you put words in a sequence to make a sentence. Sentences create mental images or meanings. When you apply the protocol of Logic in language, a trinity appears. I use the word Trinity because a similar concept exists in the Christian dogma of

the Holy Trinity with the Father, the Son, and the Holy Spirit. You want to say something about a topic which can be an item, stuff, a subject, an object, or a source. In Biblical terms, we call this the Father. The issue asks for clarification. The 'thing' has to manifest itself what happens in the next ritual movement of Logic. A 'proposal' or a 'proposition' is presented, which connects the subject to something else. The item takes up a role or a task; it is the Son of the Trinity sent to the earth with a mission. The third step asks for an answer, a conclusion, a result that inspires and announces that something will happen; the Spirit descends.

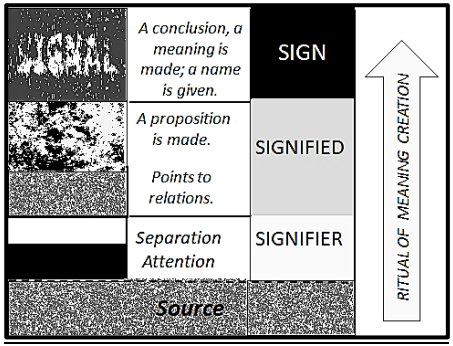
Language is a macro processor of metaphors and similarly is Science, a macro-logic operation. You formulate a hypothesis, then you execute an experiment, and next is to draft the conclusions. You repeat the same protocol with small variations. When the results of many loops show consistent results, then you can formulate a final determination, which eventually becomes a law when it covers a broad scope. In the end, we conclude that: ***the sapiens fill their imagined concepts with mental content via a ritual called Logic.***

The ritual Logic is only one manifestation of rhythmic patterns in our mind and nature. Underneath there is a more fundamental rhythm of SIGN and SIGNIFICATION, which belongs to the creation of meaning and communication. Signification carries meaning. A signal is a signifier pointing to meaning. The Signifier is the medium that transports a message, like a red traffic light signifying the message to stop. An icon and a

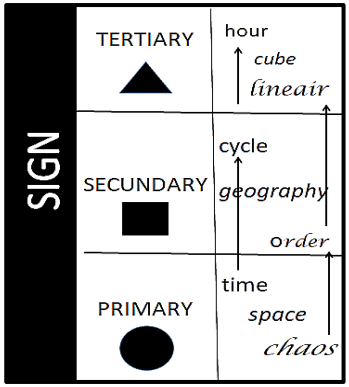
logo signify a meaning. The medium that carries the message can be a mental picture like the traffic light, a chemical like a smell or physical like the doorbell that rings. The Signified is that, which can carry the message forward. Something stands in for another thing, and this process repeats itself. A ringing doorbell means that somebody is at the door. The bell can also ring a code with a secret message. *A sign always acts on a coincidence of time and space together.* The more potent both instances are, the more influential the sign is. The stop- sign on the road, rules only on the spot of the crossing (space), and the moment (time) when you arrive there. Mental images accumulate more pictures and meanings. This repetitive process ultimately leads to the concepts of religion and scientific knowledge. The full insight is presented in the book: Sign of Life. The life of Signs. [317]. The lifeworld we perceive is the culmination of a ritual process that starts with the attention for something unknown, followed by the emergence in the mind of an idea or concept that points to something else to which a meaning is attached. The new approach is the start for another linkage (as a logical construct), and expansion of meaning.

This ritual is a fundamental process of cognition.

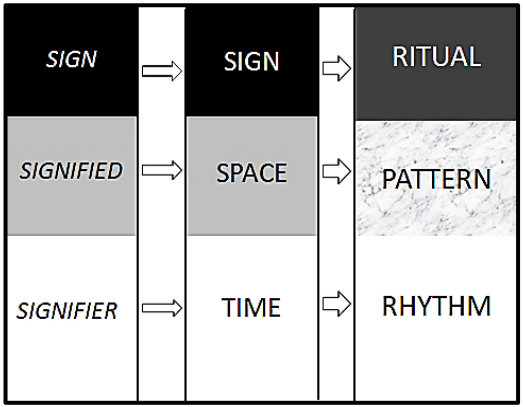
The next infographic image is a summary of the perception concept leading to knowledge. In the same way, we reconstruct the idea of Ritual, Pattern, and Rhythm, which on their term are specified from a Sign, Space, and Time.

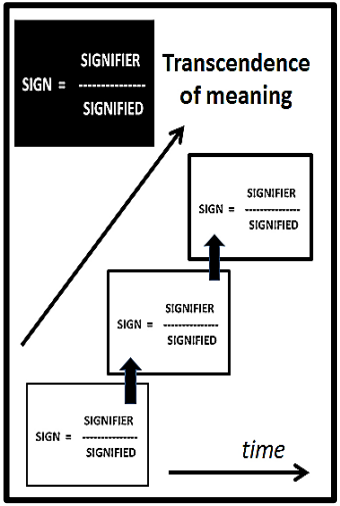


The development of the conscious starts with dichotomy oppositions like black/white. From the unknown emerge images with familiarity to other pictures. When the new image is stable, it can get a name with a meaning attached to it.



Every cycle provides a new meaning which obtains a name in language or a geometric figure or a mathematical expression or a concept. When the idea is general, the SIGN is called a Primary Sign like time, space. When the sign is transformed into a more precise view, it becomes a Secondary Sign line cycle, geography — the next transcendence results in a Tertiary Sign which, is very specific like one minute, a cube.





This map shows how the ritual grows from the intuition of Time and Space. All knowledge is an intellectual transformation of meaning created by recurrent processes of a signifier pointing to something else and give it another meaning.

This model is essential to understand the principle of how our brain creates the MIND. Rhythm is not only a primary mechanism that operates the mind or the mental; it is also a principle that establishes the form of all material inclusive the biological. The clearest example of transcendence is the idea of the gods; beyond that, there is Mysticism. Before elaborating on Rhythm as the driving mechanism of life and cognition,

let's take an overview of the total mental frame, its content as per today, and how it progresses.

1.3 HOW THINKING CREATES KNOWLEDGE.

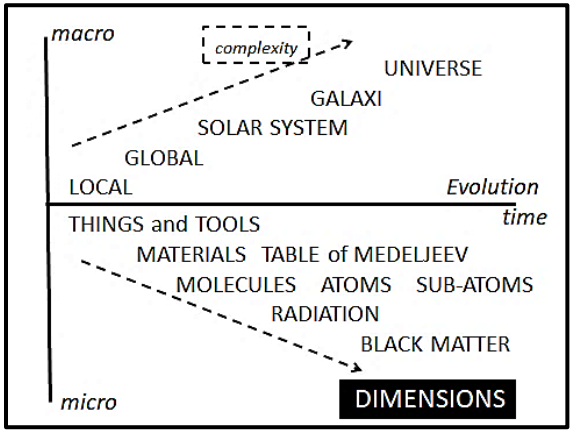
I admit that the next paragraphs wander far from scientific propositions, and like Evolution, only build stories on observations. Its truth value comes from the consistency of models. The thinking process is a ritual. Let's have a closer look at what a ritual is. A ceremony holds two elements: rhythm and pattern. A pattern is a repetition in time or a shape belonging to space. Patterns and rhythm power all human cognitive achievement. Geometrical patterns are a unification factor for people, which the human mind expresses in art, symbols, and rituals. Patterns have a close link to 'feeling' and provide comfort, heals, and appeases. Probably, in art, the designs take over the rhythmic thinking mind. The practice of Mindfulness to manage stress and burn-out builds on the control of rhythm and regularity. You do not think when listening to music. Feeling opposes thinking. Is feeling also a ritual as thinking is? There is repetition in feeling as it comes and goes in intensity. The content of feeling points to ideas like happy, sorry, laugh, anger, etc. These mental constructs do not have a space-dimension except that it happens in the mind's time. Life is primarily a matter of feelings, so feelings deserve full attention. When you ask a robot if it has feelings, it can answer 'yes'; but it won't feel shame that it lies or jump with joy because the robot could foul you. Ask the robot what the most common fundamentals in all life sciences are? The knowledge robot starts to process trillions of publications and papers from the past till now. After the

categorization, classification, reshuffling, condensing, and statistically processing, there is a high chance that the outcome contains the notions *patterns* and *rhythm* as the most essential shared content. Although the mind robot has no affections, it proofs to be very helpful in building Cognition.

The data intake capabilities of my brain are tiny compared to the big data machines, but the processing power of my mind is much stronger. Data serve to make judgments and plan action, but it is the brain-mind which provides the intuition. By the way, the robot is the product of the cumulative cognition of generations of minds, and ultimately of intuition, judgments, and actions.

1.4 THE EVOLUTION OF COGNITION...

The most obvious manifestation of the progress of Cognition is currently Science and Technology, but without LANGUAGE, none would exist. TIME and SPACE, although fictional ideas, scaffold Cognition. Space points to two directions: the micro and the macro. Further, we consider Evolution as a time event. The history of Space is a continuous expansion in size from micro to macro, while knowledge explodes in complexity over time. Experience is stored in a memory activated by language, and in the tools called Technology. Cognition fills with mental images of phantasies. The sun today is entirely different from the sun-God of the primitive man. The next picture shows the Evolution in two maps of Time-Space Cognitive relations.



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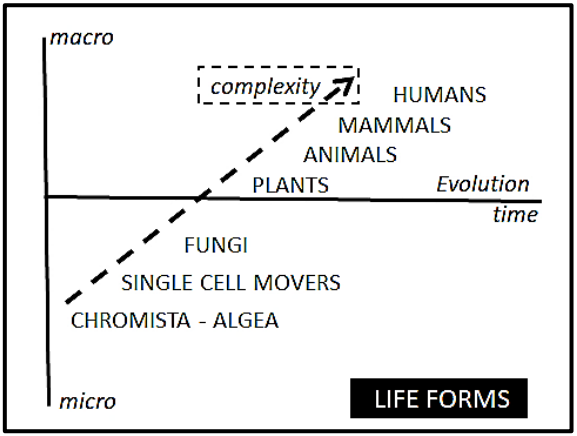


2

1 The Micro and Macro meet each other in the concept of the Big Bang, where fundamental particles packed at extreme temperature and density triggers the universe to expand and create new particles and radiation cooling to the materials which make up our solar system. From these materials and radiation evolve the biological matter of life forms and species. In this way, relate Space and Time to Complexity.
2 Is a simplification of the life forms that emerged in Evolution.

2 RHYTHM, CHAOS, SYSTEMS AND PATTERNS.

All is Rhythm. Holderlin

You find rhythm and patterns in all domains of science, in art, architecture, and Nature as building blocks of life itself. With this observation, I started to search for publications about rhythm and patterns. One book captured special attention (later I use the term attraction), which is a small oeuvre titled 'The rhythm of life, based on the philosophy of Lao-Tse' by Henri Borel 1921. [305]. Lao-Tze is an ancient Chinese philosopher and writer, whose most famous book is the I-Ching or the Book of Change. Lao-Tze is also the founder of philosophical Taoism. Philosophers seldom bother much on rhythm. Patterns were first caught by observing the cosmos and later in biology and Evolution. In material science, crystallography describes patterns intensively. The electromagnetic wave functions give ample discussions on patterns. Mathematics provides tools like the complex numbers and sinus and cosinus functions to describe patterns. Till then, the attention for rhythm was for music, dance, and rituals exclusively. Rhythm is quantified as frequency. If rhythm and patterns are the most fundamental

manifestation of life, it justifies studying the whole range of vibrations we find in Nature.

Let me come back first to Lao-Tze's thinking. The Tao is the endpoint of transcendental thought, the mystic of that what we cannot know. Lao-Tze writes on the Tao. "Tao is the source of everything: trees, flowers, birds; of the sea, desert, and the rocks; of light and darkness; of heat and cold; of day and night; of life and death; of summer and winter, and your being. Worlds and Oceans evaporate into Eternity." We can only know about the Tao because of the other concept of Wu-Wei. "Wu-Wei, or 'non-resistance,' or 'self-movement' or the breath of impulse brought out. In every man, there is an impulse which, proceeding from Tao, urges him back to Tao again. That which is real in you, your soul, can never pass away. "

" … out of life-energy grew form, and form became birth. "
" Life is cold and empty,"
There is, in fact, no such thing as ' life '; it is unreal. ….. "

From the stirring of Tao within you is Love the highest."

*" Love is no other than the **rhythm of Tao**. I have told you : you are come out of Tao, and to Tao you will return."*
" What your soul desires in the excitement of beholding this strange, unspeakable feeling is nothing but your oneness with this beauty, and with the source of this beauty Tao."

Lao-Tze, as many philosophers claim that what we experience is not real, only rhythm is constant. The limit of the rhythmic transcendental thinking is the rhythm itself. This statement is similar to what God of the Christian Bible answers to the question: God, who are you*? "I Am that I Am."* "*I am who I am*" *or "I will be what I will be" or even "I create what(ever) I create" "I will cause to be what I will cause to be."*

The only interpretation of these answers is that you are looking into a mirror and listening to your echo.

All cognition and intellect is a product of the collective mind made of individual thoughts over time. We say the mind is a product of the brain. As the brain is part of the body, the mind belongs to the body. Can the mind explain itself? Fire cannot burn fire, as logic cannot clarify Logic.

The mind translates the experience of the body in images, which are coded in drawings or pictures or language. This codification is required to connect to other minds. I cannot read your feeling directly, but I can guess them from what I see, hear, and how I experience you. I cannot know what you think at this very moment. Minds meet and communicate in a coded way, which means that minds belong to a kind of unified medium. Our representation of the world we live in is a product of the mind and is not necessarily the real thing. Lao-Tze claims that we cannot know the real thing, which is the Tao. We only can approach the Tao by what the Tao produces, namely Rhythm and Patterns. Nature performs the ritual relentlessly in the process of coming to the Tao.

2.1 RHYTHM

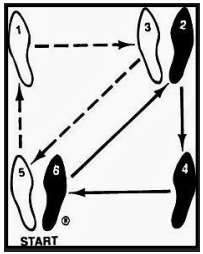
Rhythm is what connects the most elementary and primitive bodily structures of even the most simple organism to the implacable movements of the universe itself: art, music, sculpture, painting, architecture, dance, resonates or transmits force through every structure .

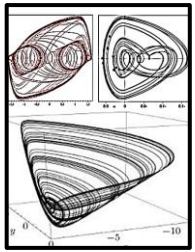
lisabeth Grosz, Chaos, Territory, Art. 2008.

May I invite you for a dance?

Dancing is a ubiquitous phenomenon in the lifeworld. Some animals perform a mating ritual, and people dance for pleasure, entertainment, or as part of ceremonies to praise and please the Nation or the Gods. Dance sometimes is valued for its aesthetical attraction. Generally spoken, dance is a semiotic tool for the expression of feelings or to show complementary. Dance is a ritual of attraction, repulsion, supplement, and balancing in repetitive cycles. Dance performs in a group, a couple, or single. The attractor in a solo dance is the message. Also, in the world of plants and micro-organisms, we find the movement principles of dance. Flowers attract birds and bees with their honey. The insects, in return, carry away its pollen to fertilize the other plants

and propagate the species and its diversity. The repetitive activity of attraction, complement, repulsion, and balancing appears to be a protocol of life itself. Let's find out more about this engine of life. When you analyze the physical movements of dnce, you can register several parameters such as the patterns of the footsteps, the trajectory followed on the floor, the mirror movements of the couple's bodies. The map of your observation probably resembles phase map patterns from publications on chaos as in the next drawing.





These patterns are the outcome of a process powered by a set of forces.

Music is the dominant actor in dance. It is the rhythm of the music that sets the pattern of the movements. A Walz creates a different flow than a cha-cha-cha. Loudspeakers that scream too loud push the pattern on a distance from the sound source. When the couple passionately stares each other in the eyes, they might bump into other people or a wall, interrupting the smooth dance process. So, there are more actors

on the stage. When we invite Newton on the floor, the talk includes forces like pull and push, action and reaction, momentum, and balance. When Maxwell and Einstein join the party, the conversation is about waves, frequencies, attraction and repulsion, space and time, energy, and symmetries.

It seems that scientists do not like dancing because none ever modeled dance in a scientific concept. Engineers model dance in line with vibrational principles used in electronics, telecommunication, and mechanics. The keywords used are - single and coupled oscillators. When we describe the dancing couple in these terms, the starting condition is that each person vibrates on its own with a specific frequency pattern. Philosophers on the floor only argue on the artistic and aesthetic meaning of the dance. Not only physical music waves drive the process, but also emotions released by the mind contribute, like: she wins the jackpot and starts dancing. Anthropologists interpret dance as a left-over of the mating ritual in the animal world, and Religion claims that dance is a ceremony to praise the gods. Maybe, the religious opinion is the closest to the truth. Humans always have tried to associate themselves with the gods, which is in line with Lao-Tze, who claims that rhythm is the expression of the Unknown. That God equals rhythm must frown the eyebrows. To clarify this bold statement, you first have to digest the chapter on the Mind. Let me repeat the words of Lao-Tse on the Tao:

" the Highest, the One can have no name, can never be expressed in any sound, just because it is The One. Wu-Wei, with the meaning of 'self-movement ' is the impulse born out of Tao or THE RHYTHM OF LIFE, and " … out of life-energy grew form, and form became birth; … Love is no other than the rhythm of Tao".

This text is in line with the reading that *in rhythm, there is no longer oneself, but rather a sort of passage from oneself to anonymity. It is also the captivation or magic of poetry and music. '* [ ] .

Western scholars use the term rhythm to describe the artistic and aesthetic aspects of poetry, literature, sculpture, architecture, painting, music, and dance. Scientists describe the cyclic movements of sociological and economic events. Discipline and order are enforced by rhythmic regulation. Rhythm provides relaxation and entertainment in dance and music. Rhythm fosters art and social cohesion. Rhythm is all over as the mover of the mind and is a principle of Nature. According to Henri Levbre.[303]. Nature appears as a regular character with infinite transformations. When you look for the definitions of rhythm, you find that it is a harmonious recurrence of a specific element, often a single particular entity like a line, shape, form, color, light, shadow, and sound. Biology, like modern science, adds to the above aspects of rhythm a definition of ' rhythm is the

fundamental principle of the development of organic life forms and of life itself as a conscious mental phenomenon.'

Let's return to the rhythmic elements of dance. We start with a pattern like 1,2,3 – turn and repeat, or 1,2 turn right, 1,2,3 turn left, or any repetitive combination matching with the pace of the music. Music is a combination of sound patterns. The dancers are coupled in their movements (not only the feet and legs but the whole body) to the music. The music acts as an attractor. Not just the body synchronizes, also the melody stirs the emotions. The lyrics of a song, the light, the location, and many more things trigger the mental brain patterns of the performers. The main attractor of the dance remains undoubtedly the music. Follows more knowledge about the power of music:

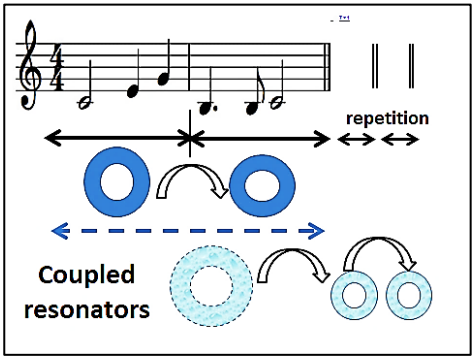
ON MUSIC.

William Pole, [307], a philosopher of Music, explains that Music is formed by a string of sounds of a peculiar kind. The tones are selected from specific elementary series called scales and then combined and arranged into a complicated structure. The composition empowers the feelings and emotions of the people, by interlocking into a beat. Music is the repetition of patterns with slight variations, which makes us curious. We get satisfaction because we know what will come and should not worry. Music, as a chaos attractor, stimulates the human body and the mind to participate in an enclosing

chaos process. It is the process of chaos coupling of the musical instruments, voices, and the person who activates the device. The player introduces personal mental feelings into the performance. Take the violin: you activate a string, and via the air, the vibration is coupled to the wooden box that generates a typical sound. The connection to the listener's ears happens through pressure waves. In the ear, there is a sophisticated bio-mechanical organ that converts the airwave in nerve signals that propagate to the brain. Here starts the mysterious process of how the mind creates a mental state of, e.g., joy, and commands the body to synchronize its movement, which we call dancing. The whole coupling process becomes a cloud of chaos manifestation. I use the word cloud because cloud computing is not much different.

What makes music different from noise? Is a bird song music? The most elementary component of music is a vibration expressed as a specific frequency. We find in Nature a range of wavelengths from x-ray, the light frequencies, radio signals, the sonic and subsonic vibrations. A set of twelve succeeding tone frequencies fills an octave, and tones can also act as a subtone. The tonic is the starting tone around which the following sequent notes fluctuate and then restart in another combination. Music is complex, with many variables from which duration and repetition define the rhythm. The complexity pattern makes the melody. When the patterns relate harmoniously, then we speak of music. Simplified, we can say that a melody is a sequence of coupled resonators where the coupling is made at different levels (1). The ear picks up every frequency of the tune

separately as a discrete component. We do not hear a melody, but we select all momentous sound frequencies which our brain remakes as a melody. Within the ear, there are many sound tubes of all frequencies which resonate when a specific wavelength is available in the noise or music. Follows a sketch of the idea. (2)



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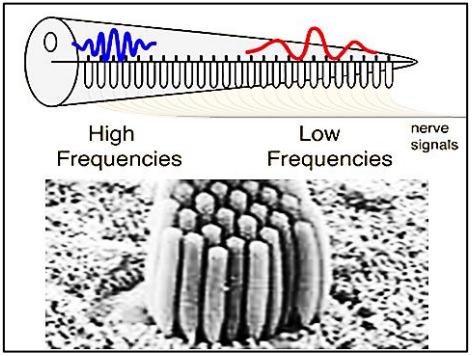


2

The processing of soundwaves to the brain is an excellent illustration of some more fundamental characteristics of rhythm and how waves, as a construct of separate frequencies, are vital to consciousness. Particular soundwaves stir emotions. The translation of music into the pallet of emotions is complicated. Some elements are

explicit like regularity gives stability, and simplicity creates relaxation. The essence of melody is motion, and many formats are available to create this. The almost uniform rate of speed and the division in equal portions in time develop a sense of movement. Music also has a binary character as we only appreciate specific frequency proportions. Because emotions are life, we are curious to learn how science and philosophy integrate repetitious phenomena in life and what mathematical tools support the ideas.

PHILOSOPHY OF REPETITIONS.

> *Rituals and regularities create meaning. It is the regularities in a form that frame a meaning.* Fucunni Turner.

A Reality is something repeated. Imagine an event that happened only once and observed by one individual, even when he or she phantasy a name for it, and talk about it with the friends, it is not real. The friends can repeat and spread the news; the phenomenon does not become real; it remains an idea, which is the case with miracles. When an event occurs before the eyes of many people, it is repeated in many minds, and they can share it by a commonly accepted name, and so becomes real. To a name, you can attach a meaning. A ritual is a macro-name to express meaning by repetition. The philosopher, Gilles Deleuze [310], profoundly analyses repetition. Contrary to most

ideas, repetition is not a concept. Remember, a concept. con-cept, is the framing of a plan to make it useful for communication and handling. A word is a concept, as money is. You cannot explain repetition by an identity having intensity or momentum or any other attribution. Take the example from Hume: AB AB AB AB AB …, is a repetition of an appearance of two attached letters as graphical signs. In the sequence, the AB's are independent of each other. Whatever position in the series, they remain a single AB, which won't change on the number of repetitions. But, from the repeats, we can derive another phenomenon, which is 'time,' and that is a concept. The meaning we give in this series is 'change'. It is rhythm and cadence as variations in the time scale that create explicit meaning. Rhythm and cadence are an envelope of repetitions that stirs the mind to provoke sense and emotion. It is the mind that creates change and the feeling of time.

As long as our intelligence does not link two occurrences, we cannot talk about repetition, which means that repetition does not come on its own. Suppose I linearly read the series in the way we process language, and I forget all words after reading, which means that there will never occur repetition without memory. I also can read the AB's like an image of arranged graphical signs AB. When the signs are arranged on one line, I need space or at least one axis in space, which insinuates time because of the sequence. When the signs are arranged into a space field XY, we want to clarify relations between the signs: why they are positioned as such, what leads to the explanation that

repetition generates the ideas of time and space. It sounds complicated, but when we study the operation of the brain, we will need the concepts of space, time, repetition, and memory. Repetitions seem very fundamental to the Mind. Your and my ability to communicate via language is the result of repetitions. A word comes to life when a nonsense series of sounds stick to an idea, repeats, is shared and repeated by other people who align with the meaning of the word. You learn new words and language by repetition, so goes the process of cognition. The sentence which you read now is a sequence of words separated by blank spaces and specific signs as, . , ; / ?. In spoken language, we add pitch, tonation, silences, etc., which similar to music carry elements to touch and steer the emotions of the audience. The repetitions of specific words and sentences create special effects, like an epimone where a phrase, usually a question, is repeated to stress a point. When you repeat the same word at the beginning and the end of a phrase, we speak of epanalepsis.

The scholars of language focus nearly exclusively on the logic- mechanic structures that create a sentence, and search for the gears of grammar, hoping to find tricks for synthetic speech and automated translations. Very few scientists investigate how the mind handles and produce language. Lots of data is available in the neurosciences on the brain regions and links where language is processed with the motoric nerve infrastructure to speak and to hear. A more fundamental question is: what is the role of Language in the Mind? The processing of Language in the brain is not along with

grammatical structures; probably it is more a statistical affair. To illustrate this, we have to look at Language from a different angle.

We start with statistics. To operate fluently in society, the command of 2000 words is sufficient, although a tenfold of words does exist. Some words we use frequently and others very seldom. The scholar Michael West [416] analyzed passages from different authors and disciplines on various subjects. The total number covers 5 billion words containing 1900 common used words.

The result is that from the 1900 words, 10 are used very frequently, 100 words often, 1000 words less regularly, etc. The frequency of usage follows a power function which is a mathematical term which describes many phenomena in nature and daily life. The examples of Power Functions are: 1% of earthquakes have a force of 7 or more on the Richter Scale, 10% have energy between 7 and 6, 80% have less than 4 Richter points. Another example is that 80% of the turnover of a company comes from 20% of the products. Take the wealth distribution in society, !% possesses 80% of richness.

Let's count Language together with Michael West 's 5 billion words of the many texts examined.
15 words of the total 1900 words are used very frequently and count for 15 % of a total of 5 billion words.
100 words are frequently used and count for 25 % of the total words.
1850 words are specific words less frequently used and count for
60% of a total of 5 billion words.

Take now the 1965 (1850+100+15) different words and analyze the meaning these words carry. With a bit of imagination, we can categorize the definition in 4 groups.
The meaning group 1 is words related to ***time*** as milestone words and specific moments.
The meaning group 2 is words related to ***spac****e*.
Meaning group 3 is words which have a *coupling or* ***relational*** *task*.
Meaning group 4 is words which have the task to *build the stage as background, soil, and* ***context***.
There are some 100- to 150 different words that fit into one of these categories, and they take a total of 40 % of the total count of words in the texts. We can say that nearly half the words that Language uses are to build the stage in time and space. The 4 groups are equally distributed each one quarter.
The 40 % of the word that fits one group is completed with 60 % words which represent an object, a topic, and subject.
A bit of more details and examples follow.

The most frequently used words are: (the), of, a/an, in/into, it, his, on, with, not, this, or, for, one, say. The word 'the' does not play in the count because most of the time the role of this word means the start of text or conversation, or that you leave Silence.

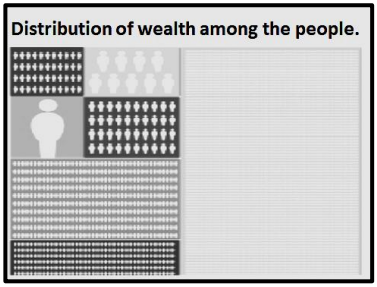
When you take the Time-Space words the most used expressions are: A, that, in, where, there, on, by. Remarkable is here that many of these words can indicate time as well as space, these words indicate where time and space unite in One.

The most words with the task of coupling, facilitation, agent, etc. are: of, by, from,

for, with, on, what, why. The backstage and context words are: It (1/3), of (in relation to , as in -'of the most..'), that (the man that…), they, of (of the people), all, such, any, some, what (what is it beautiful).

Let's picture the words of Language as a field, then 40 % of the surface is taken by words that stage and manage time and space and the relations between all players. The other 60 % hold the meanings. The other chart illustrates the distribution of wealth in society, which is also a power law.

Language creates the lifeworld and not the opposite. Pretending that Language has emerged from a lifeworld that invents words and semantic rules are false. Language is the first, and it creates reality. Some words remind us of the primary feeling of space and time, while other words picture a stage with a background or context and relations to the words holding meaning. The brain creates moments and conscious durations to release reality in a language format.



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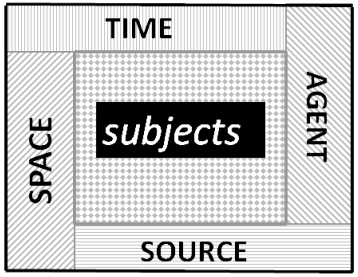


2

1 The distribution of wealth among the people is an example of a power function.
2 The map of Language types of word distribution.

The graphics of written language is also a repetitive affair. The first characters were probably the registration of a phenomenon like the appearance of the moon or some prey. The strokes became signs with meaning, and combinations elevated the purpose and the extended the scope of application. The next image is from the very first written characters.

From the early conscious time, we can already distinguish the element of time, space (as an enclosure) relations, and symbols. Remember your first writing lessons on how you had to repeat over and over strokes that made characters, what is even more explicit in Chinese writing.

With this unconventional look at language, I like to demonstrate another aspect which is helpful to frame the concepts of how the brain creates the mind. *Every word contains its evolution just as our body reflashes the whole organic development of life*. Etymology is a stroll in the past of the human mind. Which are the first words of the humans? Of course, we cannot overhear the first meaningful shared utterances from the primitive tribes. When we look at the common roots of the many first languages reconstructed by the scholars, we retain a few remarkable things.

The concept of life in most primitive and current languages contain the sounds f, v, w, ph, as in live, *leben, vivre, liv, vita, vida, zivot, dzive.* Definitely the first words reflect the priorities in survival referring to the sources of food, the dangers of preditors, and especially the instincts for the female and her fertility. Examples of primeval words are: *fiskaz* (fish), *flaiskaz* (flesh), *fuzlaz, fugel* (bird, vogel), *fahan* (catch, vangen), *feld, velt, feld, wald, would, woud, wildi, wilt, wild*. It is clear that they are dominated by the f,v, ww, ph sound. The old English word *wenan* (expect) has a form *to ween* (believe, suppose) and *wish, win* and *venus.* The female reference words are *faémne, feima* (maid, virgin), *fatjanan, fatia, fetian* (fetch, marry), *fula* (feel), *funon, fon, fonke* (spark, fire), *faiman, feim* (foam, *fatan* (barrel), ***f****at* (cloathe, fashion), *vanis, vinna* (wish), *winna* (to win), *venus* (lust), *wempel* (labia), *willan* (to will), *wamba, womb, wampa* (belly, body), *wamm* (stain), *vaxa, wahsan* (to grow), *wagjan* (craddle), *waila* (good), *vaesche* (fantasia), *valsch, valleye, vaets, veyle, veynsen, vlechten, vleesch, vleyen, volghen, voechtig.* All these words can be closely linked to *wives.* The etymology of wife is linked to *weave* and *web.* Also in Daoist Chinese terms is the **w** and **v** sounds prominent as in

wuwei (no action), *wuxin (*no spirit*), wuxiang (*formless*), wushi (*empty, do nothing, idle*).*

After the series of archaic female sound-words follows the *penetration* of the male, which sounds more rude and raw. The hard **p** and the grating **r** join the female sound-words. *Pader, pater, fadar* (vader)**,** *fretan* (vreten), *fro-, fra-, frja-* (fertilize, change), *fram, fremd* (strange), *fram-gangan* (frames, guide), *fra-letan* (to free), *fracodt* (evil, bad), *frag-gildan* (to reciprocate), *friznan, fra-gan* (to question), *wair, verr* (man, husband). The old meaning of **-pa** comes from the Arish language with the meaning of 'feeding'. The root **-ar** refers to ' plowing' as in the words agrarian, are, arena. Earlier, I have explained *vair, fair* as the ideas of fertilizer with *fraiw* (seed), *fro, fra, frja* as in *fraizwa* (pregnant), *ferse, frisk* (fresh), *fuljan* (to fill), *fula* (to feel), *vaer, vaerlick* (dangerous), effray), *figger* (finger), *franja* (lord). We call in the science of Language the sounds v, f, w, p, ph, bilabial referring to the joint action of the two lips that produce the sound. The hard d, t, is called alveolar. In the production of this sound, the tongue pushes against the palate. The hard r has the name of uvular, which is created by the pulsation of the soft protrusion, the uvular. The hard r uvular movements mirror copulation. Bilabial words are crow, crack, scratch, prick, cradle, etc. The female characters dress in the velvet sounds of v, w, f, ph, and when a male is around, they attract with a perfume. Now starts the seduction by using the s and z sound, from words like hiss, sea, season, scene, syphe (a spirit}, sympa, symbol, sin, snake, snail, slime, slow, swan, swamp, sweet, swing… Note that the symbol of the s-sound curls like a snake. But can a woman sin without a man? The s, v, w, mingle with r, d, t in words like screw, sperm, scratch, sword, service, sir.

The highlights on language show the repetitious structure of signs, sounds, and the modulations that provide meaning. At any NOW conscious moment, the evolutions are mirrored, also in words.
So far, repetitions associate with sense and emotions. What about the scientific and mathematical approach towards repetitions? Science does not know feelings, only consistency.

RHYTHM AND TIME.

Time is philosophically a mysterious concept with many dimensions. Some aspects emerge from sensations like a moment, duration, and the idea of 'now.' We say that time flies, and that the time has stopped. Generally, we conceive time as the unstoppable arrow fleeing in one direction.' Now' is a crucial notion, because we *feel* in 'now.' We cannot sense in the future, and what we felt is the memory of the valuation of an impression. We remember the feeling of our first love, but we don't feel it anymore.

There exist many kinds of 'time.' There is the time as a relation between Sun, Moon, Earth, and Orion. Galaxies have their own time. These 'times' exist in conjunction with some other phenomenon that participates in the observations. One thing common to all 'times' is periodicity. An event that never repeated itself cannot have time. For example, the Big Bang does not have time as it did not happen in time, but it is the

creator of time. [304]. The different time occurrences produce different names. Names related to Earth-time are: year, day, second, etc. Can you answer the question of what the time is at the North Pole? It seems as if time disappears magically at the poles of the globe. A ticking clock, how precise the mechanism is, never can indicate 12:00. It is not yet, or it is already too late. We can put many questions about time, such as do all creatures have their own time, a dog with a dog time, and the cat a cat time? Is my time the same as yours? This question is not whether we refer to the same standard clock reference.

> 'Everything has its own time and things coming together will influence these specific times. Each process, therefore, determines its proper times'. Gilles Deleuze

All thoughts and phenomena in the lifeworld follow an arrow of TIME, which is a kind of measure of CHANGE. Some changes result in ever different things, called chaos. Changes resembling each other are said to be repetitive. Repetition becomes an essential element of time. Repetition has induced the sense of counting and the numbers. A quantity or a multiplicity includes time. When we look at a picture with three apples, we see the whole in no time. Only when we differentiate what we observe, we start consuming time.

Repetitions leave a flow of time-markers. Repetition is technically quantified in

FREQUENCY, and its unity is Herz, or one cycle per second. The phenomenon which consists of repetitive cycles is sometimes called a wave. A wave has frequencies and intensity called amplitude. Frequency is the inverse of time-lapse, and the mathematical expression is that the product (multiplication) of Time and the Inverse Time equals one. $T \times T^{-1} = 1$. (T^{-1} is the Inverse Time). With this formula, I introduce the mathematical notation of the relation time-frequency.

In daily life, we encounter the inverse - time as frequencies in, for example, three times per day, four pills, once per year on holiday, and eight hours per day sleep. The lifeworld hides many more undercover frequency markers like the ticking of a clock, the number of lines writing the television images, the frequency clock of a computer, and your biological clock. All these elements belong to T^{-1}, which makes up the pace of daily life. Rhythm and Time play an essential psychological role. When your day is stacked with time markers of too many activities, then there is no time left for yourself. This ends in the feeling that you have no longer control of your life. The surrounding consumes you, and a burnout looms. That is the psychological explanation of the formula Time multiplied by the Inverse Time remains one.

The mathematical concept of time and rhythm is widespread in physics and engineering. The subjective view of the 'happening' of time, although mostly overlooked, is essential to control and enjoy individual life. You experience that the first time you walk a trajectory, last longer than the subsequent trips. We say that time

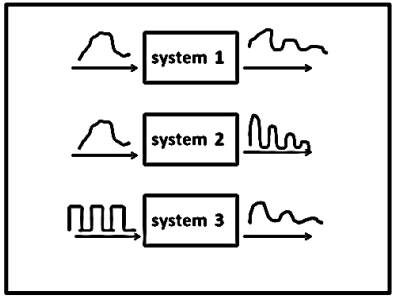
flies, which is a feeling when we are engaged in continuous repetitive actions. With the time markers, your day is stuffed with a sequence of alerts, traffic lights, meetings, train schedules, e-mails, and responding calls.

The Industrial Age, initiated by Isaac Newton, chopped all activities to the smallest details to control the processes. This division never stopped. Today, the clock frequency of computers determine the efficiency of operations and businesses of man, machines, communication, and data handling. The scientist never attaches a feeling or psychological meaning to the concepts of time. Periodicity, as a theory, is described in what is best known as spectrum analysis, Fourier analysis, or harmonic analysis. Fourier processing has become a powerful mathematical tool in communication, data processing, electronics, and material analysis, in which the link between time and periodicity is practiced. Because these concepts are essential to understand the brain, consciousness, and mind, I explain more of spectrum analysis.

The principle is the following. When you apply a force, we call it a signal, to a system, a reaction follows. The input impulse can be an event, an explosion, a knock on the door, or the clapping of your hands. The response to handclapping is sound waves that propagate in the air and heat the hands. The input can be a single impulse with a particular form or a repetitive signal. We call the output signal the response to the input. Technically we say that we activate the system, which will respond. A signal

(input and output) has a shape (intensity) and a duration in time. The theory is that all signals can be synthesized to the sum of basic patterns, which we call sinusoidal and cosinusoidal waves with different frequencies and amplitudes or intensities. The same input signal results in a different output depending on the content of the system. The relationship between output and input tells a lot about the system itself.

A system is not necessarily a physical construct, as it also can be a mental construct like a mood, or the mathematical concept of a multidimensional matrix of data. The concept of spectrum analysis is that - any signal can be reduced to a sum of different sinus and cosine waves of different frequencies what the next image shows.



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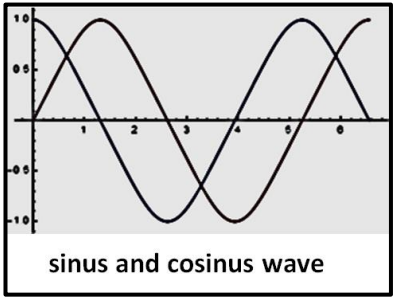

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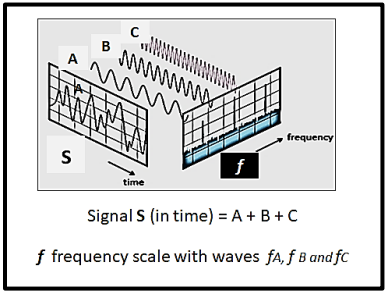
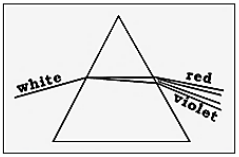


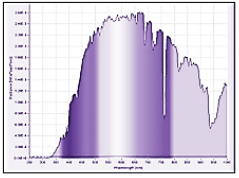
3

1 System with Input and Output 2 Sinusoidal waves 3 Spectrum where a signal is decomposed of different waves with specific frequencies.

The Fourier transformation is the mathematical tool that does the translation of the time impulse into the sum of separate waves with different frequencies. The principle also applies to data analysis, which I explain in the chapter on systems. The method is that you take sample measurements at a pace of a phenomenon. Next, you calculate the statistical correlation between, e.g., sample 1,2,3, and you make the next calculation for sample 1,3.5.7… etc. In this way, regularities reveal itself as frequencies. By finetuning the steps, you can filter more frequencies, which constitute the whole. A map of the frequencies is called a Spectrum. I show the example of moonlight and a specific sound in the next images.



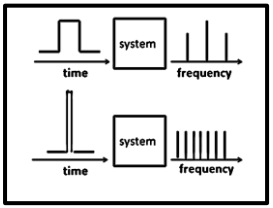
White light traveling through a prism will split in different colors. Each color correspondents to a different FREQUENCY. Between red and violet there are many more colors with an own frequency.

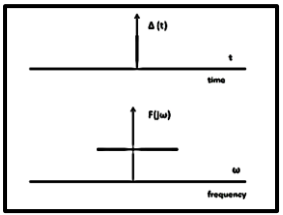


Each object reflects and absorbs specific light frequencies.
The example is the spectrum from the moonlight color.

Spectrum analysis is a widely used technique in science and industry. Such as to find the types of particles in a composition. Each particle or molecule absorbs or reflects a specific wavelength, from which the content can be derived. This is the only method to measure the content of the Universe and the stars.

A specific case is the DIRAC DELTA FUNCTION.



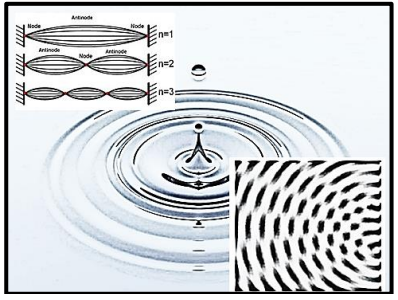


When the input of a system is extremely short in time and incredibly intense, then the output contains all possible frequencies. This can serve as a model of what happened at the Big Bang. Although the Big Bang happened outside Time (it created Time and Space according to the mathematical models), the result of the impulse is a spectrum of repetitive events of all possible frequencies.

Philosophers shun far from the creation of meaning by mathematics. Mathematicians only manipulate symbols and restrain from giving sense. Mathematical models serve as a tool to explain the phenomenon in real life; and they only prove that data from observations fit the model.

Let me give an example to illustrate the Dirac Delta function. Take a water pond, and you drop a small pebble in the middle. The impact on the surface is a short impulse with given energy depending on the weight of the stone and the height it falls from.

What we observe is a sum of waves that expand in time in all directions. The waves fade out because of the friction of the water molecules. The higher the force of the impact, the larger the amplitudes of the waves are. When the pond is a small square, the waves reflect on the edges and change direction. Now we see 'standing waves' with frequencies depending on the distance between two opposite borders. This is easy to understand because, at the side, the velocity of the wave must be zero. The reflected wave meets the incoming wave, and they add on what makes a new wave. When two pebbles drop on the surface, the waves meet and reinforce or dampen, and we see interference patterns.



Interferences shapes create interesting visual shapes. Pattern waves is a topic of big data. Take the example of cosmology, which is essentially a science of electromagnetic waves. The spectra become a measure for the quantification and qualification of the stars and other phenomena. We derive the distance of a star from wave data, and similarly, the expansion of the universe. The material content of the universe and composition of the stars is derived from the spectra.

Waves generate more magic phenomenon. You sit in a boat that is anchored in the water. A relatively strong wind creates waves that push the boat up and down continuously. You will feel as if the ship is moving in a direction on the surface. A 'movement' is a space-time relation, and a sensation is a process of the brain. In this example, we link a physical event with a mental feeling, a subject to clarify in the brain-mind study.

I give an example of how scientific concepts can illustrate the mental domain. Sometimes we experience an event that touches us profoundly psychologically or physically. The result is an accumulation of many thoughts, actions, and events that occur in a sequence in time. You have a car accident. The impact itself is of short duration, but the activities and steps that follow are extensive and can last a long period before everything is back to normal. The more significant the impact is, the more consequences follow and the intenser they feel. The accident creates a mental delta function triggering your mind followed by waves of feelings. The inverse case also exists. You feel a recurrent pain in your body, and the intensity grows till moments of dizzy occur. After a third short attack of a massive headache, you go and see a doctor. The waves of feelings end in a decision. I hope that with this example, you are ready to open your mind for the concept of Rhythm and Time.

The next fundamental scientific concept that is required to grasp the brain and the mind is CHAOS.

2.2 CHAOS.

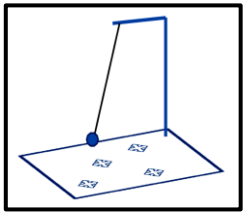
Let's rejoin the dancers in the ballroom or enter a theatre hall. The queue to buy a ticket is ordered, but the people's movement at the doors usually turn chaotic until you progress to your seat in a disciplined way. We enter the room in a ritual spirit. The architecture, the decoration, and the atmosphere contribute to the ceremonial feeling. The rhythm in the architecture and decorations impress and induce a sense of the enjoyment of beauty. Now analyze this occurrence with a scientific mind, ignore the sentiments and try to model the behavior of the people, and fit it in a mathematical concept. Cognition is arranging experiences in concepts. When an idea grows complicated, we call it a system. A core element in a system is to find the relations between the elements that participate in the model.
The word Chaos suggests the unpredictable behavior of a system or situation. A chaotic system changes in time, and dynamically responds to influences. Take the example of the weather; we measure temperature, speed, and wind direction, air humidity, altitude, geographic position, planetary constellation, etc. Some settings vary in time and are interdependent, like the gravity force of the sun and the moon. To map the changes and

to predict the movements requires the handling of big sets of data. We need a lot of algorithmic calculations to predict the weather for the coming days. Meteorology is an example of a chaos system that never comes to a stable point. In some instances, we register repetitive patterns like in winter, at the polar surfaces, deserts, where the measurements remain within certain predictable limits.

Chaos mathematics describes the phenomenon which evolves from a chaotic pattern to a more stable situation and vice versa. In most chaos systems, there are different possible outcomes of behavior. Take the example of climate change: the average rise of global atmospheric temperature can transform a region into a desert or wetland. Such a switch leads to changes in habitats and new phenomena like floods. The direction in which a chaotic system evolves is set by the boundary conditions and the starting situation of the whole system. Sometimes the system never comes to a stable position. All may disappear like in an explosion. The dinosaurs were wiped out forever, presumably due to climate conditions. Chaos systems occur on macro and small scales. Take the example of moisture in the atmosphere. Water can take the form of a large variety of solid ice with different structures, liquid, and steam, depending on temperature, pressure, contamination, etc.

The primary drivers of the chaos system are called attractors and repulsors. There can be more attractors and repulsors, and they may vary in time and intensity. Other system parameters are boundaries that can change as initial conditions during the

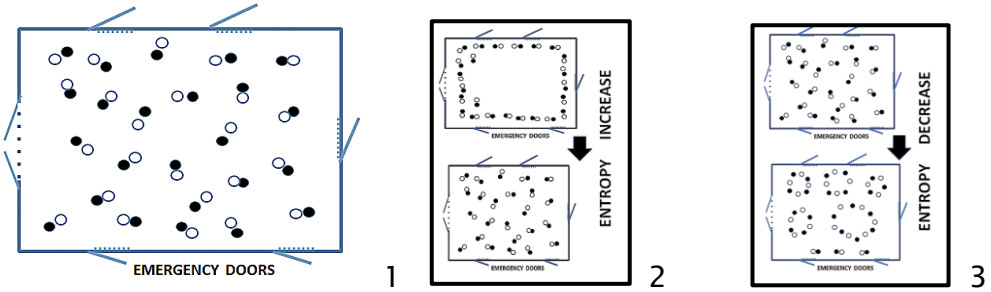
process. In the example of the meteorological forecast, the locations, size, and strength of depressions and high-pressure patterns are the starting point to calculate the coming weather patterns. The more parameters can be incorporated into the model, the better the forecast is. We easily can demonstrate a chaos model with the setup of a pendulum equipped with a steel point which can swing freely above a plate. The attractor is gravity, and the initial conditions are the dimensional set up of the swing, the direction, and angle at the zero start moment of swing. Newton's laws tell us that, the pendulum continuously follows the same path, and the process ends after some time when you take into account the friction and resistance elements of the construction and the air. Now we put one or more magnets on the plate and start the same test. The path is no longer apparent. It becomes difficult to calculate the trajectories because all along one cycle of the pendulum swing, the attraction, and repulsion of the magnets influence the path. Every period is different. The result seems one big mess of trajectories. You can record the effect by putting a laser in the tip of the pendulum and a light-sensitive paper above the plane of the magnets.



Rhythm and Balance are essential aspects of chaos systems, but these elements do not explain what causes the abrupt variations in a chaos system. We need more body for the Chaos model.

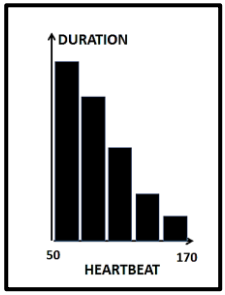
2.3 CHAOS SYSTEMS.

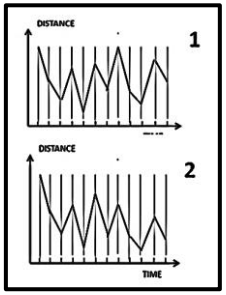
We return to the ballroom and consider this as a system where many couples dance. The dance master invites the pairs to align around the hall (2) for a welcome word and listen to the regulations in place. There are many ways to look at the room and the couples system-wise. We can conceptualize the physical aspect of energy flows like in thermodynamics modeling the particle speed, heat, and pressure. We can study the dynamics, stability, and evolution of different sub-systems, together with the balance of the whole. The second law of Thermodynamics stipulates that a closed system evolves from an orderly way to disorder or a chaotic system. The measure of this evolution is called ENTROPY. More order is less entropy, so when entropy increases, mean more chaos.



When the couples align around the room, the system is ordered. Once the music plays, the couples move around the floor, and the order evolves into chaos. The master may change the music and ask to do a round dance for a specific selection of, e.g., married couples, singles, over fifty,(3). This won't change the total energetic content, but more information is available, which results in a decrease in entropy. With few dancers, there is room to move freely, and the distinct patterns which the couples run on the floor are entirely chaotic. I do not expect that the pattern is different depending on the age of the couples. Suppose now that the pairs have been formed woman and man randomly not related. Usually, acquainted people and lovers plan to be together or as close as can be. You try to minimize the separating distance to the favorite person. As scientists, we measure the gap in the number of dancing passes needed to get to the target. Hopefully, you are an attractor to your target moving in your direction. Now we consider the density

of dancers. The floor is entirely occupied when there is only one movement possible between each pair, which already demands maneuvering and synchronization by the couples. The system behaves differently from when we entered with few dancing people—systems demands for quantification. One possible measure is the number of dancers at a distance. When my position is in the middle, I am surrounded by 4 people at dance distance 1, 8 couples at range 2, 16 pairs at range 4, etc., so the number is exponential. Suppose my heartbeat increases when my eye apple comes nearer, and I map my pulse over a period, you find a graph like in the following diagram. This kind of quantitative relation, which we see all over in the lifeworld, is called the Power Law, which I have explained earlier.



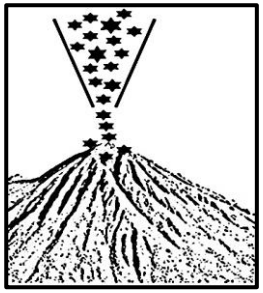


The power-law also gets another name like the 1/f signal-noise rule. When my sweetheart is close, our body language signals communicate clearly, while at a distance, it becomes noise. Suppose I am desperate to dance with somebody else. The next histogram shows the quantification of this loving feeling. We can make a graph of the range which separates us in time what looks like following chart 1.

Usually, the distance between the two couples is randomly distributed. The split lovers manoeuver in a way that they come closer to each other what graph 2 shows.

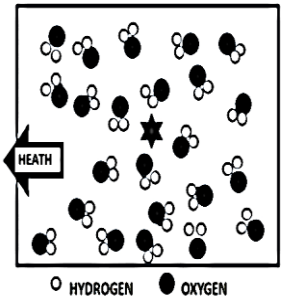
We can say that there is some intelligence in the system because the system has evolved from fully chaotic to a better-ordered phenomenon. The entropy in the ballroom decreases because knowledge has been injected, and the system has evolved to another equilibrium, which is not very visible.

Now you look for the couples that discretely approach each other. One way to handle this is to compare the distance between all couples over time. A system that comes under stress will release signs. The task is now: what are the signs and to what of system deficiency it points to? Take the example of the crowded ballroom. With plenty of space, we expect random displacements of all couples. More people enter, and none leaves. It becomes congested, and couples bump into each other. There are disruptions in the flow at random places and moments; the system becomes critical. When even more people join the floor, you can feel the tension. An emergency can trigger the system to collapse, and people flee through the outdoors.



A didactic illustration of this phenomenon is the sandpile. When you drip grains of sand on a surface, there grows a pile. The grains have different sizes and shapes, and on the microscopic level, they find an equilibrium. Sometimes grains glide, and small avalanches occur. The system still grows to a shape as if an invisible intelligence knows how large it should be. The size and number of avalanches follow a power law, and the system reaches a critical limit when all the added sand rolls from the pile, which now stops growing.

Sometimes a minor disturbance triggers the system to evolve to an entirely different pattern. A small meteorological disturbance can cause, under specific circumstances, a hurricane. This kind of trigger is called the Butterfly effect as if the flapping of the butterfly's wings creates a storm. Even when a pattern seems completely chaotic, in many cases, there is a kind of hidden regularity in the system. It happens that at a particular point in a chaos process, several options are open for the phenomenon to proceed. Water vapor can form clouds, it condenses to a liquid raindrop, or solidifies to an ice crystal making snow. We call this a bifurcation.

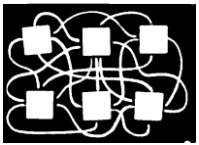


The next images show a barrel with water molecules. Take heat from the container, and the molecules condense to water drops or ice crystals that grow around a dust particle acting as a disturbance to the system. Chemical processes occur similarly with catalyst molecules as the disturbance, what in biological processes is called an enzyme. All these processes run on an underlying rhythm. In the case of the sandpile, it is the number of grains added per time frame; in the chemical and physical processes, it is the vibration of the molecules that makes the rhythm.

A sequence of bifurcations results in fragmented patterns called fractals. The second law of thermodynamics plays its role in many disciplines like engines, chemistry, social systems, pattern generation. One intriguing case is the emergence of Life. How does a super-organized biological life emerge from the chaos of material particles? And *how does entropy decrease shaping complex organization, where all systems strife for more chaos?* To find an answer, we need a closer look at the dynamics of systems and what makes a system.

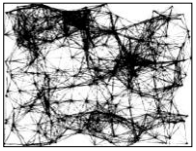
2.4 SYSTEMS, COMPLEXITY, and PATTERNS.

In general terms, we can say that a SYSTEM is made up of building blocks governed by principles of relations and feedback, balancing processes and equilibrium positions, quantities, and the connections between Systems, what the next pictures illustrate.

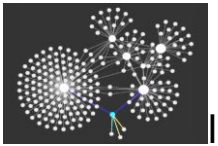


The parts make **Relations** between each other, and **feedback loops** are installed in the role of stabilizer.

The parts set up **balances** and reach **equilibrium** after a process of stabilization**.**



There is the management of the **Quantities** of the elements which take part in the evolution of the system**.**



The different **Systems** relate to each other as every system plays a separate role or has a specific task with the other systems.

We find these aspects anytime we discuss systems. Let's start with Relations within a system. The many relations ask for a kind of categorization that points to consistency; what is the core element of a pattern.

I introduce you to the somewhat disruptive scientific ideas on PATTERNS of Stephen Wolfram in ' A new kind of Science. 2002'. In this book, Stephen writes about the patterns in biology, the ecosystem, chemistry, and other materials. Especially on the microscopic scale, you discover a very high regularity in simple shapes with a wide variety of patterns. The remarkable thing is that most of these geometries can be reproduced with simple digital programs that mimic Nature's design creativity called fractals. The simple software that generates the shapes in Nature has changed the views on Darwin's Theory of Evolution of the Species. The knowledge we learn from Darwin is not strictly Science. Because the claims are deducted from observations with little experimental confirmation, the fundamentals of Darwin's theory are founded on the view of regularities and patterns. For example, you can not prove the idea of the survival of the fittest scientifically.

One strong belief of Evolutionists is that the species develop along a path of adaptation and natural selection. The survival of the species' fittest translates in computer language as – the problem of satisfaction of constraints. We can explain Evolution as: ' find the algorithm of the making of shapes that lead to a system complexity which coops best with the surrounding for energy supply, defense, growth, and multiplication. Evolution becomes, in this way, system building.

Functionality for a plant means energy supply by capturing the maximum sunlight. Some cells in the plant specialize in the conversion of photons into chemicals. The shape of the leave and the whole tree has to maximize the capture of light. Another function is the defense against predators or a hostile environment. The branch of the tree develops a spine not to be eaten by animals. The subsystems work together and define new organic structures to support the whole. In this way, the complexity grows, and the winner is the species that develop the best programs which realize the optimal match with the environment and provide dominance over the other species. The result of the development programs should not be the absolute optimal; *the winning algorithm provides the highest flexibility* to correct and adapt to new circumstances.

Now we look at the kind of programs that nature practices to develop a specific functionality. The most straightforward example of a feature is the shape of the species and its organs. Let's make some simple computer simulations for a shape generator.

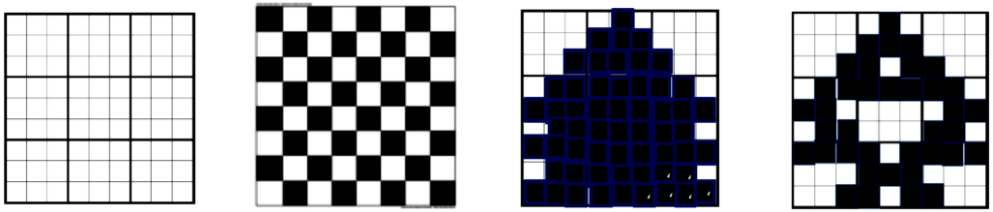
A SIMPLE PROGRAM that creates COMPLEXITY. [404].

We start with the process of PATTERN GENERATION, which is a product of cellular **programming. CELLULAR PROGRAMMING is a new influential tool for Big Data processing.** Take a square raster as a system like a board game, and call the frame the boundary limitations. The board game is defined by the patterns allowed, the steps in time, and a variety of rules. One rule can be the time slot for action, or the rhythm to proceed. A digital computer program runs similarly; the clock frequency determines the rhythm of the processor. A CNN or Cellular Neural Network algorithm runs the same way. The choice of the name 'neural' indicates that this has something to do with the brain processes.

We start with an empty cell that can be filled with content like on/off, black/white, one/zero. In case the cell has, e.g., four positions and each position can be black or white (or 1 or zero) there can be 2x4 different states or 8 possibilities, such as

Let's take a system with nine cells, as in figure (1), and we simulate the eight first steps. We fill the cells with content following specific rules. Step by step, the board fills, and it is evident that the pattern depends on the rules. A step in time or sequence makes a row. For example (2) the cell fills with alternate black and white cells like in a checker game, and the rule is to change color every next

iteration. The laws in case (3) are that the initial step puts black in the middle position. The following steps follows the simple rule that the neighbor white cell becomes black. When the left or right edge is reached, the cell changes color. In (4) we add a rule that when a cell has three black cells in a row, the middle compartment change to white in the next step.

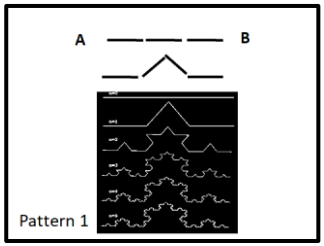


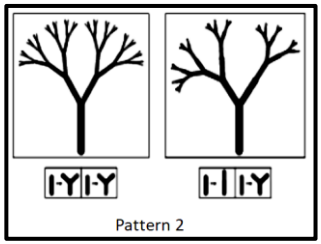
(1) (2) (3) (4)

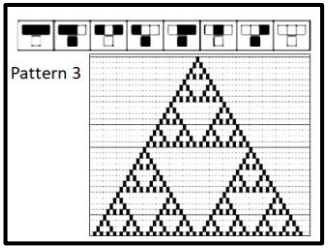
You can imagine unlimited variations in the application, and even simple rules result in a vast amount of different patterns. I give another example.

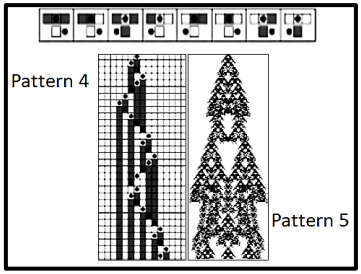
A point moves along a trajectory from A to B in a straight line, and simultaneously from B to A. A to B has a defined length. The rule is that at one-third of the total distance, there is a roadblock that we overcome by stepping aside under an angle of 45 degrees left in the direction AB and right for BA. The right and left points meet in the middle. The next step of the cell program is that the process repeats itself for every stretch of

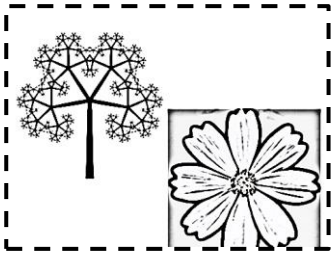
line. In the end, we walk a pattern like in the next drawing. For every segment, we repeat the same procedure until we break the program loop. This is a simple program, and the result is, of course, a periodical figure Pattern 1 because we repeat the same loop. With another simple rule of branching, you get figures like Pattern 2, 3, 4 and 5. [404]). With permission from Wolfram Publications,

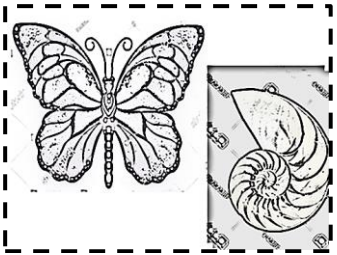






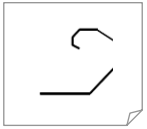






Fractals in nature

With these examples, it is not difficult to accept cellular programming as a mechanism in the creation of diversity in Nature. Cellular programs primarily generate two types of patterns: branches and enclosures. The biological world demonstrates branch patterns in trees, leaves, nerve systems, etc., and organs and cells are examples of the enclosure type. The different variety of shapes that we observe in Nature are in line with the possibilities of CNN algorithms. Another example of configurations from Nature is the spiral design. We observe similar structures on all levels of inorganic and organic materials like the molecular structures, molecule chains, tissues, and a complete construction as a snail's house.



We postulate that the species' development is driven by the functionality of their shapes to fulfill its purpose. According to scientist Gerald Edelman, neurobiology is a science where *shapes recognize other forms* that fit to make more complex shapes or new functionality [113-p29]. The constraint parameters in the programs for cellular biological calculations are gravity, sunlight, temperature gradient, acidity, etc. In the organic world, the functionalities matching the best other species and new surroundings will survive. We can question what the optimum is of the evolutionary steps. Is it the structure that allows maximum offspring, the speed of development, size, adaptability? In the case of versatility, viruses are on top. Every species develops its strategy. It is clear that in Evolution, there is a trend towards increasing complexity. Probably, this is a tactic to dominate the other species or to realize another purpose.

We postulate that the species' development is driven by the increase of complexity. So far, the humans, win the dominance in the evolutionary process. Is the complexity of our brain the best guarantee for survival in the long term? The answer to this question points in another direction. History shows examples of dominant species disappearing because they destroy their habitat. Some CNN algorithm does not achieve higher complexity but instead target the balance of keeping many algorithmic subsystems together. The subsystems are not only organs, but also incorporate the environment in its micro and macrostructure. Viruses play a vital role in our body and are not only a nuisance of a winter cold. The corona virus of 2020 proves that even a tiny organic body can act as a global system's tipping point.

There is no answer to the philosophical question of why do higher organisms exist after all? Stephen Wolfram guesses that it is not the search for the optimum, which is critical. We can consider Evolution as the result of the extensive and continuous generation of new features (shapes) by mutations and tries and error. Nature searches combinations of organic functionality that stay in balance with the other body parts and the environment.

Historically, Science developed along the lines of causality. What exists or what happens must have a cause. The human intellect formulates laws allowing us to make reliable predictions. But not all events are straightforward, as sometimes we see

randomness and chaos. Searching the dynamic rules of chaos processes remains an attempt to catch causality. It is evident that the formation of the leaves of a plant, the protective shell of a turtle, and the network of veins in the human body, are the results of steps in Evolution. Evolution points to the expanding complexity of the body to better coop with the environmental conditions. The hypothesis that in Evolution, there is a 'shape generator mechanism' at work is very plausible; that's why we take a closer look at the cellular programming.

I used a simple cellular model to explain the principles op pattern generation, which, of course, can be made more complicated. The variation of rules is endless, and every new procedure results in another pattern. I have illustrated the CNN examples with black and white blocks; you also can give the cell a binary content 0 and 1 or even a number, or a gradation. A typical CNN application is the creation of grey scales in graphic design. CNN is widely used in the encryption of data. The pharmaceutical and material sciences create artificial molecules which fit a specific surrounding or get a particular function. Many modern medicines are developed with CNN programs mixed with try and error simulations. Visual face recognition is another CNN application that requires the handling of massive data. The first challenge in face recognition is to find the sub-systems of, e.g., what optical parameters determine gender, age, character, mood, etc., and by what mechanisms do the sub-systems stick together (the balance element). Technically, the task is to detect regular patterns in chaotic systems. Beside classified

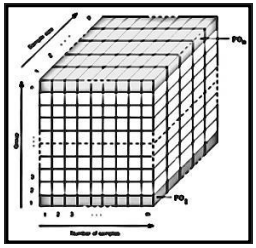
facial types (nine), there are 43 facial muscles of a person and assume that each muscle has three tensions expressing a character and a mood. The combinations of parameters which determine a person's identity and its spirit (dangerous, in panic, etc.) result in a massive number of combinations. It is clear that in such a CNN application, we enter Big Data land.

2.4 SYSTEMS, COMPLEXITY, and PATTERNS.

I elaborate on specific scientific topics required for the understanding of the neuroscience requires; one area is the principles of Big Data analysis.

Data are sets of quantified observations or measurements presentable in sequential order. For example, we report measurement results of the air temperature at 5 given altitudes measured every hour of the day and at four different locations. This provides for every day a 3-dimensional matrix 24 x 5 x 4 of measurements. The week overview becomes a four-dimensional matrix. A 3-dimensional picture of such a matrix is shown next picture.

1.1	1.2	1.3	1.4	1.5	1.6
2.1	2.2	2.3	2.4	2.5	2.8
3.1	3.2	3.3	3.4	3.5	3.6
4.1	4.2	4.3	4.4	4.5	4.6
5.1	5.2	5.3	5.4	5.5	5.6
6.1	6.2	6.3	6.4	6.5	6.6



Let's start with a 2-dimensional analysis and take 6 cells per row and 6 rows. Every cell contains a value of the recorded measurement. Mathematicians will check with statistical means on a large number of possibilities to find some or other correlation. For example, find a relationship in one row between the value of the positions n and n+I, and next between n and n+2. Another possibility is to shift the cell with a fixed number of steps and compare the two rows. You can check for correlations between rows and columns in x, y, z-direction. In most real cases, we take apparent relations into account, like the fact that the temperatures during the night are lower than in the daytime.

The statisticians have developed tricks to incorporate known correlations and how to reduce the number of calculations in the search for associations. Crunching Big Data requires powerful computers, sophisticated mathematics, and new computing models (like CNN, and quantum computing) to come to an acceptable level

of predictability. Just as in the pattern generation, the number of possible cellular moves is unlimited, which makes that an immense amount of analysis trajectories can be tried out. Even in a simple one-row cell, you can look for a correlation between every other position. In practice, the statistician and computer experts use pragmatism to speed up the calculations. For example, economic trends and financial markets show historical tendencies that can be incorporated into the model. Big Data crunching applies the technique of encoding and encryption, compressing and expansion, pattern recognition, and image correction, and virtual games.

Pattern recognition is a specific topic in Big Data. There exist categories of patterns that initiate the analysis in the search for a degree of match. Symmetries are a vital parameter set in data analysis, and that's why crystallography is an excellent introduction to the recognition of symmetry patterns. Spiral patterns indicate yet another type of active cell mechanism in the formation of shape and need specific algorithms.

Why this introduction in Big Data? The applications of Big Data are not new. It started with the repetitive electrical signs of Morse, which launched electronic communication. Later the human voice was encoded on a vinyl disk, followed by images on a compact disc and solid-state carrier. Data handling and manipulation improve quality, noise reduction, speed, the economy of bandwidth by compression and expansion, image improvement,

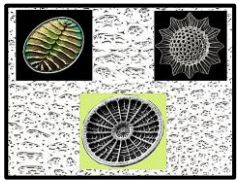
image recognition, etc. You are familiar with the next pattern. 

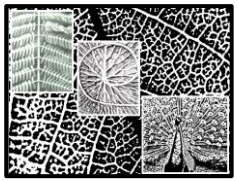
We expect that soon, Big Data, Deep Learning, and Artificial Intelligence disclose the mechanism of the body and the brain. Will it also explain the Mind and the purpose of life on this planet? The answer is no. The use of smart technology accelerates the discovery of the biological mechanism, but what life is, remains a mystery. One major issue with Big Data is that the outcome of all data cooking must be presented in a meaningful way. The word '*meaning*' here is tricky. Which intellect determines what and how the results are shown? Bias and politics play a role in all translation of data into everyday language. To attach meaning to data, and to direct the thoughts is political. Data do not generate meaning or purpose; it is the human intellect that creates sense, and men and women have moods, tendencies, and opinions. The computer programmer's mission is to convert the data into a format that allows meaning giving, and this task cannot be left to the computer.

With these principles of CNN, pattern recognition and genertion, chaos and complexity we can model the birth of biological life and find an answer to the question where life starts.

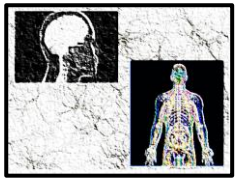
3 THE CREATION OF LIFE, A COMPLEXITY AFFAIR.

3.1 THE LIFE PATTERNS

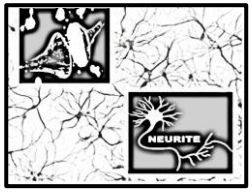




Nature is full of fractal patterns like cells and leaves shown in the next pictures; so is the human body. Let's map the RELATIONS between the organs and body parts. We connect 78 functional organs like the heart, fingers, etc., and then we group the 206 bones with 600 muscles. Not all components are interlinked, some have many links, and other few. The total picture is still a massive map. We can simplify the diagram by restricting the number of organs and specify functionality like the blood supply, energy distribution, waste recollection, and the information paths like the nerves. We do the same exercise on the organ level and map the patterns. We distinguish two global categories of tree-like and clustered shapes. The deeper we pierce in each organ, the larger the QUANTITIES are of parts we find. Our body counts 30-50 trillion cells, and each cell has sub-cell organs and connections, and billions of DNA strings.



Moreover, the body entity has to coop with a direct intermixed organic medium of 500 trillion bacteria divided over 500 kinds of bacteria. Add to this the viruses, and your system complexity explodes ever further. When we map the brain machinery that controls the whole body, we get images like the pictures of the nervous systems with a deeper level of neurons as displayed in the background.The similarities with the fractals of leaves and shells are apparent.



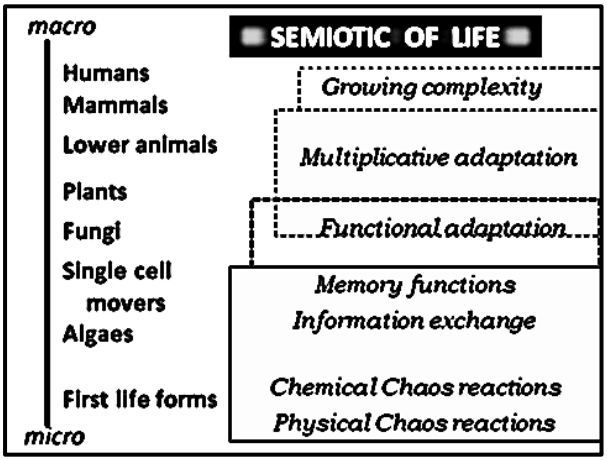
Besides patterns and quantities, Complex Systems have to steer BALANCES. How does our body stay in balance? There are many balances, such as matching shapes, rhythmic movements, the forces of gravity, friction, action, and reaction.

All organs participate in a dynamic flow. To map the balances, you should think about the drawings that explain the judo and the dancing movements.

When you enter the microcosmos of the body, things get even more complicated. A cell, the blood infrastructure, and the neurons are all chemical-physical-electrical factories that continuously balance their processes. A chemical molecule on its own is a composition of different essential balanced particles, what is also true for an organic molecule, or any biological structure. Go deeper to the atomic level, again sub-particles keep together in

equilibrium by the physical quantum laws. All systems are in a temporary chaotic situation where the time scale ranges from femtoseconds on the atomic level to light-years on a cosmic scale. In the physical world, balances can be quantified, which is not possible with feelings and emotions. For example, your physician checks some 30 hematological parameters of your blood and another 20 biochemical markers. His judgment about your health is based on apparent deviations and the balance of the whole. In the case the complaint is psychological, de healer question you on how balanced your lifestyle is. In all areas of society, from the economy to sociology, we find long lists of criteria that require a balance to be successful. Balances are part of the definition of a complex system. The next dimension to Patterns, Relations, Quantities, and Balances is the *INTERACTION WITH OTHER SYSTEMS.* A human is a high-classified mammal living together in one ecosystem on planet earth along 8,700,000 other kinds of living species, from which 7,700,000 sorts of animals, 300,000 plants, 600,000 fungi, 36,000 single-cell movers and 27,000 chromista of algae. We, humans, live together with other people in systems of a family, a society, a political and economic structure. Each of these societies is similarly a new complex system with a *mind* that steers the whole. It is too early to describe what makes the mind. Does a system, a society, an animal, has a mind? Before we look for an answer, we first have to understand how the brain works. One thing that you have to retain at this moment is that the mind

operates as all Chaos systems do. Feedback plays a significant role in the Balances and stability. The next chart gives a generalized overview of the semiotic element of Evolution. But one ingredient is missing in the translation of the human species into a Complex System. That missing part is the language of communication between the Systems, or the SYSTEM SEMIOTICS. In the definitions of a Language System, we use terms like information coding, speed, bandwidth, feedback and feedforward, carrier, etc.



The first step in the Evolution of Lef Complexity is the chemical particles knitting stable long molecules and find matching enzymes that facilitate multiplication. This implies a kind of communication. The molecular ion act as a memory in finding the best combinations to create more complex molecules. The more combinations that Nature tries out, the better chance to see a functional link to the surrounding; the access to energy is the major one. The first process is ***matching patterns***.

The next step is molecular multiplication while maintaining stability and add functionality. Here starts the specialization into organs (macro patterns), which become building blocks for bodies that grow further in complexity. The above map is the story of the physical development of the species; the mental version is more complicated.

So far, I have approached biological life as a Complex System. The dynamics of the systems are Chaos processes valid for all stages of the development of organic growth. But why Nature never stops that process of creation, diversification, and growth of complexity?

3.2 THE EMERGENCE OF LIFE

Science explains today's biological life as a *self-organized critical complex system*. The system has inputs and outputs, balancing mechanisms, exchange of data, and energy and the management of complexity sub-organizations. Physical chemistry is a discipline where all these processes come together. The big question is, what triggered a physical complexity to become life? Chemistry deals with structures and properties of materials in all its combinations. Chemical structures are fractal patterns. Molecules, natural or artificial, are combinatorial structures of the basic elements which we find in the table of Mendeleev. The simple parts date from the birth of the universe, after which the formation of complex materials occurred. Our knowledge of the world follows the

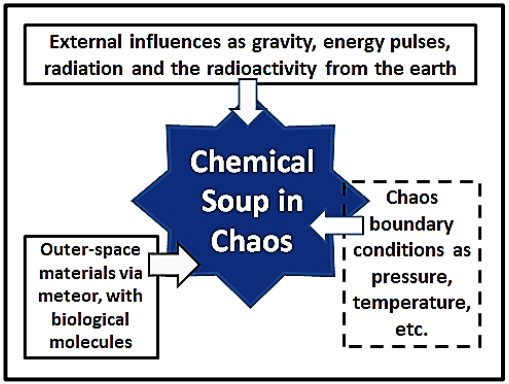
expansion of scientific models that the human intellect invents. Some major stepstones on which cognition has proceeded are the Newtonian Gravity force, Light as a window of Radiation, Einsteins' Relativity, and the relation between Energy, Light and Matter (mass), and the Quantum Sciences of Particles and Waves.

To keep the models consistent with the experiments, new concepts emerge, while technology runs the experiments needed to validate the models. In the last century, many new particles and forces popped up demanding for new theories. The birth itself of the Universe has many hypotheses. I selected the view of Steven Weinberg in his book 'The first three minutes, a modern look of the origin of the Universe.' [304]. The hypothesis starts with the explosion of highly compressed electrons and positrons at a temperature of 10^{11} degrees centigrade. Quantum and physical laws support a model where these primary particles explode simultaneously, creating sub-particles and radiation. The expansion cools down the Universe and allows more particles to come to existence from which light as photons, neutrinos together with anti-neutrinos and bits of the nuclear materials, are initially abundant. Hydrogen and Helium follow.

The quantum processes lead to the creation of even more particles until the content of the Cosmos amounts to 75% of Hydrogen and 25% Helium. More complex materials come into existence. Clusters of matter make Galaxies filled with their own stellar systems. The complexity of newly formed elements grows further to structures

with specific properties leading to molecules that become building blocks of the living species.

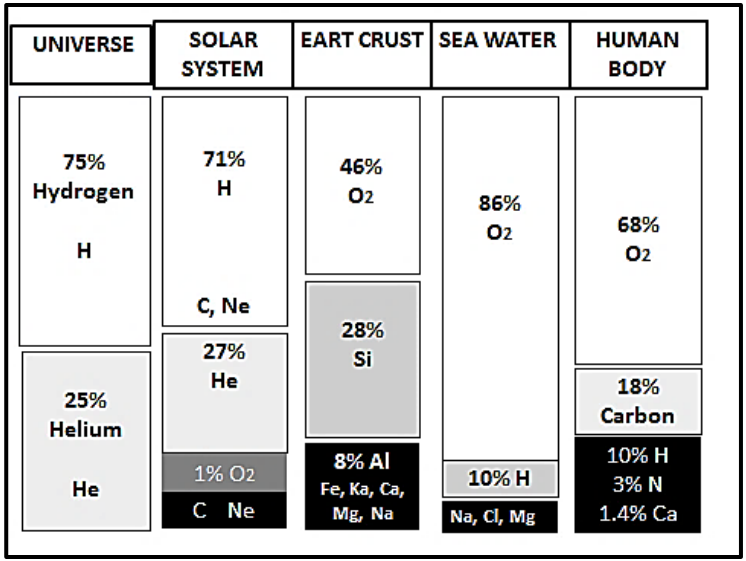
The primary generator in the chaos process is the forces of attraction and repulsion between the particles and the molecules. It happens in an environment with many parameters of temperature, pressure, radiation energy, magnetic fields, exchange with the outside, disturbances, etc. Under specific conditions, stable patterns of molecules emerge which make the organic matter as a building block of biological organs.



The next map gives a survey of the chemical content of the current Universe and some distinct parts from which the human body is probably the most complex structure.

Carbon plays a dominant role in the world of organic material. The organic is the material structure of bio-life, a term used from the moment the chemical cluster can reproduce itself by interaction with elements from the surroundings. The formation of bio-life does not explain what exactly life is. Reproduction is only one aspect of life that

needs to be completed with the notions of memory, information exchange in the form of energy, chemistry, electricity, and complexity.



The Molecular content of the Universe during Evolution.

Remark that the material content of the human body is closer to the sea than to the earth.

Compiled from *Aspects of the Origin of L Edited by M. Florkin, 1960, article Bernal,* [201]

In chemistry, there are many self-maintaining reactions initiated by catalyst molecules. Add a drop of lemon juice to your milk cup, and soon the whole turn out sour. The same catalyst function in biology is called enzymes. Life processes are

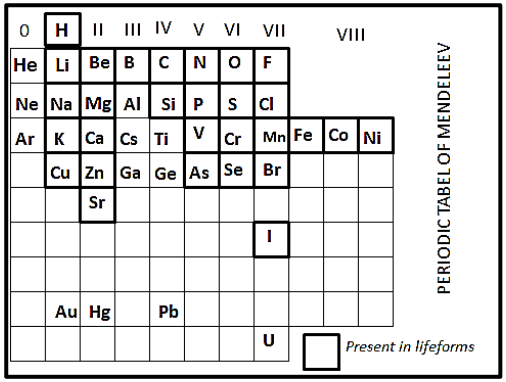
transformations of complex molecules by catalysts and enzymes. Remarkable is that the first organic element still applies to the life complex organisms, like our bodies.

The process of evolution is not only a process of the past, but it occurs every moment in our own body, and in the environment, we share.

The underlying mechanism is the rhythm of vibrating, juxtaposed ions in search of stability.

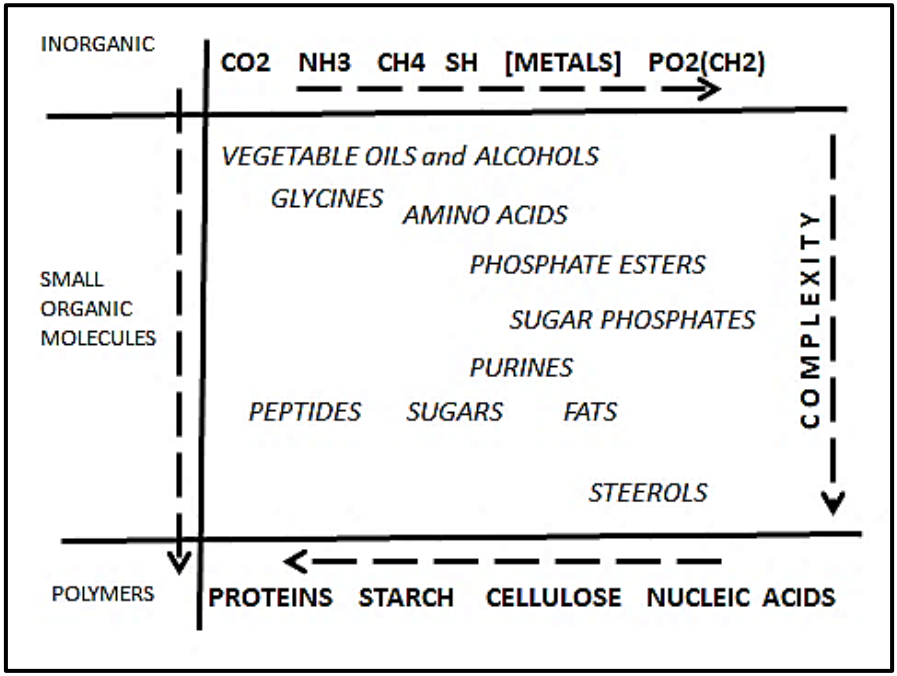
According to scientist Lipmann, the essential molecule is carbamyl phosphate OC-NH2*OPO3. The development stages of new and more complex molecules require a degree of organization and coherence.

The next survey shows that from the 94 elements of the table of Mendeleev found in nature, some 28 actively participate in the mammal's biology. These elements operate in specific combinations in a large number of different molecules that make the organs and the nutrients for the metabolism.



During evolution, the number of bio-molecules and their complexity has grown exponentially. To these quantities, we add the synthetic pharmaceutical created in recent decades.

The next map presents a simplified survey of the growth in time and complexity of the organic molecules which are essential for our body and our food.



Abstract out of: Aspects of the Origin of Life. Edited by M. Florkin, 1960, article J D Bernal, [201]

I use the books of A.I. Oparin's titled, 'the Origin of Life on Earth' [202], and 'Aspects of the origin of life,' edited by M. Florkin [201], as reference for the emergence of life. These works tell us that the organization of any living thing, even the most straightforward structure, is not only very complicated but extraordinarily well adapted in fulfilling the life functions. It directs towards the continuous self-preservation and self-reproduction of the whole living system in its environment. The Chemistry of the primary materials has evolved into organic chemistry, called the chemistry of hydrocarbons and their derivatives. Primary natural life appearances named the autotrophs like algae and colonies of thermophilic bacteria, source the energy or nutrition from inorganic compounds. The higher in the development chain, the more the species rely on dead organic for food.

All living matter is organized complexity, where the sub-parts run rhythmic cycles of defined order, which constitutes its metabolism. Modern biochemistry has managed to synthesize some of the bio intermediate molecules needed for living creatures, such as vitamins, antibiotics, and hormones. Today, scientists grow even complete organs in the laboratories.

An organic molecule is not yet a live-molecule, but it is a building block to a natural live structure. The specific chemical processes which lead to self-sustaining

reproduction and metabolism are very complicated, requiring good knowledge of System Complexity and 'ordered Chaos.'

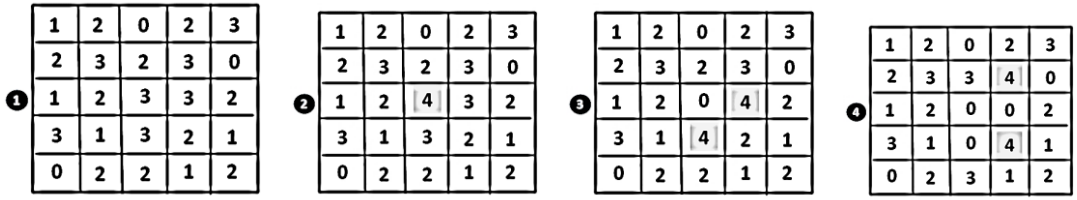
3.3 THE EMERGENCE OF LIFE FROM CHAOS.

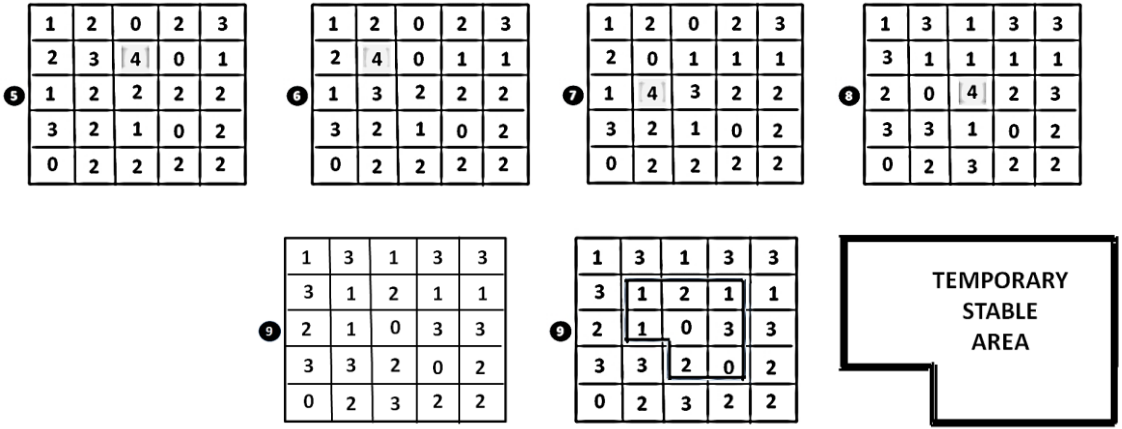
We consider Natural life a self-organized critical chaos system. A chaotic chemical mixture dissipates energy in the form of power laws avalanches, as we have seen in the sand pile. Self-regulation is a high-end chaos process, which is an essential process to life systems. The necessary condition is a particular state of the system striving for balance and stability. This point is at the edge *where the entropy increase reaches a balance with a decrease of entropy.* At this point, the system obtains the maximum flexibility to choose a next configuration pattern or to evolve/bifurcate to another state. We can simulate the generation of patterns reaching such a critical state. It is at this point that the creative capacity for new patterns is highest. The question now is: which patterns are characteristic of biological life forms?

Per Bak did much research to reproduce the pattern mechanisms that evolve into a stable situation. [414]. The sandpile simulation, as a pattern generator, comes close to the idea of life ignition. It works as follows: Take a two-dimensional pattern of 5x5 cells containing each a value or a number. The content represents stacked sand grains or documents to process on the desk of a clerk. When the quantity becomes 4, then the

sand grains roll over to the four neighbor cells, and the cell is emptied, or the clerk throws the document to his neighbors each one report and takes a rest with zero papers on his desk. At the edge of the pile, the grain falls outside and belongs no longer to the system, or the document is thrown out of the window.

I start map 1 with a random filling of the cells. Now follows that a particle is dropped from the outside on one specific cell or a document added at one desk, as shown on map 2. If it occurs that the cell has a content of 3, at the next step, the value 1 adds to the neighbor cells. In this way, the cell empties itself. As such, we obtain a sequence of maps or patterns. In this particular case, with the rules stipulated, the model evolves into a system containing a design that won't trigger the next step. The system is fixed until the whole process starts again by the external input of a new grain or a new document ending on a desk. So we have a self-evolving process reaching stability at some point, and waiting for external input to start a new cycle.





This example does not illustrate life but only the aspect of a complex system that finds itself a stable position or a fixed composition. The same model explains how landscape forms over time and how specific patterns evolve. Biological life as a system also evolves over different stages of reshuffling its content. When you consider society as an assemblage of complex systems, it is not difficult to imagine that overload in one part result in the destruction of another aspect like the avalanches in the sand pile. As the

climate conditions of planet earth reach a new critical point of stability, all kinds of power-law events can shake global societies. Scientists are playing with cellular automata to get a clue of what kind of scenarios might happen, and how evolution can unfold from disruptive events to a new period of stability.

Cellular techniques demonstrate only partial aspects of biological life evolution. Reproduction and mutations, which are crucial elements of the functioning of a biological entity, are harder to model with the cellular automata. Another approach to explore the life mechanisms and evolution comes from experiments with simplified chaos models. Famously is the Logistic map formula Xn+1= a.Xn (1- Xn-1) with < or =1 and a<4. This formula is often used to illustrate the evolution of a population in a system with a growth rate and limiting factors like the prey-predator population in a closed environment. I do not elaborate on this method as it is classic in the textbooks on chaos. Scientists hypothesize many other system concepts and simulate dynamic behavior to generate data from computer simulations and compare them with natural phenomena. The study of evolution, being an exclusive observation activity, becomes more a simulation technology in parallel to understand the underlying mechanisms.

The CNN pattern generators point to the mechanism of the emergence of biological life. We start from a chemical mono-cell, which extends to a multi-cell organism with increased complexity and enhanced functionality. The borderline remains unclear

when a molecular structure becomes a biological entity. The primary molecular chains arrange into groups in interaction with other clusters to form a body, which is a match of shapes. This body-entity can evolve to a plant or an animal species, with on top of the complexity of the human body. Our upper position by the complexity and functionality comes from our brain. Biological entities communicate with each other in their surroundings, which is also true for any chemical structure. How far the communication stretches, or how deep the entity can probe its environment, depends on the level of achieved overall complexity. Human societies probably have the most extensive reach because of their languages, social organization, and technologies like the internet. But, complexity is not a guarantee for survival; viruses or bacteria might still win in the end. In case the humans are wiped out by a nuclear catastrophe, we already know the winner.

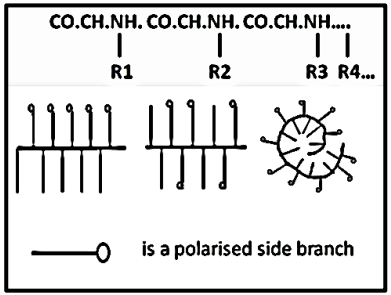
A collection of biological entities form ecological families. The match of pattern leads to a great variety in appearances, and the organization and communications serve the wellbeing of the colony or species. Languages are the information handling that steers the interaction of all sub-systems of the body cells, organs, the species, and the environment. We call the overall macro-language Semiotics. *Biological Semiotics is* a system of signs created by physical, electrical, magnetic, electromagnetic, and chemical processes that serve the biological entity. The brain nerves communicate in a well defined chemical-electrical way. Organs have their sign-language to communicate with other organs. When you are hungry, your metabolism system triggers your stomach; the blood

prepares for selection and the transport of nutrients. The brain controls and coordinates the whole. The mind (I still need to explain what the mind is) steers the brain's action to find the food that benefits the body best. The chemical receptors of your tongue prepare to check the conformity of what you chew with the physical requirements. There is an entire exchange of information ongoing on many levels fitting into the rhythmic chaos processes of balancing acts in time frames.

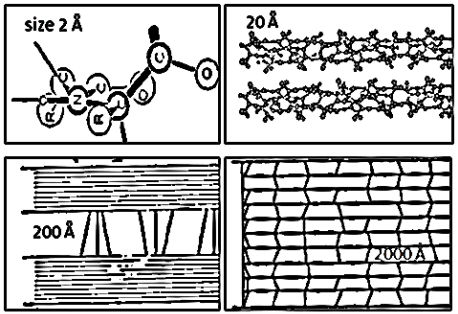
3.4 THE BUILDING BLOCKS OF LIFE.

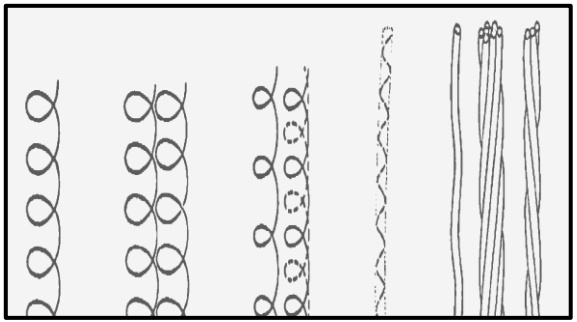
The construction of the physical life-building blocks is similar to the CNN Cellular Neural Networks, building an unlimited number of possible configurations. The first complex life structure starts from the chemical structures of mainly the Proteins. Proteins are the dominant biological bricks and are available in a broad diversity. The fabric of a protein is a chain of simple repetitive groups of chemical elements which connect to the outer environment via free atomic groups (that react via ionic forces) R1, R2, … having different chemical properties like acids, basis, alcohols, phenols, etc. When the chain becomes long, it is easy to understand that the whole curls following to the polarized clusters. Units of a reasonable size cluster to form a higher-order structure, similarly as building Lego blocks. Nature creates its structures following the available probable solutions that can match the physical and chemical laws and reach

stability or balance in a chaos mechanism. Starting from the helical basis, we get following all kinds of strings.



The large variety of R's, the position of the R in the chain, and the combination of R's creates a vast array of possibilities of proteins to react with the surrounding and build via the chaos processes a stable molecule with a specific biological function.



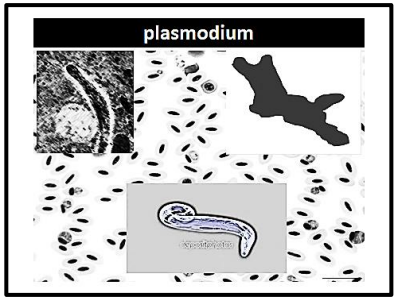


In this way, life starts from a physical-chemical mechanism of inorganic compounds that knit organic structures. The starting point of life is when the properties of the material clusters give rise to life functions of duplication, sustenance in the specific surrounding, intake of energy, and communication. The variety of possible cluster combinations and reactions, resulting in ever more complex structures with specific properties. The physical-chemical interfaces with the environment act as the semiotic information channel with the exterior. Complex structures specialize as organs that serve a higher aggregate or entity. Structures, complexity, balance, information exchange, the dynamical adaptation, and regeneration convert to life organs. The brain is not different, which I show in the next chapter.

The step towards the Mind is COGNITION, which requires CONSCIOUSNESS.

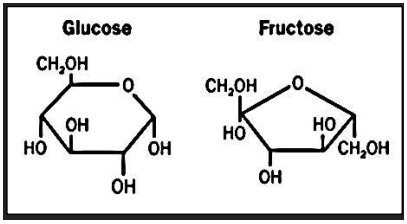
Biologists have, in the last decennia, clarified a lot about Consciousness. We best start with the definition, but as with the concept of time, there are many definitions of Consciousness. Let me first explain how cognition is a step towards the conscious. The publication 'Slime mold: the fundamental mechanisms of biological Cognition,' [200], is an excellent introduction to the understanding of the conscious. This book concludes that mold or fungus is capable of performing an incredible list of cognitive tasks. Slime mold shows outstanding creative abilities to adapt its protoplasmic network to varying

environmental conditions. It solves tasks of computational geometry, image processing, logic, and arithmetic. The adaptive actions are solely based on binary configurations of attractants and repellents as the rules that generate the next CNN step.



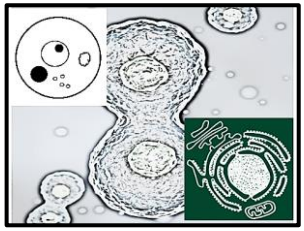
One stage of the slime mold is a plasmodium, which is an organism of a uniform structure that can grow centimeters and is known under the version of unicellular parasites like the one of malaria.

The higher development speed of superior organisms is because higher living forms find their food in the lower species and decayed organic material, which contains already more complex molecules. Another probable contributor to life emergence is dissymmetry. Two molecules containing precisely the same atoms and the same groups and sequences have different properties depending on the spatial structure. Here we are back on the matching of shapes. Our hands are a typical macro example of dissymmetry. Proteins having the same biological function may differ markedly from one another chemically.



A sugar and fructose molecule has the same content of chemical elements. The structure differs what results in other properties as nutrients

The operation of living cells is a well-organized 'division of labor' between its parts. The task is to get the optimal energy exchange and to synthesize life material effectively. Take the example of the Plasmodium parasite. This plasmodium optimizes its protoplasmic network to cover all sources of nutrients, to stay away from repellents, and to minimize the transportation of metabolites inside its body. The slime mold senses gradients of chemo-attractants and repellents and responds to chemical or physical stimulation by changing patterns and generating electrical fields. The slime mold builds around protoplasmic tubes that vibrate by the thousands. The *biochemical oscillators* have varied modes of coupling, like in the rhythmic coupling between de music instrument, the soundwaves, and the ear of the listener. The mold organism operates in a surrounding of gradients, concentrations of attractants and repellents which make up the semiotic language of the species. They are typically rhythmic chaos processes.
The slime mold serves as a blueprint for cell functioning like the neurons in our brain, and the evolution of organic patterns.



The insertion of different organic droplets are a step to the emergence of a cell, and to multiplication.

A biological cell is a long chain of molecules curling to droplets which enclose a liquid soup having a particular function. The entity can duplicate by, e.g., producing internally new droplets from which some develop to complete other cells or to specific cell organs with specialized tasks. Cellular substances are encapsulated into a membrane, which again is a mesh of long molecules with defined properties.

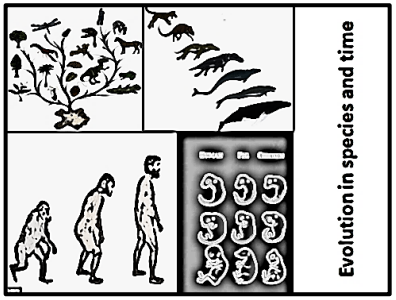
The structure and operations of biological cells are documented in textbooks of biology. What is missing is the link to Consciousness. *Is a cell conscious? At what level of aggregate or complexity can we talk of intentional behavior?* To come closer to an answer, we need to understand cellular semiotics or the exchange of information between the biological entities.

The key to the development of a living system is its operational autonomy in the execution of the organism's internal and external communication. In this way, it claims that ***a live system is an autonomous information processor with a purpose.*** *In this*

formulation, we introduce the notion of MEANING. The feature of purpose and meaning is also called cognitive biology. The living entity is a mechanism that acts as agents in finding food, avoiding predators, and the search for mating partners. Unique is that *the slime mold does not have a brain or a central nervous system.* Despite the lack of a nervous processor of information, the slime mold performs specialized cognitive tasks beyond the normal chemical responses to the surrounding, which is a stunning observation. The element Mind and Meaning enter here the discussions in BIOSEMIOTICS. Some biological mechanisms found in the slime mold can be reproduced in the laboratory. Computer models like the bio-machine of Kolmogorov-Uspensky, which is a combined analog-digital computer type processor to simulate the behavior of living organisms. [ ].

Growing complexity asks for better communication between the sub-parts or the species organs and with the environment. On the top level of the semiotic development is the human language, to which we probably should add the internet. .

Earlier I have presented a map of the semiotic evolution. We usually consider evolution as continuous in time with bifurcations of the species to more diversity. The technology to determine the age of archeologic items has improved over time, and big data techniques help to define more links and relations. We consider evolution as a dynamic complexity subject to the chaos processes.



Evolution is a Chaos process of growing complexity, bifurcations, disappearance, new life forms evolving to ever new stable structures. The underlying process is a probability pattern generator of systems with each an own rhythm.

3.5 THE EVOLUTION OF THE LIFE BUILDING BLOCKS

Now let's analyze the diversity and complexity in evolution. I have demonstrated that cellular programs lead to a wide variety of geometric patterns and shapes. These programs run at the pace of discrete time steps. The evolution of a specific species seems continuous in time. A dog breed doesn't change overnight. Some features might vary gradually from generation to generation due to the environment or by bifurcation caused by genetic disruptions. It is also a fact that no individual is precisely the same, and that the life span of a species is limited and different. Viruses outside the body live minutes while trees stand ages. Every species has an average life cycle and an individual lifespan. Individuals die, and new members are born. Within the body, the organs and

the biological building blocks from cell to protein, also recycle at a given rhythm. Within the coupled natural cycles, one rhythm remains underexposed namely Evolution as a momentuous event.

All chemicals and the processes participating in the evolution of the species, continue to play an active role in today's life. I repeat the names of elementary formed materials, which constitute the organic molecules: O2, CO2, Fe, Natrium, Kalium, Chromium, Calcium, Phosphor, Iron, larger metallic particles, oils, alcohols, glycine, amino acids, phosphate esters, sugars, purines, fats, folium acid, vitamins, proteins, etc. All these molecules emerged at a stage in evolution with a particular function. These chemicals and molecules are the leftovers of the trials of pattern generation of Nature. The selected molecules still are needed to sustain our daily biological life. ***We can say that at each moment in time, our body runs the program of the whole evolution***. Not only the molecules participate, but also the processes which came to life million years ago repeat itself continuously in our running biologic cycle. Fermentation, which transfers the milk into cheese, was once an edge innovative biologic process in Nature. It remains a crucial process in our digestion system.

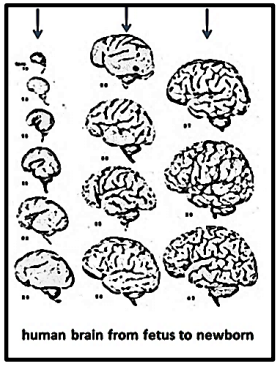
Our organic body is the MIRROR of EVOLUTION, TIME, and RHYTHM.

A long list of cycles participates in daily life starting from the solar system (day and night, the seasons, etc.), the biological functions (birth and death, the metabolism)

from the cells to the body, the energy transformation cycles, and many more. From this view, *life is a super complexity of coupled rhythmic transformation of content and shape,* which promotes '*being*' to a Ritual. The bodily ritual is completed with a similar mental rhythm with spirits, mood, longing, love, anger, hope, wu-wei, and many more. Before we study the mental waves, we proceed with the cognition of the Conscious and its links to the concept of time.

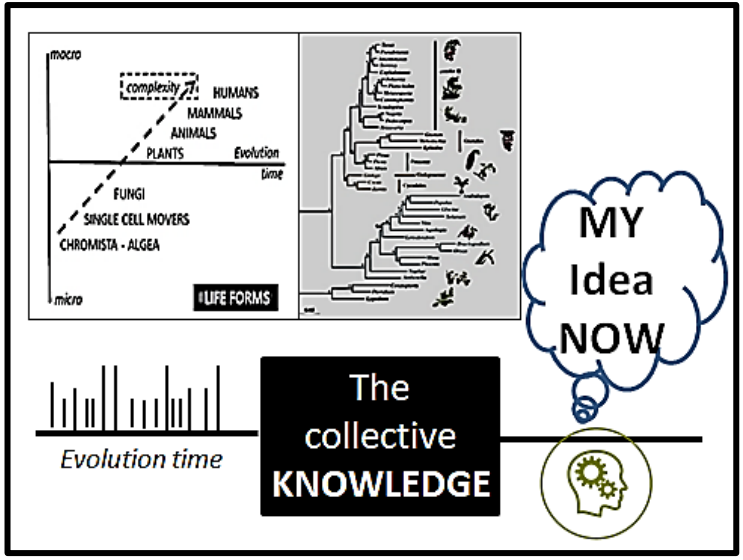
The growth from original materials to complex polymers and the living organisms that evolved in time are now stored as collective cognition of the current conscious time frame. This information is available as an idea to the awareness in the NOW moment. We consider *the sum of all defined materials and species as an instant cognition resulting from an inverse Fourier integration*.

Evolution is not a historical event; it happens at any moment as a whole. The human embryo goes from the moment of conception, through phases that reflect all species types. *Your body is the inverse Fourier function of all live organic stages*. The same is true for the brain. The first fetus's brain of humans is the same as from a fish and incorporates all stages of the species' brain evolution, what the next images show. The picture of the brain (Larroche 1966) and the body (Haeckel 1897) show the development of the embryo of a dog, a calf, a rabbit, and a human.



I have already stressed how the basic materials and molecules active in human biology, came into existence at a specific time in Evolution. The complexity and system performance still grows steadily. I modeled organisms and species as a dynamic system acting in a chaos mode. Today, science builds cognition of complexities on Bid Data mathematics, computer simulations, spectrum analysis, and Fourier mathematics. I choose these concepts because neuroscientists begin to describe the birth of consciousness out of brain processes in a similar approach.

All organic life forms that came into existence in the Evolution still participate in our organic life body.



All history is the interpretation NOW of the flow of memorized events.

4 THE BRAIN SYSTEM.

4.1 THE BRAIN STRUCTURE.

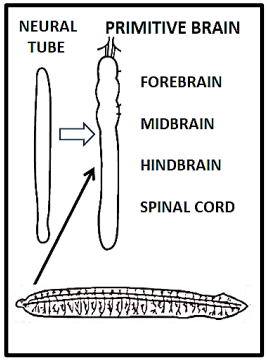
The exploding neuroscience creates a tremendous amount of data about the physical, chemical, and biological structure of the brain and the nervous systems which control the body and mind. More than 40000 neuroscientists produce yearly 20000 scientific papers. Two big- databases concentrate the neuro findings of 50 registered storage collections of neuroscience data (Wikipedia). Nearly all branches of science have now a neuro-version like Cognitive neuroscience (NS), Affective molecular, and Behavioral, cellular NS, Cellular and Molecular, Clinical, Evolutionary NS, and many more. In this chapter, I try to sketch the structure, complexity, and brain data handling produced by current scientists. The purpose is not to give an account of neuroscience, which is far from my competences but to link some fundamental principles to what might make up the mysterious Mind.

The human body, as an organic system, is an assembly of connected organs that perform the role of specialized systems in support of the biological entity. Each organ, on its own, is a complex system from which the cells are a dedicated complex sub-entity. All

system entities from small to large have an individual rhythmic operating program acting in a chaos mode to fulfill a specific task. The systems connect mainly on a hierarchical base and distribute processing is available as well. Remind the slime mold, which has no hierarchical brain processor. Communication channels between all systems of physical, chemical, and electrical design, handle specific semiotic codes, instructions, and feedback. The higher and more complex species are equipped with a BRAIN that acts as the top hierarchy in the data processing. The electrical and chemical processes in the brain and the nerve systems behave as coupled chaos mechanisms with a clock and own rhythm. The information and data structure and the dynamics of the whole system are called the **MIND**.

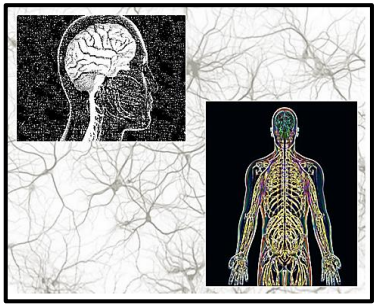
I try to explain the BRAIN in a few infographic maps.

From the slime mold species' type with distributed control of its functions, new life forms developed where the command activities are centralized in a nervous system with an attached brain. Because survival in the environment demands more tasks, the brain increases in complexity and speed of execution, leading to mobility. The brain and the nerve system remain one organ — a similar growth happens on the micro-scale with the development and specialization of the NEURONS and the nerve networks.



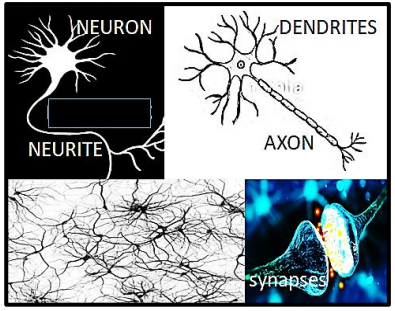
The first appearance of a brain is a neural tube that developed into a primitive brain where the parts specialize for the vital function. The forebrain senses (the smell as a chemical function) and coordinates the senses with movement function in the midbrain. Food, energy, and waste management is the hindbrain.
The species is the amphioxus, the simplest living chordate. The central nerve is a neural tube with sensory nerves and motoric tubes for simple movements.

The BRAIN, as the central organ of command, has an extension in the spinal cord and the nerve system which connects all organs. Its function is to sense the external and internal organs, take decisions, and to instruct physical movements and physical-chemical-electrical commands to the organs.



The primary organic biological processor is the NEURON.

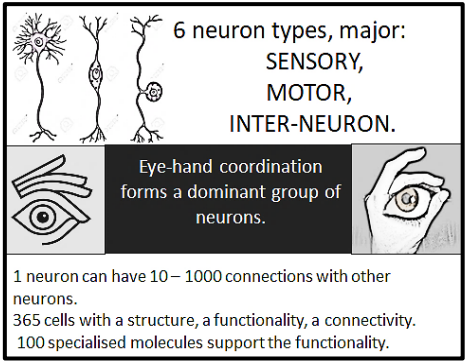
Neurons are highly specialized cells, numerous in quantity, and extraordinarily dense in their interconnections. The highest density is in the thin outer layer of the brain's great cerebral hemispheres called the 'grey matter.' The layer beneath, the 'white' matter fills with connections. Interconnections are as crucial for the functioning of the brain as the neurons self. There are layers of specific neurons interconnected vertically and horizontally to other domains, to the nerve channels, to the organs and the highway between the two hemispheres and the peripheral nerve pattern



The neuron is a specialized bio-chemical-electrical cell which acts as a processor in a parallel processing network and provides the connecting lines with the overall system. The connections and the management of the links is part of the processing modes.

The neuron is composed of a processing cell and neurites as connecting wires. There are two types of connectors, the dendrites, which are mainly sensors that feel other neuron wires, and axons with a physical-chemical structure to make the connections along which the signals travel. These connecting points are called the Synapses. It says that a

synapses fires when a data transfer occurs. This firing is an electrochemical process with a specific rhythmic pattern. The frequency of the firing is a measure of the intensity of data handling. There are excitatory and inhibitory synapses.



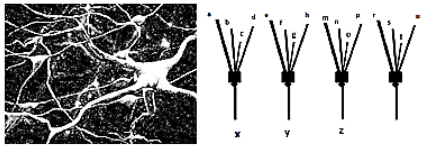
SENSORY neurons bring in the signals, and the MOTOR type are executors.

The INTER-NEURON types are mainly occupied with the management of the connections.

Recent research points to many more specialized neuron types.

Earlier, I explained the evolution of the primary biological cell to an organ and adapted its shape to the needs for food, multiplication, and defense. Motor control skills develops to the move around what boosts flexibility and possibilities to further evolution. The sensory organs, like eyes and smell combined with the motoric capabilities, became a highly specialized functionality of the brain. Neuroscientists study intensively the visual senses and how the data is acquired and processed to motoric signals.

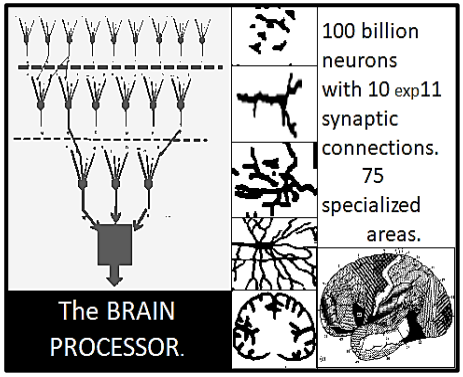
The neuron processor has an internal electrical potential membrane that can release electrical pulses at different locations and thresholds. This makes the neuron to an analog and digital processor. The coupling via the dendrites creates a massive parallel processor.



Neurons are specialised, with many inputs/ outputs
The processing of the inputs is selective: on intensity, frequency, with tresholds, synchronous with other neuron populations, with memory function, with an inhibition function.

A Neuron is a distributed parallel processor with chemical/electrical interfaces.

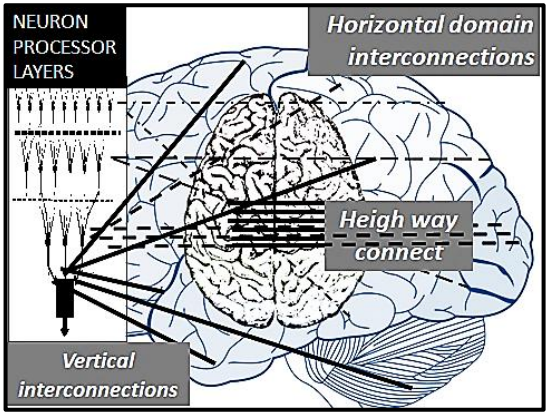
The brain has two parts: left and right, linked to the symmetrical body organs and limps. All controls are partially processed: in both sides of the brain's outer grey part, the inner white and the deeper sections. The distribution of the tasks between left and right, and the different domains is still a mystery. It is known that there is a highway of 200 million axons between the left and the right hemisphere of the cerebrum.



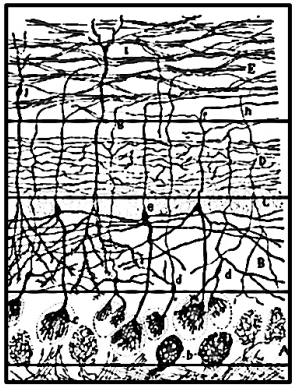
The layered structure and specific neurons make it possible to create lots of specialized interconnected parallel processors. The specialization clusters in brain areas sometimes called the Broca domains. Different Broca areas can cause a super functional processor to coordinate, e.g., sensory, motoric, and psychological states.

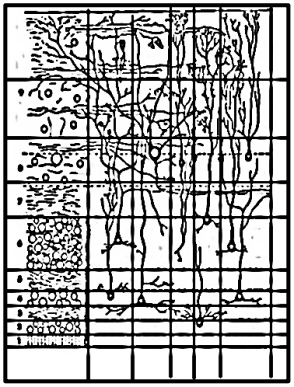
The neurons control the connecting networks by re-weighting, strengthen, weaken, and so they *redefine the patterns*. The connectome can rewire and create new branches or eliminate and disable them. The core processor of the neurological infrastructure is DNA, which is a pattern imprinted in all biological material. This pattern becomes fully deployed in the life cycle from fetus to adult. The connectome is dynamically active all life, and damaged brain tissues can restore the mental deficiency caused by trauma. Cognitive and psychological experience in life makes, also create adjustments to the individual connectome. In this way, *the connectome contributes to the definition of the Self.*

All neuron layers connect vertically with each other and horizontally with all domains in the brain. Also, some connects are made directly with different positions of the nerve system throughout the body.



Some detail images show the physical connections organized as a multidimensional matrix. The vertical columns and horizontal matrix lines come together in nodes that are specialized data processors. The whole volume of the brain is stuffed with this bio-matrices with specific tasks, and each command only can be executed in combination with one or more domains. Scientists try to simulate the operation of the brain but fear that no single computer or cloud network will ever be capable of reproducing this brain processor, mainly because the interconnection between all matrices is dynamic, and that is the work of the MIND.



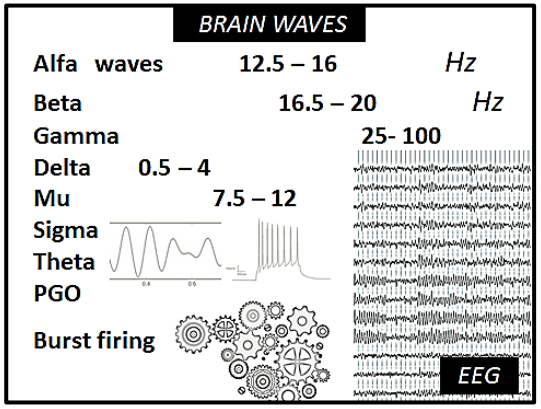


Out of: Brain structures and its origine. G.E.Schneider.

4.2 THE CHAOS PROCESSES IN THE BRAIN.

The brain and the nerve system form a super complex organization because of the quantities, the diversity of processing cells with dedicated programs, the flexibility of the dynamic connections, and the clustering of functions. Computer models managed to simulate only small features of brain activity. Probably the best approach is to compare the brain and nerve infrastructure with a manufacturing corporation managing dedicated processes with computerized systems such as the procurement of goods and services,

recruitment, remuneration and management of staff, production units, quality control, housekeeping customer service, planning, investment committee, board meeting, etc. A corporation is a continuous process of coupled systems having a specific dynamic and cyclic behavior. The activity of the brain can be measured indirectly by the electrical clouds produced repetitively by the mind. The cloud is an assembly of electromagnetic waves. Similar techniques like Big Data process are used to explain the information processing, and regular performances are compared statistically to stress situations or trauma failures of the brain. That's what a doctor does when she/he takes an EEG at the hospital.



These are the main brainwaves; there exist many more. Not only the shape, duration, and intensity of the wave give information; also, the combinations are specific for mental states.

The registration and calibration of brainwaves is standard procedure in the study of the brain and the pathologies. The techniques used are magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI), diffusion MRI, magneto- cephalography (MEG), electroencephalography (EEG), and positron emission tomography (PET), technologies that improve brain imaging drastically. [102].

Despite intense efforts by neuro and computer scientists, the only progress is to discover the emergence of ever more patterns. Moreover, the correlation of the waves with mind expressions and the brain areas is generally weak. The motoric brain functions, including hart, breath, and other life functions, are better mapped. To relate all the brainwaves to a comprehensive system's model is a massive task for Big Data calculations. The brain processes seem to be coupled with chaos operations, which usually are a headache for researchers. Scientists search for synchrony waves coupled to brain areas in search of group natural frequencies. The brain processes are self-organizing, non-equilibrium transitions. Sometimes bifurcations happen as a migraine or epilepsy attack of a patient and bi-stable mental conditions.

Most fundamental studies in neuroscience, focus on the process of vision and its link to the motoric response. A specific and challenging issue is the management of contextual data. The focus at an object and the interpretation of what it represents are strongly linked to the contextual surrounding. Similarly, the psychological mood and background play a role in what we observe. The translation of contextual issues into

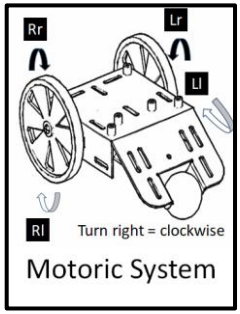
computer neuron language requires the processing of concurrent contextual inputs, dynamic grouping, dynamic linking, and dynamic routing to different neuron groups. In the real, the brain simultaneously scans and processes many more outer and inner functions. The mind hierarchy can overrule and prioritize activities. Intuitively, you can understand that rhythmic synchronization plays a fundamental role. Linked to prioritization, the biggest challenge for the neuroscientists is probably to understand the process of ATTENTION and CONSCIOUSNESS. What, for example, is the mental mechanism that selects what excites me at a given moment?

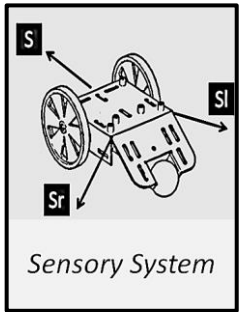
To initiate some knowledge of brain models, I draw a couple of simplified examples of how scientists approach the brain operation.

4.3 THE SENSOR MOTOR FUNCTION.

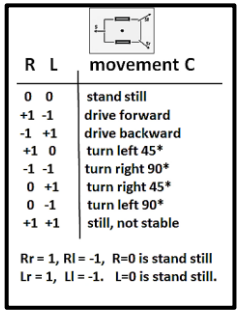
We have seen that the slime mold can adjust its shape to fulfill the biological needs for access to food and protection from the hostile surrounding. Scientists managed to simulate this behavior with mathematical algorithms used in analog computers. The step to move into the surrounding while optimizing the functions is tremendously significant in Evolution. This ability initiated many bifurcations in body shapes, the sense organs, and mechanical solutions for the movement. Notably, the coordination of the different

tasks to operate simultaneously is hard to solve. Let's construct and model a simple robot as a primitive insect.



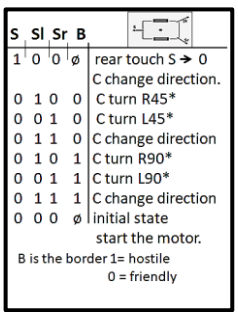


Rr: right wheel turns right.
Rl: right wheel turns left.
Lr: left wheel turns right.
LL: left wheel turns left.



R	L	movement C
0	0	stand still
+1	-1	drive forward
-1	+1	drive backward
+1	0	turn left 45*
-1	-1	turn right 90*
0	+1	turn right 45*
0	-1	turn left 90*
+1	+1	still, not stable

Rr = 1, Rl = -1, R=0 is stand still
Lr = 1, Ll = -1. L=0 is stand still.



S	Sl	Sr	B	
1	0	0	ø	rear touch S → 0 C change direction.
0	1	0	0	C turn R45*
0	0	1	0	C turn L45*
0	1	1	0	C change direction
0	1	0	1	C turn R90*
0	0	1	1	C turn L90*
0	1	1	1	C change direction
0	0	0	ø	initial state start the motor.

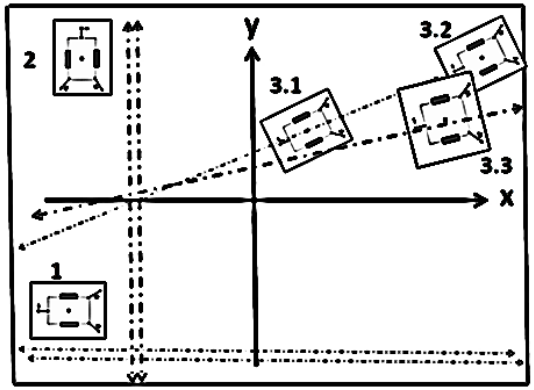
B is the border 1= hostile 0 = friendly

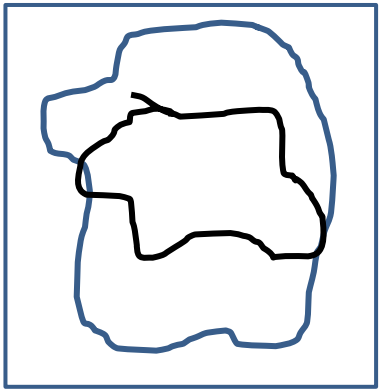
We start with a simple configuration. The wheels do operate independently and can turn right or left or stands still. The system runs at a rhythmic pace of a clock rate, in which a set of parameters are active — the whole split into two sub-systems: the motoric and the sensory part. The motoric system consists of the two wheels; they turn in steps of 90 degrees clockwise (turn right) or anti clock as turn left. The system clock sets the rhythm, and we describe the model as a CNN construct. The sensory system has three sensors: one rear and two front sensors left and right under a specific angle. Let's call the robot C from Charlie or cockroach. C operates in an enclosed territory. The two sub-

systems have a particular set of rules coupled via another rule protocol. The motoric set comprises the right wheel Rr meaning that it turns 90 degrees clockwise, Rl is the opposite. Similarly for Lr and Ll. By combining the wheel turning, Charlie can stop, move forward, backward, turn right, turn left (at a specific angle). The turning pivots 90 degrees around the center point of C when R and L are operated. When only one wheel moves and the other is fixed, then the touching point of the wheel with the ground is the pivoting spot, and we assume that the robot turns than 45 degrees because of the friction. The sensor parameter is S for the rear and Sr and Sl for the front.

We extend the model with the environment parameter B, which means that a sensor touches a hostile point, which requires Charlie to react differently, for example, turn twice 90 degrees and double the speed. The following tables are a codification of the different motoric and sensory parameters and the actions associated with them in particular combinations.

It is not too difficult to imagine and draw the trajectories of Charlie starting from some beginning position like in the next drawing.

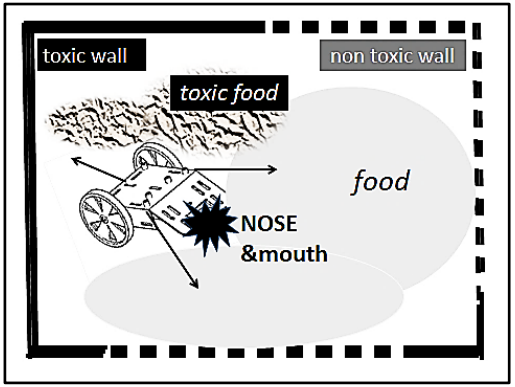




Starting point 1: C is positioned parallel to the x-axis. It is clear that Charlie, once started, runs up and down in straight lines. We assume that the front sensors touch the border simultaneously. Similarly, in 2 is the running parallel to the y-axis. In example 3, is the starting position under an angle that means that one front sensor will touch first, then disables the other sensor as long as it feels the edge and turns 45 degrees and reverse (3.2). When the rear sensor reaches the opposite site, C reverses direction. When you map the center point of Charlie, you will see that the points follow a regular pattern which depends on the starting position. In reality, it is a chaotic pattern because the sensors are not ideal, they bent a bit, or the reaction is delayed, or a wheel slips and the turning

angle is not precisely 45 degrees.

Now we take another more complicated situation.



I put the robot in an enclosure which is fenced off with partially electrified wire. For Charlie to touch the wire is painful, and he will accelerate when feeling that area to get away from it. Into the field, there are patches with lovely food, but also toxic vegetation to be avoided. Now I give the robot a nose to sniff and a mouth to eat. Charlie only eats when his stomach is empty, and when he finds the right food.

In this model, we have to add new functions and parameters to the system. The nose N can sniff in three directions: in front (1), right (2), left (3). The food is F, and F0 means there is no food at the spot, F1 is OK, and F2 is toxic. X, Y are the coordinates of the position of the center point C of the robot, and θ is the angle, P = 1 when the power is on and is zero when off; P = 2 when Charlie flights from the electric wire with increased power. We reserve W as an additional parameter, and many more can be added. As mentioned before the system operates in steps. A set of parameters defines the status of

the system and varies at each sequential step of the system clock. Now we can present the model in matrix form like in the next CNN chart.

P	Rr	Rl	S	Sr	Sl	N	F	W	x	y	θ
0	0	0	0	0	0	0	0	0	X1	Y1	θ1
1	0	0	0	0	0	1	0	0	X1	Y1	θ1
1	+1	-1	0	0	0	1	0	0	X2	Y2	θ1
1	0	0	0	0	0	1	1	0	X3	Y3	θ1
1	0	0	0	0	0	2	0	0	X3	Y3	θ1
1	+1	+1	0	0	0	2	1	0	X3	Y3	θ2
1	+1	-1	0	0	0	-1	1	0	X4	Y4	θ2
1	0	0	0	1	0	0	0	0	X5	Y5	θ2
1	-1	-1	0	0	0	0	0	0	X5	Y5	θ3
1	0	0	0	0	0	1	1	0	X6	Y6	θ3

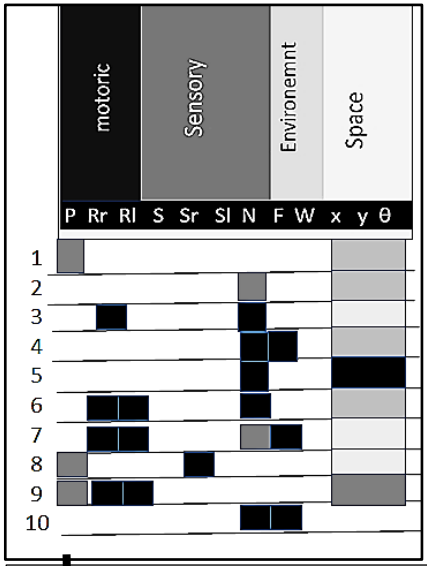
1 Starting position. Power off.
2 Power on. Nose start sensing ahead. No food.
3 Robot moves forwards. *Repeat till food found.*
4 Stop. Eat till no more food.
5 Sniffs to the right. No food.

6 Turn right 90 degrees. Sniffs in front.
7 Robot moves ahead. *Repeat till food found.*
8 Right sensor reaches the wall.
9 Robot turns left 45 degrees.
10 Stops as it finds here food.

When you compile all the above CNN states, you get a large matrix. When you color the cells black, white, and grey for graduations, you discover patterns, as I have discussed in the earlier chapters. All CNN systems need a rhythmic clock to proceed in time and a control unit that stores and adjust the rules during processing. We call the whole the brain of the system. It is interesting to map the relationships between motoric, sensory, environment, and geographical space. Most models can be conceptualized as combinatorial logic like all computer algorithms are.

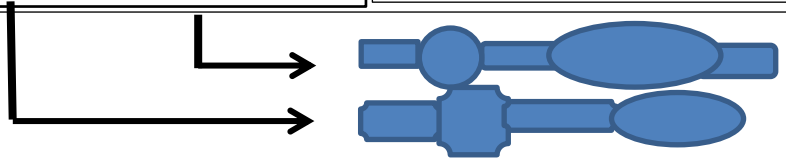
In the next illustration, I present Charlie in the most simplified version of the biological functioning of the brain and body. The extension to humans is similar, resulting in a super complex system with rhythm and pattern processing in chaos mode. In such a super system, there is cooperation between sub-systems; there is balancing with attractors and repulsors. Scientists have detailed the model of Charlie for the human eye and hand coordination. The eyes adjust during the process to the position and movement from the hands to grab an object. Eye-hand coordination is, for us, the most common daily operation, but in scientific terms, it is a very complicated exercise, even without contextual factors. Paul M. Churchland developed a simplified version in his publication:]Some Reductive Strategies in Cognitive Neurobiology'.[3]. The CNN type patterns which translate the relations between the sensory and the motoric activities are projected into state spaces.

The Charlie model is a very rough illustration of the principles of brain operation using CNN engines. The brain processes continuously n-dimensional matrixes for all the bio-neurological activities. Processing means the edition of maps that relate to other plans in search of correlations between the matrix rows and columns. New patterns emerging from the calculations are stored in another chart or projected on a new sheet.

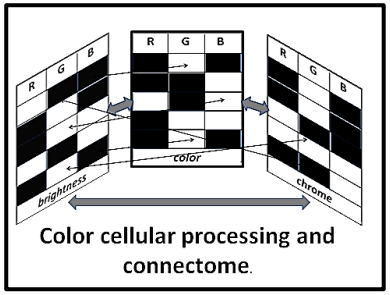


Brainwave generation by CNN processes.

The data types that are active during the system evolution. The greyscales indicate the intensity of action and participation.
Space and time always participate as elements of the core consciousness.
This chart can suggest the resemblance with the specialized Broca areas and the interconnections and the brainwaves when there is activity.



Brain waves

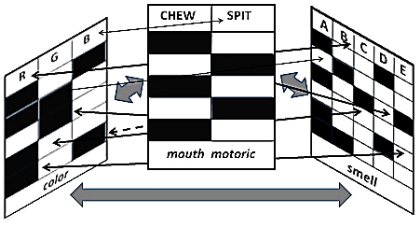


Color cellular processing and connectome.

Take the example of the processing of the incoming data from the eye. We know that in the retina, three types of cones detect the basis colors red, green, blue, from which any other color can be synthesized as a weighted combination. We also know that the eye needs a defined time to take the picture, that's why we do not see the flickering from the 50 Hz writing lines on a television screen. The eye takes 10-20 msec to process a picture. The hypothesis is that the CNN view process, which translates a picture into a mental code, is around 20 msec. (there is no scientific reference for this). More elements that make up our view are color balance xR, yG, zB content, brightness, chroma, detected by dedicated cells. Together, these components create mental color appreciation in a given context. Color, brightness, and chrome matrixes combine in a 3-dimensional CNN map like in the above illustration.

The advantage of CNN processing of parallel maps is that at every step, the correlations with the corresponding stage of the other plans can be made, and *new rules defined for the next step.* The many specialized neurons with rhythmic and conditional firing and the massive amount of interconnections point to a CNN concept with cross-links that activate at a specific step in the sequence, creating tremendous flexibility. CNN

pattern generators follow the rules being stored in specific maps; these rules are encoded in the *DNA, which is a particular CNN map*. The DNA is a very long sentence because it writes all the rules for all the CNN sheets and the connections. The system does not need ample memory storage because everything is registered in the DNA, the connectome, and the specialized neurons.The sense-motoric coupling is of the most significant importance for the species adaptability to the environment. Understandingly, the neurons have specialized as dedicated processors. There are hundreds to even thousands of such neurons, and each neuron is an assembly of self arranging molecules — [102 p70]. The networking of specific neurons is a new topic of research. Some act and connect as lone neurons, others form groups, and the dynamics of the assembly creates the specific function.



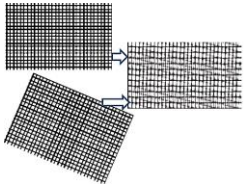
Eating cellular processing and connectome.

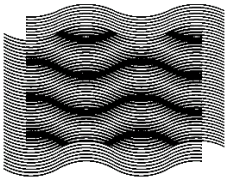
The above map is a connectome of 3 maps involved in eating: the color and the taste are sensory CNN maps. The motoric map decides to start the chewing or to spit the food out. There is a sheet that maps the connectomes and inter-cell direct connections.

We can draft a similar concept for smell and motion and taste. Let's build a simplified infrastructure of taste receptors in the mouth with its highest concentration on the tongue. The taste buds sense five basic tastes: sweet, sour, bitter, salty, and umami. As with the primary colors, we synthesize all flavors with these parameters and map them in an initial CNN matrix. We add more independent elements that determine our appetite like texture, color, smell, temperature, etc. Your first bite starts a chaos protocol to detect the attractors and repulsors and put the corresponding phase space (matrix) in the priority queue for processing. Take, e.g., smell, temperature, and color (in case the food does not conform to the standard). The five taste components can be prioritized to your individual preferences, and to the actual needs from the nutrition system, e.g., to supply sugar. It is not difficult to conceive a computer program that makes the transformations, projections, and statistical calculations until all the maps reach a stable image or pattern. At this point, the brain triggers the motoric system, and you start chewing, or you spew out the bite. Again this is a very simplified example to demonstrate the massive complexity of the brain as a super system. The detection of colors and tastes demonstrate the sensory and the motoric space combined with the *feeling* domain, which leads us towards the content of the MIND. The very simplified examples make clear the enormous complexity and connectome of the human brain in its size and volume. To illustrate the complexity: the vision function of a monkey needs more than 30 underlying maps [25]. There are maps of the mapping of other plan-levels with CNN content.

Moreover, the connectivity of the connectome is not fixed and adapts over time. All CNN sheet operations, calculations, and projections are autopilot functions belonging to the unconscious biological life.

Another illustration of overlapping datasheet operations is the Moiré figures. Lay two regular unrelated patterns on each other, and you can see total different pictures.

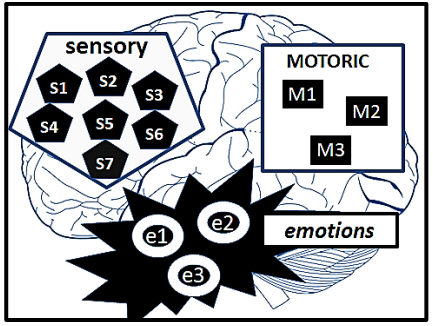




The dynamics of the sheet processing have a specific rhythm per function and synchronize together. According to William Klemm [114], the frequency of synchronous activity seems to change over time with maturation.

How exactly the processing of the patterns happen is not yet clear, One model is from Gerald Edelman [113] and is called the Theory of neural group selection or TNGS. I try to summarise in a few infographics maps on how the algorithms work, with the food tasting procedure. Three areas in the brain work together on the tasting: the sensory with two categories, the primary tastes, and the temperature of the food. We only retain in the model - too hot and too cold. The second area involved is emotional. For example, I like to experience a new dish, but I fear food poisoning. The third active domain is the

motoric functions of my tongue, the chewing, and spitting in case I suspect danger. The three brain areas that participate in the action are formed by temporary cooperations of general and specialized neurons. Now we translate the brain states in relational maps and define the links. In the real, the links are dendrites belonging to the brain and nerve connectome. Some neurons are specialized in one-directional communication, others in two ways. Some connections participate in the active domains, and others have an alert function belonging to another field sheet. The connectome is an evolutionary construct defining our experience of sweet and sour. Bitter and sour signals alert and prepare the motoric chew or to spit the food out. The tongue also has a motoric function in the chewing and the spitting; this is the way, the system builds the tasting connectome.

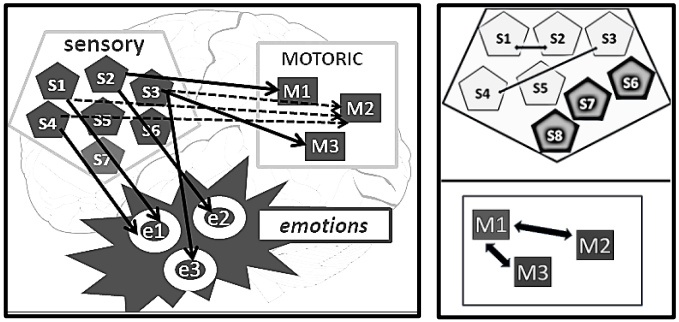


S1 Taste sour. S2 Taste sweet S3 Taste bitter. S4 Taste salty S5 Taste unami. *S6 Temperature too HOT*
S7-.8 Temp. OK, too COLD

M1 Motoric tongue twist M2 Motoric chew M3 Motoric spit

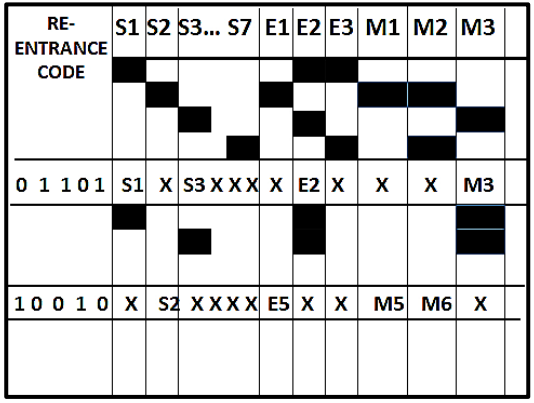
E1 Emotion seeking (explore) E2 Emotion care (desire).
E3 Emotion fear.(toxic).

We translate now the sensory, the motor, and the emotional maps in three CNN matrix. The brain selects and activates the domains first and start a synchronizing process to establish communication between the three sheets.



This initiation begins in the hippocampus. The process first awakes the older (in evolution) available maps of food tasting and prepare for comparison. Now tasting proceeds in discrete steps till a stable image is obtained in the S matrix. The past experience is mainly emotional memory. The S matrix is projected on the E matrix like a Moiré image. The processors of M, S, and E search at a synchronized rhythm for correlation between them. Gerald Edelman adds here the notion of *re-entrance*, which is a principle allowing to change the rules at any CNN step, changing the connection pattern and data routing. The re-entrance also selects new brain centra to participate, which makes the brain an extremely flexible self-learning machine. The learning and memorization are realized by the chemical data processes that, after many repetitions,

stabilize in the making of other molecules and new connections that make a skill permanent.



This CNN map starts with an index code, referring to the next activity processed, e.g., look for correlations, compare with the previous sheet to see if the movement is aligned to the sensory, or to relate to an old map from the past.

Although CNN processors help a lot to model the functioning of the brain, it is not sufficient. Self-learning is a chaos process that reaches an equilibrium and requires memorization and prioritization. The connectome takes part in the memory, but also other functions become specific task processors as specialized neurons and neuron configurations. CNN is not the only mode of operation; many hardware and software algorithms are unknown. Examples of specific cells are the 'place cells.'[102 –p100]. This

kind of neurons was discovered in rat experiments — the neurons fire at a specific rate when the rat enters a known enclosure. Grid cells are organized in a small number of maps with discrete properties. In the group of the grid cells, there is a category called border cells, which can be labeled as dangerous. Also, the positions of the rat's head are dedicated to groups of cells, which makes the data processing more effective [102 – p113]. These discoveries push the models of the brain to look like a society run by specific participants in collaboration and in synchronization.

The specialization is wired on all levels like receptor cells, neurons for the senses to detect chemicals, light, pressure and stretch for the skin cells, vibration, electrical and heath gradients, radiation, and magnetic fields. [8]. Some neurons specialize in the generation of clock frequencies that coordinate the synchronization between the sub-processes of all the brain atlas domains. They are the generators of rhythm, and a specific group makes our biological clock of cells.

Cells and cell groups have been discovered that react on specific images or part of pictures like circles, parallel lines, or complete sceneries viewed in the past — [106 -p188]. According to Wilder Penfield, all scenarios from the past are stored in micro-circuitry in the cortex.

5 VIRTUAL REALITY AS A MIRROR OF THE MIND.

We still try to describe the Brain in language and pictures. Be reminded that images and language are two aspects of the Mind. But what is the Mind? We only can approach the answer from what our Brain provides in concepts and cognition. Because knowledge belongs to the Mind, again and over and over, we see that Brain and Mind mirror each other. We only can emphasize on the physical aspects when describing the Brain and the mental affairs for the Mind. A lynching pin to switch side from the Mind's Brain to the Brain's Mind is the world of Virtual Reality, which the modern humans create.

5.1 ABOUT VIRTUAL REALITY AND FACE RECOGNITION.

REALITY is a philosophical issue and many concepts of what it might do exist. Nobody knows what Reality really is: is it an external physical affair, a mental creation, or a mix of both? At least all philosophers agree that we can define Reality as a *System being a construct of relations with many dimensions that vary in time*. From here, I follow Ulam's version [406] of Reality, which comprises the ideas in line with the theories of the brain with the matrix type of construction and the chaotic CNN processing.

In a Reality as a multidimensional construct of relations varying in time, you might doubt that time exists. In this case, assume time as un unknown variable taking part in the relationships. In line with the continuous highlight of rhythm in all phenomena, I take the definition of Ulam, where Reality is a System of Relations between two major players: *Space and Time*. We consider Space and Time as pure parameters with no definition of what they really are. The Reality System is driven by a ticking clock that provides the Time dimension, and Space is a discrete lattice of cells where each cell is occupied by one of a finite number of states as a number, a greyscale. [M.Waldrop 406- P219]. This is the reality seen in patterns that Wolfram describes so well (see chapter 3) and which I have tried to use into the flow of ideas about material life. At any tick of the clock, the next stage is determined by the previous one. The number of rules that can apply is infinite, but in Nature's practice, the patterns do not follow the randomness of regulations. Some rules generate patterns that come to a stop, and no change follows. Another category of rules continue to give random patterns without any detectable recurrent image; what is a generator of complete chaos. A class of rules shows repetitive patterns; sometimes, several different stages appear. The most important category of rules is those that replicate a pattern, what we experience in Nature, and which is part of our living reality. So, *Reality as a System is a category of generated patterns that reach a stable configuration and which replicates itself in the next step*.

We now call our replicating system a Biological System. All biological constructs from cells to species are a dynamic relational construct. The humans take a privileged place among the systems universe because of the *conscious*. The conscious adjusts the relational parameters to improve the system in the advantage of the human entity. The adjustment of the system parameters are activities performed by the entity (the body). The center of command of the relations is the brain of the body. The activities expand the relational matrix in the environment, and we call the whole operation the TECHNOLOGY of the entity. Entity and environment form the REALITY relational matrix.

The technology is mental and physical. Mental technology defines the rules for the relational pattern. The most effective mental technique is *language*, which supports the relational function of communication. The physical tools are ample. The evolutionist scholars even apply the usage of tools as the demarcation between animals and humans. Mental and physical tools create the AUGMENTED REALITY we live in today.
When the sun sets, and it becomes dark, we switch on artificial light to augment vision. Spectacles that expand my visual comfort is a technology which improves the light signals underway to neuro signal data capture. The light signals traveling from the external to the brain undergo many manipulations. The optical eye construct and the nerve-neuron processor putting the picture upside down. VIRTUAL REALITY is a subset of

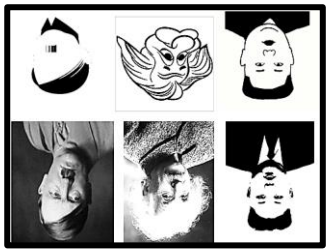
Augmented Reality which reformats the Reality System for a purpose like in video games, or with devices that guide you through a museum.

Reality, as a relational system, seeks stable and consistent patterns recognizable by the brain maps in storage. *The process does not differentiate whether the input is real or mentally fabricated*. From this broad perspective, we consider Augmented Reality as a tool that enhances communication. The brain process handles information in a patterned macro language, which we call Semiotics. In this way, Semiotics is a generator and manipulator of patterns that frame our lifeworld. But also feelings are translated in data brain maps, think of the emoji. The Reality expanded with augmented realities mixed with real feelings and graphically feeling signs makes it difficult to distinguish the 'sensed' Reality from the virtual version. Everything becomes intertwined, and the borders between the external and internal fade. In the new version of the Lion's King, it seems as real animals are staging, and video animated persons are difficult to recognize from real actors. This New Reality is the product of the human mind, and when the brain hardly can differentiate the actual percept from the virtual, it might be that both use the same techniques.

The visual is our most potent sense, and technology has progressed considerably to enhance the capabilities, think of the images from space. The sens of smell is

complemented with chemical spectral analysis for purposes like gas and explosive detection, and the smelling for sicknesses have been initiated. The touch sense of robots makes progress to grab delicate objects. In the audible, since the invention of sound recording, the acoustic experience has improved by digital means. Deficiencies of the hearing organ can correct with an electronic chip as an interface to the brain. So what do these technologies suggest how the brain functions?

Let's analyze the visual brain processing from the technology of visual recognition. First, what are the data of a human face picture? There are pictural features like shape, directional positioning, light infall, surface structures, explicit shapes, and proportions. To this, we add typification like age and sex, and generic characteristics for groups of people like pious women, and expressive messages. Psychological observations and experiments translate typical appearances and behaviors into databases with categories and models. Generally, many data elements play together or correlate and require specialized statistics to process and distill meaningful results. I show some difficulties which scientists encounter, such as when the pattern is an upside-down face.

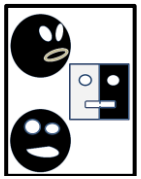
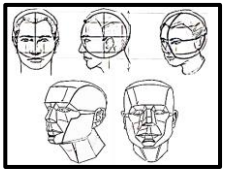
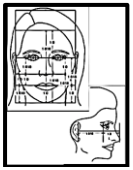


Although all proportions and relations between any sub-patterns of an upside-down face remain intact, it is harder to recognize a person, even when it is a cartoon drawing. Only specific well-known features put you in the right direction to give a correct answer.

The most practiced parameters in face cognition are the 'Rickett golden ratio proportions,' which also aesthetic surgeons apply to reconstruct or to beautify the patient's face. Ethnic researches map the Rickett parameters to explain the visual appearances of people and gender. These bio-metrical numbers are a basis for all face data processing. The recognition of a face in a group or a crowd is even harder to crack. The technology of face recognition and verification has been growing very fast in the last decades with astonishing results. The implication of facial recognition on society is today manifest as big brother watching always and everywhere.

The technology used is a clear example of mirroring the human brain. The core ideas are based on the understanding of neuroscience and precisely the visual eye-brain-motoric function. The process checks the facial traits and aspects: make category selection, perform familiarity check, recognition, emotions, dynamics, and identification. A comparison is made with sets of pictural data containing shapes and the proportions, The brain handles all these visual data similarly in series with iterative routines in search

of correlations with templates and previous brain sheets. In parallel, the environmental context is assessed, which creates a mind holistic component.

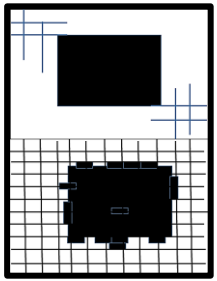




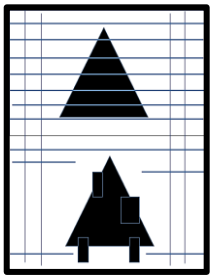



Do not underestimate the holistic aspect of face recognition because the neuro researchers found that the face *we store in the brain is related to the experiences we got with that person,* the circumstances, emotions, time, etc. We store complementary data which determine and condition our action upon the recognition of the person. [411]. The person's name has its specific storage allocation what probably explains why the name of our first love biases the connotation with any face having that name

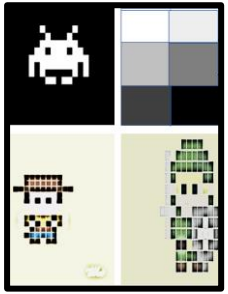
5.2 VIRTUAL REALITY AND ARTIFICAL INTELLIGENCE.

The automatic recognition techniques mirror the models as the neuroscientists describe the data processing of the brain. The other fundamental operation mode of our nervous system is driven by chaos processes which Artificial Intelligence embeds. For this, we connect back to pattern generation and big data. Finding rules to generate patterns means that, for a given pattern, we can study what the rules are to come to specific design. We are back in the field of big data with the question to find regular patterns from a given image. Statistical programmers apply templates and type-proportions to compare the pictures with sets of pre-selected pictural frames. To illustrate the technique, we start with template patterns of a square, a triangle, or a most typical face shape template, and compare it with a selected frame from a larger image.



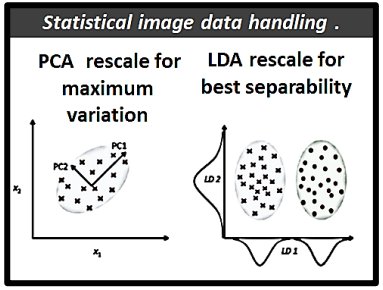


We call an image-frame a digital map with cells organized in rows and columns. The information captured by the eye looks similar. Just like a TV screen where a sequence of pixels is written line per line, we read the data as a string of digits.



In the chapter on pattern generation, we compared the data strings with a sinusoidal pattern that allows reconstructing the pattern as a sum of sinusoidal waves with specific frequency and amplitude (Fourier analysis). In face recognition, we do the same and compare it with the template patterns. Now it is up to statistical data processing to reveal a result. We can choose from several statistical methods.

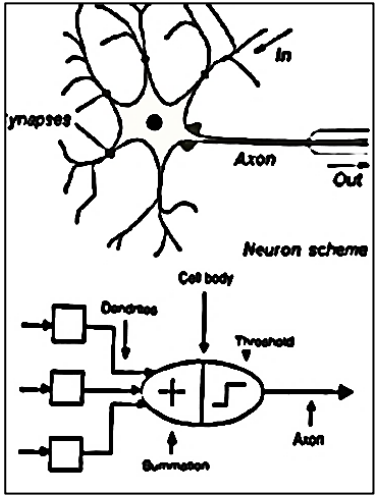
A simple version is called the Principal Component Analysis PCA. It compares all rows or columns with the template and eliminates the variances to keep lesser data and fluctuations. A simplified or normative image is called an eigenvalue of a template, which simplifies the comparison with other images. In this way, you can retain from the many, a set of eigenvalue faces. The image has been reduced to a minimum of data that catches the essential feature of the image. Another technique is called Linear Discriminant Analysis LDA, which searches from a group of pixels the separates or the separability of the data set. All these techniques become very specialized in line with the many application in pattern handling and recognition and communication efficiency and reliability. The next picture is an attempt to illustrate the principles of the main statistical tools used.

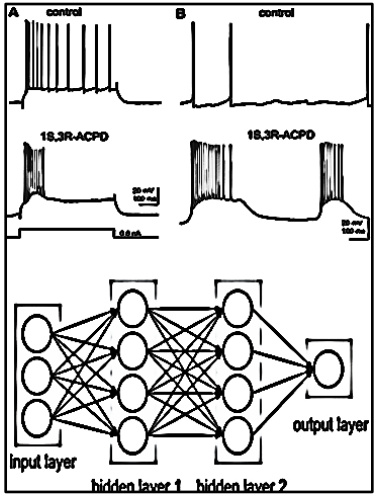


Instead of processing absolute values of measurements, we use the deviations from a fixed norm, which can be the average; or we allocate the measurement data to a class or group and treat these groups separately.

The studies of the brain's dynamic operation discover more phenomena ready for ever more models and hypotheses. The concepts presented by the scientists mirror the techniques used in complexity models and chaos dynamics. In artificial intelligence or automated learning, the main computational methods are based on neural networks, which I explained in the version of mental brain maps. The system thinkers like Stephan Wolfram, who studied the endless variety of patterns emerging from simple rules, stand now model for the variety of species. In the dynamic of pattern emergence and growth, you read the echo of Evolution with birth, death, reproduction, and diversification. Why would not the brain process the data gathered from the senses, as a complex network? The name of Neural Network derived from the word neuron indicates synergy between the physical brain and the mathematical systems.

The neuron is the core building block of the brain. Although there exist many kinds of neurons, we can catch the essential operation in a simplified model like electronic engineers practice with logic cells making decisions of AND, OR, NAND, NOR, Delay, FILP-FLOP (memory) and Oscillator. With these logical building blocks, you construct a computer. The scientists believing that the brain is a computer, model the brain accordingly with the neuron as a logical cell.





A neuron, as a simplified logical cell with dendrites as inputs and axons as output. A neuron acts on intensities, frequencies, and combinations, which requires more intermediate layers for simulations. Artificial learning models apply this kind of level parameterization.

In reality, neurons are much more complex in handling the electrical and chemical data in a combination that has no equivalent in technology. The input-pattern of the neuron plays a role in the functioning such as a wait and see protocol, an emergency reaction, and, most importantly, a self-learning capability, which leads to the existence of many specialized neurons. On top of it, there is an interplay with the connecting network as a dynamic situational process. The models of the nervous system have an equivalent in most current advanced technologies of databases and networks. Parallel specialized processors are standard in complex networks, self-learning software, sensors with embedded processors, robotic movements, and dynamic network configurations. It seems that the concepts of neuroscience mirror the digital models of complex systems and electronic networks. Vice-versa, the neuron, as a simplified logical cell with dendrites as inputs and axons as output, acts as dedicated decentralized processors. Because a neuron reacts to intensities, frequencies, and combinations, the brain model is expanded with more intermediate layers.

FROM THE BRAIN TO THE MIND.

Neuro-science, as all sciences, contributes to shaping society at the actualized stage in Evolution. The religions claimed, and still do, a soul which helps to establish a social power base. This soul acts as an independent medium from the body, connects to

God and is separated from the body, with reunion planned at Judgment Day. René Descartes, who also studied the brain, compromised the religious instruction for separation of soul and body, by the introduction of the notion of the conscious and unconscious managed by God. The conscious became the communication channel to the outside world. [LeDoux]. Later, brain doctors confirmed that the connection with the outside, like speech and behavior, change or disappear when specific brain sectors are damaged. The anatomist Franz Joseph Gall introduced in 1800 phrenology or the science of the brain atlas and geography. This theory connects a person's behavior and character to the brain sections. Gall used the words atlas or geography because, at that period, the scientific center was Europe being a conglomerate of states with conflicting social and political policies.

In 1900 Freud focussed on the individual minds with passions, emotions, and aggression, which trigger social awareness pointing to the individual. The person got rights, which took some more time for women. The long ongoing industrial revolution was succeeded by the age of electro-magnetism with electricity for light and power and the waves that carry communication.

Hans Berger developed brainwave EEG in 1929, which become the first communication tool with the brain. The brain atlas models were encapsulated in networks, just like the people and societies became interconnected. Lobotomy or cutting nerve connections in the brain to eliminate severe mental issues revealed the highways

and the extended network from the brain to toe and fingertips.

The computer from the forties entered into the management of business and society; similarly, the brain neurons compare to a digital business processor. Follows now the theory of chaos as an attempt to explain the real world that never is stable, and that only increases complexity, and that can explode or implode as well. Disturbances in the brain like opiate substances turn the mind crazy. The society grows ever more complex, and Science has to harvest the ideas more broadly and with more in-depth specialization. So happens with neuroscience. Neuropsychology climbs to the same clouds as the neuro-computational sciences participate in the global cloud computing networks. One strong result of these computational power is now neurogenetics, which can map (dis)orders in an individual brain.

WHAT PSYCHEDELIC MEDICINE TELLS ABOUT THE BRAIN'S MIND. [123]

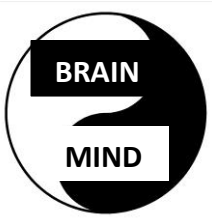
Scientific research started with the development and experience of LSD in psychiatry. These studies clarify the operation of neurons and the chemicals that feed the brain parts. Simplified, we can say that three chemicals dopamine, serotonin, and norepinephrine feed the brain regions in a modulated way what means that the chemicals vary in kind and intensity to feed brain regions selectively. They are the facilitators of the real process of the transmitters as glutamate and gamma-aminobutyric acid [GABA], and

to some extent acetylcholine, and ion transport. Here enter the evolutionary cycles again. Serotonin is produced by raphe nuclei neurons, and there are some 15 different receptors among the many neuron types that detect serotonin. Serotonin 2 receptors emerge first in the biology with variations 2A, 2B, 2C. The serotonin 2A receptor appears in most of the brain domains involved in cognition and higher cortical processing, such as the visual cortex. That's why drugtakers experience visual hallucinations and distortions. The serotonin is involved in emotions—anger, rage, hunger, sex drive, cognition, depression, mood, and more. LSD and psychedelic medicine act mainly on the serotine type receptors and, as such, influence the many mind expressions. It is not clear that serotonin receptors directly react to the chemicals, or it helps the oxidation of glucose. *Consciousness is the result of the oxidation of glucose*, being the energy that produces the neuronal activity. Whether changes in blood supply stimulate neurons, or whether the stimulation of neurons creates changes in blood supply is still disputed. [123 -p73].

The fact is that the brain holds a network called the "default mode network, which controls what enters consciousness and what doesn't. It shields us from too many signals from the unconscious to bother the actual need of the body. *The LSD drug acts on the control network resulting that all kinds of data and maps from the unconscious are released into the conscious.* That's why drugtakers experience visual hallucinations and distortions because different parts of the brain talk to each other in an uncontrolled way.

The experiences with LSD conclude the brain-mind hard and wetware model as described above.

In all this excitement, we should not forget that this is all the work of individual brains operating in their own minds, which connects to other brains as a collective Mind. The conclusion so far is that all the time, we look into a mirror.



So far, the emphasis was on the Brain, or at least what the Mind tells us about the physical Brain. That we cannot explain without the Mind.

I modeled some characteristics of the Mind's operation in the acquisition of KNOWLEDGE by keeping the consistency right with the concepts of Cognition. The consistency line is based on the underlying process principle of pulsation and rhythm, which drives all processes of organic as well as non-organic material. The acquisition of knowledge starts with the Perception of the external world and the processing of the data. PATTERN Recognition is the dominant process of EVOLUTION, which is fundamentally a generator of Patterns. With these principles, I try to build a model of Brain-Mind as a logic concept.

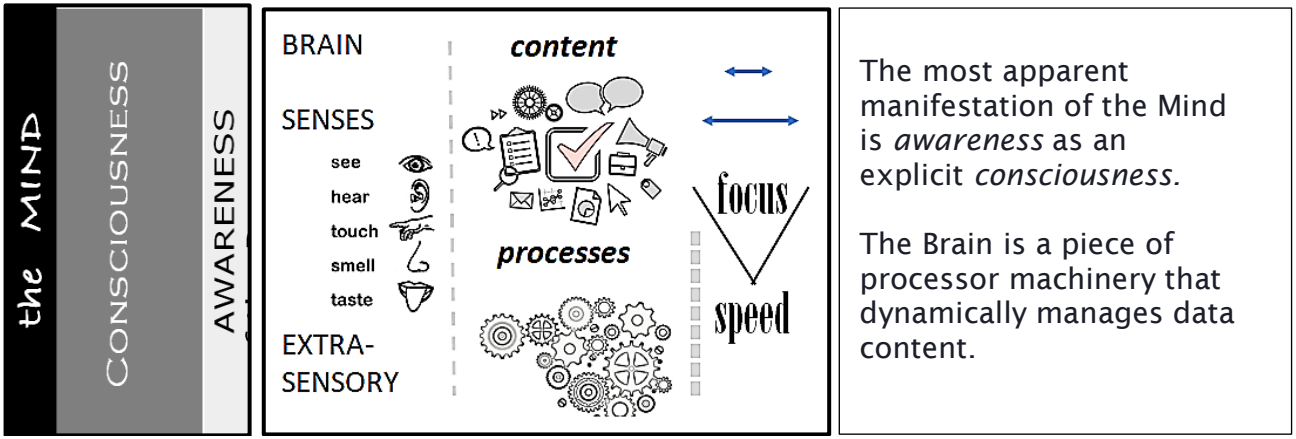
In the following chapters, the MIND takes over the leading role, and we find out how the Brain participates in the Mind processes.

6 THE MIND.

6.1 FROM CELLULAR NEURAL NETWORK TO CONSCIOUSNESS.

We differentiate the MIND from the technical operation of the brain. The mind is the *conscious experience of the functioning of the individual brain and senses*. [Stanley Sobottka]. The mind has content that stretches over a field that depends on the focus and dynamics of the moment. The content of the mind consists of thoughts, emotions, feelings, dreams, vision, and a unique conglomerate called the 'I.' The brain, the nerve system, and the senses participate in a dynamic chaos process together with a new concept called the extra-sensory. The senses trigger most operations, but something also starts the mysterious *extra-sensory*. The body and organ motoric engine communicate in chemical-electrical coding, and we are not aware of what's going on inside us. The inner chaos processes run smoothly until they hit an 'out of equilibrium' state like when a disease, hunger, or fear pops up. The neurons fire patterns resulting in awareness as mainly an internal affair. The externalized results are called signs which can appear in the consciousness. Probably, the brain focusses primarily on the input of the senses from the external and the preparation for bodily actions. The entire brain process is internal

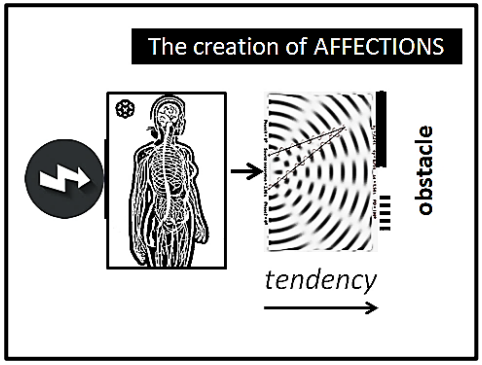
autopilot machinery. When we drive a car, we focus mainly on the surrounding until some alarm light flashes.

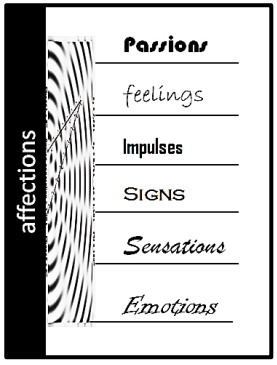


As explained earlier, the body is a balanced assembly of organs whose activities are managed by the brain and the nervous system bringing back to the brain the sensory inputs. Clouds of information and instruction waves are transported through the nerves and radiated as electromagnetic waves. We classify these data waves as sensory, motoric, and extra-sensory, to which we add the emotional feelings. *The mind waves do not*

resonate only under the skull but vibrate through the whole body. According to some people, radiation also goes beyond the body. The psychological, emotional, and feeling can be modeled as a chaos system with inputs, outputs, and boundary restrictions. Psychologists apply many concepts to explain the domain of human feelings, actions, and behavior. The next infographic map reflects the view of F.Paulhan in his book 'Laws of Feeling.'[405]. I use the theory on Complex Systems to visualize some operations of the Mind.

Let's consider the mind as a system activated by the senses and thoughts. The system responds with the release of a spectrum of signal-waves. Such a wave is called a *Tendency*. The word indicates that the response propagates until it fades altogether. When prefixed ideas of memorized experiences obstruct the tendency, new waves appear. Usually, there are several hindrances for the tendency wave. Interference can amplify or smoothen each other. The interferences are called *Affections*. A sub-wave has its characteristics of frequency and amplitude, which translates as a personal psychological manifestation. The psyche is a spectrum composed of many emotions like passions, feelings, impulses, sensations, etc.

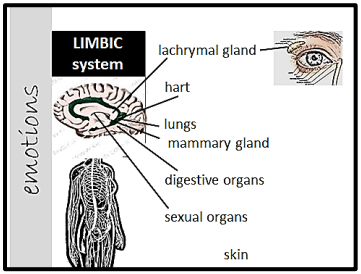




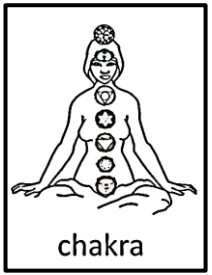
Psychology is depicted as a complex system that reacts to inputs that can be external as a punch or mental as a thought or a dream. The response to the input pulse is a spectrum of the psychic phenomenon, which depends on the system preconditions.

The link of brain sections with psychological behavior is well documented in what is called the Limbic system, which contains the following brain parts: septum, hippocampus, entorhinal cortex, amygdala, cingulate cortex, hypothalamus, and some more specific area's. Malfunctioning of the limbic system is the so-called *psychosomatic* diseases. The coupling of the limbic and nerve system to the organs works in both directions. The Buddhists, the yogi, and theophany make the relation explicit between the mental and the psychological states with the body organs.

When we talk about the MIND, we open a vast field which extends from the neuron configurations, to wave functions and even to the holistic society. Emotions and Thought drive Cognition. The next map serves as an example of the view from a holistic approach.



We can look into the mirror of the soul from many angels. I try to link as much the brain infrastructure, and its processes to the mental manifestations of the mind.



Theosophy is a holistic thought which is close to the ideas of Buddhism. The chakra represents the body parts and organs against mental functions and states. There are many versions of chakra, such as foot reflexology. Some scholars go even further and extend the body to an aura or a pattern of radiation of energy waves outside the body, which is so far speculative. Although the neuro-sciences carry the name Science, many ideas are hypothetical, mainly when the Emotions and Thoughts are discussed. Best is still to follow the rationale in the vast landscape of the Mind, where even professionals get lost in phantasy.

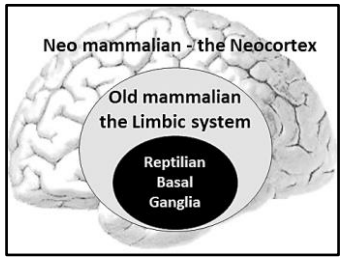
How to couple Psychology with the brain-nerve-neuron infrastructure and the waves it creates? The neuroscientists have allocated many emotions and mental states into brain geography. Again, no single emotional feeling occurs in one particular area. There are always different regions active in a flexible configuration, which means that any

specific sense of, e.g., anger does not always provide the same wave pattern. For each person, it can be different.

The whole issue of the MIND is the notion of CONSCIOUSNESS. *The scientists come close to a physical description of Consciousness.* The first step in the understanding of Consciousness is EMOTIONS. A comprehensive explanation on this topic comes from Jaak Panksepp 'The Foundations of Human and Animal Emotions 1998'. [110]. Emotions start with SENSING. A total model of Sensing describes how humans interact with the environment and within their own body-mind entity. There are three categories of sensing: external (vision, smell, hear, touch), internal (hunger, oxygen in the blood, hormonal housekeeping, etc.) and the AFFECT sensory system with the seven psychological terms: *Seeking* (exploration, anticipation, desire, enthusiasm, curiosity). *Fear* (flight or freeze to avoid physical destruction and pain). *Rage* (frustration, resentment, retaliation, jealousy, envy). *Lust* (sex drive, urge to reproduce). *Care* (desire to nurture). *Panic* (anxiety when separated). *Play* (rough-and-tumble play, fun).

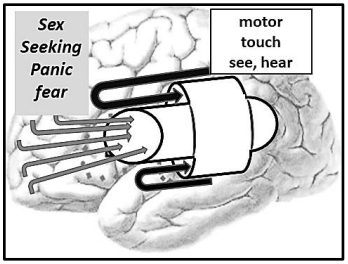
The BRAIN organ mirrors the Evolution physically in the network of neurons, the connectome, the cell DNA, and the semiotic code, which regulates the system communication. *The MIND is the continuous rehearsal of the story of Evolution and the personal physical and mental experience updated until now.* This theatre plays in a rhythmic process where all past events determine the subsequent psychological pattern

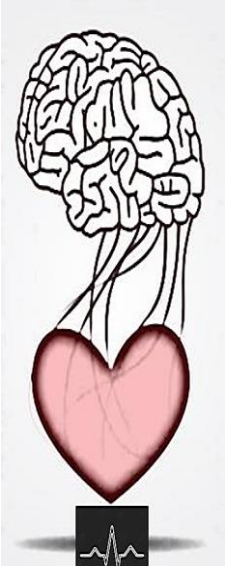
formation. The first molecules from the universe participate in the life of today together with the complex biological molecules that emerged later, and the pattern formation of organs and the nervous system. The first life species still participate in daily life. The brain is the organ that physically integrates the steps in the Evolution of the life mechanism, which is called the Maclean triune brain concept.



The reptilian core provides the automatic reactions of food-seeking, aggression, etc.
The Limbic system adds psychological and emotional social resolution.
The neocortex covers organization, logic, mediation, and all cognitive functions.

Deep in the brain, there is an area where connections from the emotional field come together with the motoric and sensory nerves. This facilitates cross-talk, and the sensory can trigger the emotional, which influences the motoric; think of the body language





Maybe the most compelling indication that the density and proximity of the nervous motoric and sensory functions are the **heart**. The brain and the mind are symbols of the rational and the emotions or feelings; the guts stand for intuition, and so have other organs associations with the Mind. When you look at these organs, they all have a particular own autonomous nervous system and a special interconnection with the brain. Especially the heart has its brain with a high density and proximity or its nervous circuitry. "The heart is a sensory-motor cognitive organ, and its neural system has a unique structure and function that makes the heart the main single cognitive organ that plays a fundamental role in the conscious behavior of man and animal, determining his intention, free will, and volitional action," Amna Al Faki. [150 p-224] . The motoric function of blood pumping is clear, and we experience the link with the emotional every day. But this process is more complicated. There is the mechanical wave function with pressure and pulse shape. The frequency spectrum content synchronizes with other selected organs. There is the sensory function that controls the production and allocation of specific hormones, just think of flight or fight decision, which is made in the heart rather than in the brain. The heart generates the body's most powerful and most extensive rhythmic electromagnetic field, hundreds of times much stronger than the electromagnetic waves from the brain. No doubt that the heart is the center of higher consciousness forms like wisdom, righteousness, faith, emotions, and love. There is convincing evidence that depression and cardiovascular disease are linked in both ways.

It follows that Theosophy slowly gets some neuroscientific backing, which got a recent update from Damasio Antonio, who summarizes: we can say that there is an old brain core handling the necessary biological regulations down in the basement. Above in the neocortex, the deliberation is done with subtlety and wisdom. Upstairs in the cortex, there is reason and willpower, and in the downstairs cortex, we find the emotions and flesh sensations — [110 –p147].

There are several layers of consciousness. The first level is in the model from the slime mold, with physically embedded functions. This view is contrary to most philosophers who regard consciousness as something holistic. In the rational model, we fit the Emotions and Affects as the update of the brain state of affairs. We can compare these states as the chaotic dynamics of the brain waves which steer the physical and the psychics of Body and Mind. More in detail, the brain waves translate emotions and affects into connectivity, chemistry, electromagnetic waves modulated in intensity, frequency, and composition. The neurologists managed to map lots of the physical relations between the brain-nerve system and the motoric, the sensory, and the emotional. The chemical blueprints confirm that the relations between the brain activities and the mental states have many interferences. As a result, all psychopathic drugs always create side effects in emotional and motoric behavior because these medicines intrude on several brain geographies. When you are drunk or under narcotic influence, the motoric, and the emotional loose coordination and stability. A positive example is the beneficial effects

that rhythm and synchronization in daily activities bring to mental health and emotions. That's why music as an audible and rhythmic sensation is so dominant in the conditioning of our feelings.

I wrote already about the specialized neuron rhythm generator from which the main one is the daily clock. A group of neurons called the suprachiasmatic nuclei, are located behind the eye and above the optic chiasm [19]. This explains the way to overcome jetlag by exposure to bright light in the morning. These specific neurons fire for more than 24 hours even after disconnection with the rest of the brain, a fact that shows that the beat generators of the brain are a crucial mechanism. The understanding of the rhythmic behavior and the dynamics of the brain processes seems for the neurosciences hopeless complicated. The whole conscious and cognition builds on the inner rhythm processes like the learning of language. Cognition relies on the fundamental rule of the transcendence triplet – ground, signifier, signified, what I explained earlier..

The biological SELF is a cumulative heritage of half of DNA transfer in the offspring steps, and half of the adaptations to the physical and social environment in the course of Evolution.
The SELF is the reverse Fourier of all life forms and experiences which an individual holds in its life span.

6.2 SCIENCE, PHILOSOPHY, AND THE CONSCIOUS

What is consciousness?' There is no single clear answer to this question. Most views contains elements from the sciences, philosophy, and religions. I try to compile the components that take part in consciousness. *Conscious is an activity*, in which also language participates. To fully answer the question needs thinking, and thinking is a relational affair. We can dream up an answer or snatch an intuition; to formulate what consciousness is, needs rational language based on reflection.
To postulate that the brain's activity is a sequence of relational mental sheet manipulation is —to claim that *consciousness is activated at any moment when we establish a relationship.* Connecting means that you link with something split. So, in this concept of consciousness, there is a sequence and a relation, which implies that sequence is before relating. We extend this philosophical thought to the idea that time being implicit to sequence, is before space (the split relationship). Conscious becomes now the coincidence or co-existence of time and space, which I have earlier defined as a SIGN. Remember how a signifier becomes (is followed by) signified, which is called a SIGN when meaning is attached to it. Remind that the traffic stop post does only impose its authority of a Sign when it is planted at the road crossing (space) and at the moment (time) when I arrive at that spot. A sign merges space and time in a moment of NOW. A sign is realized when a signifier points to something that obtains a signification.

Awareness is the signifier, and the signified is an image as the result of consciousness. Finally, we must conclude that consciousness is a happening NOW moment.

The translation from one map into another occurs mostly unconsciously. When we are aware of a transformation means that we are conscious of something happening, or we become conscious of a Relation. When maps connect in a series, we call it a THOUGHT. The relational CNN maps refresh or change at a rhythmic pace, which is the source of the feeling of Duration.

The typical relational cycle is presented as the — logical steps zero, number, the next , or — 'signifier' becoming a 'signified sign' or — source, signifier, sign. A chain of these rhythmic steps of thought is called Transcendence. The transcendent thoughts become the generation of meaning, which is the path of cognition building. This concept seems entirely consistent; the only thing left is to explain how something undefined can act as a signifier to point at another thing becoming a signified Sign. The term Signifier is now the same as AWARENESS.

AWARENESS, as a step to conscious, is also hard to explain. Psychologists use the technical term of Sentience or the capacity to feel, to experience, to perceive changes, and to choose alternatives. To distinguish options, and to select out of them, brings us to another topic: which are brain maps are selected for comparison or projection? Part of the answer is that DNA prewires the brain as a result of evolution and learning, but there are still options left, and the question remains: which mechanism makes a choice?

Technically, AWARENESS can only come after that something happened. You can speculate that an event might occur, but to become conscious of something, it must have happened first. So, all emotions, feelings, and thoughts have popped up before I am aware of them. I am only conscious of some of my auto-pilot actions. Association of consciousness with the happening of life results that I only can live in the past. Here stop all discussions on FREE WILL. It was decided for you … by what or who? The only answer is IT, the life engine, or as Friedrich Nietzsche calls it the Will to Power.

Can we conceive a non-cognitive concept where there is no before or after or elsewhere? This idea is called the CORE CONSCIOUSNESS, which only operates in now and here; or better in no space and no time. Dreams belong to the domain of the core-conscious. Dreams happen in a non-logical structure where space and time are merely random appearances without flow. We use Space and Time in intellectual or cognitive concepts, and they are pure fiction derived from feelings. Space and Time are signs that we manipulated in mathematics, and turn out to be very useful in building new ideas.

Cognition is a series of steps uplifting meaning to the next level. The rhythm or the beat of the core consciousness is the motor of the extended or broad consciousness. Core-consciousness holds the imprint of the functioning of the whole body and rhythmically stimulates the execution of the biological and mental tasks. Similar to the

slime mold's system to adapt its shape to the opportunities and dangers of the surrounding, so does the core consciousness represents all functionalities to realize a specific species. We can compare the core consciousness as the bootstrap program that initiates a sophisticated software program. The core consciousness does not possess a longterm memory nor DNA, which are required for the extended consciousness. Neurologic patients who have their higher brain functions damaged still rely on the vital biological services provided by the core nucleus. We can say that consciousness is powerful when the biological machinery is performing, and the relational capacity of thought is strong, but we cannot measure it or quantify it. We both can be conscious of something, but the content is different. We are conscious about feelings and emotions, but not of memories and images stored in the brain. Is consciousness a product of evolution, and is it beneficial? It is not a summit but rather an intermediate state. It is at the bottom line, a communication gate from human to human. [203 –p13]. Last, the medical definition is: consciousness is when normal wakefulness attention and purposeful behavior are present.

I add to this other statements regarding consciousness: Whenever there is consciousness, there is an element of recollection. It recalls an earlier phase of dim recesses from the unconscious. [319] Alfred North Whitehead. Process and Reality 1928]

Consciousness is understood as a microscopic neural ordered switching of patterns which result from the microscopic interaction of elements from the brain.

Consciousness is a state in which several sensory stimuli and mental functions are integrated in a few seconds and standing in the focus of one's attention.

[402]. Klaus Mainzer. A little book of Time.

6.3 FROM THE CONSCIOUS TO REALITY AND COGNITION.

Now we make a move to REALITY starting from Consciousness that pops up at the interface of one CNN map projection to another sheet. The differences between maps create a *sensation*. As the map switching is rhythmic, we feel a duration (remember the relation between frequency and time). *It is that feeling of rhythm which creates Reality*.

Let's climb some more philosophical stones. A *difference* reveals itself only when there is a distinction, which means that it is not all the same; some things are different, or there is a limitation or a split. A transcendence of a limitation is a SHAPE, and a transcendence of a Shape is LIKELINESS. Recognition relates to likeness, and the next transcendental steps creat meaning, ending in cognition. This is the way by which we create Reality. There are many distinguished objects in the neural sheets, which only exist in relation to another thing, or the same, but in a different position. The position is relational. When we sense an object as a visual percept, we, as a cognitive convention,

put the object in a 3-dimensional map x, y, z. Now we switch to the physics' domain of CHANGE, what in neural terms are a series of maps. Change is the most common phenomenon in the real world. We cannot escape change because of the fundamental rhythm of life, making change a given. We transcendent the sensation of space and time into sign language (X, Y, Z), and the subsequent neural maps also carry the codes X, Y, Z but shifted in time (the duration of comparison of the sheets), Reality has two sequent 3-dimensional maps or six dimensions, [32-p152].

> " If we think in relations, and if relations have some universal form, it is manifest that such universal forms of relations become universal forms of consciousness". Herbert Spencer. [320 –p172].

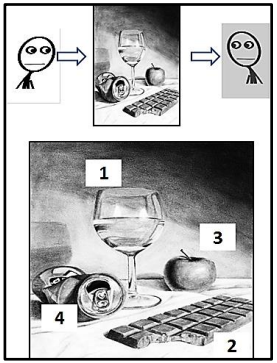
Now when we combine the statement that 'Life is definable as the continuous adjustment of internal relations to external relations.' [320 -p96]; means that we should broaden the initial steps of cognition to the exchange of information, what we call in general terms *Semiotics*.

Before we handle the language of conscious' communication, we need to understand the technical processes of perception. In chapter 1, I have introduced Perception as a necessary component of Cognition, and how brain processes the vision

data, and how the results integrate into the Mind. Now we look at the mental side of perception also named Psychology.

6.4 THE VISUAL AND THE MIND with an introduction to PSYCHOANALYSIS.

How to link the model of brain maps of vision to the everyday psychological experience? We first analyze the process of perception.

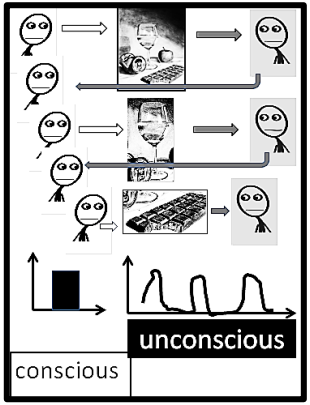


To perceive the World is to co-perceive oneself.

When I look at a scene, I first see the whole, and then I differentiate. What is in the picture checks with my unconscious the relevance of what I see. When I am thirsty, the glass of water tells reminds me that I have to give priority to drink. Then a next priority will be processed and stored in the unconscious. Walking along with a shop, I am triggered to first look for drinks and next for sweets.

The process is chaotic means that iterative selection and comparison of cellular maps search for a stable point, which releases a meaning to the conscious. In this way, we can speculate that *the unconscious operates pulsive in the frequency domain (brain waves).* The reverse Fourier integral is a signal or sign in a time laps colled a moment or NOW.

Consciousness jumps from Now to Now, in which time and space coincide into a Sign with a Meaning.



Here follows what happens. The viewer differentiates (ask for details) and integrates the inputs (tries to make sense of the data). This goes on until a stable mental map of the view is reached, called an IMAGE. In some cases, people do not manage to re-integrate the parts of the picture and can make no sense of a whole. The person will focus on a specific section or element and get obsessed what we call *paranoia*. Sometimes, an emotional image map is dominant, and no stable meaning can be formed, which can result in mental, or psychological deficiencies.

This kind of mental images and thoughts or emotions pop up all the time, what the waves in a brain-scan testify. Obstacles and boundaries to waves create standing waves or interferences. Seeing an object might trigger an insatiable demand for a specific

object; now, we speak of a *fetish*. Some woman tends to buy shoes anytime they approach a shoe shop. By satisfying that need, they hide a real suppressed DESIRE. In extreme cases, this desire is called NEUROTIC behavior. The opposite does also exist. The needed object is at reach, which usually triggers the action to obtain the target. The contrary happens by rejecting the needed item; the desire is insatiable. Anorexia is such a case: the food is there, and the patient refuses to consume it...only to demonstrate her or his passion. Neurologists found that the mental images stored in the unconsciousness occupy the frequency bandwidth where the green color is situated. In this way, to appeal to the unconscious, it is better to present pictures in green color.

The mind and body are very much integrated; what makes the question – is the mind in the body, or is the body a product of the mind? Both mind and body participate in the same phenomenon of life. The content of the mind is a mixture of process procedures and stored in the unconscious and occasionally processed as conscious mental matter. As we have entered Psychology and Psychoanalysis, we now link the models from the Mind scholars, with the concepts from the Neuroscientists as I have compiled so far.

PSYCHOANALYSE, the CONSCIOUS and UNCONSCIOUS.

The following psychoanalytical ideas come from the references [500-510] covering the views of C.G. Jung, Freud, Jacques Lacan, and Jean Laplanche. I have tried to position their concepts into the Brain-Mind model on which this publication builds. First, all the psychoanalysts share the concept of the conscious and unconscious. The Unconscious has no real *content* in the form of any meaningful format. The Unconscious is instead a *process* that fosters links and references to personal, collective, and evolutionary conscious experiences from the past. The fragments containing the information whirl chaotically in the Unconscious and can accidentally reach the Conscious via specific channels. The whole psychological process can be pictured as the structure and dynamics of a *jellyfish,* which exhibits its inner part with the outer environment by a pulsating movement around a ring. The whole (psychological life) moves by the synchronized impulses of the jellyfish's tentacles.

The (s)pinning point for the movements (like the shaft of a wheel) is LONGING.
The researchers still dispute the process, which makes it possible for the internal to become external. in the concept of the ID (das Es).

This idea can be conceived as an embryo in which the different members and functions are still under development, while the coordination between them is not fixed yet.

The fundamental rhythmic process which dominates all bodily and mental processes is in the psychoanalysis LONGING, a theory developed by Lacan. Spinosa declared earlier that Longing is the essence of Life. In the representation as to the jellyfish, the longing is pictured as the ring, around which life pulsates. Closest to the ring is the sexual domain. We all experience that the sexual quickly excites pleasure. Especially, the joy related to intimate knowledge triggers the unconscious memory. That's why Freud has developed his theories around the sexual. In Freudian terms, the sucking of a baby and the defecation is linked to the impulse of pleasure. It looks like we genuinely remember a kind of satisfaction that we want to recapture again. This permanently firing pulse is the Longing. Sometimes, this longing is called 'the Will to live,' the 'Libido,' or the 'lust for living'. Lacan adds a particular dimension to the Longing, which is the longing for the *Longing of the Other*. We do not long for the other person, but we long for what the other person wants, what brings us to social behavior.

We all know that we are born with the inclination to imitate. This is the first process that steers our learning. The baby mimics the movements, facial expressions, and the sounds of the mother, later follow the mimic of the environments. According to Lacan, this initial impulse to imitate develops into the longing for the Longing. The baby quickly learns that the imitated smile will make the mother happy. The baby tries to please the mother at any moment, just like the mother pleases the baby, something that does not work all the time. Here starts the first psychological tension for the baby. When

during further development, this resentment cannot be balanced, it can develop jealousy, even leading to psychic disturbances.

Longing is the rhythmic of Life. The claim that —-the neighbor's grass is always greener than at home means that I wish to acquire the longing of my neighbor; I want to *synchronize*. When my neighbor proposes to exchange his car, which you like more than yours, you will not be satisfied. The point is that the neighbor is prepared to trade his car for something that he/she values higher. Although you do not know what he wants, you envy the neighbor's longing. This longing will fade out whenever you come close to it. The wave smoothens. This longing plays a primordial role in psychology and psychiatric sciences. It is a source of economic and social development. In this way, Longing becomes the primary mover of all processes which dominate society. How to explain the trigger for longing when we look at another person?

Earlier, we have learned that in the process of observation, we start a self-reflection. When the object is *another person*, a subject will attach itself to the object as a signified sign. The question which pops up first is: 'what does this person want?' This will be mirrored as 'what do I want?' Is our Longing directed to the object? This explains why people so readily associate themselves with heroes. We do not make an effort to question our longing; we instead blindly copy the hunger of the other. Our longing

becomes the signified symbol of another person. Cling too long to a particular longing becomes a *fantasy* that ends up in a *phantom*. The imagination which we develop by seeing somebody else can even sick the mind of a voyeur and an exhibitionist. What this person wants is to see the minded person naked. Fantasy is not necessary a nuisance; it can have a positive impact on, for example, problem-solving. *Imagination emerges between the Unconscious and the Conscious*, which allocate an essential role to imagination in psychiatric treatment. What is now the relationship between longing and instincts?

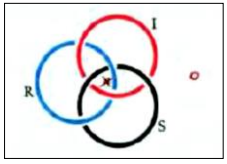
Instinct is a condensed longing that is channeled and encounters resistance. This resistance can occur in the unconscious as well as in the conscious of a person. According to Lacan, Longing plays a vital role in the development of the Self as the own longing needs to be satisfied. The instincts are the tools which can help to channel the longing. When we feel that we cannot satisfy the hunger, we arrive at a point where — fear to live, starts. It would help if you did not ignore nor push the longing aside. The awareness of the instincts which drive you and the way you can balance the instinctive acts; determine how well you can satisfy the longing. When this is not enough, you should try to fill in the hunger with an alternative, maybe more explicit wishes.

You might get bored by this psychoanalytical introduction, but finally, we get a link to our neuro-scientific model. Longing also translates in the wish for knowledge and understanding, which is the acquisition of Knowledge. *The rhythmic switching of mental*

maps in the activity of comparison and creation of newly organized data is what brings the Longing or Tendencies. The confrontation with hindrances creates new psychological standing wave patterns and shapes the Ego. An example: One of the first conflicts, according to Freud, is that the child discovers that the mother does not only loves her baby. Other people who get the mother's attention is in the first place the father. The father takes part in the longing of the mother, which immediately will be noticed by the child. We arrive at the famous complex of Oedipus. The inner conflicts might slumber and pop up at any age by specific triggers. Such a demonstration is 'childish behavior under particular circumstances,' meaning that the person goes back to childhood. It is not necessarily the birth-father who plays a role as an archetype. A substitute figure as a hero (Batman) or even an object can take over the part of the Oeidus father. A child also can have several of these creatures to attach to, hoping to solve the problem which the mother has created by not giving exclusive attention to her baby.

All data from the past are stored in the brain and remain available to be recalled. What and how the selection processes happens is still a mystery. There must be different types of stored maps. With this short introduction to Freud, we come to a crucial aspect of psychoanalysis, namely the differences between the **real**, the **symbolic**, and the **imaginary**. Probably this relates to *specific types of mental maps* in the brain, which the mother creates when switching attention to more than one point.

Lacan made the following entwine to illustrate that problem. **R** is the real, **I** the imaginary, and **S** stands for the symbolic. Remember the process of Thinking where we create continuously new metaphors from Sign, Signifier to a new Sign. The mind stores its data in a kind of image language. Images come from perception, the real thing, or can be generated by the brain itself as Imagination or from a dream. The new Signification created by Sign-Signifier can become a Symbol as a new Sign.



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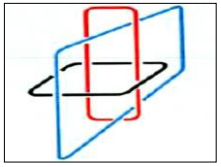
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Lacan nods. Only when you can open one knot, then the whole will fall apart. For any psychoanalysis, this is the most complicated part of the job. Do not take it for granted that you can do this quickly.

When we talk about something (a patient speaks to his mental helper), you cannot distinguish whether the topic is a real object which exists and can be touched or a state of mind. The issue can be fantasized. It is also possible that the subject is a surrogate or a symbol or signifier, which leads to another thing. One of the topics in healing psychiatric patients is that many times they take symbolic signs for real. How to distinguish real, imaginary, and symbolic is the most significant first challenge for the healer. Because this concept is a core model in psychiatry and is a good illustration of the data processing of the brain, I elaborate with a practical example.

A person comes to see a psychiatrist with the complaint that all the time he is being chased by a lion, what makes him incredibly anxious even at daytime.

This is a real situation; the person comes to see the doctor and has a story.

The starting approach of the psychiatrist is to question the patient and analyze the dreams to find a connecting point to the phenomenon of the lion.

The fear of the patient can be real or play. The same is valid for the lion in the story, and even the whole story can be faked up.

The patient and the psychiatrist are building a relationship made up by listening to each other, questioning and suggesting. Is there is trust between both?

It might be that the patient fakes it all in order to catch attention or the patient enjoys the game he/she plays with his expert healer.

The psychiatrist will have to check if the lion has been a real object in the life of the patient, or is it a fantasy or even it might be a symbol (an archetype, a fetish as a cuddle pet, a pure symbol). This is a difficult task as there are many phases in the life of the patient which he wants to reveal or to hide something.

It can happen that the patient may refuse to talk about anything that is real.

Working out the psychoanalytic chart of what the psychiatrist has learned so far becomes a big flowchart with lots of possibilities and trajectories which could be the actual scenarios.

An example of such a hypothetical scenario is that the patient's father was an absolute or impulsive person, who at one point in time has thrown his child's cuddle plush pet into the fire.

The father acts as a Freudian archetype in the story. The patients view the psychiatrist as a father figure on who he now sees the opportunity to take revenge. He invents the story of the lion. The fire (from the real fact) is also an archetype. The patient will use this archetype to 'grille' his interrogating psychiatrist.

An alternative scenario is that the patient has a very strong memory of a circus event in his childhood where a lion jumped through a ring of fire in his direction.

This kind of scenarios can be developed extensively by the psychiatrist to the enjoyment of the patient who now sees that his master is just following his own game of fantasizing. The patient wins at any new scenario which the healer will suggest (it is not too hard for the patient to trace the scenario's followed by the doctor because he questions a lot).

After the too many sessions with the never-ending scenarios, the psychiatrist concludes that it all has been faked up by the patient and the real new task is to find out the cause of this fantasizing behavior of the patient.

This is a real fact now.

Again can the process start with possible scenarios. A classic explanation is that the patient, at one time has disappointed his father deeply in the execution of a task which took away his self-esteem and trust. His whole life became a failure in real terms, which lead to sick fantasying. Now the doctor will focus on all elements which present itself as a 'real fact'.

It all ends with a massive complexity of hypotheses which cannot be tested, or very few will reveal real facts.

The knot has to be broken: or the fantasies, or the symbolic or the real. Lacan suggests how to do this. The SYMPTOMS, as a very complex given, has to be put at a place in the real. Lacan gives this the name of SINTHOME, which is a fictive word that sounds like symptom and 'send home.'

Instead of getting involved in fantasying, mental healer continuously makes a reality check. For example, the psychiatrist checks how the patient reacts to elements of his fantasies. In the case of the fetish with the lion, the psychiatrist controls the reaction when the patient is confronted with a plush lion, a flag with a lion, a fragment from the movie King Lion, a visit to the zoo, etc. The patient delivers on all these occasions a 'real' reaction, which the analyst can map. In this way, the healer searches for a match with the real environment. For example, the patient can get a job is an animal asylum. This example should make it clear that the task of psychoanalysis is a challenging job. Even professional spiritual health healers cannot give any guarantee for solutions to mental sickness. Many times even after an extended period of treatment, they have to give it up.

Another practical example of the PSYCHOANALYTICAL MIND in the brain-mind model is the **EVOLUTIONARY CYCLE IN PERCEPTION**.

Besides the short emotional cycle the brain processes in perception, there is a more extended protocol which reproduces the Evolution. When you are confronted with a new view or scenery, the mind runs a checklist, which is part of the alphabet of visual semiotics. We look around; we see a scenery or picture, we notice something, we look for details. The attention of the brain follows a specific program with the following steps.

1 The first attraction goes to the things that move. Any movement like linear displacement, rotation, falling, tumble, spiral propagation, catch the mind first, and takes up attention.

2 The next step of the brain is to estimate the distance of the object that is moving. Probably is this a reflex to find out if any danger is prominent, and to prepare the tactic for defense: flight or fight.

3 Now, the following thing happens: we look for stretches of lines. Probably we want to calculate the most and quickest trajectory to flight and check on roadblocks, or a hiding place.

4 A reliable flight path is one that fits the physical capabilities of the hunted and is difficult for the hunter. We check the ground, the background, the shapes and sizes around us, and look for hindrances on the stipulated path.

5 Related to the above, we pay attention to touch: smooth or rough, continuous, porous?

6 Upon the assessment of the environment comes a priority attention to the people in the scene. We first want to see the eyes of the person. Are the eyes closed, or wide open, and what color do we notice? Red eyes are alarming.

7 Once a person is cleared, we turn back to the environment: what is big and what is small. We want to judge whether we can master the obstacles or the objects around us.

8 Next is that we want to find the meaning of the red colors we notice. It is the association to blood or flesh that triggers this attention.

9 Adding to the above emotional signals come the sexual impulse. Is it an opportunity for mating in the air?

10 This is followed by considering whether the scene fits for play, what links to courting rituals.

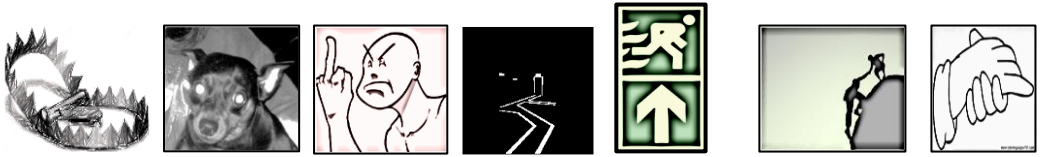
11 Now we have time, space, and attention to the temperature and breeze.

12 When all seems safe and comfortable, we start imagination, fantasy, and relaxation. We can dream, we discover patterns in the clouds, the stars tell us stories. We hear the birds and notice that the color of strawberries talks sweetness.

13 Once the senses are satisfied, we switch to knowledge. We first analyze people's faces and body language. We look for meaning in everything around us. There is a need for communication and sharing.
14 Now we like to feel comfortable and start looking for beautiful things. We eliminate the ugly objects; we set apart what is clear and what is hidden, old, or new.
15 Upon the choices are made, the ritual, pulsation, and vibrations can start.
16 After the excitement, we need rest and calm. Water is an excellent facilitator.
17 During the relaxation phase, the need for a goal pops up.
18 Now we notice a fire, tunnels, and death. Spiritual thoughts enter.
19 God is claiming his place together with respect for authority.
20 After this, we request rewards and honor. We notice flags and treasures.
21 We become aware that not all are given and that efforts are needed to achieve something.
22 We become aware that we need support. We distinguish groups of people smaller than twenty from the masses of people.
23 Last in the process of perception is that we fall on the faults in the picture; we want to restart all over.

These views come from: Norseen, John D: "Images of Mind: The Semiotic Alphabet" 1996. [313].

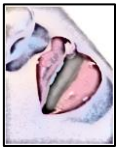
The above scenario follows the path of the Evolution of human reflexes. It shows that Evolution is active as a Now moment. The infographic illustration of the evolutionary sequence looks like this:



Read the threats and find the escape route — the look for support and cooperation.

Now the feelings take over followed with passion and dreams.









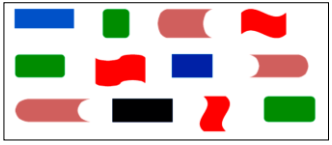


Time comes to make plans and settle down. Ethics plays a role now, and the material rewards attract and push to more significant challenges. Failures happen with despair and hope. You decide to restart.

6.5 THE SEMIOTICS OF THE BRAIN-MIND.

I just have demonstrated two cyclic modes of how the brain processes perceptual data to synthesize a meaning for the Mind. The first is the concise evolutionary cycle, flee or fight, and the second is an extended social cycle of cooperation to settle in a society or group. So far, we managed to keep consistency with the model of the mental data maps

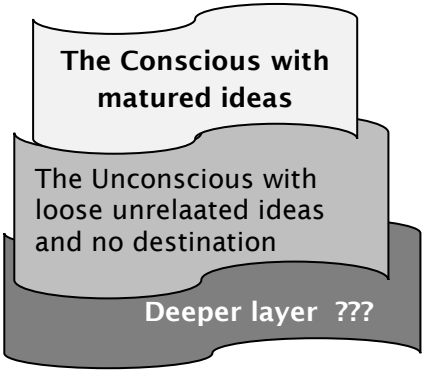
processed by the brain handling the sensory inputs and steering the motoric function. On the Mind side, we know that we operate in a cloud of images, where also dreams participate. We learned that we, as humans, develop a thinking process by which we give some images a meaning, called a sign. We use this sign for pointing to other phenomenon and provide a new sense to it. In this model, the brain as a data processor creates new images and signs like words. Language is a macro dynamic sign practised to develop new meaning.



Earlier, we postulated a data processing mode called CNN Convolutional Neural Networks that rhythmically generates patterns that can result in images. Patterns are all-over in physical entities from molecules, interconnections to bodies. Technically, life operation is an interchange of patterns in a chaos process striving to reach higher complexity while it keeps its stages of development as working memory. The rules of the game for the interchange we call LIFE SEMIOTICS, and its nature is physical to which we have to add an unknown element of the Mind. The physical part is electromagnetic, chemical, photonic as part of electromagnetic, classical physics, and even quantum mechanical. How does

the language which the brain processes in the interchange of data sheet, converts to mental tasks as to the sensor-motor functions?

The scholars of psychoanalysis like Freud, Lacan, Lemaire, Green, Jung, and Laplanche; do endorse the idea of — conscious and unconscious modes, in which the mind operates. Deeper under the unconscious there seems to be another even darker level which is not accessible to the rational thought.

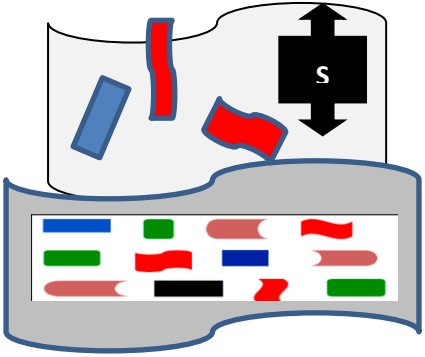


The Unconscious is a barrel filled with this kind of loose signifiers with no ultimate meaning, but they can acquire a sense and a role to play. These free signifiers are chaotically organized and follow the mechanisms of Chaos. In real life, there are impressions which we experience which will end up in the barrel of unconscious signifiers and that sooner or later pop up in the conscious with meaning attached to it. The process of how signifiers get meaning is still not understood, and most probably, it results from the data processing of the brain maps. Take the example of the picture of the tree.

S

This image can trigger the meaning of a naked woman's body. Signifiers can be thickness, size, orientation, color, etc. None of these signifiers is related to a naked body. Despite can the composition triggers the idea of a naked woman. This is the same mechanism as to how metaphors work. So, there is an exchange of primary signifiers that drips into the conscious mental life, which quickly can become a symbol. As soon as these symbols have played a role in the Conscious, they can return to the Unconscious. The more experiences and confrontations we encounter in the Conscious, the more will the Unconscious be fed with new loose signifiers.

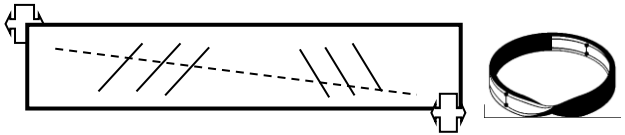
The next drawings are intended to visualize the process of interchange between Unconscious and the Conscious.



This drawing represents the mechanism of how the Unconscious releases a signifier, and the reproduction of signs clusters into the Unconscious and that are pushed out to the real world under the form of tensions, instincts. These clusters are determining the ID, or the Self's content .

There exist many misunderstandings on what the Unconscious is. Many people like to hear that this is a library of all old secrets from the past and the steps humankind made during the evolution. The Unconscious is loose words out of a primary language that contains fragments of our personal experiences and collective achievements as a species. The process which steers the chaotic pieces is subjected to the mechanisms of chaos, which means attraction, repulsion, cluster, search for balance, disturbances, followed by a new equilibrium. The whole never ends and will repeat itself without showing the same situation.
The psychoanalyst Lacan [507,508] defends a model of the conscious/unconscious that is in line with the dynamics of the brain maps. The Unconscious and the Conscious belong to the same medium. This medium has two faces. Lacan compares these faces with a Móbius strip, which is a piece of paper where figures are drafted on both sides. The key element is that the sides have been twisted to make it a ring.

Hold now the strip against the light and the patterns drawn on both sides will act as Moiré figures. In this way is it possible for the content of the Unconscious to create a new picture in the Conscious.



Lacan warns us that this is a very simplified version of how he sees the process of mental activities. In reality, there are more layers filled with pulsating chaotic signifiers on the inner, which can create layers of signified clusters in the conscious.

What is the dictionary of what I indicated with 

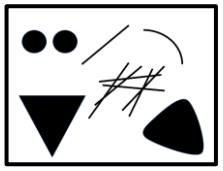
?

We call this dictionary the ARCHETYPES. The word indicates already that again Evolution carries a stamp on the words that make the Semiotic language. This time we call upon Artists to guide us through the fundamental archetypes of visual perception. Artists create a form of condensed meaning, and meaning belongs to the domain of the Mind. Images act as building blocks to realize meaning. Pictures are for the Mind macro signs, being made up of simple graphic words. The combinations of micro-graphics carry a specific psychological connotation, which is commonly shared by most humans. Stefan Arteni is a contemporary artist who has published much about art and its connection to semiotics. Another reference book is from Wassily Kandinsky titled ‘ Point and Line to Plane’ 1926. In this paper, the artist relates visual art and music, as well as colors, shapes, and orientations. Rhythm in graphics and painting is a repetition in space.

Let me introduce you to the world of graphic design, art, and the visual aesthetic rules of composition, which probably have to do with neurological patterns processed by the brain. I first show an image from the natural scene of the tree I used before and a painting of Herman Miller.

The tree can induce the image of a naked woman because it comprises archetypical basic shapes that associates with the female body — evolution anchors in our brain a full catalog of primary figures inducing specific connotations in the Mind.





The brain processors are sourcing archetypes in the unconscious and present possible valid ideas to the conscious. Psychologists have done a lot in this field (the Rorchard test is an example), and also neurologists publish on the brain mechanism when we perceive basic patterns. Although it is hypothetical, the ideas from artists could mirror best the mental processing of images. An excellent guide in this matter is Rudolf Arnheim [316], from whom I take over a few statements. — Perception is cognition, and perception of shapes is finding the structural features in it. The mind stores mental templates (s.a. Jungian archetypes) of simple features from which some can trigger instinctual behavior and gestalt figural activities. There is, in principle, no difference between a percept and a concept, and what is right for a form is also valid for colors. In this process of cognition, there is also intelligence, e.g., when a person moves away from the scenery, the visual capture becomes a smaller shape, although we hold in mind the real size constant. Perception always is a focus on a complex, diffuse environment full of noise and context.

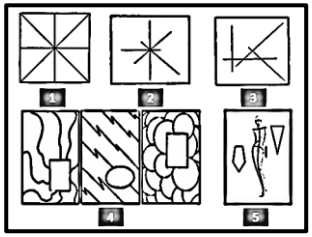
The process seeks constancy and invariability as a continuity. This is one of the problems of moving pictures in virtual reality.

I give a short technical overview of basic patterns, which might look like a course in drawing. You can speculate on the deeper source of the existence of these patterns, from which many easily can be linked to Evolution. I did not check on the scientific underpinning of evolutionary underpinning.

The point is a proto-element with a value depending on inside or outside a territory. A point always carries weight. The line is the antithesis to the point and is secondary to the point. A line is not natural and relates to some force. Movement is always a perceptual trigger and can naturally be horizontal or vertical. Horizontal gives a stable hold and is associated with cold. Vertical, up to the sun, is warm and imaginative. In the horizontal movement is the direction most important: toward the viewer or moving away. Our viewing field is 120 degrees left, right and 45 degrees up, down. Such a frame is considered rational, while a vertical rectangular gives a warm comfort. Compare a banknote and a menu card. Balanced and symmetric provide good feeling. The circle comes on top of the square. An up triangle is male dominance, and when it points down, it becomes a female symbol. A convex shape is preferable to a concave pattern. Then comes the separate forms into the frame that makes the composition. A wide variety is possible, and that is what the artist explores to create a feeling for him/her self and the viewer. That art carries appreciation points universally to the direction that there is a kind of common neurological algorithm that processes perceptible human data. The power of these algorithms is

or everybody different and can be trained. Take the example of abstract art; some people do appreciate it others no at all. Even when the appreciation feeling is conscious, it isn't very easy to bring it into words. What you hear is usually remarks on basic shapes and composition of lines, shapes, colors, harmony, attraction, etc. In the alphabet of semiotic graphic shapes, there are also the priority attention for colors and the combination of shapes with colors that create different feelings and appreciations.

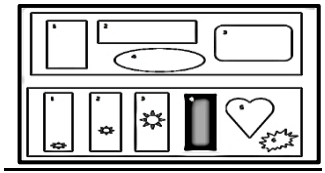
The link to the Evolution of human mental awareness cannot be proofed, but many explanations sound plausible. For a comprehensive survey, I like to refer to my publication Signs of Life. The life of Signs. [317]. The next map is a graphic illustration of basic shapes and the corresponding connotations.



(1)

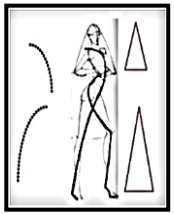
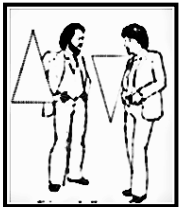
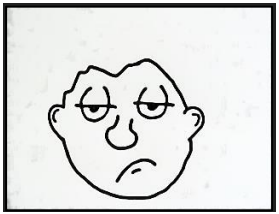
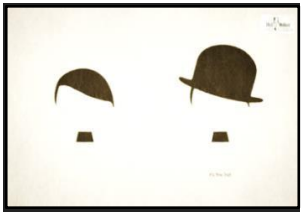
1.Lines bring lyric and make quite.
2.Dramatic expression.
3. Great tension.
4. techniques to attract.
5. The underlying frames. In this case, the female shapes of curves, down triangle, and the pentagram for power and

(2)



(3)

The mind probably reconstructs incoming perceptual data with basic neuro patterns it stores to make a full private version. An artist begins a new painting by sketching frames and iteratively improves them until a stable mental picture corresponds with the wanted imaginary image to express in the conscious sphere. Nature and Evolution have made the neuro processes efficient and effective by the use of a library of basic shapes. A mental mirror of this neuro efficiency can be illustrated with the art of cartoons and cartoon stories, and minimalistic artwork and graphic logo's. A person's character is sketched with a few lines. In the cartoon story, the timeline is made by frames of different shapes, remember the connotation of a horizontal structure versus vertical and how focus, speed, the intensity is realized with simple lines. The hidden frames make the connotations for dominance and submission with the triangles in the next image of the two persons picture 3.

More on the graphic language of our thoughts come from Rudolf Arnheim [316], which is in line with writings of Kandinsky. Here follows a summary of the visual algorithm of perception.

1 The primer points of attraction are the center and the corners. The center dominates what makes that the locations of balance come closer to the edges.

2 Borderlines within the view always create points of attraction or repulsion.

3 Viewing is a dynamic process where the attention jumps between the positions of attraction and repulsion.

4 Points of leverage determine the weight of care in a particular area. These points balance their content of details against more prominent parts or will oppose within the full view.

5 The size of the objects contributes to the weight in the perception, so do colors and the light intensity. For example, the red weight more than blue or green colors.

6 An isolated object in space will logically claim attention.

7 Regular patterns play a more significant role than loose compositions.

8 Next in focus is that vertical weights more than horizontal and oblique.

9 The hidden frame of an arrangement helps to guide the attention.

10 An object in the upper part plays a more prominent role than the same item in the bottom portion. This is also true for the felt side over the right side. These rules are culturally determined linked to the reading process direction; from left to right or the opposite, like in Arabic.

11 We generally pay more attention to what happens on the left-hand side.

12 When making graphic design, you should be aware of the laws of Gestalt. Our brain makes corrections or completes parts of pieces of what we view.

13 The background is as necessary as the target object is in the picture. An unbalance in the background makes you feel uncomfortable, the same is true for the texture of the canvas.

14 Colors and shapes should come in equal groups. For the complementary colors, we refer to the following chapters.
15 When we intuitively make connections between groups of objects, this happens from bottom to top. The soil is the standard base that unites. Splitting and differentiation come from the top.
16 When more objects are displayed, so will the distance between the objects that make part of the associations felt, message, or meaning.
17 Symmetry weights different when it is vertical or horizontal. Vertical balance is more pronounced.
18 That which points to the top inspires and set free; to the bottom asks for explanation and engagement.
19 The action happens horizontal and vision vertical.

There exist other theories about the mental algorithms initiated by perception. One of them is called the ecological approach from Gibson, saying that the cognitive content of the mind confronted with a perception starts filtering the data in the search for elements that point to a possible action. There are instincts, but also the acute biological needs of the body. When you are hungry, you filter food and restaurants first out of the perceptual data.
With these examples, we can reconstruct more or less how the neuro maps create conscious images shared by most humans to a certain degree. Science still has no clue how the neuro hardware-software or wetware creates the wave clouds and how meaning rains from this heaven into the conscious.

6.6 THE MIND CLOUDS.

Semiotics, the exchange language of information between two systems, covers the whole of physical sciences, as well as every action in our lifeworld. Semiotics splits into areas of interest. From micro to macro, scientists have created subjects like Physiosemiosis on a physical and chemical level. The next level is Biosemiosis, which starts with DNA and RNA components to cells. This level is followed by Phytosemios describing the plants and the interactive processes with the environment, such as sunlight. Higher is Zoosemiosis covering operations between plants and animals. Highest is Antrosemios, where we humans get directly involved. More focus on the communication and information processes (neurons) and chemical interaction across the levels is called Endosemiosis and Exosemiosis. There is yet another division made: Theoretical and Empirical Semiotics. Semiotics belongs clearly to the Mind, but it needs matter to exist, and matter needs information and exchange of energy to evolve.

This means the MIND is a property of all matter, organic as well as inorganic and interchanges information. The Mind is the exchange between the inner and the outer, which is a language. I have demonstrated some aspects of the human visual perception language. Similar constructs exist for the bees and ants and how they communicate as individuals and as colonies. Biologists describe how migrating

birds make use of earth magnetism and how they communicate with each other. The links of the creature's minds and their bodies are documented in many examples of how specific cells and neurons, and their configurations (shapes) become functional detectors and communicators as part of the brain and body and the Mind. Some Mind function are attributed to the body, although we still do not know *if sensations and emotions make the cells vibrate, or the vibrations of cells cause our feelings.* The scientists agree that the Mind-Body meets in the electro-magnetic and chemical clouds in and around the bodies.

The primary generator of electromagnetic waves is the brain with the infra-low <0.5Hz, the delta 0,5-3Hz, theta 3-8Hz, alfa 8-12Hz, beta with 3 split bands between 12-38Hz, gamma 38-42Hz. The relations to the bio and mental functions are complex, and with big data analysis, lots of correlations are established. Besides the brain, is the heart the most active and strong and the electromagnetic fields and rhythms are more powerful than the brain, as if the heart is the amplifier for action that steers the rest of the body's nervous system

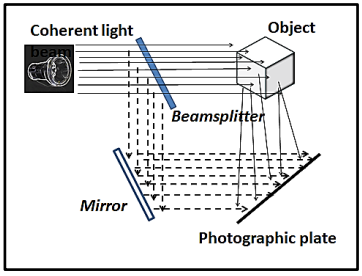
Science is far from decoding even a couple of these multidimensional waves in time and space, in a chemical or electromagnetic way. In fact, Science just

arrived at the point to recognize that these fields do exist and play a role in the life functions. Reference [209] presents an introduction to the role of electromagnetism to organic live and its functions. Examples are the bio cycles that run synchronously to the earth's electromagnetic field and even the moon and planets. Especially the sunburst plays a proven role in biological and mental functions. One problem for the scientist is that the level of electromagnetism in the organs is very weak. Pigeons have a neuron setting that detects magnetic fields much lower than most of our instruments can detect. Science confirms a connection between the sun's magnetic field and the Escherichia coli bacteria living in our intestines and helps us digest our food; the bacteria grow faster when the sun's field is positive, or pointing toward earth, and slowed down when negative. Do not forget the invisible cloud of micro-organisms, bacteria, viruses, and gases that fill our body and surround us. They all have radiation fields and interfere with other fields and communicate with sensors and emitters, But it would go a long way toward explaining extrasensory perception. The chakras with different sensory areas into the body become now very plausible,

6.7 THE HOLOGRAPHIC MIND.

Let us now summarize the main ideas that we gathered so far in the model Brain-Mind. The deepest level on which everything builds is vibration. Science describes concepts of vibrating media and mechanisms linked to the material world from Brown movement, acoustics to electromagnetism. Vibrations and matter melt together in the quantum mechanic theory where energy can change manifestation as a particle or matter and an electromagnetic wave. Light is the mother of electromagnetic waves for the humans as a wave or a photon. Light is our medium of preference to the outside body-world. Science describes wave mechanisms in phenomenon as synchronization, resonance, reflection, scattering, interference, standing waves, etc.. Mathematics provides the most profound philosophical aspect of vibration in the concept time-frequency. From this idea follows the excellent operational tool in the Fourier transformation that unravels any pattern into a summation of discrete waves. These insights and scientific tools are core to model the brain function and its linkage to the mind. Quantum mechanics enter the brain-mind models with many disputes nowadays. This is not so for the explicit concepts of HOLOGRAMS, which provide the right consistency to most Mind models. Holographic is not different from the maps I presented in the description of brain functioning.

A Hologram is an interference pattern that holds information about its sources being the different waves that create the hologram. Remember your old camera with film. It stopped at the last film frame. You click again and take another picture of the same scene. Of course, between every click, you moved the camera a bit. After developing the film, the last picture is very blurred, and you can hardly recognize the image. Still, the picture contains all information of the image, even more, because you changed the angle between the last clicks. The retrieval of the scene offers you a kind of three-dimensional image. This technique is called holography.



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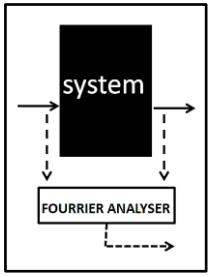

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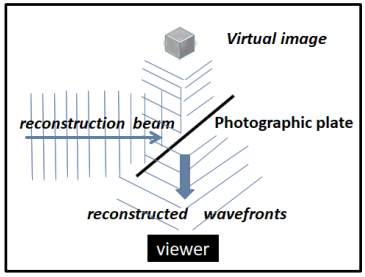

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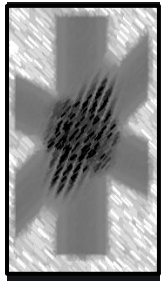
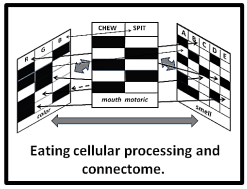

4

A coherent light beam (a laser) projected on an object scatters the light according to the shapes it hit and leaves an imprint on a photographic plate as an image of the object. When at the same time, we project the laser beam on the same plate, the imprints

mix as interferences to give a hologram (4). We can change a bit the angle of the beam, and so more information about the object is projected into the hologram. We can consider this experiment as a system with an input and an output that reflects the characteristics of the system (2). By comparison of input versus output or a Fourier analysis, we retrieve the correlations in/out. Starting from the hologram, we can reconstruct the original as in the setup of (3), and the viewer sees a three-dimensional image.



Eating cellular processing and connectome.

The brain maps discussed before can also be modeled in holographic techniques and do explain the tremendous capacity the brain has in storing image like information. Here starts the idea of the holographic Mind.

The brain stores something to $2.8.10^{20}$ holograms [121]. Holographic interference, for example, explains the way how we retrieve familiar and unfamiliar features of an image. Recognizing a face we haven't seen for many years, is just the projection of a stored image with the current image beam or brain map. But our brain is not a network of light fibers. As Fourier processing is the retrieval of frequencies, the medium carrying the data are most probably electromagnetic waves, as light is, and speculatively also other waves like gravity and more unknown vibrations. Holography

allows the projection of images to places where they are not. This is also true for sensations like in the Phanton Link Sensation, as a patient feels a pain in an amputated limb. The brain-body operation turns out to be a complex biological network of Fourier processors that analyze the spectrum of signals and reshape frequencies to motoric pulses. The ear and our osmic (smell) are clear examples of selective frequency processing. The animal world shows that the neurological instruments used are incredibly sensitive, like the pigeon's magnetic detector.

The scientific evidence of the many examples of events lay the bridge to the *Esoteric Mind*. Famous scientists like David Bohm build a supportive theoretical frame to make it a respectful discipline. New concepts enter In these theories like gravitational fields and a quantum potential field, which is probably the most potent as it does not diminish away from its source like all other field do. Bohm writes, 'Our brains mathematically construct objective reality by interpreting frequencies that are ultimately projections from another dimension, a deeper order of existence that is beyond both space and time. — The brain is a hologram enfolded in a holographic universe' [121-p(85)]

The most extreme idea derived from Holography is about the Universe. After the Big Bang follows a long period of evolution. At the point of the present, our being and intelligence (a characteristic of the Mind) result from that evolution. Our biological

material body results from the accumulation of all previous processes, so are the conscious awareness of our existence. Light as an electromagnetic medium is the primary carrier in the development of being and perception, particularly our visual capabilities. *Our life functions and the awareness and knowledge of it are the Inverse Fourier of the whole past.* We occupy one point in a universe containing an infinity of points. This holistic point, like any other point, includes the same information from the Universe's past. So at any point in the Universe, the corresponding data content is available, which means that this can be projected at any other place and time of the Universe. This is called the Holographic Universe, and the data exchange is the HOLOGRAPHIC MIND. Everything is connected with everything else, which Bohm calls an Implicate Order, which is a deeper level of reality.

Individual existence is an explicit or unfolding order, which comes to the idea of quantum mechanics' term of the collapsing waveform. Bohm continues [212] 'What 'carries' an implicate order is *the holomovement*, which is an unbroken and undivided totality like the wave function in quantum mechanics. The holomovement is not limited in any specifiable way at all. It is not required to conform to any particular order or to be bounded by any specific measure. Thus, *the holomovement is undefinable and immeasurable.* The implicit order carries all phenomena from our reality. Matter and radiation are the most familiar implicit orders we experience. We can consider *the mind-body to be a temporary*

concentration as wave-matter interference in a point in space, that becomes CONSCIOUS. In the brain model, there was the suggestion that consciousness emerges from cross-talk at a high concentration and density of motoric, sensory nerves, and neurons. In the complex system theory, such density brings the chaos dynamics to the point of instability that can bifurcate to a temporary stable pattern. The holomovement of Bohm is in this model the generator of patterns and movements that never stops, or the will to live. Bohm writes in [121], "The ability of form to be active is the most characteristic feature of the mind. Just as every portion of a hologram contains the image of the whole, every portion of the universe enfolds the whole. Every cell in our body enfolds the entire cosmos. "

6.8 FROM THE HOLOGRAPHIC MIND TO THE ESOTHERIC.

YOUR SELF IN THE WORLD OF SPIRITS.

Many people tend to approach the esoteric as a religion. Please do not make that mistake and jump into a pool of yoga, occultism, esotery, theosophy, or metanoia without professional guidance. Your 'Self' is a momentous interference of all kinds of power waves from which some are still undiscovered by science. Your Self Mind is subject to these powers but also can influence and, to some extent, control them. For example, in

yoga, you control mind-body by the visualization of motoric functions like breathing, heartbeat, body balance, and you practice consciously the synchronization of these normally autopilot functions of the unconscious. The key to the esoteric is to create visual brain maps as macro's that can enrich the Self Mind. In specific circumstances, you can appeal on these maps to control a situation like stress. Before we explore more details of the esoteric, let's first review view some phenomena or appearances that seem magical or mysterious in our rational world.

ART.

The most natural manifestation of aesthetic feeling is MUSIC, which is universally appreciated by all humans, from fetus to old age. Music, like a wave, is in terms of David Bohm, the expression of an implicate order of a holomovement. This holomovement moves from a mechanical force of musical instruments through the surrounding air. It enters the ear's natural frequency detector and analyzer to stir the mind's mood and activate the brain's motoric system. The chain of connected resonators activates different media like air, organic cells, and technologies of sound recording and reproduction. The material body absorbs and translates the energetic waves to multiple other waves of chemical and electromagnetic character. In this process, it is challenging to segregate what is mind and what is the body. At some moment and place, the motion of bodies,

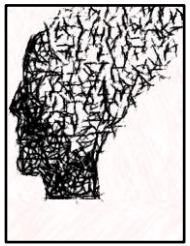
limbs, and emotions converge like a standing wave, probably generated by micro-vibrations of cells and organs. Is the mind activating the cells, or do the cell vibrations create the mind? This question remains unanswered.

GRAPHIC ART, especially in modern expression, tries to reproduce the deeper layers of our visual experience. In the chapter on Semiotics, I explained how the artist, in a chaotic process, find the underlying framework for the expression envisaged. In modern art, some artist stops at the frames and make them explicit in composition, repetition, and colors. The lover of modern art seeks to perceive, enjoy, or resonate on another platform of brain maps inherent to an artwork. The contribution of the artist is to catch another universal mind that seeks synchronization with deep content. Technically, many methods can stimulate resonance with the art lover's mind, such as repetitions in patterns, colors, themes, and compositions. There is a strong link between art and the unconscious. I reproduce some statements from Asta Suton: Art and the Unconscious A Semiotic Case Study of the Painting Process. [321]. — The topic is the reciprocal and beneficial connection between art and the unconscious. "… it is widely agreed that Picasso projected images from his unconscious. The other scholar of art, Herbert Read, claimes that Picasso, by the intense concentration of his conscious perception, explored

the collective unconscious and its symptoms of the psychic disorders of society, [321-p116]. C G Jung thought that Picasso's later work did not refer to any object of outer experience at all. He also wrote that Picasso's art draws its content essentially from "inside." Rudolf Arnheim claims that artists: interpret the potential of the object and create new patterns that are available for the medium. -p232] .

A particular linking pin with the mental processes is the art made by psychiatric patients. The next images show that both reproduce similar images or maps.

Abstract and modern art.



Many years of psychiatric research reveal lots about the mind and the processes that run the behavior and the mental experiences of the patients. Especially the treatment with drugs like LSD and psychedelic substances learn a lot about the mechanisms that control the mental states. I give a summary of dr Richard Miller [123].

Brain fluids control the processes. The real hardwiring in the brain uses fast transmitters, such as glutamate and gamma-aminobutyric acid [GABA], and to some extent, acetylcholine. Serotonin, dopamine, and norepinephrine modulate those systems —regulate them up and down. The hardware is driven by glutamate and GABA, and ion transport. Serotonin modulates those systems and makes them more reactive or less reactive. The most ancient is the serotonin 2 receptors, which come in three variations: 2A, 2B, and 2C. It turns out that the serotonin 2A receptor is profoundly expressed in a lot of the areas of the brain involved in cognition and higher cortical processing. It's also expressed in the primary visual cortex, so with low doses of psychedelics, you see a lot of optical illusions and distortions. Every place in the brain that is involved in cognition and consciousness is directly or indirectly affected when psychedelics stimulate this serotonin. All of the psychedelics also interact or activate the serotonin 5-HT2A receptor. Serotonin goes way back into evolutionary history, occurring in paramecia and simple insects. It was employed early on in evolution for a variety of things —including brain development and all kinds of systems development. In humans, we know that serotonin neurons project into virtually all parts of the cortex and higher areas of the brain. They're involved in emotions —anger, rage, hunger, sex drive, cognition, depression, mood, and more. Dopamine, serotonin, and norepinephrine are *modulators* of other systems. When the infusion of LSD takes place, one sees suddenly the whole brain is much more connected. Different parts of the brain are speaking to each other simultaneously. The mechanisms of hallucinations come from the stimulation of the visual area of the brain with eyes closed as with eyes open. *Consciousness is the result of the oxidation of glucose,* the energy that produces the neuronal activity. Wether changes in blood supply stimulate neurons, or whether the stimulation of neurons creates changes in blood supply. Key to the whole experience is the

brain network called the “default mode network, which controls what enters consciousness and what doesn’t. [123-p73].

THE HOLISTIC MIND AND PSYCHOTHERAPY BASED ON LSD AND PSYCHEDELIC.

I have reported earlier on the brain-mind interaction induced by LSC, which we now extend to the holistic mind. Stanislav Grof practiced many years of psychotherapy based on brain-changing drugs and gave a comprehensive account in ref. [511]. His findings match very well with the models proclaimed by neuroscientists. I summarise some statements on the mind changes made by the drugs.

The patient experiences dramatic sequences of various kinds with a sensory vividness, reality, and intensity that match or surpass the ordinary perception of the material world. On occasion, powerful, isolated sounds, human and animal voices, entire musical sequences, intense physical pain as distinct tastes, and smells. The psychedelic state has a multilevel and multidimensional quality. Psychedelic visions seem to occupy a specific space and can be seen from different directions and angles with a real parallax. An essential characteristic of the psychedelic experience is that it transcends space and time. It disregards the linear continuum The represented objects cover the entire range of dimensions from atoms, molecules, and single cells to large celestial bodies, solar systems, and galaxies. The distinction between the microcosm and macrocosm is arbitrary; they can coexist within the same experience and are readily interchangeable. An LSD subject can experience himself or herself as a single cell, as a fetus, and as a galaxy; these three states can co-occur, or in an alternating fashion by a simple shift of focus.

There are modes of psychedelic experience in which time appears to slow down or accelerate enormously, to flow backward, or to be entirely transcended and cease to exist. (511-p34] any number of interpenetrating universes of different orders can be seen in holographic coexistence.

Another essential characteristic of psychedelic states is the transcendence of the sharp distinction between matter, energy, and consciousness. Inner visions can be so realistic that they successfully simulate the phenomena of the material world, and, conversely, what in everyday life appears as solid and tangible "material stuff" can disintegrate into patterns of energy, a cosmic dance of vibrations, or a play of consciousness. The world of separate individuals and objects is replaced by an undifferentiated pool of energy patterns or consciousness. In an LSD session, it is possible to experience oneself as somebody or something else, both with and without the loss of one's original identity.

Many LSD subjects have independently reported their insights that consciousness is not a product of the central nervous system and, as such, limited to humans and higher vertebrates. They saw it as a primary characteristic of existence that cannot be further reduced to or derived from, anything else. Common is a sense of identification with a consciousness of inorganic matter or processes, such as gold, granite, water, fire, lightning, tornado, [511-p44].

This account is in line with the concept of a brain that represents the whole evolutions of cognition, thoughts, and emotions stored in the biological wetware (neurons, nerves, cells, organs) and which are coupled mysteriously with the external world. When the brain's master controller loses the command of which content from the unconscious may enter the conscious, then all parts enter and compete with content and intensity in the conscious space. The holistic ideas of David Bohm fit smoothly with

psychopathic experiences.

Besides the Psychiatric reports, there is the common phenomenon of Near-Death Experience where a person in the agony of death in a short moment experiences the movie of his whole life in physical details and emotions. This confirms the mechanism of a Delta function holding all data (events) concentrated. Applying Fourier mathematics on this content shows then a series of experiences in real-time. This kind of psychical events is called COEX systems, or systems of condensed experience. *A COEX system is a dynamic constellation of memories (and associated fantasy material) from different periods of the individual's life, with the common denominator of a strong emotional charge of the same quality, an intense physical sensation of the same kind, or the fact that they share some other important element.* [511-p112].

Understandably, all these mental phenomena open a wide imaginary field of speculation and phantasy of the esoteric and especially in the parapsychology. In these theories, new concepts enter like gravitational fields. The most potential is a quantum field that does not diminish away from its source. Science tries to find answers and proofs. One direction of research points to the biological fields of cells, organs, and living bodies that generate electrical, magnetic, and electromagnetic fields , although weak but tangible. The other quantum-theoretical wave functions are more speculative. I give a short account of the research from the book of Robert.O. Becker and Gary Selden, THE BODY ELECTRIC, Electromagnetism, and the foundation of Life. [209].

There is evidence that the electromagnetic cosmos electromagnetic fields, mainly the sun and the earth, are correlated to biological rhythms of all the species. For example, people wholly isolated from the earth's fields become entirely desynchronized. The micropulsations of the earth's electromagnetic field are the prime timer of bio-cycles. So is the 10 hertz wave the dominant (alpha) frequency of the brain's EEG. Very small magnetic fields influence the pineal gland. A magnetic field oriented to add or to subtract from the earth's regular field increases or decrease the production of pineal melatonin and serotonin. Melatonin is the hormone that regulates the bio-cycle wake-sleep and remembers from previous paragraphs the role of serotonin in the brain. Passing small electrical currents across the head from temple to temple, is a used therapy to introduce sleep. Escherichia coli bacteria that live in our intestines and help us digest our food are influenced by the magnetic field of the sun. [209-p235]. The existence of magnetic sensors in such diverse creatures as bacteria, bees, and birds (27 species have magnetic organs) suggests that a magnetic sense has existed from the very beginning of life, The biggest problem for science is that the bio-fields participating in the life processes are very weak in comparison the earth's field and hardly to be measured.

The problem of measurement and accuracy of scientific experiments seeks for new hypotheses. The first one is the idea of coupled nervous systems, and the second more speculative is about the paranormal. The idea is that one nervous system senses the field of another. When other biological entities emit all kinds of fields, it goes a long way toward explaining extrasensory perception. Society recognizes that the issue exists and must be studied. The first focus is on ELF-EMF pollution or low electromagnetic frequency and medium frequency, which is a topic in healthcare. Scientists postulate that the ELF

band from 35 to 100 hertz would be the most damaging. At the same time, higher frequencies might go more or less unnoticed until the energy injected into cells becomes intense or prolonged enough to be significant — [209 –p274].
Regarding the many brainwaves and the low power levels our brain produces, it justifies worrying about electromagnetic pollution. All kinds of communication equipment, the cell phone against your ear, and the power lines around us are the new polluters. Military intelligence probably collected the most data, but suspiciously the results remain shielded from the public.

HOW TO CONNECT TO THE PARANORMAL AND THE ESOTERIC ?

FROM BODY LANGUAGE TO EURYTMY.

We, humans, possess a body which we can consider as a complex system of living material parts as cells, viruses, bacteria, organs, liquids like blood, etc. The primary task of our body is to perceive, to communicate, and to act for a higher purpose. The connected sub-systems act in chaos mode with their own cycles modulated to a universal unknown and unknowable medium. The collective system is continuously at the critical stage, ready to evolve to a new phase that we call creation or creativity. The sub-system exchange data are modulated (coded) on electromagnetic waves, light, acoustics, and probably also quantum waves. The concept of David Bohm connects everything via a process of synchronization. The human system is the top of a biological evolution

accumulating all past elements of materials and processes. Scientists speculate that the psychical coincidence and densities generate functional crosstalk, which we call consciousness. Consciousness allows humans to communicate and act more effectively and continuously develop new languages under a generic name Semiotics. We can consider that the esoteric is a matter of mastering the mind's semiotic.

I explain with the example of Body language, which is mainly unconscious. Body language expresses the mental and emotional state of a person or animal to communicate with the exterior. People quickly recognize most of the sign messages which are encoded in visual expressions or sounds. Some communication is very subtle and needs training to detect, as in the example of seeing a disease. The signs are produced by the motoric brain and be tiny muscle action or skin tension and coloring. We learn a lot from the technology to create virtual persons. The first generations of virtual human or animal figures can easily be segregated from the real. A figure becomes a nearly original version when all body and face muscles and movements, mostly very tiny, are replicated. This requires a database with feelings and emotions linked to all muscles, tensions, and combinations. Some people are gifted with the skills to read another person's semiotic and even can decode and formulate the person's hologram containing the past and the future. We all are gifted with the skill to perceive patterns and complete Gestalt. We easily retrieve a known person in the crowd without seeing her/his face on the pattern traces of their movement. The material body expands with a cloud of Mind- signs.

We are not aware of the signs we emit. Some people produce more signs than others, and you can train to recognize the signs.

A sign cloud varies in intensity, volume, and the distance it covers. In Theosophy, the extended body is called the SOUL. The cooperation between the soul and the body is called a Soul Body or Kama Rupa what means 'shape.' The soul obtains two faces: a sensitive soul and an intellectual soul. The last one is called Intuition. We live a life in clouds of sign patterns to which we add our signs. These patterns mingle to macro signs which shape complex sign structures as we call —Social protocols, Ethical norms, Cultural habits, Political ideologies, Economic models, etc. These macro sign patterns change over time and space. We call it 'spirit of the time' or 'zeitgeist.'

Part of the holistic is as such based on the supersensible of the world we move in. A combination of the supersensible and the pattern generation and recognition is an art discipline called Eurythmy pioneered by Rudolf Steiner, also known for his educational methods for children.

Similar to what a cartoonist makes is Eurythmy, which contins a hologram of subtle movements of the body that express the supersensitive patterns or the artist. This can be shown in dance, clothing, or images like the next pictures. This illustrates again that art appreciation comes to the reading of the deeper organization of the mind.



The Eurythmy compositions indicated in sequence: love, annunciation, and despair.
The essence of Eurythmy is to express the inner mental state using the body.

More speculative is the body as emitter and receiver of weak electromagnetic waves. The fact that some species navigate and communicate with weak signals and have the detector neurons available suggests that also the humans possess such infrastructure but probably undeveloped by no usage. Some people might acquire skills like practicing the diving rod to find water or metals. Scientifically it is correct that all the biological organs, even the plants, emit a weak specific spectrum modulated with system information like the brainwaves do. The sum of these waves is called the astral body, divided into areas related to particular kinds of feelings. The sensations and the intensity linked to specific regions are pictured like a lotus flower whose leaves open in a rotating sequence.

The dots on the picture of an astral body are related to the different sense organs and are called chakras. For example, the larynx is a chakra point that senses the reading of other people; in the first place if somebody is sympathetic or repulsive. The heart shows the feeling and the lower abdomen the passions.

6.9 THE MIND'S NEW DIMENSION.

The first issue is that the brain is the physical organ for the conscious and unconscious mental functions, which sets the scene for an individual mind. From the process of visual and audible perception, we learn that our own mind is influenced and connected to other minds of people, animals, and even real stuff. I long for what the others possess, feel romantic with this music, and a walk with my dog in the forest calms me. The fields like electromagnetism and gravity proved by science explain some phenomenon by experiments, but many paranormal facts have no explanation. The possible answers lead to an unprovable carrier of a wave function type. Neuroscientists do not give up yet on finding what mechanisms could lead to new mysterious media. One such attempt comes from Benjamin Libet, who measured mind pulse duration of information crossing from the unconscious to the conscious. [124]. He proves that the brain's unconscious initiates all voluntary acts, upon which 350-400 ms later the conscious becomes active, followed by the motor act 150 ms later that the conscious awareness. This scientific discovery leads to the big philosophical discussion of whether we have free will. Or is anything we do under the control of the unconscious? The question becomes now — what process decides which past data stored in the holographic brain are sent to the conscious? The conscious only task is now to execute dark orders.

This creates a major philosophical and ethical issue. Looking carefully at the time delays, it seems that the conscious still can perform a veto before sending the motoric request. The next question is whether the veto process is trigggered from deeper unconscious order? The vetoing of the conscious brings us back of the — conscious as a state of complexity in a critical stage. Remember the bifurcation point water, damp, ice crystal; a choice has to be made. *The Conscious is a series of moments where the brain's mental stage reaches criticality and sets off to a next now point of choice.*

If you take the ideas that result from recent neuroscientific research, you tend to conclude that the new models tend to be holistic and even the esoteric. Anytime we cannot explain a phenomenon the magic dominates the ideas, Luckely as long as we follow the scientific way the human intellect manages to build consistant concepts.

7 THE MIND-BODY. CONCLUSIONS: A VIBRATIONAL AFFAIR.

7.1 THE SENSORY-MOTOTRIC REVIEWED.

I started this publication with a chapter on COGNITION. Cognition belongs to the Mind, but it still does not explain what the Mind is. JC Maxwell wrote that the Mind fabricates the laws of matter, and the laws of matter come from the Mind. We look into a mirror as the the Mind consistently describes itself. We are the Mind, and we split ourself in a Mind and a Brain hoping that looking from one side will see the other. We cannot hold one position for long and switch views all the time. This vacillation turns out to keep the process that creates the Mind. We even cannot stop that mechanism of thinking. The cognition of the Brain and the Mind is a snapshot of the ongoing process that represents the summation of all knowledge acquired through Evolution. The reconstruction of Evolution reveals in the first place biological matter that comes to life, which introduces a mind into the matter. The body becomes an action center resulting in a change in space and time. The mind of the living organism has a purpose which for the body means a movement in space, and for the mind, a purpose for the species and its environment. Today's cognition presses us to describe Life and Evolution in broad scientifical terms of

chemistry, electromagnetism, semiotics, mathematical models, statistical handling of data, theories of complexity and chaos, holography and quantum mechanics. None of these disciplines can grasp the whole and only can contribute the full idea as long as its models knit consistency of the total.

A critical node in the evolutionary process is Consciousness, which starts very early in Evolution when matter entities change shape or pattern with a purpose to reproduce the entity. From that point, the split Body/Mind is relevant, and the Body becomes an action center that we model today as a —distributed processor of sensory language with the highest hierarchy situated in the brain. The understanding of the Motor-Sensory process is vital to come to a solid concept of Mind-Brain. Our principal sensor is vision what makes the Perception-Motoric process the most studied topic in neuroscience. In previous chapters 4.3, I have explained the system sensor-motor, and 6.4 describes the visual and the mind. The virtual reality technology of today mirrors a substantial part of the knowledge that we hold of the brain-body nerve system and processes. To this, I have to add a particular finding from the neuroscientists, which set the stage for next overall scientific-philosophical summary. Karl H Pribam write in his book Thr Form Within [125 – p106]

> *The ability to perceive at all depends on oscillatory movements* . The explanation — when the oscillation of the eyes is nullified, the vision disappears within 30 seconds Same results have

been repeatedly obtained in experiments involving other senses. Fine oscillations of our receptors or of the stimulating environment around us are needed for us to see, to feel by touch, and to hear. The oscillations of the eyes form a point attractor in the neuro-nodal deep structure of fine fibers that can then serve as a pixel. Forming a point attractor, a pixel, from oscillations is a transformation. The transformation converts the frequency of oscillations in the spectral domain to points in space-time. In short, the transformation is described by *the (inverse) Fourier equation*.

The brain detects in perception, patterns which are neuron configurations and connectomes. It has long been believed that the brain holds the holographic blueprint of all the muscles and organs. Pribram claims that this is not the case, but the *behavioral actions* are stored, and the action center of the cortex is really a sensory cortex for movement. Perception is a chaos oscillation between the brain and the sensory images of the Mind around an attractor.

7.2 ALL IS VIBRATION.

We are back to the beginning of this publication with Holderin's statement:

All is Rhythm.

The Bible: *And God said, "Let* there *be* light,*" and* there *was* light.

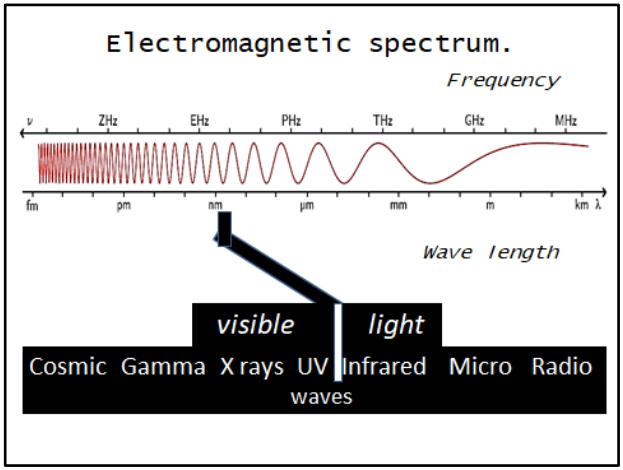
Light, the most prominent vibration, plays a dominant role in the evolution of life; just think of the photosynthesis of plants. Light is a trigger in the awake of consciousness in day and night. The night offered phenomenon for phantasies like the moon, the stars, and their movements. The linkage of an appearance to something else is the birth of language and reasoning by the rhythmic linkage signifier, signified, sign. A phenomenon or an object gets a name by *repetition* and sharing with other people. Logically, light acquired a special status in the mind of the people. The mirror and the invariance or representation of an object in the mind make it clear that light is a medium carrying information, and these data can be processed in different ways. The object that moves in space-time and keeps its shape invariant indicates that light might be more fundamental that a x,y,z space, and the concept of change as a variation of space-time parameters lead to the idea of the speed of light. Science determined that speed as the maximum speed any object can reach, and that *light predominates space-time relations*. Looking at the stars means that the observation of the star I see now is not the current star but an old example because light needs time to reach my eye.

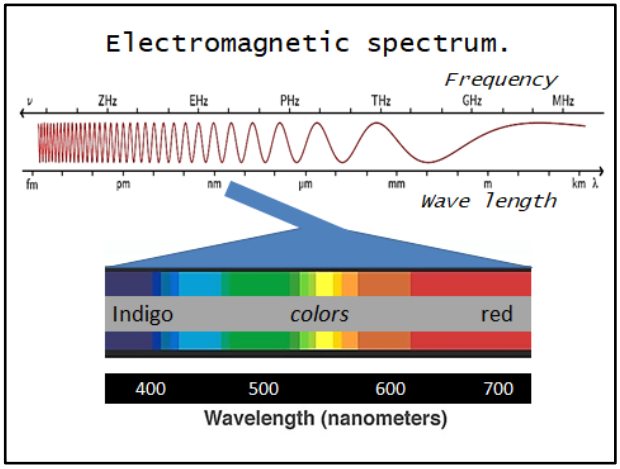
Moreover, I do not see a specific light bundle coming from that star, but a diffuse light composition of all corners and distance hit my eye. These considerations must fit some consistent model, and theories emerge from the birth of the universe, the shape, and its changes. Theories must fit experiments such as one star that is brighter than the other and moves faster and leads to new physical models. Famous is here Einstein's Special Relativity Theory. We allocate an own space-time frame to two moving stars. The observation by the eye (light) is made in one frame, and the requirement that light has a fixed speed results that space and time parameters of the separate spaces will vary. An

occupant of one space will grow older slower of faster in relation to the observer in the other frame.

I have explained earlier the holographs that contain perceptions (light data) of one object from how different angels, which lead to the idea that there must be an all comprising representation of any object. If that object is the universe, then there must be two complementary views — the all comprising universe in no time and an actual observation made at one point in that universe (a time-space version) at one moment in time. Science also discovered that light itself has two appearances, depending on how or what makes the perception. There is a photon (matter) and a wave version which are not absolute but only can be measured as probabilities. The predominant visible light for our human species is not unique; it belongs to a general waveform called Electromagnetic Waves as represented in the next chart.

We humans use only a small part of the spectrum to function biologically. Some species handle specific frequencies differently like fish has sharper subsonic senses, dogs hear sounds inaudible to us, insects make better use of the infrared, ultraviolet waves kill viruses and bacteria, etc. Humankind has learned to make use of the whole electromagnetic spectrum from radio waves, microwaves, UV, X-ray, and also gamma wave applications enter science.





Lesser known is the role of the entire spectrum in biological life functions. Our body emits some 100 Watt infrared, and thermography measures resolutions of 0.01-degree centigrade to detect illness. Biophoton measurement of light emission in the range of 400-720 nm map the photon radiation of a body is search of correlations with biological phenomenon, which becomes relevant in the energy lines and routes in acupuncture. [210].

Besides electromagnetism, other fields take part in biological life like magnetism

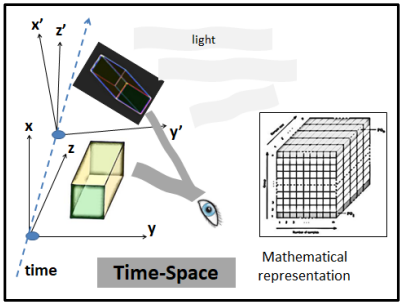
and gravity, and also here, species have developed specialist features to use these fields like birds to navigate the globe. A characteristic feature of gravity and magnetism is that they decrease intensity on distance, which means they belong to a space-time frame. Light having a velocity for an observer has no proper time of its own. Light allows us to see, to appear, but is not seen in itself or itself appear. [Timoty Rogers]. Very special waves emerge together with newly discovered particles, and neuroscientists hypothesize that here we have to find the not understood brain-mind phenomenon.

The intuition of the mind has created the frame of space-time, which fits well to build a relational structure to match our perceptions. But this model fails to model the process of how the human brain creates a mind and vice versa. The mathematical thought of Fourier provides a tool to unlock the space-time fetish. The theoretical physicist Richard Feynman claims that — *the Fourier Theorem, the probably most fundamental in physics*. —"The Fourier transformation is a spread function that disperses space-time events which therefore no longer exist as such.
In the holographic, enfolded domain, space, and time disappear. a transformation in itself suggests that some uncertainty may inhere when an attempt is made to measure both spectral and space-time forms simultaneously". [125 -p444].

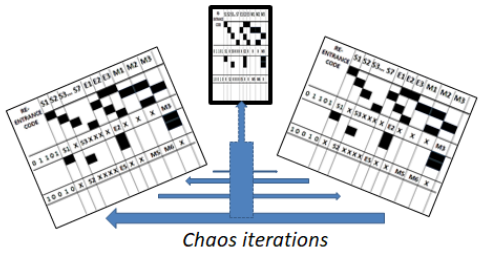
The Fourier theorem tells that an event in time has an equivalent as a summation of a frequency spectrum of different waves at different frequencies. Out of the theory follows massive applications in communication and spectrum analysis in material science,

also the scientific-philosophical interpretations are now widespread. The Big-bang as a time-event is the whole spectrum of electromagnetic waves we perceive and makes our life. The equivalent to the Time event is what Roger Penrose calls the universe as —a gentle rain falling upon a quiet lake, each drop making ripples that spread to intersect with other ripples made by other drops.

The Fourier theorem offers especially a model for the mechanisms discovered of the brain and nerve system. The perception of our senses is simply a set of Fourier processes. In the hearing process, organic mechanisms tune the pressure frequencies from the air, followed by Fourier analysis and reverse Fourier calculations to create an image. The visible perception is similar: in the eye, specific neuron patterns detect the light frequencies for further handling by the brain. These processes are the algorithms that a chaos routine performs to come to a stable data pattern. *The duration to come to stability is a component of Consciousness.*



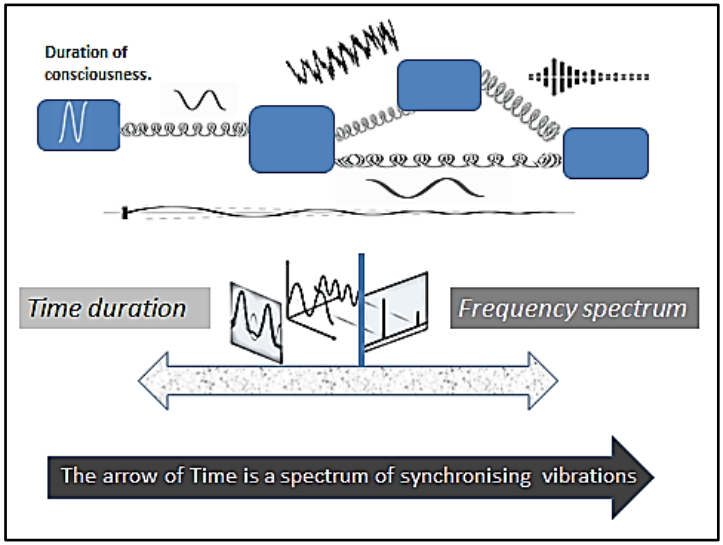
In Time-Space, an object can be mathematically represented by numbers in a multi-dimensional matrix. The same object in different frames gets different numbers, but as the shape is the same, there is a set of numbers invariant of the frame for a particular shape. *Light is the universal constant in all frames and for all observers. In this way, light mediates or* ***synchronizes*** *the process to keep the shape equal.*



Duration of consciousness.

The awareness of differences in brain maps triggers an iterative brain routine to come up with a stable pattern. That process generates awareness and has a duration. Consciousness is a continuum of successive durations. We call this also a NOW point or a moment. There is no longer a flowing time. The content of the brain maps is the cumulative experience and cognition available at that moment.

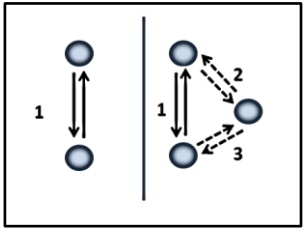
This is more or less a synthesis of the brain-mind model based on complexity, pattern generation and recognition. Essential is the Fourier theorem, where time events translate in frequency waves that create new interference patterns, and a brain processor that handles vibrations which reconvert in conscious moments to a NOW sensation and cognitive awareness. The next scheme illustrates this idea.

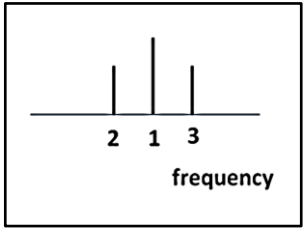


Conscious NOW moments synchronize in search of new patterns (ideas) with mental content. The now moments are interlinked and are not a time series. Our thought jumps around also to past fragments and images. The coupling of all time events creates the feeling of the time arrow. The sensation that Time flies is a weighting of NOW moments.

This concept triggers lots of physical and philosophical discussion of how current, Newtonian, and even Einsteinian views fit or oppose. By relinquishing Newton's absolute space, the proximity of light focuses now on continuous movement. Space-time is now a web of point-events of past-Now-future with equal reality possibilities. The contemporary philosopher Emanuelle Levinas underwrites the new idea of a NOW moment as a relational

activity. “Consciousness is born as the presence of a third party. Order, appearing, phenomenology, are produced in signification, in proximity, starting with the third party.” [418 –p33]. Because the core of consciousness is a process of relations, let’s look at the most primary relationship. Professor Peono [ ] explains that we must start with a dictionary of three words. One symbol stands for zero, another for number, and the third for —next after. All logic and mathematics start from here. Counting begins with a first and others that come afterward, which makes that counting is a matter of order. Zero is the first, and the next is the first relation. You cannot derive one from the other. If both exist and you take one, automatically you involve the other. This is the core mental oscillation. Herbert Spencer writes that Relation is the universal of thought, and as such relations become universal forms of consciousness. The abstract of sequence becomes Time, and from co-existence Space. [308 –p172].



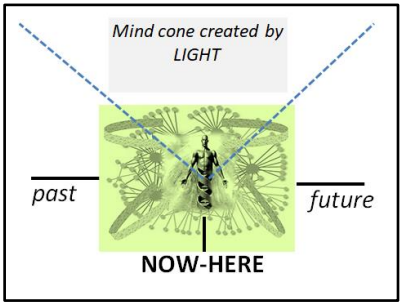


The relation of two elements is reciprocally vibrating to keep existing. When a third element enters, the original relation interrupts to check each with the newcomers, and then reconfirm the initial status. There is a sequence that result is a frequency spectrum.

The core mental oscillation is also the pace of pattern generation and the mental sequencing of logic and signifier, signified, and sign triplet that creates cognition.

The collective knowledge acquired in neuroscience reflects the new insights provided by the other sciences as chaos theory, complexity, quantum mechanics, holography, and especially the Fourier Theorem learns us to see things differently. I repeat that this momentary cognition is the accumulated product of a collective human brain and mind. Ultimately, all perception of material and phenomenon is the reflection of light waves that the brain has processed and still do. Scientists call this the light cone (Minkowski). The frequency data can be represented as macro-relations which we experience and handle as shapes and movements in an imagined space-time frame. Keeping these relations consistent allows the brain to present these relations as Reality.

We, as individual humans, are a momentous mind wave interference with a dense content of organic material. The compact coupling is the source of Consciousness. These summary ideas on the brain-mind are suggested in the next image.



The Brain does not reveal what the Mind is, nor does the Mind can explain the Brain, or the Mind tells us what the Mind is, just like Light enlights the things but not itself. All the time, we look into a mirror.

The process of evolution is not only a process of the past, but it occurs in full every moment in our own body and in the environment we share.

Time is the mechansim that prevents that everythings happens at the same moment.

All is Rhythm. Holderlin

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BRAINS — *Mind*

The biological Brain creates the mental Mind.

Today our collective Mind becomes so fascinated by its source, Brain, that all sciences incorporate neuro models in their concepts to increase global brainpower with technology.

The most significant discovery is probably philosophical.
We learn how the Brain creates consciousness, and how the Brain generates momentaneous it's Time.
Discover how at each moment in Time, our body runs the whole program of Evolution.

Life is a rhythmic ritual.

What we know about the Brain is phantasy from the Mind.

Mind — BRAIN

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