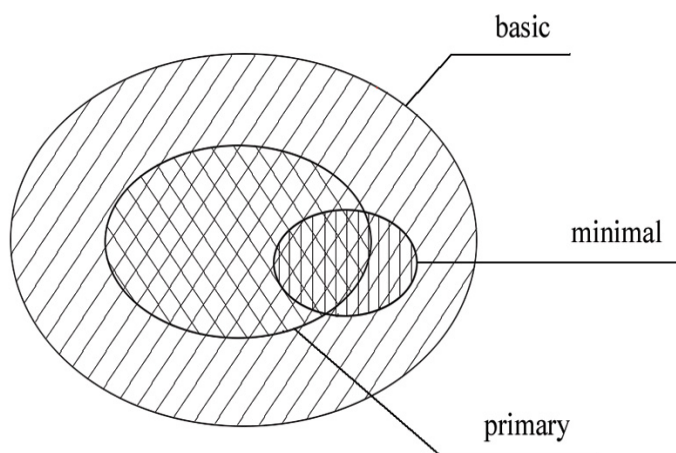


PRIMARY STRUCTURES OF FORMS IN THE UNIVERSE, LIFE AND MIND.

(Brief summary, definitions and basic forms of the Universe in 2-dimentional space or a mathematical approach to the concept of beauty.)

What is all about? It is about how all forms of Life look like being part of remarkably simple Universal” language “,why a scientist, an artist, a fish have different pleasing sensory effects and different aesthetics based on the same simplicity of Nature, and about “primary art”.

“Unlike more superficial forms of expertise, mathematics is a way of saying less and less about more and more. A mathematical text is thus not en end in itself, but a key to a world beyond the compass of ordinary description.” G. Spencer Brown “Laws of Form” 1972



The center of the figure has highest degree of formality.

Basic – something fundamental, underlying, starting point which stays in any development or evolution.

Primary - something first in rank, fundamental which forms any development path of evolution.

Minimal- of the least possible, synonymous to economical.

I would like to make the distinction between minimal, base and primary art. Primary art is always minimal by its very nature, but minimal art is not necessarily a primary one. The definition of base art is something underlying but does not fit the idea of development and evolution. The minimal art was an essential step of our culture based on the concept of the "economical" universe, which is true, but it is only one of the "primary ideas" of the mind & universe, and the beauty likes to "play" in variations, which are not really economical.

“Aesthetics is the brunch of philosophy dealing with beauty and taste, based on the pleasing sensory effect.” (Definition from a dictionary).A fish, an artist, a musician and a mathematician have primary the same but different developed senses and different pleasing sensory effects and thus different concepts of beauty. It depends on the degree of its formality in their fields of experience and knowledge. Aesthetics are many but the reason is one. The reason is- a pleasure to see, «understanding», equilibrium between “inside” and “outside”, a generalization which is present in every discovery. Mind “understands” Universe, being not only part of it, but having the same substance.

Many philosophers mentioned the paradox of knowledge:

Spinoza-“By substance I mean that which is in itself and is conceived by itself”

Kant mentioned that it is impossible to get knowledge or meaning from experience, but only from knowledge itself by forming “transcendental ideas” beyond any experience.

In linguistic, Chomsky created famous expression: “Colorless green ideas sleep furiously”, where much of grammatical structure is independent of meaning and all languages have the same deep structure as inherited basis for translation.

Plato-“Learning is discovering what we already know”

Whitehead-“Art is imposing of a pattern on experience, and our aesthetic enjoyment is recognition of the pattern”.

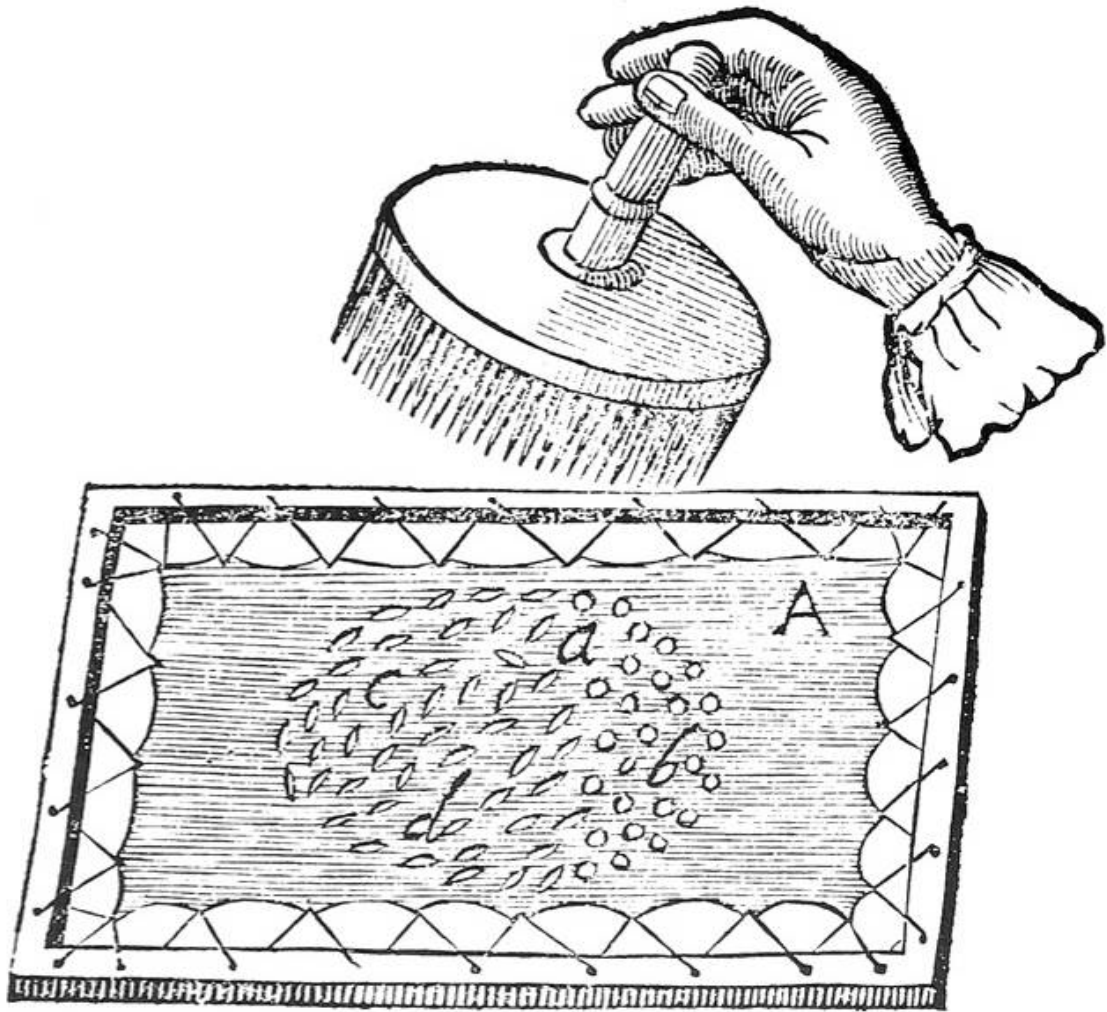


Fig.1.Rene Descartes’s far-sighted analogy for mental memory (dated 1664).From the book “Mechanics of the mind” by Colin Blakemore.1977.

Here he expressed the process of remembering as a set of the holes in the vital spirit A made by a set of needles of the original pattern of sense’s activity which is left and could be recalled by repetition even only part of the original sensory pattern, especially when the original pattern was repeated many times before.

Physiologically our senses form a model of outside world as a kind of map or set of patterns which are transmitted to a brain forming different brain’s maps based on evolutionary developed primary patterns. The patterns should reflect some “universal language” like Kantians transcendental objects or “pure reason” because any brain is a part of the Universe itself having the same substance. Kant figured “vital spirit” or “pure reason” as a prisoner of senses.

V.Kandinsky mentioned the same “universal language.” All his definitions of composition, forms and colors in abstraction were generalized from the culture itself.

“The Black Square” of Malevitch is a generalization of culture in a sense when primitive mandala was developed to a house. The beginning of civilization was marked by invention of a brick from clay and introduction of clay tablets with one dimensional cipher of writing and become now a space of pixels like we see in works of Mondrian. Symmetry was studied by Escher. Constantine Brancusi analyzed the natural forms in sculpture.

Understanding this primary objects and their interaction is partly possible through studying evolution of life especially its chemical origin, embryology and psychological development of a child with help of mathematical ideas. It is only one way to the universal language of Nature.

Thus, according to Kant we can not speak about meaning but only about structure of meaning. The structure, the patterns are evolutionary implanted and developed inside Mind.

“In expanding life...intellect...has been fashioned by evolution during the course of progress; it is cut out of smth. larger or, rather it is only the projection, necessarily on a plane, or a reality that possesses both relief and depth.”
H. Bergson . From “Creative evolution”.1911.



Fig.2.Evolutional pattern of Life, Mind and Universe as a process and as a graph:

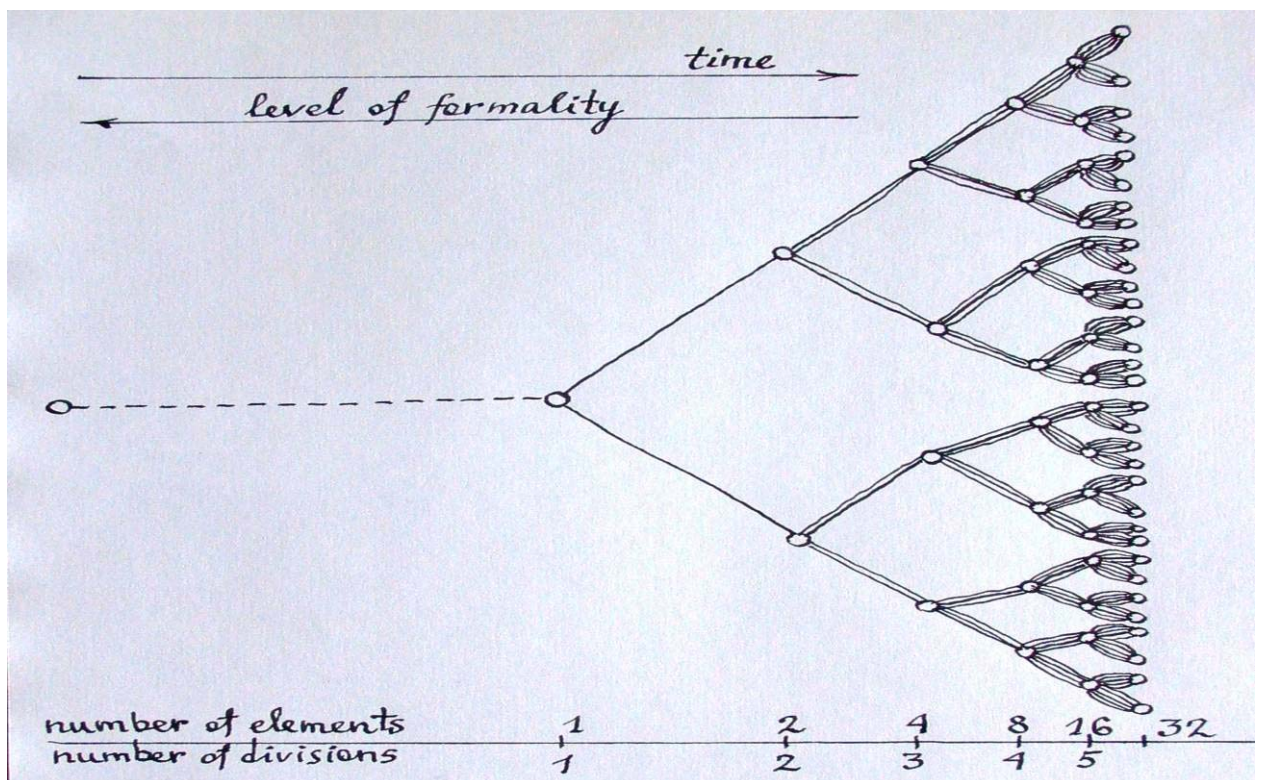


Fig.2. Evolution of life has “an arrow of time” which makes it non-reversible and asymmetrical. Other important feature of evolution is progressive acceleration of time-space continuum and gradually increasing complexity all forms of cells and organisms following decreasing changes of the physical laws and free energy with expanding and dispersion energy-matter in time. We pay for the complexity and reproduction by losing regeneration and ageing. Culture itself and mental theories follow the same pattern.

Senses are developed from simple chemical reaction to stimulus on membranes up to vision where an eye of octopus still has a proof of the first “prototype” with photoreceptors pointing to light instead of highly developed eyes of mammals where it is opposite. Basically the same senses of men with genetically programmed brain’s ability to learn differ tremendously in cultures, fields of activity and levels of training. The same landscape “says” and “pleases” very differently a dog, a mathematician, a musician, and a visual artist because of different levels of formality in their fields of experience and thus their sensations and perceptions form different “aesthetics” but their sensations are the same substance with the same primary structures.

There is no principal difference between organic and inorganic matter, Life itself and Matter, at least from the scientific point of view. The two are made from the same elements, not many in numbers.” The material bases of life are the commonest of all the elements of the Universe: hydrogen, carbon, oxygen and nitrogen”(J.D.Bernal). The only difference is-” Life is aperiodical and asymmetrical crystal” which has parasitic feature, being ”order from order”(Schrödinger.) .An organism has rotations of 5,7 order both in plants and animals, a crystal belongs to one of the 32 classes which involve symmetrical rotations of the orders of 2,3,4,6 and no more. Left and right symmetry is most intriguing puzzle of Nature-structures of different symmetries do not fit each other.

“The specific peculiarity of living organisms is only that in them there have been collected and integrated an extremely complicated combination of a large number of properties and characteristics which are present in isolation in various dead, inorganic bodies. Life is not characterized by any special properties but by a definite, specific, combination of these properties.”

J.D.Bernal.”The Origin of Life” 1969.

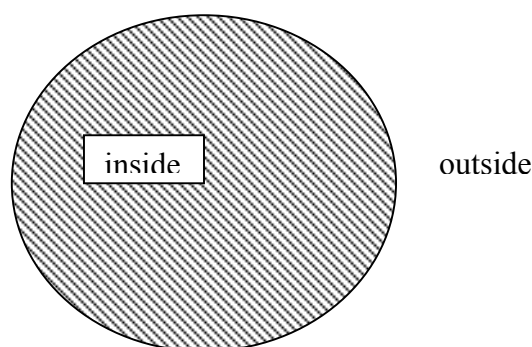


Fig.3. Form.

“...a universe comes into being when a space is severed or taken apart. The skin of a living organism cuts off an outside from inside. So does the circumference of a circle in a plane. By tracing the way we represent such a severance, we can begin to reconstruct, with an accuracy and coverage that appear almost uncanny, the basic forms underlying linguistic, mathematical, physical, and biological science, and can begin to see how the familiar laws of our own experience follow inexorably from the original act of severance. “

“Although all forms, and thus all universes, are possible and any particular form mutable, it becomes evident that the laws relating such forms are the same in any universe.”

G. Spencer Brown. ”Laws of Form”1969.

A circle is generalisation of every possible object or meaning of the object-it is the symbol of generalisation .Evolution of life derived first primitive cells from long chains of linear molecules, evolved from open forms to topologically closed forms, developed a system instead of aggregate and created the difference between inside and outside. It is the same pattern to evolve army from primitive tribe or crowd. So does any theory from many observations and data. Mental developing of a child follows developing of culture and reflects the primary patterns very clearly at early stages together with ability to master a language. ” Ontogeny recapitulates phylogeny” – Haeckel’s expression is true for the patterns and the structures of evolution.

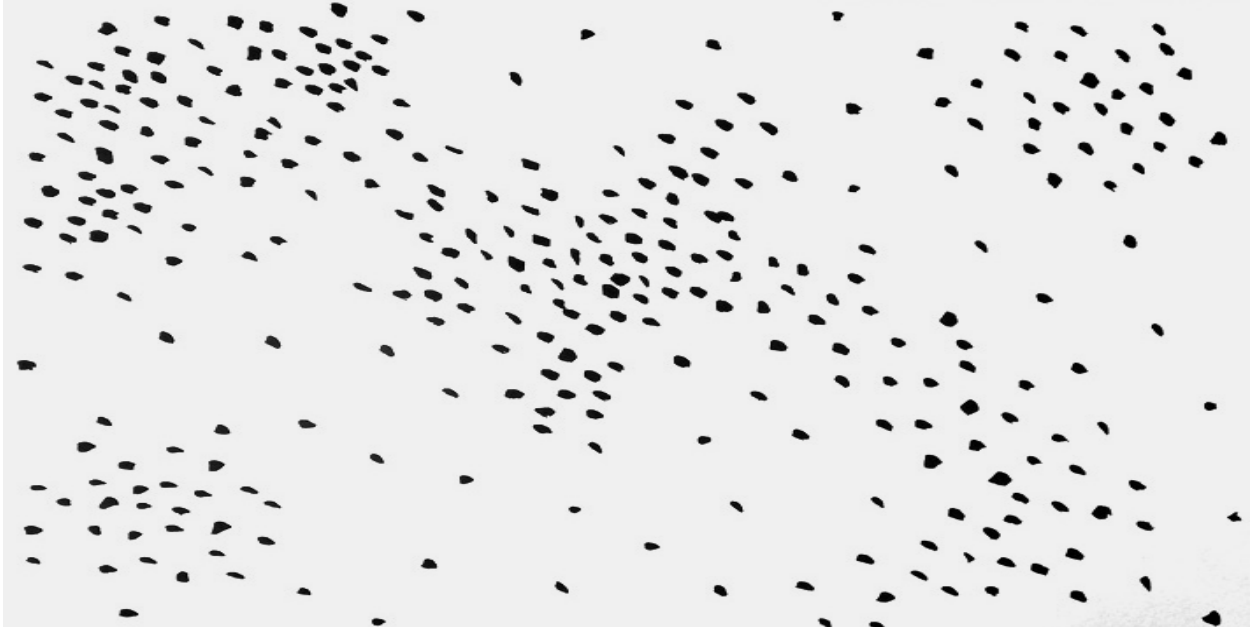


Fig.4. Stage1.A model of aggregate of particles, showing natural tendency to cluster because of asymmetry of space-time or gravitation. Clustering is later developed “herd instinct” of S.Freud. Any cluster will form later a part of a system with its differences. All mythologies mentioned genesis as formation mankind from the dust of the ground.



A drawing of a child showing the same pattern.

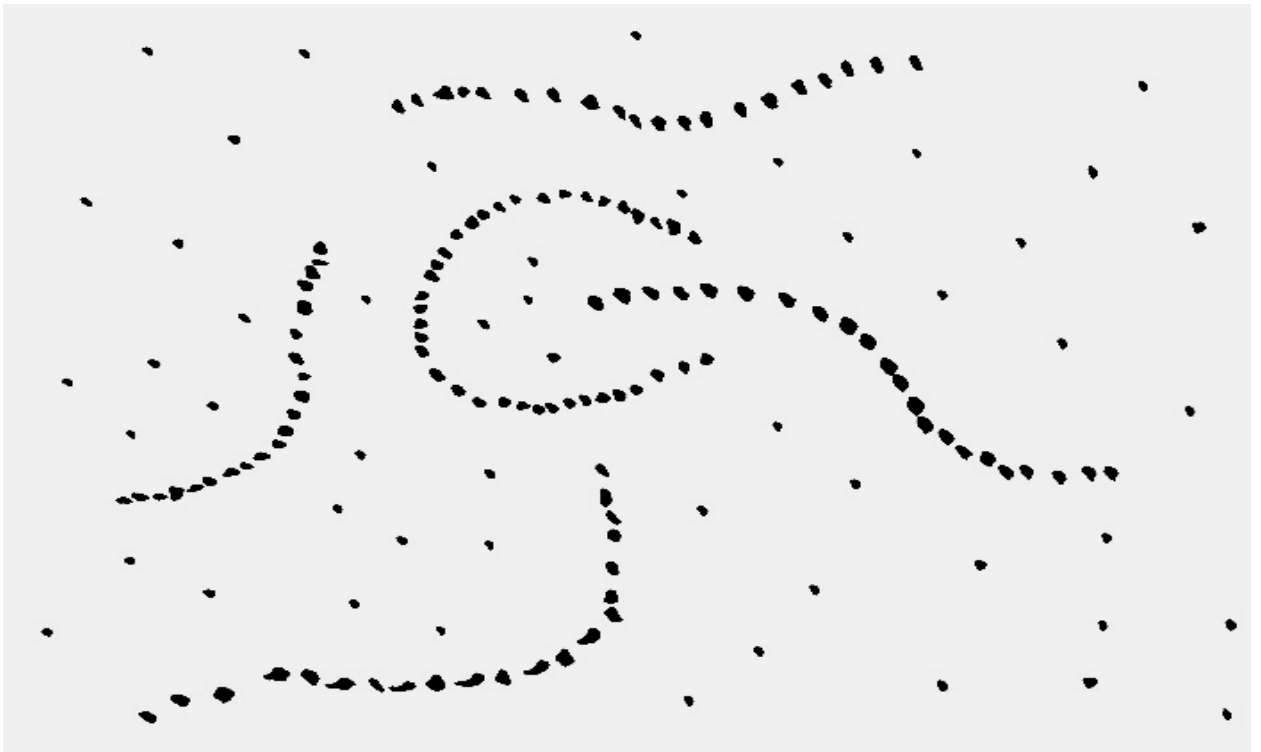


Fig.5.Stage2 A model of first linear molecules of open forms, chains of particles or first elements of speech. Minimal chain is 3 particles-any grammar starts from 3 units or words(object acts with another object or itself).Note here that “object” and “action” belong to concept of “solid body”(object) and muscle «movement”(force) for Life on the Earth, while crystals and atoms show already other and more general phenomenon of energy-matter relationship. The general definition of harmony in music by Cecil Gray: “...two notes of the scale sounded together intentionally” proves higher level of formality in music compare to language where an interval between notes or stimulus is considered as a part of minimal unit of a “sentence.”



A child's drawing as illustration of Stage 2..

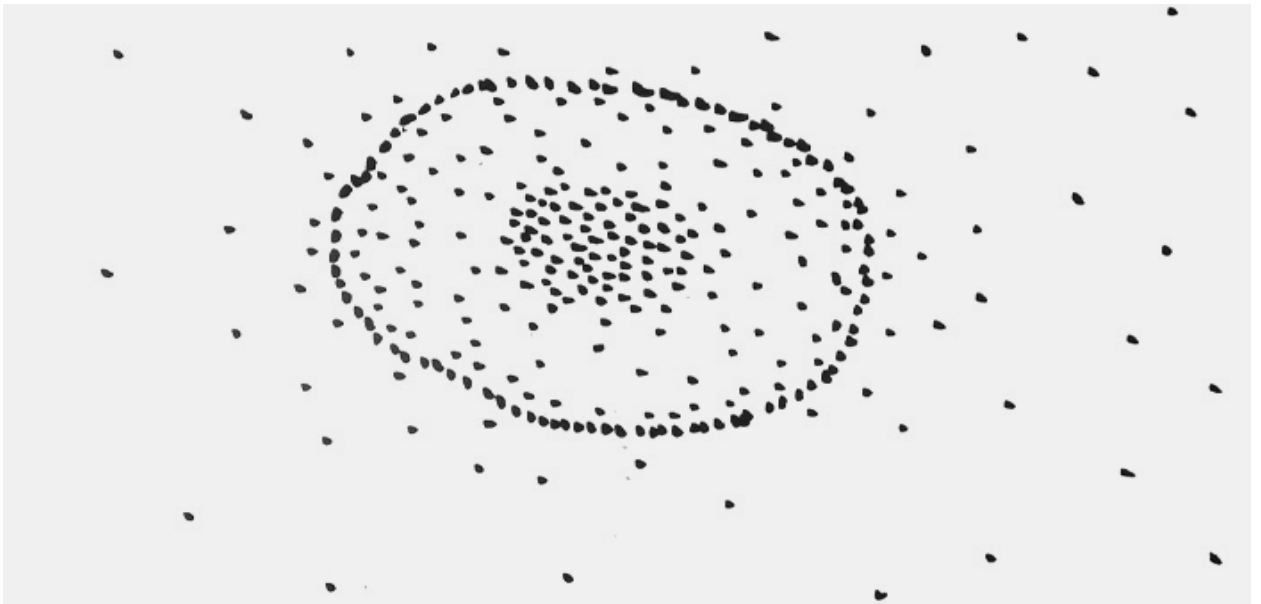
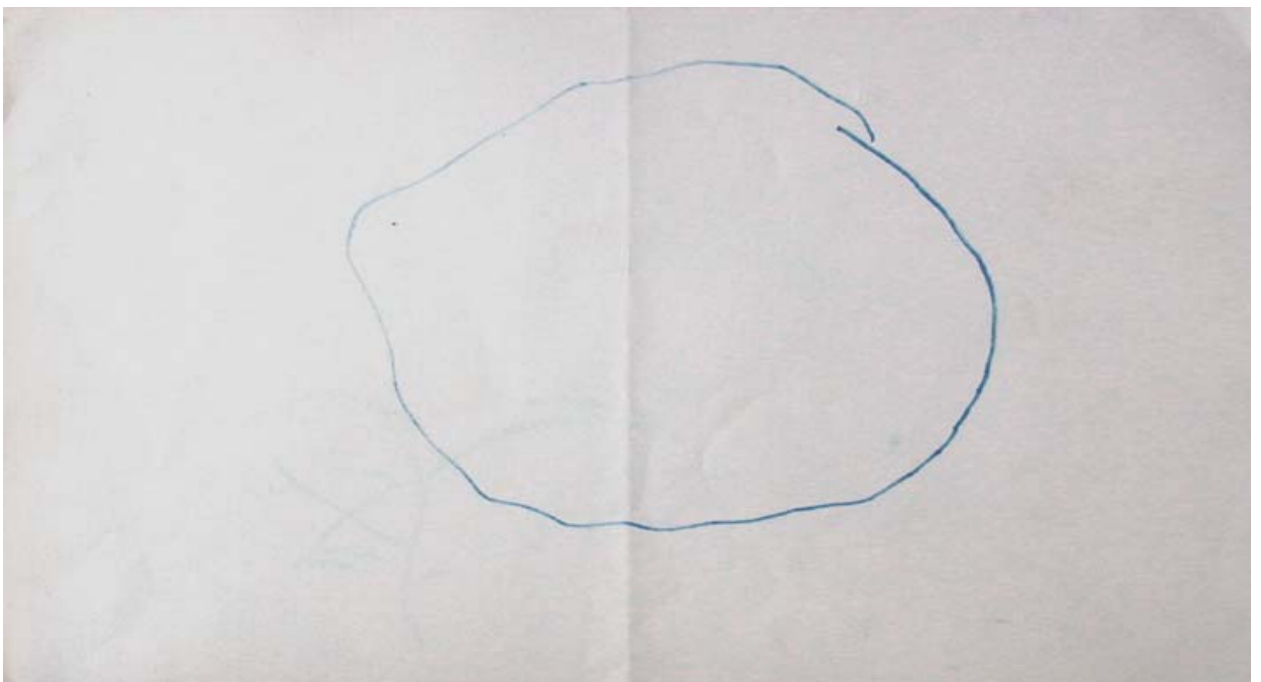


Fig.6.Stage 3.A model of a cell, a system instead of aggregate, the difference between inside and outside. All particles inside are now different from particles outside by level of formality being “order” from “disorder” and future nucleus- “order” from “order.” The primary sell, a state, an army, a theory has now organization or composition which is prescribed genetically in most broad sense for reproduction and self-preservation.

A border, membrane or skin evolves as a self closed line. Evolution of life is also an evolution of membrane, which is the base for future developed senses from first primitive receptors.



A child's drawing.

Stages 1, 2, and 3 from Fig.4, 5, 6 could be traced in prehistory of human culture when tremendous time was spent from first traces by first tools or hands on rocks to create the idea of mandala or self-identification.

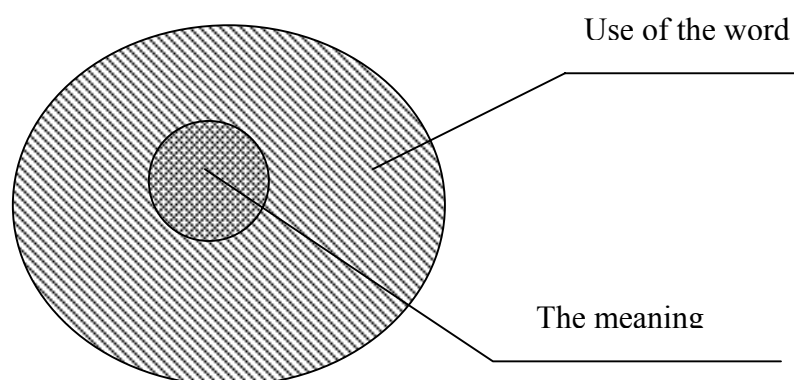


Fig.7. Structure of a meaning (B.Russell)

(Note the difference and complexity from Fig.3. The centre has highest degree of formality)

Every meaning of a word in a language could be expressed topologically in 2-dimensional space of a page or a canvas or a screen as a “cell”, where nucleus is the meaning and the field around is the use of the word, “overlapping” with the other synonyms. So does an atom, a cell, any organization like a church or an army, any theory. In case of an army nucleus of Fig.7 is General Stuff, all around are soldiers. If we replace all soldiers by another ones-it is still the army, but if we replace General Stuff-it is another army. There is more in the case of “order.” Then white space outside is “disorder”, first space inside is “order from disorder” and the last space in nucleus is «order from order.” In case of a theory the nucleus is the original idea and the space around is its use and applications.

“...in the study of material things, number, order and position are the threefold clue to exact knowledge; that these three, in the mathematician’s hands, furnish the “first outlines for a sketch of the Universe”; that by square and circle we are helped, like Emile Verhaeren’s carpenter, to conceive “Les lois indubitables et fecondes Qui sont la regle et la claret du monde.”

D’Arcy Thompson “On Growth and Form”.1961

To continue so we may construct “primary map” of a language, where overlapping structures are similar and synonymous (normally 3 in number), nucleuses never overlap and clustering and density of nucleuses show most use or an attachment to a particular sense of a body. It is a map of different languages, cultures, spices, sensory representations on a brain’s surface, too.

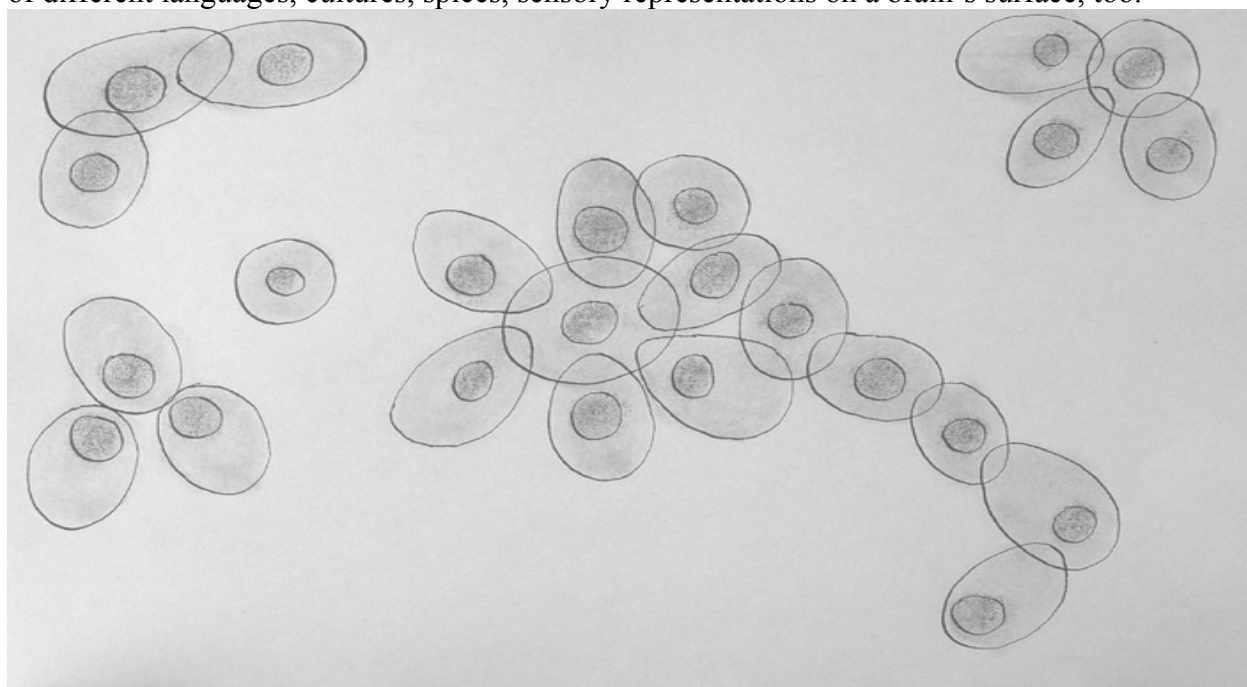


Fig.8. “Primary map” of a language or projection of senses on a brain map (simplest pattern).

The evolutionary path of the structures could be topologically expressed like this, showing different numbers, classes and orders:

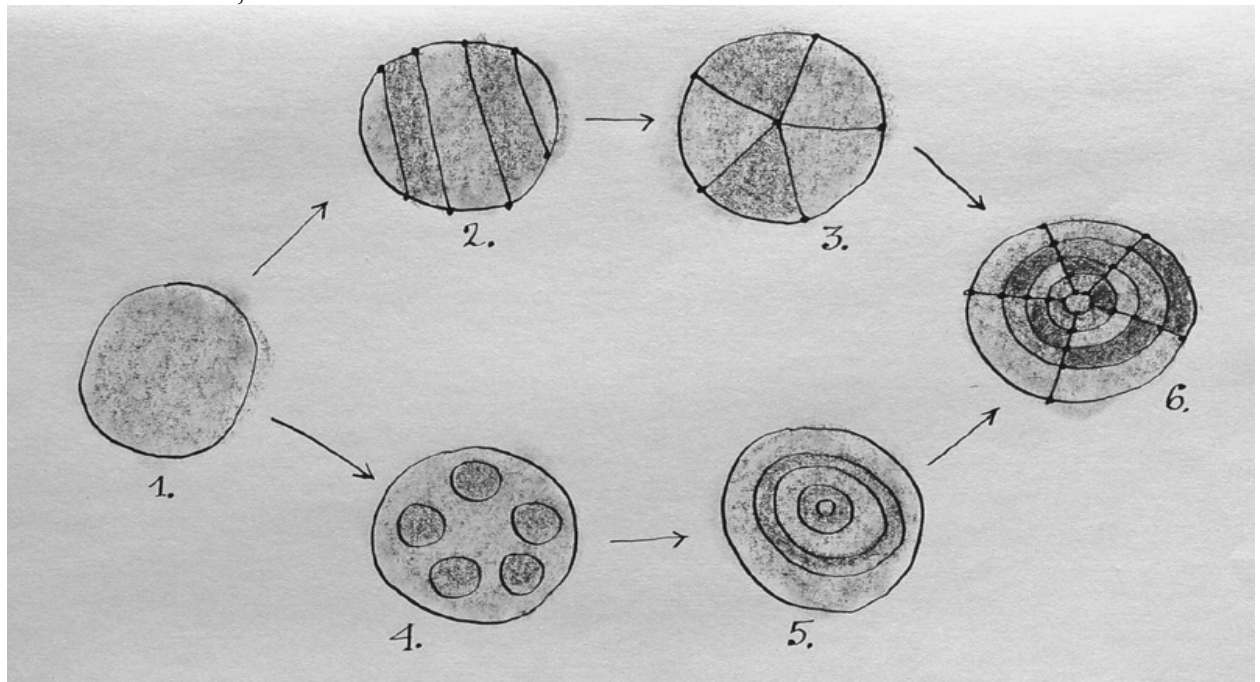
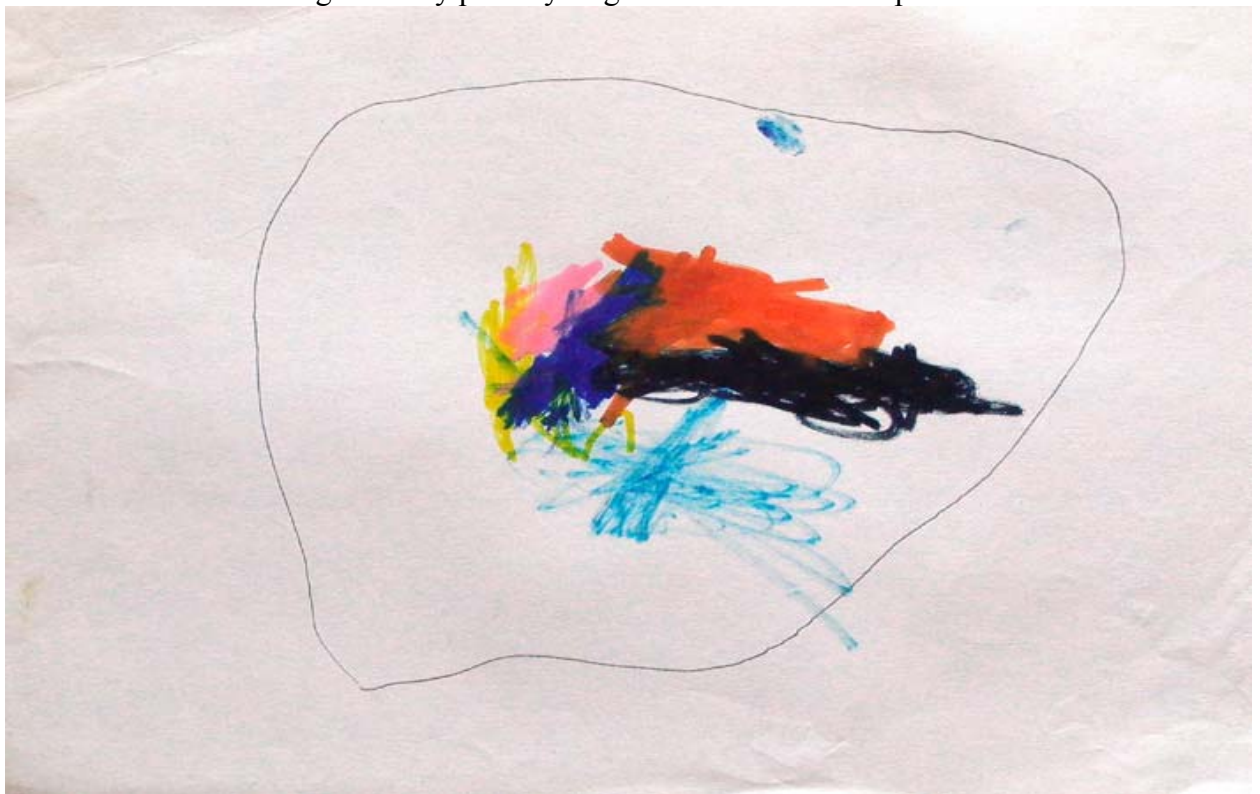


Fig.9. Six basic primary structures.

There are many possibilities for other variations between 6 basic structures. Sequence 1, 3, 6 shows development of an underground map; 1, 2, 3, 6-development of central nervous system with sensory organs on the skin, where 2 is very simple differentiated structure of a worm but 3 is a structure of a sea star with appearance of center, which is much more developed in 6. Anyone from the structures could be used in Fig.8 in more complex patterns.

Here are child's drawings of early primary stages of structure development:





Every Universe, every form has the unknown beginning and the end in “a larger reference frame” of knowledge thus two “ideal objects” or two singularities, which are round in form from a first stage of any developing universe to more complex forms showing different systems of symmetry. In mythology it is God and Devil, Heaven and Hell, Genesis and Apocalypses.

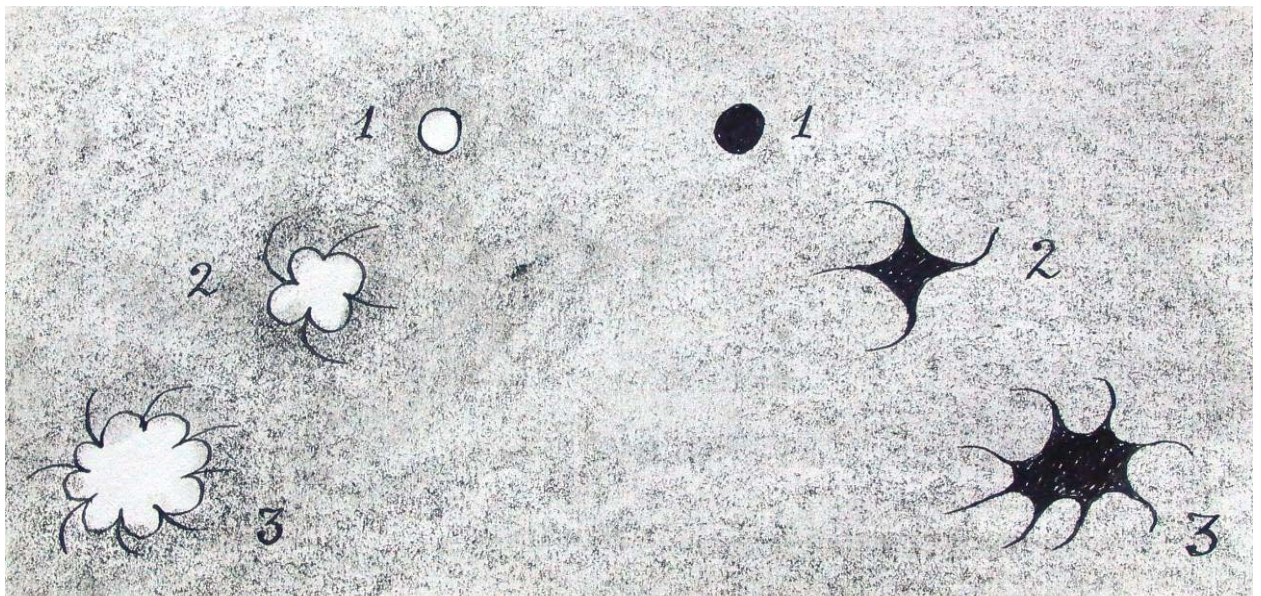


Fig.10.Black and white singularities: stage 1-1(round forms) and later stages 2-2 (symmetry 4) and 3- 3(symmetry 8).

Every canvas or flat space with perimeter P_1, P_2, P_3, P_4 is a two-dimensional model of a universe with two singularities and other developing structures (on Fig. 11 only one in center is shown for simplicity). A – is a starting and B – ending point of the whole process:

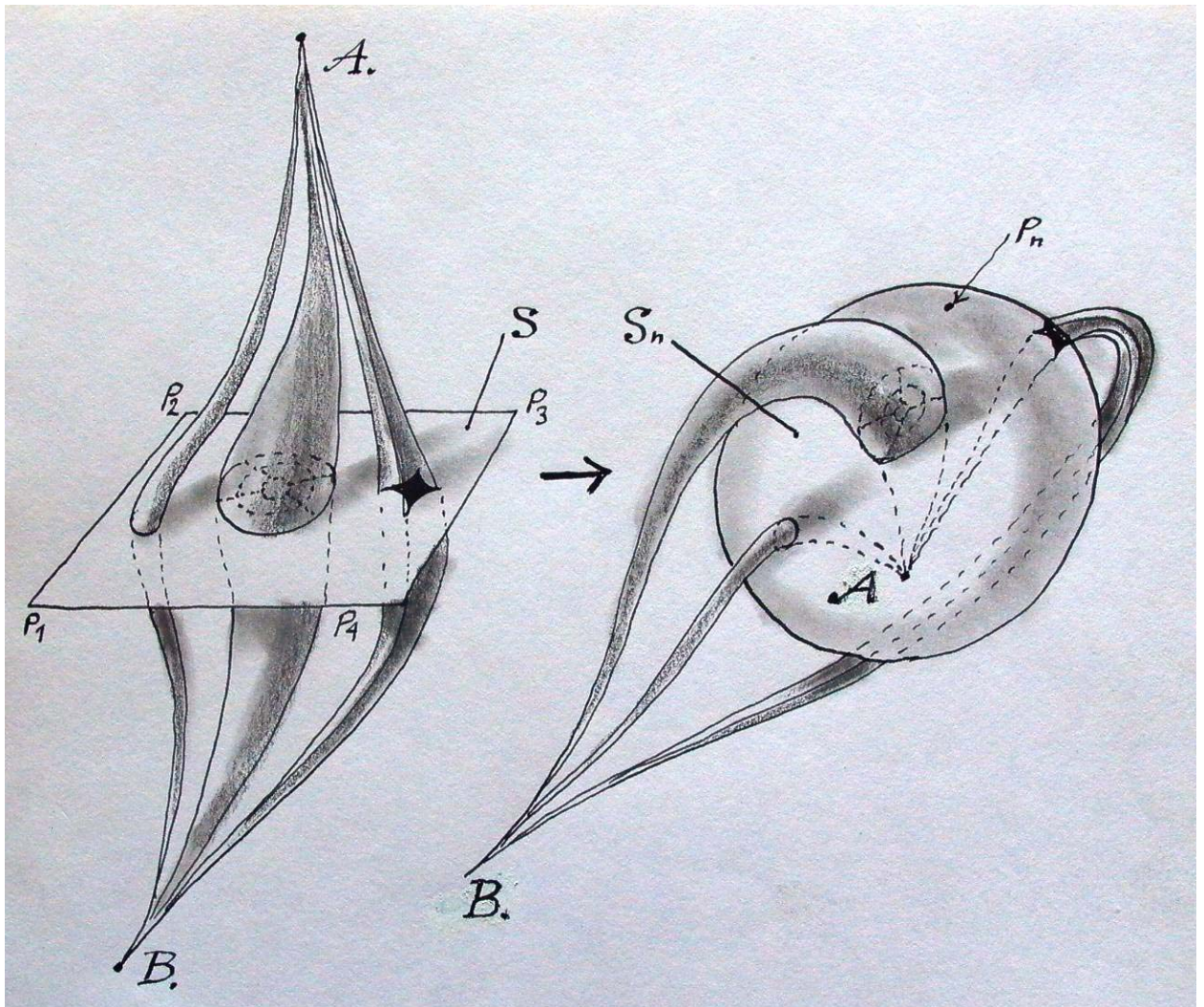


Fig. 11. The whole process of the life cycle of a universe from the beginning A to the end B .

The plane P_1, P_2, P_3, P_4 is a kind of Descartes's analogy of vital spirit, a plane of "now", a map of sensory representations on surface of a brain, any theory at a certain stage, a field of "transcendental objects", certain stage of any evolutionary process. Surfaces S and S_n are "basic planes" or BP in texts of V. Kandinsky where points, lines and forms with their "inner life" exist for interpretations between artist and observer.

The perimeter P_1, P_2, P_3, P_4 of S could be topologically transformed into point P_n on the sphere S_n , starting point A goes inside the sphere, leaving ending point B outside. In this way we have a model of endless but limited universe like the one we are living in. What is the most important – the whole system AB with universes S, S_n between is pulsating and changing every moment showing composing and decomposing processes of evolution. What we actually see on the surface of the sphere or the flat canvas – are "frozen", fixed sections of very many conical evolutionary processes AB like it is on Fig. 8. We are part of the evolutionally process being floating, constantly changing 2-dimensional objects in the universes S and S_n . The flat canvas or plane instead of the sphere is used for convenience only – topologically they are identical.

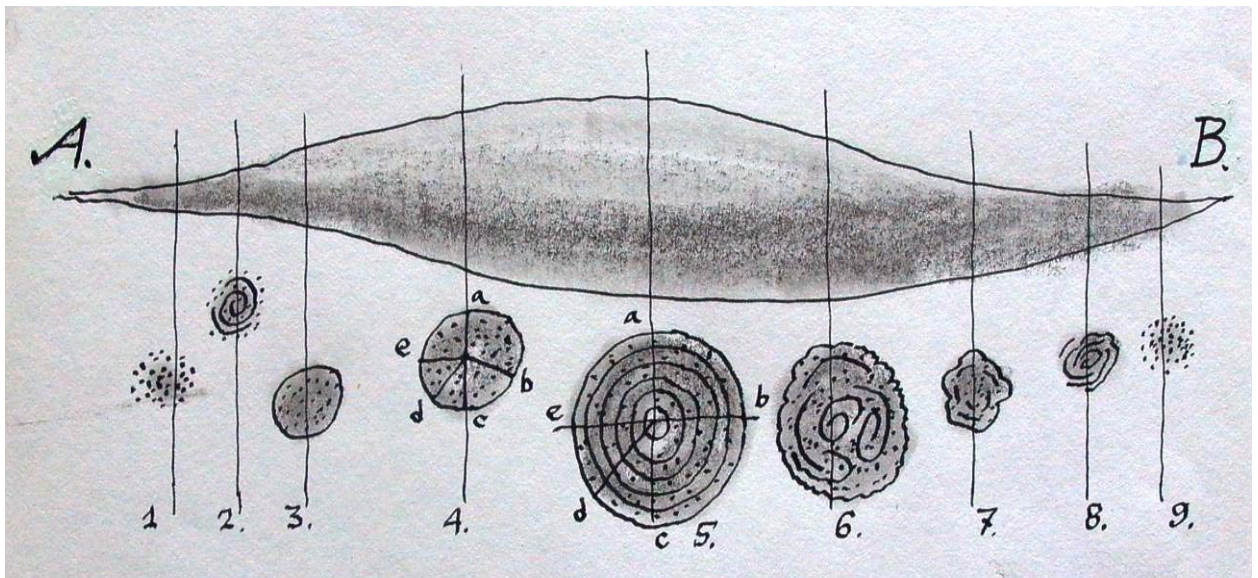


Fig.12. Conical sections of an evolutionary path AB from Fig.11, showing basic principles of composing and decomposing processes of the path.

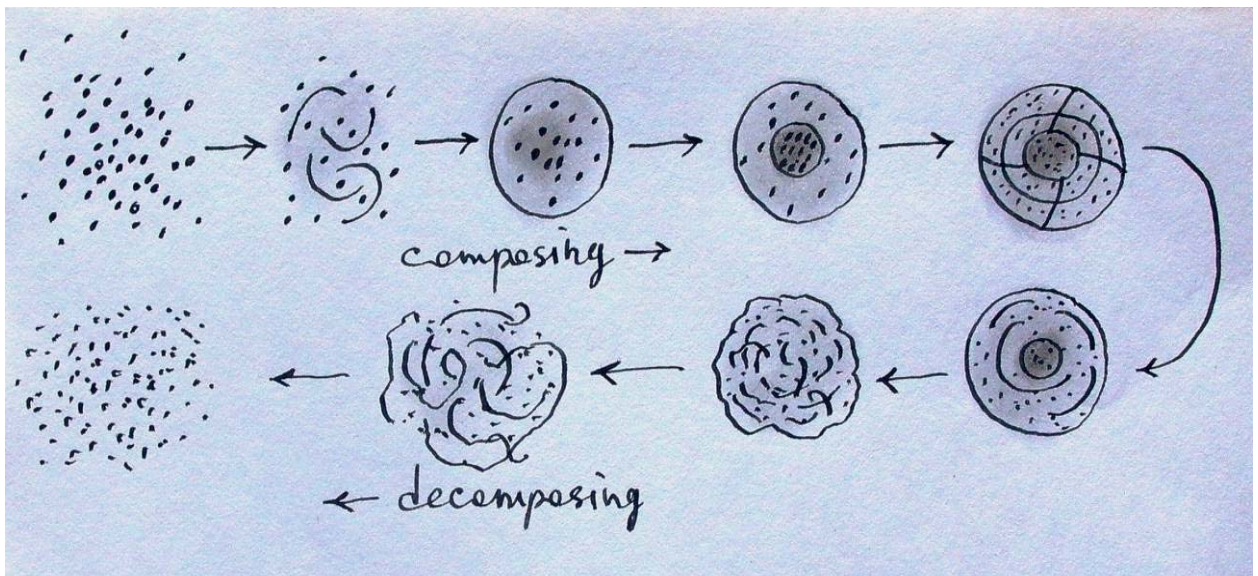


Fig.13. Basic stages of composing and decomposing of any structures in an evolutionary process.

“Some individuals have extra-sensory perception or true clairvoyance, to plan for the future. The evolution of intelligence has evolved gradually increasing power of prediction.”

(From the book “Mechanics of the mind”)

Fig.11, 12, 13 give us possible explanation of the fact of prediction-knowing or feeling the laws of the basic patterns might affect the possibility to predict.

Transformation of flat surface $S(P_1, P_2, P_3, P_4)$ into sphere S_n is one of the oldest inventions of Life and is still used by primitive living multicellular form of Nature- Volvox (around 500 millions years old) and in every embryological development today.

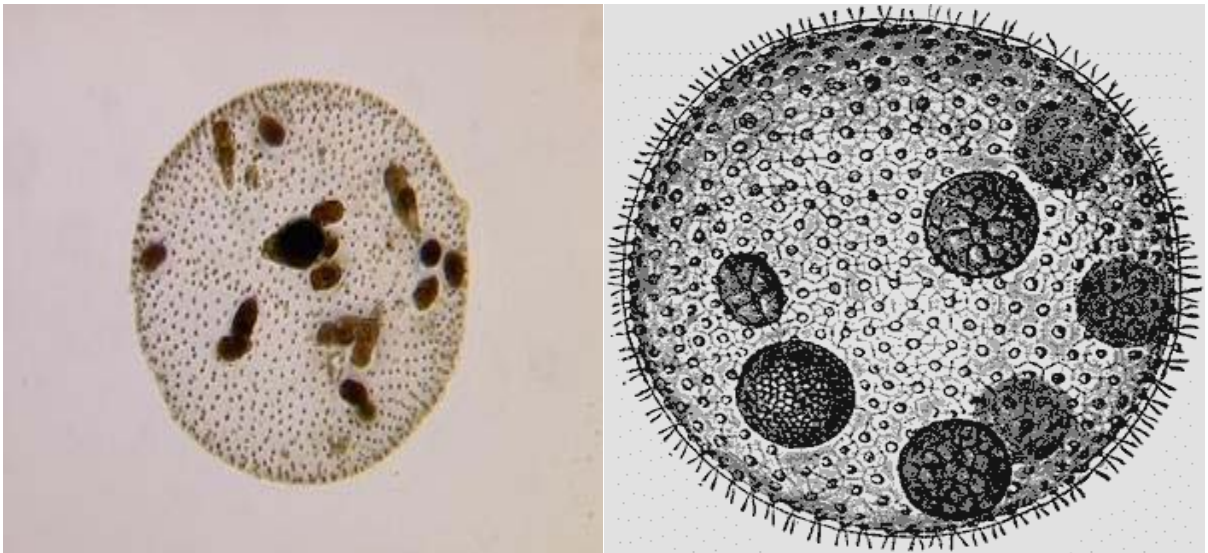


Fig.14. Volvox-spherical colony of somatical and reproductive cells with flagellas showing first stages of evolution.

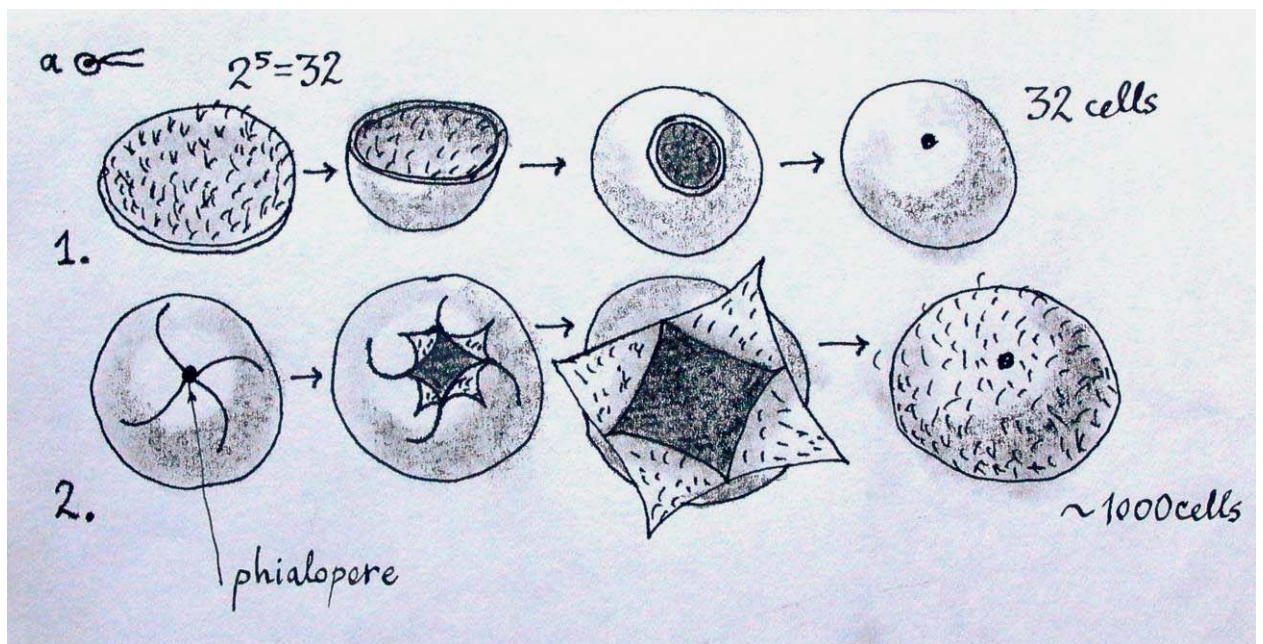


Fig.15. Inversion of a Volvox colony.

Transformation line 1: First five divisions of cell “a” give 32 cells in form of a discus, which immediately turns in a sphere with flagella inside. .

Transformation line 2: Sells continue divisions and the colony grows. Than the hollow spheroidal Volvox embryo turns inside-out through a small opening called the phialopore (like point Pn in Fig.11) by forming the cross-cut in form of swastika to bring flagella from its inner to its surface. The inversion is a dominant aspect of morphogenesis in Volvox.

Embryological development of the human brain shows the same primary pattern which was first developed by Nature in case of Volvox (transformation line 1 from Fig.15):

After fertilization an egg by sperm: -“ As the cells continue to divide and adhere to each other through the 8,16, 32 cell stages, etc., the cluster begins to resemble a mulberry and, as a result, this is often referred to as the 'morula' (mulberry) stage. During the following sequence of divisions, the solid mass of daughter cells develop an inner cavity, thereby entering the 'blastocyst' (blast, developing; cyst, sac) stage. At one end of the now hollow, ball-like structure, a cluster of cells grows more rapidly than those around it, becoming the 'inner cell mass'. This is the beginning of the embryo. The remainder of the blastocyst will form the various parts of the embryo/fetus support system, i.e. placenta, amniotic sac, etc.”

Arnold B. Scheibel.

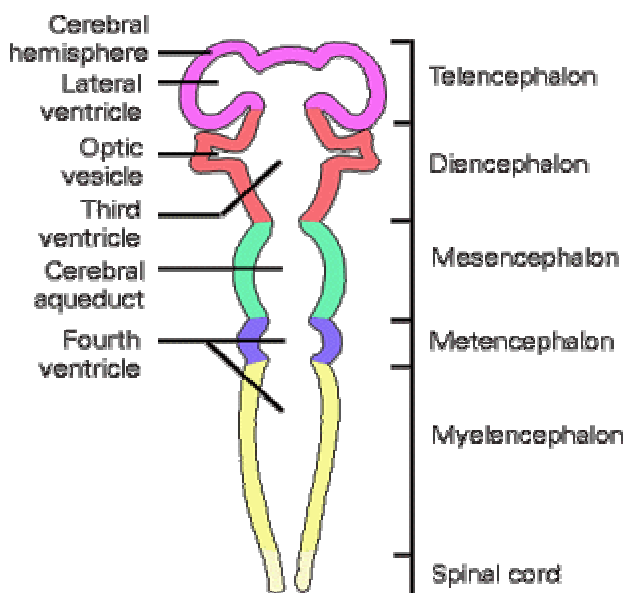


Fig.16. Embryo of a human brain.

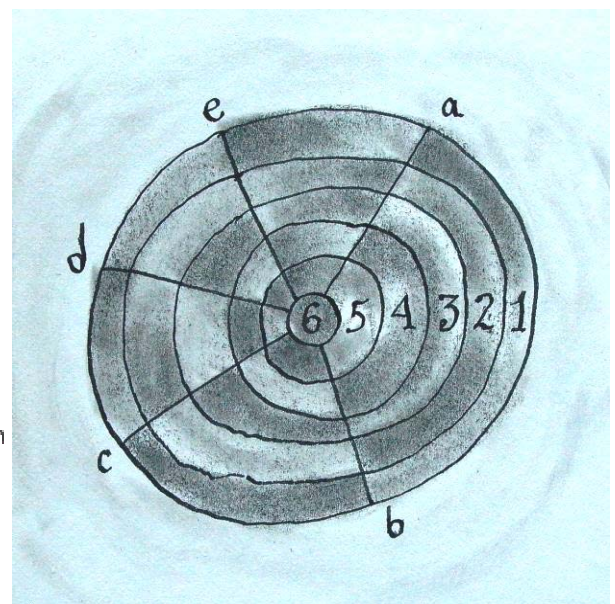


Fig.17. Layers of a human brain.

Embryo of a human brain is topologically a sphere from the first stage with later development of 2 structures.

Formation of layers:

“The cerebral cortex of higher forms is made up of six cell layers. Each layer has its distinct pattern of organization and connections. During the developmental phase which we are following, the cells initially move in to form the deepest or sixth layer. Each successive migration ascends farther, progressively forming more superficial (fifth, fourth, third second and first) layers beyond the layer that was initially laid down. Thus each group of migrating cells must pass through the layers already laid down by the earlier arrivals, thereby following an inside-out sequence of development. “

Arnold B. Scheibel

Formation of radial structures:

“As this thickening occurs, the trip from inner boundary of the neural tube to the outer portions becomes longer and increasingly fraught with potential difficulty. For this reason, some of these daughter cells unselfishly develop into a specialized type of "rope ladder" configuration, the radial glial guide cells, along which the primitive nerve cells (neuroblasts) can migrate. A number of these migrating cells may use the same glial guide cells, literally gliding up the glial 'rope' one after the other.”

Arnold B. Scheibel.

So speaking we have here the description of primary structure 6 from Fig.9-most complex from the others ever existing on the planet. It is Fig.17 where “ab”, “bc”, “cd”, “de” and “ea” represent 5 senses.

“During the first 6-10 years of life, the young individual undoubtedly achieves the highest density of synapses per unit volume of neural tissue (and the highest level of cortical glucose metabolism as revealed by PET scans) that he/she will ever have. This is also a period of enormous information input and acquisition, social, environmental, linguistic, etc. The growing brain may well be in its most sponge-like phase of learning as the child becomes acquainted with the endless range of symbols, rules, facts and behaviors that make it a member of its culture.”

Arnold B. Scheibel

This is the most important period in a child's life and explains the fact why in Imperial Japan there was a rule to give a name to a boy only after 7 years of age. First years of life is the period of forming “the primary structures» and is of the extreme importance for a child.

Let us summarize the picture of the Life, the Mind and the Universe.

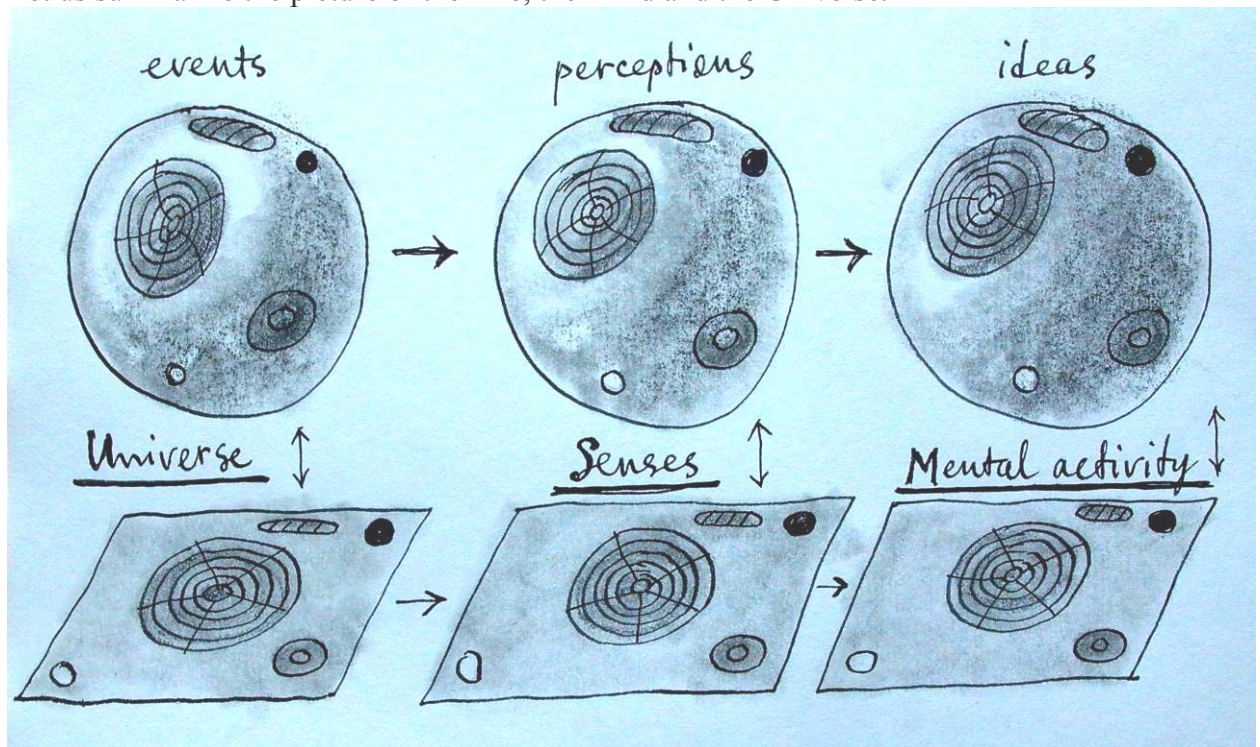


Fig.18. Universe, Mind and Reason are not only made from the same substance, they are the Substance and have the same structures of different levels of formality or generalization.

COMPOSITION in PRIMARY ART.

” Primary Art” has new definition of composition in general. Sizes, proportions of forms are no longer important- number, order and position replaced them. Any form and color which we actually see is false pleasing us only by physiological reason in order to survive as biological spices. There is no composition as a concept, which can or can't be fulfilled intentionally as a concept itself or an art work. Composing returns back to the stage of the remote past as a mandala, a process which could be done starting from any point or few points by an artist or group of artists having in mind basic laws of primary structures and their interactions on an endless but limited spherical universe which is a Plane of Now stretched and flattened to a canvas of any form without holes. Singularities are exceptions.

Elements of any composition are points, topological lines and surfaces. Colors, numbers, orders and positions are the properties of the elements.

New composition is not combination of new elements but new combination of the same elements.

The first flying apparatus of Otto Lilienthal was made from the components known to mankind 2000 years ago-wood, cloth, glue, ropes but it took so long to develop a new composition in order to fly with help of mathematic. Geometry by Lobachevsky is based on the same elements as geometry by Euclide but nearly the same time was needed for new composition in order to fly in the outer space of our Universe. Any evolutional step is a change of combinations.

A PLAY.

A “play” exists as variations and mutations everywhere in the Universe. It is a pattern, an algorithm, a quantum jump and the main instrument of evolution. In Life we see a play between animals and children where they explore “rules” of future activity in their development path. Any play is learning a pattern, variations in music, and an algorithm where they are implanted genetically in a brain as primary structures. It is again Fig.7. where nucleus is rules and field around is applications of them. Playing “outside” is cheating or being false. The common expression “outsider” stays as unconscious proof of the phenomenon in culture. Plays of children are learning models of behavior which are all confined in a certain circle. The seven deadly sins could be replaced by one expression- “Do not be selfish” (Bertrand Russell) but applied only for members of the group, a tribe or a nation. You are a hero when you managed to kill as many “enemies” as possible actually being outside of Fig.7. Children’s drawings are first steps of generalization and a kind of play at the same time. In this play they try to form first abstractions of any object and then “a chair”, “a car”, “a dog”...among all possible chairs, cars, dogs...They start from the highest level of formality passing stages of a fish, a mathematician, a musician and a visual artist. That is why studying most early activity and drawings of children before generalization of “object” is so important. They are remarkable the same as prehistory drawings and tribal art. It is a possible explanation why very remote cultures on the planet show strong resemblance without a proof of their contacts. It is the only one possible development path of the Universe, the Life and the Mind.

ELEMENTS OF ANY PRIMARY STRUCTURE. Points, lines, surfaces-definitions and laws of their interactions.(to be continued)

A SYMMETRY (to be continued)

PHSYCHOLOGY OF A NEW BORN CHILD AND EARLIEST CHILD’S DRAWINGS AS PRIMARY STRUCTURES (to be continued).

HISTORY OF WORLD ART AS TOPOLOGICAL STRUCTURES (to be continued)...

All www.konevin.com texts and images are copyright Konevin Valery.They may be downloaded and printed for educational purposes only.Any other use without express written permission is copyright infringement.