IMAGINATION THE CREATION PROCEESSES IN ART AND SCIENCES

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Abstract: Article introduces the attributes that characterize the creative activity. To compared the processes and expressions of artistic and scientific creation. It is considered their similarities and differences. Seek an "algorithm" for creative activity.

Creations exist also in outside the art and science. A creation and recreation take place in the nature continuously. To creators are there various cosmic, atmospheric and earthly processes. Are these processes random?

Definitions

Creation as a human activity is a *purposeful undertaking* for accomplishment the new spiritual and material values.

Both ***art*** and ***science*** is a specific form of human consciousness and -activity for ***reflection of the reality.***

How the accomplishment of new spiritual and material values coincides with the reflection of reality?

Arguably, the world is reflected in brain in the principle of a ***model***. There is no doubt that both artwork and scientific presentation has a characteristic of the model. It must be borne in mind that the model is a product of both a cognitive and creative activities of a human. *To model*, i.e. to create a new reality that is similar to the "primary" reality. Modeling in general, including in art represents the human cognitive and creative (creative) of actions. Tartu-Moscow school of culture semiotics treats arts as a ***secondary modeling system***, which uses the means of a primary modeling system (*language, speech, image*, etc.) in a specific and meaningful way. Therefore, to the arts is particularly characteristic the differentiation and observation styles, genres and imagination modes. In science is important the adequacy and precision of model. It should also be borne in mind that the model is the human cognitive activity as well as the creative product. Furthermore, the model includes the concept still substantiality, human-created material texture, without which there can be no art at all.

On the other hand, both art and science are a special ***sign system***, which mediates the artistic and/or scientific information to others. To this needs the maker certain ***skills***. In scientific sign system is also a secondary modeling system and model, which is densely related with the cognitive approach and a philosophical outlook on life. Its aim is to obtain new knowledge and their presentation (*fundamental sciences*) and of course their using (*applied sciences*). Also be distinguished the *exact sciences, natural sciences, humanities, frontier sciences* and *schools of thought.*

Art reflects it subjectively, in connection with human attitude to this, a reality together with value judgments. It is imposed from creation methods, talent, weltanschauung (world view), emotions and aesthetic ideals of the artist. An essential ensign of art is its ***interactivity***. Art does not explain

anything but it may raise problems. Art is one of the most important ways of *perceiving* the world. ***Science should reflect an objective reality*** in a rational manner, generalized and systematically, i.e. in the form of a ***knowledge system*** whereof authenticity to verify and in the practice permanently specify and supplemented. In science is centre the transition from discovery the essential relations of relatively simple cause and consequences to formulation the fundamental laws of *being and thinking.*

This could refer to the Latin word ***ars***, which means the *skills*, as well as *art* and *science.*

Human activity of any description, including the creation is induced by its ***senses.*** To sense organs are only the *eye, ear* and *nose*, but to the senses are now listed seven: *visual sense, aural sense, sense of smell, sense of taste, tactile sense, sense of balance and temperature sense.* ***Sensation*** is a direct result of the environment's effects. The *cognition process* begins with sensations that are perceived beforehand, where the individual properties of objects and phenomena (signs!) are directly reflected in *consciousness*. Sensation is the only channel through which a person is directly related to the environment. ***Perception*** is a *model*, based on the sensation of an object or phenomenon that also depends on the preceding experiences, emotions and thinking. ***Consciousness*** is the highest form of reflection of reality, it takes for attribute of "highly organized matter", to reflection of the (objective) world. ***Unconscious*** constitutes an assemblage of psychic phenomena that stay on threshold of consciousness, but affecting the individual's activities. This has become known through the teachings of Freud. ***Attention*** to filter out all the information coming through the senses and concentrate to an object of consciousness. ***Thinking*** is a process of mutual influence between the sentient subject and the cognizable object, in practice, a primary form of the subject's orienteering in reality. Human thinking is related with ***language***.

Creativity is expressed first of all in ***creative thinking***, it means in the ability to solving the problems, create a new, both on the ideas level and the material world. In most cases this is linked to the ability to find unconventional, original relations also between things and noticed problems where others see only habitude. The borders of creative thinking extend from *figural (visual) thinking* to the *abstract (mental) way of thinking*. It is argued that creativity has a necessary *conditions*: a) atmosphere conducive to creativity, in which a person perceives a certain tension, feels that more can not be ignored, b) the creative person must be familiar with this area, but can not get used to the old solutions, c) are usually creative a good friend who supports and criticizes him.; d) criticism and advice to help ideas before release to the public, to the extent necessary to justify e) creative persons surrender at many live-weal and committed to work.

Platon treat creation as a "divine repute", Schelling and E. Hartmann as "unconscious life-giving breath", Bergson as a "mystical intuition", Freud, of course, as an "instinct's manifestation". In *creative process* take part all human intellectual power, especially *imagination*, there exist also the elements of *study* and *play.* Creative concentrating is expressed in the tension of willpower and an unique emotional condition (state). Often requires a creative moment so far unknown properties of things and phenomena and the relationship between behavior that reflects a new, capture or detection method. The creative processes are subjectively described in more, also by Henri Poincare. Unfortunately they have not been systematized and compared with each other.

Creativity is enkindled by ***inspiration,*** as a concentration of all the mental energy, to creation object. This is also supported by ***intuition***, as a direct, adversative to logical discussion side and ***association***, as an individual's life occurred during the mental link between actions and or conditions, which be expressed by call forth ones by the others.

Broadly speaking, it is divided into *visual, auditory, sensory and mental creation.* To visual creation are the *visual arts* as *painting, graphic arts, sculpture and architecture*, but it also includes the *fiber- (fibre-), leather-, glass-* and other to "consumer arts" titled branches. Auditory creation is, of course music. Almost in all the arts exists *sensuality*. *Mentality (thoughness) or spirituality* must be exists both in *visual- and audio arts* as well as in *literature and science*. Unfortunately, this is not always the case.

To create something, it must beforehand *be imagined* or *envisioned*.

The ***imagination*** is a sensual shape of a object (previously perceived object or phenomenon), the direct influence of the sense organs. According to Pushkin's is the vision or imagination necessary for both the geometry as well as poetry. In the *cognition process* is the imagination anything betwixt between sensuous perception and abstract thinking. The image is an essential element of *consciousness*, because he always associates the concepts of meaning and the spirit of things at the same time, shapes, and gives the opportunity to freely operate the conscious mind of images of objects. The imagination is an ability to create on the ground of impressions the human consciousness the new reprocessing or imaginary depictions of sensuality, which is not present us with the reality. ***Fantasy*** is an imagination, for which is a characteristic the special power, brightness and eccentricity of the created shapes.

Thus, the *imagination* is a "semi-finished product" of creation on the ground which anything attempt to *imagine*. To imagine can be *a picture, a sound, a subject, conception as well as a mathematical expression, algorithm and a proof* until they are *settled or realized or to* ***shapes (images)*** *form*. Thus, the creative process begins with arise an imagination and ends with realization or shaping or consummation.

The form of reflection the reality, i.e. creation called to shape (image). Shape definition produce the perfect and reflective relationship of art and science with its object highlights the art and science of the perfect reflection of the relationship, and its object (a subjective shape of objective world).

Shape (image) is ambiguous, we are interested in general cognitive meaning of the shape (i.e., in meaning of ~ *image, Gestalt*) as an essential attribute of *creativity*. Delete the following shapes:

1) ***Visual or "artistic" shape*** *(image)* is a specific to artwork (artistic creation) form and mode of cognition and adjudge for representation of reality. It is a common general category of all fields of arts. *Fine art* reflects the cognizable and artist's experiences by visual sense perceived *visual shapes*. So it will take place in the *textile-* and many other areas of "applied arts".
2) ***Auditory or music shape*** *(image)* represents something with aural sense perceptible. Music is *art of intonated idea (thought).*
3) ***Literary shape*** *(image)* is a mode of the art of words, which seeks by word using, word format, conceptual coherence of a particular word, sentencement, a ratio of sounds the expressiveness of language, trope, figurativeness and influentiality. Literary shape is first of all sensuous, especially in poetry. Whit which sense is perceived literary shape? Acceptance of this by visual- and aural sense is not enough.

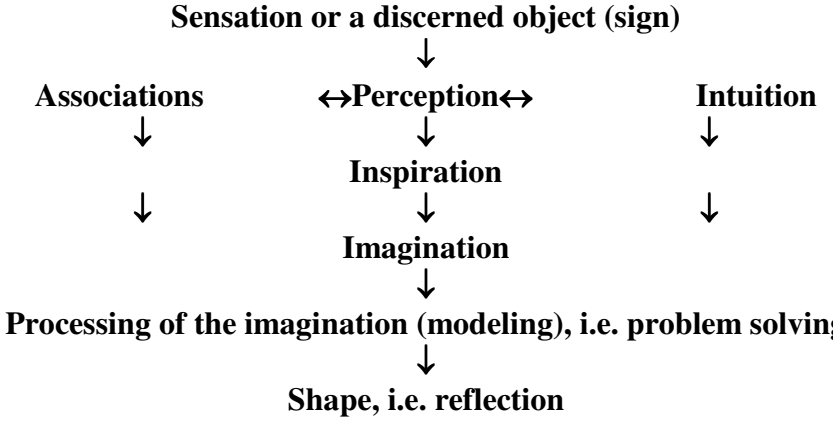
Comment: Also in the *science* we no escape form shape. Also scientific *creation* represents anything. Define it:

4) ***Scientific shape*** *(image)* is first of all *mental* and *abstract* (considered, deep-laid, forethoughtful) and expressed by specific conceptual coherence of words and/or signs. To scientific shapes are *concept, hypothesis, proposition, theorem, equation, formula etc.*

Mentality (thinking, to render meaning) must be exists in each area of creation. Artistic and scientific shape can be perceived, but not to accept, its idea can be stay incomprehensible.

So, as artists, as well as scientist *sense, perceive, think, represent, solves problems and produce.* Unfortunately take for creative persona only *artists, composers, writers* but not scientists. Why? Indeed, not all scientists are creative. But also among the artists, composers and writers can be found those who rather *reproduce*, than *producing,* say, not create.

To key words of creative processes are *a sensation, sense, an association, intuition, perception, inspiration, thinking, imagination, model, heuristics (problem solving) and the shape is perhaps a reflection.*



Both artistic and scientific creative process is a *heuristic*. This "algorithm" implies more than the creative attributes also the individual qualities and "taste" of the creator (maker) and various adopted rules and beliefs. Its implementation has been limited with the ability of creator.

Finding a solution may seem unawares *(Eureka!)*, although this is actually the fruit of intensive and long-term operation. Fine arts can create a *sketch (draft)*, or a complete artwork on one time *(à la prime!)*. The creative activities of the motives and objectives can be either *bargains (the so-called necessary)* or *self-interests (the so-called unnecessary)*. Which of them is creative?

Good, if creative person in his area also ***gifted (talented)*** is. Ideally, it is congenital, it has also been achieved through *commitment to professional,* but it can sometimes also *in the training*.

There is also a widespread but unintelligible term, in Estonian language – ***kiiks***. It means an open-minded, "dissimilarly" or "childlike" attitude to phenomena. It no has English equivalent. *Kiiks* is difficult to measure. They are often creative persons with certain *kiiks*. This does not mean necessarily that every creative person has a *"kiiks"*. Among the *"kiiks-mans"* creative persons exist few. On the other hand, a *"kiiks-free"* person cannot would-be a great creator, it is too confined. The *"kiiks-mans"* can in art easier to succeed than in science. One of the useful features of the creative is ***intellect***, it helps to balance a ***"kiiks"***.

But who is this *genius*? ***Genius*** is a creative person who will effectively and a lot of work. An important factor can be heredity. For example, on Bach's house are 16 composers Bach, and the families of Strauss and Kapp's are full of talent. Some are "God created" geniuses. Childhood manifest talents poets, composers (Mozart), mathematicians (N. Abel). Others geniuses are with been slower progress. In childhood were even talentless. Newton had difficulties in school, Darwin was a family disgrace. Such geniuses achieve renown with adults - at the age of 25. But their productive activity takes a long time: by Darwin 50, Freud 55 years. In case of genius

forming plays a role its *environment*. Creativity predisposed by openness of society, tolerance, diversity of influences, cooperation the creative personalities and so on. Creative individuals must also meet the knowledge, intellectual ability, certain personality and motivation. It was found that creative people take up such subjects, or underestimate what others are ignored. They develop it into a meaningful and important.

In principle the artistic and scientific creations are indistinguishable. On expression modes is the art very broad – from fine art to poetry, composing and black arts. The field of sciences is also spacious – from exact sciences to the Humanities. It is not excluded the direct contact domains of art and science. At the same time can be in the art and science to find anything such where the creative side disputable is.

Discussion

As we have seen, the creation is a ***deed (act)***, but such that bears "a qualitatively new material or spiritual values". It is difficult to measure, it appraising is inevitably subjective.

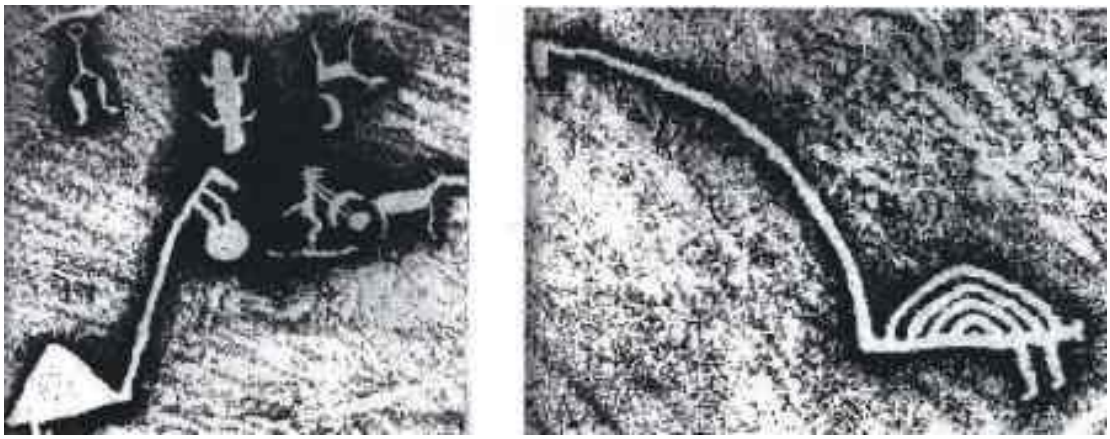
On the roots and evolution of arts and sciences

Which arise earlier, art or science? Do cavern-frescos an art or a science? It is after all among the geometric shapes and other unexplained found.

Creating something new seems primarily pertain to the field of science. When a human "under the tree had to be", then he thought the tools you need: spear, ax, bow and lever. The invention of the wheel was much later and it was already a great achievement. But it was not more research – it was just the *ability to think*.

One of the cave paintings in Lascaux' (France) ca 15000-10000 years BC. We see that the service is already one of the "scientific achievement", bow

It is alleged that the creations are accomplished on the religious inducements. In the painting caves have also to found the flutes on elephant bone. So, it was not so bleak of that time – had meditated, painted and make music.



Some of the petrographs in Äänisjärve (Karelia). It is asked, are these representations of cosmic objects? Many of the drawings have been noted for their compliance with the constellations. Man has already investigates the world and meditate.

Reconstruction of Stonehenge (England) ca 1900-1400 years BC.

Man reunited with long-term reflection of the world. This prompted him to create a variety of facilities that were supposed to help him to sense it. Stonehenge is as works of art and science phenomenon, because it was allegedly linked to the movement of celestial bodies examined. It is also referred to as "calendar computer".

Using the tools was a r t i s a n s h i p (craftsmanship, handwork). Artisans (craftsmens) were the smiths: blacksmith, potter, mason, carpenter, and others. Handwork making – ***skills*** – takes for ***art***. In addition to smiths were to *artists* later also writers, actors, painters, reckoners, musicians and so on.

The boundaries between art and science are in rather vague and variable. For example, the motto of Swedish Royal Institute of Technology (KTH) is “Science and the Arts”, which no means that the art’s cultivation in Technology Institute a very important role has. It is a medieval motto when only *medicine* and *astrology* take for science, whereby *mathematics, psychology, physics, alchemy (chemistry), stonecutting, painting and poetry* peaceably shack up to the arts sphere belonged. Why? Quite well known at the time was only the human body and firmament. The skills of mathematics, psychology, physics and other areas were rather inexplicable and no-systemized and each maker does without guidance.

In the initial years of computing were very popular writings à la "Art of programming" – and for the same reason, it was a set of *inexplicable* and *no-systemized skills*. Even now, it seems that IT is one of the tip was in science, the other end was still "art" within the meaning of their emerging skills. Belonging to the science in during the Middle astronomy has begun again to "artistic" side incline. Various researchers have found by different ways some different formations what can be differently interpreted – where is there attributed to science objective truthful, not to mention trying to systemization.

On similarity of creative processes

The creation both in art and science is a ***sensuous activity.*** The shape (realization) of something new as well as in spiritual or in the material level begins with *sensations* which by *associations* and *intuition* to perceived can and to an *imagination* change (becomes). To imagine can be a *picture, a sound, plot, theme, concept, hypothesis,* as well as the *mathematical expression, algorithm and a proof* until they heuristically *shape out* or ***realize*** or to a ***shape*** forms.

Thus, for example, both the working a gobelin tapestry as well as a set up a hypothesis and of a new kind of an old theorem to prove the same creative process, they consist of the same partial processes, elements. Without the skills, knowledge and thinking is cannot do in scientific or even artistic creation.

Old Athenians cultivate already monumental arts – sculpture and architecture. All of this was a very scientific and instigated from Pythagorians was served under the requirements of the geometry, which was for "visualists" understandable. There was golden section cult, it has been obligated to divine proportions, which may note very many places. Golden Ratio of the clip into two, so that the length of the longer takes part as part of a longer takes the short. Divine Proportion ratio is an approximate value of 1.6180339887498948482045 8 ... . This ratio appears in many contexts are interested. Also in the music was put emphasis to the harmony, mathematics and music (theory) were on the same level.

Thus, both artistic and scientific creation is a *directed, conscious* and *meaningful (toughtful)* activities, be purposed to shaping (imagine) an object.

Both the scientist as artist come across in it creation with analysis, abstraction, and synthesis. For example, *abstractionism* is an art direction which depicts the reality in an abstract form be shaped.

Both amongst artists and scientists are also found among those who *reproduce* rather than create. Both art and science is fragmented, there is a whole range of niche-typical evens. The differences between the various artistic expressions (e.g. paintings and musical works) are equivalent with differences between scientific phenomena (e.g. mathematics and psychology).

If an artist or a scientist has created something, he wants it presented. The representations an artwork or research result on a website are *equal actions. Exhibiting the artwork* in a common exhibition is equivalent to *speaking and/or display stand* in a workshop. *Solo exhibition* is equivalent to a *publishing of a larger article or monograph*. An *organized collection of artworks* is equivalent to a *scientific theory*. And so on. The *prestige* of presentation corresponds to the prestige of presentation place. Prestigious presentation places are rather *conservative (supporting*

the reproduction) – particularly in science sphere, as *innovative (supporting the creative products).*

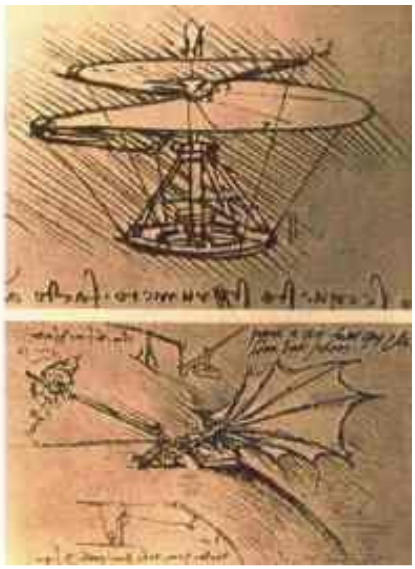
The differences

The main difference is considered that the artistic creation can be raise the problems but scientific creation strives to explain them.

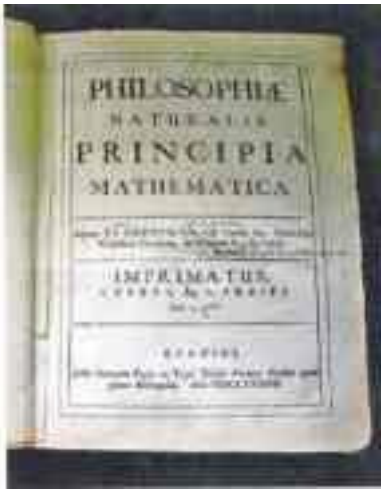
Art and scientific creation divided first of all *into different imaging modality* or ***shapes (images)*** of the objects. *Visual-, aural- (audio), literary- and scientific shapes (images)* are quite different phenomena. If the first works only on the sight sense, then the aural called also to the *shape of intoned idea (though).* Both the literary and scientific shape (image) use the sight sense, but are *though shapes,* and on this meaning similar. Of course, these shapes (images) may be a lot more to unravel. The most important difference exists between the visual and scientific shape (image), for example, the visualists does not recognize the isomorphism problem, etc.

After the collapse of the Roman Empire dominated in Middle Ages the architecture as Romanesque and Gothic styles emerging in height (pictured Chartres Cathedral) with the correlation of copper glazing. In mental life and science was dominated mysticism. Antic sciences were systematized to “seven free Arts” such as grammar, geometry, astronomy, music, metaphysics, etc. Sought links between religion and science, do well Alchemy and other mystic arts. Opened the universities of Bologna (1119), Oxford (1167), Cambridge (1209). Europe also amount to typography (Gutenberg, 1440). At the end of the Middle Ages was the Central and Western Europe an intellectual and cultural upheaval – *the Renaissance* – a striving for humanitarian and material values.

Arts and scientific creation *differ* from the *approach modus*, ***aspect*** and ***imagining (shaping) modus*** of results. Each object (phenomenon, system) is *many-aspect(ic)*. Each aspect is expressed by its ***sign system*** *(modeling system).* Artists and scientists trained to cognize very different sign systems. Yet “worse”, various artists can be seen in the same object different sign systems, ie to approach on different aspects. So is it also in science. *To imagine (to shape) can be only this, what is* ***perceived*** *(observed, recognized).* The story that the artist sees something generalized and research only "cause and effect" is not tenable. Has a musical composition an initial object?



Leonardo da Vinci (1457-1519) has a wide-ranging sight- or sign system – he was a painter, sculptor, architect, engineer, art theorist and nature explorer. He followed the principle of DivineProportion on their artworks and makes the calculations for its inventions. In case of its flying machine he unfortunately mistake, they could start to fly until four centuries later. He is particularly valued as Grand Master of High Romans.



In Renaissance era was all seated – the art and science were segregated. Netherlands modern top-painter and graphics Rembrandt (1606-1669) haw a picturesque manner, free paintbrush using and warm palette. Here is the painting of his research topics *"Dr. Tulp's Anatomy talks"* (1632). At the same age works *sir* Isaac Newton (1643-1727) with an Euclidean pertinacity put in place the principles of mathematics and mechanics (1687), which in school mathematics are hold good, so as Euclidean principles.

The artist sets to work an emerged imagination that it *to imagine* wish, but the scientist its imagination that it *to concretize* wish. A scientist is more *inquisitive.*

If in science attempts the new phenomena of science in *popular scientific* form to explain, then in art sphere a *"popular artistic"* explaining form no exist.

Artistic and scientific works valued differently. Highly be rated the ***fine art*** as *fundamental, veritable art*, ***applied arts*** (textiles, ceramics, metal arts, etc.) are not. In science is the story on

the contrary, there is especially valued ***applied science*** – only such a science is "beneficial", which also can be paid for. But that "benefit" has fine art? If the using value of science be measured by household and utility, then allegedly is art consumed by the spirit. However, only a refreshing spirit of ***fundamental or veritable science*** to pay for someone not inclined to do.

A semiosphere (semiotics-field)

Speaking here about *perceiving (sighting)* and *sign systems* means that it is deal with ***semiotics***. The semiotics exist many, both in science and art. Semiotics characterized pluralism. By W. Nöth a *semiosphere* forms by cultural semiotics (Umiker-Sebeok 1977), multimedia semiotics (Hess-Lüttich, 1982), anthropology semiotics (Singer, 1984), philosophy and logic of the relationship semiotics (Klaus, 1963), psycho-semiotics (Ullmann , 1975), medical semiotics, socio-semiotics (Koch, 1971), economic semiotics, folklore semiotics (Bogatyrev, 1937), opera and ballet semiotics, law semiotics, history semiotics, and others. Most of semiotics can be considered as the *text semiotics*. For example, for the signs of medical semiotics are symptoms, by using the diagnosis will be applied.

It is also very specific, such as *zoo-semiotics* (Sebeok, 1963), in which the signs are secretions and smells. Therefore, semiotics is not in any way as only a humanitarian discipline. In W. Nöth's list figure also *semiotics of mathematics* (Hermes, 1938), one of the previous semiotics at all! The significance of mathematics be expressed *in codes and in theirs be contained information*. Thus, an equivalence exist between the phenomena *perceiving (sighting)~sign~code~meaning~shape* . For example, the significance of structure be grounded on the codes – structural characteristics – and their systems. No all the perceiving (sighting) systems are yet officially accepted.

It can be argued that *each idependently thinking creative person has its own perceiving- or sign system.*

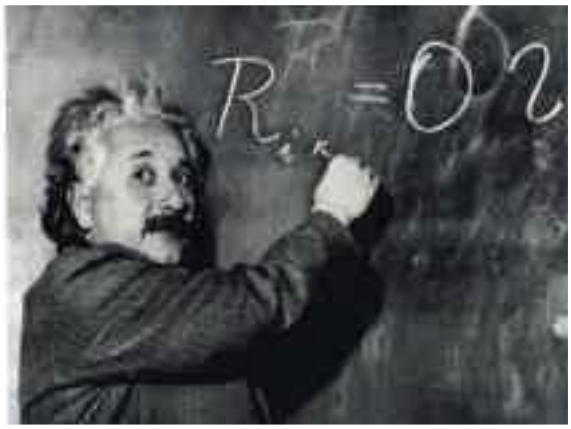
On the frontier domain of Art and Science?

It is alleged that the artistic creation is a subjective imagination of the artist but scientific creation is an objective reflection of the reality. However, so drastic this difference is not. The artist can exhibit in his creation also rationality and objectivity, but scientific creation can not be fully emotion-free and without events of subjectivity.

Some of the *humanities*, such as philosophy, social sciences and history bear the signs of artistic creation, *world-views* and *subjectivity*. Well-known are slogans on the topics "forgers of history" or "rewriting the history". Can be the humans able to by the "historical truth", or should agree to do so but extraterrestrials? Currently it is limited only to the truth of epochs and dateless, but not on the level of their interpretation. *Is the history a science or an art of manipulation?* Such examples can lead others in the humanities field.

If the artist sees his objects *externally, as a whole, in general*, it is somewhat *generalist*. By observation of anything natural association (community) can it bewitch its colors and harmony. A researcher can be interested there quite on the inner processes of the same association and its colors and harmony can be stay unnoticed. The researcher's approach to the object may be *narrower, deeper,* this is a *professional* approach. On the other hand, the artist may also be

interested in a little detail in this association, if an eco-semiotic(an) there the *general principles* perceive.



To the end of the 19th century are the arts and sciences as well as "crooked". In France had developed various flows of arts, such as impressionism, expressionism, cubism, futurism, and others. For example, fovist Henri Matisse (1869-1908) paintings represented something other than classical. To this time had N. Ivanovich Lobachevsky (1792-1856) the geometry to the negative and G. R. B. Riemann (1826-1866) to the positive side crooked. Albert Einstein (1879-1955) is over when the other remained than by his general theory of relativity (1916) all the space-time to crook.

As mentioned, in the times of arising the hardware was the information technology only an Art. Attributed to Arts *subjectivity*, and *manipulation with skills* also appears in sciences. For example, the geometries are at least three, and graph theories many. In graph theory cannot go over nor around on the creation of heuristic methods that need various *skills.* On this basis, we argue that there are, for example: "Art of the clique recognition", "Art of isomorphism identification" and so on. After all, there no exists the *objective truth* that is inherent for strict science. In creation a heuristic method must be *thinks and solve a problem*, so as in the case of poetry and literature.

On the other hand, in the same graph theory to finds also serious scientific-creative attempts. For example, when in the 1976th from K. Appel and W. Haken'i realized proof of the *four-color problem* was a "Art" the skills of using of thousands configurations, then from Ashay Dharwadker in year 2001 elaborated, to group theory and Steiner systems based proof is strictly scientific-creative. His perceiving and sign system is more efficient. This historical problem was waits such solution 158 years. Also "the Art of isomorphism identification" may be to scientific-creative if it is based on brings out all the substitutions.

But some "Artistry" in science is inescapable. For example, if the recognition of graph's orbits by combinatorial methods is scientific (but not creative) trying work, then their structure-semiotic "Artistic" recognition is more effective and clearly arranged. On the same aspect seems the during over 64 years efforts of graph's reconstruction problem something be meaningless (nonsensical). A structural solution exists there.

In the early years of the Estonian Republic of art that was also cultivated different artistic taste. For example, set up under the influence of expressionism was Konrad Mägi's painting "Landscape" (1920-1921). In science, it was pragmatic. The chemists in Tartu University to researched how oil shale could be extracted.

If a scientist of a concrete discipline has attracted on any phenomenon, idea or method that no belong to this discipline, but he find a way for it using – then is touch with a creative *art-phenomenon*, where its inculcating can be *to conduce (promote)* this discipline. Science has grown out of the art and *science evolves by artistic expressions* higher as the art self.

Some researchers can be keen an art creation, and it even efficiently. Amongst the writers and artists are many that be trained to engineers and others. For a fine artist, who has interested in quantum mechanics to hear naught. Is noticeable the music loving of some exact scientists. Between music and science at all, it seems some mutual proximity. Is also know the by Ferenc Liszt write "mathematical notebooks". In Estonia is also known some in mathematics interested professional composer.

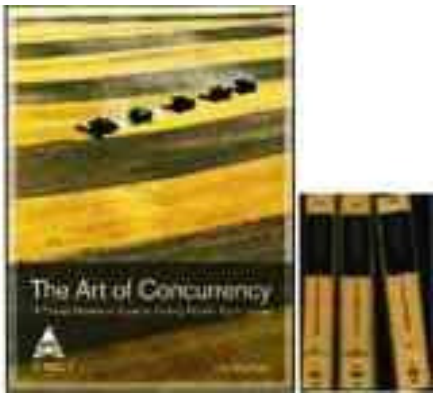
Some problems

We are takes for the science all that exist between astronomy, mathematics, social sciences and the humanities. However, under Arts we think all the between fine art, poetry and black art. A fine artist can be here to protest, but it is inevitable, because the art of beginning from *skilling to imagine* and devising a new *trick* is undoubtedly a *creative act*, and its *spiritual value* is *entertainment*. Are the *performances* and some other new art phenomena a modern form of black arts? We have also been used in information technology and graph theory *heuristic tricks* to artistic titled. All this should not be something unnatural.

Over the "Artistic taste" to be held pointless to debate, but it is disputed endlessly. However, there are cases in which no disputed. **...** Disputes about Monuments are eternal. And so is it also in Estonia. There is room for urban development specialists who have their own theories. Nice, but unfortunately there are no eternal, unvarying theories, as well as the geometry is revised at least twice. The history is well known that in his time called for the immediate demolition of the Eiffel Tower.

Is all right now was on the canvas or warps be imposed, chopped on stone, as sounds performed, on paper (on scientific or poetry purposes) written, designed or constructed a creation? Since it is a new one, even qualitatively, can be generally accepted? Who determines their value? If anyone

to determine it, then it will remain so? If ever evaluated the creation by their aesthetic value, then what is valued now? Values and their estimates are very much changing.



The end of the last millennium is again tangled relationship of art and science gone. If the concrete poetry cultivating well-known fine artist Raul Meel offers merely *salt*, then the same well-known scientist of parallel programming Clay Breshears offers *arts*. And nor is his one and only. Various *arts* in information technology field to find more than salt package of Raul Meel.

The connection between art and science of art itself is due to the stem. As science is the arts also a reflection of reality, and possesses disposition function. The reflective nature of Art is evident in these fields of arts, in which the artwork is formed on the basis of the reality of the phenomena (visual arts, drama, theater, cinemas). But even in those fields of arts, where the figure is not based on imaging (such as music, architecture, design, choreography) is the world reflected not only subjectively but also objectively.

Over time the artistic creation is done through re-evaluations. If to 20 century was dominated there the aesthetic values, so called “lovely arts” then later is more interested in “social values” and others. For example, the “socialist realism” which is currently simulated in the Jehovah's Witnesses publications. In visual arts were the aesthetic values been replaced with various new “tricks”. These values are still remained in tapestry-, glass and some other fields of “applied arts”.

Scientific creation has always been encouraged by the two opposing sides – the practical needs and the desire of understanding (knowledge, inquisitiveness). If the first be interested everybody then the second only a few.

Conclusions

The activity of artistic and scientific creation is *similar*. Any creation as a sensuous cognition, begin from the *sensations* what with help the *associations* and *intuition* to *perceived can* and by obtaining the inspiration an *imagination* arise.

To imagine can be a *picture, image, a sound, topics, conception* as well as a *mathematical expression, algorithm and a proof* until they are settled or realized or *to shape (image) form*.

Both artistic and scientific creative process is *heuristic*. This “algorithm” implies after the creative attributes also the individual qualities of the maker (creator) and various accredited rules and beliefs. Its implementation has been limited with the ability of the maker.

A verbal heuristic algorithm of creative process could be, for example a derivation and extension of the Feynman Problem Solving Algorithm – for all the makers to know seem condition:

1) Hold your eyes open and senses uplifted, but no happen too straggle. To minimize your appliance loads.
2) If an idea has arisen that to an imagination be ripen, then sketch it (make a rough draft).
3) Make sketches eagerly. Think carefully adjusted, and struggled with his sketches (drafts)
4) If you are pleased with the effort (outcome), then to shape it.

Heuristic-based computer programs have tried to make "the machine creations", such as "Machine Music" and "Machine Tapestries" and other form. However, they were only contributing towards creativity. The former is now used by many contemporary composers, also the "Machine Tapestries" to exist. There are computer programs for the art of building. Flourish is lost "computer graphics", not to mention the variety research software. The attempts for "machine proofs" of the theorems are unsuccessful.

Artistic creation was takes for a immediate emotional and subjective shaping, but scientific creation for rational and objective shaping of reality. Such limit cases naturally exists, but objectivity and rationality can be found also in artistic creation and subjectivity and emotionality be found in scientific creation. The artistic and scientific creations are closely related to each other.

Artistic and scientific creation *differ from its phenomena* to different ways of depiction their objects to *shapes (realizations)*. It can be say that for each sense correspond an art class: to sense of sight visual art, to aural sense sound art (music), to sense of taste cooking art, to sense of smell odor art etc. To the "information carriers" of creation results can be papers, files, film, canvas, threads, musical instruments, languages, stage, props, people, equipment, food, taste and chemical agents, etc.

As we have seen, is science grew out from arts, its roots are in the arts. There should be something terrible, when we scientific creation to a specific art phenomenon entitle. Scientific creation is an ***object-oriented art of deep-thinking*.** Artistic creation itself is an ***assemblage of shaping-modes of objects.***

Ars (Latin: *art, science, skills*) ***longa*** (*timeless*)***!*** We can here to add: ***Ars mutor*** (*changing*)***!***