

Aesthetics of the Natural Forms as the Motivation of Science

by Michal Giboda

A Loose Interpretation of the Concepts of Art and Aesthetics.

Silvie Vondřejcová, a student at the Academy of Art, Architecture and Design in Prague, imposed deliberate limitations such as "no speaking", "no staying at home overnight" etc. upon herself for a period of six months. Particular restrictions were changed every month. She informed the public about the deliberately imposed limitations by fixing labels on her dress. She was recording her activities in the forms of diary, film, photograph and sound. After finishing her activities she was asked whether she thought that her project belonged to the sphere of the visual arts. She insisted that it did, interpreting herself as a "thought-provoking walking picture". She did not intend inspiring people to imitate her. She endeavoured to evoke the viewer's imagination, causing an unusual excitement. The instructions such as "not sitting" and "not speaking" could give a mental impulse resulting in the viewer's experiencing it "equally to reality". Does this mental process differ from the exaltation evoked by an impressive artifact?

Marcel Duchamp placed an ordinary utilitarian object – bottle-holder – into the middle of a serious exhibition hall. The exhibit was not modified by any creative intervention. This simple utilitarian object, turned into art because the space was intended for art exhibition. The bottle-holder was chosen by the artist who predetermined it for a special, magic role (I. Zhofi, 1992). Thanks to its reflection in the human mind the "ready-made" bottle-holder was endowed with a new, aesthetic character that resulted in turning the utilitarian object an artwork. Because of it the concept of art has been extended.

German artist Joseph Beuys, a military pilot shot down in the Crimea in 1943, was found and cured with the use of felt and grease by the Tatars. Later on he raised these two materials to the means of artistic expression. Beuys' *Chair* with the seat filled partly with margarine turned legendary. It was sold for 2 500,- DM in 1964. Its actual value is hundredfold. Beuys, cloaked by a tilt blanked and holding a walking-stick in his hand, was reclining with a living coyote at a corner of the exhibition hall in New York in 1974. The artist turned in a part of the artwork, a three-dimensional sculpture that extended the borderlines of the traditional understanding of sculpture without further comment. He fixed the inscription "I Love America and America Loves me" above him. It was a "performance". The word *performance* implies, in addition to other things, a public presentation.

It raises the question as to whether all activities performed publicly at art galleries are worthy to be classified as art. Is it cardinal regarding the aesthetic nature evoking the feeling of beauty? Is it really art? On the occasion of his exhibition presented at the Brno House of Art in 2003 Vladimír Kokolia said that "art" was derived from "to change" ("**měnit**" in Czech). Naturally, Kokolia continued, it was a pun, nevertheless coming close to the truth: turning everything into art. According to Kokolia the prize (of an artwork) is to be interpreted as an aesthetic category understandable to everybody, a category that could fabulously intensify the viewer's experience of an artwork. The theory of evolution has been evidenced by the recent history of painting: the medium, predetermined to extinction due to the dematerialization mediated by video and installation, has re-emerged (once more!) reconsidering partly the previous development, having either the conceptual and / or action nature, echoing and / or paraphrasing the visual character of the new media etc.

There are few examples of the evolution of art and / or the understanding of art. The sphere of art has also been influenced by evolutionary processes. With regarding art the evolution has not resulted from the nature of art. It has been mediated by the artist echoing the metamorphoses of the artist's memetic portfolio (en lieu of the Darwinian genetic portfolio). What is meme? It is the basic component of the human mind structure. Its importance corresponds to the generally accepted role of gene regarding the biological forms. Corresponding to the evolution of new forms of life starting with the gradual transformation of genetic portfolio caused by mutation, the evolution of culture (including art) is based on replacing the old memes by new ideas and thoughts. The fact that they are disseminated among posterity do not result from the "good" nature of these ideas. It results from the fact that the "good memes" such as

safety, food and reproduction have been included within them. It influences the evolution of human behaviour, forcing people to respect them. (Naturally, it does not eliminate the importance of free will). In the early history of humankind - Homo Sapiens - the human consciousness was focused on survival and reproduction. The character of knowledge was simple and purposeful: the knowledge of the field, the knowledge of the season, the way of hunting etc. The originally unspecified, universal knowledge turned gradually specialized, due to the emotional influences and the evolutionary selection, corresponding to the metamorphose und by man. It was the memetic revolution. Memes influenced cardinally the selective forces which had the impact on the genetic portfolio of preferring the group of genes that were able also to satisfy the aesthetic libido (for example the ideal of beauty). French anthropologist Levi-Strauss formulated the thesis about the birth of human thinking. According to Levi-Strauss the use of language resulted in the transformation of the natural being into the cultural breed of men. Human culture emerged, i. e. the state of mind enabling the dissemination of information vertically (from the parents to the offspring) as well as horizontally (among non-relative individuals). Creativeness, associated with satisfying other needs than simple survival, emerged from the depth of the awakening consciousness. *Homo habilis* started to experience emotions, so he created art to satisfy them. The successful type of art was based on a combination of many elements regarding the human instinctive experience of values that contributed to the satisfaction of emotional needs.

Contemporary society is so complex that the simple, practical type of knowledge, which was purposeful in the stone-age, is not able to compete with the new memes. It is expected that further developments of the cognitive abilities will evidence that the evolution of human consciousness and culture has been formed by particular memes capable of leading men to perfection. The empirical evidences differ from this thesis. Concerning the tests, students' results have worsened... It is evident that the identical memes have been being disseminated globally thanks to the inventions of writing, letter-print, communication nets and information technologies, resulting in turning the planet into a global village. "The globalization of thoughts" has been evidenced by the identical moral standards, norms of behaviour, ethics, fashion, and the desire for the free society. The systems, which are not strictly rigid, i. e. are able to reconsider their memes and / or tolerate the coexistence of various memes (science, democracy and liberalism), have better chance of survival. An increasing number of people like to overcome the limits of the established concepts. The aesthetics have been confronted with new images. The sources of inspiration have been searched in the untraditional spheres of mind; the mystery of science is a thought-provoking, seething source of new stimuli. It is like integrating the two spheres - science and art - that were splintered hundreds of years ago. The questions are: Do different artistic forms express the identical emotions? Are the emotions being changed in the correlation to the development of culture, so that the artistic form echoes the spirit of a particular period?

The Venetian Biennial evidenced the leading role of science, followed by art. Which of the classical media of painting, printmaking and drawing have remained in force? None of them! The theorists have been challenged to redefine art. How to classify the items which were on show in the Venetian Biennial? Of course, it must be called art: Conceptual, post-Modern, Theatrical, Visualization and the Utopia , nevertheless it hardly could be described as fine art. All of the aforementioned types of art represent more-less mastered shaping ideas through technical means. Creativeness has been limited by the technical skill of the creator.

Problems, which are more important than the technical mastership, concern the idea, inspiration, message. Only a few of the displayed works evoked the feeling of beauty. The majority of items on display represented the desperate cries of disgust, hopelessness and fear. Why? Who is decadent? Art? The world? The artists? The Viewer? Why do artists try to get the audience involved in the cheerless states of their minds? Why do they disturb the viewer by the sour atmosphere of purposeless philosophizing, and idle ambitions of being the leaders of nations. What are the sources of their elixirs of life like? Do they live still within the real world? Have they lost the ability to understand it due to its dynamic transformation? Do they mediate their depression, caused by the frustration resulting from their incapacity for understanding the world, the public ? Who is the dictator? The viewer? Do the artists transmit their disorientation in the audience, making the viewer co-responsible for their false view of the world?

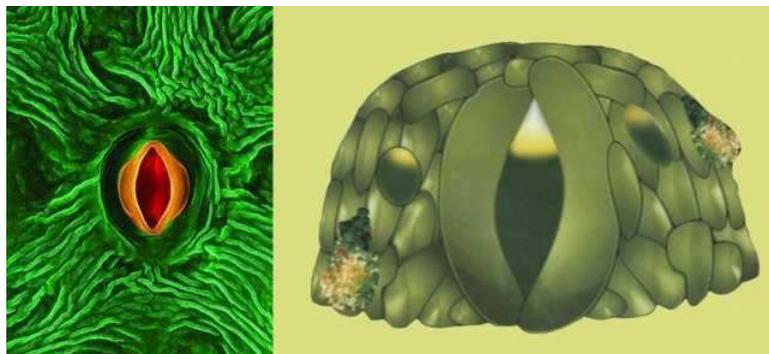
The Natural Forms of Aesthetics .

In contrast to the theory of art, the aesthetics deals with categories of beauty, attractiveness and ugliness within complex contexts, including non-artistic issues such as the behaviour of animals, particularly associated with the sexual affinity (the law of the preservation of species is one of the dominant natural laws). The aesthetic norms, used from the animal kingdom to beauty contests, differ from aesthetic standards of men, so that they are hardly identifiable. The majority of conclusions are empirical, based on observations in the open air. In the mating season male birds get their proper coat and / or try to woo female birds by beautiful songs. Due to our experiences we are able to imagine the feelings of a young female bird listening to the grooms' warbling but we are hardly able to imagine her criteria concerning the selection of future father, the donor of sparrow's genes. And what about fathers? British and Swedish scientists discovered that the role of fathers is not as passive as we have to expect. They studied the quality of ejaculate on cocks according to the following criteria: (1) The frequent mating with promiscuous hens. (2) mating with a new hen for the first time. (3) mating with a hen with nice "sexy" ornaments, signaling dominant maternal standing. The scientists discovered an increase in ejaculation from 1 to 3! The category of beauty served both as the aesthetic criterion as the biological criterion regarding the quality of offspring.

According to the discoveries published in the *Sirius* journal (1/2004) the male and female birds *Aethia cristatella* (Alaska) are wooing their partners by specific smell, produced during the mating season only. Their feathers are tangerine-like scented! Other birds, for example pigeons and vultures, use smell for finding food and / or navigation. The use of smell as a means of communication is an absolutely new discovery in the bird kingdom.

Concerning men and women, how dominant is the role of beauty in the selection of partner? Many young, pretty, independent and well-to-do ladies are single. I asked young men for their explanation of this fact. They hold the opinion that these young ladies are searching for proper fathers of their future children – they are searching for the donor of genes and provider. I ask the question: How many contemporary men and women are under the influence of the atavistic meme, the roots of which were connected with the priority of the vanished past – the benefits of posterity (that is still the priority of animals)? If we have overcome this atavism, which meme is able to have impact on reproduction, the most natural sphere of our behaviour? Through which of the emotional and cognitive ways does this meme influence us? Perhaps by answering this question we would be able to answer the question *why we are menaced with extinction!*

The philosophy of aesthetics could be applied to both the artificial (artistic) objects and the natural structures and forms.



In accordance to Kant's statement the perception of beauty is subjective. It depends on one's taste and is always associated with the feelings of pleasure and delight. According to George Santayane beauty could be found equal to pleasure. No surprise that many people can derive the aesthetic pleasures from the harmony of nature. Geologist Václav Cílek meditates about the male and female elements of landscape. He speaks about human characters influenced by the Earth. German molecular biologist Andreas Ruppel explored the concept of natural beauty. He arrived at conclusion about the link

connecting the biological function with beauty echoed in the mysteries of the evolution of biological systems. He compares the *metamerné* order of particular organs, such as the articulated body of the centipede and the earthworm, and the human ribs and vertebrae, to the rhythm of music and rhymes of a poem. He derives the rhythm from the heartbeat. The emotions of verses have been formed by the rhythm of the words. The veneration for the metamorphosis of dropping into the beautiful bug scarab by the ancient Egyptians, and the veneration for the mystic metamorphosis of the malodorous swamp into the beautiful lotus in bloom by the Buddhists endows beauty with a spiritual dimension.



Categories such as aesthetics, beauty, harmony and art are hardly ever associated with science. The rational, analytic and emotionless nature of science is often found contrasting with the subjective, sensual, emotional and unique nature of art. This strictly antagonistic understanding of art and science, representing the common opinion, has resulted from insufficient information about the world of science, scholars, and particularly the function of emotions regarding the selection of scientific discipline and the process of research. According to the common opinion a scholar is an uncommunicative Dr. Dryasdust, who is almost



asocial and absolutely unsocialized. Jacobus H. van't Hoff ¹, the first Nobel Prize-winner for chemistry (1901), said in his speech delivered on the occasion of the Nobel award that great scientific discoveries were unthinkable without the scientist's great imagination. He gave an example of the outstanding chemist Sir Humprey Davy, who was a poet and visionary. Physical chemist Wilhelm Ostwald ², the Nobel Prize-winner for chemistry in 1909, was a zealous amateur painter. His research in the field of theory of colours resulted in his collaboration with the Bauhaus School in Weimar (1920). Paul Klee and Wassily Kandinsky were teaching there. Ostwald's theory of colours influenced Kandinsky, who believed that the specific selection of colours could intentionally touch the right chord of human emotions similarly to the strings of a piano. According to Suzanne Anker, the New York based artist and co-author of the book *"The molecular gaze. Art in genetic age"* (2003), Kandinsky's artistic style was also influenced by the discovery of atomic fission and the endeavour to visualize this discovery. Duchamp, Picabia and Kupka were influenced by the invisible world that emerged after the discovery of X-rays. Russian Avant-Garde artist Pavel Filonov propagated scientific, analytical intuitive type of naturalism. He suggested to analyze the purpose of the whole object, the real substance of the whole world based on the processes observable and unobservable with the naked eye.

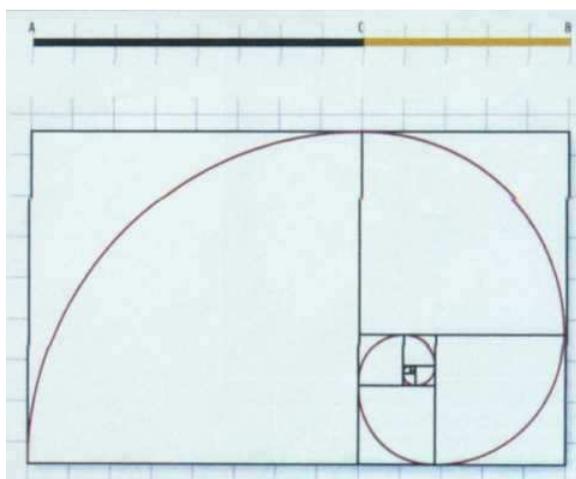
Thanks to the shift of the genesis of thinking a new source of artistic inspiration emerged from the invisible world of scientific and technological inventions.



Regarding Czech chemists, Emil Votoček is a paragon. He was the leading Czechoslovak chemist in the mid-war era. He contributed by university textbooks, musical compositions and an encyclopaedia of music. Great ideas emerge during the quick, spontaneous gleam of spirituality. It is like poetry illuminating the scientist's mind in revealing the truth without warning. Everybody, who experienced the beauty of science and research, is aware of the role of illumination in the birth of a great scientific idea. Henri Poincaré (1854) , who inspired both Albert Einstein and Pablo Picasso, declared that all discoveries, including the scientific inventions, had to exceed the limits of pure logic. He found logic a „sterile science“, useful in recognizing the correct way, nevertheless inapplicable in showing the way to unknown spheres of knowledge. The artificial barriers between cogency and enthusiasm, appreciation and sensitivity, and the senses and intuition have a detrimental influence on scholars. The suppression of passion for science, sensibility and intuition from the scholar's daily activities does not make science. It is the elimination of the subjective, emotional stimuli from the origins and conclusions of scientific discoveries that is fundamental. "The concentrated mind and blurred feelings". Is it really true that science mortifies the sense of aesthetics, artistic sensitivity and creativity, and the intellectual and spiritual potentialities? Does science impair human abilities of profound experiences and sensibility? Become acquainted with the painting of pathologist Jiří Špacek from Fingerland Institute of Pathology in Hradec Králové, read philosophical books about science written by mathematician Petr Vopěnka, and make acquaintance with the work of geneticist Vladimír Vondřejš, who contributed by engaging "pictures made of water" and spatial constructions of tensegrity to be assured about the contrary conclusions.

The perfect shapes in nature attracted the attention of people from time immemorial. Why does a tree have a spacious top? Why are its roots divergent? It is because the tree needs to obtain the maximum nutritive matter from the earth and simultaneously expose its body to the sunshine as much as possible. The flow of nutritive matter in a tree is influenced by friction and gravitation, similar to the circulation of blood in the human body. The ramifications are typical of wood (see the illustration), vascular system and human lungs. The latter is comparable to the ramiform shape of coral – the maximum volume is crucial for both a coral and human lungs (see the illustration), evidencing the highly professional constructive potentialities of nature. This opinion was expressed by American scientist Adrian Bejan in his book *Shape and Structure. From Technology to Nature*. Bejan used the term *constructal theory*. It represents a scientific and philosophical attitude thanks to which people are able to approach new biological and lifeless forms of nature. Where did the shapes in nature originate from? Scientists, artists and philosophers keep asking this question. The universal law of shaping different bodies is to be mathematicized. Greek mathematicians discovered a special importance of the number $(1+\sqrt{5})/2$, approximately 1,618. The division of the abscissa AB into two parts (AC and CB) in the ratio 1,618 results in the same number concerning the ratio of the length of the abscissa AB to the length of its longer part. The ratio of AC to CB is equal to the ratio of AB to AC (see the illustration). The repetition of the oblong with adjacent sides in the aforementioned ratio can be visualized as a spiral. It is the dominant principle of the shells of sea molluscs and galaxie.

The number 1,618 is detectable in unexpected places. For example, a leaf often stands at an angle of 137,5° to the stem. It corresponds to 360° divided by 1,618, resulting in the angles 137,5° and 222,5°.



This divine ratio was used for construction of the metropolis of Athens. Leonardo da Vinci found it a key to understanding of the proportions of human body (see the illustration). Le Corbusier, the major French architect of the 20th century, understood it as a device for harmonization of buildings with human stature.

Robert Root-Bernstein, the physiologist from the Michigan University (2003), expressed in his essay entitled *"Esthetics as a motivation for research"* an opinion that, concerning the Nobel Prize-winners for chemistry, the strong aesthetically emotional relation between the scientist and the field of his research was evident. He paralleled the truths of natural sciences with the refinements of art. The understanding of the scientific truth is as simple as perceiving the beauty. The geni of Newton, Shakespeare, Michelangelo and Händel were basically similar. The taste and refinement, which are so important regarding the research in the fields of natural sciences, are simply other expressions of knowledge; the love for nature is a passion similar to the love for the perfection of an artwork. The article by James Watson and Francis Crick describing the structure of deoxyribonucleic acid (DNA), published in the British journal *Nature* on April 20, 1953, was accompanied by a simple drawing by Odile Crick, Francis Crick's wife. The Cricks were so enchanted by "their" molecule that they said that it was so beautiful that it had to exist. The double helix of DNA turned the icon of modern science. Serving as the visual and verbal types of inspiration for novels, films and computer games it turned a trendy cultural phenomenon. Salvador Dali was the first artists who used it (see the catalogue accompanying the Dali exhibition held at Egon Schiele Centre from 23. 11. 2003 to 14. 9. 2003, p. 114). Since Dali's times DNA has been the subject of many artworks. Brazilian artist Eduardo Kac transliterated biblical sentences first with the Morse code, than with the DNA code transmitting it to the genetic portfolio of a bacteria. Some artists, biologists and computer scientists endeavour to set DNA to music, declaring the newly generated music to represent the "voice of the 21st century". The aforementioned artist Suzanne Anker approached to the theme of DNA as "the genetic imagination". Her paintings have echoed the artist's searching for beauty coded in genes and biological structures. Oscar Wilde pointed out the artist's role in creating beautiful things. He found the purpose of artmaking in revealing art and veiling the artist.

Within the contexts of Oriental cultures products of nature are not distinguished from artifacts. The explanation for this fact is simple: the concept of statutory difference is unknown in Oriental cultures. The Occidental type of thinking takes for granted that a thing can have fundamentally different statutes, for example the "denoting" and the "denoted". In contrast to it the cognizance of unity and universal continuity is typical of Oriental cultures. From the Oriental point of view the "denoting" is a concentrated form of the "denoted" within the continuum. If we keep pulling at an end of a rope we can expect that something from the other end will fall down on our heads soon. We could be crushed under it.

Art and literature searching and concerning cardinally for and gaining freedom. Thanks to it difficult traumas, scandals of instincts and desires, passions, encounters with death, and elements of chaos have been integrated in the articulated world of forms: the continuity of culture, civilization, history and psychology has resulted in a state of lawfulness, the background, the order, and the cosmos, so that the awful dread of being hurled down the abyss by the forces of the hurting edges of traumas and the never-ending questions have been weakened.

The idea of a loose interpretation of art and aesthetics emerge thanks to the social processes of liberalization and democratization. This idea is absolutely unthinkable within the contexts of dictatorial and /or fundamentalist régimes that keep controlling and correcting the deviations from the strictly defined categories of arts and aesthetics.

The searching for the new aesthetic stimuli and experience beyond the traditional bounds will neither inflict damage upon us nor deprive us of something desirable. We could be only enriched with it. Since its origination science has stimulated art. On the other hand art has influenced thinking applicable to science.