

THE ROLE OF BEAUTY IN ART AND SCIENCE

Beauty, as an ontological or empirical quality that causes aesthetic satisfaction, is presently connected as much with the arts as with the sciences. The conventional opinion that beauty is an exclusive and unique characteristic of artistic creation has substantially been abandoned: on the one hand, the arts serve various purposes and, on the other, the aesthetics of science conceives of beauty as an integral and essential part of scientific research.

The visual arts, as an indication of man's ability to express himself through images, do not always aim at aesthetic satisfaction; therefore, they shouldn't be approached through exclusively aesthetic criteria. Many are the works of art that have been created in order to satisfy philosophical and intellectual concerns, to provoke, to alert or even to serve social, religious and political objectives. In these cases, beauty and aesthetic satisfaction are either coincidental or completely absent.

This paper is focused in the visual arts and the analytical sciences of the 20th century: in the first part, the role of beauty in the arts and the aesthetics is examined, while in the second part the scientific approaches are analyzed, which at that period discovered aesthetic values inherent in scientific research, reversing the traditional perception of science as an objective, controllable rationality. The aim is to show that the role of aesthetics in the scientific approach of the world can only be the creation of the motives for productive research and the help in the discovery of true theories, while the arts can exist free from the conventions of the past which connected them absolutely to beauty.

The redefinition of beauty in the visual arts of the 20th century

Until the end of the 19th century it was generally accepted that art aimed at beauty, which, depending on the historical period, gained ontological or subjective grounds. The revolution of Modernism turned against the traditional perception of art, laying the foundations of an autonomous and independent visual expression. In the frame of both central tendencies of the 20th century, formalism and conceptualism, beauty, as the generally accepted essential quality of aesthetic value, was either downgraded or rejected by a large number of artists, theoreticians and philosophers (Steiner 2001). Arthur Danto (2003) reports that beauty had disappeared not only from the advanced art of the 1960's, but also from the advanced philosophy of that period.

In the first half of the 20th century, art disengaged from its role to represent reality and to express beauty. Artists and movements expressing various world-perceptions, such as Fauvism, Expressionism, Cubism, Futurism etc. abolished traditional styles and introduced the principles of two - dimensionality, deformity, splitting and the projection of the process on the completed work. Form functioned as a revolutionary vehicle, while the subject in many works of art acquired a secondary and even a non-existent role (abstraction).

At the same time, the foundations were laid for the post-war conceptual art. Marchel Duchamp formulated the theory that the idea can be more important than the form of the art work, while with his "ready - made" he exceeded the conventional limits of painting and sculpture, setting the traditional correlation of art, aesthetic values, the dexterities of artists and the application of stylistic rules under strong contestation (Iversen 2004: 47-48).

The movement of conceptual art, dated between 1968-1975, considered the idea as the most important aspect of the artwork, bypassing any relation to aesthetic values. Sol Le Witt, in an informal manifesto of the movement in the journal "Artforum", explained that the concept becomes a machine for the creation of art and that the appearance of the artwork is not important. Conceptual art should be shaped with the biggest possible economy of means. If some idea could be formulated well in two dimensions, it should not be depicted in three dimensions. Concepts could also be expressed through numbers, photographs or words or in any other way chosen by the artist, so long as form was unimportant (Robins 1984).

Conceptual art was powerfully connected to language and knowledge, while in some cases (Joseph Kosuth) it used elements of Ludwig Wittgenstein's theory. A. Danto (2005) reports that, in the 60's and 70's, philosophy and advanced art were ready for each other, meaning obviously that the visual creations of that period could only be comprehended in a frame of philosophical thought and interpretation. Art was transformed from a product of aesthetic thought to a field of philosophical approach, often aiming at the arousal of the spectator to the traditional values that were unconsciously imposed on him.

"Creations" like Duchamp's "ready-made" or Warhol's "Brillo boxes" led the art world to utter confusion (Danto 1986: 81-115) as the problem of redefinition of art became imperative. The traditional definitions were not valid, while questions resulted, such as why Warhol's "boxes" were valued at two hundred dollars, while those of the artist who first created them for the market were of minimal value. An answer is offered through the institutional theory of art, which was completely formulated by George Dickie (1974, 1984). According to him, works of art have to fulfil two conditions: first, they must be artefacts, in a broad sense of the term, as the mere display of a common object in an exhibition space is considered to be a creative process. Second, prestigious members of the artistic world must have recognized the works of art as visual creations. It is a non - evaluative theory that does not deal with the reasons for which the art world considers certain creations "artistic" (Wollmeim 1987). Nevertheless, it is the only one that attempts to explain the phenomenon of the avant-garde art of the 60's and 70's, reminding us that art is defined according to the society, the historical era and the institutions in the frame of which it is created and not according to a universal rule (Weitz, in Neill / Ridley 1995: 183-193).

The concept of "beautiful" is absent from most of the philosophical art theories of the 20th century. In some of them, however, there are relative references, as in the theory of "significant form", in which Clive Bell recognizes as a basic characteristic of all authentic art works the aesthetic sentiment that they create in the spectator because of their common attribute, which he calls "significant form". By this term he means a specific relation of the particular characteristics of the structure of the artwork that are independent of its subject matter, are not particularised and become intuitively perceptible by the sensitive critic. Contrary to the institutional theory, this theory is evaluative and the notion of the "significant form" replaces in some degree the idea of beautiful, harmonious and balanced.

In his aesthetic theory, Benedetto Croce claims that beauty is a successful expression, or moreover just an expression, because an unsuccessful one cannot be perceived as such. Henri Bergson characterizes as a beautiful feeling each feeling submitted and not caused: the objective aim of art is to bring us to a situation of perfect receptivity, in which we conceive the submitted idea and sense the expressed sentiment. Bergson believes that art confronts us with reality bypassing the conventional and socially admissible generalities that conceal it.

The first person who defined art independently of the traditional aesthetic criteria was the German philosopher Konrad Fiedler in his “Ueber den Ursprung der kuenstlerischen Taetigkeit” (1887). He claimed that art is not created in order to cause aesthetic satisfaction, but to introduce new ways of perceiving the world, exempted from traditional rules and subconscious conventions. In this respect, the aesthetic experience has rather a cognitive and philosophical character.

Martin Heidegger, in his book “The origins of the work of art” (1950), connects beauty with truth and ascribes to art cognitive, not aesthetic, purpose. He believes that the role of art is to reveal that the Being is hidden. When Van Gogh paints a pair of worn out villager’s shoes, in a way that he shows the labour of his steps and his contact with the soil, he teaches us what is truly a shoe. Then, according to Heidegger, there exists beauty, which is interpreted as the way in which the truth of the absolute Being is made obvious.

Another important philosopher of the 20th century, who dealt with the relation of art and beauty was Ludwig Wittgenstein, although his theory is differentiated between his early and his later period. In the notes of his “Diaries 1914-1916” he claims that the work of art reveals fully the actual reality without any moral interventions. The spectator of the work, influenced by its beauty, sees the happy side of the world. Thus, beauty is the aim of art because it causes cheerful feelings. However in his “Lectures on aesthetics”, held in 1938 in Cambridge, Wittgenstein’s theory is changed: the aim of art is to release thought from the claus of certain concepts which have directed human thought to similar intellectual movements for long periods. In 1949 he included “beauty” to these concepts, as it determined a whole tradition of thought concerning art and aesthetic criteria. According to the later Wittgenstein the latter are not limited to descriptive adjectives (e.g. “beautiful”, “amazing”), but are formed by sentences about right or wrong, success or failure, which, however, presuppose theoretical and practical knowledge.

According to A. Danto, the knowledge of philosophy and of art history is important for the understanding of contemporary art and for gaining aesthetic experience. Although conceptual works of art do not aim at aesthetic pleasure, they are, nevertheless, aesthetic objects, as art and aesthetic value are ontological connected. Their similarity to practical objects does not decrease their aesthetic value, which though does not depend on their form, but on the interpretation given by the spectator. Works of art are differentiated from practical objects because of their declarative attribute: the work of art declares something (about art, the world etc.) and the spectator has to identify and to interpret it. The aesthetic experience constitutes, according to Danto, a second stage after cognitive thought, because an object develops aesthetic character only through its inclusion in a theoretical frame.

The conceptual artists turn against beauty rejecting it as a basic characteristic of artistic expression. However, it is not possible to reverse its visual character that connects it with the senses: artistic impulse is connected biologically, to some degree, with the sense of beautiful and the spectator of an artwork, consciously or subconsciously seeks aesthetic pleasure (Spencer, 1855 / 2000).

Umberto Eco (2004) interprets the revolution of modernism in the arts as the result of a new way of perceiving the “beautiful”, and claims that the pioneering artists of the 20th century do not reject beauty from their work, but they re-define it according to modern conditions. He speaks about the new industrial aesthetics, according to which form is considered beautiful when it is functional and effective. Therefore, at the beginning of the century, machines, trains and speed were as admired as were the important works of art in the past. Futurists create works in

which speed appears as the eminently characteristic element of modern life and art, while through Marinetti they declare that a race car is more beautiful than the "Nike of Samothrace". This statement has a double meaning, as on the one hand it diminishes the significance of beauty in classical art, and on the other it projects their aim for the revision and the redefinition of beauty and art. The balance, the harmony and the symmetry that constituted the essential characteristics of classical beauty are rejected by most avant-garde artists with few exceptions, such as Giorgio de Chirico or the abstract Piet Mondrian and Malevich.

In contrast to conceptual artists, formalistic painters do not reject the aesthetic value of their works, but they attribute new qualities to it. The French philosopher Jean – Francois Lyotard, influenced by Kant on the one hand and by the work and the theory of the American abstract painter Barnett Newman on the other, characterizes the "sublime" as the motive power of modern art.

In the 1990's many critics recognize in contemporary art a tendency towards the creation and revelation of beauty. Peg Zeglin Brand (1999) mentions the following examples as statements for the new situation: Klaus Kertess, the curator of Whitney Biennial 1995, realised that the central axis of the art of the 1990's is beauty, while a year later Peter Schjeldahl (1996:161), critic for "The Village Voice", declared: "Beauty is back. A trampled aesthetic blooms again ". The latter one believes that the beautiful exists in the "bizarre, often bleak, even grotesque extremes of visual sensation" (Zeglin Brand,1999:7). Dave Hickey (1993) re-defines the term, pointing out that any image can be "beautiful" if it is not dangerous or in any way illicit. Bill Beckley and David Shapiro (1998) bring back the subject of "beauty" in art, while the first declares that beauty has become unexplainably uncontrollable.

The reappearance of beauty in the art of the 1990's was recognized as a crutch for the saturation and boredom of the artistic world: the shocking conceptual art of the 80's and 90's, at the end of the decade ended up being boring (Goldberg 1997:33). The avant-garde artists are still provocative; however, many of them create with aesthetic intentions and are judged by the experts by standards of aesthetic values.

Thus, Robert Mapplethorpe, known for his obscene homoerotic photos of the "X Portfolio", declares that he is obsessed with "beauty" and according to Dave Hickey (1993: 55) his photographs constitute a perfect example of "formal beauty". Furthermore, Damien Hirst declares that he combines beauty and hard savagery when he exposes an enormous dead shark in a container with formalin, while for his work that is composed of bookshelves scattered with thousands of cigarette butts, Roberta Smith uses the characterization "strikingly beautiful". Cindy Sherman received positive reviews for her photographs that presented bloody mannequin body parts, while she declared that she is interested in anything that is thought to be grotesque or even bad, for she perceives it as fascinating and beautiful. Answering a question about the character of her work she mentioned among others: "It seems boring to me to pursue the typical idea of beauty, because that is the easiest or the most obvious way to see the world. It's more challenging to look at the other side" (Fuku 1997: 80 / Felix, Schwander 1995 / Zeglin Brand 1999:7).

As a matter of fact, contemporary art projects a new model of beauty that is against anything conceived as conventionally beautiful. Visual perception and aesthetic thought are adapted to the new standards and thus the artistic public discovers beauty in the often obscene, offensive and provocative avant-garde creations. On the one hand, the institutional promotion of the works plays a decisive role (institutional theory); on the other hand the social, cultural and philosophical frame of the era constitutes values and models, which are not diachronic or regular,

but variable and redefiniciable. The definition of “beautiful”, however, remains subjective and conventional, a fact that creates the appropriate circumstances for formulation and analysis of completely variant theories and critics.

Thus, in the case of contemporary art, there are some critics with the tendency to rediscover beauty in art, and others who cannot recognize most artworks as beautiful. A. Danto (1994), beyond a category of works, which he calls "internally beautiful", he characterizes a minimum of works as beautiful. He refers particularly to those which handle ethical subjects, and formulates the theory that beauty and moral sensitivity cannot coexist, as the former has the faculty to hide and to idealise the world's immorality. According to Danto it is immoral to seek beauty in the pictures of pain, torture, war and unfairness, while by this theory he is setting limits to art and beauty.

Aesthetic values in science

As already analysed, aesthetic values and conceptual art do not go hand in hand, reversing the traditional perception of the meaning and the content of artistic expression. On the other hand, there are scientists who research the aesthetic dimension of science, claiming that beauty does not constitute a part, but the essential condition of the scientific process: science cannot exist without an aesthetic base. The scientist's aesthetic satisfaction is reported as the unique motive of scientific research, while theoretical forms and conclusions are approached as works of art, by giving more emphasis to their language and form rather than to their content.

As in the arts, so in science the perception of “beautiful” has a dual character: on the one hand it is related to the person, having subjective substance, functioning as a psychological motive for the acquisition of knowledge. On the other hand, it has ontological foundations and it is identified with truth. As ontological beauty cannot be explained by rational intellectual processes, it is revealed only to scientists capable of conceiving it intuitively (Chandrasekhar 1987:66). A powerful Platonic tradition often leads to the concept that a scientist derives satisfaction from the identification of the archetypal images of the soul with the behaviour of the external objects (Chandrasekhar 1987: 67 / Fischer 2004). This experience is so revealing, that it stimulates his self-confidence to an excessive degree. Particularly the mathematic axioms are not understood as human inventions but as structural elements of the world insightfully founded in truth and beauty. Absolute truth and ontological beauty are identified: the scientist is motivated by aesthetic criteria, thus scientific discoveries and theories must also be studied by similar ones (Atalay 2004: 89, 150).

That beauty is an important element in the discovery of mathematic symbols and formulations, has been recognized by many representatives of the science (Huntley 1970: 70-89). The English mathematician G. H. Hardy (1992) mentions as important characteristics of a beautiful mathematic theorem the generality that ensures connection and unity to a large number of mathematic ideas, the depth that allows the resolution of difficult problems and the surprise or the unexpected.

In natural sciences, a part of their aesthetic quality is reduced to the mathematic language they use. Galileo claimed that mathematics is the language by which God wrote the book of nature, influencing later scientists to ascribe to it ontological power beyond its empirical equivalence to the world. The Hungarian mathematician Paul Erdős, although an atheist, spoke about an imaginary book, in which God had recorded all the beautiful mathematic theorems and proofs, while the French philosopher Alain Badiou believed in the ontological self-reliance of mathematics, but also in its deep connection to poetry and philosophy. In order to

justify his deep conviction that mathematics is beautiful, he connected its aesthetic value with that of the ninth Symphony of Beethoven, which is recognized by all without searching the reason. Important is also B. Russel's analysis (1956) of the concerns of mathematical beauty, where the following is reported: "Mathematics, rightly viewed, possesses not only truth, but supreme beauty – a beauty cold and austere, like that of sculpture, without appeal to any part of our weaker nature, without the gorgeous trappings of painting or music, yet sublimely pure, and capable of a stern perfection such as only the greatest art can show. The true spirit of delight, the exaltation, the sense of being more than Man, which is the touchstone of the highest excellence, is to be found in mathematics as surely as poetry".

In the faculty of natural sciences, another source of beauty is their cognitive object, nature. Poincare (Chandrasekhar 1987: 59) wrote that the scientist does not study nature with a utilitarian aim, but because he derives enjoyment from its beauty, which functions as the only motive in the quest for knowledge. J. W. N. Sullivan (Chandrasekhar 1987: 60) believed that the discovery of harmony in nature should be evaluated aesthetically. Moreover, R. Fry recognized the aesthetic enjoyment derived from nature as a motive for the scientific process, even though he also reports non-aesthetic criteria for the evaluation of a scientific work.

Interesting is also Philip Fisher's effort to answer the question of why we feel admiration and aesthetic enjoyment when we see the rainbow (1998). The proposed criterion of beauty, also functioning as the motive of scientific work is, among others, the impermanence of the phenomenon that is seldom presented, but frequently enough, to be conceived as a real one. His conviction is, that in order to maintain the beauty of a phenomenon, it should be obvious as long as we need it in order to observe and to enjoy it. If this interval is exceeded, its beauty disappears. The sudden appearance of the rainbow, its rarity and its beauty draw our attention, fixate us and cause sentiments of admiration and awe, which function as motives for the quest for truth.

Furthermore, in the faculty of social sciences efforts for the aesthetic analysis of scientific theories are not absent. The well - known American economist P. Samuelson (1954: 380) considers as possible the mathematic – aesthetic approach to economic theories. He denies that the mathematics of economic theories have less aesthetic value than those of physics and claims that the Ricardian theorem of comparative advantage is beautiful. Studies, however, on the aesthetics of economic theories, beyond their mathematic formulation, that would connect theoretical inventions with the economic world (proportional to those of the natural sciences), do not exist.

More generally, the aestheticians of science place aesthetic values as much in the object of their research as in the scientific theories and in the experience of the scientist. Methods and conclusions that have simplicity, extraordinary brevity and new and original ideas, that create surprise and offer solutions to multiple problems, are carriers of aesthetic value and beauty. Because of its aesthetic dimension, science, for many has insightful character that identifies absolute truth with ontological beauty. It is interesting to mention at this point the older position of Benedetto Croce that each scientific work is also a work of art: it can be read not only for its content but also for its quality as an intellectual monument.

Conclusions

The modern efforts to discover and establish beauty in the sciences and to dispute it in art, present a paradox that is in acute opposition to the traditional

perception of the character and the content of these intellectual activities. This opposition is particularly powerful in the analytic sciences that are directed to a regulating significance of truth as the right representation of the world. The explanation and the forecast of the phenomena through the manufacture and the reasonable and empirical control of scientific affairs and theories exclude moral evaluations from science (Gemtos 2003, 2004). For the same reason, aesthetic evaluations that do not serve the cognitive-informative aim of these sciences should also be excluded.

The issue is differentiated in the normative (Law, Ethics, Economy of Prosperity) and the humanistic (History, Philology) sciences, that are evaluative activities in themselves. The criteria of justice, freedom and prosperity that are generally used by the former for the regulation of the world and the principles of intellectual comprehension and reproduction that are used by the latter, differ substantially from the criteria of beauty that hardly accept objective control (the essential condition of the scientific apprehension). Particularly problematic would be the work of the humanistic sciences with art as their object (Theory and History of Art), if they were limited to simple secondary repetition of the artistic work. Science, in all its forms, is an original and strictly rational apprehension of the world, a unique achievement of European culture.

Even though science and art have different aims and consequently different methodology, it does not mean that they do not have interconnections. The traditional image of the sciences as a strictly inductive process in certain foundations was abandoned long ago. Karl Popper pointed out the critical role of the creative imagination in the formation of scientific hypothesis that are not the simply reasonable products of a sum of precise observations. Intellectual creative ingenuity is a common element of science and art, but it is included in a different mesh of aims and methods. The role of aesthetics in the scientific approach of the world can only be the creation of motives for productive research, the help in the discovery of true theories and effective regulations or the precise comprehension of actions and intellectual works. On the other hand, science can offer poetic and visual inspiration to artists, who, in their turn, make scientific conclusions more comprehensive to the wide public, by the aesthetic language and the images they use (Dawkins 1998).

In the arts, many of the disparities that characterise the 20th cen. (artists without works of art, artistic creations without object and aesthetic value) have their starting point in the ideology of renewal and progress that is related to the era of the industrial and the technological revolution. At the beginning of the century, society was directed to the future and to progress, while it identified repetition with regression. Characteristic is Marx's idea that each repetition transforms drama into comedy. In this frame, the traditional artistic values were sacrificed in the altar of the avant-garde, which appeared having as basic demand the complete renewal.

It is generally acceptable that art, artistic creation and freedom are unbreakably connected. As Plato mentioned in the Politician (299 e) "block the artist from researching and the arts would disappear for ever, without any hope of being reborn. And our life, that ... is full of troubles, would become unendurable ". The revolution of avant-garde, that burst out at the eve of the first World War, led to a pluralistic art that created complete confusion and impasse in the artistic world (Hodin 1967: 181-186): the need for a redefinition of art and for a new determination of artistic values was considered imperative.

For a long period, beauty ceased to be a main quality of aesthetic value, for this was considered as retrospective and hence reprehensible by the community of

avant-garde and the criteria of progress applied by it. It is however an incorrect approach, because even though progress is a constant aim and value for science and technology, it cannot be effective for art. That is, we cannot consider a modern sculpture as better or worse than a Cycladic statuette. The discovery of new means and materials and the invention of artifices, as e.g. the linear perspective in the Renaissance, constitute progress, which however can be considered as an evaluative criterion only in the frame of a certain period.

The avant – garde revolution is surely legitimate, as it gave to art new conceptual content and aim by enriching the aesthetic experience with less conventional qualities. The need for renewal led the artists to new intellectual fields, rendering to art a philosophical, scientific and technological character. However, today we stand at the end of an era: the avant-garde is institutionalised and to a large extent saturated. New qualities are sought, that will give to art once again aesthetic and humanitarian content. The fable of progress, the censorship of feelings and the undermining of the artistic work have led to an impasse and to the need for returning to the universal qualities of the aesthetic values, at the culmination of which stands “beauty” (Nelson / Shiff 2003: 279, Prettejohn 2005 :193-205, Nehamas 2007).

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