Art and technology: the division fades

Xavier Berenguer

Co-Director of the Masters Degree in Digitals Arts (IUA)
berenguer@iua.upf.es

Abstract: Centuries ago there was no distinction between what was done by artists and scientists. From Newton onwards, however, there came about a separation of the two, which became more marked with Romanticism, with "two cultures" eventually becoming established, between which there was barely any connection. During the twentieth century, there were a series of authors and works, midway between expression and technology, which contributed to overcoming that divide. Certain members of the avant-gardes, particular joint experiments between creators and technicians, the sixties and, in general, the emergence of new audiovisual and communications technologies wore it back further. Today, the creative application of computers has diminished it much further still, to the point that it has all but disappeared, opening up an artistic horizon on which the two callings live, necessarily, side-by-side.

In 1964, in his essay *The Two Cultures*, Charles Percy Snow described two clearly defined communities—that of scientists on the one hand, and that of artists and "literary" intellectuals on the other—that were characterized by their having lost their common roots, as well as by their inability to communicate with each other. The origin of this split, according to Snow, lies in the scientific paradigm of the mechanical universe, which sat human inquiry on the basis of reason and reductionism, that is, scientific method. Thus, while the scientist toys with reality and with logic, the artist is concerned with the imagination and with emotions. Art investigates the subjective world; science, meanwhile, goes in search of the objective world and rational methods. As a result of this schism, the art world eventually adopted romanticism as its principal ideology, and the artist became someone who was marginalized, a commentator and a critic, rather than a participant in and contributor to reality.

But now, decades after Snow's diagnosis, there are reasons, experiments, hopes and even entire industries that show that this polarisation of attitudes and fields of work is beginning to fade. In the first place, science itself cannot do away with the moral, social and other considerations concerning its discoveries, as has been warned in such fields as nuclear research, molecular biology, genetic engineering... But, besides, in more and more frequent cases, within science itself the need arises to be more flexible over rationality's sacredness.

Much of scientific knowledge has very little to do with the model of the objective order of things. In new physics, for example, the universe often seems unlimited and unpredictable, and in the subatomic world events can be, not be, and both at the same time. For their part, astronomy and cosmology make use of the imagination, metaphors and analogy as if it were a question of philosophising. Besides producing arguments that directly involve the human condition and existence, science thus invades territory traditionally reserved for the "other" culture.

Art, however, seems less open and active. The avant-gardes which stimulated it in the first half of the century no longer exist; either because it has now all been said, or because the value a work has is "what someone is prepared to pay for it," as Andy Warhol said.

But the crisis facing art is also a crisis of mediums and, to some extent, of languages.

© Xavier Berenguer, 2002
© FUOC, 2002
Original title: *Art i tecnologia: una frontera que s'ensorra*

-1-

ISSN 1695-5951
Legal deposit B-52019-2002

UOC

Traditional forms of art have altered both in terms of their audiences and their use.

A musician has to bear in mind, for example, that his music, thanks to the compact disc, will be listened to not in a concert hall but mainly by individuals. The book, for its part, has its work cut out to compete with multimedia systems for presenting information, among other reasons because the book contains much less. In general terms, it is not so much that traditional mediums and languages should have to disappear as that they are being compelled to heighten their specificity.

The vigour of science and technology, compared with the doubting nature of established art, means that the frontiers that have isolated us for centuries are being worn away. Paul Brown, the artist and educator, goes further, seeing a full-scale invasion. "I think that the art historian of the future, when he comes to analyse the end and the beginning of the millennium, will see that most important aesthetic impulses have come from science, not art... Perhaps science is evolving towards a new science called art, perhaps art itself, at least the art we have seen in the last twenty-five years, has ceased to have any social utility..."

The distance between science and art is diminishing, but when was that separation started and which artists have made the crossover?

In antiquity, there was no separation between artists and scientists. The Greeks made no distinction, it was all *techné* (art, ability, technique, skills...). In this sense, Leonardo da Vinci was the splendid culmination of the synthesis of the two professions.

Until 1700, the raw materials used in pigments were completely natural, such as charcoal, earth... But after that, thanks to research into chemistry, the artist's palette was fed with new materials and new colours, white from titanium, yellows from zinc, chrome, cadmium... Another discovery that revolutionised the plastic arts, after the Second World War, was acrylic paint, the quick drying nature of which made possible new forms of painting. So that, from an instrumental point of view, there has never truly been divorce between art and technology.

The parting of the ways for artists and scientists had its origins with Newton and his mechanistic model of the universe and this was then consolidated by the consequences of his methods, particularly during the Industrial Revolution.

In the nineteenth century, machines replaced man, saving him effort but, at the same time, taking away his identity. Science, growing in its importance, then began to show its destructive, antihumanitarian fangs. Artists, as a reaction, took refuge in themselves; typical among them was an attitude like that of William Morris who, joining the Luddite movement, declared that "the artist and the machine are absolutely incompatible." This concept, and its counterpart saying "the scientist and subjectivity are absolutely incompatible" was to rule over the relationship between the scientific and artistic communities during the nineteenth century and much of the twentieth.

But there were artists, such as the **futurists**, who put forward an alternative view. Gino Severini, one of them, said "I foresee the end of the picture and the statue. These forms of art, in spite of the most genuinely innovatory spirit, curb the artist's creative freedom. They contain within them their own fates: museums and collectors' galleries, in other words cemeteries." The futurists proposed the search for new artistic forms; in this search, technology—and its symbol, the machine—were not enemies; on the contrary, they were an ally and might even make for work worthy of aesthetic praise. In 1909 Filippo Marinetti declared "the car is more beautiful than the *Victory of Samothrace.*"

The futurist movement, although it did not last and was full of contradictions, is today the most direct precedent for the integrative trend that is currently inspiring a joint practice of art and technology. But besides that it was in its day a very rich alternative proposal which induced, between 1910 and 1930, a series of pictorial movements that focused on the question of whether or not art should ignore the technology that had come with industrialization, oppose it or exploit it.

UOC

Among these movements was **Dada**, with such significant artists as Marcel Duchamp, Max Ernst, Man Ray, etc.; the machine appeared as a motif in a number of their works. Another school that was positive towards science and technology was that of the **constructivists**, who stood for not so much a new painting *per se* as for new forms of painting, the use of new materials and, in general, a new conception of the artist. In reference to the project for the *Monument to the Third International* by one of them, Vladimir Tatlin, it was commented "Art is dead... Long live Tatlin's new machine art!"

Naum Gabo, another constructivist and the first author of kinetic sculpture, said: "The one objective of our pictorial and plastic art should be to fix our perception of the world in terms of space and time... The plumb line in our hand, eyes as straight as a ruler... We should create our work in the same way that the universe creates its work, in the same way that the engineer builds bridges, the mathematician formulae." Other artists, like Lazlo Moholy-Nagy, created original work based on movement, light or the cinema.

One of the precursors of this rapprochement between the arts and technology is the **Bauhaus** school, founded in Weimar, Germany, by the architect Walter Gropius. From 1919 to 1933, Bauhaus fostered a teaching both of the historical tradition of the arts and of the artisan methods of craftsmanship schools, inspired by art's approaching living reality and new technologies, and advocating work done in teams rather than by the individual. In it worked painters like Paul Klee and Vasilij Kandinsky. Closed by the Nazis, Bauhaus was continued years later by Moholy-Nagy, in the US. Bauhaus lingers in our memories as an institution that extended art to daily life and to industry, and which promoted the value and development of **industrial design**, a discipline in which, as in architecture, artistic and technical criteria-and the two professions-live together quite happily side by side.

During the Second World War, most of the innovators went to the States, for which reason the most interesting proposals for the use of technology came from there. John Cage, in 1938, keyed the strings of a piano up with diverse objects and proposed a composition based on chance; with it **electronic music** was born. Around that time, Walter Benjamin was saying with some foresight how, thanks to technology, one of the taboos of traditional art, the unique and unrepeatable nature of any work of art, was no longer. According to Benjamin, art thus loses its old "aura" and is reduced to an object of consumption, without necessarily losing its value, however.

Then along came some unusual characters: the **technoartists**. Frank Malina, for example, was a rocket designer who left the army and turned to building sculpture installations. Takis, who had been a soldier and was familiar with radar and explosives, became famous at the end of the 1950s for a series of works in which he used motors, magnetic fields...

In the 1960s, attempts to synthesise art and technology became more widespread and took things forward. The radical atmosphere of the times gave rise to numerous proposals for alternative art—among them art based on technology—some of which remain notable points of reference even today.

In Europe groups like ZERO and GRAV (which in Spain had its offshoot in Equipo 57) were landmarks in the organisation of groups of artists who were not averse, quite the contrary in fact, to using technology.

In the US, at the time Marshall McLuhan was publishing his essay *Understanding Media* and Andy Warhol was calling his studio "The Factory", Robert Rauschenberg and Billy Kluver (another former engineer) were founding **EAT** (Experiments in Art and Technology), an organization devoted to boosting creatively the synthesis of art and technology. Outstanding among EAT projects was the "Nine Evenings" exhibition, held in New York in 1966. In this exhibition, for the first time, authorship of the work on display was divided—and was publicly recognised as such—between the artist and the engineer. At the next EAT exhibition, "Some more beginnings", prizes were also awarded to the technicians who had collaborated on the pieces.

In 1967, Frank Malina founded the first periodical devoted to "the arts, sciences and technology", *Leonardo*. The decade was to culminate with the "Cybernetic Serendipity" exhibition, held in London in 1969. The exhibition showed that the take-up of technology by artists was an increasingly fluid process and that the protagonism of the artist could be shared with the **protagonism of the engineer**, without the artist tearing his hair out as a result.

Another of the events of the decade was the increasing popularity of television around the world, which attracted a certain number of artists who saw in the new medium a new possibility for expression. Along then came the **videoartists**, who with the adoption of numerous techniques for manipulating images, eventually produced work that was independent of and alternative to film and television. Many videoartists did not limit themselves to producing images but also took up the television and the television set as the inspiration for sculpture installations.

During the 1970s, the creative inertia of the sixties continued, to the point that museums started to take an interest in technology-based works and to display them. Most significant was the initiative of Los Angeles County Museum, which organized teams of artists and engineers to produce work; in order to finance them, they secured sponsorship from major firms like IBM, Lockheed, TRW and Rand, who also provided the advanced technology required.

At the end of the 1970s, the relationship between art and technology began to be looked at in a radically new fashion, and the outlook opening up was an extraordinary one. The protagonist of this qualitative leap was the **computer**.

Until then, the computer had only been used in business and in big organizations. But its lightning progress, year after year, had increased its potential, slashed its cost and put it at the disposal of individuals as well as groups. In 1984 the first computer that could deal with texts and images at an affordable prize came along, with enough capacity for a person's needs. The capacity for graphics and the customizable environment of the **personal computer** attracted the most receptive artists immediately.

Today, the application of the computer to communication and **audiovisual** expression has made enormous progress; this practice is a clear example of the fusion of art and technology. Ian Paluka was the first to detect the phenomenon; in a 1983 article he announced the *de facto* fall of the barrier that had separated artists from scientists. In order to produce synthetic images with a computer, Paluka said, it is necessary to have both sides of the brain, left and right, working together.

One of the paradigms emanating from digital culture is what is called **virtual reality**, an audiovisual wraparound environment in which, besides seeing and hearing, you touch, smell and can walk... With virtual reality, it reaches its simulatory climax: it allows artificial environments to be created that are inhabited by spectators who interact together. Paul Brown says on the subject: "With the development of computer technology, science has developed new models of knowledge: we now know, for example, of the possibility of other universes such as simulations which blur the distinction between 'reality' and 'illusion'. The two go hand-in-hand in a holistic model that alters the relationship between the observer and what is observed, between the signifier and what is signified."

The computer's potential to simulate allows us to reproduce, to limits that are impossible to predict, the human activities of conceiving, designing, imagining, communicating... The computer is thus a prosthesis of the mind and, as such, is at the artist's call; in particular of the artist for whom creativity and technique are two sides of the same coin.

Related links:

� Art and Science Collaborations - Resources:
   http://www.asci.org/resources/links.html

UOC

➟ Daniel Langlois Foundation - Experiments in Art and Technology Collection:
  http://www.fondation-langlois.org/e/CRD/eat/index.html
➟ fineArt forum (fAf) - Art & Technology Net News:
  http://www.msstate.edu/Fineart_Online/home.html
➟ IDEA - International Directory of Electronic Arts:
  http://nunc.com/index.phtml
➟ Leonardo On-Line:
  http://mitpress2.mit.edu/e-journals/Leonardo/index.html
➟ New Media Encyclopedia:
  http://www.newmedia-arts.org
➟ Paul Brown - Art & Technology:
  http://www.paul-brown.com

Published on: December 2002

UOC