

Art and technosciences. Theoretical and thematic reflections

Pier Luigi Capucci
plc@noemalab.org

This text was originally presented at the international seminar “Tecnoscienze, Intuizione Artistica e Ambiente Artificiale”, promoted by the City of Turin in collaboration with Ars Technica and Extramuseum (Turin, Museum of Modern and Contemporary Art, 23-24 October 1993). It was published in my book Arte e tecnologie, Bologna, Ed. dell’Ortica, 1996.

1. Human culture and virtuality: models and representations

In human culture, from a theoretical point of view, indicating signs, orality, visual and acoustic images, writing, printing, all types of representation including those more complex, polysensory, kynaesthetic and sensomotory given by virtual reality, are all similar: physical, technical symbolic systems which have externalised mental models, giving a sensitive and socially shareable form to the imaginary, and at the same time averting the physical and material presence of the phenomenic reality from the individual, occupying the space of interaction between the latter and the world. An ever-widening symbolic dimension delegated to represent, support and mediate the physical relationship between man and the phenomenical reality. On one hand, these models have helped man to relate to the world, to interpret it, to get to know it, to share it, to communicate and to modify it, to possess it knowingly, theoretically and practically. On the other hand, they have averted this reality of phenomenon, keeping it at a safe distance, and bit by bit they have made the relationship with it less and less direct, transferring it to the technical-symbolic dimension. With symbolic models, the human species has reached three fundamental and closely related objectives: *protection*, *knowledge*, and *effectiveness*, using these models both as filters, knowingly, and as prostheses. To these functions, which are of self-preservation, we may add the consequent function of *perpetuation*, put into effect by the anthropocentric reconstruction of the world and the modification of the individual.

All living individuals possess, produce and use models of themselves and of their own life environment which depend on their biological specificity and on

their existential phenomenology. A model is a bridge which connects two entities, it is the place of intersection between the existential dominion of a “subject” and the phenomenical dominion of an “object”, even if, in spite of the fact that it allows certain faculties to be put into effect, it is still a reduction of that totality with which the organism compares itself with. But if every living organism uses models, the peculiarity of the human species lies in the capacity and ease with which it extracts and gives a physical, shareable, social form to these models, codifying them in symbolic constructions (technical and theoretical, material and immaterial, artefacts and representations...), ductile and manageable, rapidly comparable, verifiable, alterable, easily communicable, and extensible in space and time. To get to this point, our species had to distance these models from the genetic matrix and from its biological modality of transmission to transfer them to the cultural dimension, detaching them from itself to the point of their being almost independent. A common inheritance of socially shareable and implementable theories, techniques and artefacts, no longer transmitted in a linear, slow, and problematic way, but rapidly and generally expandable and transferable, usable and verifiable through symbolic systems.

In this way, man’s symbolic universe has evolved enormously. Models, techniques, artifacts which are increasingly complex, sophisticated and powerful, “intelligent” and self-sufficient with which to interpret, know, and modify the existence and the world in an increasingly profound way. Cognitive models, more and more effective prostheses of intervention, in a geometric progression of *virtualisation of the cultural* which has multiplied their diffusion and capacity, in a general process of anthropisation which now concerns the whole planet. Using these models, humanity has greatly widened the capacity of the perceptive and sensorial faculties and its effectiveness, it has interrogated itself as to its own biological and intellectual specificities, acting on them and trying to increase them, to reproduce them in artefacts, in machines, humanity has even sent its signals beyond the solar system. The symbolic and planning, technical and pragmatic dimension, has become so hypertrophic, complex and pre-eminent that it mediates or even completely replaces the physical interaction with the phenomenical reality, distancing the physicality of the world as if it wanted to exorcise it, widening the breach opened many hundreds of thousands of years ago with the irruption of the symbolic, probably starting with the indicial signs.

Hidden from symbols, far from the rigid, rugged, ungovernable real world, bristling with dangers and difficulties, far from its inertia and decadence, from the inexorability of the biological processes, from fatigue, from physical pain and from death, our species has found refuge and at the same time an inkling of omnipotence, of immortality. Symbolic models and their technical derivatives make our existence easier, they relieve fatigue, we use them to think, to imagine, to know, for amusement, to cure diseases, to prolong life, to widen our capacities... They make the rapport with the real more advantageous, in a relationship of dependence and of symbiosis. This helps us to understand why – besides creating and using symbolic models, techniques, theories, artefacts which are increasingly evolved, complex and global to delegate the rapport with the phenomenical world, normalising it, to the point of substituting it completely with virtual constructions – our species tends increasingly to live “inside” these representations, protected inside this anthropocentric “new nature”. The fascination with representations, signs, languages of the symbolic which man constructs for himself, which he *speaks* and which he *is spoken* of, for better or for

worse, is born here. The symbolic, the *peculiar artificial* of our species, is a sort of Promised Land which humanity tends towards and whose phenomenic existence he tries to bend.

Considered in its more general meaning, besides the modes and the peculiarities, the *virtual* is that intermediate territory between being and phenomenic world, is the universe of definition and of operation of the models, of whatever nature they may be. The virtual is in act where every living organism creates strategies of survival and of existential ergonomics. The virtual indicates that potential and/or effectual mechanisms are subjected to models and their operativity.

2. Simulation and interactivity

The term “simulation” enjoys good stead, especially in the field of representation (beyond even the mere visual and acoustic components). Technologies like multimedia, computer image, holography, telepresence and virtual reality, or others based on emulation, like robotics and artificial intelligence, have moved interesting questions tied to simulation to the foreground.

As a rule, one can say that simulation is a universal function and, to stay within living systems, that it is a fundamental existential strategy of organisms at all levels (biological, genetic, cultural). The effectiveness and, after all, the reason for the existence of a model are tied to its operative capacity, to its functionality in carrying out some job or function under certain conditions and objectives. In the “structural coupling” between two systems (like for example an organism and an environment) for the purpose of a constructive co-existence, a sort of dynamic compatibility, a coevolution (1) is required: existence always implies some sort of compatibility between interdependent processes. The models which preside these processes must therefore be able to interpret those features, that information significant for the success of the co-existence between the subject and its context. The simulation is thus an operative strategy behind every existential condition, we can consider it as being that reciprocally interactive interface which allows the co-existence of the phenomenic entities at all levels.

Next to this general concept there is another, closely correlated and just as general, also particularly actuate now thanks to technological representations: interactivity. Interactivity, as a reciprocal influence between two entities, is a function present at all levels, macrophysical and microphysical, biological and non-biological, symbolic, social, environmental. The existence in itself always implies a systemic interconnection, the exposure of levels of interactivity, existing cannot leave out interacting. The discernible universe, what we consider as existing (but even our only imagined universes, just for the reason that they are imaginable), is just a boundless system supported by and pervaded with interactivity. We may say that interactivity precedes simulation, that it is the prime cause. In its generality, implying the presence of reciprocally shared channels through which “information” is biunivocally exchanged, interactivity serves to objectify phenomenic existence and systemic interconnection.

Interactivity and simulation pervade with phenomenic existence, they are thus behind all those phenomena and organised behaviours present at various levels in living entities, from the elementary to the most complex. Immanences which,

by the way, put the specious matter of exquisitely anthropocentric dichotomy between “natural” and “artificial” at risk.

3. Questions regarding the artificial

It may be time to rethink the concept of the artificial in a wider manner, not limited to the anthropocentric. This concept is so often applied and considered negatively (especially with the latest technologies). The artificial is generally defined as that group of techniques, theories and artifacts created by man in interaction with his environment so as to obtain a better existential ergonomy (2). In any case, each system tends to better its existential ergonomy, which could also be called “quality of life” (likewise a body which is submitted to the force of gravity settles in the most energetically favourable place, to the molecules of a gas which tend to be uniformly distributed in an empty space, to an electron which occupies the most suitable energy level in the energetic economy of the atom...). This capacity is obviously far more articulated in those systems which we define as “living”.

If by “artificial” we mean a construction, of any type whatsoever, *created in a certain way for a certain objective* (as its etymon suggests), then the “artificial” is a prerogative of every living species (and we might even risk an even wider generalisation, considering complex dynamic systems or other entities outside biology). The artificial is the trace, the sign, the result of interaction between every living thing and the world which surrounds it. “Natural” and “artificial” are thus not opposites and indomitable concepts, they are not oppositions but are instead complementarities: artificial is based on the transformation of natural and natural bases its operative capacity, the success of its effectuality on artificial. The artificial is a type of evolution of the natural and at the same time a witness – a memory – of the vitality of this evolution. The artificial indicates the assumption and the arrangement of the existing phenomenon by the organism within the grills of its biological matrix and according to its individual cultural experience. Every species, in its relationship with the surrounding environment, generates the artificial: the artificial is only the result of the interaction of a culture and its past, on its evolutionary path, with the existing; the sign of pulses to survival, the indication of the efforts of existential ergonomics. And, next to the more general hierarchy of species, each single organism, with its own personal background, contributes in articulating this artificial. The mechanisms of actuating the artificial in their great variety, correspond to general pulses which are found in the existence of all living organisms. The dimension of the artificial is pertinent to all living species because the reasons which form the basis of this dimension are the same: to cut out an individual ability to survive, an individual existential dimension, within the environment and to tend to improve it.

4. Creativity, intelligence, artificial life

Under this perspective, concepts such as those of “artificial life”, of “intelligence”, of “creativity”, assume new dimensions. Creativity is no longer something typically human, but it has a more general biological foundation. It is a mechanism for surmounting the obstacles which oppose the realisation of being. A few years ago, products from technological resources were considered as

a dis-humanisation (as if the concept of being human – of body and mind – were underivable, golden and unchangeable, whereas it is a cultural concept, subject to changes which may even be physiological). As a matter of fact, until a few years ago, in technological and communication processes the involved information concerned only limited sensoriality of the body, almost exclusively the senses of sight and hearing. Today instead we are witnessing a development, in particular in the framework of representation, which shows the body's revenge, the recovery of previously neglected cognitive dimensions, such as polysensory, kinaesthetic, sensomotory. Even if only at a symbolic level, the body in its psychophysical and sensory indivisibility is central, is obviously the fulcrum, the motive behind technological artefacts, they suit it almost like a second skin. This should not be surprising since it corresponds to the normal order of existential strategies, of resolving needs: the artifacts can only be created on the basis of human, and therefore physical, cognitive, needs... The body is translated into symbols which concern the entire sphere of expression, the symbolic cognitive dimension also takes possession of the polysensorial, kinaesthetic and sensomotory cognitive capacities, which are not rational, not exclusive, far more antique, powerful and developed than reasoning, largely shared by human beings, instinctive and intuitive (3), and which for this reason have previously been considered simple and secondary, and which are properties of all living organisms.

New technologies constitute cognitive resources of great scope, with extraordinary cultural aspects. But we can catch a glimpse of a further horizon, beyond the anthropical, more general. Today with technology it is possible to operate on the basis of life, on its simulation, manipulation or recreation. Genetics, biotechnology, research and creation of life forms which are not based on carbon biology (4), are able to perpetuate, or, according to new hereditary modalities, even surpass human culture, the *real essence*, definitive of our species, beyond the limitations imposed by the genetic foundation. The interpretation of intelligence as an anthropic matter is dissolved in the end, absorbed in a *continuum* of imperceptible and pulsing operatives, in an inextricable coacervation of activities apparently without purpose which, through strategies of virtuality, relentlessly pursue the implementation of existence and, after all, immortality. Intelligence as an anthropic peculiarity is an oleographic image. As with all other living beings, "life" pervades man and man pervades his artefacts with "life". The existing generates the existing according to those same fundamental pulses, shaped to the continuous texture of the conditions of possibility. Above all, definitive living entities, true "natural", are the general laws which found universes, which hold together atoms and planets, which explain electromagnetic phenomena, biology, life pulses, which preside cognition, conscience... The true "beauty" of nature lies not in its contemplative appearance, or in its material substance, but in its operativity.

5. Art as a metaphor

Looking at the history of man's forms of expression means tracing the course, and problems, of his symbolic thought, his objectives. Scientific and artistic experiments are two faces of creativity of human culture, the first – which comes under natural sciences – with the purpose of studying the phenomenic world and its principles, the second – under human sciences – with the purpose of

investigating the relationship with the phenomenic world. Pure scientific research, like artistic research, aspires to absolute symbolic-cognitive models, and should be theoretically free, unrestrained by interests outside those proper belonging to research. Art, as creative-heuristic symbolic processuality, has, with its instruments, always operated with mimesis, with simulation (like all other human activities, including scientific activity, since each model, each representation is a simulation), based both on the mimesis of phenomenic appearance and on the modality of accomplishment and on the founding mechanisms of such an appearance. The latest technological resources in information systems, in telematics, in robotics, in artificial intelligence, in genetic engineering, in biotechnology, in artificial life, generate instruments which allow us to go even further beyond this double-simulation, to the point of generating not only a “new nature” and even a sort of new humanity based on our culture and at the same time far from it (5), but even a new “art”.

Why produce art with computer instruments, lasers, virtual reality, and telepresence, and not with instruments of artificial life, biotechnology, genetic engineering? Obviously we are walking into an area mined with cultural ethical, moral religious taboos. It should be mentioned that, in spite of the fact that their number is increasing, artists show a certain reluctance in using these instruments, in facing these matters. In any case, the importance of this matter today can be shown and proven by the fact that in recent years the most important international technological art shows have had these concerns as important, if not principle, themes. Both art and science question, as always, what “life” is, even beyond its carbon-based forms, through disciplines and instruments such as robotics, genetic engineering and artificial life (6). The hardware approach, focused on the centrality of the matter, historically antecedent, is less promising today than the software approach, which instead focuses on processes, properties, thanks also to computers. In other words, life is not located in the matter, but instead the mechanisms and processes determine the discriminator between life and other phenomena, as demonstrated by artificial life – which studies the absolute rules of life independently by the material constitution of the matter –, by genetics. New technologies, especially information technologies, have transferred life from substance, from matter, from hardware, to the code, the language, the processes, the software. The modern art which uses these languages, the more illuminated, works in this very direction.

The congenital pulse of representing and reconstructing life, from the disfida between Zeusi and Parrasio to Pygmalion, from Michelangelo to the Golem, from Cagliostro to robots, up to genetics and artificial life, is but a chapter of that path towards the perpetuation carried out by Nature. The destiny of man, as of every living thing, of the existing, is to create, somehow starting from itself, according to its own rules and possibilities, entities which are capable of emulating it, and surpass it. Behind the dream which we humans call “immortality” lies the unstoppable pulse of existence, of achievement, of improvement, of elimination of suffering. As is now happening, the new technological instruments of artistic research finally result in an “art” (if we still want to use this term) profoundly different from that – mostly cold, closed, myopic, obtuse, schematic and pretextual, solipsistic, founded on appearance, repetitiveness and without life, force, ideals, emotions, “mechanical and without spirituality” to quote Webel (7) – celebrated by contemporaneity, which today is in the limelight.

Quotes

1. The work of Humberto Maturana and Francisco Varela. In particular *L'albero della conoscenza*, Milan, Garzanti, 1987.
2. Herbert Simon, *Le scienze dell'artificiale*, Bologna, Il Mulino, 1988. In an aesthetic sphere, and considering the limitations highlighted, see Gillo Dorfles, *Artificio e natura*, Torino, Einaudi, 1968.
3. On the use of this cognitive ability, in particular in virtual reality, see Richard L. Holloway, "Art-Related Virtual Reality Applications at the University of North Carolina at Chapel Hill", in Wim van der Plas (by), *SISEA Proceedings*, Groningen, SISEA, 1990; Howard Rheingold, *Virtual Reality*, New York, Touchstone Books, 1992; Pier Luigi Capucci, *Realtà del virtuale*, Bologna, Clueb, 1993.
4. On artificial life see Charles G. Langton (by), *Artificial Life*, Reading, Addison-Wesley, 1989; C.G. Langton, J.D. Farmer, S. Rasmussen (by), *Artificial Life II*, Reading, Addison-Wesley, 1992. Also *Sistemi Intelligenti*, n. 2, August 1992.
5. Hans Moravec, *Mind Children*, Harvard University Press, 1988. Also Pier Luigi Capucci (by), *Il corpo tecnologico*, Bologna, Baskerville, 1994.
6. Karl Gerbel, Peter Weibel (by), *Genetische Kunst-Künstlichen Leben*, Linz, PVS Verleger, 1993.
7. Peter Weibel, "Virtuelle Welten: Des Kaisers neue Körper", in G. Hattinger, M. Russell, C. Schöpf, P. Weibel (by), *Virtuelle Welten*, Linz, Veritas-Verlag, 1990, vol. 2, p. 37.