Ellul, Jacques, ***Remarks on Technology and Art***, Social Research, 46:4 (1979:Winter) p.805

Remarks on Technology and Art

BY JACQUES ELLUL

It is not my intention here to formulate a philosophical approach to the relation between art and technology. I shall not attempt to provide a generally valid explanation or even a sketch of that relation. Others have already done so in anthropology (Leroi-Gourhan) and in philosophy (Hegel and his epigones). My aim is more modest: I think that a total transformation of technology has taken place since 1945 and (as I have shown elsewhere) that our society has passed from an industrial era, not to some sort of "postindustrial" phase, but rather to a "technocratic" phase in which technology influences everything, and has indeed become the chief determinant not only of man's habitat but also of his history. This transformation has changed art as well, and in no mean way: contemporary art is remote from what has for millennia been called art. Far from seeking beauty or meaning, it is no more than a game, and all agree to define it so. This new conception is the product of technology. Today art has two main orientations, the first a direct reflection of the increasing role of technology, the second a sort of explosive reaction against the rigor of technological thinking. In these brief pages I'd like to indicate how contemporary art relates to modern technology and to locate that art in the technocratic universe.

Art and Science

The relation between contemporary art and science has not gone unexplored. In a remarkable article Schlesinger has tried

to show that science and art have the same approach to reality. Heuristic strategies, the direct examination of experience, the positing of more-or-less-fruitful hypotheses—art and science advance side by side, in defiance of dogma and in quest of the experience that can legitimate them. Science enables us to restructure the external world, art to interpret our experience of that world. Both are sources of evolution, yet also means of evaluating that evolution, and both produce a sort of permanent revolution. Clearly this parallel is rather questionable, but what interests me is precisely the fact that the correspondence and its theoretical formulation have been the subject of so much research; everybody seems convinced not only that science and art are closely related but also that science *determines* what modern art shall be: Schlesinger even attributes characteristics to art which by all accounts would appear proper to science. There can be no doubt that the rule of science exerts an inescapable influence upon art. We know how much the Special Theory of Relativity altered our perception of the universe; when the "uniform, rational" space of Newton was dissolved, art had to take into account man's new domain, Space-Time. Not surprisingly, it was at just this period that Picasso was painting his "Demoiselles d'Avignon." Again, more or less as antimatter was being discovered, "the notion of anti-art reigned supreme in the arts: there was the antinovel, antipainting," etc. Another example: Monet apparently regarded the canvas he was working on as a sort of "field" in the sense in which the word is used by physicists, that is, as a space differentiated into tiny interreacting particles; and Monet invented his style of painting just as Maxwell, from 1868 to 1873, was perfecting his theory of the electromagnetic field. It was science which made sense of movement in time and space; but, not long after, Duchamps was painting his "Nude Descending a Staircase." Spatial relationships, speed, the internal structure of objects—science has preceded the plastic arts in all these subjects of research. J. Michel has even claimed, with some justification, that Max Ernst was a "painter of the Freud-

ian era." Ernst studied psychiatry, discovered the artistic value of the drawings of the mentally disturbed, and fed upon what he knew to be phantasms and hallucinations (which, in fact, he soon learned to induce). His domain is that of the unconscious, but an unconscious to which the human mind is no longer given up quite without consciousness, without knowledge: an unconscious recognized by science. Last but not least, mathematics has had an enormous impact: Theodor Adorno pointed out that Vienna, which witnessed the birth of mathematical techniques in certain previously inexact sciences, also saw the creation of twelve-tone music.

The impressionist painters replaced traditional seeing with a new notion of the object of vision and revived the analytical study of light and color. Francastel has emphasized that, despite all the differences between artists and scientists, they both rely upon intellectual structures: the impressionists' empirical analysis of the sensation of color corroborated the discoveries of scientists. But he cautions, and rightly so, that this fact does not imply that they were following in the scientists' footsteps. Later, the idea that matter is a form or expression of active yet also essentially disjunctive energy led to those styles of art in which the expression of disjunction, of empty, energy-charged space, was the primary purpose. One could go even further: does not, for example, the introduction into art of chance factors and found objects derive from a whole complex of mathematical interpretations? "How," asks Delevoy,

> could artists have continued to want to imitate a natural world which physics (Rutherford, Planck) had shown to be in movement, which geometry (Poincaré) had shown to be malleable, which biology (Mendel, Weisman) had shown to be in constant evolution, which chemistry (Becquerel, Curie) had shown to be radioactive, and which psychoanalysis had shown to be a play of hidden forces? Even earlier, Cézanne had admitted that he dealt with counters, equivalents for natural elements: he wished with these counters to elicit in the viewer that sort of tremor usually induced by the realization that time has gone by, that we have shifted position, or that the scene before us has changed.

One could go on quoting: Adorno, Delevoy, R. Clair, Francastel, Daix, MacLuhan, Moles . . . . Yet their claims are usually modest: science does not seem to have had a *direct* influence upon or to have offered *immediate* inspiration to the arts. Daix writes that the entire influence "consists in metaphors, for painters at their easels had not the slightest notion of what was happening in physics." Francastel similarly refrains from overstating the case, and Delevoy even notes that no mental adjustment to the discovery of the fourth dimension has taken place in our culture. Yet all emphasize one "coincidence": that everything has transpired *as if* the great scientific discoveries have influenced the thought, the vision, the sensibility of the artists. Some thinkers have even insisted that art is as effective as science as a way of apprehending the world, and one which arrives at the same result. This seems to me absurd. If there has been no direct influence, neither has there been any convergent progress. If certain painters have worked their way toward a new way of perceiving light, that cannot have been the consequence of a miraculous, implicit, unconscious accord with scientists of whose very existence they were unaware. And yet, if they introduced a new sort of movement into their pictures, surely that was not entirely independent of the physicists' new understanding of kinetic energy.

It seems to me that the impact of science on art (I refer only to the modern period, of course, not to the whole of human history[1]) has come about in a twofold pattern. First, Western man has acquired a global attitude, which the artist shares and puts to work. A vulgarized and popularized science, of whose exact workings the layman knows little, but which has already molded the general intelligence and sensibility, places man in

[1] Note, however, that very early in the scientific age ideas began to filter from science through to art. It has been observed that because Kepler posited an infinite universe the Baroque was born: thenceforth space was no longer a datum, but something to be constructed. Pictures, towns, poems—all lost the unique center about which they, as geometrical forms, had previously turned. Rubens, Borromini, and Góngora were in fact engaged in the translation of the Keplerian cosmology.

a new position in the world, and the artist tends to feel this sooner than others: he receives, all unwittingly, an image of an order founded on exact measurement and calculation, and he is impelled (though without at first being able to verbalize his impulsion) to make an art based on a rational ideal. Society loses its religious infrastructure, and the artist is the first to feel this. When society then reorganizes itself along lines dictated by the scientific will to rationality, those makers known as modernists soon follow suit. But at the same time they learn that they can now manipulate or even recast nature at will; after all, if science is assured of its mastery of nature, why shouldn't the artist too feel tempted to declare his independence toward motif, model, canvas, all traditional syntax? Science can remodel everything; the artist too wants to rearrange his universe. Science, indeed, affords him a sort of model of power, created of the most powerful intellectual means: the artist begins to feel himself a demiurge. All is recalled into question in order that it may be reconstructed, not capriciously of course, but according to esthetic rules which, once again, are vaguely modeled after the rigorous laws of science. And we notice that artistic theory, in imitation of scientific theory, begins to play an ever greater role. Science takes nature as the *starting point* of its analysis and research, not as the unalterable product of divine creation: it no longer catalogues nature but takes it apart and puts it back together again. The artist follows the same procedure: the motif is no longer something given to imitate but a point of departure for successive transformations, for a process of analysis aimed at de- and recomposition. The same process has taken place in literature, sculpture, music, etc. And just as nineteenth-century science transformed the interpretative universe that had preceded it, so artists challenged the ancient conventions of their trade. Such, then, is the first link between science and art: not one of direct influence, or of miraculous coincidence, but rather a slow penetration of the intelligence and sensibility

of the artist by whatever the collective mind has made of the scientific spirit. But there is another much stronger and more important connection, that which is maintained by technology.

Art and Technology

What has really influenced artists is technology in its various manifestations. There are two main ways in which this has taken place. On the one hand, the great scientific discoveries become known through their various practical applications. Only when new scientific ideas find practical application are artists able to sense what they are about. The great "break" in music, literature, architecture, and painting happened between 1845 and 1885, for it was precisely then that technology was being most rapidly transformed. It was also then that artists first encountered "the machine" on a wide scale; Baudelaire, for example, condemned photography, the ugliness of machine-made objects, the insanity of industrialization, etc.[2] Francastel has offered what I find a most satisfactory periodization of this phenomenon: from 1850 to 1890, the first encounter between industry and the arts, beginning with union, evolving into opposition, and followed by attempts at reconciliation—early functionalism, for example—and, finally, dissociation,[3] with art being regarded as a noble, lofty, inte-

[2] "What man worthy of the name of artist," wrote Baudelaire, "has ever confused art with industry."

[3] I have bypassed naive attempts to conjoin art and technology by putting cast-iron flowers on Singer sewing machines or zinc garlands on the combines of the 1860s. Giedion has devoted an excellent study to this phenomenon, and Delevoy has described it as "the metamorphosis of the sewing machine into a lotus, of the phonograph into a morning glory, of the gas jet into an acanthus leaf, and of the Metro entry into a whole botanical garden." Art Nouveau tried simply to *appliqué* art to the bare, irreducible products of technology. It would be easy to call this a peripheral phenomenon of bourgeois and reactionary character: it expressed the fact that art felt itself voided, emptied out by technology, and tried to recover its legitimacy by clinging to technology at the same time that it attempted, by adding the esthetic element, to efface the inhumanity of technology and thus to sanctify it. It has been claimed that there is a contradiction between the industrializing impulse and the sensibility, the

grated activity opposed to the machine and to the deforming character of industrial labor. In the second phase, from 1890 to 1940, art became involved in rationalistic notions of organic beauty but also in a revived impulse away from the mechanical and toward the irrational. In both cases, the impact of technology was felt as a definitive break with the past. Technological development, it seemed, takes place willy-nilly; it utterly transforms man's sensible, hence his mental world; the moral and visual values of the past can no longer be his touchstone; a dead world cannot furnish the matter of a living style. Of course we may, in our fear or laziness, merely copy what we have inherited and try to preserve the vantages of the old society; but this is doomed to failure, and can only give rise to an art patently ill-fitted to our social reality. Architects cannot build houses as they did in the eighteenth century; sculptors cannot shape forms as they did in the thirteenth. They must rid themselves of outdated schemas that inhibit thought and vision. They must see a new world with a new eye, they must acknowledge the need to create without recourse to the old certainties, to supposedly immutable techniques. Technology's destruction of tradition forces artists to invent a new esthetic.

But technology also exerts a more direct influence upon the artist's activity. There are new tools, media, processes: art,

---

humanism, of art; yet, from the very beginning, some sort of conjunction of the two seemed inevitable. We have witnessed the birth of an art which is no longer merely applied decoration (though of course such decoration still exists: the French government requires that 1 percent of all construction budgets be devoted to ornamentation: in official circles art still is—as it has always been—a kind of decorum) but the product of a profound fusion of the esthetic imagination and technology. The days of nostalgia for handmade naturalistic decoration are mostly behind us; nonetheless, we still find a tendency in that direction in the proliferation of commercial design workshops, and indeed one could even claim that design is quite the opposite of art, since it merely shapes industrial objects in a more-or-less-attractive way. The whole current notion of design is merely a prolongation of what, in the interwar period, was called Moderne; and if current "industrial design" is more than a mere revival of " 'thirties Moderne," it is perhaps also no coincidence the Kitsch has become popular again concurrently with "industrial design." Mankind must permit itself memory, nostalgia, even regret; but that is not where technology is pointing.

indeed, provides a verification of the basic law of technological society, that the transformation of the means of production entails the transformation of everything else: artists do not use a certain medium merely because they have in some abstract way derived from science a new vision of the world. The message of modern art is that *the means are everything:* it is precisely the transformation of the means that has produced the different schools of modern art. There is probably no more revealing study of the impact of mechanization than B. Rordorf's "La Transformation de l'espace habité" (*Bulletin du Centre Protestant d'Études de Genève,* 1975). In this study of Le Corbusier, Rordorf, despite his closeness to his subject, despite his admiration and sympathy for the architect, shows that

> this great creator, whose explicit aim was to devise an architectural order suited to our industrial civilization, especially where it had shattered the established patterns of the old cities, wished above all to complete the transformation of space born of the explosive growth of industrialism. And the wish to rationalize construction according to the pattern of mass production really comes of that desire for precision which is the very soul of technocracy.

To note that Le Corbusier used new materials, that he built houses like factories, is not in itself especially interesting: one must understand how the architect, with his standard of the "Modular," according to which man once again becomes the measure of all things, is inevitably led to build houses in which the purely technological imperative, with its classification of functions, reigns supreme. And, significantly, it is always *motor traffic* that takes priority: as Rordorf puts it, "traffic, like the segregation of urban functions, of which it is a specific example, far from giving life or movement to the city, destroys the city's space and its life." And he goes on to show how Le Corbusier's architecture reflects the nature of a society in which only production really counts, in which culture is mere recreation. "The compartmentalization of space," he writes, "is accompanied by the specialization of behavior. . . . Man is split

into various discrete activities, into separate needs. . . . Functionalism is merely the architectural expression of the general social discipline." And he reminds us that Le Corbusier's Radiant City was dedicated "To Authority." "The 'architecture of joy' really meant the organization of good clean fun according to a philistine, even an authoritarian pattern." He cites Caroux's opinion poll taken at La Grande Borne at Gringny, that great "overshadowing presence which seems to obey only its own laws, and to become the manipulative *subject* of its inhabitants, who are relegated to the role of *objects*. . . ." Here architecture exemplifies one of the salient characteristics of modern technology, the transformation of everything into an engine: one flips a switch and the building "goes on." Thus Le Corbusier: "In this age of interpenetrating technologies, I propose one sort of house for all countries and climates: the house of perfect breath." To which Rordorf rejoins: "What he really wanted to do was to hook us all up to a big oxygen bottle!" Like technology, this sort of architecture wants simply to assemble homogeneous elements each with its own clear function. The architect becomes the administrator of an exact syntax within a delimited space. (This notion—of an exact syntax in a delimited space—is in fact a valid description of all modern art.) The sort of architecture and city planning that have come out of Le Corbusier entail the negation of all heterogeneity, "and that is why man has come to lose both his depth and his spontaneity." Man can no longer be a "habitant," to employ Le Lannou's coinage, and this very condition, or noncondition, is the direct expression of the new technocrat-produced milieu in which man and his house are now situated. Rordorf puts it well: "An art," he says, "has gainsaid itself: in finding a new place for man, it has annihilated him." And this is precisely the failure and the internal contradiction of all modern art.

Now let us shift our focus. Two discoveries prompted painters to embark on the enterprise known as plein air painting: the invention of outdoor photography, and the commercializa-

tion of the tin tube (the latter hardly a momentous innovation, but one which rid artists of the bother of grinding pigments). It was above all photography which changed men's perception of reality: they were obliged to acknowledge another vision than the one they had known. Presently new forms of lighting, first gas, then electricity, transformed the realm of light, and the paint and dye companies offered a new and undreamt-of range of color. The speed of locomotives introduced a new tempo into the vision of town and country. One had, it was felt, to represent movement in a synthetic mode, but this mode was still conceived of as something mechanical. "Organic processes," writes Lewis Mumford, "were reduced to their mechanical equivalents." Yet with the perfection of certain instruments the converse also became possible: with the stroboscopic camera, for example, one could show successive moments of a continuous movement on one strip of film, giving the illusion of an organic rhythm. Yet it was only after 1950 that the explosion of technical possibilities came to change the very conditions of creation. The use of acrylic colors gave rise to color field painting, with its rapid drying, its heavy impastoes and scratchings. In electronic music it even became possible to synthesize sounds[4] which have contradictory auditory qualities, seeming to some hearers to rise in pitch while to others they seem to fall. Xenakis has combined music with six hundred flash-lights and three lasers, all reflected in mirrors which create a changing architecture of light. Every twenty seconds taped coded signals convey their instructions to the lighting system, which itself is in sync with a multitrack music tape. M. Philippot has invented what he calls a "visible algorithm," a value-scale obtained by means of microsigns with

[4] The sound synthesizers now used by composers in the electronic music field, with their generators, filters, and modulators, can be used for both the creation and the modification of sound. A memory bank allows them to retain information, and they are small enough to be "played" during concerts.

Since 1945 John Cage has made use of recorded tapes to create a total sound-space and to introduce chance elements into his art. His work is an example of an art which is more and more the direct product of the technical means.

which he can make designs. And then there is Bayle's "accusmonium," with its two layers of bass speakers and others held aloft on poles or dispersed throughout the auditorium. Here one can even get an immediate rereading of taped sounds recorded with highly sensitive engineering devices. In music as in the visual arts, new equipment has given rise to new art forms.

Artistic invention has by degrees become less direct, more often mediated by some prodigious apparatus. Highly technical calculations are made to attain results either vaguely conceived of in advance or quite unforeseen. The well-known "ambulomare"—sometimes called "the deconditioning machine"—enacts the transition from architecture to sculpture using modern chemical products. Dubuffet has made walls of expansible polyesterene, the same material that Niki de Saint-Phalle used for her Nanas. Both Dubuffet and Singer have used epoxy resin. Artists are no longer content to create "environments," they manufacture whole new landscapes of which no other human being ever dreamed: forms larger than a human being which the spectator must enter among, climb, or stroll around, thus losing his spectatorship and becoming a participant. The sense of touch is as important as that of sight, and synesthetic sensations are induced: the "user's" visual or mental routines must be suspended. Piotr Kowalski has experimented with deforming elastic surfaces (elasticity being one of the properties of the "cocoons" used for storing war materiel). Weinbaum has employed several synthetic resins to make stained-glass windows. Yet when creativity and new materials meet there is always a problem: the encounter may be derisory, but the Bauhaus was an early example of just how profound it can be. One wants, of course, to try out all the new media, not only because they allow for new possibilities within an art form, but also because they allow the traditional boundaries among those art forms to be blurred (I shall be returning to this intermixing of the traditional art forms). The word media refers also to tools—the new equipment that per-

mits innovative creation, yet also conditions the nature of that creation: contemporary music, for example, is evolving as a function of its new instruments. One no longer produces works of art, one manufactures programs. Xenakis does calculations, Barbaud seeks to discover as clear a formulation as possible of the objective constraints that limit all musical creation: "Algorithmic music consists in the formulation of the sequential list of operations to be carried out with certain data to obtain the desired musical effect." What is involved here is not only a new operation but a new music, "a music of machines, where the laws of logic governing specific data are followed without any ad hoc improvisation." These words are most significant, especially in that what counts—as in nonartistic technology—is the method, the process, and no longer the subjective intention of the artist or even the effect to be produced upon the listener. This is an attitude we shall often encounter. But the machine is also movement: art becomes "dynamic": the artworks change form. One need only think of the "universe of inflatable objects." The problem of form, such as artists have tried to resolve it in the past, that is, with static media, is now outmoded. We are far from the first attempts, in which, following the example of the cinema, painters tried to render the effect of movement: after all, it was still canvases that they were painting. Now one can produce movement itself. The artist tries to invent open, indeterminate, multidimensional structures requiring of the "consumer" a multisensorial experience. Yet the new media do not merely make invention possible, they are also in strictest concordance with what technology has made of art: the artist, inspired by new possibilities, in effect *in-spires* technology itself, fills it with his spirit. Here man is no longer of any importance: art celebrates not man but abstract "forces" and is thought of as a "field" of such interacting forces. This involves a conception of art both totally despairing and radically negating of all freedom: a theory affirmed in particular and applied by Jackson Pollock. And the artist is, as it were,

worked by technology, to the degree that he uses properly technological media and equipment: he becomes the agent of the technological system.[5] Technology may even be his model, the machine may be his direct source of information.[6] The Italian architectural school called Nuove Tendenze[7] proclaimed that a house should resemble a gigantic machine, with the brutal simplicity of technology, and that the modern city should be *conceived* by city planners as full of noise and of movement. (If they were still alive, these creators would be delighted by the quite unplanned cities that have grown up around us!) Since technology has produced our environment, it is technology, we are told, that the artist/witness must take into account. But that technology has become complex and difficult: it is no longer merely a question of walking to the new railway to see the iron horse roar by. Nowadays technology means (for example) nuclear power plants: but to know

[5] I do not of course mean to endow technology with human qualities: I do not say that technology has a will, consciousness, or that it has somehow purposefully gotten hold of the artist!

[6] What is really important is not that the artist takes the products of technology as his model, nor that he is inspired by scientific theories. The importance of the relation cannot be illustrated by Leger's cogwheels, Honegger's tone-painted locomotives, Stenberg's crane-resembling sculptures, mechanical-looking architecture, Tatlin's International Tower, or even Le Corbusier's inhabitable machines. Such examples provide evidence of a direct but really rather superficial influence, and reveal the effects of mechanization, industrialization, rather than those of technological thinking as such. All this is nothing more than "being of one's time." What I am trying to pinpoint is a much more subtle and profound nexus. One must remember that like the philosopher and the sociologist the artist is always behind his time: he usually still sees things from the vantage of modern industry, the machine. Thus our French architects, overcome during the 'sixties by a veritable modernist frenzy (which produced La Defense, Le Front de Seine, and the Tour Montparnasse), are making an architecture reminiscent of an older industrialism, car-loving and destructive of neighborhood life, without realizing that their designs really express, not 'sixties technology, but the industrialization of the prewar period. It was only *unconsciously* that these architects expressed the technological system as such, which is exactly what I am trying to stress.

[7] It was perhaps the Futurists who first posed the theoretical question of the relation between technology and the new art. By 1910 they had seen the importance of the diversity of materials, the use of mixed media, the longing for a machine esthetic, the primacy of structure, etc. Cf. G. Lista: *I Futuristi—Manifeste, Documenti, Proclamazioni* (1973).

such a thing, to transmute its reality into art—what a job for the artist! He would have to be able to pass through the portal that separates ordinary mortals from nuclear technology.

The limiting case is when the technical object becomes a work of art *per se,* to be considered esthetic in its own right: perhaps an "elegant" dam, warship, or airplane. "The artist who seeks new forms," says Niki de Saint-Phalle, "has been overtaken by the new technology. He feels ridiculous when he looks at the beauty of a rocket." N. Vichnay characteristically titled a series of articles about modern technical achievements "the New Cathedrals" (*Le Monde,* November 1974). The Pont de la Manche, the Usine Marémotrice, the Concorde, etc.—all these prestige technological enterprises were treated as works of art expressive at once of "faith" and "beauty." Yet the error of functionalism is to fail to see that if adaptation to function *can* result in beauty, it does not *necessarily* do so: a 1939 pocket crusier is a delight, but a 1970 aircraft carrier is a monstrosity.

Very early certain characteristics of technology began to be reproduced in art. Standardization is one. We find such tendencies particularly in pre-World War I architecture. Mathesius, championing the Werkband school, wrote that "it is only through standardization that one can establish reliable and generally accepted criteria of taste." (Though standardization still plays a role, "taste" has been abandoned as an artistic criterion.) Then there is the division of labor. Its inspiring quality stems primarily from its embodiment of a new space-time dimension: today one wants to analyze the components of movement, to decompose time into images, and, finally, to translate into an optical language the "constitutive moments of a phenomenon whose nature is to resolve itself in space and to melt in time" (Delevoy). (And of course the division of labor has also been introduced into esthetic production itself.)

There is also a direct inspiration from machines, whose perfection has often been a sort of ideal. Besides functionalism, a sort of new vision of harmony has been in the

making; even in today's experimentation with disequilibrium, with rupture and with conflict, the ideal of precision covertly remains, though occasionally at the service of some sort of artistic delirium. Heidi Mayer paints with millimetric precision, as if to express a vision of madness in a world of robots, man's anguish before a future that he has created and that will come to dominate him; viewing her painting, we are in the presence of one of those undreamt-of contradictions which characterize our time's art.

But the central contradiction is that for freedom: it would seem that technology has opened up vistas in all fields, that the artist can resolve any imaginable problem with new media and equipment. Robert le Ricolais seems able to resolve all the problems of city planning with extraordinary innovative techniques (for traffic, tubes encased in cables, etc.). Dubuffet even resolves "spiritual problems" with technical means: technology is the ideal way to get anything done. But it soon becomes an imperious mistress, rigid and authoritarian. Art is subordinated to the proliferation of media: it is the logical imperative of the technique that comes to determine style. Doubtless man acquires through these techniques a new knowledge of himself and of technology. He sees what no one ever saw before: the moon from close up, the evolution of a fetus accelerated to the point where it is visible, the behavior of the rarest exotic birds, etc. All is seen and known. J. J. Trillat has shown how X-rays and the electron microscope allow the eye to explore a previously invisible world. Painters and architects also express this new vision (though Trillat points out that certain of their creations came before the images revealed by close-up photography and electron microscopy, as if the artist had discovered by intuition what technology was later to reveal). Such discoveries extend also to color: we learn that color is not what we thought it was according to our traditional, learned viewpoint. Here again the artist is liberated. Yet let us return for a moment to the key expression, "a traditional, learned viewpoint." Psychosociology

teaches us that we see the world through forms and images that are traditionally transmitted to us, unaware that what we think we see is very different from what is actually there. Now one of technology's chief effects is that it calls all traditions into question. Technology upsets our universe of images, of traditional constructions, of transmitted doctrines. Yet what has happened is that this prodigious freedom has become part of a new determinism. It is not that art cannot be made in a technological society. Chenevière has judiciously noted, in speaking of technological man as an "art consumer," that mental stress, overconsumption, the excess of information, nervous tension, etc., deprive man of "vacant time," so that he cannot genuinely meditate or gain distance from events: thus his experience of art is acquired too rapidly: the public has no leisure to familiarize itself with a *work* of art, it seeks the immediate phenomenon. In the threater real participation has become impossible, so theater companies try to replace it with devices like symbolic aggression. By the same token, to the degree that social relations have lost all density it has become vain to try to represent them, to symbolize them, to enrich them, in the theater. Whence the theater of the absurd, the theater of derision, etc., which are not the products of artistic creation but reflections of the condition of the spectators. MacLuhan has shown that photography changes not only our attitudes but also our internal dialogue. The culture is that of the Gestalt, induced by an image, and socialization is linked to the transformation of means, for example, the means of communication: one tries to reappropriate something from the flow of information. Perhaps the video generation is in the process of replacing the TV generation; this would be interesting, since video can produce an "action culture." The more the new media allow the artist to do whatever he wants, the more consumption, as well as production, becomes strictly determined by the very technology that has provided the means of expression.

Art Separate from Technology

Technology's influence upon art is not without an undertow. One may even speak of the separation of art and technology. For centuries they were indistinguishable.[8] There is in what is called folk culture a close relation between tools and a certain esthetic sensibility. It is only recently that art has become quite separate from technology. Art is now thought of as something more exalted. Freedom and beauty, in the unalloyed state, are practiced by a few people for a tiny clientele and are set apart from the manufacture of purely utilitarian objects for the masses. Art seems as cut off from the people as it does from daily concerns, but art also lacks the vigor of the people, of daily life. Until now mass production has brought to working people and to most of the bourgeoisie nothing but material goods, most of them ephemeral; mass-produced goods are soon caught up in a swift tide of distribution, use, and abandonment. The work of art has always had, at least up to now, the claim that it would last, possibly for all eternity: "The work of art will be beautiful if it is invisibly chiseled out of the most resistant marble, wrenched out of the desire for something perfect; it will then be indestructible as a diamond." In contrast, mass-produced objects are meaningless, if not positively ugly, but indispensable for the time being. Once money was invested in beauty (in the simple beauty of daily use: a beautiful piece of furniture, fine linen, a good family house in a traditional yet well-balanced style) whereas today it is invested in machines. For working people the moped has replaced the carved chest, for the middle class the car has replaced the silver service.

> Mass-produced articles are contrary to the nature of art because they are interchangeable and impersonally manufactured. . . . Art is the fruit of a personal act whose author set his hand to

[8] On what follows see Charbonneau, *Le Paradoxe de la culture.*

> nature. When a man has been present, his product bears the stamp of art. But modern industry no longer chisels but casts, molds, vacuum-forms its products in an unnamed substance that it rightly calls *plastic,* in which it is possible to impress whatever decorative shapes one wants, in order to hide the characterlessness of the medium itself.[9]

And as the everyday object, the product of technology, becomes totally divorced from art, from the presence of the man embedded in his work, one falls back upon an art which comes to seem the more admirable that it is absent, useless, self-sufficient: "Work in wood, stone, or metal becomes the monopoly of artists who ornament the lives of a privileged clientele, with the people having a right only to the reflection of this work, that is, to reproductions."

Art is perceived as something very different from the products of technology. A particular case was the initial reaction to photography: critics were ready to grant that it adequately reproduced reality, and even that it could serve as the carrier of the myth of the real, but artistic activity was still thought to reside elsewhere. The plastic arts, faced with this new competitor, had to convey a sense of their differentness, to quit the realm of reality and venture into the unseen and the unknown. "From now on," it was said, "painting is everything that photography is not." Daix has offered a most convincing analysis of the three dislocations wrought by this flood of artificial images. First, a technique had replaced an art—we no longer need a man to make an image of man. Second, the photographic technique has revealed the imperfections of human vision: it has led artists to wonder what it is they really see, to accept, by degrees, the truth that convention has had a

[9] P. Bellini has written a study of this subject titled *Estetica e comportamento* (1977) where he calls our society "the society of the identical." The "identical" is the perfectly crystallized, the reduction to stereotypes totally different from tradition (i.e., values so perennial that they may be projected indefinitely into the future). The identical—that is, massive standardization—is impoverishment disguised as profusion, without values, principles, or truth, losing itself in endless reiteration, though exciting curiosity, distraction, even "interest." Industrial production creates "the identical society," whereas art creates a society where one can chose "the different."

strong hold upon that vision, and thus to free themselves from the images they felt they ought to see. Last, photography conveys vastly more information than could ever be conveyed before. The various forms of technology, then, do not all produce the same effect upon art. Some are felt as competition for the artist's traditional activity, such as photography for painting, or recorded tapes for live music. In such cases the artist must rethink his art, do something new—he is driven to make himself different, to affirm that artworks are different from the products of technology. Other forms of technology merely provide new tools and media for an art activity that remains essentially traditional. Still others seem totally outside the realm of art, offering it nothing of interest, yet still they are part of the technocratic world, which determines the artist's or art-lover's very essence though he may be insensible of the influence. Sometimes, on the other hand, the artist wants to use a modern, technological medium. There is a constant traffic, as Francastel has observed, between science, applied science (technology), and the arts: "A technical discovery gives rise to a plastic interpretation, and the latter in turn suggests a use for a new material whose potentialities society has not yet realized." Here the artist is in effect the inventor of a new use for a technique. But often, confronting the technological imperative, society and its artists merely give up all the creative claims of artistic mastery: art is liquidated by the onslaught of technology. This leads one to suspect that artistic activity in our century has much the same status it had in the last: the status of an activity which, despite artists' claims, is marginal enough to be left alone—it does not disturb anything essential. Pompidou, according to Fermigier, has made only one truly historic pronouncement: "We must adapt Paris to the automobile and leave behind our outmoded estheticism." Here there is no question of a meeting of art and technology: art is scrapped, technology embraced. Buckminster Fuller is another who has gone on the warpath against "estheticism": "The world," he writes, "evolves from the visible

toward the invisible: architecture will evolve in the same way." He clearly regards electronics as the decisive development; architecture is no longer a going concern because the world of construction is in flux and the art of the solid is doomed. All structures can simply be built by engineers, and we can throw art and other such nonsense to the winds. We'll all live in geodesic domes in a dymaxion universe. Technology is in total command; art vanishes. And Fuller is perhaps right, to the degree that by "art" he understands mere decoration. But his way of thinking implies that art may from now on be found only in those nooks and crannies of society that technology has not yet filled. Small wonder, then, that a major contemporary esthetic current urges that art be entirely independent of technology: whenever—as after Hiroshima, or after the birth of the ecology movement in 1968—people especially distrust or fear technology, and want to avoid it or rid themselves of it, a type of organic, nonfigurative art, radically opposed to the constructivist side of modernism, comes to the fore: abstract expressionism, "action painting," more recently lyrical abstraction, etc.—this sort of painting claims to owe nothing to technology. Yet one wonders if it is not indeed located in the interstices of our technological society, if technology does not ignore it merely because it is so unimportant. René Huyghe argues that art has ceased to be an amusement for esthetes and has become the conquest of reality. But he fails to see how thoroughly art has been conditioned by technology: art is the poor servant of this new reality. If photography has brought about a transformation of the painter's role, the architect too is now confronted by modern engineering (whence Buckminster Fuller's radical defeatism, a defeatism that wears a triumphal, antiarchitectural mask). Yet it is by no means impossible to create an architectural work of art, even one that may be described as "antitechnological" (i.e., nongeometrical). What initially opened the whole debate was the C.H.U. by Wugenski (1966), a disciple of Le Corbusier. This work was celebrated as "antitechnological" precisely because its art com-

ponent had not been appliquéed but was an integral part of the initial creative concept. Yet this building is really only a judicious blend of all possible modern techniques, including psychological ones. It is a model of what the artist may do *with* modern techniques (not unlike Xenakis's music), but it neither questions nor confronts the technological environment. A successful work of art is not automatically a defiance of technology. Since the beginning of the century art has been an attempt, ever renewed, to meet the challenge of technology, but it is itself situated *within* the technological system. The technocratic experiment has been integrated into the life of mankind, including artists, who may use it or protest against it, but who can never dominate it except fictively. Still less can they symbolize it: when art tries to negate technology it only bears witness to the impotence of all such attempted symbolizations.

In the Technological Universe

After trying to sketch the complex relationship between art and technology considered as two objectively analyzable realities, I should like to try to understand what art becomes when it is a function of the technocratic system.[10] As happens in all environments, art, when integrated into the technological environment, assumes its character. The artist adopts a technician's mentality ("I just paint, period," said Manet). The artist, who for a century has been claiming this mentality for his own, is simply the expression of his surroundings. Everything confirms this harsh judgment. Thus a growing number of artists consider that only technical problems are important. Doubtless artists have always posed themselves such problems, but only as minor and subordinate ones. Beginning with Manet, beauty, art, painting were identified by the artist with the metamorphosis of reality into paint. That metamorphosis

[10] J. Ellul, *Le Système technicien* (1977).

was his whole job: "Reality itself," as Daix puts it, "is the act of transformation into paint." These are words that might perfectly well have come out of the mouth of a technician who considers reality to be the production process: the technical production schema is void of all meaning, of all concept. The technical job is taken for the only reality, and claims to account for all reality. We find this same ambiguity in modern art. The painters—and the critics—were overcome, amazed by photography and the cinema, which, contrary to subjective vision, gave an exact account of the real, until they saw the arbitrary and fallacious quality of this product. In the same way, high-fidelity technicians imperceptibly betray the original music, until the aural simulacrum becomes an ersatz reality (Schaeffer). Here modern art follows the same ambiguous progress as all technology.

Art has also become a form of action. The criterion of utility is progressively abandoned until the means have predominance over the ends. Hence art may become an instrument of propaganda, destined to persuade an audience or spur it to action. On a deeper level art is now thought fitted to work, by means proper to itself, upon our vision of the world. Of course art at other epochs, as in the Counter-Reformation, has been used to convince people of things, but I'm not certain that it had such an explicit will to modify man's vision, man's understanding of the world. It was more innocent then. Today we are experiencing a sort of double consciousness characteristic of the technological era.[11] The modern artist has

[11] Sometimes art's relation to the technical universe is clearly perceived and expressed: thus Rosenberg, who insists that art must evolve as a function of technical efficiency, and Efron, who emphasizes that the evolution of art takes place according to the progress of technology and not according to the human experience of art. But the most clear-cut case is that of Marshall MacLuhan, who insists that art provide exact information on "how to modify man's psyche to bring him into full accord with technology, and even to predispose him to receive the new technological current." To avert a social breakdown from the overrapid development of technology, the artist must "leave this ivory tower and enter the control tower of society." He is there to modify the soul of man in relation to the needs of technology. At the same time he must translate the *vie des formes* of electronics and make it directly accessible to the people (*Understanding Media*). This is the classic expression of the belief that the artist is a factor in making the world conform to technical progress.

the conviction that the man in the street does not see the truth because blinded by a false reality, by a fallacious cultural heritage. And he makes art to destroy this heritage, to transport us into a different mental world. "From the slavery of representation to the advent of the 'sensibility of absence,' a system of qualities has, in less than two decades, abolished a system of grandeurs, vanquished anthropomorphism, dissolved the 'subject' in the sign . . ." (Delevoy). It is not only the autonomy of the pictorial language that is acquired, but also art as a conscious tool of action, that is, as a technical *means*. It is the technical environment that produces this mutation (previously it was merely a byproduct).[12] In the same way there emerges a concern over the usefulness of art. Art can no longer be pure or useless. It has a function. Even when people try to cast off this conviction they remain bound to it will-nilly. Traditionally art had no utility, or rather that utility belonged to the nature of art itself, when it had a magicoreligious quality. The great transformation of this century is that the utility of art is regarded as its function. What is important is no longer the content of the message, the expression of a sense of beauty, but the material in which this message is embedded, its medium. And one must know if the work really reaches the millions it is intended for. Here we have a singular paradox. One often reads sociologists, philosophers, art critics claiming that "nowadays there can no longer be any 'misunderstood' artists or *poètes maudits*. The power of the media, the curiosity of journalists, the delight in everything new—all these would immediately rescue any genius from obscurity." But this is true only if the product of the artist is transmittable to the public. The important question is: Can this artistic

[12] Perpetual innovation, the severing of artistic roots, the imposition by art of norms of vision geared to the rapid changes of our society are important factors in the ideological acclimatization to the necessities of productivity, and of integration into the technological environment. It is purely illusory to believe with Lebot (in *L'Art de masse n'existe pas*) that in a formal game anything other than inert images are produced. He mentions "forms critical of the system that has brought them forth" which cause "an irreducible difference" to arise. What difference? Difference from what? All this is mere dreaming.

discovery be used by, say, a major network—which is to say, Is it *useful?* The utility criterion of modern art is rarely explicit, but it reveals the profound influence of the technocratic mentality.

But the essential point is that the means dominate the ends. One of the major characteristics of the technological universe is that it is a system of means from which the ends have disappeared. Hence the "utility" of which I have spoken cannot be measured against the attainment of goals: there are no more goals. Nor can one say that art's "aim" is to destroy a traditional mode of vision. This is an *effect* of technological autonomy and not a teleology of art. The principal interest of every artist today is the process employed rather than the result.[13]

Ricardou's *Pour une theorie du nouveau roman* offers us a subtle analysis of analogous literary procedures, the works he analyzes being worthy of interest to the degree that they use these procedures. The formula that continually recurs is: "It's not what you have to say, it's why you have to say it." Ricardou uses the excellent phrase "the pen's animal spirits," but he could equally well have written "the brush's animal spirits." To produce a work of art is simply to submit to a calculation, to an order, to the act of writing itself. The artist and his goals no longer count. One relies upon montage, collage, puzzles, etc., and it's the newly invented technique which excites interest and admiration. Of course these techniques do not have the same dimensions as industrial ones: one of the essential aspects of industrial technology is mass production. Indeed, the great weakness of art (except in the case of Moles, who is consistent to the end) is that since one is interested only in the technique one rather quickly tires of the product, and the artist, hard pressed, is forced to hunt for new techniques,

[13] John Cage emphasizes that it is the technique itself that finally becomes the art: we are equipped to turn our attention to the operations of art. But the most remarkable thing is that with his pure, his exclusive technicity Cage cannot prevent himself from referring to nature and to man. This sort of contradiction is characteristic of the mental confusion which reigns in the world of art producers (Cage, *Silence,* 1958).

failing which his "consumers" will lose interest. This is a logical continuation of the tendency which began in the last century, when the autonomy of the pictorial order was discovered. The *act* of painting became its only real legitimation, one no longer refered to god or nature. It was a typical technician's attitude, which unwittingly expressed the demiurgic, promethean attitude of the technological adventure: to destroy the real in order to reconstitute it, to destroy appearance in order to recreate it. One could not wish a more perfect identity of project and attitude: modern art is the expression of the technological mentality at its most pure and total. It was Theodor Adorno who best grasped the phenomenon when, speaking of "Schoenberg and Progress," he wrote, "[Twelve-tone music] is a system of dominating nature and music which corresponds to a nostalgia for the first era of the bourgeoisie, when industrialists or merchants acquired things by means of better organization. . . ." Whereas in the past art had played the role of nature's mediator and handmaiden, it must now try to acquire, to dominate and replace her.

The exposition "Babel 65" expressed, in especially vigorous terms, this affirmation of the primacy of technique: "There are no more artists," proclaimed Miro, "only men who express themselves with plastic means." Kowalski declared that he was "more interested in the way he got his forms than what they looked like. . . ." Mathieu's analysis seemed perfect: "For the first time in the history of form, the sign precedes the signification." So much I concede; but that is only because art is no longer linked to a human intention, to a mental reference, but instead brutally expresses through its signs the reign of technique. The sign expresses the technique, no longer the imagination or the personality of the artist, who is a creator starting from zero.

Unfinished Art

Art thus becomes a sort of confirmation of the technological universe. Because technology is integral, and also a factor of

integration, and because technological society is universal, we are witnessing the discovery of integral techniques of artistic composition which are in reality an extreme effort to palliate the anguish of modern man, who feels himself eaten up by this totally integrated world. And here too we see one of the two faces of this art: *compensation* (the other being *reflection*) for the technological universe. But this art is, by virtue of that very fact, inhuman. For that is the game that technology forces art to play: the inhumanity of art expresses that of technology in the very name of the human and as a remedy to man's anguish. We have here the key to this art, and the meeting point of its two functions. But in its client role vis-à-vis technology and its universe, art profoundly changes its character: before, it had always claimed to offer a finished work, something which had attained a final perfection: if one note, one spot of color were removed, the whole would seem incomplete. We have already seen that this claim is no longer made; art is now located in the realm of the transitory and the instantaneous. This quality is also inherited from technology, since the latter is always in transition, each state of technological development being merely a stage on the way to something more efficient. But with modern art there is an added factor: incompletion appears inevitable. Every modern work of art is essentially unfinished. Rubens made hundreds of drawings for each painting he did and regarded them as nothing. Yet the slightest scrawl by Picasso was instantaneously delivered to the public as a complete work. Add or take away two or three yards of Niki de Saint-Phalle's plastic Nanas and little is changed. Modern art is by nature a succession of unfinished works which condition one another. There is no longer, as we have seen, *one* work. No work seeks to attain the finished, the eternal, the equipoised, the perfect, because no technological means is ever exhausted, it is never really anything but a sketch for something more efficient to come, and, at the same time, no technology exists for itself, with its own internal

meaning: it has no sense except in relation to all the other technological systems. Nothing is more comical than to hear critics and philosophers say that there are no longer any individual artists because modern man has become solidary, socialized, that it is the community that creates (a return to Gothic!), that the monster of bourgeois individualism has been vanquished, and that the artist is now a conducting rod in the great collective creative current of the masses, etc., etc. In reality *all* the characteristics of modern art, without exception, come from the universe of technology. Not only is technology always in transition, but at any given moment it is at the summit of its possibilities. And it is here that art is so profoundly devalued: it is constrained by this momentary "perfection" of technology to be nothing but a sketch of itself. Art cannot bring technology to a halt, thus no work of art can ever be finished. The modern artist restricts himself to a translation of technology; what previously composed the specific activity of the artist, a sort of heightening of reality in the service of transposition, has now been annihilated. "Natural" reality is wiped out in the promethean process; technical reality triumphs. Sometimes this double determination leads one to believe that the artist is freer because he has been liberated from figuration. One feels that he has outrun reality in the pursuit of a symbolizing function; but this is false. His art is on the contrary perfectly servile, indeed *figurative in relation to the technological environment.* It is banally imitative though it claims to be highly composed. This sort of art is taken for an *art savant,* but it is more *savant* than an idiot savant. It is, to be sure, intellectualized, in the image of the surrounding technological environment, but in this sense it is merely the reflection of the abstractness of the system: only in that sense is it abstract. Yet it is influenced not by technological *form* (except during the early period when the machine and its movements were being directly copied) but by the *structure of the technological system* and of its informing principles. It is the

true witness, the tangible sign of the system. In this sense, it still fulfills its traditional function, but only by having repudiated its human grandeur and creativity.

Three Environments

Thus the transformation of contemporary art has been brought about not by the direct influence of technological systems, not by science or philosophy, not by politics or economics, not even by the creativity of the artist. Modern art is the transfigured reflection of its environment (which in no way detracts from the "genius" of the artist, who is neither a mechanical meter nor a spiritual archangel).

I should like to refer briefly to the theory of the three environments. During the prehistoric period man's environment was nature. Art was conceived as a function of this environment, was directly at grips with it. Scholars often speak of a magicoreligious art. In reality art had the function of exorcism, of dominating the environment, and this took place through symbolic channels. When settlements became denser and more numerous, and social organization came about, man began to consider society as his true environment. Nature was still there of course, but relegated to a lower level of importance. Here we enter human history; man's great preoccupation was no longer to survive but to organize his society and to govern it. The great problem became one of politics. Progressively art became the reflection of man's various societies. Of course art remained magicoreligious, but now in relation to society; it remained symbolic, but symbolic now of social functions and political acts. Art had an essentially political function in the broadest sense.

Once again the human environment has changed: it has become the technological universe. Clearly our earlier environments, nature and society, have not been totally destroyed: nature has been conquered and is a minor force, but society

remains ideologically dominant. Man has not realized that his politicosocial problems refer essentially to yesterday's environment, which is already devalued and outmoded. True, society subsists as a source of trouble and danger. But the artist's sensibility feels the transmutations more quickly than others and expresses them not directly but by metaphor. Art is no longer magicoreligious, symbolic, or political. The technological environment, having become the reigning milieu, has brought about new, essentially functional art forms. It is a case of artifice functioning in relation to artifice, none of it symbolizable. Art receives its character from the technological environment, where every force works upon every other. And hence art takes on a *ludic* function, the *ludism* being at once the positive reflection of the freedom confered by technology and a compensation for the fatality of technological growth.

TRANSLATED BY DANIEL HOFSTADTER