

Second Part

Man and the Technical Object

Chapter 1

The Two Fundamental Modes of Relation Between Man and the Technical Object

Section I. The Social Majority and Minority of Technics

We would like to show that the technical object can be related to man in two opposite ways: either through a status of majority (i.e. in the *sui juris* sense in that it has come of age and is fully responsible as an individual) or as a status of minority (i.e. not considered as being in full control or responsible for one's actions as an individual). The status of minority is the one according to which the technical object is first and foremost an object to be used, that is necessary to everyday life and is part of the environment in which the individual human grows and develops. In this state, the first encounter between the technical object and man essentially takes place during childhood. Technical knowledge is innate, built on habit and un-thought. On the other hand, the status of majority corresponds to its conscious and considered use by a free adult, who has at his disposal the means of rational knowledge as elaborated by science—the knowledge of the apprentice is this way opposed to that of the engineer. Once the apprentice becomes an adult artisan and the engineer is introduced into his network of social relations, they sustain and cause to radiate around them a vision of the technical object which corresponds in the first case to a relation of minority and in the second to one of majority. These represent two very different sources for the representation and comparison of technical objects. The artisan and engineer don't live only for themselves—as agents and witnesses to the relation between human society as a whole and the world of technical objects as a whole, they are worthwhile exemplars: through them, the technical object incorporates itself into culture. Until today, these two modes of incorporation have been unable to provide concordant results and have resulted in two

languages and two types of thinking on technics that are not consistent with each other. This lack of consistency is partly responsible for the contradictions within culture as to how it represents to itself and thinks about the technical object in relation to man.

This conflict between majority and minority status is nothing else than another example of the inadequate relationship that has always existed between man as an individual or as a social being and the technical reality. In antiquity, a very large part of technical activity was banished outside of the domain of thought since it corresponded to servile occupations—in the same way that the slave was relegated to the outside of the city, the servile occupations and technical objects which corresponded to them were likewise banished from the universe of discourse, of reflective thought and of culture. Only the sophists, and Socrates to a certain extent, made an effort to bring into the domain of noble thought the technical activities practised by slaves and freedmen. The status of majority was only accorded to certain activities, such as agriculture, hunting, war, and the art of navigation, whereas the technical activities that use tools were kept outside of the realm of culture: Cicero draws almost all his metaphors from the noble arts, particularly from agriculture and navigation; the mechanical arts are rarely invoked by him.

Going back further into the past, one would find that a variety of civilizations would differentiate between technics that were noble and those that were not. The history of the Hebrews accords a veritable privilege to pastoral technics while regarding the earth as damned. God accepts Abel's offers but not Cain's—the shepherd is superior to the farmer. The Bible contains a multitude of paradigms and schemes of thought drawn from the methods by which herds can be made to prosper. On the other hand, the scriptures introduce modes of thought drawn from agriculture. Perhaps, in the origins of mythologies and of religions, we can find a certain predisposition towards a particular technology, consecrating the noble technics while refusing the right of expression of others, even when they are in fact used. This initial choice between a majority technics and a minority technics, between a valued technics and a devalued technics, imparts to the culture which incorporates these technical schemes thus created an aspect of partiality, of non-universality. Our research does not propose to reveal for each particular case the reasons for

the choice between fundamental technics but to show that human thought must establish a relation of equality without undue privilege between man and technics. This task remains to be accomplished since the occurrences of technical dominance, which during every historical era cause the recognition of a part of the technical world by culture while rejecting others, maintain an inadequate relation between human reality and technical reality.

The suppression of slavery in Western Europe allowed ancient servile technics to see the light of day and manifest themselves in rational thought and the Renaissance consecrated artisanal technics by bringing to them the light of rationality. Rational mechanics allowed machines to enter the domain of mathematical thought—Descartes calculated the transformations of movement within simple machines used by the slaves of antiquity. This effort towards rationalization, which signifies integration to culture, went on until the end of the 18th century. But in spite of that, the unity of technics was still not maintained. A real reversal was in operation, which repressed the ancient noble technics (those of agriculture and of husbandry) into the domain of the irrational and of the non-cultural. The relation to the natural world was lost and the technical object became an artificial object which distanced man from the world. Today, we can barely see a pathway of reconciliation between thought inspired by technics relative to living beings and artificialist thought, creator of automatons. Mechanistic technics were unable to attain a status of majority unless they were thought up by the engineer, rather than remaining technics of the artisan. At an artisanal level, the concrete relation between the world and the technical object still exists, but the object thought up by the engineer is an abstract technical object that is not linked to the natural world. In order for culture to be able to incorporate technical objects, we would have to discover a middle way between the status of majority and the status of minority of technical objects. The disjunction between culture and technics finds itself in the state of disjunction which exists within the world of technics itself. In order to find an adequate relation between man and the technical object, we would have to be able to discover a unity to the technical world, through a representation which simultaneously incorporates that of the artisan and that of the engineer. The artisan's representation is engulfed in the concrete, engaged in material manipulation and sensible existence;

it is dominated by its object. On the other hand, the engineer's representation is dominating: it makes out of the object a bundle of measured relations, a product, an ensemble of characteristics.

Thus, the first condition towards the integration of technical objects and culture would be that man ought not be inferior nor superior to technical objects; that he'd be able to interact with them and learn to know them within a relationship of equality and of reciprocal exchange—a social relation of some sort.

The compatibility or incompatibility between the different technological modes deserves being subjected to a conditional analysis. Perhaps it would be possible to discover instances of compatibility between a technology such as that of the Romans and that of another such as the civilised society of today. Or perhaps it might be possible to discover an incompatibility barely discernible between the technological conditions of the 19th century and those of the middle of the 20th century. Certain myths born from the misguided encounter of two incompatible technological paradigms could be brought back to their initial conditions and analyzed.

Section II. Technics as learnt by the child and technics as thought by the adult

One cannot study the status of the technical object within a civilization without bringing to the forefront the differences between the ways technical objects relate to adults and to children. Even though life in modern societies gives us the option to think that there is continuity between childhood and adulthood, the history of technical education quickly shows us that a difference does exist and that the way a child or an adult acquire technical knowledge is not the same. We have no intention of presenting a normative rule; we only wish to show that the character of technical education has varied significantly over time. This variation is due not only to the level of technical knowledge or the structure of society, but also to the age difference between the individuals being educated. We could likely discover a circular causality between the level of technics and the age of acquisition of knowledge that constitutes the technician's baggage.

If a barely rationalized technics requires its learning at an extremely early age, the young subject will preserve the irrational basis of his technical knowledge into adulthood. He will hold onto this knowledge by virtue of its repeated inculcation, deeply rooted because it was acquired from very early on. In the same manner, the technician will put forward his knowledge not through a clearly represented diagram, but in a manner that comes across almost as a sleight-of-hand acquired by instinct and relegated to second nature as habit. His science will manifest itself at the level of the sensorial and the qualitative, very close to the concrete character of the material. This individual will be gifted with powers of intuitive collusion with the world which will give him a remarkable ability that will manifest itself, not in his conscience or in his discourse, but exclusively through his work. The artisan will be like a magician and his knowledge will be a working knowledge more than intellectual one, and it will be a capacity more than a knowledge. It will be secret to others because it is secret even to himself and to his own conscience on account of its nature.

Even today, a technical subconscious that cannot be expressed as a function of reflexive activity can still be found in peasants or shepherds. They are able to directly understand the value of seeds, the exposure of a piece of land, the best place to plant a tree or to set up an enclosure for animals in such a way that it will be sheltered and well located. These individuals are experts in the etymological sense of the term: they are part of the living nature of the thing they know, and their knowledge is a participatory knowledge that is deep, direct, and requires an original symbiosis that includes a kinship with a valued and qualified aspect of the world.

Man behaves in this instance as an animal that can smell water or salt from afar, or that knows how to choose where to place a nest without forethought or planning. This type of involvement is by nature instinctive and is only found where successive generations have adapted to the rhythms of life, the conditions of perception and the mental structures essential to the type of collectivities that emerge from on-going stability. In a tale remarkably titled *The Mine*, Hoffman described a similar style of intuition in a real miner—he smells danger and knows how to discover the ore in the most secreted veins. He lives in nature as part of the nature of underground, and his being with this nature is so ingrained that it excludes all other sentiments or attachments. The real miner is an underground man.

Whosoever goes down into the mine without loving it, like the errant seafarer who courageously hires on to work in the mine because he loves a young woman, will never partake of this essential being with nature; the morning of his wedding, he will become a casualty of the mine. There is no moral novelty here. The young sailor is full of merit and worth, but he is a sailor and not a miner: he does not possess the intuition for the mine. The ghost of the old miner warns him of the danger he is in; the mine does not accept outsiders, intruders from other trades, from other lives, that don't partake in the gift of involvement. Human nature as found in the peasant, the shepherd, the miner, the sailor, doubles up with a double second nature which is like an ancestral pact with an element or a region. It is difficult to say whether this sense of participation is acquired during the first years of life or if it is part and parcel of an innate heritage, but it is certain that a similar technical education belongs to childhood even if it is made up of intuitions and purely physical functional schemes that are very difficult to express and convey through oral or figurative symbolism. And for that same reason, it is very difficult for it to evolve or to be reformulated in adulthood. In fact, it is not of a scientific or conceptual nature and cannot be modified by any kind of intellectual symbolism, oral or written.

This technical education is rigid. It would be excessive to consider this technical education as necessarily inferior to an education based on intellectual symbolisms; the quantity of information contained in this instinctual education can be as great as that contained in symbol-based knowledge, explained by graphics, drawings or formulas. It would be too easy to pit routine against science, particularly since science usually implies progress. Primitiveness cannot be mixed up with dullness or denseness, any more than conceptualization can be confused with science, but it is important to point out that this technical knowledge is effectively fixed, since one cannot become a child once again in order to acquire a new set of basic intuitions. This type of technical knowledge also has a second character: access to it is restricted and requires initiation. In fact, it's only through being raised within a community that the child acquires these basic intuitions. The outsider is most likely deprived of this initial involvement which requires the existence of living conditions because these living conditions are first and foremost educational. It would be too much to attribute

the demise of ancient technics to the closing of communal life of societies. In fact, these societies knew how to remain open, as demonstrated by the temporary or seasonal migration of peasants from Auvergne to Paris up to the end of the 19th century. In this case, it is technics itself which corresponds to a closed regime of life because a technical education is valid only for the society within which it was created and only for that society. It appears that historians have dealt with in a rather abstract fashion the initiation rites of ancient trades by considering them only from a purely sociological point of view. It needs to be pointed out that the trials that correspond to the acquisition of technical knowledge by the child are not only social rites but feats through which a young person becomes an adult by taming the world or by measuring up to a critical situation and overcoming it. There's a certain magical charge to the trial, i.e. a feat by which the child becomes a man by using all his strength pushed to its extreme limit. In this perilous face-to-face with world and matter, if he lacks resolve or is not up to the task, he will put on the line his efficacy as a man of action. If the hostile environment wins out, the man will be unable to fully become an adult because a rift has formed between nature and man—the trial becomes a hex cast by the technical being that will last a lifetime. In the same way that an animal becomes docile from the day it allows itself to be led for the first time, matter comes to obey this man who has become its master by dominating it in the trial. If the first attempts miss, the animal will rebel and will remain untamed. It will never accept him as master and he, in turn, will forever be insecure because the connection was broken right then and there. In the trial, the law of all or nothing takes hold; man and world are transformed and an asymmetrical union takes place. We're not saying that the trial is a test for the demonstration of courage or ability—it engenders these qualities since courage emerges from an immediate and confident linkage with the world which dispels all uncertainty and hesitation. Courage is not fear overcome, but fear deferred by the presence of intuition which puts the world on the side of the one who acts. The able man is the one that the world accepts, that matter is fond of and to whom it obeys with the faithful docility of the animal that recognizes his master. Ability is one of the forms of power, and power supposes a spell

that makes possible an exchange of forces, or rather a mode of participation somewhat more primitive or more natural than the already very elaborate and partially abstract spell. In this sense, ability is not the application of violent despotism but the application of a force appropriate to the being it drives. In the true power of the able man, there is a recurring relation of causality. The true technician is fond of the matter he works on and he is on its side. He is an initiate and respects that to which he has been initiated to. And once he has tamed it, he becomes a couple with the matter and does not easily give it over to the profane because he has a sense of the sacred. The artisan and the peasant, to this very day, are averse to bring to market certain products or works which demonstrate their most perfect or refined technical pursuits. An example of the prohibition of commercialism and divulgence is patent in the off-market limited edition of a book not offered for sale by a printer, editor or author. It is also manifest when the peasant, at his home in the Pyrenees, offers a visitor certain foodstuffs which he would never put up for sale or allow the visitor to take away.

The secret and non-evolving nature of such technics is therefore not only a product of social conditions; it is created by the structure of the group just as much as the structure of the group conditions the technics. It is quite possible that technics must in some way or other carry within themselves a coefficient of intuition and instinct necessary for the establishment of mutually acceptable communication between man and technical beings. But next to this first aspect of technical education, there is a second one which is its inverse and which essentially addresses itself to adult man. Like in the preceding case, there is a dynamic action on the individual and on the group by bringing it to take on an adult mentality.

The second type of technical knowledge is rational, theoretical, scientific, universal knowledge. Its best example is Diderot and D'Alembert's Encyclopaedia. If the Encyclopaedia appeared as a powerful and dangerous work, it wasn't because of veiled or direct attacks against abuse or privilege, nor because of the philosophical nature of various articles—at that time there existed pamphlets and libelous tracts much more violent than the Encyclopaedia. The most alarming aspect of the Encyclopaedia was that it was moved by an enormous force, that of technical encyclopaedism—a force that had been granted by powerful and enlightened protectors. This force existed on its own, because it

responded to need even more than to political or financial reforms. It was a positive and creative force that managed to bring about a remarkable grouping of researchers, writers and correspondents, while giving faith to this team of men who would come together to collaborate even though they were not associated to each other by means of a social or religious community: a great task was to be accomplished. The greatness and novelty of the Encyclopaedia resides in the fundamental character of the plates of diagrams and machine models which pay homage to the trades and to the irrational knowledge of technical operations. These plates don't play the role of purely disinterested documentation for a public desirous to satisfy its curiosity. Rather, information is presented in a rather complete way in order to present the documentation in a practical and useful way so that an individual who owns the work would be capable of constructing a depicted machine or to advance through invention the state-of-the-art in a particular domain and to pursue research at the point where other researchers left off.

The method and structure of these new teachings are opposite to those which came before: they are rational and doubly universal, and in that respect they are adult. They are rational because they use measurement, calculation, and the processes of geometrical figuration and descriptive analysis. They are also rational because they call upon objective explanations, and invoke the results of experience, taking care to precisely present the conditions, treating the hypothetical as that which is conjectural, and established fact as that which must be considered as such. Not only is scientific explanation required, it is required with a distinct taste for the scientific spirit. On the other hand, this style of teaching is doubly universal because of the public to whom it is addressed and the information it provides. Even though it is higher-level knowledge that is being taught, it is meant for everyone; only the purchase price limits the number of possible buyers. This knowledge is provided in the spirit of the highest possible universality according to a circular schema that is based on a technical process that can never be closed in upon itself within the secret of its specialty, but which is related to others using a variety of analogous tools which rely on a small number of principles. For the first time, we see a technical universe coming into existence, a cosmos where everything is linked to everything else instead of being jealously guarded by a corporation. This consistent and objective universality which presupposes an internal resonance with this

technical world, requires that the work be open to everyone in order to constitute a material and intellectual universality, a block of technical knowledge that is available and open. This style of education takes for granted an adult subject capable of self direction and able to establish his own norms without someone to direct him: the autodidact is by necessity an adult. A society of autodidacts cannot accept tutelage or to be taken for a minor in spirit because this kind of society aspires to drive and manage itself. It is principally in this sense and through its technological power that the Encyclopaedia brings forth a new force and a new social dynamic; it's the causal circularity of encyclopaedic knowledge that rejects the moral and political heteronomy of Ancien Regime society. The technical world becomes aware of its independence when it realizes its unity; the Encyclopaedia is like a celebration of the Federation of Technics that discovers for the first time a solidarity amongst themselves.

Section III. Common Nature of the Minor and Major Technics. Meaning of Encyclopaedism.

We will attempt to analyze the relation between the encyclopaedic spirit and the technical object because it appears to be one of the poles of any technological conscience. On top of its historical meaning it also possesses a valid sense towards the knowing of technicity. We have always opposed the implicit spiritual and magical nature of technical education aimed at the child. It runs counter to the spirit of the Encyclopaedia but this opposition risks hiding a deep analogy within the existent dynamisms in the structurations of technical knowledge. Encyclopaedism brings out and propagates an inversion of the fundamental dynamisms of technics; nevertheless, this inversion is only possible because these operations are not shattered but displaced or turned back in some way. The Encyclopaedia manipulates and transfers forces and powers; it also casts a spell and traces a circle like a magical circle, only it doesn't do it in the same way as the trial associated with instinctual knowledge and it is not the same reality that it places within the circle of knowledge. It is human society with its forces and its dark powers which is placed within the circle which has now become immense and all-inclusive. The circle is the objective reality of

the book that represents and constitutes it. Everything that appears in the encyclopaedic book is within the power of the individual who possesses this representational symbol of all human activities in their most secret detail. The Encyclopaedia creates a universality of initiation and thus shatters the meaning of initiation itself. The secret of the universal rendered objective keeps a positive sense of the notion of secret (perfection of knowledge, familiarity with the sacred), and annihilates its negative character (obscurity, a means of exclusion through mystery, knowledge reserved for a small number of men). Technics becomes an exoteric mystery. (1) The Encyclopaedia is a vault, but a more efficient one on account of its being constructed from a more precise, more exact, more objective representation of its model. All the active springs, all the living forces of human operations are assembled here in this object-symbol. Every individual capable of reading and of understanding possesses the vault of the world and of society. As if by magic, everyone becomes the master of everything because they possess the vault of everything. The cosmos (that once upon a time enveloped everything and was superior to the individual) and the constraining social circle (that was always eccentric with regards to individual power) are now in the hands of the individual like the orb representing the world that emperors carried as a sign of sovereignty. Power, the safety of the reader of the Encyclopaedia is the same as that of the man that attacks an effigy of an animal prior to taking it on in nature, or of the primitive farmer who entrusts seeds to the earth after having accomplished propitiatory rites, or of the traveler who does not venture abroad to a new land except only after having rendered favourable his journey through some kind of rite establishing a communion and a pre-possession of memory which is preserved in the Odyssey (2). This rite of initiation is the union to a still hostile reality which remains so until it has been dominated and possessed. It's for this reason that all initiations render one more virile and more adult.

Every manifestation of the encyclopaedic spirit can therefore appear, within a psycho-sociological scope, as a background movement within a society

that expresses the need to attain a state of adulthood and freedom because the regime or habits of thought perpetuate an artificial state of tutelage and minority in individuals. The will towards the passage from a state of minority to that of adulthood by widening the circle of knowledge and the liberation of the power of knowing has taken place three times in the history of thought since the Middle Ages. The first manifestation of the encyclopaedic spirit constitutes the Renaissance and is contemporary with the ethical and religious revolution of the Reformation. The desire to go from the Vulgate to actual Biblical texts, to seek out the Greek texts instead of a complacency with bad Latin translations, or to find Plato once again beyond the scholastic tradition crystallized as fixed dogma is to refuse the arbitrary limitation of thought and knowledge. Erudition represents not the return to the past as the past, but the will to widen the circle of knowledge, to recover once again the entirety of human thought in order to free oneself from the limitations of knowledge.

The humanism of the Renaissance was never the will towards finding a fixed image of man in order to restrain and normalize knowledge as the decadence in classical studies would have us believe nowadays. Humanism responds first and foremost to the encyclopaedic drive, but this drive turned towards an already formalized knowledge because the level of development of technics was not high enough to allow the intervention of a rapid formalization in this domain. The sciences in particular were not developed enough and the intellectual means towards the technics of universalization were not ready so it is only with the 17th century that the means for the universalization of the technics come about which the Encyclopaedia set afoot. However, we must underline that, since the Renaissance, a great deal of goodwill towards technics has been manifested—already it is valued as a paradigm and as a means of expression (1), if anything for the human value in opening new pathways. Rabelais's magnificent praise of the Pantagruel tales summarizes the hope of Renaissance man—their complete belief in the virtue of technics—thanks to which humanity will perhaps be able to go one day to the “celestial signs” in the same way that it figured out how to go from the Old World to the New.

The second encyclopaedic stage is that of the Enlightenment. Scientific thought had found its freedom but technical thought was still not free;

scientific thought liberated technical thought. In the same way that technics touches commerce, agriculture, and industry as aspects of society, technological encyclopaedism could not but be a correlate of social and administrative reforms. Institutions such as the Grandes Écoles merge as a result of the encyclopaedic spirit. Encyclopaedism is by definition polytechnical, under the auspices of industry, in the same way that it is physiocratic in accordance with its agricultural nature. The industrial aspect developed much more than its physiocratic aspect. This is because encyclopaedic rationalization permitted more sensible transformations within the industrial domain that had benefited from the recent scientific discoveries of the end of the 18th century. Meanwhile, this asymmetrical development cannot allow us to forget one of the more important components of the spirit of technical encyclopaedism, i.e. the direct relation of the individual to its biological nature, to the vegetal and animal world. Rather than being legated to the descendents of ancient serfs, the techniques of the plowman's art are valued by even the most distinguished of individuals. It's the era of the "bergeries" or hobby sheep farms, a time when even a solid soul such as Daubenton has no problems writing a treaty for the use of shepherds which is the prototype for the advanced and open-handed popularizing book that gathers the ancient tradition of didactic works and gives it new life with a clear and graphic symbolism almost understandable by the illiterate. The etchings are the essence of this beautiful book and they are as clean and expressive as those of the Encyclopaedia. We should note that, in fact, technology requires a means of expression other than oral expression which uses already known concepts and is capable of transmitting emotions, but deals with difficulty with the expression of patterns of movement or precise material structures. The appropriate symbolism for technical processes is visual symbolism with its rich play of forms and proportions. The civilization of the word gives up its place to that of the image. Thus, the civilization of the word is by nature even more exclusive than that of the image since the image is by nature universal, one does not require a pre-established code of meanings. All verbal expression tends to become initiative. It always ends up as a specialized coded language where ancient corporate jargons are a clear example. One must be a member of a closed group in order to understand its oral or written language whereas one only needs to perceive in order to understand diagrammatic expression. It's only with the diagram that technical encyclopaedism draws together all its meaning and its power

of dissemination and becomes truly universal. Printing had given birth to the first encyclopaedism by distributing texts but this encyclopaedism could only arrive at emotional or reflexive meanings already sanctioned by established culture. By being word-based, the information travelling from person to person takes a detour through the social institution of language. The printed word, as spokesperson for the visual, primarily conveys an oral message with all the inherent limitations to this mode of expression—the command of all living and ancient languages is required to exercise the intelligence of encyclopaedic verbal meaning. This command, or at least the effort towards this command, is part of the meaning of the Renaissance. And in spite of its remaining within the domain of humanists and the learned, culture does not enjoy a direct universality through oral or written language. Perhaps, it is for this reason that the Renaissance was unable to produce a technological universality even though it tended to prefer plastic and graphic expression to all other symbolisms, particularly within the arts. As disseminator of the spatial scheme, printing comes into its own through etching. Thus, symbolic etching, used as a means for clearly translating the thinking of structures and processes and freed from all will towards allegorical expression that seeks to return to oral expression (such as talking coat of arms), appears fully developed in 17th century treatises by Descartes. Lending its expressive force and its power for precision to the service of geometry, symbolic etching is ready to constitute the requisite symbolism for a universal technology.

At last, a third instance of encyclopaedic thought appears to be announcing itself during our era but has not yet managed to constitute a universal mode of expression. The civilization of oral symbolism has once again won over that of spatial or visual symbolism because the new means of disseminating information have given primacy to oral expression. When information is converted into a printed object and then transported, the delay which separates the discovery of an idea from its expression is the same for written information as it is for figurative information. To a certain extent, printing privileges figurative information since out of necessity it uses the spatial form. The diagram does not need to be translated into a form other than its original form, whereas writing represents the translation of a series into a spatialized series, that was originally temporal,

and which must then be reconverted through reading. On the other hand, with information transmitted by telephone, telegraph, or Hertzian radio broadcasting, the means of transmission requires the translation of a spatial scheme into a temporal series that is then reconverted into a spatial scheme. Radio broadcasting specifically is particularly fitting to oral expression and cannot be adapted but with great difficulty to the transmission of a spatial scheme as it preserves the primacy of sound. Spatial information is thus relegated to the domain of costly or scarce objects, always arriving second with respect to oral information, which is valued because it rides on the coattails of vital becoming (1). Thus, a civilization is guided by a hidden paradigm at the level of the information it values. This paradigm has become oral once again: thought presents itself according to verbal semanthemes on the order of the slogan and the active presence within interpersonal relationships is on the order of the verb. Cinema and television do indeed exist, however, we must note that cinematography, because of the dynamism of its images, is a dramatic or cinematic activity more than a grapheme of simultaneity and not a direct expression of intelligible and stable form. Even though television was invented after the cinema, from its first transmission trials, cinema totally eclipsed television and imposed on it the dynamism of images. This has placed an enormous load on television, making it into a competitor and imitator of cinematography, incapable of discovering its own innate mode of expression and indentured to the public as a means of pleasure. The cinematographic movement is suffused with a hypnotic rhythm that saps the reflexive faculties of the individual and puts him into a state of aesthetic involvement. Organized according to a temporal series that uses visual terms, the cinema is an art and a means of expression for emotion. The image is there as a word or phrase and not as an object containing a structure to be analyzed by the individual; it rarely becomes a motionless and radiant symbol. Moreover, television could become a means of information co-temporal with human activity, something cinema is unable of doing because being a fixed and recorded thing, it places in the past everything it incorporates. But since television wants to be dynamic, it sees itself as having to transform all the points of each image into a temporal series, or a time intervals as short as

the projection of one static frame in cinema. It thus transforms the dynamic into the static thanks to a prior breakdown into frames. Then, during the transmission of each frame, it transforms the simultaneous points of the static image into a temporal series that in the end transforms itself into an immobile spatial tableau where the rapid succession of these images creates an analysis of movement as in cinematography as a result of movement perception. This double transformation gets to the need of transmitting enormous quantities information, even for extremely simple image in its intelligible structure. Here, there is no shared measure between a quantity of information that is interesting and meaningful for the subject, and a quantity of information technically used, corresponding to several million signals per second. Television's squandering of information prevents it from providing the individual with a flexible and faithful means of expression and hampers the emergence of a truly universal visual symbolism; radio broadcasting overcomes borders, whereas visual information often remains linked to the communal life of groups; under these conditions it cannot be valued. But research on coding systems useful for inscribing the results of calculating machines on a cathodic oscilloscope screen, or to present on the same type of screen electromagnetic detection signals (1), would seem to be able to bring on great simplification through Hertzian means diagramatized images; thus, in relation to voice radio broadcasting, visual information would find once again find a place that it lost to radio broadcasting and would enable it to give birth to a new universal symbolism.

The intentions of encyclopaedism begin to manifest themselves within science and technics through the tendency towards the rationalization of the machine and the institution of a shared symbolism between man and machine. Thanks to this symbolism, a synergy between man and machine is possible because a joint activity requires a means of communication. And since man cannot **entertain** various types of thought (all translation corresponds to a loss of information), it is in this mix of human to machine relations that a new universal symbolism

must emerge in order to be aligned with a universal encyclopaedism.

Cybernetic thought has already produced research within information theory, such as human engineering, that specifically studies the relationship between man and machine; we can also conceive of a technology-based encyclopaedism.

Like the two that came before it, the new encyclopaedism must find its own means to liberate itself, but in a different way—it cannot be a repetition of the Enlightenment. In the 16th century, man was indentured to intellectual stereotypes; in the 18th century, he was bound by the hierarchical aspects of social rigidity; and in the 20th he is unwittingly a slave to his dependence on unknown and distant powers which control him and render him unable to rebel against them; the isolation enslaves him and the lack of consistent information alienates him. Having become machine in a mechanized world, he cannot find his freedom except by taking on his role and going beyond it through an understanding of technical functions thought out under the aspect of universality. All encyclopaedism is humanism, if we understand by humanism the will to bring to a estate of freedom that which has been alienated from human beings, so that nothing of the human shall be a stranger to man. But this rediscovery of human reality can work itself out in different ways: each era re-creates a humanism which is always in some way appropriate to the circumstances since it always targets the most egregious aspects of the alienation brought on or produced by civilization.

The Renaissance defined a humanism willing to compensate for the alienation resulting from intellectual and ethical dogmatism—it sought to find once again the freedom of theoretical intellectual thought. The 18th-century sought to find meaning to the effort of human thought as applied to technics, and found with the idea of progress the nobility of creative continuity which is found within invention. It defines the right of technical initiative to exist in spite of the inhibiting forces of societies. The 20th century seeks a humanism capable of compensating for the alienation which intervenes within the development of technics as a result of specialization that society demands and produces. There appears to exist a singular law to the becoming of

human thought, according to which all ethical, technical and scientific invention, which is first and foremost a means for the liberation and the rediscovery of man, but becomes through historical evolution an instrument which turns against its own ends and limits man by enslaving him—in its beginnings, Christianity was a liberating force, encouraging men to go beyond the formalism of customs and the codified prestige of ancient society.

That was the rationale that created the Sabbath for man, and not the other way around; nonetheless, it's the same brand of Christianity that reformers of the Renaissance accused of rigidity, linked to a formalism and a restrictive dogmatism that runs counter to the real and deep sense of human life: the Renaissance opposed Physis to Anti-Physis. In the same way, the technical, invoked as liberating progress during the Enlightenment, is today accused of indenturing man and of reducing him to a slave by altering his nature and alienating him from his self through specialization which is a barrier and a source of misunderstanding. The center of convergence has become the principle of enclosure. For that reason, humanism can never be a doctrine nor even an attitude that can define itself once and for all: every period must discover its humanism by taking aim at its principal danger, alienation. In the Renaissance, the narrow-mindedness of dogma engendered the birth of a new fervour and a new élan.

In the 18th century, the infinite fragmentation of social hierarchy and closed communities pushed towards the discovery of universal and non-mediated means of efficiency by way of the rationalization and universalization of the technical gesture that bypassed all the barriers and prohibitions that tradition had instituted. In the 20th century, it is no longer the hierarchical or local breakdown of society that creates alienation between men in human society, but rather its dynamic, limitless, vertiginous immensity. The human world of technical activity has become alien to the individual once again through its development and its formalism, and by setting under the guises of a machinism that has become a new bond between the individual and the industrial world which surpasses the conceptual imagination and scope of the individual. The liberating technics

in 18th century is at the human scale because it is artisanal whereas that of the 20th century is beyond the scope of the individual and constitutes within the industrial world a human reality that is compact and resistant yet alienated, as well as entirely beyond the reach of the individual as it once was in hierarchical societies.

What man needs now is not a universalizing freedom, but mediation. The new magic is not to be found within the individual's sphere of influence of his actions (his confidence bolstered by the knowledge that gives action the efficacy of certitude) but in the rationalization of the forces that situate man by giving him meaning within the human and natural ensemble. Treating teleology as a knowable mechanism and not as an indeterminable mystery demonstrates man's intention to not accept a situation as simply lived or experienced. Instead of searching for a process to fabricate objects without making a pact with matter, man frees himself from his enslavement to the finality of everything by learning how to create finality or organize a final whole which he can judge and appreciate so as to not be passively subjected to integration. Cybernetics, the theory of information and consequently the theory of finalized structures and dynamisms, liberates man from the constraining closure of organization by rendering him capable of judging this organization, rather than tolerating it by venerating it and respecting it, because he is incapable of imagining it or constituting it. Just as he did in the 18th century when he subjugated the unfortunate need to work by rationalizing it instead of suffering and resigning himself to render work more efficient, man outdoes enslavement by consciously organizing finality. Human society, aware of its own teleological mechanisms, is the result of conscious human thought, and consequently incorporates those who constitute it. Human society is also a product of an organizing human effort and creates the equation between the fact of being situated and of situating itself. The place of man within a society then becomes a relation between the element of activity and the element of passivity like a mixed status caught between redoing and perfection because it is of what is human, interrupted but not alienated. The conscience

is simultaneously demiurgic and the result of an anterior organization; social reality is contemporaneous with human effort and homogeneous with respect to that effort. Only a scheme of simultaneity, a constellation of forces represented within their relational power, could prove adequate for this type of reality—its development postulates a similar dynamic representation of man within society. Cybernetic schemes can only find their universal sense in a society already constituted in a manner that conforms with this thinking and the ability to react that is most difficult to gauge is a society's relation to cybernetic thought; it can only be created progressively through intermediary means of information that already there, such as the exchanges between technics working synergistically on a given point. Norbert Wiener, a mathematician-teacher within a technological institute, mentions this type of grouping as a source of this new technology which is a technics of technics, at the beginning of his book published in 1948 entitled *Cybernetics* which is a new *Discourse on Method*. *Cybernetics* gives man a new type of majority—one that penetrates within its relations to authority by dispersing itself within the social body and there it finds beyond the maturity of reason, a type of reflection that on top of allowing the freedom to act, grants the power to create organization while instituting teleology. Likewise, finality and organization being able to be rationally thought and created, since they become matter for technics, they are not the end-all and be-all of reason, capable of justifying everything: if finality becomes a technical object, there is a beyond to finality within ethics. In this sense, cybernetics frees man from the unconditional prestige of the idea of finality. Through technics, man frees himself from social constraint; through information technology, he becomes the creator of the organization of solidarity which at one time imprisoned him. This stage of technical encyclopaedism can only be provisional; it calls that of technical encyclopaedism

that finishes him while giving the individual the possibility of returning to the social while changing status and becomes the object of an organizing construction instead of being except in this of a given that is valued or fought for, but subsisting with its primitive external characteristics to the activity of man. Thus, individual nature is no longer external to human domain. After access to freedom, access to authority manifests itself in the full sense of the term, as creative force.

Such are the three stages of the encyclopaedic spirit, which at first was ethical, then technical, and which could become technological by going beyond the idea of finality taken as ultimate justification.

Hence, one cannot say that the technics of a finalized organization are only useful according to their practical results. They are useful in the sense that they allow finality to pass from the level of magic to the level of technics. While the evocation of a superior end, and the order which realizes this end, is considered to be the last term in a search for justification because life is mistaken for finality, in an era where technical schemes are but schemes of causality, the introduction of thought within technological schemes plays a cathartic role: that where technics is found cannot be its last justification. Individual and social life includes aspects of finalized processes, but finality cannot be the deepest aspect of individual or social life, and neither can the different modalities of finalized action such as adaptation to an environment.

We can say without a doubt that it is not a veritable finality that animates regressive recurring processes of causality—at least this technical production of teleological mechanisms allows to emerge from the magical domain the most inferior and basest aspects of finality: the subordination of all means to an end, hence, the security of the end with respect to means. In becoming technical material, such an organization is nothing more than an aspect of social or individual life and can no longer mask from its prestige the possibilities of development, of becoming, of the emergence of new forms that cannot be justified by finality since they create their own as the last term of evolution: evolution is as much maladaptation as it is adaptation. The reification of adaptation is but one aspect of life; homeostases are partial functions; by compartmentalizing them and allowing not only

to conceive them but to realize them rationally, technology leaves in plain view the open processes of social and individual life. In this sense, technology diminishes alienation.

Section IV. The Need for Synthesis Between the Mode of Majority and the Mode of Minority in Accessing Technics in Education

The separation of adult education and the education of the child with respect to technology corresponds to a difference in the structure between two normative systems, and in part, to a difference between the results. The outcome is that there is still a breach between pedagogical technology and encyclopaedic technology that has not been surmounted.

Encyclopaedic technological education aims to give the adult the feeling that he is an accomplished individual, completely realized, in full possession of his faculties and of his strengths, an image of man as an individual in a true state of maturity—the requisite condition for this feeling is a universality of the right to knowledge. Therefore, there remains something abstract within encyclopaedic education and an intractable defect to universality. In fact, the immaterial gathering of all technical devices into one technological compilation that pulls them together by ordering them according to simultaneity or reason discards the temporal, sequential, quantifiable character of discoveries that have given way to our current situation. In an instant we grasp in actuality what has been progressively constructed and slowly and successively put together. The idea of progress in terms of its mythic content comes from the illusion of cotemporality which takes for a state of being something which is only a stage. Encyclopaedism, excluding historicity, allows man to possess a false entelechy even though this stage is still rich with virtualities. Determinism does not presuppose invention, and if progress is thought of as continuous, it masks the very reality of invention. The autodidact is tempted to bring everything into the present: the past can be incorporate insofar that he can roll it in to present knowledge, and the future insofar that it can be considered part of a continuous flow from the present mediated by progress. What is lacking in the autodidact is to have been brought up, i.e. to have progressively become an adult, through a temporal series of developments structured and capped by crises that allow passage onto other phases.

One would have to have understood the historicity of technical becoming through the historicity of subjective becoming to add to the order of cotemporality that of the successive in terms of time. Requiring temporal universality as well as simultaneous universality, real encyclopaedism must integrate a child's education. It can't become truly universal unless it makes the adult from the child by following temporal universality in order to obtain the universality of simultaneity: one must locate the continuity between the two forms of universality.

Conversely, technological education lacks the universality of simultaneity which is what we mean when we say that it aims at culture more than that knowledge. But any undertaking that would get rid of knowledge in order to have culture would be deluded since the encyclopaedic order of knowledge is part of culture. Hence it cannot be understood but in an abstract manner and consequently in a non-cultural manner if this order is to be understood outside of knowledge. The representation of knowledge without knowledge itself can only be carried out by grasping an external symbol, such as, for example, through the mythic and socialized representation of man that embody knowledge. Knowledge is here replaced by the figure of the wise man, by an element of social topology or of a catalogued characterology that is totally inadequate for knowledge in itself and introduces into culture a mystification which renders it inauthentic. At best, knowledge can be replaced by an opinion, a biography, a character trait, or a description of a wise man's character, but these are still totally inadequate elements since they introduce, not knowledge, but an idolatry of the human underpinnings of knowledge, which is not on the same order as knowledge itself. There is more genuine culture in the gesture of a child that reinvents some technical device than in the text where Châteaubriand describes the frightful genius that was Blaise Pascal. We are closer to invention when we try to understand the geared adding device within Pascal's calculating machine (arithmetical machine) than when we read the most declamatory passages relative to his genius. To understand Pascal would be to make a machine similar to his with our own hands without copying it, by re-creating it, if at all possible, as an electronic summation device; in this way we would reinvent it rather than reproduce it, thereby actualizing Pascal's intellectual and operational schemes.

To cultivate oneself is to analogically actualize real human schemes, but only by hardly bothering with the stir that this invention or that publication might have had on its contemporaries as they are not essential and can only be understood by referring to original thought, to the invention of itself.

We cannot rue the fact that a cultivated high school senior should know Descartes's theory of vortices through Bélière's pretensions or the state of astronomy in the 17th century "through this long lens which scares people" that Chrysale could not endure.

There is a lack of seriousness here, a lack of truthfulness to thought which can in no way be presented as culture. These imaginative recreations of the past could find their place if they could be put in relation to their real source and understood, but not through the pharisaism of a work of art which has ends other than culture. The encyclopaedic order of simultaneity is rejected in cultural education because it does not agree with the opinions of social groups, who never have a representation of the order of simultaneity, because they only represent but a minute fraction of life at a particular time in which they can't even situate themselves. This gap between actual life and culture comes from the alienation of culture, where culture is really only an initiation to the opinions of specific social groups having existed in preceding eras. The primacy of the arts in cultural education comes from the overwhelming power of opinion. A work, and in particular a work that has survived, expresses the ethics of a group or an era in such a way that the group recognizes itself within it. A literary culture is therefore a slave to a group, it is at the level of groups from the past; a literary work is social witnessing. All the outpouring of didactic works is eliminated from culture, unless it is ancient and can be considered as a testimonial for the didactic genre. Nowadays, culture feigns to consider the didactic genre as extinguished, while perhaps never has so much expressive force, so much art, so much human presence, ever been contained within scientific and technical writings. And what is now happening is that culture has become a genre with its own rules and its own fixed norms and has lost its sense of universality.

For something that is totally educational, education lacks in

human dynamism. If we specifically consider the technical portion of education and encyclopaedism, we see that it is a valuable mediator since it incorporates aspects which make it accessible to the child as well as to other aspects that effectively symbolize successive stages of scientific knowledge. The pitfall which brings down cultural education when it wishes to become encyclopaedic is the difficulty of understanding through discursive intellectual symbols the science we wish to understand. On the contrary, technical awareness can provide the scientific knowledge which serves as the guiding principle (shadowed by discursive understanding) under the guise of a dynamic intuition so that even a young child will likely become progressively more enlightened. A true discursive knowledge does not accept gradations: it is either totally right or totally wrong because it is inadequate. Through technics, encyclopaedism can find its place in a child's education without requiring capacities of abstraction which a young child may not have at his command. In this way the acquisition of a technological understanding by the child can trigger an intuitive encyclopaedism that can be grasped through the character of the technical object. The technical object can in fact differentiate itself from the scientific object because the scientific object is an analytic object that aims to analyze a unique effect with all its conditions and its most precise characteristics. On the other hand, the technical object, far from situating itself entirely within the context of a specific science, is in fact the nexus of a multitude of scientific givens and effects arising from the most varied disciplines, integrating what at first appears to be completely disparate knowledge, that might not be intellectually coordinated even though they appear to be so within the functioning of the technical object. We can say that the technical object results from the art of compromise because in fact its structure is synthetic and cannot be understood in any other way than through the introduction of a synthetic schematism which precedes invention. The technical diagram as the relation between a variety of structures and a complex operation that realizes itself through them by nature encyclopaedic since it actualizes the circularity knowledge, a synergy of elements of knowledge still theoretically heterogenous.

Perhaps we should note that until the 20th century, technics were never able to take on the role of relating encyclopaedic work and the culture offered to the child.

Even now it is still not easy to find within technics truly universal operations, which includes the schematism of sensation or thought. Today, the existence of a technics of information gives technology an infinitely larger universality. The theory of information places technology at the center of a very large number of very diverse sciences, such as physiology, logic, aesthetics, phonetics or grammatical studies, and even semantics of language, numerical calculus, geometry, theory of group organization and of regimes of authority, the calculation of probabilities, and all the technics of conveying information whether it be spoken-word, audio or visuals. The theory of information is an intra-scientific technology that permits the systematization of scientific concepts as well as the schematization of various technics. We ought not consider the theory of information as a variety of technics among technics. In reality it is a thinking which mediates between the various technics on the one hand, the various sciences on the other hand, but within sciences and technics. It can play this role because links exist between the sciences which are not only theoretical (yet instrumental) and technical—where each science is able to take into its service a certain number of other sciences which it can use as technical sources in order to realize the effect which it is studying. A technical relationship between sciences exists. Furthermore, technics can theorize itself as a form of science and the theory of information can intervene in the science of technics as well as the technics of sciences, establishing a state of reciprocity between these functions of exchange.

It's at this level, and only at this level, that encyclopaedism and technical education are able to meet within the coherence of the two orders of universality, simultaneity and successiveness.

We can therefore say that if to this day, technics has only been able to provide two difficultly reconcilable dynamisms, i.e. one addressed at adults and the other one at children, this antagonism creates within the theory of information a mediating discipline which sets up a continuity between specialization and encyclopaedism within the education of the child and of the adult. There we can find a reflexive technology founded on top of different technics which define thought and create a relation between sciences and technics.

The implications of this reflexive union of technics coupled with the end of the rivalry between theoretical knowledge and practical knowledge

are considerable towards the reflexive conception of man. Once this level is attained, there is no gap or rivalry between the period of education and adulthood. Succession as order and simultaneity as order organize themselves under a relationship of reciprocity, and adult time is not antagonistic to that of education. To a certain extent, the evolution of societies, up to now suspended to the determinism of youth, then to maturity and then to old age, and its corresponding political and social regimes can no longer be considered as fatal if the penetration of technics is deep enough to introduce the system of references and independent values of this implicit biologism.

A careful analysis of dualities within value systems, such as the ones between the manual and the intellectual, the peasant and the city dweller, the child and the adult, show that at the bottom of these oppositions there is a technical incompatibility between various groups of schematisms. The manual lives according to an intuitive schematism at the level of material objects, and on the other hand, the intellectual conceptualizes sensible qualities and thrives on order that stabilizes successive order according to definitions of the nature and destiny of man. He carries a certain power of conceptualization and of valuation or devaluation of human gestures and values existing at the level of intuition. The manual lives according to the order of simultaneity and is autodidactic when he wishes to accede to culture. It is according to these same differences between schematisms that the country dweller is in opposition to the city dweller. The country dweller is cotemporal with an ensemble of demands and participations that make him an integrated entity within a natural system of existence: his predispositions and his intuitions are the links with this integration. The city dweller is an individualized being, linked to social becoming more than to a natural order. He is in opposition to the country dweller in the same way that an abstract and cultured being is opposed to an integrated and uncultured being. The city dweller is of a time or an era, while the country dweller is of a territory. The first integrates himself within the order of the successive, the second into the order of the simultaneous. We generally note the attachment of the country dweller to traditions but tradition is precisely that aspect which is the most unconscious of historicity that masks the representation of the order of the successive and presupposes the invariability of succession. What is considered to be true traditionalism rests upon a representation of the series of becoming where this becoming vanishes. At last, the opposition between child and adult

perpetuates these antagonisms. The child is the being of succession, created from virtualities, changing with time while being conscious of the changes and alterations. The adult, that life presents to him, integrates himself within society according to the order of simultaneity. Furthermore, this maturity cannot be fully attained except within the measure that society is stable and not evolving too rapidly, without which a society in the process of transformation that privileges successive order, communicates to its adult members a dynamism that makes adolescents out of them.