

THE ROLE OF ARTS AND TECHNOLOGY IN HUMAN DEVELOPMENT

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ABSTRACT

The Role of Arts and Technology In Human Development.

by

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This thesis represents a necessarily incomplete but carefully selected set of examples, observations, thoughts and arguments, focusing on the problems of contemporary civilization as a whole and on the enigma of art education in particular. In our electronic-computer age society, a split has developed and continues to exist, between the social-human and scientific-technological aspects of our experience. This differentiation manifests itself as a dehumanizing force, destroying humanistic values and considerations. The resulting disharmony must be countered to create a desirable equilibrium between spiritual and materialistic values. An analytic technique is developing, called "technology assessment" to regulate and control the growth of technology; and education, especially art education, could provide an ideal framework within which to develop a parallel study of the contribution made by the emergence and growth of technology to the development of man in his individual and social aspects.

Some consideration of the science-technology parameter should be inserted into the traditional liberal arts system to provide a comprehensive and full knowledge of the word of the past, present and future.

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INTRODUCTION.

a) Problem Definition.

Students now attending educational institutions, may still be alive in the 21st century. On the basis of projected trends, that century could be characterized by accelerating social changes originating in, and interacting with, its technological basis. This means that the next generation will be faced ~~even more than our own~~ - with problems in the area where science and technology meet with artistic, spiritual, humanistic and social concerns.

This future holds unpredictable possibilities for the human race and through a study and comprehension of the development of past civilizations we might be able to project the "destiny" of the coming generation.

The man of the present-time has grown up in a society in which scientifically-based technology forms an essential element. This element in the current time-frame has acquired major importance and is emerging as a dominating factor which overshadows the humanistic aspects of our society.

Introducing more technology into education which recently has become aware of the shortcomings of technology, appears to be a contradictory strategy and must be viewed with

skepticism, because as a result of technology, in modern mechanized societies, nonobjective or emotional activities are regarded as unreal in comparison to machines, materials and products.

Thus art as an "unreal" phenomenon becomes a "depressed" area of modern life. The methods and assumptions of technology are applied in considering human affairs in a mechanical way which produces, in the choice between emotional and materialistic criteria, an almost complete rejection of spiritual values. This current undesirable effect of technology creates a dehumanized society, but beside this effect it also provides goods and fulfilling of the wants which it has itself created.

The further intrusion of technology and its supposedly dehumanizing effect into education is one source of anxiety among people concerned with social and educational questions:

... "My question is: why are the engineers the barbarians?"

"I believe that this descriptions is valid, and that the reason for it lies deep in the roots of our scholastic system. At an ever increasing rate, specialization in the field of one's choice begins in the high school.

In many secondary schools, the student may be put into an advanced maths class, or an Honors Science class, with that subject being concentrated. Upon graduation, he is a little more aware of science and a lot less aware of the humanities." 1

Our civilization has achieved a very high degree of scientific and technical refinement. Exploration of the Moon represents in one sense an intellectual maturity. On the other hand, the constant threat of war, social injustice and a spoiled ecology indicate emotional immaturity. This gross psychopathy; - external order, progress and rationalism on one side, against internal chaos, repression and irrationality on the other, are characteristics of our contemporary civilization. It appears that at this moment in time man has the technological knowledge required to end these problems, but is incapable of utilizing that knowledge by exploiting the humanizing and eliminating the dehumanizing effects of mechanization. Technology seems to have become an overpowering force in our lives and it is open to debate whether we are in a situation to dominate technology or merely to coexist, or even worse, to be dominated by it.

However, technology can be a very powerful tool or ally, to be put to productive use, as long as the proper safeguards are observed.

The history of the development of technique* and technology** in essence is the history of civilization. In the course of history, man gradually liberated himself from the restrictions of human muscle as a prime unit of power. Technique and technology provided extra available time and energy to mankind and

*The word "technique" is used to refer to the early stage of the development of technology without machine-generated power, i.e. steam, combustion engines, electricity or nuclear power.
 **"Technology" includes power-tools, mechanization and electronics.

it is both a bonus and a loss in human terms.

In the hands of people who use it, technology has the effect of increasing the technologists' or specialists' power for both constructive and destructive ends. Thus technology can be given a humanizing role in human affairs, by freeing man from backbreaking labour and drudgery, - but only when the time and energy thereby saved is invested in the improvement of human relationships and productivity.

Using the resources of technology to wage wars and upset the ecological equilibrium of the environment for the benefit and profit of a small minority group, for example, would be playing indeed an obviously destructive and dehumanizing role.

b) Objectives.

Humanizing technology to serve human needs is a prime issue which must become of immediate concern to all segments of society. The writer of this thesis intends to make a contribution towards the recognition and identification of problems arising from the development of technology and its effects on human conceptions. A special effort will be given to find relevant connections and references between the progress of technology and educational phenomena.

c) Methodology:

The topic envisaged is so broad and intricate that to give a full account of it in a paper of limited compass is impossible.

Only a selective survey has been attempted, and the aim has been limited to presenting certain representative examples. Limiting and selecting the material as it approaches the present day presented a difficult task because of the historical or rather systematic method of compilation and the tremendous amount of available information.

A study in depth of the history of the socio-economic development of our civilization, in terms of the contribution made by technology to that development, with profound side-effects on the psyche and emotional formation of contemporary man, might provide interesting data towards the definition of a solution. Artistic creativity and self-expression as a part of any educational process is a form of communication which offers one of the few remaining opportunities for a re-humanization of society, on a collective as well as an individual basis. It could serve as a corrective to the tendency to mechanize and reify people implicit in the present educational system which produces, in the extreme case, an end-product definable as a highly-skilled professional barbarian.

This thesis represents a working hypothesis. The initial definition of an aesthetic and philosophical standpoint involved countless modifications, and the outcome of this research and investigation has been summarized in the later chapters. The hypothesis is still being re-worked, and is subject to further refinement in the light of subsequent experience and

findings. Every statement, no matter how fully documented, is subject to second thoughts and remains a matter of subjective truth only as long as there is nobody to question it. In my opinion, there are no "plain facts" in the history of civilization or in the history of anything else, for that matter; only degrees of plausibility. Therefore, the present exposition of a personal view necessarily contains conceptual "building blocks" where I was prevented by the limitations of this paper from searching for a more plausible interpretation of the evidence. These are indispensable and I would like to emphasize that their formulation is merely provisional and so structured as to provide consistency and connections between thoughts and hypotheses. Any apparent tendency to over-generalization is enforced by the range and breadth of the topic under examination.

CHAPTER I.

OVERVIEW:

A.) The Problems of Contemporary Society.

Perhaps the next step in the development of our civilization will be to re-establish an ethic which deals as much with the relation of man to his environment as with the relation of man to man. Perhaps we must teach everyone that survival, much less fulfillment, is a function of harmony with the environment. I.2.
William H. Hunt

In our present state of evolution there is an undercurrent of belief that an advanced civilization would be a technological one. However, my opinion is that in order to survive and reach an "advanced" level, our contemporary civilization must outgrow the present adolescent machine-freak state and evolve to a new reacceptance of nature, with the proper use of humanized technology.

In an aphorism, Francis Bacon projected the thought: "Natura non nisi parendo vincitur". (Nature can be conquered only by obeying her).

We must conduct a series of fundamental shifts in behavioral patterns. The exaggerated drive for the production and consumption of material goods must change to the preference of services, such as recreation and education.

"The overall objective should be to educate the whole man, to inspire him to mobilize and develop his potentials and talents..." I.3

The role of the art educator in such a case is especially important; he is in a key position to influence future developments and shifts in behavioural patterns. Modern society regards the educational system as a caretaker of culture and the social agency responsible for the quality of the future generation. It is obvious that human beings and their educational pattern remained in control of technology up to a certain point in time. Technology itself at present, however, has taken over the mastery and as a consequence, technology now determines the course taken by humans and by the educational process.

When doubts arise about the competency or reliability of the educational system as a custodian of culture, it is necessary to reexamine the basic principles and create a new relationship between the spiritual and material world.

Any failure to achieve a new equilibrium by a general overhaul of behavioural patterns would be fatal to our civilization, but as a hopeful sign, in the past few years we have witnessed a promising evolution of concern and response to this issue.

At the International Meeting of Scientists and Astronomers (Armenia, Sept. 1971)^{1.5} the members agreed on the length of time that a race could survive as a technological society. Pessimists in the group estimated that a civilization might survive as little as 40 or 50 years after it developed the capacity to transmit radio messages; it would soon destroy itself in a nuclear holocaust or pollute itself to death.*

*Among the participants were: S. Miller -U. of Chicago, H. Urey, a Nobel Laureate, S. Fox -U. of Florida, Juan Oro - U. of Houston, C. Sagan - Berkeley, Su-Shu Huang - NASA.

Following the latest enquiries and developments of this subject, it is indeed a fact, that there is a new and wide consensus among informed scientists as well as the lay public; that if our civilization is to survive, its expansionist behaviour and rapacious technology have to be brought under control.

According to Arnold Toynbee, it is a matter of life and death to make society work properly, and the further development of technology can wait. Homo Sapiens, as he boastfully called himself, survived with Lower Palaeolithic equipment for the first half-million or million years of his existence. Our technological advances during the last 30,000 years did not originate in any real human need, and can no longer be afforded. We are still dangerously incompetent and irresponsible in our social relations with each other.

Furthermore Toynbee suggests that the unevenness of our endowment is a calamity for mankind because ...

"Man's happiness and even his survival, depend on his being the social success that he has signally failed to be so far, whereas his astonishing technological prowess is a superfluity and a snare."

... "The extremeness of man's social incompetence is brought out by its contrast with his technological brilliance." .I.6

In his essay Toynbee challenges the traditional concept of continuous growth and warns that "... there can be no serious person today willing to concede the possibility, or indeed the desirability of our accommodating the pressures arising from such growth. For should we attempt to do so, the con-

sequences will be the disruption of ecosystems, the failure of food supplies, the exhaustion of resources, and the collapse of society." I.6

Another group of prominent scientists associated with the Club of Rome are probing the facts about the impact of technology on the progress of our civilization. Britain's representative, Alexander King (Director General for Scientific Affairs of the Office for Economic Cooperation and Development), in cooperation with Aurelio Peccei (Italian economist) and M.I.T. Computer expert, Dennis Meadows are studying the most basic issue of all - survival. Their findings are being studied by the Potomac Associates in Washington, D.C., and their predictions and projections concerning possible developments will be published in the near future.

The question King - Peccei and Meadows would like to answer is: How long can population and industrialization continue to grow on this finite planet?

The answer is computed by using M.I.T.'s Professor Jay Forrester's model of the totality of major ecological forces. Using this model Meadows fed the M.I.T.'s computer with a collection of data in the following categories:

- expert opinions
- empirical facts
- the world's known resources
- population growth rates
- incidence of pollution, etc.

The analysis concludes that the depletion of nonrenewable resources will result in the end of our contemporary civilization.

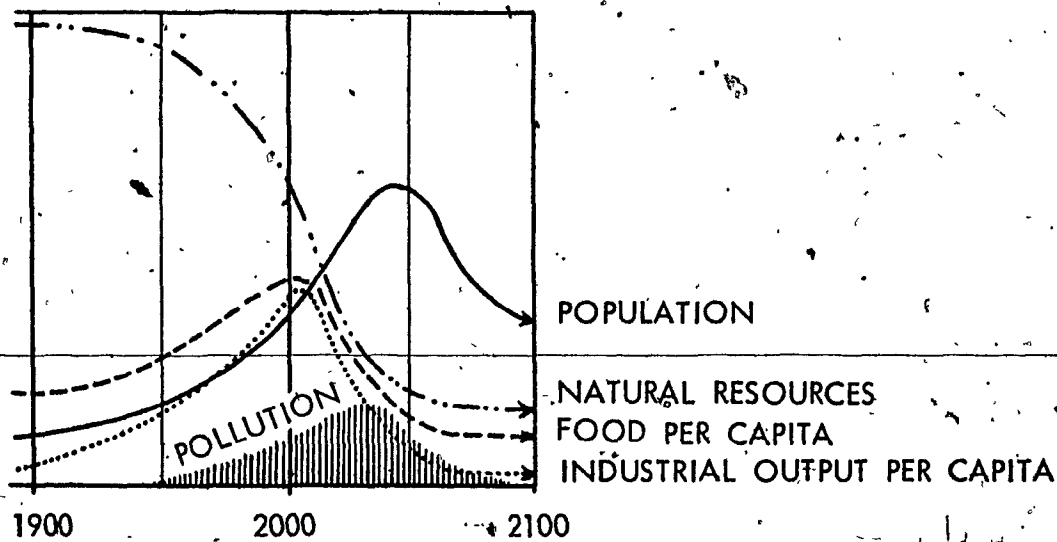


Fig. 1.

Computer Output Chart in "The Limits of Growth" Report.

B.) Theories Concerning the Future.

The foregoing evidence suggests that the problem of contemporary civilization - the gap between humanistic and materialistic values - must be eliminated before this problem can be seriously approached. It would be suicidal for us to overlook these warnings, in the way that Henry Adams' statement was ignored in 1905. Over half a century later, we can comprehend the accuracy of his prediction: --

"At the present rate of progression since 1600, it will not need another century or half century to tip thought upside down. Law in that case would disappear as theory or a priori principle and give place to force. Morality would become police. Explosives would reach cosmic violence. Disintegration would overcome integration." I.7

Warnings and predictions by prominent thinkers, underlining the evidence of objective data, statistics and even computer chart in "The Limits of Growth" Report, are signs that the seriousness of the situation has been established, and the implication foreseen.

During a seminar on the powers of technology (SGWU, June 10, 1973) Alvin Toffler, futurologist and author of "Future Shock" claimed that if no attention is given to alternatives to the present political system, then "we will be in very deep trouble." "I am not persuaded doomsday is upon us", he said in reply to a questioner about the future of our civilization. He considered that man now is living through an enormous upheaval which will take him upwards to a new level unlike any-

thing known in the past.

Another participant in the seminar, M. Kransberg said that "A new political instrument called "technology assessment", now being developed, offers citizens a chance to control and direct the products of science." He saw hope in the new study of technology assessment. In the past, he said, "Technology was assessed either in profit or military terms. Now there is a realization that social and human effects of technology must also be evaluated before it is applied. If we want to control our destiny, we must also control technology."

More optimistically Sir Julian Huxley suggests that:

"The human species has many grave problems before it; but it has a great deal of time in which to work them out." I.8

(There may be some comfort in that thought!) Huxley also wrote, concerning the psycho-social evolution of man:

"...Man is very young and human development is in an explosive and very early phase... He has every prospect of an equal or even greater span of psycho-social evolution before him." I.8

To dramatize further the question of survival, the following quotes are fitting examples:

- Malthus: "The world's population will multiply more rapidly than the available food supply."
- Darwin: "Only the fittest will survive."
- Marx: "The workers who produce things are the fittest because they are the only ones who know to produce physically and therefore they ought to be the ones."

to survive."

- Fuller: "Technology providing more and more goods from fewer and fewer resources could guarantee that all men would survive."

What Fuller is saying is that if we can do more with less resources, we can accommodate all of the people at a much higher level than mere survival and we really have to try to ephemeralize as much as we can, i.e. to do more with less to accomplish these ends.

To illustrate Fuller's concept of parsimony, also how technology could be applied in a new approach to serve human needs, the following examples are presented:

- The Biosphere in Montreal's St. Helen Island weights about one fiftieth of a conventionally built free-span space of like volume.
- One communication satellite using a few pounds of copper more than replaces a submarine cable using tens of thousands of tons of this already relatively scarce metal.

As a summary of this chapter, it can be concluded that:

- The coming era of civilization will certainly be a technological one.
- A gap exists between the spiritual and materialistic concepts of modern society.
- The survival of humanity is a very real question.
- Failure to achieve a new equilibrium by general overhaul of

behavioural patterns of the society would be fatal to our civilization.

- "Technology assessment", - a political instrument - could regulate technology to serve human needs and desires.

It is a universal desire among humans in all ages to change living conditions for the better. Many thinkers have left us written descriptions of ideal states or countries referred to us as "utopian". Utopia, of course, is necessarily a purely imaginary society, - perfect in its living conditions for all its inhabitants. Anatole France wrote: "Without Utopians of other times, men would still live in caves, miserable and naked... Utopia is the principle of all progress, and essay into a better future."

Some writers have thought that the ideal State would be brought into being through political development. Others have found inspiration in religion. Still others put their trust in education. Lewis Mumford wrote in "The Story of Utopias": "The genuine alternative for most of us is that between an aimless utopia of escape and a positive utopia of reconstruction." I.9

In the present study, I have sketched out a personal view of Utopia, in the sense of planned system intended for the betterment of man's physical, social-spiritual, and phisic existence.

The concepts of "Technology", "Humanization" and "Education"

have been briefly mentioned and defined. In subsequent chapters, these ideas will be more closely examined and elaborated as components in a method of advancing human development along lines of personal integration and self-fulfillment. This vision is not necessarily Utopian.

CHAPTER II.

THE EVOLUTION FROM HANDICRAFT TO COMPUTER.

A) Overview.

Our history proves, as will be illustrated in the following pages with some examples, that a physiological drive for aesthetic expression is an inherited drive and characteristic of our human nature. It is not a learned skill which was invented by geniuses and spread by a talented group of teachers. The evidence of archaeology and history is that every known human grouping has developed some form of artistic activity. In fact we have knowledge of several vanished civilizations only through the survival of some remains of their artistic objects. Searching further back into remoter ages, we have nothing else but some remains and traces of artistic activity of pre-historic man. (An outstanding example is the art of the cave-paintings of Altamira, N. Spain.)

What we know about these long-departed ancestors in their way of existence, struggles, daily occupations, communications, customs or superstitions, has been reflected by their art, on such materials as bone, stone or clay.

Knowing that the men of pre-history, and the tribesmen of primitive cultures that have survived into the present age, devoted considerable effort and energy to the creation of art, we have to conclude that there must be a very important human need motivating this activity.

Why did they add this burden to the many difficulties of their precarious life? Why this expenditure of energies and material resources? My answer to these questions will be drawn from my interpretation of the nature and purpose of a variety of human artifacts from primitive times.

The field of inquiry is limited by the shortage of examples. However, archaeological research is far from complete. Who knows what kind of new discoveries are going to be made in the future?

Up to the present time relatively few objects have been discovered in comparison with the vast number that must have been created over the millenia of man's existence. This situation is somewhat similar to the contemporary scene of primitive art. Whole tribes are being wiped out by the encroachment of a machine-dominated civilization. Their traditional way of life, and precious art products are dwindling under the pressure of modern technology.

Even if we accept that it is impossible to have a complete and final answer in explaining the psychological drive for aesthetic expression implicit in human nature in primitive or developed cultures; - these art-objects of pre-civilized men will reveal a fragment of the mystery. They can tell us something, each from a different perspective. Thus we may be able to understand more about the nature of art itself and the development of technology from handicraft to computer. With this knowledge we may be able to exploit fully the

humanizing effects of technology in the field of social development and especially in education.

B) Homo Sapiens as Homo Faber.

I suggest that we learn a new approach to history in order to understand and appreciate the prevailing forces in modern civilizations. I suggest a re-evaluation of history, to re-discover a vast storehouse of information and heritage of permanent relevance and value.

To put a date on what was the beginning of mechanization has been a difficult task for archeologists and historians.

The immediate ancestors of man acquired the ability to maintain an upright posture and this evolution freed the hands to make and manipulate tools. This evolution required millions of years, but this step in evolution gave mankind the power to re-model the natural environment. The use of tools meant that man now was able to make fire, construct shelters, fabricate clothes, and thus free himself from the limitations of nature. If we define Homo Sapiens as a tool-making animal, the starting point of his history coincides with the emergence of the first artifacts.

The progress of human development is a result of the discoveries of new tools and new materials for tool-making, therefore the stages of technical developments are periods of the history of mankind, - periods initiated by new techniques and new discoveries.

The Stone Age, the Bronze-Age, the Iron Age and the Steel Age, are not chronological periods of history; they overlap each other and are extremely complex stages in the evolution of technique with irregular boundaries in the span of mere chronological time.

C) Discovery of Sense of Form-In-Itself.

In the development of the Arts the discovery of form-in-itself as something separate from an object, represents a tremendous intellectual leap forward. It elevated man from the environment and created all kind of symbol systems designed to assist in the psychic control of the world about him. It resulted in such symbol systems as tools, technologies, media, languages. These systems operate according to aesthetic laws and basis of these laws are: consistency, coherence and economy, according to Herbert Read.

Read adds his opinion that the development from ape to man was gradual, extending over hundreds of thousands of years and that the stimulus for the change was in consciousness, in the discovery of form.

"The first stages in the development of the axehead were obviously pragmatic - a selection of the stone for size and compactness for striking power consistent with hardness. Once this basic form had been standardized, a process of trial and corrections led to a gradual refinement."

"Then began the final and most significant stage of formal evolution: The axe was divorced from its utilitarian function and further refined to serve as a ritual and ceremonial object. Form, having divorced from function was free

to develop according to new principles or laws - those laws and principles which we now call aesthetic." II.10

D) Analysis of Some Anepigraphic Relics.

The findings of anepigraphic archaeology (the science of unwritten documents) are very valuable, because art objects provide very important documentation both for chronology and for the history of civilization. Art objects embody a high level of the technical and artistic endeavour of pre-historic or ancient man. An analysis of the techniques and purposes they represent could therefore disclose important aesthetic and historical insights.

To examine the relationship of form and decoration, it is sufficient to choose simple examples - the everyday tools of primitive man.

The weapons illustrated below (Fig. 2) are from New Guinea. They are the spears of Asmat head-hunters.

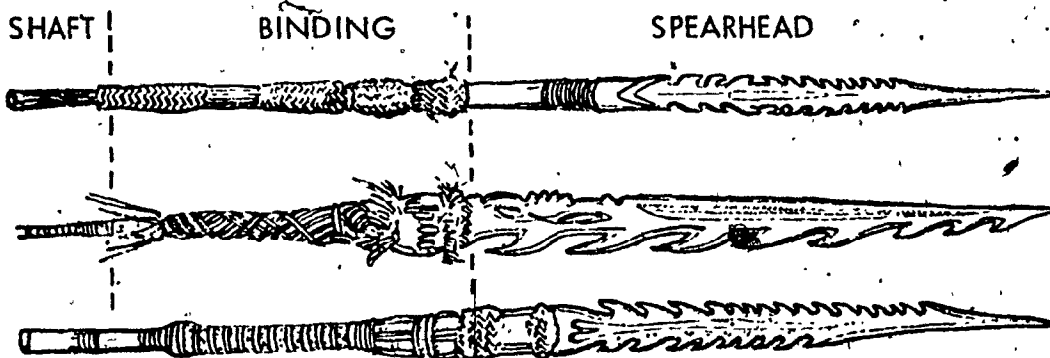


Fig. 2

Spearheads from New Guinea.

The stems or shafts are cane, the heads of bamboo or hard wood. These two parts are tied together with a string. Using a piece of cord or hide as a strap is the most economical and logical way to join the parts. Probably the hunter who crafted these weapons first never thought that the strapping itself could be a decorative motif.

The Bronze-age spearhead illustrated below (Fig. 3) and the heads shown in Fig. 2 are different. However, the representation in metal of a formalized echo of stringing or strapping could very well have been included in the design with a new purpose - to decorate and perhaps personalize the weapon.

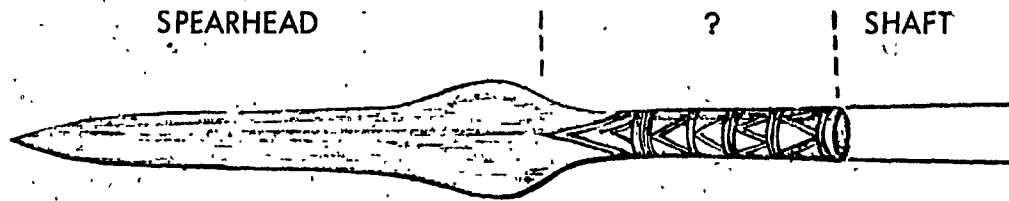


Fig. 3
Bronze-age spearhead.

The strapping necessary to join head to shaft is not, in its original form (Fig. 2) measured or precise. In the Bronze-age spearhead (Fig. 3) it is highly organized and regulated. The form created by necessity has undergone an evolutionary process and reappears as a decorative motif. On the bronze spearhead the decoration is arbitrarily located exactly in the same place as the original form appeared on the primitive spearheads, but because it is not functional any more in the construction of the weapon, it is not bound to any specific

location. Thus the form or motif could change, reappear on different objects and on different materials, of widely-separated times and locations. In this evolution the motif could change to such a degree that it is difficult to recognize any longer.

The following examples will further illustrate this phenomenon. (Figures 4 - 8)

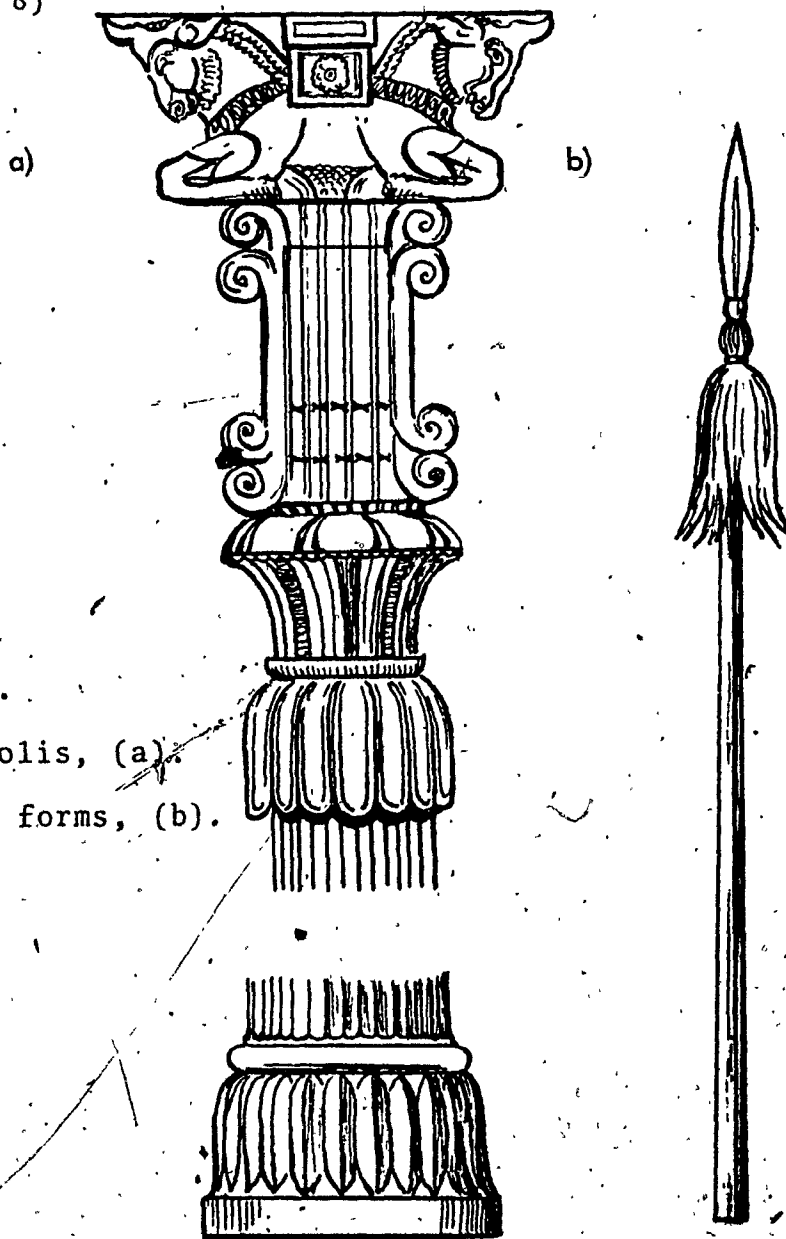
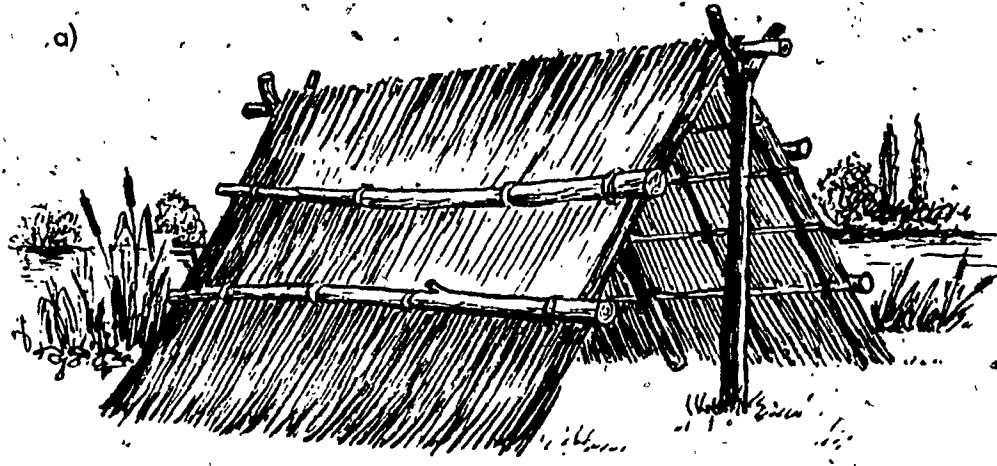


Fig. 4

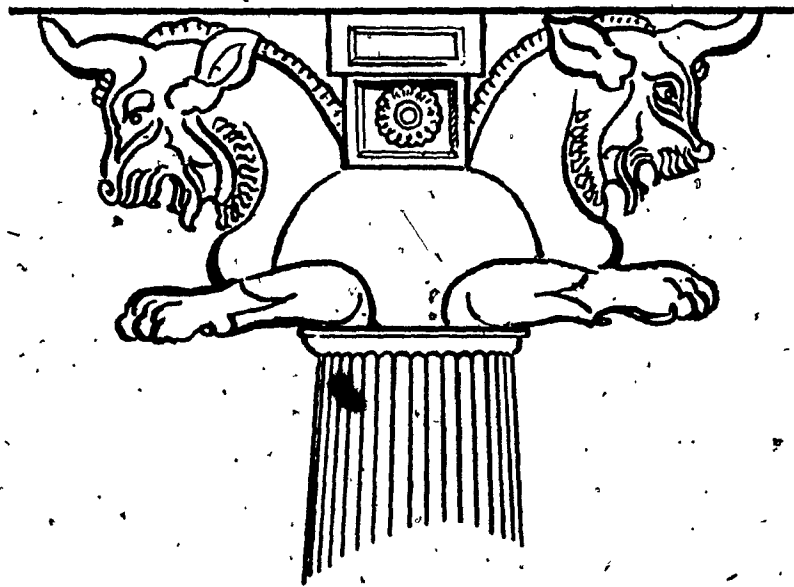
Evolution of forms.

Pillar from Persepolis, (a).

A likely origin of forms, (b).



a) Primitive wood column. (Fishermen's hut, Hungary.)



b) Capital of a column from the Apadana at Persepolis.* (Iran)

Fig. 5

The form could grow, change and reappear on different objects, materials, times and locations.

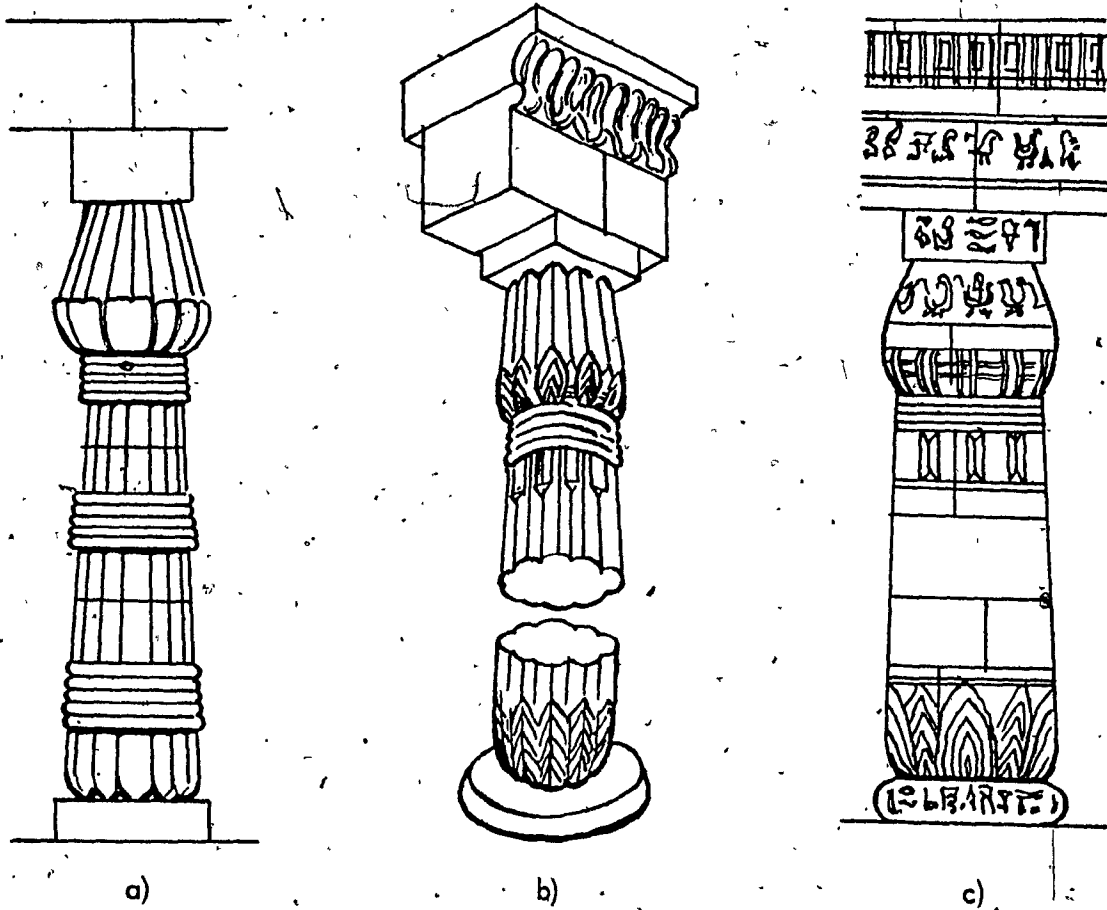


Fig. 6

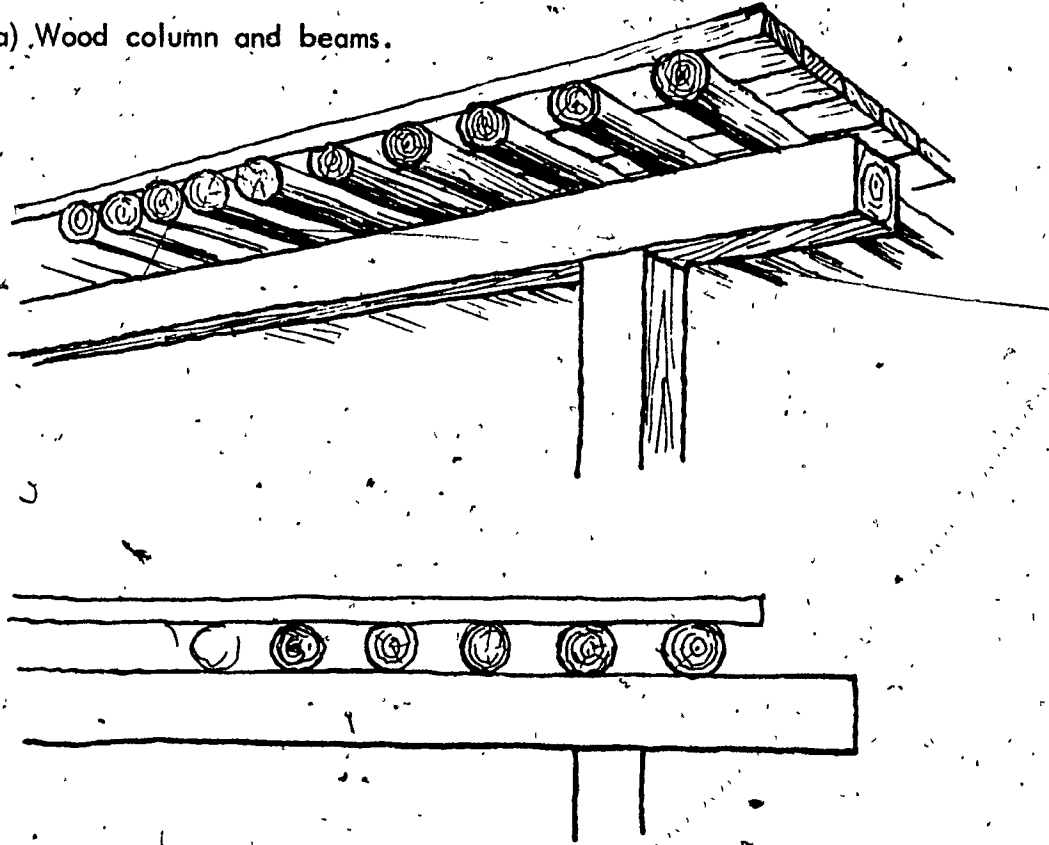
Egyptian columns. Column in the shape of papyrus bundles with closed-umbel capital, (a). The changing forms, (b and c).



Fig. 7

The forms of leather strappings on Greek stone columns

a) Wood column and beams.



b) Stone beams of an Ionic temple.

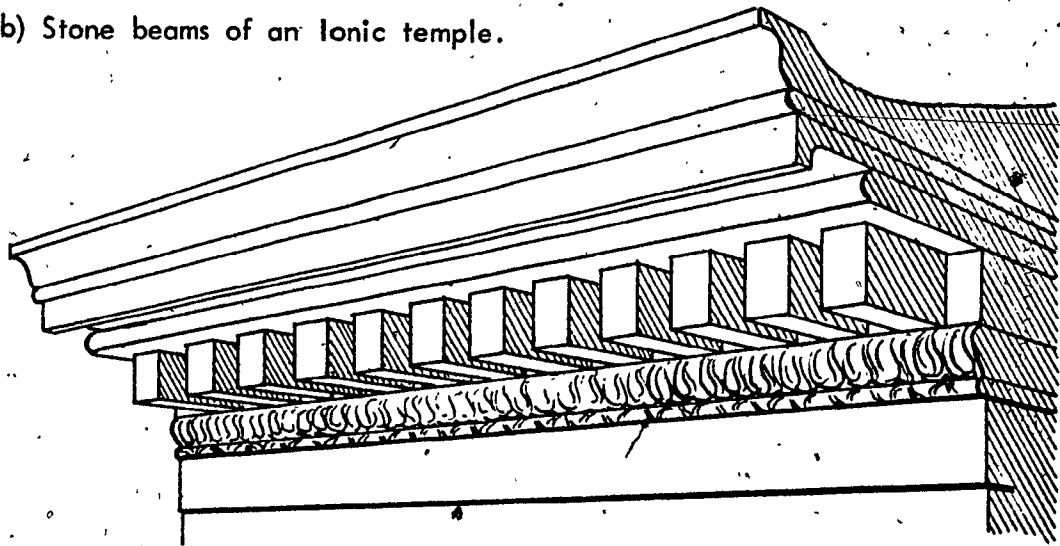


Fig. 8

The form created by necessity went through an evolutionary process and reappears as a decorative motif.

The weaving of rushes, fronds and branches is another ancient craft whose techniques and practices have been recorded.

Mats served many practical purposes and there is no known tribe - ancient or contemporary - which does not use some form of weaving. Fig. 9 illustrates the basic structure, pattern of a fabric.

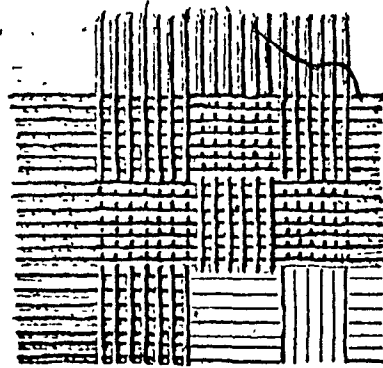


Fig. 9

Simple woven fabric.

This type of cloth or fabric frays very easily around the edges; therefore, it was necessary that the threads be tied securely into knots, to ensure the fabric's usefulness. Thus fringes were created out of necessity. This new form continued an independent life as ornamentation on different objects, structures and materials.

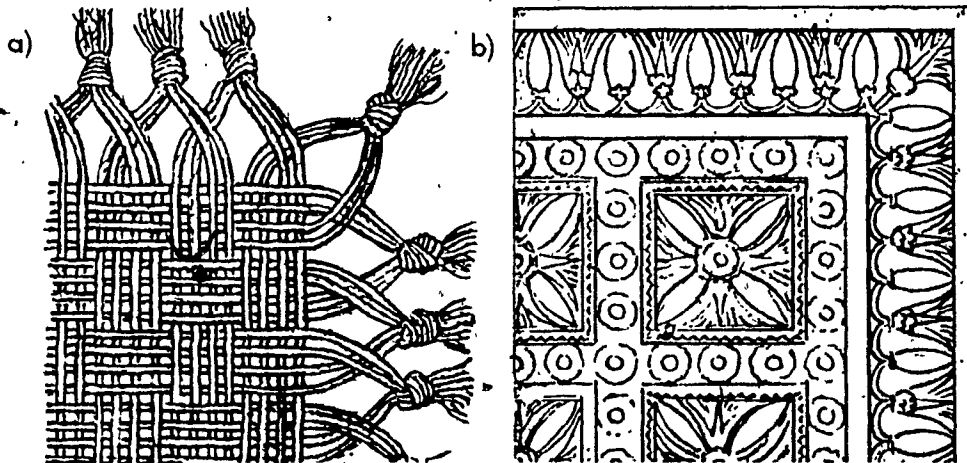


Fig. 10

The original form of fringes and its adaptation.

Fig. 10 shows the original form of fringes on a woven covering (a) and the modified form on part of a floor from the palace of King Ashurbanipal. (b). (Marble, height of fragment 20". Seventh century B.C. British Museum, London.)

The original pattern of the fringe appears on various materials such as stone, wood, or leather and this adaptation influences the original form. This evolutionary process shows the threads and strings growing broader and the tassels resembling or transforming into flower petals, palm trees and other related patterns.



Fig. 11

Greek ornaments whose origin can be traced to fringes and tassels.

Sewing is also a basic ancient skill and bronze needles are abundantly found on archaeological sites. In earlier times sewing was the only method of joining pieces of mats, hides or fabric. Stitching is the basic operation of sewing, and the form of stitching is determined by the nature of the materials available for the process. The pattern of stitching appears on different materials such as stone, wood or clay; and we can see it as printed or painted decoration on flat surfaces, as relief on stone, or as carving in wood.

The stitching pattern is transformed from its technical function in cloth to symbolic representation of "connections" in the new material of wood, clay or stone.

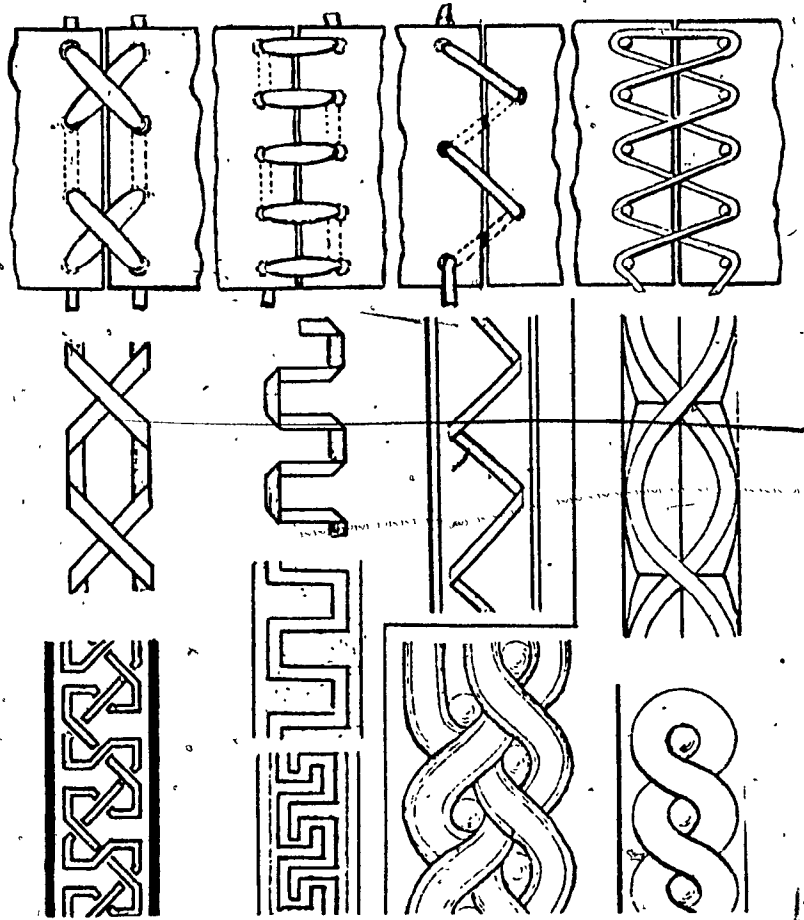


Fig. 12

A few methods of hand sewing showing different patterns (a), which are probably the origins of decorative Greek forms (b).

Pottery was also an early discovery in ancient times, and was a widely practised craft. Archaeological finds are abundant and they show a very wide variety in style and design. The ornamentation is especially diverse and this

phenomenon could be explained in terms of the flexibility of the material used. The basic form of pottery imitated the form of basket to be carried in the hand or on the back. Plastering with clay rendered an ordinary basket suitable for use as a cooking-pot or water container. (This technique is still in use among primitive tribes around the world.)

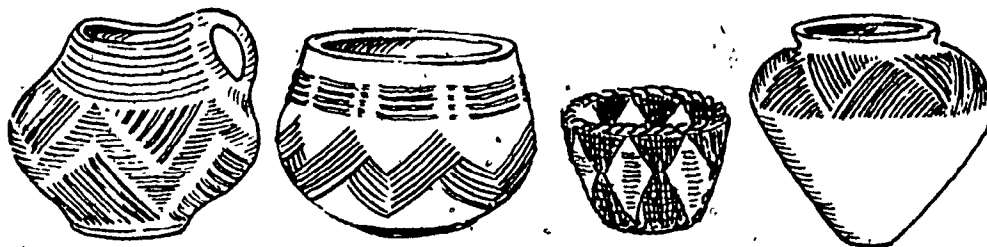


Fig.13

Pre-historic clay vessels, ornaments resembling wicker work. (These drawings are reconstructions and are based on a study of fragments of pottery. Location of relics; Cueva de la Pileta, Spain, 1973.)

The concave marks on the pottery clearly indicate the "plastering" method of production.

At the later stage of sophistication in the production of pottery, these marks resembling wicker work are still applied but now for decorative purposes only.

Fig. 14

Painted forms of wicker work on a "Sangria" pitcher from Spain. Glazed pottery. 1973.



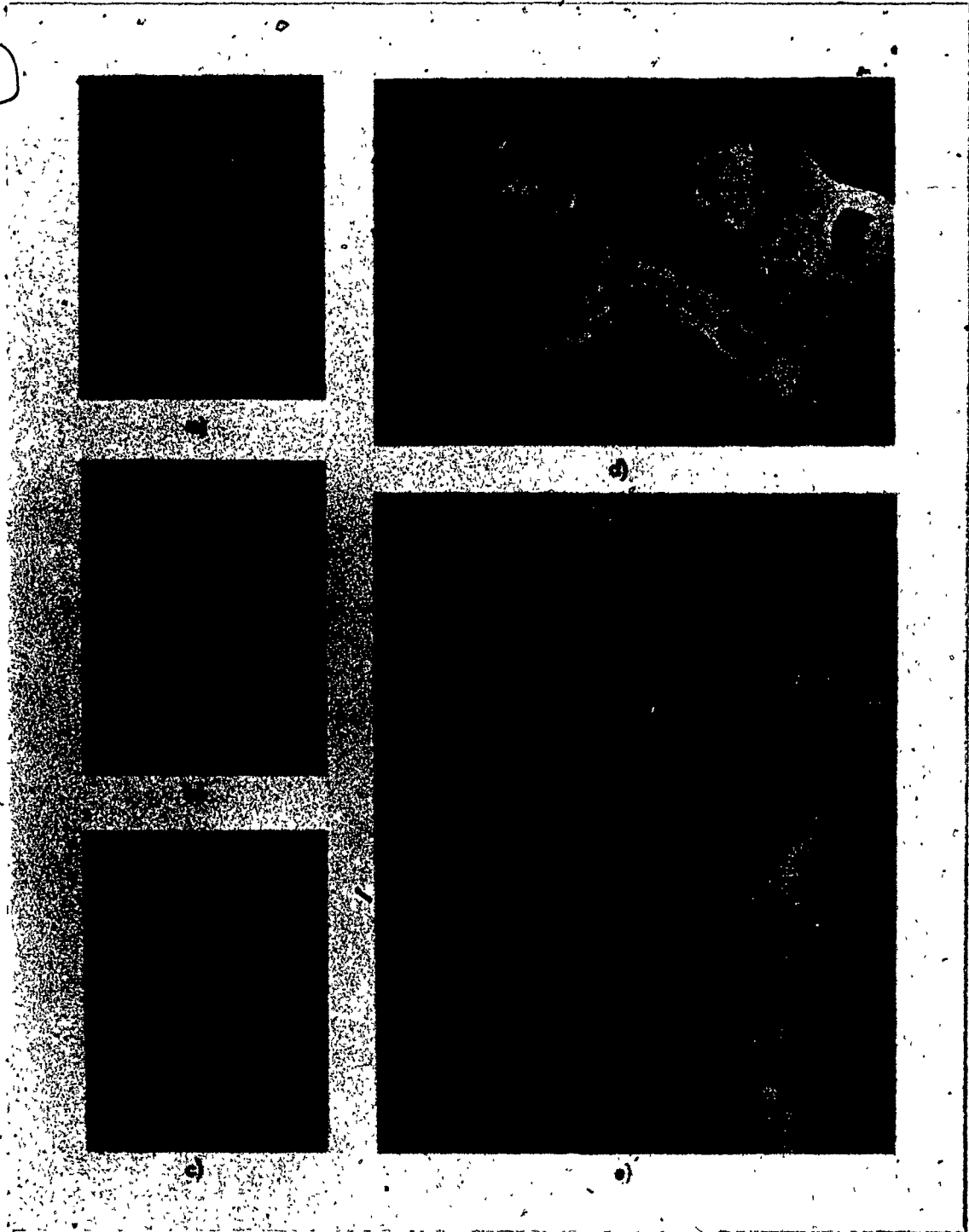


Fig. 15

The most elementary form of art, is the decoration of the human body itself.

For the purposes of this line of argument it could be maintained that the most elementary form of art is the decoration of the human body itself. In this interpretation, by daubing red or brown clay over his body and face, primitive men sought protection from the outside world, first against natural, then against supernatural phenomena. By application of colour man was able to differentiate himself from his animal state, to externalize himself in a new form recognizably distinct from his own body in its natural state.

The first application of colour on the body possibly emerged from necessity. The guanaco hunters in the Loreto and San Martin regions of Peru still paint their bodies according to the chosen hunting ground, whether this be on a rocky open area of the high plateau or in the bush of the lower valleys. The most ingenious variations have been observed in tribes from the Brazilian hinterland and neighbouring regions of Peru and Ecuador. Fig. 15, p.37, (Colour plate).

The origin of their body painting could also be attributed to their environment. Abstract designs symbolic of jungle creatures, - armadillos, pumas, hawks - and nature's patterns inspire makeup for the Waurá war games. (Amazon Basin, Brasil) The thickly applied paint has proved its value as an effective insect repellent. It is made from the oil of pressed urucu seeds, boiled into paste, and this sticky dye wards off both supernatural beings and real insects. (Fig. 15, a, b, c.) The colours usually change, according to availability. the forms originate in nature and are influenced by the

characteristics of the material, and considerations of practical usefulness. During an evolutionary process these forms could acquire a new meaning, becoming clan or tribal identifications, or marks of social rank within a tribal group. (Fig. 15, e-f.)

E) Interpretation of the Selected Anepigraphic Relics and Other Observations Concerning Neolithic Institutions and a New Revolution.

The analysis shows three underlying principles of the factual examples in Part D.

- a) A change of material is accompanied by only slight variation in form. (Fig. 2 & 3).
- b) A change of geographical location involves change of materials and forms, - an adaptation to local conditions. (Figs. 4, 5, 6, 7 & 8).
- c) A change of function results in some adaptation to new uses. (Figs. 10, 11, 12, 13).

All examples suggest very strongly that the creation of form and the resultant evolution into symbol is indeed a major evolutionary leap. Form and ornamentation are transferred from material to material, from one region to another, and during this migration may become almost unrecognizable.

However by retracing vestiges of form to its origin, it usually appears true that the form was born out of necessity as a result of natural process. The form-to-symbol evolution was induced by the discoveries of new materials and

techniques and was regulated by the habits of their users. Leonardo da Vinci recognized that necessity, as an intrinsic element, regulates nature.

"Necessity is the mistress and the teacher of nature, it is the theme and inspiration of nature, its curb and eternal regulator." II.11

The wanderings of the forms and ornaments can be explained by, and ethnohistory can prove, the importance of custom. To be accustomed to the usual is one result of prolonged experiences and it is a characteristic of the human behaviour. The phenomenon of custom is also linked to balance. It has been asserted that man strives for balance because the maintenance of bodily equilibrium is one of man's most elementary needs. We must expect the need for balance to correspond to a universal human experience of much greater range, therefore the phenomenon of balance must be seen in a wider context.

In physics the principle of entropy (also known as the second law of thermodynamics) asserts that in any isolated system each state represents an irreversible decrease of energy.

The universe tends toward a state of balance, in which all existing asymmetries of distribution will be eliminated.

In psychology the Gestalt theorists have come to the conclusion that every psychological field tends toward the simplest, most balanced, and regular organization available.

Freud described man's basic instincts as an expression of the conservative nature of living matter, as an inherent tendency to go back to a former state.

Despite the above theories or facts, it can be pointed out that a human being finds his fulfillment not in passivity but in doing, moving, changing, growing, exploring, producing and creating. But such a view does not deny the importance of balance and custom, because to achieve equilibrium remains the final goal of any problem to be solved, any wish to be fulfilled.

It is implicit in the above exposition that the reason to maintain balance is complicated and deeply rooted in our psyche and it is not feasible to explore all the possibilities of this topic, within the present study.

The fact is that individuals and societies are slow in response to and adaptation of new phenomena and this attitude is reflected in many proverbs such as an old Hungarian saying; "Ajárt utat a járatlanért soha el ne hagyd." (Never leave the known route for the unknown one.)

As was mentioned beforehand, custom and/or habit is formed during a prolonged period of exposures and experiences. To explain this phenomenon we might consider some historical events:

The human race has some 300,000 years or maybe even more than 500,000 years of experience, in a very slow and gradual development of civilization. In contrast to this prolonged span of time our experience with technology (technology as clarified on page 9 under two asterisks) has emerged in less than four hundred years, and we are experiencing a strong

impact of technology in the past couple of decades only. In this perspective our psyche is not too far from the cave-man's and our concept of life essentially is the concept of the man of thousands of years ago.

The chart below has been compiled for visual illustration of the periods of time in which man's psyche and habit have developed.

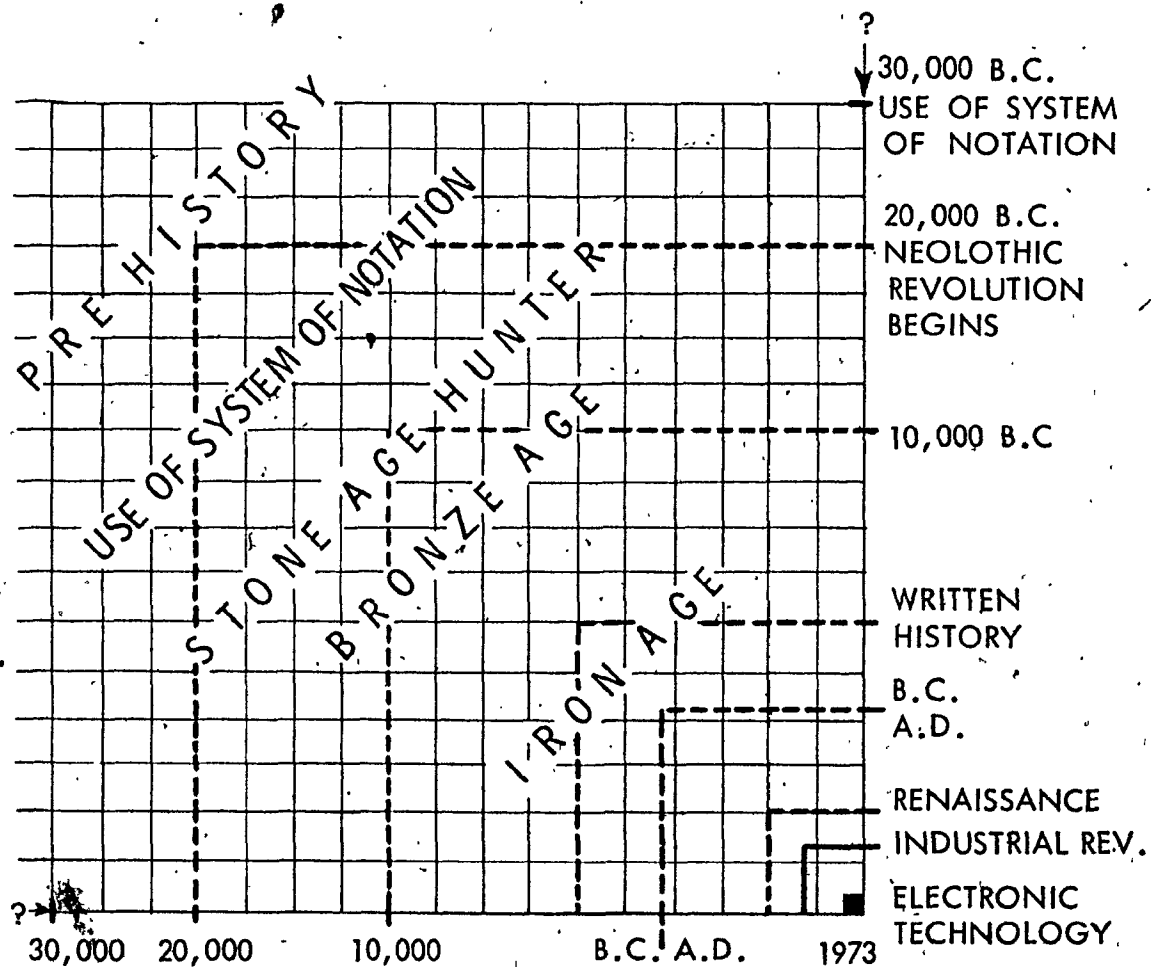


Fig. 16

Quantitative Chart Showing the Proportions of Time for Comparison. One quarter inch square represents 100 years. (approx.)

The date of 30,000 B.C. as a starting point for the above chart is based on A. Marshack's book; "The roots of civilization". He described and proved that apparently as far back as 30,000 B.C. the Ice Age hunter of western Europe was using a system of notation that was already evolved, complex and sophisticated, a tradition that would seem to have been thousand of years old by this point.

The following chart is intended to illustrate the acceleration of the development of technology.

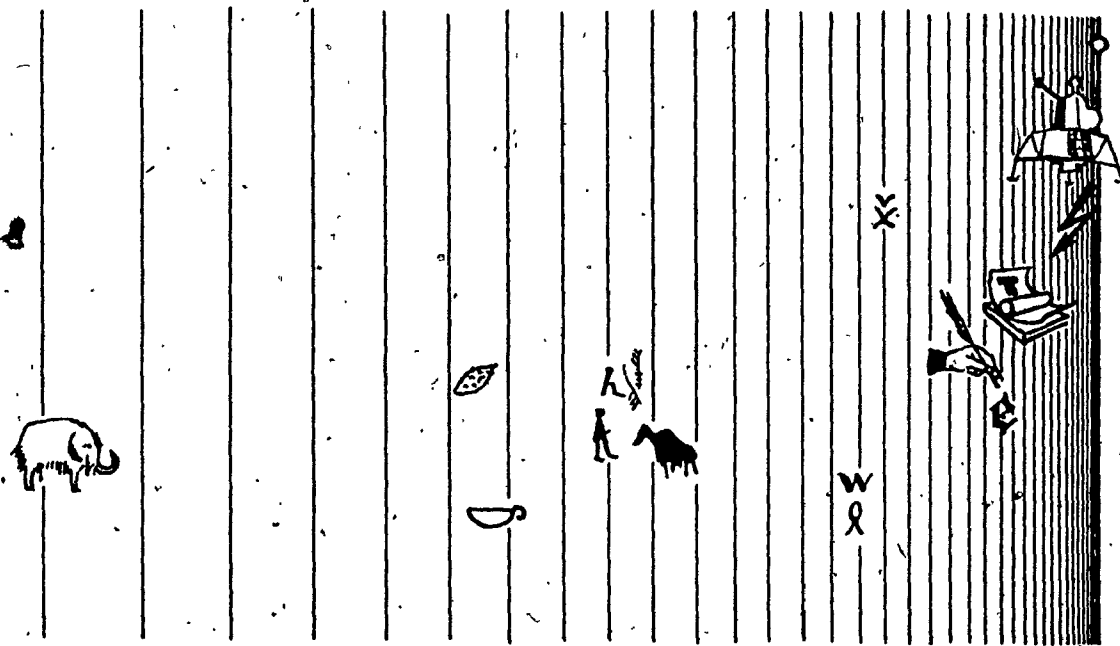


Fig. 17

The arrival of technology occurs at 30 seconds to midnight in the 24-hour day of biological evolution.

The observations and theories already outlined may suggest that subconsciously we cannot absorb the realities of our modern age and the effects of technology are not yet "engraved" in our consciousness or genes.

The following observations may also prove our attachment to customs:

- a) The evolution of the axe from stone to bronze lasted longer than the entire period of written history.
- b) The use of an outdated standard of measure system, instead of the easier, more practical and more universal metric measurement.
- c) The circle was divided into 360 parts in Sumer-Babylon, still in use for no scientific reason.
- d) In our downtown areas countless number of buildings are ornamented with Ionic or Corinthian columns from cultures 3000 years and 4000 miles distant.

Realizing this phenomenon it is understandable that the artist-craftsman who created the marble floor for King Ashurbanipal (Fig. 10b) would feel that his work was not complete without the customary form of a carpet with its fringes. Also the potter who first used the wheel to form clay vessels, painted or scratched the traditional marks of the basketwork. Without this he would have felt his product deficient and imperfect.

Custom, superstition, mystical considerations, tribe or class interests, also "imprints" in our psyche are the main forces for maintaining equilibrium.

These powers permit a very gradual change at a very slow pace in our psyche.

In contrast to electronic age technology, evolution in ancient times was slow. Later, when machine production was possible, technology gradually created an environment whose content was the old environment of agrarian life and the arts and crafts. With the explosive-like development of electronics and the automation of the last decade, a totally new environment has been created.

Technology is providing us with the instant possibility of complex process that ordinarily used to extend over a long period of time. The speed of electricity today confers new dimensions on social and industrial action. We are living alongside these concepts, but we are continuing to think in the customary way; fragmentarily and on single planes.

But an epoch that started 10,000 years ago is ending. Our generation is involved in a revolution of society that is as complete and as profound as the one that changed man the hunter to farmer and craftsman. Ten thousand years ago the Neolithic revolution closed an age that had lasted for hundreds of thousands of years. The foundations of society created by that revolution have lasted, no matter how refined and sophisticated the superstructure of civilization has become.

Only within the last century and especially in the last 25

years have these foundations begun to crumble, as the new scientific technological revolution spread with ever increasing speed throughout the world.

Now historians, social scientists, artists and perceptive thinkers realize that both the systems of the so called "free world" or capitalist society and the "workers' democratic republics", - the communist dictatorships- are in the throes of a social revolution. The ills of our society arise from the fact that the old basic institutions are less and less compatible for the modern technological world. The alienation, chaos and confusion so caused, are evidently greatest where most experimentation could be conducted, for example in Canada or in the U.S.A.

No matter how complex the societies of the past 10,000 years became, they exhibited a striking number of common features, in the way of living and working conditions, and in the structure of institutions. But to-day, nothing seems to work, neither God or Government, and science has degenerated to the Hypocritical Polluter.

We often put the blame on minority pressure groups whom we blame for being responsible for the breakdown in private or social morality. However the problem lies deeper, locked in history. To grasp the new realities we need to know the essence of these dying institutions and what they provided for the human race.

i) The Historical City.

The Neolithic revolution first increased the food supply, so that population increased rapidly, but the erratic nature of the agricultural methods in use was a source of anxiety to this increased population. Successful harvests, fertility in crops and animals, became the centre of interest and concern, and this preoccupation gave rise to rituals. Thus organized religion was born. The magnificent ziggurats of Sumer and Babylon with their urban concentrations and their gods and godlike kings, developed. In Egypt the Pharaohs were god and king, - they created temple cities and built for eternity. The city provided a center for religious ceremonies and fiestas as at Thebes or Itzā. In other locations secular and spiritual authority may be combined in the same ruler, though sometimes the two authorities remain distinct. In the medieval cities of Europe this duality is clearly manifested by the cathedral and the castle dominating the urban skyline. The city also became the centre of commerce, marketing, arts, crafts and cultural exchange, the home of pleasure as well as religion; thus it was a social magnet that attracted the more ambitious elements of the population.

This conglomeration was ruled by monarchs, and there was the organized religion supported by the state. The ruling class of landowners-aristocrats-warriors was small in proportion to the population. Towns and cities were also small and few in number and the bulk of the population lived in villages

scattered around the countryside, strictly bred in tradition both in work and belief. For more than 10,000 years this was the basic pattern of human living. However, at the beginning of the nineteenth century, in the first stages of the Industrial Revolution, this pattern began to crumble. The first cracks were small and their significance not understood, - except by a few visionary artists and thinkers - but it became obvious later that the social structure was breaking down.

As the Industrial Revolution spread throughout Europe and America, elevating mankind to an advanced level of civilization and prosperity, masses of the population left the countryside and by 1950 the majority of the people of the Western Hemisphere were living in cities.

Production was now on a mass scale. There was a buoyant market for goods, a plentiful supply of money, an expanding population, a wide-ranging commerce and involvement in wars, - all of which stimulated production.

Thus, a fundamental change in living had taken place within the institutions of the pre-industrial world. Its intellectual and religious attitudes, its culture now were called in to question.

ii) The Cities of Today.

The cities of the past served social, economic and religious purposes. Today they no longer serve as the centres of a

king-priest class nor are they places of religious rituals. It is possible to govern from the hills of Gattineau, from the control cabin of U.S. Air Force Plane No. 1, or from a "dacha" in the woods. Most of the new social ruling forces, the commercial and industrial enterprises and factories could move, and already have moved, from the big cities without any obvious disadvantage or loss. Technology made possible instant electronic communications and the transportation of masses and goods. Distance has been obliterated. The city also lost its appeal as a secure habitation; its defensive value diminished and even turned negative in the view of multi-megaton proportions of the H-bomb of computerized warfare.

"God is dead" as an Anglican bishop publicly stated and it is not only religion which is collapsing into near-anarchy in the growth of mysticism, astrology and magical witchcraft, but also any kind of artistic endeavour. Paintings, sculpture, music and theatre are developing into esoteric phenomena. People are deserting the city centres to dwell in suburbia and the vast shopping centres, malls and promenades are following this move. Expressways, gas stations, parking lots, billboards, slums are the dominating sights in most of our modern cities. Only the entertainment world is left, the restaurants, theatres and shops for tourists from suburbia or foreign countries. Tens of thousands of commuters flow constantly in and out of the cities; no other social

need compels them to do so but the location of work-places, offices and shops.

iii) The Family.

The family was more than an economic unit in the past. It was the school which provided technical education, security, love and care. As the children learned their skills as farmers or craftsmen, they also received from their parents the patterns of social morality, their position in their social class and their attitudes to government and authority. The family unit was a highly complex and very powerful institution through which all human beings had to pass. Now the social and economic weakness of family life is manifested in the steady increase of divorce, desertion and the acceptance of "living together" without marriage.

The economic and social function of the family unit is breaking down. It no longer teaches economic skills and imposes social morality. The care, protection and love of children still has its place in the family and this is a function that society can not easily replace as yet, but society is taking over the responsibility for education.

iv) Education.

The school is not in better shape than any of the other traditional institutions. There is a radical movement to

deschool education, and it is seen that the school is unable to do what it did so effectively in the past four hundred years; educate for living, and inculcate social principles.

The problem is that the educational system was designed for a selected élite and now is attempting to educate the mass of industrial society; - for which it was never conceived.

In the past the students were the sons and daughters of élite groups and willingly subjected themselves to discipline, for the rewards of success - guaranteed status in society, high office, wealth and power.

For the masses coming out of public schools and universities today, there is no guarantee even of a job, not to mention social status. - What is available for everyone distinguishes no one. The constant soul-searching of educators also indicates that they themselves have little faith in what they teach, and students constantly denounce curricula as irrelevant to their needs.

Our society is at the end-point of 10,000 years of consistent evolution and involved in a revolution more profound than any that man has so far experienced. If we fail to create new institutions that enable us to cope with electronic-industrialized-technological life, there could be a sharp retreat from scientific, urban and technological civilization. Alternatively, the whole of humanity may cease to exist.

The above historical survey may imply a pessimistic approach and it indeed projects a gloomy situation, but also as is repeatedly pointed out in the previous pages of this thesis, man's capacity for social evolution is exceptional.

The human psyche is resilient, and through this saving factor may come out of this electronic-age revolution into a new phase of civilization.

CHAPTER III.

ART AND SYMBOLIZATION.

A) Definition of Art and Symbol.

It has been suggested in Chapter II. above, that art arises out of necessity and the universal human impulse to create objects which are pleasing, without reference to their usefulness in maintaining minimum levels of survival.

i) Art.

Art then is, first of all, a form of human activity and is a concept much easier to recognize than to define. It is so closely and intimately connected with the shifting and imprecise states of feeling, of which we are all aware, but which defy analysis on introspection, that we are the losers in human terms if we attempt to explain away in scientific terms those aesthetic impressions which represent a major element in our inner consciousness.

Art does not exist in itself; it is a quality observed in objects, processes or events by those attuned to its perception.

Art has to do with beauty. Beauty could be defined as the quality of appeal to the inner sense of harmony of the beholder. It could therefore be argued that art is the process of creating that which pleases when seen.

In humanistic terms, art is a form of human behaviour capable, in some aspects, of control and discipline.

In the end it is a communication in symbolic terms of a truth perceived.

ii) Symbol.

Art represents a specifically human need and is based on a unique capacity of man, - the capacity for symbolization. Symbols are expressions of inner states. They are projections of desires and attitudes and also a form of response to impressions arising in the external world. By his use of symbols man is able to create new experiences, project new possibilities. Through the process of symbolization, man is able to link past with future and to project new phenomena. In the historical development of civilizations the symbol becomes increasingly used as a device to project abstract thought in the advancement and growth of technical knowledge.

B) The Meanings of Art and Technique.

The meanings of art are of a different order from the meanings of technique, because of their purpose and origin. Art relates to internal transformations, technique to external means and consequences. If we contemplate art as specific human activity, we are implying a sharp distinction between natural and "artistic" phenomena. In linguistic terms, the word "Ars" originates from the Indo-European "Ar" meaning "join, put together". The Greek "artizein"

means "to prepare". As the word itself suggests, therefore, "Art" is a combination of idea and work - the human mind and human activity. (Thus the purely natural object, - for example a weathered tree-trunk or a stone from the sea-shore, may remind us of art, but can never in itself be a piece of art, because it is void of human touch and effort.)

Art as a product of human effort merges with other activities through certain common traits. For example: craftwork, science, painting and graphics are the outcome of human thought and endeavour, and thus have a common source with technology.

According to Lewis Mumford:

"... to differentiate between art and technics, art is that part of technics which bears the fullest imprint of the human personality; technics is that manifestation of art from which a large part of the human personality has been excluded, in order to further the mechanical process." III. 12

Technique and technology are concerned with emphasizing and extending human physical strength and power. By contrast, art is basically an expression of human feelings of concern and love, in all their delicate variations.

i) The Parallel Development of Mechanization and Society.

At the beginnings of history, technique and art are inseparable. In the earliest age of weapons and tools, we can observe carvings or scratchings of decorative motifs in

situations where the craftsman had to say something as well as make something. (Figs. 3 - 13) At that time the tool and the object, - the symbol and the subject - were not separated. A man while working on a tool felt the impulse to add a quality to the object, additional to the minimum requirements of mere usefulness. In this earliest stage of evolution, symbolic and technical interest were equally important. The forms of decoration are inherent in all handicrafts and are a sign of human concern and a way of communication with other human beings. This element is usually missing from the products of machines.

At the early stages of the application of machines to produce objects, - when the human hand was still important in the process, motifs and decorations were not absent as in later more mechanized productions. The craftsman controlled all phases of production and was personally involved. He decided the range and space of his work and was the real "master" of the production process. At this phase of mechanization, technology contributed to the creativeness of the craftsman. Up to this point of the development, technical development and symbolic expression were interdependent. Handicraft was the link, a cementing factor between art and technology.

But this integrated method and relationship, this harmony and relative balance, was destroyed by advancing mechanization. Human and personal involvement were gradually phased

out and sacrificed in the name of efficiency. The human touch was decreasing with the same speed as the first tools evolved into machines, power-machines, automated production lines and computers. Thus technical interest gradually took the lead and dominated purely aesthetic considerations.

However this process was very gradual. At first, devices and artifacts were considered to be extensions of the man who made them, and so retained a certain personal relationship with their users. The fishing boats on Portugal's coast with painted bows bearing their names, decorative motifs, and the "eye of God" to guide them through the sea, are examples for illustrating this period of change, when the production and operations of machines were under the control of the craftsman himself.

In the process of further mechanization this integrated method of thinking-working-creating, which was determined by human norms and interest, came to an end. As mechanization increases, specialization takes over and subordinates the whole human being into a concentration of one function in the process of production. The once unified process of work is broken up into a series of fractional operations. The effect is devastating in human terms. The worker, denied the satisfaction of personal creation, is deprived of the opportunity for self-expression and becomes merely a hand, an eye or a nervous closed-circuit linked to and serving the machine. After a prolonged subjection to this situation it is scarcely

surprising that human beings are conditioned into behaving like machines. In this way, technology declares itself as a dehumanizing force by destroying spiritual values.

Technology is being applied to educational processes in an increasing number of ways to improve their cost-effectiveness.

It can therefore influence the process of individual development at a very early stage.

Introducing technology into education, if the process concentrates on the mechanistic characteristics of the learning process, implies a dehumanizing effect. Nevertheless technology can also be applied to education in ways which preserve, enhance and reinforce the humanistic aspects of the learning process.

ii) The Contemporary Scene in the Field of Arts.

In a passage of brilliant insight, Andre Malraux in his work of "The voices of Silence" (Volume II.p.124..Secker & Warburg Ltd., London, England) makes a comment which summarises the dilemma of the artist, and the crisis in the field of art in contemporary society: -

"Artists attacking all humanistic values (i.e. all engaged in total attack upon humanistic values) challenge implicitly the civilization which gave them birth or brings them back to life. That, indeed, is the link between the naive and the early medieval artists; between the madman (sometimes the child as well) and the primitive. And that is what makes each of these arts a weapon in the armoury of modern anti-humanism. The artist who goes to school with the primitives obviously seeks more than a mere discovery of forms. In a culture like ours every recourse to primitivism implies a fellowship with what our culture lacks.. And our revival of these forms, like our appreciation of them, carries with it an appeal to forces latent below the conscious threshold... Raphael's world - the world of man at peace with God - had, since the death of Ingres, become an alien, hostile world, and the school of Bologna... strikes us... as an imposture... But already the gods of the day - which their art ignored - had mustered their attendant devils; history, whose importunity now obsesses Europe, much as Buddha's Pyrrhonism disintegrated Asia, was coming into being.

No longer was it mere chronology but an anxious investigation of the past for any light it might throw on the dark vistas of the future.

Western culture was losing faith in itself. The diabolical principle - from war, that major devil, to its train of minor devils, fears and complexes - which is present more or less surreptitiously in all savage art, was coming to the fore again... That diabolical principle stands for all in man that seeks to compass his destruction.

The powers of darkness of the Christian past, the Freudian devil, and the devil of Bikini - all wear the same aspect. And the more ground these new demons gain in Europe, the more her art tends to hark back to the mood of earlier cultures plagued

by their appropriate devils...
By contrast with the nineteenth, our century
stands for a Renaissance of Destiny. This Europe
of phantom cities is not more devastated than is
the idea of Man that once was hers." III. 13

Malraux here analyses accurately the current impasse. By juxtaposing primitivism, infantilism psychotic art and the many prevalent and anarchistic movements, he emphasizes the diabolic principle inhering in this grouping. Our period of organized decadence in the field of arts is the reflection of our own familiar evil spirit, - the devil of mechanization.

The encroachment of electronic technology on modern society has occurred massively, with a complete disregard of the possible side-effects. For example, the wholesale suppression of age-old social institutions has proceeded unchecked, without any consideration for substitutes, or in fact, for the implications of the dehumanizing process of mechanization. The incorporation of technological developments into our society is effecting the entire social structure and not merely selected sections of it.

It is only the present generation of human society that has developed sufficient scientific awareness and self-consciousness, to measure the impact apparent up to this point in history, and to extrapolate the current trends. Only this generation can make decisions as to whether existing dangers are to be allowed to expand and develop, or whether they

will be controlled and eliminated once and for all.

Up to the present, (in the Western countries), there has been no conscious or planned regulation of the factors affecting social life or personal development in the face of the processes implied in social evolution, except in the recommendations or the isolated examples set by artists in their lives and work.

The artist, sensitive, receptive, visionary, is able to sense a cultural and technological challenge long in advance of its eventual appearance.

It is the artist and his output that may provide the ultimate counter-balance to the deleterious processes which continue to abrade and diminish the heritage of the human mind, which must be preserved if human life is to have any continuity.

In experimental art man was given a detailed preview of the coming age of violence to their own psyche produced by the impact of technology. To prevent further damage or a complete wrecking of society, the artist now must come out from the convenient refuge of the ivory-tower to take the chair in the control-tower of society.

C) The Role of Art Education.

The aim of the humanities and art education should be to incorporate the study of science and technology into traditional humanistic educational programmes and philosophies.

For Leonardo da Vinci the living world and art were not only closely bound together, but were also to be considered equally as manifestations of the human spirit made real and visible. He spoke of science as the "knowledge of things possible in the future, of the present and of the past."

In his writings, he made a distinction but never a dichotomy between scientific and artistic activity, the first permitting man to amass knowledge, the other serving to express the function of the spirit.

It has been argued in the previous chapters, that science and technology have had human and social implications throughout history. In a new approach in education, a study of this aspect of human development could alert students to the effects and implications inherent to their future of further developments in applied technology.

Concentration on interface problems - the meeting-place between the humanistic-social and the scientific-technical - could provide a broader and more meaningful basis for a new generation to control its environment than the now outmoded and irrelevant patterns of what once were "liberal" studies. In artifacts, - in tools and structures, - much of the creative expression of our civilization is recorded.

The artifacts of our contemporary civilization also represent the sensory and the aesthetic expressions and experiences of modern times. The advancement of technology requires as much human ingenuity, sensitivity, creativity and imagination as do achievements in the field of arts. Artists now express their emotions in contemporary rather than classic materials - concrete, fiberglass or steel. The engines, motors, circuits, and other appliances of our times, in a way, are no less noble than painting, music or literature.

The insertion of the science-technology parameter into the traditional liberal arts system could result in more comprehensive and fuller knowledge of the world of the present and the future. The contemporary scene is one of a computer-age society. Such an organization requires more highly trained and educated technologists, than past eras. Therefore, our educational institutions must set themselves to the task of not only training but also of educating future citizens to understand the social forces accompanying technological growth.

Art education is an obvious framework in which to achieve these objectives, because art education should and could be the process of the refinement of sensitivity through exposure to the best manifestations of the human spirit, with the aims of eliciting the full potential of each individual's creative powers of self-expression and self-fulfillment.

D) Directions and Observations.

"Students are human beings first and students second. As people, they want to be seen, listened to, and understood. As students, they want meaningful information and skills to process a vast store of experiences and the practical ability to earn a living." III. 14

Aristotle's dictum that men by nature desire to know, supports the theory that children are naturally eager to learn. The most superficial study of State-sponsored educational systems is sufficient to suggest that this natural hunger for knowledge is not always best satisfied under the regime imposed by traditional classroom fare.

Indifference to the more basically human needs of learners in modern education has obviously contributed to the process of social alienation, resulting in hostility, aggression and vandalism, and the explosion of violence in schools and on the streets.

Some possible guidelines for educational practices designed to restore some equilibrium in the development of young human beings integrated in their psychological, emotional, intellectual and vocational identities, might be:

- 1) Sensitivity and responsiveness of the teacher to feedback from students would exert a humanizing effect. The absence of reciprocity, personal feedback or human response will diminish it.

- 2) The acceptance and sustenance by teachers of individual one-to-one relationships will inevitably contribute to the humanizing and socializing of the pupil or student.
- 3) Indifference, detachment or denial of contact on the part of the teacher are forms of psychological homicide: these are practices that contribute to the suppression of the growth of the student as a human being.
- 4) Free flow of communication inside the whole learning group (from teacher to student, student to teacher and student to student) is more humanizing than a unidirectional flow of communication from teacher to student only.
- 5) More positive results can be achieved through free and spontaneous creative activity than by merely mechanical activity which reinforces the observance of objective rules and authoritarian patterns.
- 6) Democratic decision-making and collaborative activities involving teachers and students will reinforce attitudes of self-respect, confidence, trust and respect for other people and their interest and opinions, and so contribute to the humanizing process.
- 7) If the learning process is based on individual involvement and effort in making or creating something, and gaining practice by personal experience, there will be a greater humanizing effect than when learn-

ing is reduced to the mere transmission and reception of encapsulated quanta of impersonal information.

- 8) For the teacher, technology can serve a humanizing purpose by providing a greater amount of time to devote to personal interactions with students.

An intelligent and eclectic use of teaching aids, in other words, will reduce the proportion of curriculum time devoted to "teaching" and increase the space available for education.

SUMMARY:

Our age is the age of high technology.

There is a well declared danger of rapid exhaustion of natural resources. The problems of pollution, the population explosion and the social problem of the schism between humanistic and mechanistic aspects of society are issues which must be brought into sharp focus as matters for concern, study and urgent concentrated action.

A fundamental shift of emphasis in behavioural patterns is essential if this and succeeding generations are to be able to control and apply technology and fulfill the desire of the human race for self-realization, psychological stability and some measure of continuity in truly human terms.

A study of the historical development of modern civilization points clearly to the following conclusions:

- a) A psychological drive for aesthetic expression is an inherent characteristic of human nature.
- b) Individuals and social groups are innately conservative and slow to accept and assimilate new phenomena, however far-reaching their implications. The tyranny of custom and tradition is one of the reasons behind the present conflict which splits off the technical achievements and the humanistic-spiritual aspects of our society.
- c) Uncontrolled technology in the past has destroyed certain aspects of our human heritage and must continue its work

of dehumanization unless our society imposes counter-measures.

- d) With technology, man can build a better future by exploiting not only purely material benefits but also its potential for the re-humanization of everyday life.

In the historical course of the development of contemporary society and mechanization, human and personal involvement were subordinated and in some instances extinguished by the advance of a mechanistic philosophy. This trend denied any opportunity to individuals for self-expression, creativity and self-fulfillment in the production process. As a consequence, technology which exerts its force against the natural psychological drives and desires of human nature for self-expression, must be controlled by some modification of the dehumanizing opportunities hitherto associated with its development.

It is in implementation of this approach that socio-technologists are currently developing new social theories from a new area of study - called technology assessment - to control destructive forces and remodel our destiny on the basis of active measures designed to preserve human values in a machine age.

Art education should be an integral part of this development. Art education is, or certainly could be, the process of re-

finement of sensitivity through exposure to the best manifestations of the human spirit, with the aim of eliciting the full potential of each individual's creative powers of self-expression and self-fulfillment. Thus the aim of humanizing technology could be realized, once society developed adequate mechanisms and techniques for assisting each individual to discover the difference between passively existing in an environment and actively interacting with it and shaping it to his needs.

Art continues to contain the power it has always possessed of distilling the intellectual and spiritual essence of the past and of the moving present, and so pointing and beckoning to the human future. Art is prophetic, in this sense, and the practising artist is the seer, the leader, the prophet.

What was true for Lysippos, Agrippa, Theophanes, Giotto, Michelangelo, da Vinci, Bosch, Rembrandt, Millet and Cezanne remains true for Picasso, Moore, Leger, Jackson and Fuller.

The artist, and art itself, has even greater relevance and significance today, when decisions as to man's imminent and ultimate destiny are being concentrated in the power to choose of an ever-reducing elite.

In the control of our technology, the artist and the ordin-

ary human being who has been educated into the values that
only art now can impart, should have an equal voice with the
industrialist, the merchant and the politician.

References:

1. Shelley, G. "Technical Barbarian" Engineering Journal, Engineering Institute of Canada, February, 1969.
- CHAPTER I.
- 1.2 Hunt, H. W. A Művészetek Könyve. (The Book of Arts) Athenaeum, Budapest, 1909. p. 12. Translated from Hungarian.
- 1.3 Bacon, Francis. "Novum Organum" Oxford University Press I. p. 3.
- 1.4 Hersfield, C. "Paper presented at the 83rd Engineering Institute of Canada Conference". Vancouver. Engineering Journal, September 1969.
- 1.5 Editorial. "Time" magazine, December 13, 1971. p. 46.
- 1.6 Toynbee, A. J. Prospects of the Western Civilization, Oxford University Publication, 1957. p. 63.
- 1.7 Adams, Henry. Biology of Memory, by Acad. of Sciences, Budapest, 1971. p. 210. translated from Hungarian.
- 1.8 Huxley, Sir Julian. Evolution in Action, Signet Books, 1964. p. 119.
- 1.9 Mumford, Lewis. The Story of Utopias, Peter Smith Co., New York, 1941.

CHAPTER II.

2.10 Read, Herbert.

The Grass Roots of Art, New York
Wittanborn, 1947. p. 47.

2.11 Nicodemi, G.

The Life and Works of Leonardo
da Vinci, Reynal & Company, New
York, 1966. p. 31.

CHAPTER III.

3.12 Mumford, Lewis

Art and Technics, Columbia Uni-
versity Press, New York, 1960.

3.13 Malraux, André

The Voices of Science, Secker
& Wartburg Ltd., London, England.

3.14 Newberg, N. A.

Psychological Humanistic Education,
Educational Opportunity Forum,
Albany, New York, 1966 Fall 1:4,
p. 24.

SELECT BIBLIOGRAPHY

Only major sources for key concepts have been included from a lengthy reading list which it would be impossible to catalogue fully.

- Lewis, Wyndham The Demon of Progress in the Arts, Henry Reguery Co., Chicago, 1955.
- Oakley, Kenneth P. Man the Tool-Maker, Phoenix Box, The University of Chicago Press, 1966.
- Albright, W. F. From the Stone Age to Christianity, Doubleday & Company Inc., Garden City, N.Y. Aucher Book Edition, 1957.
- Burkitt, Miles The Old Stone Age, Athenaeum, N.Y. 1963.
- Mumford, Lewis Art and Technics, Columbia University Press, N.Y. 1960.
- Middleton, W.E.K. The Scientific Revolution, Six Radio lectures as broadcast on CBC University of the Air. CBC, 1963.
- Forbes, R.J. & Dijksterhuis, E.J. A History of Science and Technology 1, Penguin Books, Baltimore, Maryland, 1963.
- Brown, Harrison The Challenge of Man's Future, The Viking Press, N.Y., 1962.
- Mead, Margaret Cultural Patterns and Technical Change, a Mentor Book, 1963.

- McLuhan, Marshal Understanding Media: The Extensions of Man, McGraw Hill, Toronto, 1966.
- Arnheim, Rudolf Art and Visual Perception, University of California Press, Berkeley, California, 1967.
- Vivas, E. &
Krieger, M. The Problems of Aesthetic, Rinehart & Company Inc., Toronto, 1955.
- Chandler, A. R. Beauty and Human Nature, D. Appleton Century Co., N.Y. 1934.
- Gilbert, K. E. &
Kuhn, H. A History of Esthetics, Indiana University Press, Bloomington, 1954.
- Croce, B. Aesthetic, Translated from Italian, D. Ainslie, The Noonday Press, N.Y. 1960.
- Weitz, Morris Problems in Aesthetic, The Macmillan Co., N.Y. 1963.
- Lyka, K. A Művészetek Könyve, (The Book of Arts) Athenaeum, Budapest, 1909.
- Nicodemi, G. The Life and Works of Leonardo da Vinci, Reynal & Company, New York, 1966.
- Tiger, L. & Fox, R. The Imperial Animal, Holt, Reinhart and Winston, New York, 1971.

Marshack, A.

The Roots of Civilization. McGraw
Hill Book Co., New York, 1972.

Hafner, G.

Art of Crete, Mycenae and Greece
Translated from German by E.
Bizzarri. Harry N. Abrams, Inc.,
New York, 1968.

Du Ry, Carel J.

Art of the Ancient Near and
Middle East. Translated from
Dutch by Alexis Brown. Harry
Abrams, Inc., New York, 1968.

ILLUSTRATIONS

- Fig. 1 Computer Output Chart in "The Limits of Growth", Report. "Time" Magazine, January, 1972, p.36.
- Fig. 2 Spearheads from New Guinea. The drawings are based on a photograph of Tifalmin Tribe's weapons. N.G.S. Special Publication; "Primitive Worlds". Washington, D.C. 1973. p. 64.
- Fig. 3 Bronze Age Spearhead. The drawing is made on a bronze age spearhead, British Museum, London.
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- Fig. 5 Primitive wood column. Capital of a column from the Apadana at Persepolis.
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Fig.10 b) Fragment of a marble floor from the palace of King Ashurbanipal. Height of fragment 20". Seventh Century, B.C. British Museum, London.

Fig.11 Greek ornaments. Drawings are based on photographs of Greek vases.

Fig.12 Illustration showing the changing forms. The elements of forms are from different art objects and structures.

Fig.13 Pre-historic clay vessels. The drawings are reconstructions and are based on a study of fragments of pottery. Location of relics: Cueva de la Pileta, Spain, 1973.

Fig.14 "Sangria" pitcher from Spain. Glazed pottery from the region of Cueva de la Pileta. (Own collection).

Fig.15 Colour plate. Photographs are from N.G.S. Special publication; The Vanishing Peoples of the Earth. Washington, D.C. 1972.

Fig.16 Quantitative Chart Showing the Proportions of Time for Comparison. Data based on this thesis.

Fig.17 Illustration showing the evolution of civilization.