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Jose Delgado's "Physical Control of the Mind"

Natural Fate Versus Human Control: The Process of Ecological Liberation and Domination

Manifestations of life depend on a continuous interplay of natural forces. Worms and elephants, mosquitoes and eagles, plankton and whales display a variety of activities on the land, in the air, and in the sea with a putpose-or lack of it-which escapes human understanding, obeying sets of laws which antedate the appearance of human intelligence.

In the animal kingdom, existence of the genetic code represents a biological determination of anatomical and functional characteristics in the newborn. The growth and development of organisms after birth proceed according to a natural fate imposed by the correlations between individual structure and environmental circumstances. The fact that about 300 million years ago all the world's creatures lived in the sea did not depend on their own volition but on biological evolution and ecological factors. The appearance of dinosaurs i8o million years ago in the Triassic period, their supremacy on earth, and their peak in power 30 million years later were determined not by the will of these animal&, which had disproportionately small brains and were probably rather stupid, but by a propitious warm and sticky climate which provided a soft slosh of water everywhere and land covered with a tangle of greenery, juicy

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palms, and huge fernlike trees extending almost to the North Pole, The catastrophic end of the age of gigantic reptiles was simply the result of their inability to adapt themselves to a change in weather and lack of food. At the beginning of the Cenozoic era 70 million years ago, the air was drier and cooler than before. High plains emerged from shallow seas and ponds, and hard- wood forests towered in place of ferns and palms. This changing ecology was unsuitable for dinosaurs and because they lacked the intelligence to understand their situation, to improve their food supply, or to modify their diet, natural fate forced these giants into extinction, and in their place small, warm-blooded, furry mammals slowly grew in size and number.

The appearance of man approximately one million years ago meant only the flourishing of one more kind of animal which shared with the others most biological laws and a complete dependence on natural forces. Men, like elephants and frogs, possessed lungs, bones, and brains; pumping of blood by the heart and other physiological phenomena were - and still are - very similar in all mammals, and proceeded according to preestablished mechanisms beyond awareness or voluntary control. Personal destiny was determined by a series of biological and environmental circumstances which could not be foreseen, understood, or modified, Natural fate meant that man, along with all animals, suffered the inclemencies of the weather, being decimated by cold temperatures, starvation, and all kinds of parasites and illnesses. He did not know how to make a fire ori a wheel, and he was not yet able to influence the functions of his own body or to modify his environment.

A decisive step in the evolution of man and in the establishment of his superiority over other living creatures was his gradual achievement of ecological liberation. Why should man accept unnecessary

hardships? Why should he be wet because the rain was failing, or cold because the sun was hidden, or be at killed because predators were hungry? Why should he not cover his body with the soft skins of animals, construct tools and

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shelter, colIect food and water? Slowly the first sparks of intelligence began to challenge natural fate, Herds Of cattle Were a more reliable source of food than hunting in the forest. Some fields were stripped of the vegetation which was growing according to capricious ecological destiny, and were placed tinder cultivation by man.

Attention was gradually directed toward the human body, and skills were learned for the treatment of injuries. Broken limbs no longer meant permanent disfunctiozi but could be repaired by transitory application of branches tied with vegetable fibers. Personal experience was not lost, but could be transmitted from generation to generation; the accumulating culture preserved through a gradually elaborated spoken and written language represented a continuous advance of civilization. Men learned to ivork together, to exchange skills and knowledge, and to join their efforts to improve their circumstances. Curiosity grew continuously, and endless questions were formulated about the observed reality. Ecological liberation could progress not by hiding inside caves but by facing danger, and man challenged the immense power of natural forces, using a lever to lift weights heavier than muscular power could manage, tricking the wind to push sailing ships through the ocean, and taming the rivers to turn the grinding stones of the mills. Thus began the process of man's ecological domination, the victory of human intelligence over the fate of a mindless nature -a victory without precedent in the history of other animal species. Biological adaptation enabled man to survive under extreme climatic conditions including arctic areas, dry deserts, high altitudes, and hot tropics, but it was the intellectual and material development of civilization that really brought about the present degree of ecological liberation and domination. The winning of a considerable degree of independence from natural elements permitted human beings to direct their intelligence and energy toward endeavors more interesting than mere survival. The signs of man's power slowly extended throughout the world, transforming the earth's surface with cultivated fields,

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with cities, and with roads; joining oceans; tunneling through mountains; harnessing atomic power; and reaching for the stars. In spite of the problems associated with the development of civilization, the fact is that today the charting of our lives depends more on intelligent decisions than on ecological circumstances. The surrounding medium of modern societies is not nature, as in the past, but buildings, machines, and culture, which are man-made products. Modem medicine has created a healthier environment by reducing infant mortality, diminishing the number and gravity of illnesses, and consider- ably increasing the span of life. According to the biological law of only a few centuries ago, pestilence desolated mankind from time to time, insects spread infections, more than half of the newborn died before the age of three, old age began at thirty or forty, and only a minority survived to the age of fifty. Scientific knowledge has modified our own biology, providing better diet, hygienic practices, and pharmacological and surgical treatment.

Viewing evolution in terms of the opposition of human in- telligence to natural fate has a dramatic appeal which empha- sizes the relative importance of each factor in the determination of events. In reality, however, we should accept the fact that the existence of man, together with all of his attributes and crea- tions, including his own ecological liberation and domination, is actually and inescapably the result of natural fate. Man did not invent man. No conscious efforts Were ever made to design- or modify-the anatomical structure of his brain. Because the development of wings was a result of biological evolution, we cannot claim that birds have liberated themselves from the pull of gravity by

flying in the air in defiance of natural laws. The fact that birds fly means that they have achieved one step of ecological liberation, escape from gravity by using the lifting support of the wind, Birds can live and play in the air above all other earthbound creatures. Their wings were a gracious gift of evolution which did not require knowledge of physics, mathematical calculations, or even the desire to own wings. Nature

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seems to be highly imaginative but excessively slow; many millions of years passed from the beginning of life on earth to the appearance of flying animals. The period from the emergence of the human mind to the invention of the airplane was much shorter. The tremendous acceleration in accomplishments was determined by the development of the unique powers of imagination and reason; and it may be expected that human inventions will have an increasing role in the control of activities on earth. Birds fly, and man thinks. Liberation from and domination of many natural elements have changed ecology, and are also influencing the needs, purpose, and general organization of human life, especially in the following aspects.

Freedom of Choice

In contrast with the limitations felt by our ancestors and by members of still primitive societies, we enjoy nearly endless possibilities to pursue interests and activities of our own choice. Modern life is not bound by the physical restrictions of geography; our voices can be transmitted with the speed of light to anyone around the world; on television we can see events in any co unity as they actually occur; and we can travel to distant lands at supersonic speeds. We are not limited in food intake by our hunting skills. Instead, we may have available a variety of supermarkets ivhich display the culinary products of many countries. In the acquisition of knowledge we are no longer limited to verbal contact, but have access to many centers of learning equipped with increasingly effective teaching aids, where the different aspects of man's recorded history are collected and preserved.. We can select from a wide variety of entertainment, careers, ideas, and religions. Even parenthood can be planned, and the birth of children controlled, by the use of medical knowledge and contraceptive devices.

Today our activities are less determined by adaptation to nature than by the ingenuity and foresight of the human mind which recently has added another dimension to its spectrum of

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choices - the possibility of investigating its own physical and chemical substratum.

Limitation and regimentation of our activities are imposed mainly by education, legislation, social pressure, and finances - which are creations of civilizationrather than by environmental determination, as was formerly the case. Civilized man has surrounded himself with a multirude of instruments which magnify his senses, skills, strengths, and the speed with which he can travel, without realizing, perhaps, that in his drive to be free from natural elements, he was creating a new kind of servitude dominated by levers, engines, currency, and computers. The concerns of earlier times for crops and predators were supplanted by economic worries, industrial problems, and the threat of atomic overkill. Despite the tremendous increase in possible courses of action, the freedom an individual enjoys is becoming more tied to mechanization which is replacing the natural environment as a determinant of behavior. Liberation from ecology is paralleled by a mechanized dependence which absorbs considerable manpower for the invention, construction, and maintenance of machines. The possibility of independent behavior is certainly contingent on the availability of different paths of conduct. But the element most essential to its achievement is awareness of the many factors influencing our actions in order to assure us that our responses will not be automatic, but deliberate and personal. As René Dubos

has said, "The need to choose is perhaps the most constant aspect of conscious human life; it constitutes both its greatest asset and its heaviest burden" (69).*

Awareness

The qualities which most distinctly separate man from other animals are the awareness of his own existence and the capacity and to resist and even change what appears to be his natural fate. The degree of individual awareness differs according to per-

* Numbers in parentheses refer to sources listed in the bibliography at the back of this book.

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sonal circumstances. Consciousness is a rather expensive luxury in terms of time and effort, and we use it sparingly while performing many daily tasks based on complex series of automatic responses. Walking, for example, requires a tedious process of motor learning in early life, but once the necessary cerebral formulas for controlling movements have been established, we pay no attention to the onset, strength, speed, timing, and sequences of muscular performance; we simply stand up and walk while our minds are occupied with other thoughts. All these processes are automatic and, to a considerable extent, are characteristic of each individual. We can, however, refocus our attention on any motor aspect of walking and re-educate and modify the motor formulas to improve the elegance and gracefulness of movement, or to mimick the gait of sailors, tramps, or cowboys, as actors do.

Stopping at a red light does not require a decision because we are highly trained and conditioned to perform this action. If we pause to analyze our behavior, we may be aware of the motor activity involved in stepping on the brakes and of the reasons that we are stopping and obeying the traffic rules which only then may be questioned or even ignored. Choice is not involved in automatic responses, but if we appraise the reasons and circumstances surrounding our actions, new avenues of response are created. This applies to emotional reactions and social behavior as well as to motor activity.

Awareness is increased by knowledge of the mechanisms of the considered phenomenon. For instance, an expert is likely to notice any peculiar car engine noises, perceiving auditory signals which may not be detected by untrained drivers. Knowledge of the structure and mechanisms of the motor improves the probability of foreseeing and preventing possible breakdowns and also of correcting malfunctioning parts.

To a considerable degree, our behavior is composed of automatic responses to sensory inputs, but if we knew the genetic determinants, cultural elements, and intracerebral mechanisms involved in various kinds of behavioral performance, we could

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come closer to understanding the motivations underlying our actions. If we were cognizant of the factors influencing our behavior, we could accept or reject many of them and minimize their effects upon us. The result would be a decrease in automatism and an increase in the deliberate quality of our responses to the environment. Awareness introduces greater individual responsibility in behavioral activities.

Responsibility

Primitive man did not have the choice of going to the movies, reading a book, or watching television. He was fully occupied searching for food and fighting for survival. Today's many behavioral alternatives require that we make a conscious effort to understand and evaluate the different

possibilities, perhaps to modify or repress emotional reactions to them, and finally, to select a course of action. In many cases, these processes are performed at the subconscious level, and responses flow effortlessly; at other times we are aware of an impending act an impending act and its possible alternatives, and arriving at a decision may be difficu and tiring. The conscious selection of one path among many places greater responsibility on the individual because his activities are not determined by automatic mechanisms or external factors beyond his control. Intelligent judgment is based on an individual's personal qualities and especially on his ability to evaluate possible solutions. Individual choice entails assuming accountability for the direction of personal destiny, and the greater one's awareness and freedom, the greater the responsibility. In a small social group such as a tribe, the consequences of the leader's choice are rather limited, while in highly organized contemporary societies, the decisions of governmental co elites will affect large numbers of people. The political actions of these powerful officials concerning foreign aid, cultural ex-change, and peace and war will affect life in most parts of the world. We should remember that decision-making always in-

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volves the activity of intracerebral mechanisms which, as yet, are little known.

Accumnulation of Power

Industrial and technological developments have created unparalleled resources with immense constructive and destructive potentials. Already we have conquered the natural obstacles of rivers, seas, and mountains, and they are no longer insurmountable barriers to the activities of man. At the same time, we have accumulated megatons of atomic energy capable of obliterating all forms of life in the world.

Instruments have been invented to increase a rniltionfold the perceptivity of our senses, the power of our muscles, and our ability to process information. In addition to increasing our material power, we have greatly improved our capacity to organize and use available resources. Plans for the development of cities, industries, research, education, and the economy in general are carefully formulated by experts, and these plans are essential for the organization and evolution of our society. These developments again introduce the question of responsibility in the choice of objectives to be reached. Because of the magnitude of our material and intellectual powers, the directive resolutions made by elite groups may be decisive for the development of scientific and economic fields of endeavor, for the evolution of civilization in general, and for the very existence of man.

Major nations are constantly faced with the choice of how to use power, and conscious efforts are made to reach intelligent decisions which are expressed as national goals such as overcoming poverty, landing a man on the moon, or meeting timetables for industrial, agricultural, and scientific development. Because our resources are not unlimited, a major effort in one field, such as armaments or outer space exploration, restricts the development of other less-favored areas. The application of

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human energy to the control of natural forces is continually increasing, and perhaps it is time to ask if the present orientation of our civilization is desirable and sound, or whether we should re-examine the universal goals of mankind and pay more attention to the primary objective, which should not be the development of machines, but of man himself.

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