

No End in Sight

# Human Nature Is Still Evolving

**H**uman nature is both stable and changeable. Biologists and physical anthropologists tend to emphasize the stable aspect; historians and cultural anthropologists tend to emphasize the enormous changes that have taken place.

Man's physical structure, including his brain capacity, has changed remarkably little since he first appeared on this planet about five million years ago. Even in his interaction with the environment there are some surprisingly stable features. For instance, the number of people with whom a person establishes a real relationship throughout a lifetime has remained constant since the Stone Age; and it does not matter whether the persons with whom this relationship is established are clustered nearby or are dispersed over the globe. Also today, with our sophisticated technologies, we control the temperature of our environment, keeping it at a comfortable seventy degrees, which was just about the temperature on the plains of Mesopotamia where the human odyssey began.

Still, great changes have occurred. Natural biological evolution in man is slow, but cultural evolution has become part of natural evolution and has accelerated it at a dizzy rate. In a way it has changed human nature radically. One might even say that whether post-modern man is still *Homo sapiens* remains to be seen. A species that can fly is different from one that cannot. A species that can transport itself out of earth's biosphere to other planets is dif-

ferent from an earthbound species. A species that can transplant vital organs from one member to another, blurring the boundaries between this individual and that individual and between life and death, is different from a species whose members cannot do this.

Curiously, the higher you go on the side of cultural evolution, the further back you go on the side of natural evolution. For instance, technology has given us wings so that we are birds again, and birds, of course, came earlier, much earlier in the process of natural evolution. Technology now is about to give us gills so that we may return to the depths of the seas where life began.

Or take the beginning of life. In the beginning, life was sexless. When sexual reproduction came into existence, multiplying the possibilities of hereditary combinations and speeding up evolution, male and female alike expelled their sexual products into the surrounding waters. Fertilization was external and the maturation of the fertilized egg was external. Then fertilization was internalized, but the maturation of the fertilized egg was still external, the birth and growth of the young was external. Then gestation was internalized, and the mammal came into being. First the fetus was expelled at an early stage in the gestation and carried externally, as in a marsupial pouch. Then internal gestation was prolonged over ever-greater periods of development: the young animal, e.g., calf or horse, was born to the light in almost



perfect shape and ready to cope with life on its own terms after only a few months.

Now we are at the turning point. *Homo sapiens* is the last mammal. There won't be other mammals after him. His baby, far from perfect, is helpless, unfinished, like the little marsupial. But the mother, to whom he is so long attached, is at the end of her mammality. Especially in the higher classes, in the cities, among intellectual and professional women — that is, among the most evolved specimens — breast milk is scarce. So lactation is being externalized.

And mothers go to work, and the more work there is for mother, the more hazardous becomes gestation. Premature births are common. Mother's physical build — tall and slender — does not seem particularly suitable for childbearing and childbirth labor. But premature births are no longer as dangerous as they used to be. There are incubators.

Thus, gestation is externalized; and the incubator-plus-formula corresponds to the egg.

Also there have been promising experiments in fertilizing a human ovum in a test tube and raising the embryo there. The first of these was carried out in 1961 by an Italian doctor, Petrucci. He raised his externally fertilized embryo for twenty-nine days, at which point he discontinued the experiment, under pressure from the Church. So fertilization had been externalized; test tube replaced the primeval waters; and scientific planning superseded chance.



All this may seem scary, but not to me. Evolution is now in our hands. "Through billions of years of blind mutation," Herman Muller has said, "microbes finally emerged as man. We are no longer blind; at least we are beginning to be conscious of what has happened and of what may happen. From now on, evolution is what we make it."

While human nature — indeed, the nature of life — changes and yet remains always the same, our awareness of ourselves continues to change and expand as our awareness of our environment changes and expands. The explorations of outer and inner space and of external and internal oceans are simultaneous.

To better understand human nature we must do four things. We must study animal nature. We must find out whether there is one human nature or whether there are different human natures — for instance, male and female. We must come to terms with the impact of technology on human nature. And we must

study the interactions among world order, social organization, and human nature. These are four massive areas for exploration.

Western man in the last few centuries has adopted and maintained a remarkably huffy attitude toward the animal kingdom. This was conditioned by his faith, which made him the king of creation, and by his ambition to subject all of nature to his domination. He believed that only he was endowed with an immortal soul (which sometimes he even denied to his companion, woman); he thought that only he could master a language, use or invent tools, engage in artistic activity, and have a religion. These convictions grew with the advance of reason, rationality, and Western civilization. In the process man forgot a lot of what he knew during his more primitive stages when he was immersed in myth, when he had a reverence for life and a sense of unity with nature — attitudes which have survived more in the Oriental cultures than in our own.

Now, however, our knowledge in the field of animal intelligence and our communication with animals are growing. The distinctions between man and the rest of the animal kingdom are breaking down. We see that capabilities, once assumed to be uniquely human, are in fact shared.

It is fascinating to search for the roots of language, technology, art, even religion, in the animal kingdom. This is an infant science; we do not know yet where it is going.

What is certain is that animals have very complex systems of communication, and that they have the capacity to learn a new language, even our language, to a much higher degree than we would have given them credit for even a few years ago. Of course, it was primitive on our part to expect that they could use their vocal cords the way we do, and to make them go through all sorts of contortions to have them pronounce words like "mamma" or "daddy." Today we are more sophisticated. Some scientists have taught chimpanzees deaf-mute language; others work with other symbols, different colored shapes. In both cases the chimps can without difficulty make logical constructs or sentences — even complicated ones — and convey information or the expression of desire.

I work with dogs. I teach them to type on an electric typewriter. I also teach them numbers. After three months of work my English setter puppies can count to at least thirteen; they know odd numbers from even; they can identify the largest number and the smallest number in a set; and they can add. Evidently they are endowed with the instruments of



logic, of symbol using, of abstraction. This is established now, not only for mammals high up on the ladder of evolution, but for simple animals, such as pigeons and goldfish. Even worms can learn.

As far as technology is concerned, there is an animal technology from the simple making and use of tools (e.g., a chopstick to dig eggs out of an ant hill, as chimps do, or a cudgel used as a weapon) to elaborate technologies (the beavers' damming of rivers for the transport of lumber; air-conditioning in termite structures; radar in bats, sonar in dolphins). This is what we know today, but we still know very little. We can see only what we already know. We had to invent air-conditioning and radar and sonar before we could discover that they existed in nature.

As far as art is concerned, there are all sorts of proto-art in the animal kingdom, although we fail to recognize most of it. Among the things we do recognize and marvel at are the painting, sculpture, and mosaic work among the bower birds of Australia.

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They decorate their bowers with shells, colored glass, shining objects. Some paint their walls with fruit pulp, wet powdered charcoal, or paste of chewed-up grass mixed with saliva. One species, the satin bower bird, makes a tool from a wad of bark to apply the paint. Others garden for a hobby. Members of one species decorate their nine-foot-high bowers with living orchids. Others build huts before which they plant lawns of moss and on these, most painstakingly, they arrange colored fruits, flowers, fungi, and other objects. When the flowers are wilted, they throw them away and replace them with fresh ones.

The roots of religion, or proto-religion, are hardest to determine. There is hardly any literature on this subject. However, that there is ritual in animal behavior, that there is "superstition," exorcism, and some relationship to dream and to death have been documented.

If we knew more about animal art, we would understand human art better. If we knew more about

the roots of religion we would understand our own religiousness in a deeper way. Our new awareness of the continuity of spiritual as well as physical life changes the concept we have of man and his position on earth. The more we know about animals, the more we will feel that we are part of nature; we will feel a reverence for nature which we lost during the last few centuries; we will fear to destroy our environment because we will see that we are thereby destroying ourselves.

So we are a part of animal nature. But technology, the world of machines, is a part of us. Technology cannot be unnatural. Technology, too, is part of animal nature, not only because it exists already in the animal world but also because of our own relationship to it. Technology is part of human nature. Heisenberg predicts, "In the future, many of our technical apparatuses will perhaps belong as inescapably to man as the snail's shell does to the snail or the spider web does to the spider. The apparatus would then be rather a part of the human organism."

Technology has no moral dimension. What is good or bad is the use we make of it. I cannot accept the idea of a technological imperative, the notion that technology is something autonomous and devilish which, in the end, will destroy mankind and probably the whole world. The outstanding exponent of this theory is Jacques Ellul. It sounds to me like a theology of doom rather than a scientific theory, and I don't like it.

I see technology as both cause and effect of human evolution. That is, there are feedback relationships among social systems, technology, and human nature.

Take war, for instance. War is a human institution that has existed, more or less in its present form, for at least a few thousand years. War has created a technology which in turn has considerably changed the nature of war. I do not think I am unduly optimistic if I say that we may have reached the point where the technology of war is abolishing war itself and thereby transforming our social and political systems. For war is a symptom rather than a cause; it is an intrinsic part of the system of nation-states in which we still live. And you cannot simply lop war off, as it were, and leave the rest of the system intact. To abolish war means to transcend the system of nation-states.

Now, of course, technology cannot abolish war if war is "part of human nature." I claim it is not. War is rather the institutionalization of behavior that is



symptomatic of the form of our social and political organization. Slavery existed over a long period of time, too, but it was abolished by the technology of the Industrial Revolution. A machine-based, industrial society had no room for slavery, so we could give vent to moral indignation against the injustice of slavery and credence to the Christian faith in the equality of all men . . . and abolish slavery.

Today technology has disintegrated war as a social institution. The destructiveness of what are now called "weapons" is such that any act of war increasingly resembles an "act of God," that is, a natural catastrophe of the highest magnitude such as the sudden disappearance of a continent. It is clear that the classical "laws of war" — for instance, the distinction between military and civilians, or the rules for the treatment of prisoners of war — no longer apply.

Furthermore, what constitutes a "weapon" is increasingly difficult to define. Weather control and modification can be a formidable weapon as well as a benefit to mankind.

Also weapons capable of exterminating a population can be fabricated by a scientist — even an amateur scientist — in a basement laboratory and can be delivered by a guerrilla.

It is obvious that under the impact of such weapons-technology the traditional approach to disarmament, arms control, and inspection is ineffectual. But this need not make us pessimistic. It simply means that war has ceased to be a usable instrument of policy-making for nations. It means that nations that cannot resort to war as a means of policy are not sovereign in the traditional meaning of the word. Something fundamental is happening to the nation-state. Technology has played a crucial role in transforming our social and political system.



What about the interactions among social organizations, world order, and human nature?

I do not conceive of world order as something in the future toward which we are moving, starting, let us say, with the individual — "natural man" — who then organizes his family, the families merging into tribes, the tribes into cities, the cities into nations, the nations into continents, and regional federations into a world federation of nations. Things just do not fall into place that way.

I think of mankind as a system — which it has always been — in which two forces, one centripetal and integrative, the other centrifugal and disintegrated,

are working. In this system, under the impact of these forces, a continuous regrouping and recluster- ing take place.

For a few hundred years we have been living in an era of nation-states. We have been living in a hierarchical, vertical order, a closed order, one based on property, power, and sovereignty, an order dominated by Western, Judeo-Grecian-Roman values.

Now we are regrouping. We are going to live in a postnational or transnational era in which nations will still exist, but they will no longer be the sole actors, or even the protagonists, on the scene of world history. Other forces and other forms of organization — economic and cultural — are taking their place. We will live in a horizontal order, where men will again participate in the decisions that affect them. We will live in an open order, with everybody being part of and moving freely within a number of overlapping subsystems in which one's work, leisure, economic, cultural, and spiritual life are organized. It will be an

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are rolling in on  
the wave of the future*

order based no longer on property, on power, or on sovereignty, for all these concepts are eroding under our eyes. And it will be an order no longer dominated by Judeo-Grecian-Roman values. The new life-style will be infused with Oriental values, which is symbolized by the drama of China's entry into the world organizations.

The centrifugal and centripetal forces at work in this regrouping are not contradictory, but complementary.

Nation-states now tend to break up. This is a worldwide phenomenon, affecting developed as well as developing nations. I have only to mention Northern Ireland or Croatia, Katanga or Nigeria, East Bengal or Québec as illustrations. The Black Power movement in this country should be viewed in the same context, as should, for that matter, student power or even woman power.

What is remarkable is that the forces of law and order, sophisticated and formidable though they may



be, are less and less capable of coping with these internal-disintegrating movements, just as, externally, they are impotent in the face of even weak, undeveloped peoples, as in Vietnam.

Each of these forces or movements has its own physiognomy, its own roots in its own history, and its own goals. But what they all have in common is an urge toward self-determination, self-management, participation in decision-making on a scale that is comprehensible in human terms.

Self-managing and self-governing communities — whether of a cultural, nationalistic, racial, economic, generational, or other character — will be much more important as the infrastructure of world order than they have been in the era of the centralized nation-state. This is an easy prediction.

If the centrifugal force thus undercuts the power of the nation-state, the centripetal force overcuts it. This force is engendered in all those areas of human activity which are too broad to be managed within the confines of a nation-state, however large that state may be. Such activities, in fact, must now be managed in a global perspective.

One such area is the management of the world's oceans and their resources. A new type of transnational organization will have to be created to take care of the oceans. This is not a pipe dream but a political reality. The Seabed Committee of the United Nations General Assembly is now preparing for a general conference on the law of the seas to draw up a treaty establishing an international ocean regime for the peaceful uses of ocean space and resources for the benefit of mankind as a whole, with special regard for the needs of the developing nations.

In trying to establish an organization for the management of ocean resources, we must tackle all the problems of world government. This includes questions of constitutional structure, distribution of voting power, relations between large and small and developed and developing nations, planning and resource management, conservation, regional and global development, taxation, diversity and unity, sovereignty and property, rights and responsibilities, a new science policy, and the control of technology for the benefit of mankind.

If we find solutions for these problems in the functionally limited and relatively noncontroversial area of ocean resource management, we may then apply these new formulae, with the necessary adaptations, to other transnational activities such as earth resource management, energy management, weather control, outer space, communications — all areas of activities

that have become too large for the nation-state to manage.

At the Center in our work on the oceans we hit on something that might be a new approach to peace and disarmament. Two things became clear. One, that the industrial uses and the military uses of ocean space conflict. As the industrial uses increase, the military uses are bound to recede. In our work on the oceans, therefore, we did not stress disarmament as a prerequisite for the establishment of an ocean regime. That approach would be hopeless. But if the peaceful uses of ocean space and economic coöperation in the oceans proceeds, the military uses will simply be crowded out. War among the members of the ocean regime will then be as unlikely as it has become among the members of the European Economic Community.

The second thing that became clear is that the same instruments on which the international community must rely for the monitoring of pollution and to perform scientific and industrial research, will also serve to uncover military secrets. As a result, they will render obsolete most of today's weapons systems.

The same applies to the new instruments to survey earth resources. Resource satellite pictures will have a resolution of about thirty-two meters on the ground, compared with about a five-kilometer resolution for weather pictures. Resource satellites are forcing a change in the whole concept of security, and so a new international understanding will have to be devised.

Therefore, it is not that nations must disarm in order to get peace. Rather, the kind of international organization we have — the European Economic Community — or will have — the ocean regime, or the International Earth Resource Management Organization — are intrinsically peace systems. As such, they will relegate one weapons system after another to museums of surrealistic art.



All these integrative and disintegrative forces, the trends to new forms of transnational organization and new forms of self-managing and self-governing entities on an intermediate level — whether of a political, economic, cultural, or other character — will interact.

"Interaction" may well become the new catchword to give a common denominator to many of our activities. These activities will continuously engender their own autonomy. Sovereignty, which is a static concept and territorially limited, will be transmuted into the



idea of an autonomy continuously engendered by interaction, which is a dynamic concept resulting from the two forces of integration and disintegration.

But these forces do not stop at the intermediate level of the self-managing community. They affect each individual and help determine human nature.

I cannot conceive of man outside the context of his social environment. The dichotomy between the individual and society is no longer tenable. The individual is not the basis of the social structure, or the beginning of the process of social integration. The structure has no basis — let us think of it as spheric — and the process has no beginning; it feeds back upon itself.

Although we are by no means “beyond freedom and dignity” — nor do we expect or wish to get there — it is clear that when we say we are free we are mostly deceiving ourselves. We are largely the products of our environment, culture, economic status, and the kind of stimuli we are exposed to from the time of conception onward, not to speak of our genetic heritage.

Man is not really an individual but a network of interacting forces, a shifting nodal point of influences. Statistically, we really can whittle him down to non-existence.

It is in his interaction with environmental forces and influences, however, that man gains his autonomy, develops his responsibility, and creates a freedom that did not exist and which must be re-created continuously. His self-awareness increases with his awareness of his environment. And increasing awareness engenders increasing interaction, remaking his past, directing his future.

A final question: Is there anything that we can solidly and stably call female and that determines women's role in society once and for all?

From my description of human nature it follows that there can be no such thing as femaleness. Like all other aspects of human nature femaleness results from forces and influences — natural, cultural, and technological. The nature of femaleness changes with changes in social organization, and so does the role of women. Theoretically, there is no limit to this changeability. With present instruments of social and biological engineering we could, theoretically, even abolish the differences between male and female. This point, far advanced on the scale of cultural evolution, would correspond to a point very far back

on the scale of natural evolution where life went on — neither male nor female — and perpetuated itself by simple cell division.

But we need not go as far as that. Descending once more into the animal kingdom in order better to understand our own nature, maleness and femaleness have taken various shapes and engendered various relationships throughout the evolution of life. In some species the females are huge, the males are tiny; in others the females are numerous, the males are scarce; in some species the females are colorful and do the display, in others the males do; in some species the females are dominant, in others the males.

In all cases, however, the relationship between males and females and their respective roles are determined by the social organization of the species. And there seems to be another rule: the more social the species, the more important is the female; the looser the organization of the species, that is, the more individualistic it is, the less conspicuous is the female. The most social of all species, the social insects, are totally dominated by females.

Deep down we seem to be aware of this affinity between femininity and collectivity. It permeates our mythology, our psychology, even our language. In the history of language, the plural form and the feminine form were born together. Originally they were identical. In all languages there are still traces of this.

In our own social evolution, movements of women's liberation have coincided with trends toward more community-oriented social organization. All socialist and communist revolutions contain an element of feminine revolution. Primeval society, which was communal, was also matriarchal, although this thesis is now being contested. But at any rate, women have played a crucial role in society.

Our generation seems to be groping for a new equilibrium between society and the individual. We have developed a concept of human nature which does not recognize any conflict between these two aspects of human nature. If this is so, it will have a profound impact on the nature of femaleness and maleness and on the participation of women in the social and political order.

The world order that I have tried to sketch, and the order of self-managing, interacting entities articulating this world order on the one hand and individual interaction on the other will be an order in which “the feminine problem” will no longer exist.

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