The Future: Do We Have a Choice?

Our choice is to accept change as inevitable; our challenge is to achieve greater agreement on priorities by integrating intellect and intuition.

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Exterior of a 21st century space colony for 10,000 people.

Our world today is the scene of rapid technological, social, and economic change in individuals and of fundamental transformations in society. It is a world of deep division between technology and humanism. This situation and its ramifications suggest to me four theses.

1. Today, as never before, we are in the process of creating a new world for ourselves.

We are living in the most dynamic generation since human beings began to evolve sociocultural systems more than three million years ago (Platt, 1981; von Puttkamer, 1981). Only a few human lifetimes were needed to create a situation that, viewed historically, represents absolute novelty: for the first time in our evolution we are able to

- manipulate, control, and change our own biological genetic substance
- carry out collective self-destruction by interacting with the elementary building blocks of our world
- create a worldwide communications and information network of an extent and effectiveness never dreamed before
- throw off the shackles of our planet in the course of spreading out in the universe.

But the development of technology is not an evenly progressing process; it is not a smooth curve with an easily foreseeable, predictable linear rise of our capabilities in such key areas as transportation, energy, food production, and health care. Technological progress is really a climb up to a capability plateau, a climb that is at first slow, then more rapid, and then again decelerating, as if up a staircase with steps and landings. After a pause, the process repeats.

Thus, the evolution of technology proceeds in successive advances and pauses of consolidation. In doing so, it reflects the reaction of every natural development to external pressures and stresses, including our struggling to catch up with the forward-leaping development and to hold it back for as long as it takes to assimilate it, to digest and

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understand it, and to enrich it.

In this way, tremendous and largely unexpected quantum jumps of cultural evolution are taking place in all areas of our civilization. With them, we establish new niches in nature for ourselves. Nuclear energy has been likened to the Promethean discovery of fire, television to Gutenberg's invention of movable-type printing, and our first steps into space to the pioneers' opening of the Western frontier of North America.

Extending Ourselves into Space

The space program is an excellent example of these jerky quantum leaps in technology. On April 12, 1961, Yuri Gagarin became the first human to be launched into space. Since that time well over 150 humans have flown into space. In the same period, we have seen the landing of 12 men on the moon along with scientific equipment and three electrically driven automobiles, the landings of unmanned research stations on Mars and Venus, and the journeys through the solar system of human-built robot probes to the planetary systems of Jupiter, Saturn, and beyond on immense voyages, becoming our extended sensory organs and, thus, our telepresence. Those messengers carry to other stars our greetings and descriptions of our cultures on metal plaques and phonograph records. They are not machines in the traditional sense of the word but parts and extensions of *ourselves*—an early hint perhaps at the cybernetic beings of the future who will come after Homo sapiens.

The developments of our space flight capabilities in a mere 22 years suggest a strange lawfulness, purposefulness, and perseverance, even inexorability, that seem to run through them like a red thread. When I look at the present, at the rapid emergence of the Space Shuttle, the revolutionary new transportation system that made its maiden flight 20 years to the day after Gagarin's pioneering flight, this sense of the inevitability of our growth is telescoping. With the Space Shuttle alone, we will fly between 1,600 and 2,000 humans into space in the next 15 years.

While the Soviet Union is well ahead in the development of an Earth-orbiting space station, in the United States we, too, are working on a program of permanent presence in space. If the current Administration approves, this should give us a space station by 1991, with the Europeans, the Japanese, and the Canadians participating—the largest cooperative international effort in space exploration history. Thus, permanent occupancy of space today is the declared goal of the space flight efforts of the major nations on Earth. Take a step back and look at this. Isn't it kind of odd? What in the world makes us do all this?

MAJOR EVOLUTIONARY JUMPS ON EARTH

TIME—Years Before Now	EARLY LIFE −4,000 M	MULTI-CELLULAR −1,000 M	EARLY HUMAN −3 M	POST-GLACIAL −10,000	MODERN −600	PRESENT TRANSITION −40
Functional Areas						
BIOLOGICAL EVOLUTION	Sexual Crossing	Migration		Domestication and Breeding	Disease Control, Contraception	Molecular Biology, Genetic Engineering (Cloning, Recombinant DNA)
ENERGY CONVERSION	Photosynthesis	Plant-Eating	Fire	Agriculture, Wind and Hydro Power	Coal-Steam, Oil, Electricity	Nuclear Power (Fission, Fusion), Solar Electric (Space Power)
HABITATION (ENCAPSULATION)	Cells; Ocean Niches	Shell, Skin, Bark, Land	Clothes (all climates)	Cities (all continents)	Western "Frontier"	Underground, Ocean-Bottom, Arctic Habitats, Space Stations/Bases
TRANSPORTATION	Drift	Fins, Feet, Wings	Boats	Horses, Wheels, Ships	Railroad, Automobile, Airplane	Wide-Body Jets Space Shuttle
TOOLS & ARMS	Chemical	Teeth, Claws	Tools; Weapons	Metal	Machine Guns, Explosives	Automation; Rockets; Nuclear & Particle Weaponry
DETECTION & SIGNALING	Chemical	Hearing, Vision, Echo-Locating	Speech	Writing	Printing, Telephone, Radio	Electromagnetic Spectrum: Radar, Laser, Television, Satellite-Communications
PROBLEM-SOLVING & INFORMATION STORAGE	DNA Chains	Nervous System & Brains	Oral Memory (Tales, Myths), Prediction	Mathematics, Science; Logic	Science & Technology ?	Electronic Data Processing, Computer Storage, Feedback Control
MECHANISMS OF CHANGE	Accident/Mutation & Selection	Foresight, Reinforcement	Thought	Invention	Research & Development	Systems Analysis & Design, Large-scale Project Management, Deliberate Invention of Evolutionary Jumps (!)

Adapted from: John Platt (1981)

Here arises the disturbing picture of a manifest evolution in which our steps into space appear to follow an invisible but real agenda, a master plan stored in us on some deep-down level—some say, on the genetic-instinctive level. A more recent school (Charon, 1977) even talks of the elementary particles, of processes on the quantum level. This level seems to obey, along with other natural phenomena, the principles of a self-organizing universe. But more about this later.

A Dynamic Age

There are equally enormous quantum leaps taking place in most other areas of our civilization, changes that make ours the most dynamic age in all of human history. For example: in *biology*, the breakthroughs of molecular biology and genetic engineering with DNA recombinations and cloning; in *medicine*, the linking of body systems with the microelectronics of modern cybernetics and the implantation of foreign and artificial organs (for example, the artificial heart in the United States), in *energy*, nuclear power (fission and fusion) as well as solar energy; in *housing*, the development of new environmental modification and habitation technologies—on the surface, underground, on the polar ice, under the sea, and in space; in the area of *tools and weaponry*, the "artificial intelligence" of robotics, large-scale automatics, and new nuclear, laser, and particle weapons; in *communications*, worldwide satellite television and interactive cable television; in *applied psychology*, behavior modification; in *socioeconomy*, the credit card and the cashless society; to handle new magnitudes of *problem solving* and information storage in this age of knowledge explosion, electronics and large-scale computers; as *mechanisms of change* and planned progress, systems analysis and the systems approach of modern program management; and in the *transportation* sector, new traffic systems on the ground (*Shinkansen*, TGV, Mag-Lev trains), in the air (wide-body jets, Concorde), and in space (reusable Space Shuttle).

It is foreseeable that these powerful new capabilities will bring our current transition phase to an end. Because of the cost of their introduction and their corresponding amortization time, they will likely continue to determine our future for quite a long time. It seems almost a miracle that in all this change we could also foresee the problems that arise from our forced evolution and test them for acceptability before they become *faits accomplis*. This is a unique evolutionary privilege for a species; it is all the more tragic that collectively we seem incapable of using this foresight properly.

Thus, we are faced with the problems of an adaptation process that in the past two centuries we have only partially consummated.

Yesterday's Thought Models

The old values are breaking down so rapidly and so thoroughly that they cannot be replaced fast enough by new ones. Such "progress" frightens those who do not understand the nature of change and who meet today's world with yesterday's thought models. We think we no longer control our destiny but are victims of dark powers. We have no integration model to give us the inner "holistic" insight to see that growing roots and achieving equilibrium in our modern times can be synonymous with stagnation and the ultimate equilibrium—death. Our strong fluctuations around the state of equilibrium are prerequisite to growth.

Our first reaction to all this new knowledge is fear. As dogmas crumble, it is as if the floor and the roof of our familiar house have vanished. There is a sense of uprooting and demythifying, of devaluation of our old cultural structures. We find that everything we believed in is illusion! At the thought of the immeasurability of space, fear grips us. God has grown beyond comprehension and has *really* become God. What are we compared to all *this?*

We feel lost and useless. But we are neither. According to Teilhard de Chardin (1973), the Jesuit paleontologist and philosopher, this fear is turned to consolation and, yes, joy as soon as we realize the reason for evolution. It is, in his words, the "explosive joy of a life that finally has found for its expansion an *infinite* space."

2. Because the adaptation process has not been accomplished fully, there is social fragmentation, polarization, and hostility toward technology.

Whereas before the 16th and 17th centuries, human beings were part of the hierarchical structure of nature, at the top of which they had been placed by the church, today we are witnessing a dynamic growth process in which human beings treat nature increasingly as an object to be subjugated. But here, too, wondrously enough, we can gain from mistakes: in the process of subjugation, we are becoming more and more aware of the critical interdependence of all ecological systems, ourselves included.

Humans have always transformed nature—and nature humans. How can we continue to grow as an integral part of nature, living with it symbiotically and transforming/evolving jointly without subjecting it to unauthorized interventions? Which interventions are authorized? Without mutually agreed upon ethical principles, we are clearly stymied by a critical schism.

Nature vs. Technology

What bothers us today is the problem of the clear conflict of nature with technological/industrial society, of the separation of body and soul, of mind and matter, of science and religion, of knowledge and wisdom. In the early periods of our evolution, we were still wholeness-related, "integrated" in our thinking. Today, such world models are found only in the East, particularly in India. In the West, we are cleft down the middle, and the fragmentation causes modern Western society to be polarized by its own growth again and again.

The cleft is everywhere. Maslow defined the natural dichotomy of human perception as "rational" vs. "intuitive," Hilgard as "realistic" vs. "impulsive," Schopenhauer as "objective" vs. "subjective," Ornstein as "analytical" vs. "holistic," Blackburn as "intellectual" vs. "sensuous," Levy as "analytical" vs. "Gestalt," and Sperry as the left and right hemispheres of the bicameral brain. The character of knowing is dichotomous by nature; twofold but in harmony. "The map is not the territory" (Alfred Korzybski). Technological Western society has essentially ignored this; it has evolved almost exclusively on the path of measuring, of ratio, of analytical thinking. This has made possible our society's immense physical growth and has gained for it the world but it has also rigidified it in dogmatic systems, making it lose its soul.

The fragmentation of technology and nature, and beyond that, of body and mind places us in a dilemma that is thoroughly terrifying to many. Modern

physical and biological technologies pose moral problems. Many humans are burdened heavily by the worry that in achieving technical progress, they might ignore the need for equal progress in inner-human and inter-human development. Their dilemma is made more difficult because they do not understand two essential points: the nature of change as an expression of life, and the need for new ethics required by that change.

If material aspects alone were considered, how could increasing order be possible in our universe—a universe that, according to science, seemingly started out with increasing entropy (or disorder) but appears to be fabricating increasingly complex, higher-order machines, humans among them? How could particles organize themselves into higher forms, from viruses to humans? How is this self-organization of the universe explainable except by an additional elementary factor not included in our traditional school physics? We need a new model to help us answer this question.

3. A way out of the fragmentation is possible only with thinking that strives for wholeness: a self-renewal that must come from rationality (science).

In today's science, the classical physics of Galileo, Descartes, and Newton cannot describe processes in the subatomic realm. Newton's mechanistic world model, adhering rigorously to cause and effect, is breaking down in today's physical world view, which sees reality as a "complicated web of relations between the various parts of a unified whole" (Capra, 1975), as a dynamic "dancing" pattern of energy processes in which causality assumes the character of psychological phenomena; that is, of thoughts, of manifestations of consciousness (Charon, 1977). The British astronomer James Jeans (1932) observed: "The universe begins to look more like a great thought than like a great machine."

Modern physicists are being told by Eastern philosophers (of Taoism, Buddhism, Hinduism, and Japanese Zen) that in the universe of the mystic this dynamic process thinking is nothing new, and that the "implicate order" that physicist David Bohm (1982) sees "behind" everyday reality as we perceive it has been sensed by the "illuminated" of all times whenever they experienced the world as absolutely connected and ordered. The points of departure of both sides, of course, are different. But in some areas of research and experience, clearly, the thought is forming that the world is an interconnected whole. The connection, moreover, may run over that which we call consciousness, corresponding to Sri Aurobindo's concept of wholeness as total consciousness (Satprem, 1968).

Degrees of Consciousness

In a way Teilhard broke through this no-man's land separating science and theology, providing the beginnings of a new model for Western society. This model attributes an elementary consciousness, almost a soul, to everything in creation, saying that the human soul is distinguished from the consciousness of an animal, a vegetable, or a mineral only in degree and not in nature. Thus, humans are only a link in an unbroken chain of consciousness development from Point Alpha, the beginning of creation, to Point Omega, the end of creation—still millions of years in the future, for to us the timeless instant of creation appears of astronomical length. In this view, humans are the culmination of a species, but there will be other human beings after us, with higher consciousness, until all matter has disappeared and all is spirit, pure consciousness.

Now, Teilhard was an anthropologist and not a physicist. Thus, he never attempted to link his convictions to the results from research in theoretical physics on elementary particles and quantum processes, as some modern thinkers have done (for instance, Charon, 1977). But he examined the problem with rigorous attention to scientific logic and came from the general to the specific by investigating, with minute exactitude, the evolution of the total universe from the mineral to the animal and from the animal to the cerebral. In Teilhard's view, certain complex structures, evolved from the union of simpler structures and completed in the course of time by the addition of matter, cause a "resonance" of the "psyche" or "consciousness" dwelling in each particle. They intensify in this manner the spirituality of each single particle of the material body, at least as long as this particle belongs to the complex structure in question. From this develops a total consciousness that is higher than the sum total of the individual consciousnesses. This effect leads humans from individuals to groups, to tribes, to townships, to cities, to city states, to nations, to international unions, and on to globalization or planetization of humankind.

Teilhard did not agree with Charles Darwin's explanation of evolution as the "survival of the fittest" in the battle for existence. He took the survival of the fittest to mean really the "survival of the more complex" because this, after all, is what manifestly drives the world to a higher consciousness.

A re-evaluation of our mindsets, thus, is necessary but it would be naive to suppose that we could go back to the original state of wholeness, before the East/West fragmentation. What *could* be done lies more in the direction of an exchange of values. What would that connote for Western people, rigidified in their systems, in a world that is founded on measuring and the measurable? They would need to integrate in their model the reality of the immeasurable—fundamental to the wisdom of the East—in order to lose their dogmatic rigidity, the root of fragmentation.

If, on our way to the third millennium, we are indeed capable of bringing into accord the measurable and immeasurable in ourselves, we could win originality, creative power, and flexibility (freedom from dogma and fear). The gain could mean the capability of better "measuring," the emergence of new mental attitudes, and a more unanimous humankind with a more complex consciousness—which would call for a new system of ethical principles.

4. The desire for integration is prerequisite to unanimity, which is prerequisite to a more universal ethic, which is prerequisite to a new humanism of growth.

The essence of change is nonequilibrium. Life itself consists of dynamic fluctuations around the state of equilibrium. As Nobel laureate Ilya Prigogine has discovered, an organism that has been "disturbed" away from equilibrium will always tend to reorganize itself in a more complex and more *capable*

form as long as a sufficient external supply of energy is at its disposal. With his self-reproducing hypercycles, Nobel laureate Manfred Eigen (1971) has provided a model mechanism for the procellular evolution of complex nucleic acids and proteins, the building blocks of life. As Erich Jantsch (1980) has shown, this mechanism of self-organization also applies to present-day humans, both as individuals and as a collective. Even the entire universe seems to be following this principle. But, again, for humankind, the notion of "more capable" can no longer be understood as "survival-fittest" in the sense of Darwin, as misinterpreted by Nietzsche, but rather as "more complex" in the sense of Teilhard de Chardin (1965).

This perspective enables us not to see just chaos when we perceive the disintegration of old structures taking place all around us, but to sense the new order that is clearly forming before our eyes, even if it causes pain, requires individual sacrifice, and leaves shards. If humans learn not only to tolerate but also to deal constructively with insecurity and uncertainty, we can gain in mobility and vitality.

Our technology, be it the printing press, the computer, or the Space Shuttle, is a manifestation of our further biological-cultural evolution: new limbs, additional brain power, longer life-spans, greater reach, more knowledge. With the power of our minds, we have made our technological and biological evolution historically equivalent. What technology has not given us is wisdom. What we need to achieve is a new humanism of growth that brings together again culture and technology, body and mind, matter and spirit, knowledge and reason, science and religion for continued co-evolutionary development.

Science and technology have been created by the human mind as instruments of evolution that can form humanity out of individual humans. For example, advanced satellite communications linked with TV can influence people's lifestyles and interactions as profoundly as the Gutenberg press and the Mergenthaler linotype. In the long-range future, through communications and education, the powers of this instrument—science and technology—will enable the coming together of humanity in ever greater collectives, with ever increasing collective consciousness, and ever growing communal bonds between humans as hunger and illiteracy, the two greatest barriers to a positive future, become obsolete and a sense of unanimity develops. In this model future, we will then see Earth and all humankind really as one whole.

Spaceflight with its technologies and its global cultural effects may provide the potential for helping to bring peace on Earth and to advance human development toward unanimity. This paradigm says that the conflicts of races, nations, and power blocs will one day come to an end as did those of individual clans and city-states in the past.

New Ethics of Humanization

But this requires a more total ethic. According to André Cournand (1981), the industrial nations must develop new and effective ethics to serve as a model for nations, regions, and ethnic groups in order to favor the maximum "humanization," the most appropriate application of technology according to basic needs, and positive projects for the future with a decent way of life for every human being as a fundamental objective. Suggestions for such ethics in which science plays a crucial role include the "ethic of knowledge" of Jacques Monod and—fundamentally opposed—the "ethic of development (to serve humankind)" by Massé.

Suggested basic principles guiding a total ethic (perhaps in the spirit of Erich Neumann, 1964) may include, as examples: (1) we must have reverence for all life (after Albert Schweitzer); (2) we are part of cosmic evolution (after Teilhard de Chardin); (3) the human being is primarily the end, not just the means (after Immanuel Kant); (4) when we learn to live with the uncertainty of growth, it becomes joyous certainty (after Teilhard de Chardin); and (5) social justice and human equality take precedence over economic parity.

As Teilhard clearly recognized and others today agree, the required higher complexity of humankind is inevitable; it is happening all around us, and technology furnishes the necessary tools. But to use them properly requires understanding; that is, insight, knowledge, and wisdom. Or, as Teilhard would say, recognition, reflection, love, and action—the four forces of the mind that must first be acquired. Thus, building the bridge between the sides starts with formidable learning.

This, then, is the choice that we have, and it is a challenge to educators—to the representatives of the spiritual and humanistic bank of the river: new types of psychologists, teachers, pedagogs, sociologists, priests, ministers, spiritual advisors of "wholeness"—all those who help to form minds and can free themselves from dogma. It is the challenge to show humans the way to more complex thinking, to coming to grips with the seeming paradoxes of our existence, to look behind the apparent differences of contemporary ethical systems, to combine reasoning with sensing and feeling; that is, to better integration of intellect and intuition and greater unanimity on ethical priorities. It is the challenge of all challenges, the "Apollo Program" of the humanists.

It is the only choice we have.□

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