

# Reinventing the future

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I have proposed that we possess a very powerful mental capacity for recognizing, tracking, modeling and participating in nonlinear

self-organizing systems. This mental capacity matches external nonlinear processes to the rich and swift internal ones of the brain itself.

It is our sense of beauty, what we have rather awkwardly euphemized as our *aesthetic sense*. We euphemized it partly because it involved an ancient, familiar, shame-ridden experience, as pleasurable as it was inexplicable, an experience that we feared because of its mawkishness and apparent uncontrol. Yet I wish to argue that there no more reliable guide for harmonizing ourselves with and optimizing the complex nonlinear feedback systems of the world.

Of course we need to use all the computerized weather-prediction, all the nonlinear econometric models, all the electroencephalograms, all the careful ecological analysis we can get. But our decisions on the basis of this knowledge must finally be in the service of the greatest beauty: the greatest epistemological beauty, that is, truth; and the greatest ethical beauty, that is goodness.

The attractors of these, we can be sure, are in the human breast.

We must evoke them, by educating our conscience and our intuition of the truth; most important of all, and for our very survival, we must cultivate our taste.

As a direct implication of the injunction to increase the organized complexity of the world, good technology preserves earlier stages and products of its own process. It will, therefore, pay special attention to the preservation of chemical complexity, to the preservation of the richness and variety of life, to the preservation of the higher organisms in particular, and to the care and reverence of human life. This is the natural order of our increasing concern, because life, higher organisms, and human beings are closer and closer approximations to the emerging nervous system of God. Within an organism, likewise, we give preference to the higher functions, especially the nervous system, over lower vegetative functions. This hierarchy of concern is really commonsense; it is the automatic assumption of any good surgeon (or any animal caught in a trap) in making decisions about which part must be sacrificed to save the rest. Indeed, it will be necessary to replace certain

environmentally unsound technologies with the more efficient, elegant, and benign ones that the new science is making possible. Certainly we will need to isolate fine examples of ancient and unique ecosystems in so-called *wilderness areas* from the natural interference of other, highly competitive species, such as ourselves and the pantropic weeds, in order to promote the richer evolution of the rest. But we do not necessarily have to yield to an anti-human and anti-technological ideology in order to make such choices.

Avant-garde critics of technology observe its increasing distribution and note correctly that the increasing distribution of destructive technology increases destruction. What they fail to note is that in market economies technology itself evolves, through relentless economic pressures, to low-input, high-efficiency, low-energy, high-yield, low-waste forms of production that are increasingly less destructive and more benign. The idea that profit is the root of all environmental evil may be difficult to accept as a fallacy; and the corresponding principle, that profit must in the long term benefit the environment, may seem like an outright paradox. Nevertheless an important set of



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priorities is at stake, and some distinctions may help. Consider the nature of appetite.

In a human being a healthy appetite is a sign of vitality, vigor, and even the capacity for productive work. Certainly that appetite can become diseased, and appear in a perverted form as gluttony, hyperobesity, and eating disorders such as anorexia and bulimia. By analogy the profit motive is like appetite: a normal, valuable, and indispensable drive for a living organism. When critics of capitalism use the terms *profit*, or *profit motive*, they do not distinguish between the healthy and the diseased forms of profit. The former is the result of the creation of new value, by ideas, art, science, and technology, through which the pie is enlarged; while the latter comes out of somebody else's hide, who is prevented by nonmarket barriers such as nationality or discrimination from resisting an oppressor's appropriation of his or her slice of the pie.

Profit is normally an indication of how well a person or an organization is serving the public and how much has been gained by productive activity to pass on to the future. A living cat is, so to speak, the profit that cat genes make over and above the *investment* of catfood that it eats. Life is matter become profitable, and personal consciousness is a special profit derived from higher forms of life. There are indeed higher and lower forms of profit, and the lower should serve and give way to the higher. The highest forms of profit are designated by the terms truth, beauty, and goodness. These, however, are founded on the lower economic forms of profit and cannot survive without them. The recent revelations of ecological catastrophe and massive pollution in the formerly socialist countries of Eastern Europe, whose economies explicitly rejected the profit motive, show that capitalist profit-appetites in themselves have little to do with environmental damage. It was ignorance and narrow specialization, common to all



Autor: Manuel Mexicano

bureaucracies socialist or capitalist, that must surely bear most of the blame. Other things being equal, profit in a competitive context is an incentive to efficiency in the use of materials, and thus tends toward a more benign presence in the environment.

The ecological philosophy or natural theology outlined in chapter III suggests that we embrace an activist,



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restorationist environmentalism, that goes with, not against, the natural inclination of humanity toward greater experience, self-awareness, mutual feedback, and technical power. It is not our job to leave nature alone nor to coexist peacefully with it; we are it, we are its future, its promise, its purpose. We must actively continue its project. If we are to do so we desperately need more knowledge and research. For a start, we need to know much more about how ecologies work.

We particularly need a better bacteriology, and a better understanding of the subtle interplay of plant, animal and human societies, gene pools, and the climatological and geological feedback loops they involve. We need to bring together evolutionists and ecologists (who sometimes do not seem to talk to each other) for a grand synthesis. The best way to do this is through the practical craft of ecological restoration itself. We best find out how ecologies work by recreating them.

We also need to know much more about genetic inheritance and genetic expression. It is beginning to look as if the 95% of the genome that is not expressed is actually a jumbled but fairly complete archive of a given organism's entire evolutionary history. As with certain big old business computer programs, which have been patched and augmented so many times that the programmers themselves no longer know quite what might still come in useful one day, it is simply too expensive to clean out all the old material, and really very inexpensive to store it in a dormant state. Further, the bacteria and viruses of the world constitute a huge lending library of past genetic diversity from all other living species. Using recombinant DNA techniques (as bacteria themselves do all the time) it may be possible one day to reconstruct and resurrect extinct species from this fossil DNA. We may thus eventually be able to undo the damage we have





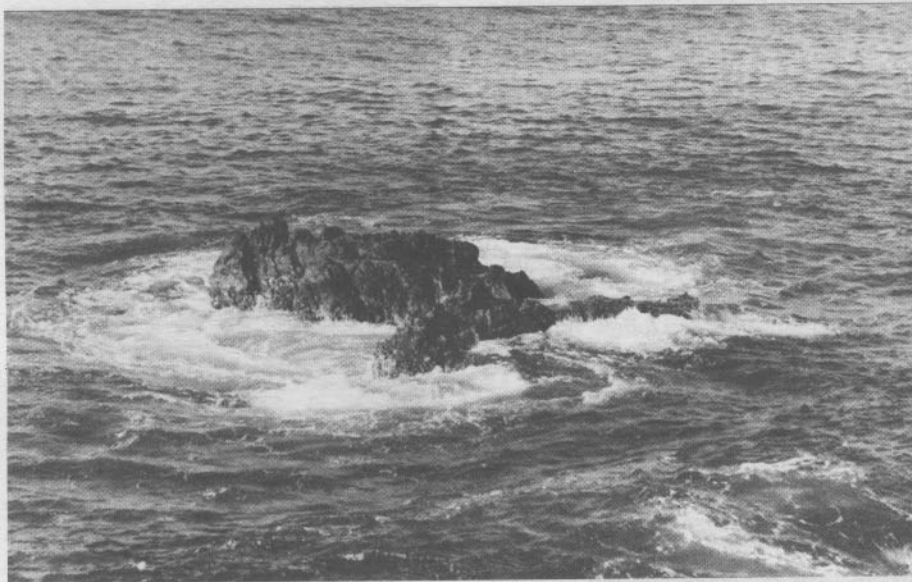
already done to species diversity, and even perhaps to restore whole ecosystems that existed before the advent of humanity. Already European breeders are in the process of restoring the extinct aurochs by selective breeding of domestic cattle, and South African breeders are bringing back the quagga by selectively breeding zebras. Wes Jackson, the McArthur prizewinning director of the Land Institute, is crossing the ancient teosinte corn with its domesticated descendants, looking for a perennial grain that will not need ploughing or pesticides. One day we may just run the combine harvester over the great

environments, as life itself did three billion years ago on this planet, into a habitat for other Earthly lifeforms. In this work we may become the seed-vectors and pollinators of the universe, carrying life beyond the fragile eggshell of this planet, so exposed to sterilization by a stray asteroid strike or an extra-large comet. We will eventually be in the business of the ecotransformation of planets; in fact we are already, with this one. We need to start thinking in these terms; I have called for a commitment by our civilization to an eventual transformation of the dead planet Mars into a living ecosystem. We should do this not only because it

brain, then we need to know how the neurons themselves work. Just as the best understanding of ecology comes from ecological restoration and the best understanding of genes comes from recombining DNA in new forms, so our best understanding of the mind is going to come from the attempt to create artificial intelligence. We know by doing and making. Artificial intelligence should be not a distant and irrelevant field for ecologists; already the computer study of nonlinear chaos, artificial neural networks, genetic algorithms, and genetic, cellular, and ecological models are coming together into a super-discipline. We evolved with natural mental gifts beautifully matched to the complexities and rhythms of nature; we need to rediscover the natural wisdom embedded in our neural structures. The human brain, as Andrew Marvell knew, seems to be an accelerated and more intense form of those external ecologies we call forests or oceans. Ideas and memories live together in a mental ecology that is continually evolving. We need to integrate our understanding of the human brain itself into our understanding of the natural environment.

Finally, and most of all, we need a new esthetic philosophy, critique, and theology, as humanistic as it is naturalistic, embodied in an art by which all these studies can be guided. The most ancient form of artificial intelligence is art itself. Beauty is finally our surest indication of whether what we do is in the most creative direction for nature as a whole. But our sense of beauty itself must be educated by an ecopoetics that embodies all our new knowledge of the oikos or household of nature.

Imagine, then, a world in which technology has become so sophisticated and miniaturized that it begins to disappear as a physical



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prairie every year or so, to get biomass for the food culture factories.

We may eventually modify existing species by recombinant DNA technology, and even develop new species adapted to new ecological niches. Sooner or later we will leave the confines of this planet. When we do we may carry with us the seeds of Earthly life, hardened and redesigned to thrive in alien environments, and perhaps to transform those

is a noble thing to do in itself, but also because we will not ever know with any confidence how our own planetary ecosystem works until we have created one ourselves on another planet.

Less obviously, we need to study the mind itself, cognition, self-awareness, and all the other characteristics of sapient life. If we are the neurons of the divine, and charged, as fetal neurons are, with the duty of wiring up the divine



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presence with its own intrusive characteristics, and becomes more and more a sort of omnipresent invisible background magic that feels natural, classical, simple, and adapted to our bodies, minds, and culture. It will be some decades yet before most of the world has passed through the stage of early industrialization, and it is the job of the developed world to ease

the transition, to help more backward economies to leapfrog the old smokestack and mass labor stages of development and go directly to a biocybernetic post-industrial prosperity. In the developed world we can already see a new technological, industrial, and economic constellation beginning to form. As mass manufacturing becomes more and more efficient and robotized, and as the cost of technology falls inexorably by comparison to the cost of human time, the manufacturing sector of the economy will undergo a relative shrinkage, though it will remain, like the utilities, a cash cow. The new areas of profit will be in service, design, education, entertainment, customized small-run manufactures, arts, crafts, tourism, science as entertainment, medicine, and religion.

Whenever a new gadget comes on the market it begins as a large, obtrusive object which its owner will often display out of pride and the desire to impress. Later it will become more sophisticated, more chic, and will begin to sprout dozens of fancy features, so that the panel of a VCR or the dashboard of a car or the controls of a blender approach the complexity of an airplane cockpit; there will be fifteen levels between *whip* and *liquefy*. Then the technology will begin to hide itself behind the paneling of a wall or closet, or behind the tinted windows of the luxury car, at first for reasons of exclusiveness and snobbery. A mature technology, though, aims toward discreetness,

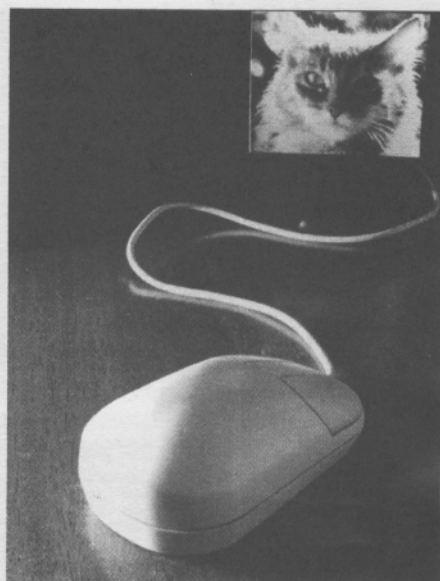
user-friendliness, simplicity and classicism, so that the gadget becomes as obvious in function as a hammer, as unobtrusive as a hidden sound system, as beautiful as a violin, as intuitive as a good icon-driven disk operating system, and as robust and cheap as an ordinary telephone. It and its user will have educated each other's taste.

What we need to aim for is a technology that has all these virtues not just for human beings but for the rest of nature as well, that will fit natural ecosystems as a good tennis racket fits the human hand. In other words, culture, art, and nature will not, as in the world of the industrial revolution, be adapted to technology, but technology will be sinuously and unobtrusively adapted to culture and nature. *Functional* will no longer mean *conforming to the technology* but rather *conforming to human and natural needs*, including our needs for beauty and comfort, and nature's needs for biochemically complex and open-ended environments. The products of industry will be small, light, multipurpose, intelligent, cheap, charming, and recyclable. The business corporation will become a campus, a thinktank, a theater, playing out styles of life and being in alternate futures. Advertising and promotion will merge with product development, as with the Nissan-Infiniti design/publicity team or GM's highly successful Saturn campaign.

Industry will go underground. It will be increasingly automated, eliminating the repetitive soul-destroying labor that Marx rightly condemned. It will tend toward the economic ideal of the closed system, so that all output is either goods or basic constituents of the environment, and nothing is wasted. Input will tend, because of the twin economic drivers of

commodity scarcity and materials science, to be the most common and available materials there are on the planet

—sand to make silicon, biomass to make carbon compounds, clay to make ceramics, air and water to lubricate the system and be returned unchanged, and sunlight. The ocean, in which every element in the universe is dissolved, will become the major source of raw materials. We will use seawater irrigation, ocean farming, biotechnology and nanotechnology to mine the seas. When we mine the land we tend to damage and poison it; but mining the ocean will simultaneously purify it



and return to the land the matter that pours from it, in such rivers as the Amazon and the Mississippi, in millions of tons every second.

Recently some long-awaited scientific/technological projects have begun to show signs of bearing fruit. The many disappointments with laser fusion and cold fusion have made us cynical about promises of cheap fusion energy; but patient research now seems to be on the verge of success. The first better-than





breakeven Tokamak will come on line in 2005. Most of the technical problems are already solved in principle, using ceramic tiles borrowed from space shuttle technology, superconducting magnets, new coil design, new coolant/working fluids, new neutron absorbers. We should have abundant inexhaustible power by the 2050s; by that time our gadgets may be so small and efficient that they will not draw much power at all. Photovoltaic collectors will become the leaves of the technological tree.

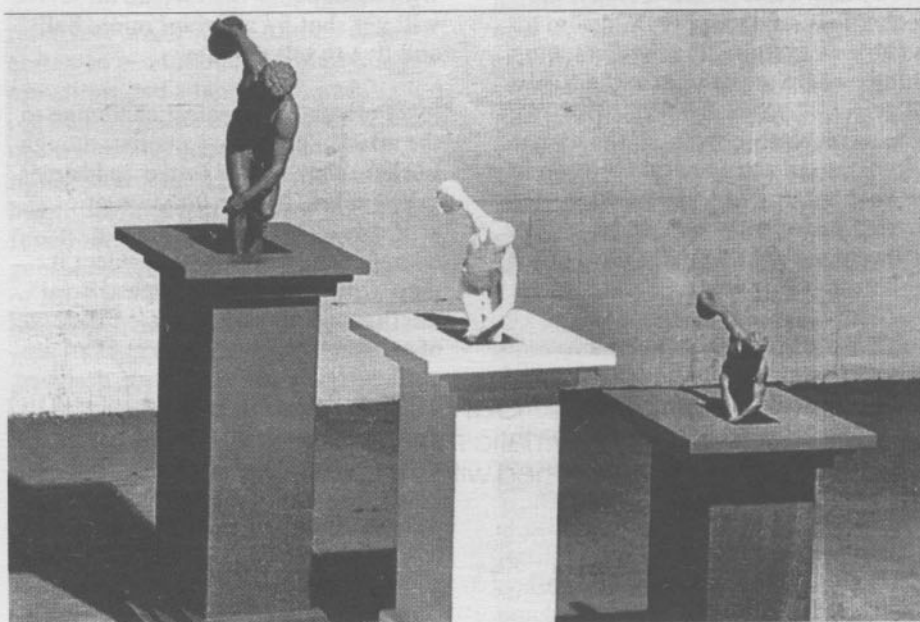
We will, I believe, continue the innervation of the physical universe with an increasingly sophisticated and organic array of sensors and effectors. We will come to know and experience the rest of nature more and more intimately, from the inside, and will be able to move and change it in the same way that we move and change our own bodies— and with the same mixture of resistance, learning, shame, pain, fatigue, and pleasure. In a sense our civilization will be immortal, for it will accelerate in control, miniaturization, and subjective temporal intensity faster than the universe can expand, distribute its energy into smaller and less accessible packets, and run down thermodynamically. It will use the cooling of the universe as it expands as an inexhaustible source of potential order. Not that we will live in some metallic or concrete or crystalline techno-desert. Our future will no doubt respond fully to our aching need for the spontaneously self-organized and self-similar forms of geology, vegetation, and the animal kingdom. We will live among trees and rocks and clouds and grasses, as we have always done; our technology will have vanished into the background, to be recalled, like magic, by a mental command. Landscape architecture and ecological restoration will come together into a super-art whose palette will be species evolution and ecological interdependence.

But there will be no *going back to nature*; the nature we would go back to never existed, in the sense of the unspoiled, uninterfered-with, harmoniously balanced wilderness. The wild is ourselves. Indeed, the whole universe will become our garden; and if that is a claustrophobic thought, consider the deep wildness of the English countryside, with its layers of history, its ghosts, the visionary and mystical qualities that William Blake and William Wordsworth and Thomas Hardy and Emily Bronte and Samuel Palmer and John Constable celebrated in it, and reflect that all England is a garden, a human-made landscape. It is up to us to make our gardens wilder than any *virgin forest*.

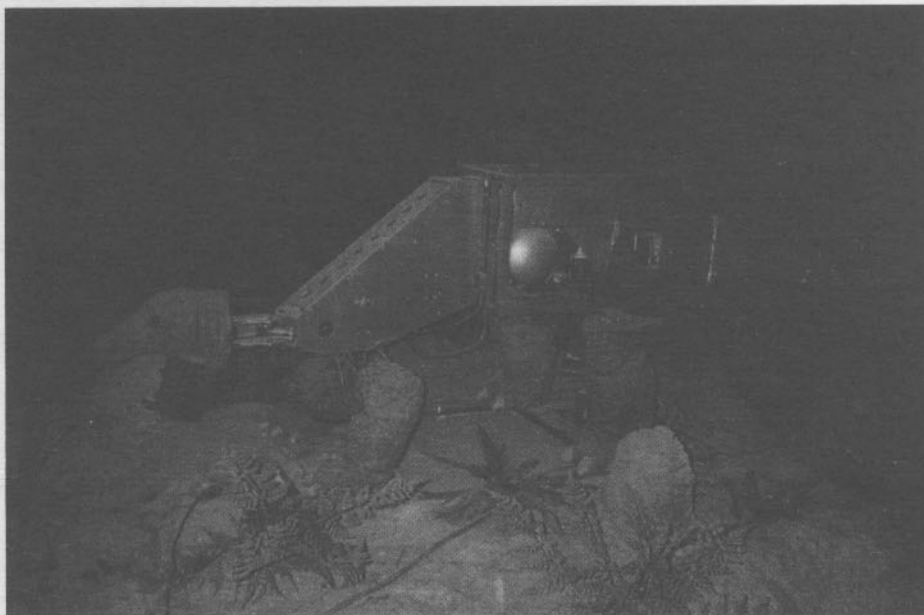
Of course there are intractable problems inherent in the transition from a labor-based to an information-based economy. The greatest of these problems is the creation of an underclass, which, because of its lack of education, has no information to sell; and which can no longer sell its labor because of lack of demand.

Thus education has now become the highest economic priority. But the benefits of the information economy should likewise not be underestimated. For it is essentially pleasurable for human beings to produce information (while it is essentially painful for human beings to engage in repetitive and mechanical labor). While the material products of labor are subject to decay and cannot be shared—a physical object cannot be in two places at once—it is in the nature of informational goods to retain their pristine form and to be infinitely reproducible and sharable among people. For the biosphere the transition to the information economy will mean an enormous lightening of the load of human activities. We human beings, carried by the feathery and invisible media of information, will tread upon the planet with only the slightest imprint.

The electronic revolution has already transformed the whole field of prosthetics for the handicapped, replacing damaged human parts with servomechanisms and computers. In the future it will apply this kind



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of knowledge to healthy and intact people, developing in effect new senses and new limbs. The direct neural/cybernetic interface will move out of the realm of science fiction and become increasingly an everyday utility. This trend has profound ecological consequences; for the direct interface will replace much costly and wasteful technology, the technology of chopping things up to be able to examine them, of stacking things where we can get at them, and of getting there in the first place. The miraculous powers of the human visual cortex and musical ability will be enabled to grasp the world in clear enough terms to be able to see at a glance what are the underlying forms, trends, and patterns.

We will be able to live more deeply into the world both within and outside us, being informed so much more deeply of its health and growth. Through neural/cybernetic interfaces, virtual reality, sophisticated games and electronic models, ordinary people will increasingly explore history, anthropology, ecology, and the sciences as entertainment, as

already they take anthropological cruises, walk nature trails, and refight the battle of Gettysburg. We can be a Bororo tribesman or a Corinthian slavegirl or an Elizabethan courtier or a timber wolf for a while. We will be able to experience directly how our domestic animal friends perceive the world, and be able to communicate with them better than we do now. We will get shot by a *virtual* minie ball and live to tell the tale.

Perhaps the greatest challenge to the artist—as to the scientist, though I believe they will be harder and harder to tell apart—is the creation of artificial intelligence. Once we take this up as an artistic project it may well appear to us that artificial intelligence already exists on the level of software: traditional works of art are artificial intelligence software, designed to be run on meat computers, and generating an intelligence different and beyond that of the unaided brain. When I look at a Cezanne or listen to a Bach fugue or read a Yeats lyric—or even more powerfully when as an actor or reader I become Falstaff, Hamlet, Madame Bovary—my brain

tissue becomes inhabited by something autonomous, personal, and creative that it could not have conceived alone.

However, human culture will never, I believe, become totally dematerialized. After the excitement of the cybernetic revolution and virtual reality, there will be a return of the classical pleasure of physical objects, physical training, the physical body. Materials science is currently going through an explosion of creativity; *Buckyballs* and aerogels are, so to speak, only the tip of the iceberg. There will be new kinds of textures, fabrics, surfaces, ropes, elastics, soundproofing, shock-absorbers, seals, glasses, heat-conductors and heat resistors, blades, dyes and pigments, building materials, and so on. We will rediscover the pleasures of natural materials as we explore the potentials of artificial ones. The present trend toward physical training and body culture will continue. Perhaps eventually genetic engineering will give us oiled fur and gills to inhabit the ocean, or a lower body-weight, keeled breastbone, and wings to inhabit the air. These are fantasies today, but a medieval observer of twentieth-century technology would find our world much more astonishing.

Art and technology will increasingly merge into one. New forms of criticism are already springing up, like *Earthworks* criticism, in which technological, cultural, and artistic values cannot be clearly distinguished. We will see new centrist movements in architecture, using our increasing knowledge of the neurobiological basis of esthetics. The visual arts will find inspiration in the intricate and self-similar designs produced by chaotic self-transforming feedback processes, designs that we seem to be biologically programmed to enjoy, because they are also





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the basis of all growing things. Landscape architecture will merge with restoration ecology, and the traditional building systems of desert peoples, cold-climate peoples, jungle-dwellers and other inhabitants of extreme climates will be consulted for elegant architectural solutions that will be both beautiful and economical in terms of energy and resources.

When we look down on the landscape by plane, we will see that much of the land has returned to meadow, swamp, forest, prairie; we will see flocks of thousands of birds, herds of deer and elk; and among the hills the occasional settlements of people who have chosen, permanently or temporarily, to explore, as the Amish do, the life of traditional technology, religion, and village economy. There will be a large increase in *wild* nature, unobtrusively managed. The Appalachians are already going back to hardwood forest; the bears and the wolves are coming back; and this is happening all over the developed world. Scotland, for instance, is now closer to its *aboriginal* state than at any time in the last four hundred years.

Huge land reserves will have been created for tourism, adventures, animal and bird watching, hunting, wargames, science, and recreational volunteer earthkeeping safaris. Many cultural traditions will contribute: the aristocratic deerpark from the European, Indian, Middle Eastern, and Chinese traditions; the religious meditation garden or sacred precinct from the Japanese, Indochinese and Mesoamerican traditions; the wilderness area, restored prairie, and theme park from the Euro-American tradition; and the maintained hunting ground from the African and Native American traditions. The word *paradise* (originally from Avestan, an ancient Iranian language) literally means *happy hunting grounds*. Perhaps we will even have *Jurassic Park* areas with extinct species resurrected by a sort of genetic archeology from the genes of living species, living in complete restored ecosystems that mimic the conditions of prehistoric periods of the Earth's history. The attempts at such reserves which we have accomplished to date, such as Curtis Prairie near Madison, Wisconsin, have been on a relatively small scale, limited in their ability to produce new evolutionary mutations and adaptations, and requiring outside maintenance to keep out weeds and exotics. Perhaps in the future these parks will be so huge that they will in a few years be functionally *wild* and productive of genuine novelty. Despite the fears of Michael Crichton and Stephen Spielberg, there is no reason why many of these parks should not be in private hands and run at a profit, encouraged by tax laws that reflect their actual benefits to the population in terms of species diversity, genetic information, education, public access, and amenity.

Although the old city centers will be increasingly limited to pedestrians,

cheap pollutionless hydrogen powered cars, partly automated, and with neural/cybernetic control, will continue the tradition of individual choice. Personal mobility will always be crucial to human freedom, as crucial as the vote. Perhaps the bicycle will become even more important than it is now. The cities will, I believe, survive the revolution in communications that has made them technologically obsolete. They will do so by developing a sense of themselves as unique centers of human communion, philosophical exploration, collective art and worship—the vision expressed in the medieval cathedrals or in Van Eyck's Ghent Altarpiece. Gardening will become one of the chief urban occupations. In Europe very heavy urban population densities have proved to be quite compatible with delightfully quiet, green and pleasant residential districts. Indeed, without feeling so, the cities may well be more populous than in the past; especially if we can solve the problem of inner-city urban decay.

We will see a return to nature-based forms of religion—new versions of animism, totemism, sacrifice ritual, seasonal/fertility/cosmological rites, and the like. The new nature religion is already becoming integrated into the old Judeo-Christian, Muslim, Hindu, and Buddhist worldviews; and such religions as Shinto and Tao did not have far to go in any case.

In this scenario the increase in atmospheric CO<sub>2</sub> will have slowed to a stop, with new forests, desert oilseed cultivation, and extended coral growth soaking up the excess produced by combustion. The level of carbon dioxide will be higher than at present; but since the gas is a plant fertilizer, and since the planet is now cooler and dryer than it has been for much of its history, the greenhouse



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effect at modest controllable levels may be just what the biosphere needs for further enrichment. The world will be warmer, wetter, and more fertile—not so as to be unrecognizable, and within the present range of variation from year to year—perhaps like a succession of particularly good winters. What were once taigas or tundras may become prairies able to support perennial-grain polyculture. The reclamation of desert seacoasts may also lead to generally milder, less extreme climates worldwide.

More alarmingly, the ozone layer will have thinned further, and we will need to find ways to protect ourselves from the resulting modest increase in ultraviolet radiation. The world has recognized the problem and is taking steps to halt the use of chlorofluorocarbons; but the damage will continue for some years and no technological solution for rolling it back has yet appeared. However, there have been episodes in the Earth's past when, as a result of meteor strikes or volcanic eruptions, there were far more catastrophic changes in the atmosphere, changes which undoubtedly included the



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release of huge amounts of the potent reagents that can trigger the decay of ozone; and the atmosphere has recovered. We must research the healing processes that already exist in the planet's repertoire, and learn how to encourage them. Most food and agricultural products will be made in laboratory/factories. Fishfarms and hydroponic truckfarming will cater to the increasingly sophisticated culinary tastes of a world in which the high arts of eating will no longer be confined to a few lucky cultures like China and France. The current fashion for reviving old strains of fruits and vegetables will continue. We will not need slaughterhouses; we will produce cloned varieties of animal muscle tissue, gene-tailored for taste and texture, without nerves or the capacity for pain. The genetic technology already exists and is being used to clone skin, interferon, and insulin.

As prosperity and economic security increase all over the world, the birthrate will go down, parents no longer feeling the need to produce an excess of children to care for them in their old age. As women all over the world find new occupations open to them, many will not choose the option of having a family. But families are still the key to psychological stability, personal dignity, and moral continuity. Perhaps there will be a new era of the extended family. Only those adults with the talent, commitment, and strength will have children. Parents will be regarded as we regard artists today, as special people with special gifts, to be accorded the highest respect and given certain social privileges so that they can do their work, the most important work of all, of creating happy and competent human beings. And perhaps people without children of their own will be part of some larger family of more distant relatives, and will owe love and

respect to the matriarch and patriarch of that family. They will have the occasional privilege of helping with the children; and they will draw emotional support and psychological health from the family. In a world in which zero population growth will have become a reality, contact with children and with real live parents will have become luxuries, perhaps essential psychic needs.

The human lifespan will be greatly extended, by biomedical and biocybernetic means; perhaps eventually we will attain practical immortality, if we desire it. This is an extremely difficult issue, especially when it comes to finding a place for the young, who will be few and at a huge disadvantage. If we are not careful the young are going to be the underclass, the discriminated-against minority, the dangerous criminals, of the twenty-first and twenty-second centuries. Even today the general improvement in the health and vigor of the middle aged has taken away some of the cultural ground and habitat of youth. We should never aim at Utopia, the fixed, perfect state in which history stops and everybody lives happily ever after. What we should always aim at is an ever-richer and more open-ended historical condition, in which new possibilities are always opening up, and thus new problems and challenges are always arising. The idea of an entirely stable and *maintainable* world order will always be a nightmare to the most vigorous, adventurous, and imaginative spirits among us; and since the only way to attain a steady-state Utopia would be by the suppression of such spirits in a kind of Gulag of the mind, the gains would not be worth the cost.

In the future the wheel may come full circle, and we may be able to build into a connection machine, as





the new parallel processors are called, the very processes that characterize the human mind: unpredictable self-elaboration and self-organization, evolutionary selection of hypotheses in an ecology of competing neural connectivities, and the use of the outside world through sensation, memory, and action as a stable database and a hardware of calculation. This further step of evolution would not be something other than ourselves, it would be ourselves, would be the Son of Man, the daughter of humanity, toward whom we have yearned unaware for so long. She would be so beautiful; she would be like Rilke's angels, like Blake's joyful deities. Of course this is dangerous thinking; but it is always dangerous to have a child, to give ourselves away to a future we hope will be better than ourselves. How could we possibly deny our generosity?

We can imagine various phases of the process by which the human race, and other intelligent species, in cooperation, increasingly innervate the physical universe, so that it becomes that body whose nervous system is made up of individual persons. This evolution will not, of course, be a one-way process of increasing topdown control; rather, as the physical universe begins, like fetal limbs, to respond to our purposes, it will simultaneously impress upon its new Mind its own flavor and local characteristics. I believe babies are quite as much humanized by their own bodies as their bodies are humanized by their brains. All body cells are really like neurons, sensitive, irritable, and able to communicate, though in a cruder way than the neurons. The neurons of the brain and spinal cord, being less specialized in a sense, are like muscle or bone cells, but able to engage in a greater variety of interconnection. Nature itself is



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already partly sentient, in its dim way, as James Lovelock and Charles Hartshorn and others have suggested.

Imagine you were wired into the basic structure of Oregon, for instance. As Oregon begins to respond to your purposes, you simultaneously become transformed into something with a hot volcanic spine, with the moisture-loving dim appetite of the Douglas Fir, with the feel of the Pacific surf upon your right shoulder, and the soft draining of great rivers across your body. Thus you would become a genius loci, a spirit of the place, and so fit nicely into the animism of old Rome, of the Plains Indians, or of Shinto. If one's special inclination were to inhabit the species-world of the animals, then totemism or Vodun might become one's spiritual reality. Or if, with a noble piety, one preferred to enter instead into the world of one's forebears, and so wire them into the emerging whole, then one would have become a living embodiment of ancestor worship. More familiarly, huge constellations

of consciousness, animated by some immensely numinous personality and poetic theme —love or war or death or the ocean or the sky— might emerge, thus constituting in the dim premonitions of our polytheistic ancestors the brilliant presences of the gods.

Perhaps Quetzalcoatl, Hashiman, Persephone/Hecate/Artemis, Kuanyin, Kavula, the Loas of Vodun, Baldur, Vishnu, Inanna are the names of those strange collective entities, made up of the neural/cybernetic interplay of many individuals on some unimaginably complex net, and the innervated body of some aspect of nature, that will one day replace such associations as the nation state or the corporation. Perhaps they in their turn will yield some of their sovereignty to a Brahman, a Yahweh, an Allah, a God who will be able to bend and choose the very coordinates of space and time, and touch with a divine finger the primal atom of the big bang. And of course in the increasingly nonlinear relations of these various divine emergences, all these religious realities would be



Author: Eduardo Vaqueria

richly copresent, not, as in the current state of religion, incompatible with one another's existence; it is possible, however, that the development of that unity might entail tragic transtemporal conflicts as different self-conceptions of the divine fought for their own time-lines in the arenas of the past.

A single Being might emerge, made up of the harmonics of all the others, at first containing, as a trinity of Persons, the vestiges of its polytheistic components, then resolving even that disunity into the mystical singleness of the Sufi's Allah or the Hasid's JHWH or the Krishna/Vishnu of the Bhagavadgita or the impersonal distributed Being of Zen Buddhism. According to this interpretation the great religious disciplines of meditation, contemplation, and prayer might be actual psychic technologies both for communicating with our descendants and also for penetrating into the deeper iterations of two-way feedback that underlie the surfaces of our lives. That deeper sense of time, infinitely rich in every moment, might be what the religious call eternity.

I have argued that we stand at the end of one cultural epoch and the beginning of another. Though I have been unsparing in my criticism of avant-garde modernism and of modernism's last postmodern fibrillations, I have also shown that there are robust sources of hope, both in our cultural past and in our scientific present. In this final section I will attempt the very risky task of artistic prophecy. What opportunities present themselves to the artist or writer who might dare to relinquish the safety of the contemporary avant garde and push off into the unknown waters of the new century? This question is less a question of form than of content. Modernism has pretty thoroughly exhausted all possible permutations, reversals, denials and innovations of formal means, and we can be sure that the great corporations and university media laboratories will alert us to any new developments in cybernetic, materials-science, or biotechnological magic that might interest an artist. The analysis of the classical artistic genres and of the neurocharms that underlie them suggests that the next century may well be one of heroic recovery, of psychic archeology, of reinvention; as the renaissance was, and as was Heian Japan. Much more important now than new form is new content. What will the new art be about, what themes will it treat, what values will it celebrate, what kind of landscape will it show its audience, and what kind of human being will step out into its rebuilt stages, stanzas, frames?

In this book I advocate a new constellation of hope, which I have characterized as evolutionary hope; its philosophy is natural classicism, and its artistic harbingers are what I have dubbed the centrists. In this new regime of hope, metabolic hopes and bodily desires are accepted and celebrated as a living part of our evolutionary past. In general those

metabolic desires which are the basis of our fleshly hopes would be placated by sacrifice, intensified by delay, enjoyed in the controlled contexts where they reach their greatest complexity and richness, and incorporated into the full body of human activities. Cuisine rather than gobbling; romance rather than copulation. The fundamental biological drives emphatically include aggression, which is to be trained and brought to the surface by sports or martial arts, and so, in the fashion of chivalry, pressed into the service of higher values such as friendship, justice, and self-control. Sex would be reconnected with dynastic and family hopes, not through a renunciation of our new reproductive technology, but through a deep recognition of the indissoluble psychological links that bind them together.

Our personal hopes for social advantage —status, property, power, and so on— would be recognized as being largely derived from our biological nature and evolutionary past. (Recent fascinating work on the feedback connection between social status and ranking in baboons and their hormonal, neurochemical, and immune systems confirms this recognition). Since these hopes are part of our biological condition, and are indissolubly linked with equally biological drives towards altruism, bonding, and cooperation, we would no longer seek to suppress them, as in the feudal and leftist systems. Instead they would be harnessed, as in the bourgeois-democratic system, to the general social and economic good. Unlike the tendency of laissez-faire capitalism, the regime of evolutionary hope would not reductively boil down all higher motivations to intelligent materialistic selfishness, but would recognize the equal reality of nobler impulses. It would base its educational system on the theory that as the shorter-range and more immediately gratifiable desires are





satiated, boredom itself can assist the teacher to arouse the deeper, finer, more intangible, less easily gratifiable thirsts for love, truth, and beauty.

Thus personal spiritual hopes would also be recognized as having an evolutionary and biological basis. Such a provenance does not discredit them but, to the contrary, ratifies and confirms them as the most accurate and powerful descriptions of the universe itself, since it was by our following them that we were enabled as a species to survive and prevail. Those hopes, for honorable achievement, for the benefit of a loved one, for the discovery of truth or the creation of beauty, were sharpened and amplified enormously by selective feedback between cultural and biological evolution during the last five million years. They are as organic as metabolism, but at the same time a marvellous artifact of our earliest human cultures. And they are among the driving forces of our future evolution.

In the constellation of evolutionary hope the great public ideals —of peace, justice, equality, freedom, and so on— are accepted as useful midrange goals but subject to redefinition according to developments. For instance, peace among nations may be an irrelevant goal if we no longer have nations in the post-renaissance sense. Harmony among smaller communities may not even be a good idea, if we recognize aggression to be a natural human drive; at the local level it may make more sense to seek channelled forms of war than to seek peace.

Thus in the new constellation religious hope would once more have a central place; but it would have radically changed. Its prime intellectual directive would be syncretism: the incorporation within higher and deeper religious ideas

of the tenets, theologies, and observances of all the religious traditions, together with the new revelations that continuously pour forth from the sciences. Religion would be at the leading edge of science. Traditional religious concepts and metaphors would be recognized as culture-bound, partial, but valid formulations of the evolutionary direction we should take and have in general been taking, and as the missing component of social hope. The conflicts among religions and theologies would be mitigated and transformed by a dramatic ethic, in which differences of ideas would be taken as the very stuff of the divine drama, and would be cherished as the life and breath of the spirit; their dialectic would be part of the very evolution of the divine fetus towards its maturity. The contradictions within the religious drama, and between it and the other institutions of society, would be accepted as part of the mortal shame of our condition, a shame whose sacrificial recognition and celebration would become the portal to an epiphanic beauty and prophetic revelation, the fuel of evolutionary hope. The state, then, would not need to preserve religious freedom by

paralysing religion: religious freedom would be the central value of religion itself. As religious hopes evolved, they would draw into themselves more and more of the richness of ancient human traditions. For genuine progress is not the rebellion of the present against the restrictions of the past so much as the breakout of the vital past, through the dead habits, expectations, and routines of the present, into a future that is a rebirth of the past in a new and unpredictable form.

What will be the role of the artist in this new regime of hope? Let us explore the hoped-for world to come, to see whether it possesses emergent features that go beyond the futurology of this book —features that might attract the mettle of a young artist or writer. This investigation will be guided by the moral of our fable: that the future will never cease to contain a tragic element. This principle is based upon the observation that every new emergent level of organization and awareness in the universe, though it solves the existing paradoxes of its prior levels, always introduces still knottier and more intractable contradictions, and revives old ones. Life, by developing self-referential





information structures, genes, that transcend the matter of their embodiment, is a solution to matter's problem of survival in a violent and changing universe. But life pays for its potential genetic immortality with an increased vulnerability to individual death. Mind pays for its cultural and spiritual transcendence of death by suffering, self-consciousness, and shame. With tragedy comes comedy; as long as time goes on, in whatever fabulously involuted and complex form, there will always be those who can laugh, and things to laugh at, whether in bitterness or joy or surprise.

I think this is what Thomas Mann had in mind when, at the center of his great Bildungsroman, *The Magic Mountain*, he gives his hero Hans Castorp a vision of an ambiguous arcadia. Caught in a snowstorm Castorp dreams of a sunlit seacoast under a sky of deep blue, a landscape of mountains and palms and islands that he recognizes as the paradisaical place we have all longed for from childhood. The scene is filled with beautiful human beings, engaged in joyful work—taming horses, launching a ship, suckling an infant. There is such gracious love and respect among them that Castorp is moved, beyond all his previous experience. Behind him there is a temple which he enters, with a sense of terrible foreboding. Its inner sanctum contains a bloody and hideous scene of sacrifice: two old hags are dismembering and devouring the body of a child. Yet the sacrifice does not invalidate the joy and love and grace of the nation by the sea. On the contrary, the awareness of the sacrifice gives depth and dignity to their lives:

Love stands opposed to death. It is love, not reason, that is stronger than death. Only love, not reason,



gives sweet thoughts. And from love and sweetness alone can form come: form and civilization, friendly, enlightened, beautiful human intercourse—always in silent recognition of the blood-sacrifice.

I accept Mann's terrible equation, and the visions of the future that I have explored in this book are under its sign.

The hope espoused here is emphatically not a utopian hope. Even if things go as well as they possibly can, they are going to get worse at the same time that they get better—because they get better. There will be the more to lose, and the greatest values entail the greatest risks. The bandwidth of value will get bigger, and this itself is a good, even if evil participates in the same general expansion. A rising tide raises all boats. And the absurdities of things are not going to diminish, but increase. This is a humanistic description of chaos theory: the richest field of information lies not in perfection and order, nor in randomness and disorder, but in the

burgeoning and beautifully paisleyed region in between, the universe's ingenious and Falstaffian contrivances for delaying payment of its thermodynamic debt.

We may hope for a rebirth of the humanities, refounded upon the rich knowledge pouring out of the sciences, and a revival of literature as the tongue of the species. This may not sound very plausible at present. Like the Jody Foster character in *The Silence of the Lambs*, we have gone to school with monsters, with the Hannibal Lecters (or cannibal lecteurs) who, in biting the text into pieces with their deconstructive slashes and parentheses, have bitten off the faces of their authors. When we sup with the devil we should use a long spoon. The great obstacle to our best hopes is not government or business but the academy, especially the humanities. The previous chapters have revealed the morass of confusions and shoddy thinking that constitutes much of the conventional wisdom of university humanities departments. But the humanities—if we include with them





such disciplines as anthropology, ethnomusicology and comparative religion— still guard the greatest treasure of humanity, the records of our common human culture. Though they guard it today as the dragon, who cannot use it but whose pleasure is to keep it from those who can, the treasure is genuine and intact. If —to use a different metaphor— the heroes of the humanistic academy can be persuaded to stop sulking in their tent, they have an enormously important role to play. They may have to give up many cherished principles from the last twenty years of critical and cultural theory, however; they will certainly have to reject as authorities —though they should of course preserve as fascinating cultural material— such thinkers as Derrida, Foucault, Barthes, Althusser, Lyotard, Baudrillard, Fish, Jameson, Lentricchia, and so on.

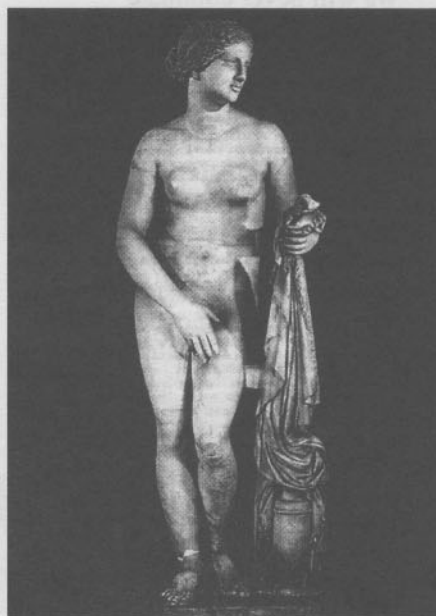
All the ingredients are in place for a great age of literature and art. It will not be a totally egalitarian one; it will be as elitist as the NBA and the Olympic Games, where there is only room for the very best. If the team is to win, it is performance, not the vote, not the popularity polls, that determines who is chosen to play. Perhaps this apparently undemocratic feature of competitive sports accounts for part of their appeal. They remind us of the hierarchical system that paradoxically undergirds and validates the equality of persons in the voting-booth. When the public loses its suspicion that the arts are a subsidized form of self-esteem therapy, it will return; the public is made up of humans, who need the arts as they need water and air.

There will be a revival of the great classical forms of the human arts, as we recognize them for what they are: direct connections with our tribal roots, ancient psychic technologies that incorporate

a cultural feedback loop into the hardwiring of our neural inheritance, bridges between the less reflective levels of nature and nature's more self-aware and self-questioning leading edge. This return will be coupled with the new electronic technology, which is, contrary to all the learned commentators, actually re-hierarchizing the text. Hypertext hierarchizes text by giving it an inner system of subordination, referential pathways, and scholia, providing a depth that the much *flatter* print technology could not match, a depth analogous to the richness of a medieval manuscript. The print medium tends to reduce all words to the same level; it is actually *egalitarian* in form. Print age writers had to struggle to revalorize the world through a richness of shared allusion and the marvellous tricks of imagistic connection. But those allusions and tricks were available only to a liberated few, and writing became, because of its dehierarchized form, the opium of the masses and the instrument of the tyrant. Hypertext (I am using this term to cover a wide range of devices, from hypermedia

and CD concordances through electronic docent tours to PBS TV documentaries and computer games) promises a revival both of hierarchy in our view of the world and of the mental independence of the general public, which will no longer need expert academic technicians to decipher the riches of the tradition. Once the allusions and connections are available at the touch of an icon, any reader will be able to engage in that ancient and lovely form of ancestor-worship known as literary study, once available only to scholars, tutors, and their aristocratic pupils. As always, the hierarchizing and unifying and prioritizing of the world is the natural precondition of human liberation and equality, as the flattening, fragmenting and dissemination of it is the sign and instrument of the tyrant.

We can permit ourselves to hope that we will come to a better understanding of the nature of shame, and learn how to deal with it more creatively than we have done in the last two hundred years. We need to renew our rituals so as to acknowledge our shame, rather than deny or project it as left-wingers and right-wingers are prone to do in their cruel search for scapegoats. Our sexual and kinship rituals need to acknowledge once again both the anarchic absurdity of sexual and family feelings, and their potentially destructive dangers; when they do so, a large part of the beauty and dignity of sex and reproduction will be restored. The mystery of sex, once recognized as such, will be transformed from breezy philistine ignorance into creative source. AIDS is already pushing us in this direction; how bitter that it should take that cruelest of all diseases to wake us up to our complacent normalization of passion, our refusal to properly fear the terrible goddess Aphrodite! The increase in rape



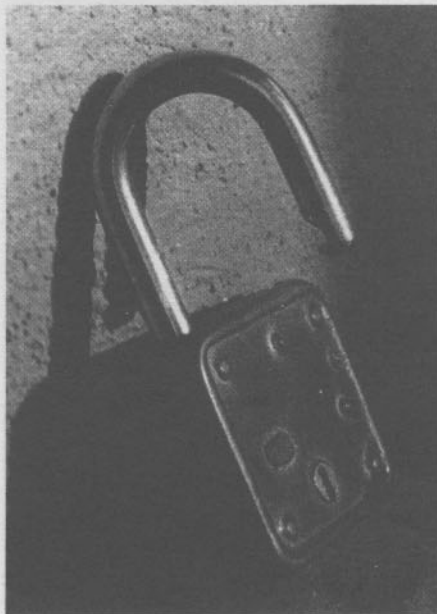
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## Reinventing the...

is another sign that we have underestimated the force of shame, the connection it makes between sex and violence, and the need for institutional and ritual ways of accepting and controlling it. If we do not manage this, we are in for another age of sexual puritanism and paranoia, that will make Victorian attitudes look liberated by comparison. I believe we will manage it, and I look forward eagerly to the cultural efflorescence that will come from our new discoveries in sexual culture.

We will, I believe, come to recognize shame as a potentially creative force, and this recognition will have the effect of restoring the inner sanctions that underwrite personal moral behavior. The intellectual elite has been trying for the last thirty years or so to get by on public morality —being opposed to fascism, capitalism, racism, sexism, environmental pollution, and so on; but the inadequacy of this program for the conduct of one's life is becoming very clear. We all know people with perfect records on these counts who are also selfish, dissolute, lecherous, conceited, miserly, envious, lazy, covetous, cowardly, deceitful and cruel. Such people are increasingly coming to realize that they are also deeply unhappy, and are seeking various therapies to relieve the discomfort. Eventually their shame will lead them, step by painful step, to the recognition of the validity of the moral code— not so very different from one culture to another— and to an anagnorisis, in which much that they had dismissed as oppressive and outdated will be revealed as the only genuine thing in their lives. The soul, not the old *a priori* essence, but no less real for being the emergent attractor of a synthesizing process, will step out from behind the self as the true center of human health. This experience may shape itself into



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new forms of commutated sacrifice, new/old rituals, new/old mythopoiea. And in the light of these changes, the public issues will take on a fresh relevance, so that their solution will devolve on us, and not on some government that we can get paid for lobbying or criticising.

We will never eliminate shame, which is the universe's eternal agonizing critique of itself, the force that opens up a new moment every moment, the anguish that drives creation. We will always be shamed by our bodily existence, by our sexuality, by our animal descent and the hardwiring that comes with it, by our necessary oppressiveness to the rest of nature, by our desire to join a community that does not necessarily want us, by our participation in an economy which demands a reciprocity of gifts. We must manage the shame, since we cannot eliminate it. And we must revive the idea of service to others, not on the basis that *there's nothing to be ashamed of* in service, but rather that service is shameful, and that is precisely why it is morally enjoined

on us and why it is so spiritually liberating.

There will be a resurgence of the concept of evolution, energized by the great metaphors of chaos theory —emergence, bifurcation, attractors, self-organization, irreversibility, levels of complexity, and self-similarity. These metaphors will act as a solvent to all existing dualisms, and to the ideological systems they support— humanity vs nature, woman vs man, black vs white, disseminated vs essentialist, foundationalist vs antifoundationalist, and so on. The idea of meaning will regain its respectability, no longer a hostage to notions of reference and representation that require an absolute distinction between spirit and flesh, mind and matter, culture and nature. We will become easier with the inextricability of our biological and social being, and less inclined to isolate the latter from the former for the sake of *changing society*.

The biggest casualty of chaos theory will, I believe, be the dominance of the notion of the social construction of reality —that concept so valuable when applied with commonsense limits, and so destructive when expanded any further. Together with social construction, the notion of power-relations so dear to contemporary social critics and reformers will become open to question. We will no longer be able to hope for a state of complete freedom from all order and constraint, or for a perfect naturalness of desire, or for an emancipation from externally imposed rules. Every system, however deconstructed at first, generates its own formal limits, and sometimes rules and forms imposed from outside are less limiting than those which arise organically from a system itself. Indeed —and





this is a true paradox— sometimes external limits are deeply liberating, as anyone who has trained as a dancer, martial artist, musician, poet, or competitive athlete knows very well.

I believe we may begin to escape some of our old evils: the triviality of much of our lives, for instance, our sheer inattention, our inability to take in the golden cornfields or miraculous human faces around us.

The satisfying return of power that we feel when we step on the accelerator of our car, or boot up a program in a fast new computer, are humble but real precursors of the kind of enhancement we can expect in our mental and sensory capacities. We will have more, and more deeply, what we already have, or at least what we have always had the chance to have— what the great lamas and poets and saints and scientists have had, briefly, fleetingly, limited by

distraction, weakness, physical and neural handicaps. I think we will gain in depth, in our sense of humor, in our capacity for work and contemplation, as we gain also in our capacity for grief and suffering. We will live our lives many times over in each moment, retracing the iterations of evolutionary cause and retroactive observer-effect. As I write this a great thunderstorm passes over my city of Dallas, threatening these words with erasure. The sweet air that comes in its wake drifts through the open porch.

