

TERTIUM ORGANUM AND MANKIND'S ROLE  
IN FUTURE EVOLUTION

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In Spain, in the lingering summer warmth of September 1980, Rollo May addressed an international conference sponsored by the European Association for Humanistic Psychology. The conference was focused upon this provocative and disquieting question: "What interaction attitudes and skills must we human beings acquire if we are to have the chance to participate in the on-going evolution of this earth?" The question implies an optimistic outlook on the future, yet soberly reminds us that our destiny literally rests in our own hands. Rollo May spoke about the past and about the importance of myth.

Among the Greeks in the high classical period, he said, when the Olympic and heroic cycle of myths were still very much alive, there prevailed a robust confidence in self and society. There were no signs whatever of anxiety, no doubts about the meaning of existence. When the mythic world view declined, individual certainty and self-confidence crumbled, society decayed, and the Greeks were soon conquered by barbarous Macedonians for whom the old myths still had meaning.

Myth, history seems to teach, is of vital importance to the human enterprise. People cannot live well or for very long in the absence of myths. Our own time is an unsettling and anxiety ridden interlude between myths. We have abandoned one mythic complex and we are in search of another. According to Rollo May, among the modern myths which have now collapsed are the myth of the individual and the myth of rationality. Associated with the latter is the world model of modern classical science - an objective, thoroughly intelligible world working, obligingly, like a well-oiled and smoothly running machine. Associated with the former are our beleaguered political and economic institutions, democracy, and the free-enterprise system. We have lost faith; trouble seems to lie ahead; dark clouds appear to be gathering on the horizon.

A living myth, of course, does not seem to be a *myth* at all. It seems to be reality itself, things as they are, the world as given. For the contemporary of Homer, the very existence of rain and

thunder was palpable proof of the powers of Zeus, just as sexual desire was unimpeachable evidence of the reality of Aphrodite. For Thomas Jefferson it was axiomatic that all men were created equal and endowed by their creator with certain inalienable *rights* and for eighteenth and nineteenth century science, Newton once and for all had disclosed the *laws* of nature. Today talk of rights seems hollow, human equality a naive piety, and for those who have the daring to venture into the "new physics" all semblance of a stable, objective nature governed by eminently intelligible principles had faded from the scene. In the words of blues musician and composer, Percy Mayfield, "The world is in an uproar/The danger zone is everywhere."

On the same occasion in Spain, (fittingly at the Monasterio de Piedra, a thirteenth century Cistercian monument to the mythic world of the Middle Ages) I speculated about a future mythology for our now global culture and civilization. I identified two future-threatening crises of the present: potential ecological and environmental collapse, the "quiet crisis" in former U.S. Secretary of Interior Steward Udall's apt description, and potential thermonuclear holocaust, the more immediate and cataclysmic "noisy crisis." The new mythology must guide us successfully through these two crises now and in the future.

My own experience enables me to address more thoughtfully the quiet crisis, although I will suggest that the new mythology which I shall sketch should also help to foster a sense of global community and therefore help with the noisy crisis as well.

Although the myth of detached and objective reason has been exploded in very different ways by Freud in psychology and Heisenberg in physics, theoretical science is still a very vigorous and thriving part of our culture. And although ecology and high energy physics seem to be at opposite poles of the scientific spectrum, there appears to be a common and fundamental characteristic of the natural world which they both suggest. The natural world at the subatomic level and at the level of macroscopic living things is systematically integrated. The world is quite literally a single, unified whole, at the most fundamental level, a non-Euclidian space-time *continuum* and at the level of our own experience of life at the planetary surface, an ecosystem, a biosphere. If during the Newtonian era in science, the world might appropriately be compared to a vast divinely crafted mechanism, the world of contemporary science might be compared to a vast living being, an *organism*.

Our human place and function in the macrocosmic structure of things is revealed in myth. To have an idea of one's place in the order of things is, simultaneously, to have an ideal of human

nature to emulate, to know how to live and what to try to achieve. If, as in the Judeo-Christian myth, we are given dominion over the world, then we shall strive to seize our birthright. If, as in the Cartesian-Newtonian ratio-mechanical myth, we are disinterested knowers of the system of Nature, then we shall practice science and discover all there is to be known about mute reality. And if knowledge is power, we shall employ our knowledge to manipulate to our advantage the world machine. But if the world is an organic whole and we are "in" it as organs in a living being, then our sense of self and well-being is intimately tied to the integrity and well-being of the whole.

The organismic myth is the nascent myth of our time. In what follows I shall develop one version of it, and suggest how it provides a conceptual framework, imaginative climate, and spiritual-emotional tonality tailor-made for meeting the challenge to human survival posed by the quiet crisis and perhaps by the noisy crisis as well.

A universal feature of traditional mythopoeia is an account of origins and destinies, when and how the world began and when and how it will end. Such an account provides those temporal boundaries which satisfy curiosity and assuage the fear of an otherwise uncertain future. The organismic myth begins some fifteen billion years ago with an event still echoing through the universe. Astrophysicists call it the "Big Bang."

Many physicists resisted the Big Bang idea because it is aesthetically unpalatable. A "Steady State" universe is preferable, since any moment of creation, as both Aristotle and Kant variously pointed out, involves certain paradoxes, not the least of which is the supposition that before a certain moment in time, apparently arbitrarily selected, nature was governed by some other set of laws (or none at all) than those we now observe to operate. According to the Big Bang complex of ideas, as the galaxies drift away from one another and stellar fuels are spent the universe will apparently end, as T.S. Eliot lamented, with a whimper (not a bang) in an entropic equilibrium death. There is a certain asymmetry in these notions - from a bang to whimper, from a flash of energy to frozen matter-certainly a less satisfying scenario than one involving some cyclical closure. I, therefore, prefer to think that the total gravity of the universe may eventually just overcome its centrifugal momentum and draw the galaxies back toward their common center. There is no evidence to prevent this from being supposed, and with the discovery of more and more "Black Holes" (hidden loci of terrific gravity) the evidence for some such supposition is mounting. That would, in all probability, produce another Big Bang and start the cycle over again. In the

puckish style of contemporary science we may call this the "Yo-Yo" theory. Accordingly, ours is but the current cycle of an infinite process of expansion and contraction, like breathing, as the ancient Hindus surmised. This idea thus combines ancient intuition with a synthesis of the two modern alternatives, the rationally appealing Steady State and the evidentially supported Big Bang theories.

The nineteenth century notion of organic evolution has been generalized and is now applied to the universe as a whole. Not only organisms, in other words, but matter itself and the physical universe as a whole participates in a kind of evolution. Shortly after the last Big Bang, energy became stabilized in the simplest form of particulate matter, atomic hydrogen. Clouds of hydrogen began to coalesce and collapse around common centers. After a time the intense heat and pressure at the core of local condensations of massive hydrogen clouds caused hydrogen atoms to fuse, forming helium and releasing radiant energy. The first stars were kindled and began to shine.

Smaller stars, as they consumed themselves, eventually ceased to shine and shrank into relatively small, very dense, dark objects. A more spectacular and productive fate lay in store for larger stars. As their stellar furnaces ran out of hydrogen, the energy emitted from their centers could no longer counter-balance the enormous centripetal force of their total gravities. Their violent collapse was so great that the helium accumulated within them was, in turn, fused to form a wide variety of the heavier or more complex elements, carbon, oxygen, iron, phosphorous, and so on. The enormous energy that this sudden and secondary process of atomic fusion released utterly exploded such stars. The precious new materials spewed out into the surrounding space, mixed with more interstellar hydrogen gas, and eventually contracted of form new swirling condensing masses. Eventually second-generation star systems formed. Some of these heavier elements collected near single stars in secondary eddies as planetary bodies. Such is our own Earth, its satellite, the moon, and its neighboring planets.

Thus, matter itself participates in a kind of evolution. Hydrogen in the interior of stars fuses to form helium and in stars of sufficient mass the variety of more complex atoms are formed. Once a variety of elementary materials are available, chemical compounds become possible.

At this point we may clearly observe two fundamental principles at work. For each new stage of relative complexity, the complexes of the previous stage serve as the relative simples. And the properties of complexes at any given evolutionary plateau are emergent; they did not exist among the properties of their components

parts. Sodium and chlorine, both of which, relative to electrons, proton, and neutrons are more complex forms of matter, are the simples from which a chemical compound like salt is formed. The properties of salt, moreover, are not present in the separate properties of sodium, on the one hand, and chlorine, on the other, nor are the laws of chemical combination the same as those governing the combination of subatomic particles.

Cosmic evolution seems thus to proceed by stages. Each subsequent stage or plateau builds with and upon that which immediately precedes it and at each subsequent stage wholly new properties, processes, and laws that did not exist at the previous stage emerge. This step-wise novelty-generating model of cosmic evolution is called "Emergent Evolution."

Latent within these rather arcane and (to many) dry propositions of contemporary cosmology lies a particle of poetry and an insight essential to a new humanism. The Earth upon which we stand, the air we breathe, the very substances from which organic bodies make themselves is all literally star dust. The materials in my hand were all forged probably some ten billion years ago in the cauldron of some giant star and have made their way here after a stellar cataclysm, after a sojourn in interstellar space, and after participating in the process of the birth of our solar system. Later still they jostled about in some caustic chemical soup on the surface of the primordial Earth combining and recombining in all sorts of proto-organic compounds - amino acids, proteinoids and so on - until finally they accidentally, but fortuitously, discovered how to make themselves into Earth's most primitive living things. They were, in turn, blue-green algae, zooplankton, amoebae, trilobites, arthropods, echinoderms, cephalopods, fishes, reptiles, fowl, insects, mammals, and now . . . man.

The potential philosophical-psychological impact of this new knowledge is staggering. Our substance itself is star dust and is now temporarily organized in human form. Between its violent creation and our assimilation of it, it has experienced the whole incredible procession of Earth's physical, chemical, and biological evolutions. Perhaps we enjoy, through our very material substance, a deep unconscious memory of this fantastic journey. We are organized bodies, and these bodies are the eventual results of cosmic, terrestrial, and organic processes. We are one with the Earth and the stars; we are linked to the whole universe and all its natural processes.

The personal, mythic import of Emergent Evolution was first and perhaps best expressed by America's greatest poet, Walt Whitman:

Rise after rise bow the phantoms behind me  
Afar down I see the first huge Nothing, I know  
    I was even there,  
I waited unseen and always, and slept through  
    the lethargic mist,  
And took my time, and took no hurt from the  
    fetid carbon...  
This then is life,  
Here is what has come to the surface after so  
    many throes and convulsions.

The natural process of building new complexes from the (relative) simples of the previous evolutionary plateau by no means reached its terminal stage with the emergence of life. The emergence of life is the transition from chemical evolution to organic evolution. Upon the appearance of living matter new properties like nutrition, reproduction, and sensitivity - properties and laws which did not exist at the immediately preceding level of complex chemical organization.

The single-cell living organisms themselves joined together to form multi-cell organisms. Here again the complex relative to the previous stage serves as the simple relative to the successive stage of evolutionary elaboration. At first these were but loose associations or societies of sister cells, but eventually they became fully integrated and articulated organizations of highly specialized cells. The complex, highly organized multi-cell organism itself, in turn, is the building block in the formation of animal societies, which in the case of some species are so tightly orchestrated and integrated that they invite comparison to organisms proper. Termite, ant, bee, and wasp societies, in other words, have been fruitfully compared to a single multi-cell organism by social entomologists since the turn of the century.

Further, with the development of ecology as one of the life sciences, it has become apparent that species are not haphazardly scattered upon the landscape to relate catch-as-catch-can nor arranged as so many externally related pieces of furniture in a room. Plants and animals and the chemical and physical characteristics of the Earth's surface are far more intimately related. They are tied together into a single "web of life" as ecologists frequently put it. The more fully these ecological relations are studied, the more wonderfully complex they are discovered to be. Ecological relations are internal, logically speaking, since the particular natures of the individual species are shaped by their relationship to the whole of which they are parts and to the otherspecies, severally, with which they share an ecosystem.

Ecologists have characterized the relationships, which it is the peculiar province of their science to study, by means of two metaphors. One is that plant and animal species are related as the various professions or niches are related in a human society or community. Just as there are doctors, lawyers, farmers, plumbers, shopkeepers, factory workers, garbagemen, and so on and on in a human community, so there are producers (the green plants), their helpers, the nitrogen-fixing bacteria, herbivores, omnivores, predators, carion eaters, fungi and other decomposers performing various specialized roles in the economy of nature. Energy is the currency in the natural economy and it is circulated like coined money in our human societies. From this representation of the relationships of species in an environment, Aldo Leopold derived the land ethic and suggested that the role of Man in the biotic community was simply that of "plain member and citizen."

Another way of expressing the nature of the relationships between and among living species disclosed by ecological biology is by means of an organismic metaphor. The living parts of nature, organisms themselves, are related together as members of a larger organic body, a third-order organic whole, the living ecosystem itself. According to this conception, species are as organs, performing some vital function in the life of the whole, and individuals or specimens are as cells.

This myth of a living organismic Earth is the culmination of the modern concept of Emergent Evolution, but it is also very ancient. Vestiges of such a myth survive in the extant fragments of ancient Greek religious poetry and in ancient Greek philosophy. Nor is it an uncommon myth among American Indian peoples. It is indeed a very old and universal myth which has gotten new life and new meaning from modern science. Among the relatively recent exponents of this scientifically recharged organic myth are P.D. Ouspensky, the Russian mystic, Teilhard de Chardin, the radical French Catholic theologian, the great geneticist and evolutionary biologist, Theodosius Dobzhansky, Conrad Bonifazi, a disciple of Teilhard, J.E. Lovelock, the English author of *Gaia*, Scottish ecologist and landscape architect, Ian McHarg, Arthur C. Clark, the science fiction writer, and the American biologist and popular writer, Lewis Thomas. Not only have the conceptual foundations of the cosmic and organic theories of Emergent Evolution, on the one hand, and ecology, on the other, given impetus to the revitalization of the myth of the Earth as a single, integrated, organic being, composed in turn of myriad organic beings, palpable human experience of the Earth from outer-space has measurably added to its psychological persuasiveness.

Since the seventeenth century it has been widely known that the

Earth is a planet drifting around its star-sun in the desert vacuum of space. But it was not until the space adventures of the middle decades of this century that human beings could actually experience Earth as a single living entity floating serenely in the void. From the abject barrenness and lifelessness of the cratered moon, the Earth appeared to be a wonderfully soft and inviting blue globe, swirled coyly around with a flounce of white cloud. The photographs returned to Earth from the moon and the intervening reaches of space are the most precious fruits of those adventures. Further, there is, mysteriously, a singular reality to the experience of viewing those photographs of the Earth from outer space, because human beings, not unmanned satellites, took them. We all, in other words, vicariously participated in the astronauts' momentary escape from and reentry into the Body in which we live, move, and have our being.

In the exhilaration of that episode of mechanical-technological triumph, the Earth was inappropriately compared to a space-ship. Much of the subsequent environmental rhetoric centered upon so-called "Space-ship Earth." That was a most unfortunate continuation of the obsolete Cartesian-Newtonian mechanical myth. A space ship is an artifact designed around and for human occupants; a space ship is literally anthropocentric. The metaphor of Space-ship Earth, thus, perpetuates the idea that the Earth is created by a transcendent artificer or designer, with a specific purpose in view - to provide a habitation and renewable "resources" for man, presumably, since space-ships are designed as human life-support systems.

Seen from outer space there is nothing about the Earth which resembles a space-ship - no antennae, no rockets, no windows, no photovoltaic panels, no destination. Clearly the Earth more than anything from that perspective resembles an organism. Its comparatively thin atmosphere is very like a cell membrane; it is selective in what it permits in and out. The Earth's surface is protected from meteor bombardment (which has pitted and cratered the moon) by the atmosphere which harmlessly burns foreign debris as it enters Earth's skin. Ozone in the upper atmosphere shelters the surface from harmful ultra-violet radiation from the sun; carbon dioxide in the atmosphere prevents the warmth of the Earth's surface from too rapidly reradiating into the cold of surrounding space. All of these functions and many more provided by the atmospheric membrane are of organic origin. Free oxygen, after all, exists in the atmosphere only because it is continually replenished by green plants; carbon dioxide, similarly, is an organic byproduct of animal respiration and the oxidation of organic materials.



The Earth itself clearly has evolved adaptive processes which enable it to live in its environment of space, time, solar gravitation and energy flux and with its endowment of star-forged materials. The evolution of the two biological kingdoms of plant and animal life solved problems of thermal balance and balance of gases in the early Earth atmosphere. Biological adaptation also solved thousands of other problems, like dangerous levels of acidity, salinity, and so on in the mothering seas. These are manifestly organismic adaptations, not mechanical. They were evolved not designed. Nothing was foreseen or fore-ordained; it was only a matter of life at the first, second, and third levels of organization persisting, surviving, adapting, elaborating, flourishing, and proliferating. It is an enterprise that is ancient beyond our powers of imagination, resilient, diverse, complex redundant, yet astonishingly delicate and fragile and within our present power to subvert from within, to seriously deface and reduce, perhaps to utterly destroy.

So much then for this old, but newly revived myth concerning the origin and structure of Nature. What is man's place in a world so conceived?

As soon as this question, which is fundamental to all myths, ancient and modern, is raised, an unwelcome and disquieting answer seems inevitable. The Earth, we say, is a single living organism. Species are as organs, specimens cells. But the human population has quite suddenly, in evolutionary measures of time, experienced a spectacular increase. As the human population has grown, populations of other species have declined precipitously. There are precious few Bengal tigers, rhinoceroses, African elephants, blue whales, Siberian cranes, timber wolves, grizzly bears . . . and these are only a few of the most magnificent of endangered species. Many are already gone forever - the passenger pigeon and the Greenland whale are but the most notorious. Mankind, from this organic and distanced perspective, clearly seems to be a planetary disease. But since human beings are not invading organisms from some other planet - we are, rather, wholly Earth-generated cells - then the present crisis in the three billion year life history of Earth is autogenous. The conclusion seems inescapable, we are as cancer cells in the Earth organism!

What a dismal and self-defeating image for mankind in the new ecologic mythology! We have always lived in the light of our myths. Nature is the theatre of human action and the image of man in Nature is the role we all play out as so many personal variations upon a single theme. If we conceive of Nature as a vast organism and of ourselves as wildly, uncontrollably reproducing cancer cells, then we shall simply live out our fate, continue as

we are, destroy our host and with it ourselves. The Earth will die and we will die, unless some human plasmids manage to escape in a space-ship and infect some other planetary organism-of-the-third-kind in some other solar system.

There is, however, a much more appealing and flattering place and role for man in the new, scientific version of the Gaia myth. Which self-image we choose is up to us; nothing is fated, determined or foreordained. Many of the recent exponents of the Gaia myth, from Teilhard to Thomas, sketch a far more attractive, inspiring, and wonderfully optimistic alternative. Suppose instead of Earth's cancer cells we portray ourselves as the Earth's brain cells, and instead of supposing that the Earth is terminally ill, we suppose instead that the Earth is now in the process, the very dangerous process, to be sure, of evolving a central nervous system. We human beings may be its components.

The particular version of this cosmic anthropology proposed by Teilhard and Bonifazi is too vague, mystical and, frankly, too Christian for my taste. Lewis Thomas has a more pedestrian, secular, and biologically well-informed notion which I shall recommend.

Increasingly the old philosophical question, what is the specific nature of Man?, or what is unique to human nature?, is answered in terms of language.

What makes rapid cultural development possible for people is our capacity to exchange verbal information. What is it then that we do that is quintessentially human? We talk.

Verbal communication has been, in recent human history, much augmented by the development of writing, then print, and presently electronic media, like radio, telephone, and television and by the development of artificial languages like logic, mathematics, and computerese. Viewed in spatial and temporal perspective, that is, as if by an extraterrestrial cosmic ecologist, a very interesting process is going on within the Earth. It is a process the outcome of which is presently uncertain. It could have disastrous, even lethal results. Earth's evolution could be interrupted and reversed, or worse yet, the living Earth could become as dead as its moon. But, on the other hand, it could propel the Earth to a new evolutionary plateau. What is happening is that beneath that blue and white atmospheric membrane, cells of a specific type are rapidly multiplying . . . and linking up. They talk to one another privately in bed, at table, in passing, and publicly in lecture halls and stadiums. They watch television, listen to radio, are wired to one another all across the globe, from Australia to Siberia, from Mexico to China.

What most of all this talk amounts to is really very little.

What productivity it has from the point of view of the health and well-being of the Earth organism as a whole is largely negative. Human communication enables Amazonian forests to be cut and paper shipped to Europe, offshore oil wells to be drilled near Texan estuaries, pipelines to be laid across wildlife sanctuaries in arctic Alaska, highways and parking lots to seal-up and choke-off the living soil . . . and the human population all the while to continue to expand.

But its ecological and evolutionary *potential* for the Earth organism is tremendous. Suppose this emerging information network, this evolving planetary nervous systems began to coordinate planetary organic functions *for the good of the whole organism* rather than for the short-term apparent good of some of the separate nerve cells. Earth's evolution might then become self-conscious and intentional, a genuine evolutionary teleology might then emerge. What a fully evolved global central nervous system might collectively think and dream and plan is for us mortal individuals unimaginable. My unified thought, the gestalt conscious state of my entire central nervous system is not known, nor knowable, to any one of my brain cells.

However unimaginable the future consciousness of Gaia may be for us ephemeral, replaceable, individual nerve cells, a vision of its general possibility is an inspiring *raison d'être* and directive for human life in the present. If our eventual human purpose and function is to be the central nervous system of the whole Earth organism, then we should strive consciously and willfully to live up to our potential future destiny. One immediate practical implication of this vision is to begin to bend the communication network that currently exists to the service of the organic health and well-being of the planet as a whole. We can and should dedicate ourselves to the control of the human population (and thus obviate the misanthropic charge that we are a global cancer), to the preservation and restoration of other species, the planet's functioning organs, and to the elimination of corrosive and destructive environmental pollutants. Our first task is conservative, to preserve the ecosystem in its currently evolved state. The emergent Gaiaic gestalt consciousness may then chart its own evolutionary course in future.

A holistic vision and a holistic concept of the Good may be the first, essential step in the transformation of a self-serving global human network into a force for planetary conservation and eventually future evolutionary directions impossible to foresee. In the last analysis our own survival and well-being as a single species is convergent with the health and well-being of the planet as a whole. Our own organs have learned this lesson. Neither the

brain nor its billions of nerve cells severally attempt to usurp the place and the functioning of the heart, liver, bowels, pancreas, and so on, yet it is the brain and its communication network which regulates the functioning of these organs for the optimum state of the whole organism. Neither can we human beings for long survive by usurping the place and doing without the functioning of whales, forests, insects, predators, microbes and all the other beings with whom we coexist. When this simple truth is taken in, we shall have turned to make our first positive step toward a new creative participation in the ongoing evolution of this Earth.

Finally, I would like to say a word about the noisy crisis, the impending possibility of nuclear holocaust, a future-threatening problem that has not been herein directly addressed. This myth of the *tertium organum*, the Earth itself as a third-order being (after the single-cell and multi-cell levels of organic organization), emphasizes by its sheer sweep and perspective the oneness and unity of mankind with itself and with Nature in contrast to the parochial nationalism, separatism, and selfishness which underlie present international tensions.

Ecology emphasizes symbiosis, cooperation, and harmonious reciprocity. An ecological habit of mind teaches us that what happens in any part of the ecosystem has repercussions throughout the whole. From this point of view it would be suicidal for one superpower to launch an all-out nuclear strike on the other, even if the victim of such an attack were unable or unwilling to respond with a single retaliatory warhead. The atmosphere would be lethally poisoned, and the winds respect no national frontiers, no iron curtains, no Monroe doctrines.

I can think of no other perspective so congenial to international peace and cooperation than the evolutionary, ecological, and organismic. Further, in the present version of this myth there is a forward-looking, not an atavistic, orientation. A technological future is envisioned, but it stresses the importance of the new electronic and software technologies of information, data processing, and communication, not the drudgery of the linear assembly-line technology, nor the ghastly destructiveness of the nuclear technology. Above all, it emphasizes two-way communication, the ideal of a global village, and a geo-political and economic cybernetic system. And, finally, it emphasizes not only the unity of mankind with itself and with Nature, it also reminds us that people and other living things are delicate organic beings, for whom the only purpose of living is life itself.