From Cosmos to Creature:
The Origins of Human Biology

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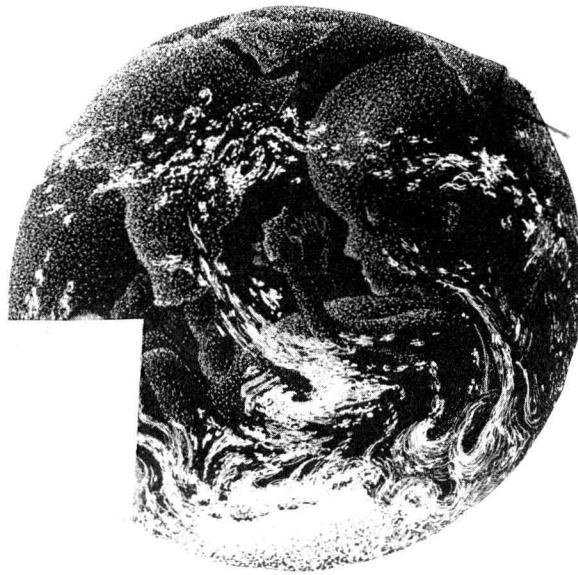

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Embryogenesis
From Cosmos to Creature: The Origins of Human Biology

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Embryogenesis,
Being a description not of *who* we are but of *what* we are.

For my unknown ancestors and descendants

Preface

This book is built around a detailed narrative account of the formation of an embryo—the human embryo itself and the sequence of nonhuman embryos on which it is based. The account brings together ontogeny and phylogeny, the two histories which converge in our formation: the former describing the development of an individual man or woman, and the latter describing the evolution of our species.

But *Embryogenesis* is also a book about life and mortality. It is a long essay exploring the means of our coming to be, not only physically but psychologically, not only psychosomatically but spiritually and epistemologically.

I have assembled this book from dozens of texts, lectures, and discussions with embryologists and doctors. I have attempted to put together the information in a way that is experientially (rather than scientistically) meaningful and that speaks to the important issues of psychology, anthropology, politics, philosophy, and religion. In the simplest sense, I have reconstructed the twentieth-century biological consensus of what we are and how we are made, while at the same time asking: What is the meaning of an existence arising from such a process? I have searched not for the more apparent revelation of modern science but for its shadow.

Throughout the writing of the text, I have gone by the premise that opposing viewpoints, values, and cosmologies shed more light on the true nature of things by their contradictions of each other than by their assertions and lucidities. For anything we might be tempted to accept at face value, there is also an opposite with its own reality to express. The truth supposedly revealed by the material world masks a truth forever concealed by the appearances of that same world. The so-acclaimed spiritual world is also a mask—a temporal one obscuring another spiritual realm.

At this stage of human history, the physical/spiritual split is merely a symptom of our social and ideological failure. Rigid adherence to one position or the other may sustain a career, but not a whole life. If, on the one hand, we accept uncritically the physical laws and statistical facts culled from nature, we will lose the actual thread of objective inquiry and become hollow scientists. If, on the other hand, we adopt theosophical systems and their landscapes of eternal life without experiencing the actual genesis of those systems in our personalities, we will find ourselves nihilists again at the end despite the years of belief. In *Embryogenesis* I have taken a different path in place of a choice between these two (or a modernistic synthesis *of* them). I have tried to recognize an actual experience that occurs outside the ordering of science and religion yet with reference to their roles in forming our collective phenomenology.

The narrative account in this book is compiled from many sources (as spelled out in the *Notes* at the back). The technical aspects have been corrected by a number of scientific readers; Dr. Stephen Black of the Department of Embryology, University of California at Berkeley, has been a consultant and advisor from beginning to end. I would also like to acknowledge and thank Dr. Barry Coller of the Department of Hematology, State University of New York at Stony Brook, for his help in the area of blood-cell formation.

I encourage readers to use their own judgment in going through the pure embryology in this book. The technical sections can be dense and difficult. Skim where you get bogged down. I wrote this book not to teach scientific terminology but to give a sense of our situation in the physical universe and to represent the twentieth-century version of human reality in all its precision and determinism. When I considered various alternative degrees of detail, I finally did not feel it was sufficient to say such things as "cells move. . . ." and "cells follow paths induced by other cells. . . .," or to settle for a summary description of biological fields. These are all abstractions. I wanted to show how the actual heart and lungs and genitals are formed, even if the words are merely a different level of abstraction. There is no need to remember the names and details of every stage and organ, but they give the reader a sense of the physical reality underlying existence.

I have also had various "nonscientific" readers give their thoughts about the book at various stages and drafts, and their additions and criticisms have been invaluable. Charles Poncé, Danny Moses, Jeffrey Auen, Laura Lederer, Lindy Hough, Herbert Guenther, Richard Heckler, and Randy Cherner have all contributed insights to this work. Additionally, I would like to thank Stanley Keleman of the

Institute for Energetic Studies in Berkeley, California, for his introduction to the role of embryo development in bioenergetic etiology and diagnosis.

I would also like to acknowledge Jeannine Parvati, a spiritual midwife, herbalist, and counsellor. Her notes on the manuscript led me to reevaluate several sections. I have tended to trust her direct experience of pregnancy, childbirth, and women's mysteries. Embryology may be one of Apollo's sciences, but the phenomena it entails arise first in Artemis' queendom, and to underestimate them is to pretend to be objective overseers of the universe rather than mortal life forms embodying profound transformations. *We* are embryos, so we are initiates in a mystery.

Parvati, though a strong supporter of this text, believes I have been too undiscriminating in my use of scientific observation at the expense of intuition and worship. She challenges my "literal embryological narrative," on the basis that it is a dangerous illusion, drawn from the work of morally corrupt scientific researchers who, without compassion, tortured embryos for their raw information. She feels that the textbooks deriving from such research are only the symptoms of a sick society.

During the writing of *Embryogenesis* I thought repeatedly about the life-styles and ethics of the scientists whose work made possible the "facts," and although I experienced an ongoing discomfort (usually unacknowledged and on an almost subliminal level), I cannot reject all of experimental science out of hand. If we could end our exploitation of sentient life forms as part of an overall change of consciousness and planetary politics, I would be glad to support and participate in a compassionate and visionary path to knowledge. However, to ignore the science of biology because it is based on mutilation of creatures would be, for me, an ideological position which would prevent the writing of this book.

I agree that knowledge gained from the severing of brain lobes of octopi, squirrel monkeys, etc., and the induction of tumors in helpless rabbits, chickens, and the like must, in some way, be sullied and distorted by the experiments themselves. Even the "torturing" of worms and insects is an ongoing crime against nature and against the sacred power of the universe. But to boycott such knowledge is to leave the twentieth century. That might not be a bad idea (as Parvati has shown by her life as healer and yogini), but my path at the moment is a different one. As far as I can see, the damage has already been done; we might as well examine the golden eggs for which we cut open the goose. At the same time, we must not pretend our knowledge is innocent or bloodless. Ambivalence and treachery lie at

the heart of this book. I have written in order to confront the changeless addictions of our society and to challenge the tyranny of our self-images and self-definitions.

Embryogenesis completes an informal trilogy begun with *Planet Medicine: From Stone-Age Shamanism to Post-Industrial Healing* (Doubleday/Anchor Books, 1979; revised edition, Shambhala Publications/Random House, 1983) and continued with *The Night Sky: The Science and Anthropology of the Stars and Planets* (Sierra Club Books/Random House, 1981). The books are clearly individual works and may be read in any order. The trilogy is the result of an eight-year inquiry into the meaning of origins: how we define ourselves and our society in the universe at large. The particular order in which they occur traces my own path of insight. I began with medicine as our unintentional self-diagnosis of a collective disease and a statement of our need to cure ourselves and our society. From there I went on to explore how we form images of the boundaries of our existence—matter, space-time, and the creation itself; what we think the stars are often determines what kind of society we generate. *Embryogenesis* contains a more explicit scientific narrative than either of the other books, partly because scientifically derived images of cell morphogenesis and embryo formation are not as available in our popular culture as equivalent images of systems of medicine and of stars and planets. Such a painstaking biological account also grounds the trilogy in protoplasm and living fields.

Recently, after finishing this book and taking a two-month break, I went on a long walk with my fourteen-year-old son around the Echo Park area of Los Angeles. Reaching the top of a steep hill we found ourselves both staring at pigeons seated on three vertically separated telephone wires above our heads. In the bright sun every feather and ruffle and coloration was etched in each bird, and each bird was different. In the rush of the moment I said: "That's what my embryology book is about—how did those birds get there?" We looked at the birds and he thought about it. Then, a few minutes later, after we had passed them, he said that his ten-year-old sister had asked him if the universe went on forever, and he didn't know what to tell her.

The difference between *The Night Sky* and *Embryogenesis* is spelled out in the tension between those two questions. *The Night Sky* addresses: Does the universe go on forever?; and *Embryogenesis* asks: How did those birds get there, in every aspect of mind, and ruffle of feather?

I would choose at this point, after eight years of writing such books, to pull out of the tar-baby. The questions are unanswerable

and will always be unanswerable, and it is a danger to give one's life to them. They will devour everyone and everything. When addressed by a Western mode of analysis, they merely double back on the author with mirages instead of new insights. I fear this would happen if I went on, so *Embryogenesis* is my last work in this mode. I will attempt other works of a different nature now.

What I finally seek is not a lifelong accumulating opus on the mysteries of physical and spiritual science, but a mode of transformation through the work itself. *Embryogenesis* is the best and clearest acknowledgment of the mystery that I can make.

(One other note to the reader: For me this book begins with Gene McDaniels singing "A Hundred Pounds of Clay." Each time I got stuck in ideas I went back to my old 45 record of that song. What this tells me is that it is not finally a book of facts and conclusions; it is a pop theme, a melody taken right off the surface of America. The obscurity of the simplest feelings finally outweighs the most complex metaphysics.)

—Richard Grossinger
Berkeley, California
March, 1984

The Ceremony of the Animals

In this world, we are the animals. For sure and for certain. We may kill them, eat their remains, ignore them, or judge ourselves by consciousness above them—but we *are* them.

If the planet is a temple, blue skies keeping the ceremony within, we are priests, Aztec in our famous cruelty, Aztec in our clarity. We carry out finite law.

They do not have personalities as we do, but they do not have the scourge that we do. They are not diseased. They bear no grievance. They are there until the absolute last moment, then they are not.

It is wrong to think of us as the bane of the animals of this world. We are their completion, their ritual. They did not intend us.

We suffer consciousness that they may be fleet and light.

We consider and judge that their ferociousness and hunger are unabated.

We dream, and they are dreamless night.

We make a text, but their bodies and footprints lie in margins we can never clear.

We make language, they are outside language.

We think. They pray. We are their unspoken intention to speech.

The truth we speak they are.

We suffer disease and madness. They suffer.

Everything we do, our cities, billboards, poems, wars, machines, houses in which they build nests, they allow. Their pure reception makes our doing it possible.

Even Roger Miller singing "King of the Road" on the radio is the ceremony of the animals. Raccoons, and starlings, and fish in the river the melting snows fill, fly buzzing in the room, tapping the windows. He sings: "Trailers for sale or rent/Rooms to let fifty cents."

Foreshadowing of this book in unpublished journal notes, 1977.

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1. Introduction to Embryogenesis

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What is the life that brings us here? How is the loose energy of the cosmos snared in our tissues and our personalities? By what agency do single entities, awake and aware, escape the vast homogeneous current?

These questions generally go unasked because there are no answers. Consequently, we distance ourselves from the intuition of our own life span and its mortal consequences. We project the death within us to an abstract spatiality without, and we placate it with metaphors and relativities, as if it did not swallow our destiny into its otherness. Not only our minds but our nerve cells, guts, lung tissue, and hearts prefer "business as usual," so it *is* business as usual, right up to the end.

We pass through this world as a shadow swims through light. It is around us, in us, inside our inside; yet we do not contain it and cannot wholly grasp it. We become alive, bringing a distant intuition of our own presence into being with us, and we sustain its fragile range of personalities all our days.

There is a spirit within us that approaches life as a limitless possibility; that expects to be surprised, forever; and that labors to make us somehow real to ourselves. Immortality seems out of the question at this stage of things—that is, the conventional linear immortality of Western cosmology—but everything we are, including the part of us that was immortal before the ascent of science, arises in an embryonic process whose origin and principle lie outside the present economy of nature. It is to the mystery we should look both for meaning and the threat of no meaning at all.

For most of our sentient history, human beings have been considered finished and complete creatures—final causes of the deific or natural agency of creation. But nothing in the world described by modern science is finished or final; all are fleeting realities assembled in the collision of time and space by events rushing to other resolutions. The *physical* basis of life is a field of constantly changing atoms, pouring through the body like light through a crystal. It takes but five years to replace every atom in us with another atom. When we meet again after a long interim, we appear as new assemblages of

particles. One so closely resembles the other (and bears its memories) because prior atoms make room for new ones only in positions equivalent to the ones they replace. Each of us contains atoms that were used by Homer and Buddha, as well as by billions of worms, fish, birds, extinct crustaceans and corals, and Stone Age men and women. The *biological* basis of life is a sequence of cellular fields, each one nested upon a previous one, so that the shapes of plants and animals emerge from the configurations of prior species, from a beginning in simple inanimate crystals which themselves originated in unidimensional chemical clusters.

Viewed physically, human existence is a temporary lattice of star currents and cosmic dust. What feels whole to us is what we make whole by being; otherwise it is a heap of atomic and cellular contradictions. The objective facts, if facts they are, lead (one way or another) to a view of life as an abnormally organized zone of molecular debris. Scientists have their own elegant aphorisms for this predicament. Frederick Hopkins pronounced, "Life is a dynamic equilibrium in a polyphasic system."[1] Other scientists have ordained that life is a partial realization of the informational potential in atoms and molecules.

In our modern revised world view, life is neither inherent nor inevitable, and, if circumstances had gone differently, there would be none on Earth (or perhaps in the universe at large) now or forever. The same elements have the potential for lifelessness, and there is nothing we know that predisposes them to making living systems. We must concede that, once these systems have been made, atoms and molecules sustain them millisecond to millisecond.

What we have said about life, in general, is even more true (if possible) for human life. Consciousness is a unique realization of the informational potential of atoms and molecules organized in cells (at least in our version). Most scientists find life so unlikely that, to them, intelligence is a mere elaboration upon the initial marvel. Biochemists see no order in cells or simple animals that guarantees the later emergence of symbols and language. It is fortunate that our own assessment of the odds against our coming into being has no effect upon the present fact of our existence.

We are apparently the conscious offspring of the unconscious struggle of matter, which probably felt about the same as water does running along a rock, until the dying and devoured trillions ascended to the fierceness of the scars of their ancestors. We are now stuck at a curious place in our own history: our search for origins has left us more and more alone in an alien place. Although we can continue with the so-called utopian program of our civilization, that civiliza-