



ALIVENESS, FEELING,
AND THE METAMORPHOSIS
OF SCIENCE

THE
BIOLOGY
OF WONDER

ANDREAS WEBER

FOREWORD BY DAVID ABRAM

Praise for
The Biology of Wonder

The Biology of Wonder is a wonderfully eclectic and wide-ranging book that clearly shows that all beings and landscapes on our fascinating and magnificent planet are deeply interconnected. In the spirit of personal rewilding, Professor Weber writes about interbeing, ecological commons, first-person ecology, and non-duality in ways that will make sense to readers with different interests, and his ideas about “poetic ecology” show clearly that we are not alone — indeed, we are one of the gang — and must not behave as if we are the only show in town.

—MARC BEKOFF, University of Colorado, and author, *Rewilding Our Hearts: Building Pathways of Compassion and Coexistence*

Weber moves biology beyond reductionism into a new expanded view of life that includes not only reductionism itself, but also the interactive cooperation, beauty, and vital force that complete the picture of our living world.

—DAVID EHRENFELD, Distinguished Professor of Biology at Rutgers, and author, *The Arrogance of Humanism and Becoming Good Ancestors: How We Balance Nature, Community, and Technology*

The Biology of Wonder is a wonder. Schrodinger asked “What is Life” with brilliance, but misses “What IS life”. Weber sees aliveness as functional wholes, self-creative, and self-generating, that co-create their worlds. The “aliveness” of all life, emotional, sentient, adgentival, interested, co-mingled, “entangled with all of life”, reorients us scientifically, poetically and morally, from the rich but insufficient reductionism Schrodinger helped spearhead.

—STUART KAUFFMAN FRSC, Emeritus Professor, University of Pennsylvania

Written with poetic elegance and interwoven with a rich vein of personal narrative, this extraordinary book takes the central idea of the subjectivity and interior life of all living beings and gives it concreteness by grounding it in the findings of modern biology. In articulating the Laws of Desire inherent in all organic life, it goes far toward reframing the debate about the relationship between mind and body.

—SHIERRY WEBER NICHOLSEN, author, *The Love of Nature and the End of the World*

In Andreas Weber's vision, nature is beautiful, and ecology is poetry. Follow his beautiful words into a science that investigates the Earth as a breathing, sensitive planet that welcomes us with story and song.

—DAVID ROTHENBERG, author, *Survival of the Beautiful* and *Bug Music*

The Biology of Wonder guides us toward discerning that value, meaning, experience, creativity, and freedom exist within and constitute the living world. Previously dismissed as “romantic,” this viewpoint, at once clearheaded and compassionate, is tenaciously represented by Andreas Weber as deep realism. To come to grips with the understanding he communicates — to recognize the ubiquity of subjectivity in the world and the feeling-unity of the human with all creation — is to glimpse what biodiversity destruction heralds for the human soul. The work of protecting and restoring nature simultaneously recovers and rescues our innermost being.

—EILEEN CRIST, coeditor, *Keeping the Wild: Against the Domestication of Earth*.

The Biology of Wonder is a wonderful biology, even a transformational one. Prof. Weber leads us into a radiant world which is sensuous, interconnected and always communicating in a bio-poetical symphony. Had we ears to hear the language and eyes to see the vision revealed in this book we would surely be made more alive and deeply thankful. This is more than a book; it is a revelation, and it joins the very few works I would take into the wilderness with me. Beautiful, wise, and grounded, I am grateful as much for the vision Prof Weber elucidates as for the love with which he clearly expresses it all.

—KALEEG HAINSWORTH, author, *An Altar in the Wilderness*

Grounded in science, yet eloquently narrated, this is a groundbreaking book. Weber's visionary work provides new insight into human/nature interconnectedness and the dire consequences we face by remaining disconnected.

—RICHARD LOUV, author, *The Nature Principle* and *Last Child in the Woods*

THE BIOLOGY OF WONDER

ALIVENESS, FEELING, AND THE
METAMORPHOSIS OF SCIENCE

ANDREAS WEBER



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To Emma

Thinking of that early spring day when you had been walking your black poodle and returned so enthusiastically. You told me that you had suddenly seen the flat sandhill with its scattered oak trees behind our house all ablaze with beauty.

*The lower animals, like man, manifestly feel pleasure
and pain, happiness and misery.*

Charles Darwin

All is allegory. Each creature is key to all other creatures.

J. M. Coetzee

*The conscious subject is not really perceiving until it
recognizes itself as part of what it perceives.*

Northrop Frye

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Foreword by David Abram

From Enlightenment to Enlivenment

The book you now hold in your hands is a living thing. Like many living entities, it is intemperate, moody, calm and collected at some moments, filled with passion and exuberance at others. Indeed this book is so brimming with vitality that, if you're not careful, you might find it wriggling free of your grasp and slithering off into the grass. The chapters herein pulse with wonder and are shadowed with ache; the pages are thick with fresh insights and often suffused with a kind of careless beauty....

Andreas Weber is a German biologist and philosopher. This book (a translation and updating of his first general audience book in Germany) is to my mind a necessary text for anyone engaged and excited by the natural sciences. In its pages one glimpses something of the shape that a genuine biology will take if and when our species wakes up to the shuddering ecological predicament that it has wrought. The mounting catastrophes, the accelerating losses of species and habitat, the discombobulation of long-established seasonal cycles as ocean currents go haywire — all these are consequences of modern humankind's strange detachment from the rest of the animate earth. More precisely, they are a consequence of our species' addiction to the countless technologies that regularly insert themselves between our bodies and the breathing land, short-circuiting the ancestral reciprocity between our senses and the sensuous terrain. Enthralled by our own fossil-fuel-driven machines, we forgot our thorough entanglement with innumerable other creatures, with woodlands and wetlands — losing our ancestral attunement to the living land even as the conflagration of fuel steadily thickened the air and defiled the waters.

Weber does not focus on the intensifying calamity; instead he trains his keen attention upon healing the experiential rift that underwrites all this wreckage. For him, this rift is the disastrous dissociation between the thinking mind and the feelingful body. Our material physicality, after all, provides our only access to the earthly world of other animals, plants and microorganisms. It's our sensate, breathing bodies that are so thoroughly intertwined with the soils and the sea currents, with the respiration of frogs, the solar yearning of aspens and the slow weathering of the stones. Since the dawn of modernity,

however, we have gotten used to thinking of the mind — our subjective self — as if it were a capacity neatly separable from the physical body. By considering mind as an immaterial essence only contingently related to the body, modern science freed itself to view the physical body as a complicated machine without any inherent sentience, and indeed to view the whole of material nature as a conglomeration of passive objects and mechanically determined processes void of any immanent creativity. Such a stance is intimately related to the more industrial view of nature as a stock of inert or passive ‘resources’ waiting only to be used by humankind.

Of course, criticizing the mechanical view of nature has in recent decades become something of a cottage industry among the educated set. Similarly, the Cartesian view of mind as a metaphysical substance has lately fallen into disrepute; the search for the material constituents of mind, or consciousness, within the activity of the brain now compels huge numbers of cognitive scientists, neurobiologists and analytic philosophers who regularly gather at immense conferences around the world. Meanwhile the pillaging of earthly nature continues apace; more and more species tumble over the brink of extinction, while more and more ecosystems collapse.

Andreas Weber is doing something different. His richly detailed contribution toward a more mature natural science opens a new and largely unfamiliar way past the thickening mire of callousness, digital distraction and rhetorical smog that clogs so much of our public discourse, confounding even our most private reflections. In this brief forward I can gesture toward only a few of the many themes that interlace in this audacious volume.

Early in the text, Weber discloses a way of resolving the mind-body rift in a manner very different from those who seek the physical correlates of consciousness within the neural circuitry of the brain. For he recognizes that mind, or subjectivity, is less a property of the brain than it is an elemental attribute of the body in its entirety. Any living body, as it navigates its way through the world, must negotiate a host of contingent encounters, obstacles, opportunities and situations whose shifting characteristics could never have been predicted (or programmed-for) in advance. To take a simple example from my own writing: consider a spider weaving its web, and the assumption — still held by many persons of a mechanistic bent — that the behavior of such a small creature is thoroughly ‘programmed’ in its genes. Without a doubt that spider has received a rich and complex genetic inheritance from its parents and its predecessors. Whatever ‘instructions,’ however, are enfolded

within its genome, those instructions can hardly predict the specifics of the terrain within which the spider may find itself at any particular moment. They could hardly have determined in advance the exact distance between the bouncing branch of an apple tree and the broken bicycle nearby, both of which the spider is using as anchorage points for her current web, nor the exact strength of the blustering wind that's making web-construction rather more difficult this early morning.

And so the spider's genome could not explicitly have commanded the order of every flexion and extension of her various limbs as she weaves this web into its place. However complex are the inherited 'programs,' patterns, or predispositions, they must still be adapted to the immediate situation in which the spider now finds itself. However determinate one's genetic inheritance, it must still, as it were, be woven into the present, an activity that necessarily involves both a receptivity to the specific shapes and textures of that present and a spontaneous creativity in adjusting oneself (and one's inheritance) to those contours.¹

It's precisely this blend of receptivity and spontaneous creativity by which any organism orients itself within the world (and orients the world around itself) that constitutes the most basic layer of sentience integral to that creature — the inward subjectivity or 'mindedness' necessarily called into being by that particular body as it navigates the present moment.

Weber points out that "intelligence," etymologically, means to 'choose between.' Intelligence, first and foremost, is the ability to make choices, to choose between divergent possibilities. And indeed no organism can live without making choices; even a single-celled amoeba or paramecium must choose between competing routes toward potential food or different ways to avoid a toxin. Such choices may not be conscious in our sense; nonetheless, such decisions stem from each body's felt hunger for more life and from its subjective sense that certain encounters enhance its existence, while others hinder it. As Weber writes:

*An organism desires to be, to endure, to be more than it is.
It hungers to unfold itself, to propagate itself, to enlarge itself....
This is a hunger for life. And this hunger is life.*

Nor is this inwardly felt subjectivity restricted to animals. Since plants are alive, then their bodies, too, are “instruments of desire” that must improvise their way in the world, orienting themselves and making choices. Weber discusses experiments with plants that are exact clones of one another, carrying identical DNA; even in highly controlled settings wherein room temperature and moisture are the same for all, these plants behave differently, each one choosing a different growth pattern from the others. Each individual plant, it would seem, has its own preferences.

Mind, then, is hardly something generated by the brain. It is, rather, the inwardness necessary to life, the felt subjectivity necessary to sustain oneself, moment by moment, as a living body. This recognition forms the first of three Laws of Desire that Weber proposes as organizing principles for the “poetic ecology” that he envisions. His First Law of Desire affirms that all living bodies are necessarily bodies of feeling. That the objective structure and behavior of any organism simply cannot be understood apart from the subjective sensations of that organism — that is, cannot be understood without recognizing the organism as a feelingful body motivated by qualitative experiences. All such subjective experiences have their source, according to Weber, in the most basic and exuberant desire to endure and to flourish, which — although it displays itself in wildly different ways — is common to all living bodies.²

To resolve in this manner the age-old segregation of the mind from the body is not merely to heal a gaping conceptual wound; it has direct and rather massive consequences for our sensorial experience of the living world around us. If we regard subjectivity as a capacity utterly necessary to the dynamic autonomy of any organism — whether an apple tree, a hummingbird, or a humpback whale — it follows that mind can no longer be construed as an entirely ineffable mystery. To recognize mindedness as nothing other than a body’s felt experience of its own dynamic autonomy as it dreams its way through the world is to realize that the mind is not an immaterial spiritual essence that could be housed, sequestered, or hidden away within that being’s body or brain. Rather, the mind of any entity is part and parcel of its physicality, and hence is evident and manifest in the dynamism of its material being. The subjective self of any organism, that which feels its encounters and chooses its movements, is not hidden somewhere inside its body; rather, it *is* the body! (Weber’s understanding is remarkably akin to what the French phenomenologist Merleau-Ponty wrote of

as the subjectivity of the living body itself, which he called the body-subject.) Hence, the mind of a fox is everywhere evident in the manner of its bodily presence, registered not just in the fox's hesitation and the gaze that holds our own, but in the sleekness of its fur, in its way of holding itself, in the abrupt tilt of its head as it catches a fresh scent and the grace of its gait as it leaps the fence and vanishes into the sagebrush. Likewise, the inward, feelingful life of a nightingale discloses itself directly in the syncopated, whirring trills and melodic lilt of that bird's corporeal singing.

For Andreas Weber, in other words, the interiority of a plant or an animal readily reveals itself, to those who have eyes to see, in the outward expression or display of that creature's bodily presence. Here his work echoes that of the Swiss zoologist, Adolf Portmann, who held that the outward surface of any organism cannot help but manifest the innermost self-experience of that organism. This then is Weber's Second Law of Desire, that the wish to live is palpable and visible in the living body of each being. As he unfurls the consequences of this principle, the full radicality of Weber's project becomes evident:

Every organism's inner perspective as a self is simultaneously and necessarily an outward aesthetic reality. If a living being is not an insensate machine but rather is animated by values and meanings, then these qualities become observable. Meaning makes itself manifest in the body. The values that an organism follows are not abstract. They actually guide a body's development and coherence, whether the body is as complex as a human being or as small as a single cell. Feeling is never invisible; it takes shape and manifests as form everywhere in nature. Nature can therefore be viewed as feeling unfurled, a living reality in front of us and amidst us.

By taking time off from our technologies, turning away from the gleaming screens that hold us hypnotized within an almost exclusively human sphere, we begin to loosen our creaturely senses from the over-civilized assumptions that stifle our experience of the breathing world. Slowly, quietly, our skin begins to remember itself to the earthly sensuous. As our ears adjust to the wordless silence, we slowly become aware that other voices are speaking, not in words but in quiet sighs and softly swelling rhythms, in distant howls and

nearby trills and cascading arpeggios of sound. We come into the presence of an earth much wider and deeper than our human designs.

And as we turn toward these other voices, tuning our attention to other shapes and rhythms of corporeal experience, our own lives gradually release their knots, becoming more coherent. Following a raptor with our eyes as it swerves and then hovers above a meadow before dropping, talons outstretched, toward some prey we cannot see, or gazing the translucent pulse of three jellyfish as they undulate in a slow rhythm beneath our kayak, we notice a deepening within ourselves, as though a previously unsuspected dimension had just opened within our chest. As though the encounter or meeting with each nonhuman form of bodily sentience — when we recognize it as such, as another shape of subjectivity — immediately confirms, or draws into salience, some essential quality within ourselves. Hence Weber's Third Law of Desire, which he articulates as follows: "Only in the mirror of other life can we understand our own lives. Only in the eyes of the other can we become ourselves. We need the regard of the most unknown. The animal's regard... Only it can unlock the depths in ourselves that otherwise would be sealed forever."

Much of the pleasure of this book consists in watching how the author unpacks these loosely-formulated principles, showing how they play out in richly variegated ways among wildly different species in very different earthly contexts. For a work concerned with the radical interdependence of animate forms and the inextricable wholeness of life — themes that infuse countless well-meaning tomes with a bland and blurry oneness — this book is wonderfully attentive to particularity, divergence and the wild-flourishing multiplicity of the real. If there is any transcendent 'oneness' to be found in this project, it will only be through the immanent, manifold particulars of creaturely encounter in the thick of this teeming world.

Throughout this work Andreas Weber synthesizes a remarkable amount of evidence from a broad array of biological disciplines, forging fresh links between some of the most creative and pioneering researchers in these disciplines — from Weber's own mentor, Francisco Varela and his associates in the field of embodied cognition, to the broad-minded Kalevi Kull and his colleagues in the burgeoning field of biosemiotics, from revolutionary biologists like Lynn Margulis and complexity theorists like Stuart Kaufmann, to plant behaviorists, marine biologists and developmental morphologists. And he draws upon the work of earlier scientists working in the more

romantic biological tradition that was once prominent in Central and Eastern Europe, like Johann Wolfgang von Goethe, Karl-Ernst von Baer and the wonderful Jakob von Uexkull, whose crucial contributions were often ignored by the Darwinian mainstream. (My only clear disagreement with this text: Weber's aloof characterization of Darwin's own astonishing work feels unwarranted to me, overlooking as it does Darwin's irrepressible fascination with the diversity and detail of life; neither the regressive views of the 'Social Darwinists' nor the dogmatism of today's neo-Darwinian orthodoxy ought to be associated with the views of the great biologist himself.) Weber elucidates the transformative insights of these many researchers by refracting them through poetry and the arts, but more importantly through his own keenly observed and richly narrated encounters with particular animals, plants and places.

What is at stake in this work is a repudiation of the enlightenment assumption that science is the study of value-free facts, that biology can and must aim at a layer of factual truth, shorn of subjective qualities. For Weber, to strip reality of such qualities is to strip it of life; a natural science given to such a goal can only pave the way for ecological breakdown and collapse. Yet as may already be evident, the participatory ecological ethics that emerges from this work is inseparable from Weber's aesthetics — inseparable, that is, from the renewed attention to the corporeal dimension of feeling and sensorial experience to which this book calls us. Although it would be impossible to consciously pinpoint and assess each of the many subtle relational ingredients of a genuinely healthy ecosystem, Weber suggests that the felt experience of beauty may be our most reliable gauge for recognizing such health. Despite the power of our complex technological instruments and fine-scale monitors, it is the sensate human body that remains — by far — our most advanced, most exquisitely-tuned instrument for feeling into the well-being (or the malaise) of the wider landscape. The sense of wonder, an attentiveness to beauty, the unexpected swelling of joy — these are indispensable guides as we work to bring our communities into alignment and reciprocity with the more-than-human commonwealth. To this end, and in keeping with his critique of the historical enlightenment, Weber's poetic objectivity calls us not toward enlightenment, but enlivenment!

Introduction: Towards a Poetic Ecology

*Of course the animals need humans. They need us
as if they were old parents, against whom we have revolted
for a while and who one day, weakened, deprived of their
former power, request to be protected by us.*

— Brigitte Kronauer

For 150 years, biology, the “science of life,” made no great efforts to answer the question of what life really is. Biologists had a concept they thought to be sufficient for their research: most of them assumed organisms to be tiny machines.

Today this belief is shaken. Only a few years ago we witnessed researchers celebrating the “decoding” of the human genome as a secular breakthrough. They seemed to be on the verge of unraveling the mechanics of life. But not much has happened since then. The boom has come to a standstill. We don’t hear much from geneticists these days. Certainly they have been charting the arrangement of genes for a growing number of organisms. But at the next step — understanding exactly how genes make the body and how the body gives rise to feeling and consciousness — the view that life is organized like a chain of military orders fails. In genetic research, developmental biology and brain research scientists are increasingly realizing that they can only understand living beings if they reintroduce a factor into biology that has been thoroughly purged from it for centuries: subjectivity.

Biology, which has made so many efforts to chase emotions from nature since the 19th century, is rediscovering feeling as the foundation of life. Until now researchers, eager to discover the structure and behavior of organisms, had glossed over the problem of an organism’s interior reality. Today, however, biologists are learning innumerable new details about how an organism brings forth itself and its experiences, and are trying not only to dissect but to reimagine developmental pathways. They realize that the more technology allows us to study life on a micro-level, the stronger the evidence of life’s complexity and intelligence becomes. Organisms are not clocks assembled from discrete, mechanical pieces; rather, they are unities held together by a mighty force: feeling what is good or bad for them.

Biology is joining the physical sciences in a groundbreaking revolution. It is discovering how the individual experiencing self is connected with all life and how this meaningful self must be seen as the basic principle of organic existence. More and more researchers agree: feeling and experience are not human add-ons to an otherwise meaningless biosphere. Rather, selves, meaning and imagination are the guiding principles of ecological functioning. The biosphere is made up of subjects with their idiosyncratic points of view and emotions. Scientists have started to recognize that only when they understand organisms as feeling, emotional, sentient systems that interpret their environments — and not as automatons slavishly obeying stimuli — can they ever expect answers to the great enigmas of life.

These questions include: How does a complete organism develop from an egg cell? How do new biological forms and new species evolve? What distinguishes organisms from machines? Can we design artificial life? What is consciousness? How does the fact that we are living beings structure our thinking and our culture? Why does humanity feel so deeply attracted to nature? What deeper, existential reasons beyond sheer utility impel us to protect nature? In short, what is life and what role do we play in it?

In this book I describe a biology of the feeling self — a biology that has discovered subjective feeling as the fundamental moving force in all life, from the cellular level up to the complexity of the human organism. I also describe how this discovery turns our image of ourselves upside down. We have understood human beings as biological machines that somehow and rather inexplicably entail some subjective “x factor” variously known as mind, spirit or soul. But now biology is discovering subjectivity as a fundamental principle throughout nature. It finds that even the most simple living things — bacterial cells, fertilized eggs, nematodes in tidal flats — act according to values. Organisms value everything they encounter according to its meaning for the further coherence of their embodied self. Even the cell’s self-production, the continuous maintenance of a highly structured order, can only be understood if we perceive the cell as an actor that persistently follows a goal.

I call this new viewpoint a “poetic ecology.” It is “poetic” because it regards feeling and expression as necessary dimensions of the existential reality of organisms — not as epiphenomena, or as bias of the human observer, or as the ghost in the machine, but as aspects of the reality of living beings we cannot do without. I call it an “ecology” because all life builds on relations and unfolds through mutual transformations. Poetic ecology restores

the human to its rightful place within “nature” — without sacrificing the otherness, the strangeness and the nobility of other beings. It can be read as a scientific argument that explains why the deep wonder, the romantic connection and the feeling of being at home in nature are legitimate — and how these experiences help us to develop a new view of life as a creative reality that is based on our profound, first-person observations of ecological relations. Poetic ecology allows us to find our place in the grand whole again. From this vantage point, we can perhaps start to sketch what the sociobiologist Edward O. Wilson has called a “second Enlightenment,” no longer putting the human apart from all other living beings.¹

A fundamental shift is waiting for us. In my last book I called this new logic and worldview “Enlivenment” — the insight that every living being is fundamentally connected to reality through the irreducible experience of being alive. The experience of being alive is not an epiphenomenon, however. It is the center of what defines an organism.²

It is still too early to even guess the future implications of this revolution in biology. The neurobiologist David Rudrauf, who works together with the brain researcher Antonio Damasio, asserts that “the search for the way organisms bring forth value and meaning is at the heart of modern cognition research, from robotics to neurosciences.”³ Stated simply, the new biology considers the phenomenon of feeling as the primary explanation not only of consciousness, but of all life processes. By “feeling” I mean the inner experience of meaning — not necessarily from a standpoint comparable to the human psychological reality, but from a certain, individual perspective to which everything that happens is of vital import. Life always has an inside, which is the result of how its matter, its outside is organized. To understand how this inside comes about, in which ways we share it with other beings and what consequences this so far unseen connection has for our view of biology is the topic of this book.

As a science, biology currently finds itself in a situation comparable to that of physics a century ago when basic understandings of matter shifted radically. Compared to the biological mainstream, the new biology is what quantum theory was in relation to Newtonian physics — a breakthrough reconceptualization.

A hundred years ago, quantum theory discovered that observer and observed are not separate entities and that everything is connected to everything else. The new biology I will be exploring in this book adds

another, beguiling dimension to our very view of “objectivity.” It states that the subjectivity of organisms is a physical factor — an objective reality in its own right. An individual point of view and feelings are not marginal, transient epiphenomenon but rather the opposite: the foundation from which an explanation of life has to start. The new biology places value and feeling at the center of a physics of living organisms — not as one of many interpretive approaches, but as an indispensable element of a scientific description of life.

Biology thus realizes that something identical to our own emotions — something deeply related to our own longing for continuation, our desire to be — qualifies as the epicenter from which the entire spectrum of nature unfolds. This understanding provides us with a home in the wilderness again, in the creative *natura naturans*, that so many people are longing for in their private lives, that they create in their gardens, that they visit during hikes in the wilderness and that they seek to protect. How peculiar and sad that, within the framework of the mainstream sciences, this universal, timeless element of life is seen as a mere curiosity, if it is acknowledged at all.

FEELING THE OTHERS

Nature is not dead. We humans love, seek and long for it. Walking through a forest fills us with peace; gazing onto the ocean calms us. The nightingale’s song moves us. We need nature and know we must conserve it. This is self-evident. But at the same time we no longer know if our feelings toward plants and animals are justified at all — or something old-fashioned and rather ridiculous. Feelings and the scientific worldview seem to be irreconcilable. For centuries, many scientists have explained that our joy in other beings is only a sentimental illusion. Such a viewpoint, however, ignores a deep human insight which connects us with other living subjects. Today, researchers are discovering that feeling — the experience of a subjective standpoint — and the desire to exist are phenomena that lie at the heart of a modern concept of biology. This message is so radical that, so far, it is not readily understood. It flouts respectable scientific opinion. Perhaps there is a subliminal resistance to the new biology because it implies a wholesale reconsideration of so many other things. It means nothing less than that the world is not an alien place for humanity, but our home in a profound existential sense. We share it with innumerable other beings that, like us, are full of feeling.

Other beings occupy an enormous space in our imagination. If you ask someone what is beautiful for her, in an overwhelming majority of cases the

first answer refers to nature — “a meadow in bloom,” “the ocean,” “my small urban garden” and so on. We decorate our windows and dining tables with flowers. Fabrics and clothes carry botanical patterns. Stuffed animals lurk in children’s rooms. Television broadcasts nature programs in prime time. Urban zoos are always crowded. Many people keep pets. A whole branch of the economy, the tourism industry, generates income by promising access to natural, untouched landscapes.

Humans seek nature because we have lost something inside. In our bodies we are nature. Our essence consists of flesh and blood. We are organic creatures connected by manifold emotional aspects to the more-than-human world, a realm that is not subject to our reasoning alone. Biologists such as the evolutionary scientist Edward O. Wilson believe that mind and feeling have developed in a continuous coevolution with plants and animals — the “biophilia hypothesis.”⁴

Mind and body have found their forms in such intimate contact with nature that they cannot survive without its presence. Today, many scientists have realized that the fact that we are animals defines our perception in such a fundamental way that we cannot change much about it. We do not experience the world primarily with our minds but with our senses and our bodies — and the consequence of this connection in the flesh is that we perceive the world not as a causal chain reaction but as a vast field of meaning. Human beings think in symbols and metaphors. Mind is meaning as well.

To fully experience this side of our being and to integrate it into our personalities, we are dependent on the presence of nature as a symbolic mirror or a repertoire reflecting or expressing our inner lives. We gather the food for our thoughts and mental concepts from the natural world. We transform plants and animals into emotional/cognitive symbols according to some of their qualities which are real — or which, at least, we presume to be real. The snake, the rose and the tree, for instance, are powerful organic images that recur in art, myth and cultural rituals throughout human history. These forms of nature seem to have a deep connection to the individual as well as the cultural subconscious. In their living reality and transformations we recognize ourselves.

The poetic ecology that I propose and develop throughout this book connects these deep human and cultural experiences with a scientific understanding of life. Within nature, those values and meanings that life