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Philosophy's Forgotten Four

> The four elements [are] the hormones of the imagination.
>
> —Gaston Bachelard, *Air and Dreams*

> Now I a fourfold vision see, / And a fourfold vision is given to me.
>
> —William Blake, Letter to Thomas Butts

Western philosophy commences as a profound, if protracted, contemplation of the natural environment in an attempt to discern the workings of the world and to reflect on its origin, constitution, and meaning. The first *physiologoi*, or natural philosophers, speculated not just on the human *psyche* (soul or mind) but also focused foremost on the vaulting sky, the flickering turns and reversals of fire, the eddies and rhythmic flows of water, and the hidden depth or silent beauty of rock and earth—in short, the four elements. By way of an engagement with the elements as well as living plants and animals, they searched for a hidden *arche* (ruling principle), an underlying *logos* (order) and a guiding *telos* (purpose or goal). Interrogating and building on ideas advanced by the Presocratics in the sixth and fifth centuries B.C.E., subsequent philosophers and incipient scientists like Aristotle and Theophrastus were able to provide the underpinnings of later ecological thought by integrating close observation of the natural world with rational explanation and justification.[1]

In these early historical periods, theories of nature were not yet separated sharply from or supplanted by more human-centered theories of mind, nor was philosophy itself distinguishable clearly from nascent science. This ancient thought remains relevant today not because it is empirically accurate but because it is embedded in a vision of the world much vaster than humanity alone. It also is marked frequently by a generosity of spirit, sensitivity to the subtleties of environmental change, openness to nonhuman otherness, and an ontologically egalitarian orientation. As environmental thinkers seek to "green" philosophy and to "deepen," "widen" or even "democratize" ecology, it is vital to recall these initial and bold theoretical strides. It is equally imperative to grasp the slow departures from a philosophical perspective rooted in a vision of an intelligible, rational, and beautiful cosmos,

the transitions out of myth and stories about animal figures, the increasing breaks with the organic and biological realms, and eventually the attempts to escape or transcend this world altogether. In so doing, we can benefit from an inquiry into how the elements—including matter, motion, and causality—were construed or constructed and ask how social and ecological changes involving deforestation or domestication, for example, altered these notions and allowed transformations of land, sea, sky, and fire power to proceed with little encumbered speed.[2]

The four elements—water, air, earth, and fire—have exercised an enormous, if often unnoticed, impact on the Occidental imagination. It may be reasonably said that they have helped to organize an influential view of the lifeworld and to frame a compelling picture of the universe. But they also served as the *materia prima* with which philosophy erected its founding edifices. This four unfolds—sets itself forth—into philosophical and literary history, too, where we can trace its unexpected resonances through the four ancient humors, the Pythagorean *tetraktus*, alchemical speculation, or the opuses of modern poets such as William Blake, T. S. Eliot, and Ezra Pound, to name but a few.

Nonetheless, it is an apparent, if at times unfortunate, truth of the human condition that we often only become aware of circumstances, conditions, and objects when they change suddenly, when they fail to function in predictable manners, or when they disappear inexplicably from our circadian rhythms. This is especially the case with things elemental. When a flame leaps out unexpectedly from a campfire and licks the surrounding brush or when lightning fissures a halcyon night sky, we become cognizant of the awesome and transfiguring force of fire. When a pipe bursts in the bathroom or when a river breaks its banks and floods communities, we no longer take the calm course of water for granted. When the atmosphere thins as we ascend a mountain or when the pressure in our ears pops on a plane, we sense quickly the presence of what formerly seemed to be missing entirely in the invisible air. When the ground is cleaved and wrenched open or when an avalanche of rock and snow is launched like a toboggan down a precipitous slope, we stand up and take immediate notice of the stirrings of the seemingly solid, stolid, and stable earth. In order, then, to foreground the four classical elements and place them before us from the outset—and prior to examining the theories of their emergence, transformation, and endurance—let us first meditate upon earth, air, fire, and water individually and consider some of the ways they enter into our everyday worlds so as to make their presence felt both as an ecological necessity and a robust cultural resource.

Earth

> O sweet spontaneous / earth how often have / the /doting / fingers of / prurient philosophers pinched / and / poked / thee /, has the naughty thumb / of science prodded / thy / beauty . . . / (but . . . / thou answerest / them only with / spring).
>
> —e. e. cummings, "O sweet spontaneous"

> The earth is not a mere fragment of dead history, stratum upon stratum like the leaves of a book, to be studied by geologists and antiquaries chiefly, but living poetry like the leaves of a tree, which precede flowers and fruit.
>
> —Henry David Thoreau, *Walden*

Earth is confoundingly complex—"wild bewildering" to borrow a pregnant phrase from Edgar Allan Poe—because it is encountered and conceived in a vast variety of ways: as dirt, humus, soil, compost, stone, land, silt, mud, clay, loam, dust, sand, mineral, and excrement, among others. At the same time, we subsume these distinctions when we speak not only of earth as ground but as planetary whole—the Earth—our life-supporting home. In many of its manifestations, earth is posited as a creative matrix, material base, or generative mother for both human civilization and philosophical speculation. These associations are evident in, for example, the religious belief that we are but a handful of shaped dirt (Adam is Hebrew for red clay) that will return to the dust; in the profound cultural attachments to land and landscape; and in attempts to recycle or reuse earthy wastes.

Just as the atmospheric air is multilayered, so is earth more than monolithic. It is extremely differentiated across an ever-proliferating surface in the form of continents, bioregions, valley basins, alpine ranges, deserts, dells, fields, and forests. It is distinguished vertically as sedimented tiers ranging from the bountiful and cultivable epidermal "skin" of the topsoil to the darker subsoil to the deep and deader realms of the interior and ultimately molten center. We live on and interact not only with *terra cognita* but also *terra incognita*, both a revealed and revealing surface and a concealed and self-secluding core, or underground. It is through the earth's "held-back silence," its "taciturn" and sequestered features, to use Rainer Rilke's words, that the fertile face of the land is held up and made manifest. As the poet asks, "Earth, isn't this what you want: to arise within us, *invisible*?"[3] Reciprocally, then, the telluric sphere sinks back into the unseen insides where in withdrawal it is kept in reserve before it is ready to emerge again.[4]

However, when the "doting fingers of prurient philosophers" explore the earthiness and underworld of dream, myth, and imagination, they frequently find—in accordance with classicists—three distinguishing psychological levels of earth: first and uppermost, Demeter's green plain of growth and fertility (the topsoil); second and below, *Ge*, the subsoil, dark earth or underground as well as physical and psychic ground (or place) of persons and communities; and third, *Chthon*, the realm of depth, coldness, and the dead beneath earth as we normally speak of it. In essence, this Demeter–Ge–Chton stratification conceives a less physical or more "pure" earth beyond the ground we normally walk on.[5] As Jung observes, when we begin to plumb the place of the unconscious, we discover invariably a vital relationship of body and earth via chthonic powers, the force of the dark and elemental, the maternal and material ground. It is this bodily belonging to earth that over time expresses our many affinities and binds our emerging identities to specific or peculiar places.

The etymologies of "earth" bespeak its multicultural manifestations and, by extension, its multinatural dimensions because the land is shaped and subsequently experienced in a variety of manners. But underlying these differences are some common connections. Our English word has cognates in many languages, including *Erde* in German and *aarde* in Dutch. It is related to *ert* ("ground") in Middle Irish and *ertha* in Old Saxon. Semitic languages possess words for "earth" that are close to those in Indo-European tongues. One finds in Arabic, *ard*; in Aramaic, *araa*; in Akkadian, *irtsitu*; in Phoenician, *erets*; and in Hebrew *arets* or *erets*. Latin roots *terr-* (as in "terrestrial") or *tellur-* (as in "tellurian") also refer to the earth. The Earth has been personified widely as a deity, too, especially a goddess, as in the Greek, *Gaia*, or the figure of "Mother Earth" (*Terra Mater* or *Tellus Mater*). The Chinese earth goddess and embodiment of fertility is Hou-Tu, who serves in a capacity similar to Gaia. In Norse myths, Jord is the divine earth mother and the parent of Thor. An exception to these gender roles can be found in ancient Egypt, where sky in the figure of Nut is a female goddess while earth appears in the form of Geb, who is male.

The nomenclature of earth underscores its vast differentiation and heterogeneity: there are ten soil orders, more than twenty designations for soil characteristics, and more than fourteen thousand individually named soils. The storied layers of earth are known appropriately as horizons, implying both an accumulated horizontality and a demarcating liminality, a line measuring the passing sands (and soils) of time. An assembly of horizons is referred to as a profile, which bears the mark of a particular soil and is fashioned through the dynamism of earth, fire, air, and water. The relatively passive earth provides a substrate in the form of igneous, metamorphic or sedimentary rock on which water works its terraforming and soil-building powers, sending silica, clays, aluminums, and irons into lower tellurian depths. Through chemical changes and wind transferences, air also exercises an assertive role. Carbon dioxide, for example, is pivotal in the production of calcium horizons in the soil profile. Finally, soil grows hotter as one moves deeper into the earth, and chemical reactions, in turn, increase dramatically with temperature rises, thereby providing a place for elemental fire in the process. Minerals are transformed; iron is oxidized; and acids and salts are freed to actively engage the earthen medium. Ultimately, the soiled surface—what geologists call regolith—is subject to a grand form of circulation akin to air and water cycles as it erodes, blows away, flows, and eventually sinks at a pace of more than ten tons per acre each year in the United States into the suture that recycles it toward a subterranean fire.[6]

Look closely at a handful of rich soil, and you can frequently unearth a cornucopia of delights resting in the palm of your hand: shards of marble, slivers of leaf fiber, specks of sand, fragments of roots, splinters of wood, the remains of tiny organisms. Soil derives from the Latin *solium*, meaning, "seat," and it is likely related to *sedere*, "to sit." In this capacity, it is the outermost earthen "stuff"

and "skin" on which we position our bodies and place our cultures. In order to maintain itself, soil employs a labor force of specialists in demolition, disassembly, and regeneration, including a million and a half species of fungi and between two and three billion species of bacteria, most of them part of a silent army of the unknown.[7] When it is fertile, soil provides the materiality of and matrix for life itself. A shortage of this substance, however, can contribute to the decline and demise of whole cultures. The Mayan, Greek, and Roman empires, for example, all eroded and fell apart from within, in part due to poor soil management, a fact to which our own society should remain alert as we consume and vanquish this invaluable resource.[8]

In his natural history of dirt—what he calls earth's "ecstatic skin"—William Bryant Logan recounts that the sea was once a kind of liquid proto-soil, a place "where Earth, air, water and the solar fire met for the first time" before life oozed onto land.[9] Although we routinely acknowledge that larger terrestrial organisms are located mainly where the earth meets the air—where the tip of the topsoil greets the base of the sky—we may forget that the soil, too, is percolating with biological activity. Environmentalists, in fact, invoke the image of a soil pyramid and often describe the land itself as living. A rich forest soil contains as many as 5,500 individual organisms and as many as seventy different species in a single square foot, including a bevy of mites, millipedes, pill bugs, termites, earthworms, and nematodes.[10] Worms are, in many respects, the embodiment of this earthy materiality—biotic citizens in the best sense—as they feast on and excrete dirt, and deposit castings that enrich the soil they inhabit. Although technically blind, they sense and "see" by way of the polarities of wet/dry and hot/cold, qualities Aristotle identified as being the essence of the four elements. As Darwin himself recognized, "It may be doubted whether there are many other animals which have played so important a part in the history of the world."[11]

In one sense at least, we can "make" earth in a way that we cannot create water or air. The "brown gold" of compost is the result of a process whereby we speed up the decomposition of organic matter. Lawn clippings, coffee grounds, leaves, rotting wood, kitchen scraps, and animal manure can all be assembled into a warm distillate that will decay over several months through the work of bacteria. There are many ecological merits of compost that are produced largely through the contributions of its main ingredient, humus. The benefits of this "buried treasure" to the ground or garden include improving soil integrity and structure; increasing the ability of the earth to hold water for growing food; absorbing solar energy to warm the soil; breaking down organic matter through a host of microorganisms to provide plants with needed elements; and restoring to the earth chemicals removed through agriculture. For the American gardener, generating compost has been elevated to the level of a moral virtue not merely because it reinvigorates the land but because it is viewed as rekindling our humanity by reasserting our interdependence with the earth and our independence from the petrochemical industry.[12]

Earth is more resistant to the force of light and thus more opposed to displaying protean qualities than the remaining triumvirate of canonical elements. Virginia Woolf caught sight of this point when she waxed: "earth absorbs colour like a sponge slowly drinking water. It puts on weight; rounds itself; hangs pendent; settles and swings beneath our feet."[13] In the fifteenth century, Basil Valentine likewise noticed that earth is both porous and gross so that it latently "receives all that the other three project onto it."[14] Geographically, earth offers girding support for the primary dimensions of place. It is an encompassing "matrix of matrices" relative to its tendency toward downward motion, providing a region of orientation for human and nonhuman bodies.[15] In landscape art, like the physical world it strives to represent, earth is routinely underlying—below water and sky—so that it both defines and delimits topographical features. As a subtending placeholder, it solicits and draws forth our beholding faculties of aesthetic appreciation.

Earth is marked more demonstrably and visibly than other elemental realms by human activity, though we can also see the signature effects of moving air, flowing water, and catalytic fire upon its surface and subsurface. "Wind and water and ice and life / have powdered our planet's obdurate skin," John Updike rightly notices."[16] More specifically, earth is inscribed with a concatenation of anthropogenic lines: a complex skein of roads and highways, urban grids, wending fences, and twisting borders. When viewed from above, these markings assume a variety of shapes and meanings in relation to geographic and cultural place. I am often entranced, even hypnotized, when staring out the window of a plane onto the geometric patterns and shifting colors of the landscape far below, especially when the view suggests a deeper sense of geologic time or a foreign cultural frame of reference. The outlines of farms appear as if a patchwork of embroidered quilts; odd shapes seem to coalesce magically into interlocking jigsaw puzzle pieces; great shadows borne of hovering clouds or distant mountains spill over vast spans of ground and generate the illusion of dimensionality, even texture, where topographical relief barely exists; and the albedo of the planet morphs from snowy alpine whites to desert browns and tans to the blues and greens of more liquid-saddled terrain.

Upon learning of the equator in grade school, a geographer friend of mine who grew up in Kenya biked a great distance to the region where the line, which lies equidistant from the planet's poles, was supposed to be. He was crestfallen, however, to discover after a fruitless search that this most famous terrestrial marking was not literally tattooed upon the earth but exists only in our collective imagination and upon cartographic creations. The Nazca lines of Peru are, by contrast, one very material kind of geoglyph or "earth carving." Etched into the desert pampa two thousand years ago through the removal of rock so as to reveal pale pink sand beneath, these lines depict several hundred figures, including pictures of a humming bird, monkey, lizard, whale, and pelican among many animals, along with concentric circles, spirals, and other geometric patterns. The fact that they are only visible from high in the air has led to speculation that they represent effigies of animal

gods, ancient roads or "walking temples," star pointers, images of constellations, primitive landing strips, or astronomical observatories. Here we gain a glimpse of earth as a kind of archival palimpsest, a tableau written or imaged upon over and over through time before being erased inexorably by elemental processes.

Throughout much of history and lasting into the Renaissance, however, normative prohibitions existed against digging too deeply into the bowels of the life-giving earth and wantonly removing minerals from it, actions believed to encourage human greed. The Roman Pliny thus wrote:

> We trace out all the veins of the earth, and yet . . . are astonished that it should occasionally cleave asunder or tremble: as though, forsooth, these signs could be any other than expressions of the indignation felt by our sacred parent! We penetrate into her entrails, and seek for treasures . . . as though each spot we tread upon were not sufficiently bounteous and fertile for us.

The earth was, in short, perceived as animate, sacred or capable of responding to such "violations" with earthquakes or other disasters, and such constraints on mining tended to protect the landscape, water, and human inhabitants from poisons and pollution.[17]

The stolidity and reliability of the often rock-solid earth lies in contrast with the overarching and ever-fluctuating sky. One is mostly stationary and stable; the other is transitory and largely transparent. Together, they form an elemental partnership and pairing around which our optical and corporeal worlds are organized. For the Greeks, the dynamism of earth and sky was expressed in terms of a division between gods and humans—between the "heavenly ones" (*epouranioi*) and "earthly ones" (*epichthonioi*)—as well as a distinction between Olympian and chthonian divinities.[18] But Thomas Moore registers a gentle protest: "A piece of the sky and a chunk of the earth lie lodged in the heart of every human being," he proclaims.[19] When the earth quakes or cleaves, as it does roughly 150,000 times each year, we are dislocated and disoriented, unsettled from our ingrained habits and forced to come to terms with the epiphanic insight of Heraclitus that everything does in fact flow and change. Of such events, Seneca once inquired, "What can one believe quite safe if the world itself is shaken, and its most solid parts totter to their fall . . . and the earth loses its chief characteristic, stability?"[20] As a seeming comment on this rhetorical query, Maurice Merleau-Ponty declared, "One earthquake does more to demonstrate our vulnerability and mortality than the whole of the history of philosophy."[21] During those instances in which we do lose contact with earth, however, we discover ourselves not in a formless void or vacuum of empty space but rather in the air and wind or in the open water, in the throes of another primal element.

On rare occasions, we sense our bodies in earth's embrace, deported into the hold of an encompassing hole, a below buried beneath the topsoil base but above a

bottomless abyss. Earthen holes tend to signify an admixture of archetypal danger, delight, and discovery. What child has not clawed joyfully into shoreline sand, overturned shovelfuls of clay dirt, or imagined tunneling through the rocky earth to China (or alternatively America) as part of an early environmental expedition? John Ruskin recalled that in his youth he was enthralled with digging holes but that to great chagrin his parents did not countenance this kind of avante-gardening.[22] "Who needs to travel thousands of miles to find the new?" Logan aptly wonders. "The most mysterious place on Earth is right beneath our feet."[23] When we are surveying the strata of rock formations and outcroppings in such locations, we may become acutely aware of deep geologic time—an other-than-human scale of temporal processes fed by inexorable erosion, death, decay, and petrifaction. The rates of this transformation, of course, differ from place to place but the end result of turning stone into soil remains eternally the same. Meanwhile, resistant granites don the mountaintops; marbles shore up the high lands; and soft sandstones are recumbent in the valley bottoms. In this way, the landscape itself testifies like an expansive canvas to the ongoing influence of elemental processes and the forces of weather on earthen minerals.

The place of earth within philosophy is largely concealed—or folded into the wider concept of nature—befitting its own tendency toward darkness and self-seclusion. Earth is the one classical element not identified specifically by a major Presocratic thinker as an *arche* (origin or governing principle), with the proviso that Xenophanes of Colophon reputedly held that "For all things come from the earth, and all things end by becoming earth."[24] But philosophers, like poets, have intermittently discovered its archaic beauty and illuminated its enduring primacy and potency. The Benedictine monk Venerable Bede thus gave voice to the idea of earth as an egg—a cosmological motif also found among ancient Egyptians, Orphics and Gnostics—and in the process incorporated the three other classical elements in his vision. "The Earth is an element placed in the middle of the world as the yolk in the middle of an egg: around it is the water, like the white surrounding the yolk; outside that is the air, like the membrane of the egg; and around all is the fire, which closes it in as the shell does."[25] Indeed, earth assumes a distinct shape and status in Plato's cosmology, a unique position in Aristotle's geocentric physics, and a vital role in recent phenomenological and ecological investigations. Earth must be recognized for its centrality to notions of human perception, territory, motility, and materiality as well as its indispensable connections with other elemental zones. Earth is in many respects the keystone of the four perennial elements, providing a physical base and philosophical basis for an understanding of geographical and cultural place, one concept integral to sustainable environmental practices.

Hesiod imagines "broad-bosomed Earth" as a "sure standing-place" that comes into being aboriginally and only subsequent to "Chaos." As an illustration of Earth's fecundity and autonomy, she then gives birth through a kind of parthenogenesis to the starry heaven (Ouranos), who as a spouse covers her from

above and conceives with her the hills and sea and "deep-whirling" Okeanos, the mythical river that encircles the Earth. Homer, too, acknowledges earth as the "well-formed . . . mother of all" whose "beauty nourishes all creatures that walk upon the land."[26] Plato, who uses similar language at times as Homer, posits the existence of what we might call a "second earth" in the *Phaedo*, a "true earth," given that we live in a "hollow" of Gaia, about a central sea "like ants or frogs round a pond." He hypothesizes that we dwell unknowingly of the real nature and decidedly large size of our spherical homeland, which he portrays vividly in his role of an early geographer as being like a ball "made of twelve pieces of skin, variegated and marked out in different colors."[27] In the *Laws*, Plato characterizes the land as an "ancestral home," counseling "we must cherish it even more than children cherish their mother." The earth is a "goddess" and "divine mistress" who deserves the same respect accorded other "spirits of the locality." [28] As is discovered here, Plato also privileges the position of earth within his *chora*-graphy of the elements, making it the *terra firma* of a transformational schema in the *Timaeus*.

Earth subtends and supports; it carries and bears the weight of the world, even if its ecological carrying capacity is finite and being stretched to the limit. Despite "her strong thighs," earth is still vulnerable and can "grow exhausted with bearing / too much, too soon too often," speculates poet Marge Piercy in one of her "Elemental Odes."[29] It is to this supportive dimension that Edmund Husserl refers when he describes the earth as *Ur-ark,* "the original ark," the "basis body" or "ground-body" (*Bodenkörper*) for all other bodies.[30] In doing so, he highlights its fundamental function as a permanent "here" for us as well as underscores the way that in its proto-primordiality—and contrary to Copernicus' claim—it does not actually move. In commenting on Husserl, Jacques Derrida observes of the earth that it is "the most universal, the most objectively exhibited element given to us" because it provides us with "the first matter of every sensible object." The earth is the "*exemplary* element" because it is "more naturally objective, more permanent, more solid, more rigid . . . than all other *elements*."[31] Merleau-Ponty also warns of the "forgetfulness of the earth"—as Martin Heidegger had explored a more abstract "forgetting of being"—and indicates that it serves as the "ground [*sol*] of experience" and "the root of our spatiality, our common homeland."[32]

In an effort to reveal its complex and multihued features, Gilles Deleuze and Félix Guattari speak of the Earth as a "body without organs," an entity "permeated by unformed, unstable matters, by flows in all directions, by free intensities or nomadic singularities."[33] The earth is not simply a singular force or phenomenon among many, nor is it a substance possessing form; nor again is it the same as territory. It is instead a "close embrace of all forces" and "an intense point in depth or in projection" that might be explored through what they style as "geo-philosophy."[34] In a broadly compatible vein, Stephen David Ross calls attention to the fecundity and seeming inexhaustibility of earth. In contrast to the hallmark ecological traits of stability and order, he finds a dizzying and disorienting superabundance

on display.[35] The profundity and generative production of the earth—creatures beyond counting, depths past fathoming, surfaces always proliferating—expresses an unpredictable diversity and a bewildering disorderliness that exceeds expectations, upending our neat taxonomic or perceptual assumptions. And, finally, it is worth registering that John Sallis specifically identifies a uniquely *elemental* index for earth, comparing it with a conception of the individual earth and the universal earth. From this view, what we need is to think the earth "not as the *from which* of material composition but as a *from which* of manifestation."[36] This enterprise, in turn, entails perceiving things of the earth in terms of their self-showing, their revelation. In many of these philosophical characterizations, earth is cast as exceptional, singled out as special in an elemental or ontological sense.

Images of earth in poetry, literature and art allow us to further pinch, poke, and prod (to use e. e. cummings' language) the elemental world. In this work, we can distinguish introverted and invisible aspects of terrestrial repose—in the recesses of caves for example—from more extroverted dimensions accessible through human action upon stone, metal, and mineral. As is seen later, Gaston Bachelard reveals how the creative forces and dynamic features of earth are opposed by a potential for telluric destruction and ultimately renewal. He shows the ways that writers imaginatively find or fashion a view of the materiality of earth that is a complex combination of resistance and acceptance so that in its precarious equipoise in the laboring hands of the body, we are able to locate our notions of relative hardness and softness.

Originating as out-of-doors descendents of Minimalism and Conceptual Art, Earth Art and Land Art leave human marks and creative traces upon the landscape in an other-than-human setting rather than in a museum or gallery. Robert Smithson's 1970 "Spiral Jetty"—a coiling fifteen-hundred-foot pedestrian-scale earthwork built up out of stone, earth, and algae into the Great Salt Lake of Utah—is the most well-known instance of this genre, but other artists labor with or upon the earth as well, employing it as a medium, an extension of other media, or literally as a swath of canvas. Hamish Fulton and Richard Long, for example, both rely on the action of the walking body to reveal the nuances of the earth in particular locales, either through the documentation of photographs accompanied by haiku-like words or by unconventional site-specific sculptures. On a grander scale, Michael Heizer has undertaken a massive and controversial work on the Mormon Mesa of Nevada entitled "Double Negative" in which 240,000 tons of earth was displaced to create two giant trenches fifty-feet deep and fifteen-hundred-feet long. These excavations refer creatively to the empty or "negative" space generated by human and natural processes, commenting on the blurred distinction between sculpture and elemental rock.

Mapping is, of course, a primary way to discern and define the vast physical stretches of earth. Most basically, a map takes measure of the earth. Edward Casey distinguishes four broad kinds of mapping in an effort to identify the ways

in which earth is marked: cartography (representation of geographic areas in the greatest possible exactitude), choragraphy (maps of particular regions), topography (maps of distinct places like cities) and, finally, a less traditional body-mapping (where the body charts or marks the earth through artistic action). Casey also astutely differentiates earth—what underlies our bodies and personal experiences as a stable place—from land, a mediatrix and middle term between earth and world. "Land turns earth inside out, as it were, putting its material contents on display, setting them out in particular places, so as to become subject to articulation in language and to play a role in the history of those who live on it."[37] Landscape, then, is where and how the earth appears; the place in which it is shaped by the cultural world. However it is evoked, the map is, of course, not identical with the represented earth, except perhaps in the fantastical tale told by Borges in which cartographers continually enlarge a map until it is coincident with the entire kingdom.

Although yielding to our efforts, earth is characterized above all by its tendency to regularly oppose our endeavors. Aviator and author Saint-Exupéry, who sets his famous story *The Little Prince* upon our own planet but speaks of tiny extra-terrestrial orbs in an unknown elsewhere, declares that "Earth teaches us a lot more about ourselves than all the books in the world, *because it resists us*." "Man," he surmises, "only finds himself when he measures himself against an obstacle."[38] To listen to, to celebrate and even to love this material resistance, this weighty opposition and unseen force we name gravity—even as we seek to surmount it—enables us to better apprehend this element. I am reminded here of one of my former students who stood in a marshy bog, a field of moist sediment and muck, during an entire spring afternoon on Earth Day in order to experience this magnified terrestrial pull and visceral earthen presence. Such a feeling is also conveyed by playing with or relaxing in viscous mud, burying oneself in sand, crawling up a slippery pyramid of gravel, climbing out of a deep hole, or even lying prone in an open grave (yes, try it!). This double moment of elemental embrace and elemental resistance is captured eloquently by Robert Frost in his lyric poem, "To Earthward": "When stiff and sore and scarred / I take away my hand / From leaning on it hard / In grass and sand. / The hurt is not enough; / I long for weight and strength / To feel the earth as rough / to all my length."[39]

It is expressed, too, in the "Burial Hymn" of the ancient *Rig Veda* when the subtending ground is addressed in prayer, along with Death and the community of mourners: "Creep away to this broad, vast earth, the mother that is kind and gentle. . . . Open up, earth; do not crush him, wrap him up as a mother wraps a son in the edge of her skirt."[40] Similarly, during yoga, in *Shavasana* or "corpse pose," one lies supine at the end of a day's practice and passively sinks into the earth, which bears one's weight generously, offering us a glimpse of that final resting state we will experience. Appropriately, perhaps, as a friend of mine was lying in *Shavasana* on a beach in Costa Rica, the spaces in the sandy earth beneath her

began to slowly wiggle, shift, and open, and a whole army of ants—emissaries of the earth—emerged to crawl gently over and claim her outstretched body.

"Earth" and "world" often seem to be in a perpetual but productive strife with one another—an ongoing and ultimately unassimilated *agon* (contest) that in certain ways mirrors a widely perceived tension and antagonism between the spheres of nature and culture. Earth is a "serving bearer" that is capable of emerging, rising forth, and issuing upward. It is a self-dependent, effortless and inexhaustible entity that provides an elemental shelter and anchor for humans and other animals. The earth withholds from our attempts to fathom it. It is self-concealing in contrast to the world, which is more self-revealing. As Heidegger argues, it is only *on-the-earth* that we can understand ourselves *in-the-world* we create. It is here that we can find a harmony with the environment because "all things of earth, and the earth itself as a whole, flow together into a reciprocal accord."[41]

The elemental imagination points not just to the importance of more definite earthen entities such as stone, mountain, and mineral but to less determinate terrestrial matter such as mud, which can function as a primitive and plastic substance. The earthy material and paste of excrement, in particular, inhabits our theories, bodies, and psychological lives as well as fertilizes agricultural soil. Excrement can, in fact, serve as an ecological and cultural aliment because waste is but food in a different context, sustenance for other organisms. Shakespeare gestures directly toward this connection when he professes in *Timon of Athens*, "earth's a thief / that feeds and breathes by composture / stolen / from general excrement."[42] One of the lasting contributions that contemporary ecological criticism might make is to demystify, or at least to openly discuss, this seemingly sacred taboo but very profane subject. One would not be going too far, in fact, to regard the political and social cause of environmentalism itself as a kind of *bowel movement* that asks us to reconsider the relationship between body and earth, excrement and aliment, anality and animality, consumption and waste, and even death and dung. As Peter Sloterdijk speculates, "The grand act of ecology in the history of ideas that will have an impact as far as philosophy, ethics, and politics are concerned will be to transform the phenomenon of refuse into a 'high' theme."[43]

"Division into sky and earth— / it's not the proper way / to contemplate this wholeness," Wislawa Szymborska reminds us, perhaps with the idea in mind that the earth extends its broad embrace to include the largely invisible atmosphere with which it is contiguous and continuous.[44] When we are sequestered inside the ground itself—*in*-habiting it—like the spelunker in a cave, this "wholeness" transforms earth into both a subterranean base and a soiled sky, both a firm footing and canopied ceiling. At such times, we are quite literally encompassed and *surrounded* by earth, as the English word "environment" (from the French *en*, in, and *viron*, circuit, turn, or circle; hence, "to encircle") implies or the comparable German *Umwelt* (linguistically, the "around world") suggests. This sense of being enclosed by the terrestrial is magnified in limestone caverns, where at a languid

pace the earth simultaneously accrues from beneath as conical pillars in stalagmites and drips down from overhead to form stalactites. Reflecting on my own experiences exploring caves in Pennsylvania, Kentucky, and Virginia, I can recall clearly the damp, cool, underground air; the moist earthen walls replying with soft echoes to human voices; the slow trickling water; and the dance of fire from flickering torches or flashlights. For me, these caves were not Platonic pits from which to escape but rather elemental worlds to behold.

In a very significant way, then, we are *autochthones* (autochthonous), creatures born of the earth as the Greek term *gegenes* suggests—combining notions of genesis and earth—and as implied by the English *human*, a word that is cognate with *humus*, the dark organic material in soils. It is probably more true to say that we emerge *out of* the earth rather than being born or thrown *into* it, as Existentialists assert**.** In fact, there is a persisting belief in many cultures that children "come from" the recesses of the earth, from local ravines and caverns or, alternatively, from rivers, springs, and ponds. Despite these superstitions and stories, it is earth-boundedness and earth-bondedness that give us our corporeal shape, our peculiar human posture and comportment, our legs that carry us as swinging pendulums across the unfolding landscape. Thus, as Nietzsche counsels, it behooves us "to remain faithful to the earth"[45] and to guard against what might be termed *earth alienation*, the attempt to surmount or escape the earth entirely.[46] Like the phenomena of fire, water and air, earth is less abstract and more primordial, particularized and localized than the notion of nature, and so it is worthy of focus not only as "our planet" but also as a canonical element. In a letter, poet Wallace Stevens appropriately reflects on "how utterly we have forsaken the Earth, in the sense of excluding it from our thoughts. There are but few who consider its physical hugeness, its rough enormity. It is still a disparate monstrosity, full of solitudes, barrens, wilds. It still dwarfs, terrifies, crushes."[47] Indeed, even as the world seems to shrink in magnitude at the same time. Actively remembering earth—and the Earth—therefore is surely one key to better appreciating, honoring and respecting its singularity and uniqueness. "O earth!" the Greek playwright Aristophanes opines, "what a sound, how august and profound! It fills me with wonder and awe."[48]

Air

> This blue wilderness of interminable air.
>
> —Lord Byron, *Cain*

> Air is our second skin. / It enters us like a lover, or we die. / . . . the intimate element, in / and out of our bodies all day, feeding / us quietly, stoking our little fires.
>
> —Marge Piercy, "What goes up"

Over the course of our lives, we will take in on average 650 million breaths.[49] Each day, that amounts to roughly thirty-five pounds of air entering and exiting our bodies by way of the cavity of our mouths and the cadenced bellows of our lungs which, if flattened like a sheet of paper, would be large enough to cover a tennis court. As with our passing awareness of the surrounding atmosphere, we rarely pause to consider this involuntary but essential activity sustaining our world and accompanying us like a trusty metronome, except perhaps when we are gasping for elusive oxygen. In his most well-known romantic tragedy, Shakespeare comments cleverly on this point when Juliet inquires of a nurse, "How art thou out of breath when thou hast breath to say to me that thou art out of breath?"[50]

Through a protracted story whereby our animal ancestors shuttled back and forth between surf and turf—water and earth—as fish, then amphibians, then reptiles and finally mammals before settling on solid soil, we evolved the ability to breathe in the open air. Later, when we stood upright, our bipedal posture altered our biological comportment and decoupled respiration from locomotion, which were allied closely in our quadrupedal forebears.[51] This change may have contributed fortuitously to the development of distinctly human speech—which relies on the subtle adjustment of the flow of air in the larynx, pharynx, and nasal hollow—and hence indirectly to our self-understanding as the animal possessing the glorious gift of language. "A living being capable of speech" (*zoon logon ekhon*), as Aristotle puts it. Sylvia Plath even seems to intuitively associate commonplace respiration and the regularity of the pulse with existential identity. "I took a deep breath and listened to the old bray of my heart: I am, I am, I am," she exclaims.[52] Taking inspiration from this epiphany, we may find the kind of certainty and conviction Descartes sought in his intellectual meditations on the *cogito* but arrive instead on a more fundamental and temporally prior, corporeal truth: *I breathe therefore I am*. Like the cry of a newborn infant gulping her first breath as she is eased into an unfamiliar world, this insight might well be worth celebrating.

The physiology of individuated and deeply personal breathing, however, passes quickly into more communal territory when we reflect on the notion that our breath is routinely circulated and shared with others, especially in the closed quarters of an office, airplane, classroom, or hospital, but also on a walk through the woods. Some of the very air you are now imbibing and shunting through your body may recently have been eddying around the majestic peak of the Matterhorn, passing out of the swollen corpse of an opossum by the side of a gravel road, trailing gently off the tail feathers of a migrating Canadian goose or whistling through the snow-ballasted branches of a Douglas fir tree. This can all be rather breathtaking. We are *conspiring*—literally, breathing together—and to contemplate this fact can dramatically change our lives to reveal new ways that human others and nonhuman otherness are woven into the very elemental conditions of our existence.

In the surviving fragments of his thought, the Presocratic Anaximenes identifies air as the source of all things. Indeed, air is linked intimately with life

and life-processes in the physical, psychological and philosophical connections it shares with the wind and breathing, conceptions of the soul or spirit, and ideas or reputed experiences of the divine. Like earth, the atmosphere is neither homogeneous nor self-same. It is instead layered and multileveled. It has, in short, its own kind of "geography" or more exactly aeolian zones such that we can even speak of *airsheds*—regional "basins" without determinate physical boundaries where pollutants move or collect—by way of analogy with the more familiar concept of watersheds and the emerging notion of foodsheds.[53] We dwell in the lowest and densest layer, the troposphere, which extends from the surface of the earth upwards to a height of about seven miles. It is here that clouds, storms, and the weather occur. Breathing is made possible in this sphere, and air moves vertically with ease because of constant changes in temperature. Above the troposphere lies the stratosphere, which reaches up roughly seven to ten miles from the earth's surface. The troposphere contains ozone, the poisonous and explosive blue gas that protects life on the planet from ultraviolet rays. The air continues to thin here and becomes even more dissipated in the third layer, the ionosphere, where we find the fierce, unfiltered rays of the sun. The outermost layer is the exosphere, which merges in its furthest depths with the very thin atmosphere of the sun and which holds only a few hundred atoms of air per cubic centimeter.

Like water, air has distinct flows and movements. In fact, water and windy air share in the ability to move as waves, circulating and swirling in similar patterns so as to carry soil or transport sediment and other debris. It is not simply aesthetic exaggeration to say that in some sense animal life evolved from one sea to another insofar as it moved from the early oceans to the emerging oceanic air, a point suggested by the ancient Greek belief in Okeanos, the river coursing around the earth.[54] The air also conducts and makes possible communication and the modulation of animal voices. Language may be less a written carving or semi-permanent engraving than it is a "curl of breath" or a piping "breeze in the pines."[55] In this view, words are "clipped breath" or tiny parcels of spirit that permit us to listen to the weather. "Our 'tongues' taste the world we eat."[56] As Malcolm de Chazal holds in an aphorism with lyrical flourish, "Water talks with its mouth full; the air with its mouth open." This, presumably, is a reason we strive harder to comprehend the "messages" of the wind than those of the burbling brooks.[57] Giambattista Vico has argued, too, that celestial signs, markings or soundings in the sky, such as lightning or the formations and flights of birds, were the first languages, occurring before phonetic forms and representing a kind of *theo-logi* (language of god) that could be grasped via divination.[58] It is clear as well that from the earliest of times, many civilizations have been sky-worshippers, stargazers, contemplators[59] of the constellations, and surveyors of the geometry of the heavens, seeking signals from above so as to better understand or communicate with animals, humans, and the cosmos itself.

The sky is air's primordial home and spacious playground. This is where air reveals itself as wind; clots or clusters into clouds; articulates itself through the

idiolects of light and color; and conjures up storms and precipitation. Szymborska artfully dissolves the common distinction we rely on between the interior and exterior in remarking that sky is "A window minus sill, frame, and panes. / An aperture, nothing more, / but wide open." She observes expansively, "I've got the sky behind my back, at hand, and on my eyelids. / The sky binds me tight / and sweeps me off my feet."[60] Metaphorically, the sky can be relocated indoors. Within buildings, high ceilings seem to facilitate speculation, wonder and elevated thoughts; lower architectural horizons are conducive to exacting and detail-oriented tasks. Rilke takes this idea a step further when he invites the firmament into the hidden recesses of our porous bodies. "The inner—what is it? If not intensified sky," he avows.[61] And Bachelard grants us license to interact imaginatively with what others have defined as off-limits materially in quoting approvingly of a poet who surmises, "The sky is waiting to be touched by a hand / of fabulous childhood."[62]

Due to its many mysteries, the sky has been subject of abiding speculation and the residence or real estate of the divinities in myriad cultures. In India, it was thought to pour forth from the navel of a man with a thousand eyes and heads. In Egypt, it was conceived and cast as a great iron lid. In Greece, a whole pantheon of gods populated this sphere. John Ruskin identifies eloquently some of the sky's ineffable attraction: "Sometimes gentle, sometimes capricious, sometimes awful, never the same for two moments together; almost human in its passions, almost spiritual in its tenderness, almost divine in its infinity its appeal to what is immortal in us."[63] The color of the sky, in particular, has engendered widespread wonder, especially among philosophers, poets, and scientists who have feuded over whether the hallmark blue is the result primarily of suspended particles of earth, properties of the air itself, aspects of water vapor, or features of fiery light—to invoke loosely the four elements as causal agents—among other explanations that include the perceptual work of the mind and the physical activities of molecules. For the Greeks and Chinese, azure suggested something profoundly nonhuman, in part because death transforms the healthy shades of red in the body to hues of blue through cyanosis.[64] Plato seemed to believe that sky blue resulted from an amalgam of darkness and brightness. And in his influential color theory, which is part of a broader *Naturphilosophie*, Goethe characterizes this blue in affective terms as cold, recessive, and remote, while nevertheless tending to draw us to chase after and contemplate its anomalies. "As the upper sky and distant mountains appear blue, so a blue surface seems to retire from us," he says.[65] Enigmas and controversies surrounding this phenomenon still remain, and Peter Pesic argues thoughtfully in *Sky in a Bottle* that the quest to comprehend the nature of sky and its color directs us equally inward and outward—toward both atomic theory and distant galaxies.

"Sky" is a word that is akin to the old English term *sceo*, meaning cloud, and one that harks back in Indo-European roots to *skeu*, a kind of covering or canopy of shifting colors. The sky should not best be thought of—although it often

is—as an absence, emptiness, or stillness on the one hand or a reflective mirror on the other hand. "Light as air" may be a poignant turn of phrase, but it is strictly inaccurate. The atmosphere is more of a visceral, thickened. and ponderous presence, weighing more than five thousand trillion tons and rife with life, activity, and movement. We often forget that it is full of moving gases (especially hydrogen, oxygen, and nitrogen), dust, fungi, spores, and viruses, along with animal life, including the larger species of birds, butterflies, bees, and bats.[66] Aerial ecosystems contain dense soups of floating plankton as well. There are as many as twenty five million flying insects over a single square mile of the earth's surface, and microbes thrive at heights of up to fifty miles. Naturalists have even observed "organic rain" in the atmosphere when invertebrate "fallout" occurs due to temperature changes after small organisms have first been carried aloft by wind, which they experience presumably as a vertical rather than horizontal force. Such beings, in fact, may be transported so high in an hour that it can take three weeks for their return to the ground. And if that odyssey is not thrilling enough for them, hungry predators often are lying in wait, such as a species of spider that has been found at altitudes higher than four miles.[67]

Bound, then, to the planet by the sucking pull of gravity, the airy sky begins quite literally at your feet, merging with and emerging in geological time from the rocks of the earth and, with the development of oxygen, destroying, and displacing most forms of anaerobic life. Atmosphere derives from the Greek *atmos*, meaning "vapor," and *sphaira*, meaning "ball" (or the Latin *sphaera* meaning "sphere"), and it shares a linguistic connection with the Greek *aenai*, "to blow." The ancient Greeks—who constructed a Tower of Winds in Athens in the second century B.C.E—used *anemos* (wind) as a synonym for direction, placing geographic markers on their maps with puffy and pointed cheeks so as to indicate North, South, East, and West, the cardinal directions that many cultures associate with the four elements. The Roman thinker Seneca defined the wind as "air flowing one way," and Christian mystics such as Hildegard von Bingen regarded the winds as moving the firmament and maintaining planetary order. As the so-called "wings of God," the four winds were thought to keep the four elements apart and in harmony. Thus, the air has helped to provide for physical and metaphysical orientation within geographic space and place. The atmosphere, we might suggestively say, is a kind of "*Atman*-sphere"—*Atman* being the Sanskrit conception of the unchanging self and a word related to the German word for breathing (*atmen*)—in the sense that it is like the innermost breath or essence of an individual. And if we continue this analogy, the atmosphere may also be viewed by extension as akin to the universal All (*Brahman*), the ultimate ground of being in Hindu philosophy.[68]

Air, too, exercises a strong aesthetic and emotional influence on us through the ever-changing weather, affecting our daily feelings and dispositions. The fact that there are so many different kinds of and names for wind—by one count, more than four hundred around the world—indicates the manifold "moods" and formless

forms that air assumes from breezes, gusts, gales, and zephyrs to tornadoes, siroccos, cyclones, and hurricanes. Add to that long list the vast variety of local and regional winds such as the Santa Ana (southern California), foehn (Alpine region), chinook (northern U.S. plains), bora (Dalmatian coast), *Trauben-kocher* ("grape cooker" of Switzerland), or harmattan (Sahara), and the moving currents around and above us take on increasing complexity. Air encompasses and encloses us in a sensible, if nonvisible, thickness. As poet Robert Browning puts it, equating *atmos* and *anima*: "that puff of vapour . . . man's soul."[69] Except perhaps as wind or smoke, however, air often does not occur as a mode of presence for many individuals, who believe habitually that there is nothing but absence in the air because we do not clearly butt up against a thing or a being. Such a view is misguided if, as Luce Irigaray argues, the ambient air, rather than the house of language, is our first home and what unites and embraces all physical bodies as well as conducts our speech.[70]

From runners, swimmers, and cyclists to more stationary weightlifters, archers, and gymnasts, most athletes realize the commanding importance of disciplined breathing for excelling at their sports. Through vigorous exercise, we can nearly double our aerobic capacity, adding to the volume of air that reaches our lungs and the amount of oxygen that nourishes our muscles. The cultivation and governance of breath is especially integral to yoga, where it is as vital to this ancient and enduring practice as the bodily postures (*asanas*) themselves. *Pranayama*—the art of breath control—assists the digestive, nervous, respiratory, and circulatory systems, and it helps to yoke both the errant senses and mind. Hatha yoga traditions consider *prana* not only to involve rhythmic inhalation and exhalation but also frequently to be equatable with life itself, as in one's "life breath." One of the most significant of the many forms of *pranayama* is *ujjayi* (victorious) breath, which entails partially closing the glottis, thereby producing an audible sound, akin to the ebb and flow of the sea or to wind moving through a stand of pines. Another is *kapalabhati* (cleansing breath), which is forceful exhalation followed by passive inhalation in rounds of breath to clear the nasal passages.

In the Brihadaranyaka Upanishad, the paramount role of breath is underscored by way of a thought experiment in which the bodily senses and faculties (*indriyas*), who are quarreling over which is best, take their disagreement to Brahman, who replies that the honor belongs to the one whose departure makes the body worst off. After each, in turn, takes leave of the body, which in its absence still manages to survive, the breath is about to exit "like a great stallion pulling up the stakes by which he was tethered," until the others beg it to stay because they realize suddenly how they all depend on *prana* for their own existence.[71] The *Bhagavad Gita*, too, speaks of the "pure calm of infinity" that may be attained by one who "shuns external objects, / fixes his gaze between his brows, / and regulates his vital breaths / as they pass between his nostrils."[72] Judging by the serene countenances and prolonged lives of those who adopt meditative breathing, there is little doubt about the merit of this claim.

The historical Buddha may be credited with the surprisingly simple but extremely significant discovery and promotion of the power of human breath. His *Anapanasati Sutra* is devoted to the subject and counsels awareness in this most quotidian of processes. Referring to the monk and his daily practices, the sutra commences with the words, "Always mindful, he breathes in; mindful he breathes out."[73] It proceeds to recommend sixteen basic exercises involving air so as to bring great benefits to the attentive mind and receptive body. These activities range from a focus on the length and constancy of the breath to the related tasks of calming mental chatter and nurturing a dispassionate disposition. For those just embarking on meditative breathing, two ways to facilitate this process and to rein in a wandering psyche involve counting during alternating in-breaths and out-breaths and consciously following the movement of the breath as it progresses from the nose (beginning) to the chest (middle) and navel (end).

The father of Western medicine, Hippocrates, remarked, "there is one common flow, one common breathing," adding that in this way "all things are in sympathy" (*sympatheia ton holon*).[74] This claim points to the unity of all beings through the medium of air and its articulation in breath. Chanting, in fact, has been described as a protracted communal exhalation that extends expiration so as to generate higher pressure in the abdomen and lungs.[75] More generally, those who meditate usually alter their breathing so as to reduce the amount of air they take in and to lengthen exhalations, which calm and quiet the brain. In seated meditation, some monks can even reduce their average number of breaths to as few as four to six per minute, two to four times fewer than most humans by comparison. In doing so, they also spend a much greater percentage of the breathing cycle in the expiratory phase.

Of breath and the "breath breathing human being," the thirteenth-century poet and mystic Rumi wisely denies it custody by any religion or philosophical perspective. It is "Not Christian or Jew or Muslim, not Hindu / Buddhist, sufi, or zen." Its ontological status is, in fact, redolent with paradox: an oxymoronic nothing strutting along the razor edge separating it from an incipient something; a supremely fulfilling, if ordinary, activity recoiling back gymnastically upon its own emptiness and extraordinariness. "I am not . . . / composed of elements at all. I do not exist. / My place is placeless, a trace of the traceless. Neither body or soul. / I belong to the beloved, have seen the two / worlds as one."[76]

Today, we know that the content of the air is critical to the maintenance of life, and that the bulk of it is produced not by photolysis of water (chemical decomposition through radiant energy) but by the burial of carbon, which is fixed in the organic matter of algae and green plants, in sedimentary rocks. The percentage of oxygen in the air (now about twenty-one percent) cannot increase more than a percentage or two from its current state (to an upper limit of about twenty-four percent) or vegetation throughout the world would burst into a tremendous conflagration that would consume tropical rain forests and even Arctic

tundra.[77] Nor can it move to a much lower range or many living species, including humans, would not be able to respire and survive. This surprisingly constant and stable level of oxygen in the air—which is in chemical disequilibrium at the same time—has been proposed as evidence for the claim that the planet functions like a living organism that actively alters its environment so as to sustain life processes.[78] The air is composed as well of other gases that serve important roles in preserving life and planetary conditions: nitrogen (about seventy-eight percent), which builds pressure in the atmosphere and helps to extinguish fires; traces of carbon dioxide, which allows for photosynthesis and climate control; and relatively minute but extremely important amounts of methane (which regulates oxygen and ventilates the anaerobic zone), nitrous oxide (which governs both oxygen and ozone), and ammonia (which controls the acidity of the environment), along with sulfur, methyl chloride, and methyl iodide.

Philosophers have on occasion peered into the invisible air to discover the vital role of respiration. Aristotle's *On Breath*—although some scholars contest its authenticity—examines the physiological and metaphysical aspects of breath, which he links with the emotions and a conception of the soul. Aristotle, in fact, envisions breath as "the purest substance of the body," giving it a flickering and evanescent materiality.[79] Heidegger implies that breath is a "temporal extension" of our lives, providing voice in a terse phrase to the idea that along with our heart, breathing keeps time and tempo for us. It functions, we might say, as kind of biological clock, even to the point that it may be more revealing for us to imaginatively count the number of breaths, rather than the remaining years, we have left in our lives. And Derrida speaks of air—and by extension breath, which partakes as a portion of it—as the "*apeiron* of Presocratic physiology, the *tehiru* of the Kabbalah, the possibility of presence, of visibility, of appearance, of voice," a phenomenon that comes to mean at heart "*this-is-trying-to-say-that*" so that we are ever in the "present infinitive."[80]

As noted, Anaximenes boldly proposes air (*aer*) as the element that can explain all that exists. He advances an early form of hylozoism—the belief that matter is living—and offers a different determinate entity in the stead of Thales' water, abandoning as well Anaximander's *apeiron* (boundless) for an infinite but definite element.[81] In his proto-scientific and philosophical theory, the invisible is rendered visible through the processes of condensation and rarefaction. Warm air changes to fire through dilation; cold air is transformed to wind through condensation, then cloud via further compression, then water by additional thickening, and finally earth and stone—hence a progressive solidification. At the same time, Anaximenes is able to account for changes in temperature because relative hotness arises through rarefaction and relative coldness through condensation. Expressed in more modern language, he finds that the appearance of air is altered by density and direction of motion such that changes in quantity are translated into changes of quality.