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Grateful Cooperation: Cistercian Inspiration for Ecological Ethics

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Grateful Cooperation: Cistercian Inspiration for Ecosystem Ethics

by

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As scholars of world religions search for promising ways of responding to the ecological crisis, the Christian tradition can look for inspiration to *Descriptio Positionis Seu Situationis Monasterii Claraevallensis*, a twelfth-century description of the site and surroundings of Clairvaux abbey. The text exudes the unnamed[1] author's deep appreciation and gratitude for the cooperative interactivity of human beings, other species, the land, water, and air that assured their mutual sustainability and maintained the site's integrity. This view predates by centuries the efforts of contemporary philosophers to reflect on the human relation to other biota and abiota that constitute ecological systems, to develop ethical principles that can guide human functioning as integral parts of these systems,[2] and to facilitate systematic thinking about sustainable

[1]Found in PL 185:569–574, *Descriptio Positionis Seu Situationis Monasterii Clarævallensis* is attributed to Saint Bernard by Dom John Mabillon (1623-1707), included on 460–67 of volume 2 of his edition of *Life and Works of Saint Bernard*, trans. Samuel J. Eales (London: Burns & Oates, 1889), and quoted throughout this article. However, Pauline Matarasso, translator and editor of *The Cistercian World: Monastic Writings of the Twelfth Century* (New York: Penguin, 1993) includes "A Description of Clairvaux" on 287–92 without definitive attribution. Comparing this description of the site with William of Saint-Thierry's in *Vita prima* 1.7.35, when he first visited the abbey four years after its founding, Matarasso conjectures on 285 that *Descriptio* was more probably written by a member of the community than by a visitor, sometime after 1135, when the elders had relocated the abbey down the mountainside and closer to the Aube River where the monks could provide more adequately for their temporal needs.

[2]For example, see Aldo Leopold, *A Sand County Almanac: With Essays on Conservation From Round River* (New York: Ballantine, 1966); J. Baird Callicott, *In Defense of the Land Ethic: Essays in Environmental Philosophy* (Albany: State University of New York, 1989); Laura Westra, *An Environmental Proposal for Ethics: The Principle of Integrity* (Lanham: Rowman & Littlefield, 1994); Bill Devall and George Sessions, "The Development of Nature Resources and the Integrity of Nature, *Environmental Ethics* 6 (1984): 293–322; Lawrence E. Johnson, "Toward the Moral Considerability of Species and Ecosystems," *Environmental Ethics* 14 (1992): 145–157; Holmes Rolston, *Environmental Ethics: Duties to and Values in the Natural World* (Philadelphia: Temple UP, 1988).

development strategies encouraged by the United Nation's World Commission on Environment and Development.[3]

While these secular considerations are demonstrated graphically in *Descriptio*, the text's author proceeds from a deeper meaning with grave religious ramifications. Faith in God, who created and sustains the world, is the foundation from which the twelfth-century text was written, and the behavioral norms suggested are theocentrically motivated. Christians who embrace the underlying notions of this medieval text and inform them with broad scientific findings are offered meaningful ways of thinking about how they ought to relate to other animate and to inanimate beings for their mutual benefit and the overall sustainability of ecological systems.

I begin with an overview of *Descriptio* with emphasis on the author's depiction of the ongoing cooperation among the monks, animal and plant species, water bodies, land, and air at Clairvaux. Subsequently, I summarize the various cooperative ways in which the author perceives the functioning of humans in relation to other species and inanimate constituents of the site. Next comes a discussion of parallel thinking among scholars today, with emphasis on human-in-ecosystem philosophy. I conclude with the theocentric ethics of grateful cooperation that result from reworking the inspiring notions in the text to reflect our current scientific understanding of the physical world.

For purposes of this article, I refer to *Descriptio*'s author as "the Cistercian" because the writer is, at the very least, Cistercian in spirit. Among the indicators that justify this designation are the author's familiarity with the site, reference to frequent reliance on the fountain, profession of deep faith in God as the ultimate source of their well-being and the ultimate end of their existence, and appreciation for the monks' efforts to meet their basic physical needs at the site by cooperating with God's other creatures.[4] Further justification for "the Cistercian" attribution is the author's humility before God's creation, a virtue required by and nurtured within the Benedictine tradition.[5]

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[3]World Commission on Environment and Development, *Our Common Future* (New York: Oxford UP, 1987). An astute overview and evaluation of various concepts of sustainability is provided by Robert U. Ayres, Jeroen C. J. M. van den Bergh, and John M. Gowdy, "Strong Versus Weak Sustainability: Economics, Natural Sciences, and 'Consilience'," *Environmental Ethics* 23 (2001): 155–68. Also see Wilfred Beckerman, "Sustainable Development: Is It a Useful Concept?" *Environmental Values* 3 (1994): 191–209; J. Baird Callicott, "The Wilderness Idea Revisited: The Sustainable Development Alternative," *The Environmental Professional* 13 (1991): 235–47; and, Bryan Norton, "Sustainability, Human Welfare and Ecosystem Health," *Environmental Values* 1 (1992): 97–111.

[4]The goal of achieving a sustainable site follows the Benedictine tradition as legislated in principle by RB 66.6: "The monastery should be so set up that everything necessary is carried on within the monastery, that is, the water, the mill, the garden, and the various crafts," *The Rule of Benedict: A Guide to Christian Living*, trans. Monks of Glenstal Abbey, comment. George Holzherr (Dublin: Four Courts, 1994) 303; hereafter Holzherr.

[5]RB 31 designates all components of a monastery's property as "consecrated vessels of the altar" to be treated with care and humility by the monks (Holzherr 174–75). In his

The Twelfth-century Text

The Cistercian begins with the express intention of describing the site so precisely that the reader will be able to envision it clearly (PL 185:569A; Eales 460). Starting with the overall topography, the author surveys the site and finds an area bounded by two mountains connected by a widening river valley. The bottom half of each mountain is cultivated, one covered with vineyards and the other with corn. On the upper halves of the mountains, the monks collect dry branches and clear the land between the trees for an express purpose:

> [S]o that there may be no impediment to the sturdy oak which salutes the heavens with its lofty top, to the graceful lime-tree which spreads its arms, to the ash-tree whose wood is so elastic and easily split, or to the leafy beech, as the one shoots upwards and the other spreads its lateral shade. (PL 185:569B; Eales 460)

Focusing on the abbey proper, the author points to the broad plain that extends from the house. A significant part of the area is enclosed by a wall that the monks constructed (PL 185:569C–570A; Eales 461). Within this space are many fruit trees of various types whose branches support singing birds. Monks with health problems walk among the trees, find shade from the hot sun, rest their eyes amidst the "pleasant green of the trees and of the turf," listen to "the sweet and harmonious concerts of birds of varied plumage," inhale "the air fragrant with the scent of hay," and delight in the abundance of ripening fruit (PL 185:569C–570A; Eales 461). The overall therapeutic atmosphere of the orchard is attributed to God's generosity:

> See how, in order to cure one sickness, the goodness of God multiplies remedies, causes the clear air to shine in serenity, the earth to breathe forth fruitfulness, and the sick man himself to inhale through eyes, and ears, and nostrils the delights of colors, of songs, and of odors. (PL 185:569C–570A; Eales 461)

In the garden beyond the orchard, the sick monks find another "pleasing site" on the bank of a pond where they watch "the sports of little fish in water clear as crystal" as they "swim to and fro in shoals like marching armies" (PL 185:569C–570A; Eales 461). The water in the pond is fed by "a constant current" channeled from the Aube river to a system of square irrigation ditches that the monks constructed throughout the garden area (PL 185:569C–570A; Eales 461).

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commentary, Abbot Holzherr explains Saint Benedict's intention that the monks reflect the prophetic image of the Servant of God in their work, so that the work is perceived as "priestly activity" aimed ultimately at serving God (177–79). RB 7 prescribes twelve steps of humility that lead the monk to a theocentric way of life, in which all actions become habitually virtuous.

Attention turns to the movement of the Aube within and around the abbey. Pointing to the channel the monks built to divert water from the river, the Cistercian personifies the stream and interprets its movement as aimed aggressively toward cooperating as fully as possible with the monks:

> The river . . . passes nowhere without rendering some service, or leaving some of its water behind. It divides the valley into two by a sinuous bed, which the labor of the brethren, and not Nature, has made, and goes on to throw half of its waters into the abbey, as if to salute the brethren. (PL 185:570B; Eales 462)

The diverted water seeks to aid the monks through an extensive system of ducts and sluices designed to feed and power their workshops.[6] Many tasks are accomplished by the cooperative interactions of the monks and the water as it drives the wheels of the mill where meal is ground, fills a boiler that is heated to prepare an unidentified liquid beverage that the monks will drink when the supply of wine is short,[7] and seeks diligently and ungrudgingly to aid the monks in their endeavors. The stream "does not hesitate nor refuse any who require its aid," the Cistercian exclaims (PL 185:570C; Eales 462).

Water from the Aube relieves the monks of their heaviest tasks, the author proclaims gratefully. It even shares the monks' fatigues. Its many services to them are acknowledged as consolations provided by God:

> O God, how many consolations Thou givest to Thy poor, so that they may not be entirely weighed down by the extreme stress of their labor! What alleviations of punishment to the penitent, that they may not be altogether absorbed by excessive sorrow! How many horses would this labor tire! Of

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[6]In the introduction to her translation of *Descriptio*, Matarasso points to Arnald of Bonneval's account in *Vita prima* 2.2 of the extensive digging to create this irrigation system (267).

[7]PL 185:570C; Eales 462. While the identity of the beverage the monks were preparing is not known with certitude from the *filia . . . festucæ* terminology used, probably it was an ale made from the grain of a straw-like weed that grows among barley or barley itself. See, for example, *A Latin Dictionary: Founded on Andrews' Edition of Freund's Latin Dictionary*, rev., enlrgd, rewritten by Charlton T. Lewis and Charles Short (Oxford: Clarendon, 1955) 743; also *Dictionary of Medieval Latin from British Sources* prepared by R. E. Latham under direction of the British Academy Committee (London: Oxford University, 1975) 933. See also Gilbert Foliot's letter in 1162 (PL 190:1040A–B) where another *festucæ filiam* configuration appears in reference to "turbatioris subere cervisia," which is "hateful to noble folk." In a letter attributed to Saint Bernard (PL 180:512C–513A), *cervisia* was used to toast visitors at Clairvaux. Fr. Chrysogonus Waddell, OCSO, of the Abbey of Gethsemani reports "numerous references to *cervisia*" in the Cistercians' General Chapter statutes of the twelfth century and says that it is "generally taken to mean beer made out of barley grain" (letter from Waddell, 4 November 2001). I am grateful to Fr. Waddell and to Marquette professors Stephen Beall, medieval Latin scholar, and theologian Wanda Zemler-Cizewski, who specializes in twelfth-century texts, for their help in interpreting this terminology.

> how many men would it weary the arms! And the kindly stream relieves us from it altogether. (PL 185:571A; Eales 463)

Without its help, the Cistercian insists, the monks would have neither food to eat nor cloth to make their garments (PL 185:571A; Eales 463).

The diverted water asks little from the monks in return for its vital assistance, the author recognizes. The only compensation it requires is to be allowed "to go free upon its way" after diligently completing its many tasks (PL 185:571B; Eales 463).

The end of the river water's cooperation with the monks draws near as it enters the workshop where sandals are being made. Separating into many troughs built by the monks, the water "penetrates all the workshops, and lends itself to everyone's need, everywhere looking for assistance that it may be able to render" (PL 185:571B; Eales 463). The author indicates a desire to be as thorough as possible in acknowledging the Aube's contributions to the site and lauds the water for also seeking to remove all the visible wastes remaining from the monks' labors: "Lastly, in order that I may not omit any thanks due to it, nor leave the catalogue of its services in any way imperfect, the river carries away all dirt and uncleanness, and leaves all things clean behind it."[8]

With this last task completed, the grateful monks cooperate with the diverted water's modest request to rejoin the rest of the Aube: "[A]fter having accomplished industriously the purpose for which it came, it returns with rapid current to the stream, and renders to it in the name of Clairvaux, thanks for all the services which it has performed" (PL 185:571C; Eales 463). Its swift departure and reunification with the Aube are interpreted as a "worthy response" to the monks' thanks for all the services it performs for them (PL 185:571C; Eales 463).

With obvious delight, but without knowledge of the debris from the workshop that might have polluted the river, the Cistercian observes the reunion of the stream with the river proper:

> Immediately [the Aube] receives into its bosom the waters that it had lent to us, and the two streams become only one. They are so perfectly mixed that no trace of their union can be found, though the onrush of the diverted water hastens the current that had been delayed, diminished, and rendered less active when part of its waters had been withdrawn. (PL 185:571C; Eales 463).

[8]PL 185:571B; Eales 463. Of course, knowledge about pollutants and toxicants gained during the twentieth century would preclude making this assumption—that the river would carry away without a "trace" all waste products produced. Many toxicants and pollutants are invisible to the unaided eye.

The Cistercian seems pleased that the monks have fulfilled their responsibility to the Aube by returning the diverted water to its place in the riverbed (PL 185:571C; Eales 463).

Focus turns to the meadows where water channeled from the river had filled the irrigation ditches the monks had built.[9] The streams are depicted as seeking to aid the abiota and the biota that constitute the site. They wander in "careless curves" through the meadows, penetrating and refreshing the earth to enable the sprouting and growth of plants. The streams provide all the moisture needed in the meadows, the Cistercian declares confidently. They have no need for "drops from the clouds" because they are fed sufficiently by the generous river (PL 185:571C; Eales 464).

Traversing the vast plain of the meadows, the author finds "much charm" for soothing the monks' weary minds and for relieving their anxieties and cares: "The smiling countenance of the earth is painted with varying colours, the blooming verdure of spring satisfies the eyes, and its sweet odour salutes the nostrils" (PL 185:572A; Eales 464).

Yet these pleasing surroundings go beyond satisfying the monks' aesthetic senses. They also trigger the monks' theological reflection: "[W]hile I am charmed without by the sweet influence of the beauty of the country, I have not less delight within in reflecting on the mysteries which are hidden beneath it" (PL 185:572A; Eales 464). The author assumes the sacramental quality of the visible creation, a common perception during the patristic through medieval eras that the physical world mediates the presence and attributes of God.[10]

Turning to the immediate benefits of the ongoing operation in the meadows, the Cistercian catalogues the many services the irrigation waters render to the monks, the plants, and the lake. The streams send moisture to the vegetation that is being cut to make hay, a process requiring twenty days of heavy work by the monks, lay brothers, and hired laborers (PL 185:272B; Eales 465). The streams also intentionally feed a lake through narrow, irrigation ditches thirty-six feet long that assure sufficient water for the fish to thrive and provide nourishment for the monks. To keep the water at a constant level, the monks maintain overflow pipes that lead back to the Aube. Their impressive technology, the streams from the generous river, and the absorbing meadows maintain the area's integrity (PL 185:572D–573A; Eales 466).

At the height of delight with this productive interactivity taking place in the meadows, the author suddenly expresses remorse for having overlooked a vital component and failing to be grateful for it:

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[9]Matarasso reports that Arnold of Bonneval describes the digging of the network of channels, ducts, and sluices that fed and powered the monks' workshops (*Vita prima* 2.2.29–31; Matarasso 285).

[10]PL 185:572A; Eales 464. In "Acting Reverently in God's Sacramental World," *Ethical Dilemmas in the Next Millennium*, vol. 2, ed. Francis A. Eigo (Villanova, PA: Villanova UP, 2001) 37–90, I explore the sacramentality of the physical world as conveyed primarily in patristic and medieval texts.

> While I breathlessly mount the steep slopes, or traverse the brightly-coloured surface of the meadow, painted by the hand of Wisdom, or describe the ridges of the mountains clothed with trees, I am accused of ingratitude by that sweet fountain of whose waters I have so often drunk, which has merited so well of me and which I have repaid so ill. (PL 185:573A; Eales 466)

The Cistercian depicts the fountain as chastising its observer:

> It reminds me in a tone of reproach that it has often quenched my thirst, that it has given me water to wash my hands and even my feet, and that it has rendered to me many such offices of kindness and benevolence. It says to me that all these good offices I have repaid with ingratitude, that it has been the last mentioned of all the places I have described, and, indeed, that it scarcely found a place at all. (PL 185:573B; Eales 466)

For "all the respect I owe to it," the author continues, "it should have been placed first" (PL 185:573B; Eales 466).

Yet the author wonders retrospectively if the fountain intends to be secretive, to be silent and hidden, as its waters pass through subterranean channels and reappear within the monastery enclosure.[11] Here the fountain returns "to life" and offers itself "to charm the sight and supply the wants of the brethren." Perhaps, the author conjectures, the fountain is "not willing to have communication with any others than saints" (PL 185:574B; Eales 467). With this strong sense of affinity between the fountain and the saintly monks, the Cistercian concludes *Descriptio.*

Gratitude for Cooperative Interactivity

Throughout this charming and enthusiastic description of the abbey site, the Cistercian conveyed deep appreciation and gratitude for the cooperative interactivity of human beings, other species, water, air, and land to achieve their mutual flourishing and the overall sustainability of the site. The author appreciated the Aube River for moistening the meadows and providing steady streams to the lake, the lake for providing a setting in which the fish can swim, the trees for preventing the earth from crumbling into the lake (PL 185:572D; Eales 466), and the tree branches for serving as perches for the singing birds (PL 185:569C; Eales 461). The author appreciated the cooperation of the river when "lending" the monks the water they needed to perform their daily tasks (PL

[11]Apparently the monks situated the abbey above a subterranean channel of water to take advantage of the fountain for their daily needs. The point the author makes, however, is that the fountain is an integral component of the site, providing a necessity of life for the monks, who in turn should appreciate and be thankful for its contribution.

185:571C; Eales 463–464), the cooperation of the fountain when quenching the monks' thirst (PL 185:573A; Eales 466), the therapeutic services offered to the sick monks by the air, shade trees, birds and fish (PL 185:569C–570A; Eales 460–61), and the meadows that cooperate with the monks by soothing their weary minds and relieving their anxieties (PL 185:571A; Eales 462). The author appreciated the monks' cooperation with the ground by collecting dry branches and brushwood that were considered disfiguring, with the oak trees by digging up roots of other plants that were thought to impede the trees' growth (PL 185:569B; Eales 460), with the river by constructing a channel through which its diverted water could aid the monks (PL 185:570B; Eales 462) and allowing it to return to the Aube riverbed after rendering its services (PL 185:570C; Eales 462), and with the lake by installing overflow pipes to assure that the lake levels remained stable enough for the fish to flourish (PL 185:572D–573A; Eales 466). From the Cistercian's perspective, this cooperative interactivity assured that the needs of the monks, trees, birds, meadowlands, lake, river and air were all met. The end result was the harmoniously functioning site with each of the components appreciated for contributing something essential to one another and, in turn, assuring the integrity of the site.

Underlying this sense of cooperation was the Cistercian's understanding that God created all components of the site and sustained their interactivity for their mutual sustenance. God caused the air to shine, the earth to "breathe forth fruitfulness," and the steady streams from the Aube River that filled the pool of water in which fish swam (PL 185:570A; Eales 461). God's "wisdom" painted the brightly-colored surface of the meadow (PL 185:573A; Eales 466), the faith-filled author insisted, and human beings have made nothing that equals God's beautiful creation.[12] The air, meadows, Aube River, trees, fountain, lake, fish, birds, and plants were valued components of the site provided by God and were meant to be tended with care and humility by the monks, which, in the Benedictine tradition, was considered a way of serving God.[13] All of the site's constituents were perceived as means through which God's presence was experienced and God's goodness was affirmed (PL 185:571D–572A; Eales 464).

Furthermore, the Cistercian's appreciation for the interactivity of all components that constituted the site gave way to explicit expressions of deep gratitude. When cataloguing the services rendered by the river, the author endeavored to avoid overlooking any thanks due to it (PL 185:571B; Eales 463). The author lamented not having sufficiently respected the fountain by mentioning it first instead of last (PL 185:573A; Eales 466). Utmost gratitude

[12]PL 185:572A; Eales 464–65. The beauty of God's creation is another prominent theme in patristic and medieval texts which I explore in "Appreciating the Beauty of Earth," TS 62 (2001): 23–52.

[13]See, for example, RB 31, "Of the Monastery's Cellarer," with the commentary by Abbot Holzherr, who provides a basis for understanding that the twelfth-century author is viewing the site's biotic and abiotic constituents as "consecrated vessels of the altar" (179).

was given to God for creating the site with its diverse components and for enabling them to function harmoniously in relation to one another. Appreciation, respect, and gratitude were hallmarks of a fitting response to the Clairvaux site that flowed from faith in God.

Human-in-Ecosystem Philosophy

Some aspects of the Cistercian's observations about the cooperative interactivity of humans, other species, and abiota at Clairvaux resonate with current philosophical thinking about the human being as an integral *part of* ecological systems. In these philosophies, the Cartesian duality of the human mind as *apart from* the physical world is dismissed as unrealistic in light of the radical human connectedness with other beings in ecological systems, the inescapable effects of human actions on others now and into the future, and the emergence of the human species from and with other forms of life over a vast period of time. The following overview of representative human-in-ecosystem thinking shows some affinity with the twelfth-century Cistercian's perception of human cooperation with other animate and inanimate beings to assure their mutual sustainability and the integrity of the site.

Ecosystem philosophy reflects on findings that fall within the discipline of ecology, a sub-specialty of biology. Arthur Tansley coined the term *ecosystem* in 1935 to signal a growing understanding among early ecologists that all biota and abiota of an area function as a working unit.[14] By the 1950s, the term had become a central organizing idea in ecology,[15] because in large part of Eugene Odum, who authored the first textbook organized around the ecosystem concept[16] and transformed it into an idea with vast theoretical and applied significance.[17]

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[14]Arthur G. Tansley, "The Use and Abuse of Vegetational Concepts and Terms," *Ecology* 16 (1935): 284–307, 299. See also J. L. Chapman and M. J. Reiss, *Ecology: Principles and Applications* (New York: Cambridge UP, 1992) 185; R. V. O'Neill, D. L. DeAngelis, J. B. Waide, and T. F. H. Allen, *A Hierarchical Concept of Ecosystems* (Princeton: Princeton UP, 1986); Frank B. Golley, *A History of the Ecosystem Concept in Ecology: More Than the Sum of the Parts* (New Haven: Yale UP, 1994) 8–11.

[15]Robert E. Ricklefs, *Ecology*, 3rd ed. (New York: Freeman, 1990) 179. See also Donald Worster, *Nature's Economy: The Roots of Ecology* (San Francisco: Sierra Club, 1977) 378. Also see Paul R. Ehrlich and Jonathan Roughgarden, *The Science of Ecology* (New York: Macmillan, 1987). The term *ecosystem* is not used by all ecologists. The focus in ecology is progressively on individuals, populations, communities, and, according to some, ecosystems. In *Ecology: Individuals, Populations, and Communities*, 3rd ed. (Boston: Blackwell Scientific, 1996), Michael Begon, John L. Harper and Colin R. Townsend do not distinguish a separate ecosystem level of organization, treat the community as the highest level acting in a given environment, and attribute to the community level all the structure and function.

[16]Eugene P. Odum, *Fundamentals of Ecology* (Philadelphia: Saunders, 1953).

[17]Golley 1.

While the term *ecosystem* is expansive and has been attributed to an area as small as a pond and to one as vast as an ocean basin,[18] ecosystems share major characteristics that have significance relative to parallel thinking in the Cistercian's text. Among these are the "holistic, whole-system property" or "integrity" that is more than the sum of the ecosystem's parts, the interactivity of its various components that brings about its holistic character, the diversity of each part that brings into play something unique and vital to constituting the whole, and the hierarchical control that some components exert over others. Other ecosystem characteristics that depart from the Cistercian's world view include the evolutionary nature of ecosystems, in which new levels of organization emerge periodically, strive to achieve stability, and bring about changes as species adapt to one another, are modified, or become extinct.[19] These characteristics underscore the interdependence of all components in constituting, developing, maintaining, and changing the identity of an ecosystem over long periods of time.

Although these characteristics were not and should not be expected to have been explored conceptually in the twelfth-century text, the medieval author graphically describes the site as a whole system made up of distinctive biota and abiota, each of which actively contributes and receives something essential to the well-being of the area. The site is not planned around the ecosystem concept as embraced by some ecologists today, but a sense of harmony of all parts working together is prominent in the twelfth-century author's view of the abbey and its surroundings. The monks were considered cooperators among cooperators, contributors among contributors, and significant beneficiaries among the beneficiaries of the Aube River ecosystem.

When describing the characteristics of ecosystems, some ecologists and philosophers of science have not treated human beings as parts of ecosystems but, rather, as forces external to them. However, informed by ecology and eschewing Cartesian dualism, Odum contends that an understanding of the ecosystem concept and the realization that the human species is part of the complex bio-geo-chemical interactions of an ecosystem is fundamental to ecology and to human affairs.[20] Nothing in this concept inherently excludes the human from consideration as a part of the ecosystem, while the concept appears naturally to include humans, who, like other living organisms, evolved within the biosphere, have adapted to its structure, functions, and chemical

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[18]Tansley 299. See also Odum, Fundamentals 1–12; and Kenneth E. Boulding, "What Went Wrong, If Anything, Since Copernicus?" *Science and Public Affairs* 30 (1974): 17–23, 17.

[19]See, for example, Anthony W. King, "Considerations of Scale and Hierarchy," *Ecological Integrity and the Management of Ecosystems*, ed. Stephen Woodley, James Kay and George Francis (Delray Beach: St. Lucie, 1993) 19–46; Ricklefs 174–77; Bernard J. Nebel, *Environmental Science: The Way the World Works*, 3rd ed. (Englewood Cliffs: Prentice Hall, 1990) 15; O'Neill et al.; Eugene Odum, "The Strategy of Ecosystem Development," *Science* 164, 18 April 1969, 262–70.

[20]Odum, Fundamentals 1–12; compare Golly 66.

composition, are dependent on the water, air, land, and other biota of their ecosystems for survival, and are subject to physical and biological constraints when conducting social, economic, and political affairs.[21]

Among the negative factors that warrant including humans as integral parts of ecosystems are the demands we make on other ecosystem components, the actions we take that place at risk the stability, diversity, and functioning of ecosystems, the air pollutants and other mobile toxicants we induce in one ecosystem that affect neighboring ecosystems, and the acceleration of ecosystem-change and species-extinction that we precipitate by choices made and technologies employed.[22] If humans are acknowledged as integral parts of the ecosystems in which we function, proponents contend, we can also be considered subject to the self-regulating rules and limitations of ecosystems.[23] Humans ought to act, therefore, in ways that are conducive to the thriving of the ecosystem with its diverse biota and abiota.

Jürgen Jacobs insists that the human being should be considered a natural but highly specialized component of ecosystems, if the human role in them is to be comprehended and if human activities are to become compatible with ecosystem functioning.[24] Thinking about our species in this way links us inextricably to the sustainability of ecosystems and the greater biosphere. The management of ecosystems from this perspective requires perceiving all human actions—biological, technological, economic, and social—within the framework

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[21]A detailed analysis of the assumptions that underlie the emergence of the human-in-ecosystem paradigm is provided by Riley E. Dunlap and Kent D. Van Liere, "The 'New Environmental Paradigm': A Proposed Measuring Instrument and Preliminary Results," *Journal of Environmental Education* 9 (1978): 10–19. Further analysis appears in William R. Catton, Jr., and Riley E. Dunlap, "A New Ecological Paradigm for Post-exuberant Sociology," *American Behavioral Scientist* 24 (1980): 15–47. See also F. H. Buttell, "Social Science and the Environment: Competing Theories," *Social Science Quarterly* 57 (1976): 307–23; Riley E. Dunlap and Kent D. Van Liere, "Land Ethic or Golden Rule," *Journal of Social Issues* 33 (1977): 200–7; and D. E. Morrison, "Growth, Environment, Equity and Scarcity," *Social Science Quarterly* 57 (1976): 292–306.

[22]Jacobs 205; Great Lakes Science Advisory Board, *The Ecosystem Approach: Scope and Implications of an Ecosystem Approach to Transboundary Problems in the Great Lakes Basin* (Windsor: International Joint Commission, 1978) vii. See a similar point made by Jared Diamond, *The Third Chimpanzee: The Evolution and Future of the Human Animal* (New York: HarperPerennial, 1992), and Bernard J. Nebel and Richard T. Wright, *Environmental Science: The Way the World Works*, 4th ed. (Englewood Cliffs: Prentice Hall, 1993) 102.

[23]R. L. Thomas, J. R. Vallentyne, K. Ogilvie, and J. D. Kingham, "The Ecosystems Approach: A Strategy for the Management of Renewable Resources in the Great Lakes Basin," *Perspectives on Ecosystem Management for the Great Lakes*, ed. Lynton K. Caldwell (Albany: State University of New York, 1988) 41.

[24]Jürgen Jacobs, "Diversity, Stability and Maturity in Ecosystems Influenced by Human Activities," *Unifying Concepts in Ecology: Report of the Plenary Sessions of the First International Congress of Ecology, The Hague, The Netherlands, September 8-14, 1974*, ed. W. H. van Dobben and R. H. Lowe-McConnell (The Hague: Dr. W. Junk B. V., 1975) 203–4. See also Golley 66.

of the ecosystem's carrying capacity and the compatibility of human actions with maintaining the ecosystem's integrity. When managing ecosystems, human needs and the needs of the ecosystem with all of its components are understood as complementary, and the human use of other ecosystem components is tempered by the goal of assuring the ecosystem's sustainability.[25]

Among the efforts to adopt and implement the ecosystem concept as a basis for management is the Great Lakes Water Quality Agreement signed by the United States and Canada in 1978. The two nations defined the ecosystem of the Great Lakes as "the interacting components of air, land, water and living organisms, including man" within the lakes' drainage basin (art. 1) and committed themselves "to restore and maintain the chemical, physical, and biological integrity" of its waters (art. 2). This action provided a conceptual framework for addressing widespread degradation throughout the Great Lakes basin.

Thinking about the human being as part of an ecosystem does not exclude economic concerns. As was already noted, humans are highly dependent on other biota, water, land, and ambient air of an ecosystem for economic well-being. How we function within an ecosystem and use its components determines the options for our occupations, recreation, and health now and in the future. Recognition of this nexus between economic and environmental well-being led the World Commission on Environment and Development to encourage the development of the economy in ways that sustain ecosystems and the larger biosphere.[26] Similar sentiment has been expressed by scientists and philosophers who urge managing the human use of ecosystem components on a sustainable basis for future generations.[27]

Ethics of Grateful Cooperation

For moral theologians who have struggled with the dualistic perception of the physical universe as merely the object of human study and exploitation, the human-in-ecosystem approach provides a scientifically informed paradigm for thinking about how humans should function as integral parts of God's creation. Ironically, a basic model existed centuries before, as exemplified by the monks' grateful cooperation with the other forms of biological life and the abiota that constituted the Clairvaux site.[28] While the Cistercian's perceptions lack the

[25]Golley 48.

[26]*Our Common Future*.

[27]Thomas, The Ecosystems Approach 32–3, 41–6.

[28]While Clarence J. Glacken finds in *Descriptio* an understanding that the human being serves as "a partner of God, sharing in, changing, and improving the creation to his own best uses because these accomplishments are for the greater glory of God (*Traces on the Rhodian Shore: Nature and Culture in Western Thought from Ancient Times to the End of the Eighteenth Century* [Berkeley: U of California P, 1967] 214), I am impressed by the Cistercian's more humble depiction of the cooperation of monks, other biota, and

current scientific perspective of the human species as having emerged from and with other living beings over cosmological and biological time, the author's appreciation, respect, and gratitude for the cooperation among the monks, other biota, and the abiota of the site provide inspiration for developing principles that will guide humans to cooperate with other components of their shared ecosystems because of their mutual relationship to God.

The ethics of grateful cooperation proceeds from the Cistercian's deep faith in God as the Creator, Sustainer, and Empowerer of the interactivity of the diverse creatures that constitute the world.[29] Proceeding from this faith perspective, the human being should cooperate with other animate and inanimate beings in their shared ecosystem out of gratitude for their contributions to its functioning and, ultimately, out of gratitude to God for having made their shared existence possible, for sustaining them in existence, and for empowering them to cooperate with one another for their mutual well-being. More specific principles to guide human functioning in ecosystems can be gleaned when informed by broad scientific findings:

1. Persons of faith should cooperate with other animate and inanimate beings by thinking about the health and welfare of other humans now and into the future within the context of the health and well-being of their ecosystem. Because humans live, work, play, and otherwise function within ecological systems, their personal welfare and the well-being of their families should not be contemplated outside of these physical contexts. This ecological frame of reference is warranted by the human connection with other species over cosmological and biological evolutionary time, the radical reliance humans have on other species, the air, land, and water for their health and well-being, and the adverse effects caused by human activities on the ecosystem, which, in turn, have adversely affected or threaten to affect other human beings near and far, now and into the future. The ethics of grateful cooperation would require weighing all concerns about human welfare, with special attention to the poor, vulnerable, and disadvantaged who are least able to sustain themselves,[30] within

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abiota to assure their mutual sustainability and the integrity of the site, all of which are attributed ultimately to God's sustaining goodness.

[29]I am grateful to one reviewer of a draft of this article for the insight that a properly trained Cistercian would not have to work on an ethics of cooperation because the inner harmony that comes with prescribed spiritual practices would expand spontaneously into harmony with all surroundings and with God, their mutual Creator and Sustainer in existence. The Cistercian model is indeed worth exploring and sharing in the quest for sustainable ecosystems. However, while the basic principles for living may flow spontaneously, the deliberations that are needed for making decisions require being informed about options and working on various levels of social, economic, and political life to implement the best options cooperatively.

[30]This principle acknowledges the option for the poor that prevails in Christian theology and has been a cornerstone of Catholic social thought for many decades. In *The Body of God* (Minneapolis: Fortress, 1993), Sallie McFague describes nature poignantly as "the new poor–the oppressed, victimized, deteriorating, excluded" which "deserves

the ecosystem context. A sense of humility of self in relation to others must prevail, and a commitment to justice must be demonstrated toward those who are adversely affected and threatened.

2. Persons of faith should cooperate with other biota and abiota by recognizing the contributions they make to their shared ecosystem and by expressing their gratitude for these contributions. Concerted effort should be made to seek at least basic knowledge about the species, air, land, and water that comprise an ecosystem and the contributions they make to one another for their mutual benefit and the integrity of their ecological system. Knowledge about at-risk species and abiota should also be sought with the aim of identifying activities that jeopardize their existence and the overall effect on other species and abiota that constitute their shared ecosystem. Knowing these facts should lead to acknowledging and valuing the contributions that the biota and abiota make to facilitate their mutual flourishing, as exemplified in *Descriptio.* Acknowledging and valuing their contributions should lead the faithful to express their gratitude, like the Cistercian nine centuries ago who lauded the Aube, the fountain, the trees, the meadows, the birds, the fish, the air, and the sunshine at Clairvaux. Forgetting any one of these would be lamentable, as we see when the Cistercian almost forgot the fountain that met the monks' basic needs.

3. Persons who believe in God, the Creator, Sustainer, and Empowerer of all natural beings, should cooperate with them by identifying ways of acting that do not inhibit or interfere with their contributions to one another. As rational-affective creatures, humans should exercise their innate abilities to identify and act in ways that avoid interfering with other species' quests for nourishment and self-preservation within their shared ecological system. Efforts should be made to investigate the projected ramifications of their actions and to choose to act at home, at work, and at play with the aim of assuring the viability of the other species and abiota that constitute their shared ecosystem. At-risk species should be protected, minimum standards for impacting environmental quality should be instituted and followed, the consumption of non-renewable biota and abiota should be self-restricted, and renewable goods of God's earth should be used in sustainable ways. These responsible actions by the faithful will demonstrate their gratitude for the diverse entities that constitute God's physical world.

4. Persons who profess faith in God should cooperate with the many different creatures that constitute an ecological system with the goal of assuring its evolving sustainability into the future. Informed by ecologists' findings, human actions must be geared toward maintaining the stability, resilience, and biotic diversity of an ecosystem[31] in ways that do not interrupt its natural

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our solidarity in its vulnerability" (200–1). The point she makes is also compelling for any system of ethics that aims to be responsive to the ecological crisis.

[31]An informative review of the various approaches to thinking about the sustainability of ecosystems is provided by Robert U. Ayres, Jeroen C. J. M. van den Bergh, and John M. Gowdy, "Strong versus Weak Sustainability: Economics, Natural Sciences, and

evolution. Where the stability of the biological populations is unbalanced, efforts must be expended to return to the equilibrium that had existed prior to human disruptions.[32] Where the ecosystem's resilience is diminished, efforts must be initiated to reduce stress on the ecosystem so that it can become more robust.[33] Where biological diversity is reduced, efforts must be made to restore it. Human cooperators should follow the precautionary principle when ecosystem health and well-being are threatened, opting to err on the side of caution rather than waiting for conclusive scientific evidence of the cause-effect relationship.[34]

5. The faithful ought to be penitent for conduct that prevents biota and abiota from cooperating with one another and jeopardizes the sustainability of an ecosystem. Human activities that disrupt the cooperative interactivity of other species, the air, the land, and the water must be perceived as failures of the human spirit to acknowledge the rightful place of humans as responsible citizens of ecosystems. Humans need to be responsive to other humans, other species, the air, land, and water that constitute ecosystems. Repentance may include acts of outward confession of these failures to cooperate, the professed intention to avoid repeating these activities, and penitence aimed toward facilitating the reinvigoration of ecosystem species and the restoration of ecosystem sustainability.

6. Persons of faith should seek the cooperation of others who profess faith in God, in order to initiate community-wide cooperative actions that aim to achieve the sustainability of their shared ecosystem. The plethora of ecosystem problems existing today transcends the capacity of one or several persons to bring about required changes in thinking and acting that are needed. While a

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Consilience," *Environmental Ethics* 23 (2001): 155–68. See also Mick Commons and Charles Perrings, "Towards an Ecological Economics of Sustainability," *Ecological Economics* 6 (1992): 7–34.

[32]For example, considerable efforts are underway to identify and make plans to restore the integrity of forty-two "Areas of Concern" around the Great Lakes that the International Joint Commission prioritized in 1987 as highly toxic. Progress is slow, primarily for "institutional and financial rather than technical reasons," according to a special report on successful strategies, *Beacons of Light/Des Lumières dans la Nuit*, International Joint Commission, March 1998 (http://www.ijc.org/boards/annex2/beacon/beacon.html).

[33]In "Resilience in the Dynamics of Economy-Environment Systems," *Environmental and Resource Economics* 11 (1998): 503–20, Charles Perrings explains two variants requiring consideration: 1) the time taken for a disturbed system to return to its initial state and, 2) the magnitude of disturbance that a system can absorb before it changes to another state. See also Crawford S. Holling, "Resilience and Stability of Ecological Systems," *Annual Review of Ecological Systems* 4 (1973): 1–24.

[34]The precautionary principle, established in Agenda 21 of the Rio Declaration at the 1992 United Nations Conference on Environment and Development, is binding on the United States, although little work has been done to implement the principle in our country. See the essays in *Protecting Public Health and the Environment: Implementing the Precautionary Principle*, ed. Carolyn Raffensperger and Joel Tickner (Washington D.C.: Island, 1999).

few faithful individuals may lead an effort, the cooperative action by many is essential, beginning in the home and moving upward to whatever level of social, economic, and political activity is necessary to achieve sustainability. Reaching out to the faithful of other religious traditions in an area would demonstrate cultural cooperation within an ecological system. Voluntary efforts should be encouraged, but restrictions and penalties for non-compliance should be instituted where needed. The principle of subsidiarity should guide decision-making, so that all possible means of cooperation at one level are exhausted before moving to the next level. Vigilance must be exercised to recognize and correct obstacles to cooperation that persist in political and economic systems.

7. The faithful should express gratitude to God for other people, for other living beings, and for abiota that cooperate to form sustainable ecological systems. Underscoring all actions of those who believe in God is the unwavering surrender to the Creator, Sustainer, and Empowerer of all beings that have emerged over cosmological and biological time. That the world is the Lord's must ever be on the lips of the faithful. In prayers, songs, religious rituals, and seemingly mundane activities, those who believe in God should express their gratitude to God for their shared physical existence, for all diverse types of beings that constitute their shared ecosystems, for their ability to interact cooperatively with them, and for their opportunity to show how cooperative they can be with God's other creatures out of our desire ultimately to be cooperative with God. The reward for this cooperation would be eternal happiness with God—the ultimate end sought by the Cistercian monks at Clairvaux.

Conclusions

A twelfth-century monastic text conveyed appreciation, respect, and gratitude for the cooperative interactivity of the monks, birds, trees, meadow, mountains, river, lake, spring, and air that constituted the Cistercian abbey site at Clairvaux. Recognition of their value to the site has parallels in contemporary philosophy in which the human being is considered a highly specialized, integral, and responsible component of an ecological system. When the human-in-ecosystem approach proceeds from faith in God, who empowers the emergence and interactivity of ecosystem components, the ethics of grateful cooperation inspired by the medieval text can guide humans to seek the health and well-being of all as a way of cooperating with God.

Following the ethics of grateful cooperation, persons of faith will cooperate with other animate and inanimate beings by thinking about the health and welfare of other humans now and into the future within the context of the well-being of the ecosystem. The faithful will recognize the contributions made by other biota and abiota to their shared ecosystem, express their gratitude for these contributions, identify ways of acting that do not inhibit or interfere with their contributions to one another within their ecological system, and seek overall to

assure the sustainability of the evolving ecosystem. The faithful will express in prayer, song, and ritual their gratitude to God for humans, other living beings, and abiota that cooperate to form sustainable ecological systems, and they will be especially grateful for their opportunities to be cooperative. The faithful will strive to involve members of their religious community and those of other faiths to achieve their shared goals for their shared ecosystem, since the cooperation of many is essential to achieve a sustainable ecosystem for all now and into the future.

When they do not cooperate with the diverse creatures of their shared ecosystem and cause its degradation, the faithful will be penitent to one another, to other beings that constitute the ecosystem, and to God for their failures. They will commit themselves to being cooperative in the future, ultimately out of their desire to be cooperative with God with whom eternal happiness is sought.

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