Introduction
Oeconomy and Ecology

The concepts of ecology and political economy did not exist in the seventeenth century. However, their shared precursor, oeconomy (as it was spelled by early modern English writers), was well-established, used to designate an array of practices and phenomena including household management, family structure, church organization, the dispensation of divine providence, and even the structure of a literary work.[1] Dating back to Ancient Greece and the influential works of Xenophon and Aristotle, and routed through patristic theology, oeconomy became in the seventeenth century a way of expressing nature's efficiency and systemic unity.[2] This book traces a genealogy of ecology in seventeenth-century literature and natural philosophy through the development of the protoecological concept of "the oeconomy of nature" – first developed by Kenelm Digby in 1644 and subsequently employed by a number of theologians, physicians, and natural philosophers to conceptualize nature as an interdependent system. Focusing on the middle decades of the seventeenth century, I examine how Digby, Samuel Gott, Walter Charleton, Robert Boyle, Samuel Collins, and Thomas Burnet formed the oeconomy of nature as well as how literary authors Ben Jonson, George Herbert, Andrew Marvell, Margaret Cavendish, and John Milton used the discourse of oeconomy to explore the contours of humankind's relationship with the natural world. This book participates in an intellectual history of the science of ecology while prompting a reevaluation of how we understand the relationship between literature and ecology in the early modern period.

In recent years, the burgeoning field of early modern ecocriticism has grown into a rich and diverse discipline.[3] Drawing upon ecological ethics and environmental history, scholars have demonstrated how "our current environmental crisis clearly has its roots in the Renaissance."[4] Once ignored, issues of deforestation, air and water pollution, loss of wetlands, and rapid urbanization are now considered important contexts for the study of early modern literature. Early modern ecocritics employ a

remarkably diverse array of critical approaches, ranging from ecofeminism to actor-network theory to Heideggerian philosophy. Writers from Shakespeare to John Evelyn have been identified as protoenvironmentalists who "reject anthropocentric bias," promote "sustainable" arboriculture, imaginatively "preserv[e] habitats," and eschew "Cartesian mind-body . . . dualism" in favor of integrative views of nature.[5] Robert Watson goes so far as to suggest that "[f]rom the moment of their conception, modern ecological and epistemological anxieties were conjoined twins" and that seventeenth-century epistemological anxiety anticipated and "later evolved into" modern environmentalism.[6] Early modern longing for unmediated access to the creation developed into modern longing for pristine nature. A still more recent wave of early modern ecocriticism has departed from the "green" focus on sustainability and pastoral harmony in favor of a more "polychromatic, ecstatic ecology," which better appreciates ecology's multiplicity."[7] Steve Mentz, for example, posits the ocean – dynamic, violent, and inhospitable to human life – as an alternative to the "pastoral nostalgia" structuring many ecocritical studies.[8] Thinking about the world as an ocean rather than a landscape reconfigures ecocritical practice as we "shift from equilibrium to dynamism" in the "postpastoral world" we find ourselves inhabiting.[9]

What unifies the heterogeneous field of early modern ecocriticism – which covers historical, epistemological, and ontological issues – is the commitment to a diverse set of concerns mobilized by modern ecology. This mode of scholarship, anachronistic as it may be, has generated powerful new interpretations of early modern literature and culture, giving us insight into the deep roots of the present environmental crisis. What early modern ecocriticism has not done, however, is foreground the historicity of ecology itself. I argue that the conceptual foundations of the system we now recognize as ecology can be located in the seventeenth-century concept of "the oeconomy of nature" – a phrase coined by Digby and subsequently employed by the cornerstone ecological thinkers Linnaeus, Charles Darwin, and Ernst Haeckel. By starting with modern ecology – at once a science, a philosophy, and an ethical program – early modern ecocriticism has tended to project a prefabricated set of ethical and epistemological concerns onto the past, distorting the constellation of ideas involved in ecology's early development. Rather than assume that ecology is ahistorical and universally available, I contend that the concept has a history, which can be traced back to early modern ideas of oeconomy.

The genealogy of ecology developed in this book, which centers on Digby's formation of the oeconomy of nature – an early model for

thinking about the natural world as an interdependent system – involves a number of forces traditionally understood as inimical to ecological thought: Cartesian dualism, Baconian empiricism, and anthropocentric projection.[10] My study thus places early modern ecocriticism in closer dialogue with scholarship on the history of science and natural philosophy. Drawing on Aristotle, Digby understood the natural world to function like a human household, with thrift, regularity, and efficient dispensation. Digby's projection of human oeconomy onto the natural world, coupled with his ontological separation of humanity from nature, has a chiastic function: It simultaneously reveals complex human-like structures in the nonhuman world and produces a mirror reflecting back humanity's own organic life. Animals and plants, like humans, modify their environments for personal advantage, becoming centers of their own oeconomies of nature. As Jane Bennett argues in her book *Vibrant Matter: A Political Ecology of Things*, personification, while long understood as ecologically problematic, can improve empirical observation, revealing previously unperceived complexities in the nonhuman world.[11] Turning to ecology's homely ancestor, oeconomy, enables us to grasp the often perplexing contours of early modern thinkers' understanding of their world.

My analysis hinges on two interrelated but distinct concepts: natural oeconomy and the oeconomy of nature. Natural oeconomy, simply referred to as "oeconomy" by early modern writers, represents humanity's interface with the natural world. Centered on the institution of the rural estate, oeconomy stands for the procurement of basic life necessities – food, water, clothing, and shelter – from the surrounding environment. Ideas of natural oeconomy are not unique to the early modern period, but rather draw on classical notions of *oikonomia* (*οἰκονομία*) going back to Xenophon and Aristotle. The oeconomy of nature, on the other hand, is a historically specific natural-philosophical concept, which Digby developed in an attempt to reconcile Aristotelian teleology with mechanism. The phrase "oeconomy of nature," which came into wide use in the middle decades of the seventeenth century, designated an array of physical phenomena, from the collective processes of human and animal bodies (in the works of Richard Bunworth, Jean de Renou, Walter Charleton, and Samuel Collins) to the systemic principle animating the world (in the works of Digby, Samuel Gott, Robert Boyle, and Thomas Burnet).[12] As noted earlier, the oeconomy of nature would become foundational to the history of ecology in subsequent centuries. Indeed, Ernst Haeckel, who coined the German term "*Oecologie*" in 1866, uses the oeconomy of nature to define the nascent discipline: "By ecology we mean the body of

knowledge concerning the economy of nature – the investigation of the total relations of the animal both to its organic and its inorganic environment."[13] The first section of the Introduction, "Natural Oeconomy," highlights oeconomy as a fundamental material interface between humanity and the natural world. The second section, "The Oeconomy of Nature," traces the transformation of oeconomy into a natural-philosophical principle in Digby's three major philosophical works: *Two Treatises* (1644), *A Late Discourse . . . Touching the Cure of Wounds by the Powder of Sympathy* (1658), and *A Discourse Concerning the Vegetation of Plants* (1661). In formulating the oeconomy of nature, Digby uses natural oeconomy as a model for the collective behavior of nonhuman creatures, thereby (imperfectly) repressing the fundamental material connection that the concept draws between humanity and the natural world, asserting instead an ontological divide. The third section, "The Oeconomy of Poetry," studies oeconomy's literary and rhetorical meaning, the formal and structural integrity of a written composition.

Early modern ecocritics have long observed connections between oeconomy and ecology. Noting the etymological twinning of the words, scholars have employed terms like "home," "stewardship," and the "whole household of living things" in green readings of early modern texts.[14] Diane McColley's foundational study of ecology in the early modern period, *Poetry and Ecology in the Age of Milton and Marvell* – published in 2007, but written almost a decade earlier – begins by rejecting oeconomy in favor of ecology: "The modern term *ecology* describes the work of these poets [Milton and Marvell] better than the classical and early modern *economy*." While *economy* "concerns rules for the efficient management of the estate," *ecology* "suggests that our use of knowledge needs to be good for the whole household of living things."[15] Subsequent scholars, like me, have sought to recapture oeconomy's protoecological importance. Sylvia Bowerbank argues that early modern women acted as "home ecologists," whose ecological wisdom "emerged from their lived experiences of daily life."[16] However, oeconomy's role in early modern ecocriticism tends to be small – passing references rather than systemic attempts to excavate the concept. Still, the preponderance of indirect references to oeconomy in early modern ecocriticism demonstrates the pervasiveness of its protoecological influence. Oeconomy, in the early modern sense, means "household management" and by extension "the management of resources" more generally. Since the household was a system for producing and distributing resources, as well as for reproducing people and cultural practices, oeconomy also came to mean, by extension, "[t]he organization,

internal constitution, apportionment of functions, of any complex unity."[17] Oeconomy can therefore mean either the domestic institution structuring human interface with nature or how the natural world functions on its own without human intervention. The natural-philosophical oeconomy of nature transforms oeconomy into a natural principle by decoupling it from human institutions, thus anticipating and helping to form modern ecology, with its focus on "the distribution and abundance of organisms" and an "encompassing and synthetic view of nature."[18] Oeconomy is not simply a metaphor but a set of material practices central to everyday life in early modern England.

Donald Worster's influential history of ecology, *Nature's Economy*, demonstrates how economic ideas have long pervaded ecological thought. Charles Darwin's economy of nature, for example, reflects (and indeed reinforces) the cutthroat world of laissez-faire capitalism that emerged in the nineteenth century. And in the twentieth century, ecologists adopted the language of modern capitalism, with its obsession with management and the bottom line, using terms like "producers and consumers," "output," "gross production," and "efficiency" to describe how organisms interact.[19] Worster's account of the early modern period, however, lacks the nuance of his detailed analysis of the nineteenth and twentieth centuries.[20] The Americanist Timothy Sweet, likewise, examines the confluence of economics and environmental concerns in early colonial texts, using mercantilist keywords "commodity," "waste," and "vent" to describe "the general, systemic relationship between the human economy and the natural environment."[21] Worster and Sweet both highlight the parallel and interrelated developments of economy and ecology.

While this book focuses primarily on the protoecological significance of oeconomy, it also has implications for the development of modern political economy – a concept that shares ecology's oeconomic roots. As Margaret Schabas argues, political economy arises in the eighteenth and nineteenth centuries in the works of David Hume, Adam Smith, and John Stuart Mill from the progressive "denaturalization" of economics, through which economic theory gradually shed the conceptual vocabulary of natural philosophy.[22] Karl Marx, for example, had a profound understanding of the "evolving material interrelations" between humanity and the natural world.[23] In his early writing on alienated labor, Marx refers to nature as humankind's "inorganic body" – things organically necessary to the body but not contained in it.[24] Thinking about oeconomy as fundamental interface between humanity and nature entails returning nature to economy. If the economy seems an uncanny presence haunting modern

ecology, transforming its high-minded ideals into economic allegories justifying the status quo, the reverse is equally true: Capitalist economy's drive toward universal abstraction imperfectly masks its ecological roots.

Thinking about the common roots of ecology and economy highlights how human economy is always an interface with the natural world, even if this relation has been deliberately obfuscated. In the sad state of modern political discourse, we are led to believe that we must choose between the economy and the environment, as if the two are easily separable. As Jean Arnold writes, "The view that culture is produced by human beings and is therefore separate from nature bypasses the fact that all human culture resides in the natural world, that every penny of economic worth ultimately draws on resources of the natural world."[25] The future of environmental criticism may lie less in getting rid of nature in favor of ecology, as Tim Morton has argued in *Ecology without Nature*, than in putting nature back into economy.[26] Indeed, the hegemony enjoyed by economic discourse in modern political thought, which marginalizes environmental concerns, suggests the imperative of restoring nature to economy.

Natural Oeconomy

Following Bruno Latour, Jean Feerick suggests that in the early modern world "the social, the cultural, and the human were still perceived to be *inside* nature, not separated from it and abiding by a discrete set of principles."[27] Thinking about oeconomy ecologically illuminates how early modernity's ontological categories are vastly different from our own. When Digby transforms oeconomy into a natural principle – the oeconomy of nature – he simultaneously projects a human institution onto nature and radically decouples humanity from the natural world, by suggesting the nature functions oeconomically without human input. These two iterations of oeconomy – natural oeconomy (including humanity) and the oeconomy of nature (excluding it) – evoke fundamental questions about humanity's place in the world.

Typically associated with architectural edifice and human family, the early modern household, in fact, comprised a surpassing array of actors, human and nonhuman. Drawing on ancient ideas of *oikonomia*, writers understood the household not only as house and family but also as land, water, plants, animals, minerals, tools, and manufactured goods. Xenophon's *Oeconomicus*, published in English translation six times between 1532 and 1573, emphasizes how oeconomy involves both "the bare house"

and everything "profitable" that the householder possesses.[28] Foucault, likewise, observes that "the *oikos* comprises more than just the house proper; it also includes the fields and possessions, wherever they may be located . . . It defines a whole sphere of activities. And this activity is connected to a lifestyle and an ethical order."[29] While Foucault is interested primarily in the household's governmental function, as an institution through which sexual norms were established and transmitted across generations, his study also draws attention to nonhuman elements.

Foucault describes the ancient Greek *oikos* as a "shelter" that protects futurity through biological and cultural reproduction. Central to this futurity was the ongoing preservation of the estate's natural environment:

> At first it looks as if descendants provide the family with its temporal dimension and shelter gives it its spatial organization. But things are a little more complex than that. The "shelter" does delimit an outside and an inside, the first being the man's domain and the second constituting the privileged place of the woman; but it is also the place where they bring in, store, and preserve that which has been acquired; to shelter is to provide for future distribution at the right times. Outside, therefore, the man sows, cultivates, plows, and tends the flocks; he brings back the things he has produced, earned, or acquired through exchange. Indoors, the woman for her part receives, preserves, and allocates according to need. Generally speaking, it is the husband's activity that brings provisions into the house, but it is the wife's management that regulates their expenditure. The two roles are exactly complementary and the absence of one would make the other useless.[30]

Production (the labor of the husband) and preservation (that of the wife) are two facets of the self-contained system of domestic oeconomy. The early modern housewife's oeconomic role was particularly complex, involving "not only saving, storing, and maintaining, but marking, ordering, accounting, dividing, distributing, spending, and disposing of household property, including both durable and perishable goods."[31] Ceaselessly laboring against wasteful expenditure and decay, the wife ensured the household's ongoing viability.[32]

Underscoring oeconomy's importance in early modern England, the historian Keith Wrightson asserts that throughout the period "the household remained the principal locus of production and most characteristic unit of labor organization. To a very large extent economic organization *was* domestic organization."[33] Beyond supplying shelter, most households were working agrarian operations, charged with establishing "the maintenance of the flow of resources upon which the household more immediately depended."[34] Manorialism, declining but still in practice in

the seventeenth century, bound people to the places where they lived and worked. Threats to the household like famine, disease, and other misfortunes "engendered a mentality which valued security and stability over growth and change; a preference for the tried and reasonably true over innovations which might promise much but might also increase vulnerability; economic strategies which were essentially defensive, designed to minimalise risks rather than to maximise gain."[35] Early modern oeconomy was, then, not expansive and profit-oriented but static and focused on self-preservation. Good oeconomy was achieved by matching human needs and desires with the productive capacity of the environment, while avoiding more intensive forms of socio-environmental manipulation: selling land, raising rents, consuming excessively, and clear-cutting woods. In reality, of course, people often did not practice good oeconomy, but the image of the functioning agrarian household instantiated a potent cultural ideal.

Philip Sidney's *New Arcadia* supplies a paradigmatic example of the early modern ideal of oeconomy. Toward the beginning of the text, when Musidorus first arrives in Arcadia, he encounters Kalander's house – a synecdoche for the central virtues of the kingdom. Eschewing opulence in favor of utility, Kalander's house represents edifice in harmony with environment. It is built with an eye to "necessary additions," "provision," and "thrift" and "with fit consideration both of the air, the prospect, and the nature of the ground."[36] In contrast, in the country of Laconia, Arcadia's foil, the people have "disfigured the face of nature, and made it ... unhospitable" (70). This passage reveals the relation between humans and their environments as a dialectic of dominance and reliance: humans have the ability to alter how nature behaves, but nature is host to human guests.

The virtues of Kalander's house lie in its durability as edifice and institution: "The house itself was built of fair and strong stone, not affecting so much any extraordinary kind of fineness as an honorable representing of a firm stateliness ... all more lasting than beautiful, but that the consideration of the exceeding lastingness made the eye believe it was exceeding beautiful" (71). Producing an alternative aesthetic standard, Sidney represents Kalander's house as beautiful not because of its spatial features but because of its (somehow easily visible) temporal stability. Traditional aesthetic beauty is thus subordinated to "lastingness" – what we would now call sustainability. Kalander's name further emphasizes the temporality significant to Sidney's vision of oeconomy. Paying little attention to the physical features of the house and its interior, Sidney focuses

instead on the estate's "well-arrayed ground," where features of the environment are hospitable to the estate's human denizens but also serve each other reciprocally: the trees, for instance, make "a pavilion" for the flowers, and the flowers are "a mosaical floor" for the trees (71, 73). It seemed, Sidney writes, "that Art therein would needs be delightful by counterfeiting his enemy Error and making order in confusion" (73). The *concordia discors* at the heart of this description signals a temporal aesthetic in which natural and artificial phenomena have reached a point of equilibrium. The ostensible confusion of nature's complexity is revealed to be a form of architectural order. This is, of course, a limited view of the nonhuman world – with no mention of disease, killing, famine, predation, or physical decay – but it does offer an early model for thinking about oeconomy as the stable confluence of natural and artificial systems.

Shakespeare supplies a more skeptical view of natural oeconomy in *Timon of Athens*. In the play, Timon's financial ruin is accompanied by an abandonment of civilization in favor of a life of simplicity, misanthropy, and self-deprivation – a Thoreauvian retreat into the wilderness.[37] Although this shift lacks the benevolent self-realization and communion with nature usually associated with wilderness retreat, it does point to an alternative topography, located outside the walls of Athens, in which other oeconomic structures might flourish. Against the "unnatural" monetary economy that leads to Timon's downfall, Shakespeare posits another, largely unrealized, economic possibility – that of natural oeconomy. This oeconomy quickly breaks down as the play gives way to social, economic, and personal entropy – a sense of imminent collapse as all economies, natural and artificial, prove unsustainable. Timon himself dies an obscure death in the wilderness. Still, by highlighting the perverse disjunction between wealth and the biological processes of life, Shakespeare gestures toward the possibility of a more sustainable relationship between the economic and the ecological, in which the two might reinforce rather than undermine each other.

The economy of *Timon of Athens* is generally understood as bifurcated into the gift economy that Timon imagines, and the monetary economy that structures Athenian life. The tragedy of the play lies in Timon's inability to come to terms with the latter. Conceiving of a circular gift economy, Timon uses borrowed wealth to gain friends, who might in turn help him in a time of need. His instrumental view of friendship is particularly evident in his metaphor that friends "were the most needless creatures living, should we ne'er have use for 'em, and would most resemble sweet instruments hung up in cases."[38] However, what we

quickly learn is the fact that Timon's gifts do not have the effect of channeling economic reciprocity – when the credit bubble collapses, and Timon is left scrambling to pay his debts; all of Timon's so-called friends refuse to loan him money, sensing that their formerly affluent acquaintance has suddenly become a risky investment. Michael Chorost points out that Timon's problem lies in his failure to appreciate money as "a dynamic, fertile, living commodity," capable of reproducing itself in quasi-sexual fashion.[39] Drawing upon Aristotle's condemnation of usury, as unnatural (generating "currency son of currency" as if by incest), Chorost argues that Timon is unable to grasp the connection between currency and biological reproduction that seems so obvious to the other characters in the play. In doing this, he links the former and latter halves of the play, contending that, "this recognition enables us to shift the discussion to a point midway between the economic and the biological ideologies."[40] Against the play's bifurcation of value, the discourse of early modern oeconomy coalesces the economic and the biological. Like the profligate urban aristocrats of Jacobean England, Timon does not generate wealth from the land that he owns. Later, after having exiled himself from Athens, enraged and penniless, Timon attempts to forage for roots, the most basic of food sources, in a material inquiry into the roots of human economic activity. In doing this, Timon moves backwards from opulence to utter squalor in an effort to discover the natural foundations of human economy. Of course, the irony is that what he finds is not food but gold, and this encourages him to reenter the human economy, though now only to sow the seeds of human destruction.

The play, moreover, conflates human economics with the cosmological principle of universal decline. In the opening lines of the play, an unnamed poet asks an unnamed painter, "how goes the world?" to which the painter responds, "It wears, sir, as it grows" (Scene 1, 3–4). This simple exchange encodes the popular notion that the world declines as it ages – a notion that seems to be born out in the progress of the play. Not only is *Timon of Athens* a tale of economic entropy but it also foregrounds various forms of biological decline. Images of cannibalism, famine, sterility, and consumptive disease proliferate, and, abandoning Athens, Timon calls upon the sun, a traditional emblem of fertility and rebirth to dry up nature's productive force. This entropic structure is reinforced on a generic level as well. The only women in the play are Amazonian actresses and prostitutes, the latter of which Timon pays to spread venereal disease. This leaves little room for the possibility of a comedic or even tragicomic resolution. Likewise, the tragic structure of the play is strikingly anticlimactic.