A “Wild Swing to Phantsy”: The Philosophical Gardener and Emergent Experimental Philosophy in the Seventeenth-Century Atlantic World

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Abstract: This essay traces the changing relationship between horticulture, agriculture, and philosophy across the seventeenth century, as the personae of the philosophical husbandman and the philosophical gardener intertwined and competed. At stake in the dynamics between them was the relationship between abstruse researches and practical applications in evolving experimental philosophy, as well as the aesthetic of experimental practices and rhetoric. Early seventeenth-century promoters of colonial projects, such as Virginian sericulture, situated the metropolitan pleasure garden, a place of whimsy and fantastical reasoning, as a realm of trial that presumed eventual utility and application to large-scale husbandry. Such views informed relationships between fanciful trials, speculative proposals, and presumptions of future utility in the development of the persona of the philosophical gardener and attendant notions of experimental philosophy over the course of the century.

INTRODUCTION: MATERIALS, FANTASY, AND EXPERIMENTAL PHILOSOPHY

A rich historiography has expanded our view of early modern experimental practice to encompass books of secrets, crafts, astrology, alchemy, magic, medicine, collecting and natural history, domestic recipe culture, husbandry, and myriad other forms of knowledge.1 However, ...

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1 See, e.g., William Eamon, Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture (Princeton, N.J.: Princeton Univ. Press, 1994); Pamela Smith, The Body of the Artisan: Art and Experience in the Scientific Revolution (Chicago: Univ. Chicago Press, 2004); Lauren Kassell, Medicine and Magic in Elizabethan London: Simon Forman: Astrologer, Alchemist, and Physician (Oxford: Oxford Univ. Press, 2005); and Elizabeth Yale, Sociable Knowledge: Natural History and the Nation in Early Modern Britain (Philadelphia: Univ. Pennsylvania Press, 2016).

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the study of these many forms of experimentation has not always permeated the specialized analysis of seventeenth-century English “experimental philosophy” that became associated with the Royal Society in the Restoration. Great agency has been ascribed to “experimental philosophy” and its associated literary genre, the “experimental essay,” in shaping the future course of experimental sciences. Much, therefore, is at stake in building bridges between these diverse forms of experimentation and experimental philosophy. Mordechai Feingold has recently investigated the origins of the term “experimental philosophy” in the 1630s in Baconian circles associated with the London-based intelligencer Samuel Hartlib (ca. 1600–1662). Feingold has shown that experimental philosophy was claimed by Fellows of the Royal Society as their distinctive approach only retrospectively. This essay extends Feingold’s research by identifying sites, practices, and texts of a particular form of horticulture, “philosophical gardening,” as prominent components in the emergence and shifting nature of experimental philosophy in the context of Atlantic colonialism.

To some, the pleasure garden appeared a privileged site for connecting experimentation and philosophy by uniting the sophisticated manipulation of materials in specialized, artificial environments with unconventional thinking about the causes of garden phenomena. Nature seemed to be stretched by art to its furthest limits when gardeners mastered the climate or transformed the shape, color, smell, taste, and fertility of plants. Yet the horticultural fantasy of the pleasure garden did not preclude a presumed relationship to eventual utility. The demonstration of the ability to overcome natural constraints in showcase gardens came coupled with a promise of enormous power and productivity. In pleasure gardens, attitudes, practices, and skills were cultivated that seemed to offer resources deployable on a grander colonial scale.

The garden, called by Roy Strong “the demonstration laboratory of the Renaissance architect-engineer,” has recently begun to receive attention as an experimental space. Dana Jalobeanu and Oana Matei have identified an emergent field of seventeenth-century research that treated plants as laboratories through “controlled experiments in which plants are taken out of their natural environments” and grown in artificial, often hydroponic, settings. While Jalobeanu and Matei ascribe this research to the influence of Francis Bacon’s experiments, I argue that an emergent field of “philosophical gardening,” which comprised more than hydroponic experiments, grew not only from the writings of gentlemen like Bacon and Sir Hugh Plat but also from the trials of master gardeners. As the alchemist did with precious metals in the alembic, gardeners tended valuable,
curious plants in contrived settings, modulating humidity, temperature, and nutrition in pots of compost, hotbeds, greenhouses, grottoes, and even at the point of a graft in a tree. Through such interventions, they hoped to draw on hidden causes of vegetation and fertility. Both the sophistication of the environments they created and their causal reasoning countenanced claims to a philosophical form of gardening.

Illuminating the specific contours of philosophical gardening will suggest how some aspects of a wider experimental culture were brought into the concept of experimental philosophy, while others were modified or rejected. Practices of trial in the aesthetic or pleasure garden grew from related forebears, such as domestic recipes, household management, alternative agriculture, and what Ayesha Mukherjee has called “dearth science” or “making shift.” However, Mukherjee distinguished sharply between the hyperlocal and “communal” focus of Elizabethan dearth science, based on a “circular and reciprocal” ethical pattern, and “linear and ‘improving’” seventeenth-century approaches. The former moved intimately between the manure pile, compost, garden, and table. The latter drew on extractive, resource-intensive, long-distance, and large-scale projects. While sixteenth-century practices of “making shift” necessitated many forms of experimentation and ingredient substitution for the purposes of survival, knowledge was localized and the outlandish was suspect as wasteful of resources. In particular, “blindness to local climates and ecologies was cast as being a form of waste which could disrupt the harmonious circulatory processes of nature and human knowledge.” The sixteenth-century valorization of local circulation between nature and human knowledge conflicted with far-ranging ambitions to control climate and dominate nature.6

During the “gardening revolution” of early Stuart England (1603–1649), pleasure gardeners showcased their overcoming of local climate through resource-intensive cultivation of tender plants, especially those transplanted over great distances in tight association with exploration and large-scale colonial projects.7 Bacon even developed the dream of mastering climate into a court masque in which winter magically transformed into spring, starring pots of real “tulipps” and “gillyflowers” arranged in a garden design. Elite pleasure gardens of the period interrelated with the aesthetics of the court masque, which staged hierarchical powers over nature through dramatic scenes of transformation. The Danvers House garden favored by Bacon was a theater of natural magic, with shifts in vista and mood, featuring exotic curiosities and hugely valuable flowers as performers.8

As this essay discusses, many argued that such privileged, resource-intensive settings allowed for testing the limits of possibility. Rather than delineating a middle ground between artisanality and scholarship, the philosophical garden offered a third, unconventional alternative: investigation in epistemic risk. Discoveries made at the edges of possible human ability to master nature could then direct projects elsewhere around the globe.

This argument might seem counterintuitive. Given the desperate material conditions of many seventeenth-century colonies, one might expect a quest for the most assured means of providing subsistence for colonists, yet colonial projecting as a whole regularly deployed practices of

6 Ayesha Mukherjee, Penury into Plenty: Dearth and the Making of Knowledge in Early Modern England (New York: Routledge, 2015), pp. 124–127, 110–111. On other “forebears” see Joan Thirk, Alternative Agriculture: A History, from the Black Death to the Present Day (Oxford: Oxford Univ. Press, 2000); and Elaine Leong, Recipes and Everyday Knowledge: Medicine, Science, and the Household in Early Modern England (Chicago: Univ. Chicago Press, 2018).
7 Keith Thomas, Man and the Natural World: Changing Attitudes in England, 1500–1800 (London: Penguin, 1984), p. 226.
8 Christine Adams, “Francis Bacon’s Wedding Gift of ‘A Garden of a Glorious and Strange Beauty’ for the Earl and Countess of Somerset,” Garden History, 2008, 36:36–58, on p. 41; John Dixon Hunt, Gardens and the Picturesque: Studies in the History of Landscape Architecture (Cambridge, Mass.: MIT Press, 1997), pp. 64–66; and Hunt, Garden and Grove: The Italian Renaissance Garden in the English Imagination, 1600–1750 (London: Dent, 1986), p. 130.
risk-taking. Conversely, one might assume that whimsical flower gardens would have been gendered as female and demure spaces unrelated to projects of colonial domination. In fact, a nexus of curiosity, investment, and colonial speculation often made the pleasure garden a masculine experimental site that “represented on a small symbolic scale” what “widespread agriculture and colonisation instantiated at a more grand and literal level.” Much like “tulipmania” in the Netherlands, the English pleasure garden embodied a realm of resource-intensive, risk-taking inquiry. Housewives, by contrast, often resorted to “ruthless pragmatism” in their management of domestic resources.

Previously, utilitarian husbandry has been related to philosophical views of vegetable growth and large-scale agricultural projects in many studies from Charles Webster’s Great Instauration to the present. In such studies, however, horticulture has not always been distinguished from agriculture. At stake in this distinction was the distance placed between researching fundamental principles of nature and application to use. It was precisely because the pleasure garden was not immediately utilitarian that it seemed to contemporaries to promise a shift in experimental toward the “haeretical,” “heterodoxe,” and fantastic.

This research into the edges of possibility, while not unique to Bacon, illustrates what distinguishes his work from the mere codification of artisanal work that had already been performed. Bacon set a high bar for inquiry that could push the envelope on human power. Even intentional experimentation that was varied, extended, and compounded from multiple experiments was the “kind of invention an Empirique may manage,” as Bacon wrote in his 1605 Advancement of Learning. Adding to that “knowledge of Phisicall causes” and keeping during “speculation” “one eye upon use & practise” was still insufficient. Such mixed speculation and practice informed with causal knowledge offered merely “Coastings along the shore,” with no “radcall or fundamentall alterations, and innovations in Nature.” Only the discovery of universal forms would enable “great libertie and Latitude of operation”—that is, true natural magic that might abolish all particular natural limits.

Although Bacon never cleared this bar himself, he did suggest an expedient to direct the pursuit of natural magic. The inquirer might explore desired feats presumed to be impossible (“optatives”); this pursuit would lead to the discovery of those experiments “which are of most universall consequence for invention of other experiments,” much as the magnetic compass directed navigation. Bacon later rearticulated this passage in his Latin Novum organum. There, he rendered optatives as “Instantias Innuentes” or “Intimating Instances,” and he gave the name

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1 Eva Brugger, “Dealing with Uncertainty: The Practice of Projecting and the Colony of New Netherland, 1609–1664,” in The Cultural Life of Risk and Innovation: Imagining New Markets from the Seventeenth Century to the Present, ed. Chia Yin Hsu, Thomas M. Lackett, and Erika Vause (New York: Routledge, 2020), pp. 23–42; Peter Harrison, The Bible, Protestantism, and the Rise of Natural Science (Cambridge: Cambridge Univ. Press, 1998), p. 239 (relating the pleasure garden to “widespread agriculture and colonisation”); Anne Goldgar, Tulipmania: Money, Honor, and Knowledge in the Dutch Golden Age (Chicago: Univ. Chicago Press, 2007); and Mukherjee, Penury into Plenty (cit. n. 6), p. 150 (“ruthless pragmatism”).

10 Charles Webster, The Great Instauration: Science, Medicine, and Reform, 1626–1660 (New York: Holmes & Meier, 1976); Paul Slack, The Invention of Improvement: Information and Material Progress in Seventeenth-Century England (Oxford: Oxford Univ. Press, 2015); Orna Matei, “Husbandry Tradition and the Emergence of Vegetable Philosophy in the Hartlib Circle,” Philosophia, 2015, 16:55–52; Justin Robert Niermeier-Dohoney, “A Vital Matter: Alchemy, Conocopanism, and Agricultural Improvement in Seventeenth-Century England” (Ph.D. diss., Univ. Chicago, 2018); and Antonio Clericuzio, “Plant and Soil Chemistry in Seventeenth-Century England: Worsley, Boyle, and Cono,” Early Sci. Med., 2018, 23:550–583.

11 See, e.g., Baldassari and Matei, “Manipulating Flora” (cit. n. 5).

12 Smith, Body of the Artisan (cit. n. 1), p. 238.

13 Francis Bacon, Of the Proficience and Advancement of Learning, Divine and Humane (London: Tones, 1605), Bk. II, pp. 32, 33.

14 Ibid., p. 34. See also Vera Keller, “The ‘New World of Sciences’: The Temporality of the Research Agenda and the Unending Ambitions of Science,” Isis, 2012, 103:727–734.
of “Instantias Polychrestas” or “Polychrest Instances” to the notion of universal, directive experiments. He drew the term “polychrest” from medicine, where it referred to a powerful, single medicine that could preternaturally treat differing ailments. In his application of this term to experiments, Bacon indicated a discovery that, by “tapping underlying natural causes,” could shift parameters of possibility in diverse settings. His development of the notion of the polychrest related to his preceding discussion of the magical optative. The pursuit of optatives—that is, magical powers presumed to be impossible—might lead to the discovery of precious polychrests.15

Simon Werrett has interpreted Bacon’s polychrests as exemplifying thrifty science, since the term, from “multi-use” in Greek, suggests a form of reuse. According to Werrett, thrifty experimental practices, reusing materials and domestic tools, blurred distinctions between experimental philosophy and heterosocial household management. However, Bacon’s relationship of the polychrest to such high-risk pursuits as the hunt for seemingly impossible optatives suggests a less thrifty conceptualization of the term. Once discovered, a polychrest could grant great savings in a practical, domestic setting, but such a setting was only one of many to which the polychrest might be applied, and it was not the setting in which the polychrest was likely to be discovered.

For instance, Bacon gave the exclusion of surrounding media, such as air or water, as one example of a polychrest. This polychrest applied both to the preservation of materials in a domestic setting and to the invention of the submarine.16 The development of Bacon’s notion of polychrests in relation to optatives suggests that, in his view, domestic experimentation in preservation would not lead to the discovery of the submarine. Rather, the desire for such extraordinary and unlikely powers as submarine navigation would drive experimentation far afield from its ordinary courses, toward more extreme discoveries that could then be applied everywhere, including to household settings.

Bacon’s encouragement of high-risk, seemingly impossible discoveries runs counter to influential views of a practical Baconian program. Marxist historians like Benjamin Farrington, Paolo Rossi, and Christopher Hill developed the notion of a “Baconian program” of cooperative action that embraced humble craftsmen and offered realizable material improvements to humanity.17 The idea of a “Baconian program” continues to shape expectations about Bacon today, although Bacon’s contemporaries and successors often remarked on the potentially unrealizable nature of his ideas, more akin to the period’s conception of a futuristic project than a dependable program. Abraham Cowley, FRS, designing a college of experimental philosophy, assured readers that it could never be Experimented.”18

In contrast to views of the “Baconian program,” Carolyn Merchant aligned Bacon with social domination, capitalism, and environmental extraction through an interpretation of his rhetoric and fictions. Werrett argues that Merchant’s account, focusing “on the message rather than the material particulars,” presents Bacon’s approach as misleadingly innovative, whereas his attention to “practice and material culture” shows seventeenth-century science as embedded in older, heterosocial practices of “making shift.” However, as Sheila Jasanoff and Katharine Park have argued, sociotechnical imaginaries and utopias, to which Merchant gave “a critical and historiographical

15 Francis Bacon, Novum organum (London: Bill, 1620), pp. 336–337 (Bk. II, aphs. 49–50); and Vera Keller, “Air-Conditioning Jahangir: The 1622 English Great Design, Climate, and the Nature of Global Projects,” Configurations, 2013, 21:331–367, on p. 363. On the polychrest in its medical context see, e.g., Leonhart Fuchs, Opera (Frankfurt, 1561), p. 251.
16 Werrett, Thrifty Science (cit. n. 4), pp. 52, 57–59, 74, 93. See also Bacon, Novum organum, p. 359 (Bk. II, aph. 50).
17 Vera Keller, “Deprogramming Baconianism: The Meaning of Desiderata in the Eighteenth Century,” Notes and Records of the Royal Society, 2018, 72:119–137, on p. 122.
18 Abraham Cowley, A Proposal for the Advancement of Experimental Philosophy (London: Herringman, 1661), p. 28.
edge,” function powerfully to shape future directions.19 Such imaginaries were not expected to be materially instantiated immediately; increasing the limits of possibility by extending the time frame of research over a long term was one of Bacon’s main goals.20 The promise of the pleasure garden as an experimental site lay in its ability to unleash fantasy and intersect with fictions such as that of New Atlantis, encouraging unconventional experimentation that pursued a linear model of ever greater advancement.

Rather than being conceptualized as related to thrift, this model can be viewed in terms of Marx’s idea of metabolic rift, to which scholars in sociology and environmental history have recently returned. Here we might relate it to the specific geography of resource-intensive, metropolitan experimental sites. Defined as “a rupture of the nutrients cycle between the soil and cities” in urbanized and capitalized societies, metabolic rift tends to grow larger over time, as declining profits push investors to overcome internal limits on capital production and wring ever more profit out of natural reserves.21 The seventeenth-century shift identified by Mukherjee away from cycles of nutrient replenishment encouraged projectors to seek to surpass natural constraints and continually identify further unheard-of resources, especially in distant locales from which such resources could be extracted and then concentrated in metropolitan centers.

Resource-intensive experimentation in those centers, consuming specialized equipment, intellectual capital, and other costly resources, promised to uncover knowledge inaccessible to less well-endowed sites of inquiry. Powers over nature unlocked in these restricted sites might then, it seemed, be universally applied again across vast expanses of nature. Such attempts to extrapolate from the pleasure garden to colonial enterprise often ended in failure. However, both the material and the imaginary legacies of philosophical gardening endured, shaping the presumed relationship between exclusive experimentation and wide-scale application in emergent experimental philosophy.

This essay first charts ideas of philosophical gardening and related notions of philosophical husbandry in horticultural writing of the early seventeenth century. It then visits one pleasure garden in particular as a case study of the types of inquiry such a site afforded, including ambitious colonial projects justified by horticultural achievement. Next, it shows how those inquiries were further prosecuted in a new institution of experimental learning of the 1630s, Francis Kynaston’s academy. It then explores how, during the Interregnum, colonial promoters revived arguments for the ways in which direction for large-scale projects should be sought in the restricted environment of the pleasure garden. Horticulture continued to play a role in the founding of Balthazar Gerbier’s academy, the first to claim experimental philosophy as its approach. Gerbier’s definition of experimental philosophy blurred domestic household management with more esoteric horticultural pursuits; he also championed the participation of women to an extraordinary degree. John Beale and John Evelyn, future Fellows of the Royal Society, took another tack, sharply distinguishing philosophical gardening from husbandry and excluding women and gardeners from the former. This was the view of philosophical gardening that informed the concept of experimental philosophy at the founding of the Royal Society.

19 Carolyn Merchant, The Death of Nature: Women, Ecology, and the Scientific Revolution (San Francisco: Harper, 1980) (see also Keller, “Deprogramming Baconianism” [cit. n. 17], p. 125); Werrett, Thrifty Science (cit. n. 4), p. 9; Sheila Jasanoff, “Future Imperfect: Science, Technology, and the Imaginations of Modernity,” in Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power, ed. Jasanoff and Sang-Hyun Kim (Chicago: Univ. Chicago Press, 2015), pp. 1–33; and Katharine Park, “Women, Gender, and Utopia: The Death of Nature and the Historiography of Early Modern Science,” Isis, 2006, 97:487–496, on p. 495.
20 Keller, “‘New World of Sciences’” (cit. n. 14).
21 Carles Soriano, “The Anthropocene and the Production and Reproduction of Capital,” Anthropocene Review, 2018, 5:202–213, on p. 210.
PHILOSOPHICAL GARDENING IN PARADISE

Two antithetical traditions of the philosophical garden competed in the seventeenth century: the idea of the garden as a meditative retreat to a simpler life (as in Virgil’s Eclogues), on the one hand, and as “philosophical” in the sense of “alchemical” and “sophisticated,” on the other. The first, more familiar today, denounced the overly curious and ambitious garden as a perversion of horticultural innocence.22 The Neo-Stoic philosopher Justus Lipsius (1547–1606), in his On Constancy, a dialogue set in a garden, influentially criticized “that sect . . . who . . . hunt after strange herbs and flowers, which having got, they preserve and cherish more carefully than any mother does her child.” The purpose of gardens was “for solace and not for sloth”; a garden should serve as a place of “quietness, withdrew from the world, meditation, reading, writing.”23

This essay focuses on the second sense of the “philosophical” garden as a highly artificial landscape where gardeners pursued trials that intersected with alchemical explorations. Gardeners worked to increase the size and coloration of blooms through infusions of many substances and grafting. Newly introduced species were grown not only through acclimatization but by adjusting the climate of the garden in hotbeds and, later in the century, greenhouses.24 Grotto and automaton builders such as Salomon and Isaac de Caus wrote treatises offering causal explanations for the ingenious moving devices they built. Other philosophers also utilized their garden phenomena.25

Guides to horticultural wonder-working showcased practices of trial and reasoning. In his 1608 Floraes Paradise, Sir Hugh Plat (1552–1608) proposed “a pretty volume of experimentall observations” concerning “the altering, multiplying, enlarging, planting, and transplanting, of sundry sorts of fruities & flowers.” Unlike the formal treatments by “Theorists,” Plat’s two hundred experiments, he claimed, were not written “by an imaginary conceit in a Schollers private Studie, but wrung out of the earth, by the painfull hand of experience.” Nevertheless, Plat’s observations remained probabilistic. Some of them were his “owne Conceits and Quaeres” and might “faile,” but Plat hoped the reader would excuse them for their “good sense and probabilite.”26 Thus, while Plat supplied Mukherjee with her central example of a resource-saving “dearth scientist,” he also engaged in esoteric and risky garden experiments.

Plat described garden contrivances designed to engage more abstruse powers not available to the regular countryman. His paved and plastered “Philosophical Garden” would obviate the need for soil by receiving nutrition directly from the heavens. It could grow “any Indian plant[s]” and make them “bear their fruities in England, as naturally as they doe in Spaine, Italie, or elswhere.” The knowledge of growing “that celestial and generative vertue into the Matrix of the Earth,” particularly by “philosophically” preparing corn, made one a “true and philosophicall Husbandman” who could “goe beyond all the country Coridons of the land,” wrote Plat, referring to a stock name

22 Paul Johnstone, “The Rural Socrates,” Journal of the History of Ideas, 1944, 5:151–175; Anthony Low, “New Science and the Georgical Revolution in Seventeenth-Century English Literature,” English Literary Renaissance, 1983, 13:231–259; and Mark Morford, “The Stoic Garden,” Journal of Garden History, 1997, 7:151–175.
23 Justus Lipsius, cited in Alexander Samson, “Introduction,” in Locus amoenus: Gardens and Horticulture in the Renaissance, ed. Sanson (Chichester: Wiley, 2012), pp. 1–25, on p. 13.
24 William Newman, Newton the Alchemist: Science, Enigma, and the Quest for Nature’s “Secret Fire” (Princeton, N.J.: Princeton Univ. Press, 2019), pp. 150–180; Rebecca Bushnell, Green Desire: Imagining Early Modern English Gardens (Ithaca, N.Y.: Cornell Univ. Press, 2003); and Margaret Willes, The Making of the English Gardener: Plants, Books, and Inspiration, 1560–1660 (New Haven, Conn.: Yale Univ. Press, 2011).
25 Salomon de Caus, Les raisons des forces mouvantes (Frankfurt: Jan Norton, 1615); Christopher Heuer, “The Perpetual Mécanicien: Isaac de Caus as Author,” Studies in the History of Gardens and Designed Landscapes, 2009, 29:192–199; and Simon Werrett, “Wonders Never Cease: Descartes’s Métores and the Rainbow Fountaine,” British Journal for the History of Science, 2001, 34:129–147 (other uses of garden phenomena).
26 Hugh Plat, Floraes Paradise (London: Leake, 1608), [A3], [A8r], [A4–A5].
for a country shepherd. The improver Gabriel Plattes (ca. 1600–1644) would likewise later suggest turning “plough-men into philosophers.”

Plat believed that his techniques would appeal to the great patron of alchemy, Maurice, the Landgrave of Hesse-Kassel (1572–1632), and he reached out to his friend, Francis Segar the Younger (b. before 1564–1615), a counselor to the Landgrave. Segar, who traveled frequently between London and Kassel, had already presented the Landgrave with his own treatise, A Practice of Corn, which drew on Plat’s work and the trials of other English gentlemen. Segar reported on trials that demonstrated exponential growth, in a “proportione” of at least a thousand for one.”

Like Plat, Segar described his approach as more philosophical than ordinary husbandry, yet more active and experiential than armchair speculation. He complained that authors of books of secrets offered as “their best receipts” “things set down, by a speciall kynd of speculation in their private studies.” In his dedication to Maurice, Segar criticized those opposing new proposals. On the one hand were the “vulgar (slothful of spirit and dispersers of all good and New Inventions).” On the other were the scholars, who, “when any new matter is propounded of which they have not heard or read, presently they are stirred with disdain to condemn it, to dispute against it, or with some Jest to put it out of countenance.” Both these groups were guilty of “self-flattery.” Their confidence in their “own wittes and sufficientie” gave rise to “so many dissection and controversyes” of “Philosopher against Philosopher, Artisan contending with Artisan, and one Maister contrarieing the other . . . disputing about who knowes most, who understands most, and who can most.” Only he who was “doutfull of his vertue” was truly “most sufficient.” Segar had sought “prooffes” of his “wounder worke” by what he had performed “in your Your Highnes-garden in cassell.”

Segar also distinguished himself by recording not just “this new maner of Husbandry but likweise the naturall and artifitiall resons thereof.” Neither the learned nor the vulgar, he asserted, reasoned appropriately. Although “many learned Philosophers as well Dutch, Italians, French as English in ther learned workes” discuss the “generative and fructifying vertue” of “vegetable salt,” they can give no “reason why dung should do any good” and “ar led therto more by custom than any Philosophicall reason.” Likewise, those who exposed their muckheaps to the weather “show themselves to bee but mean husband-men, and that they never tasted of any naturall Philosopher.”

Neither Plat nor Segar differentiated between philosophical gardening and philosophical husbandry. The pleasure garden, distinct from the field, took on a new prominence as an experimental site in Francis Bacon’s posthumously published New Atlantis. Salomoni’s House, established for “the Enlarging of the bounds of Humane Empire, to the Effecting of all Things possible,” encompassed a vast array of environments for experimentation, including gardens, orchards, vineyards, enclosures for beasts and birds, and houses for breeding insects and silkworms, but not fields. This omission is all the more striking given the importance of farm labor both to monastic models and to precedents such as Thomas More’s Utopia (where everyone performed farm work).
Instead of agricultural experiments, Bacon described investigations that drew closely on contemporary horticultural experiments in actual gardens and in texts, such as Giambattista della Porta’s *Natural Magic*. These included “grafting and inoculating,” making “Trees and Flowers, to come earlier or later, then their Season,” and making them “greater much then their Nature: and their Fruit greater, and sweeter, and of differing Tast, Smell, Colour, and Figure, from their Nature,” making “diverse Plants, rise by Mixtures of Earths without Seedes,” and also making “diverse New Plants, differing from the Vulgar, and to make one Tree or Plant turne into another.”

At the conclusion of *New Atlantis*, Bacon collected the abilities of Salomon’s House into a list, *Magnalia Naturae praecipue quoad usus Humanos* [Great Works of Nature particularly for Human uses]. Many of these, such as “Acceleration of Germination,” and “Making Rich Composts for the Earth,” Bacon also addressed within the *Sylva sylvarum*, a miscellaneous text that may represent Bacon’s working papers, reflecting both his own experiments and his reading of other authors such as Plat and della Porta. As Bacon made clear in his inclusion of “the Transmutation of Plants” among “*magnalia* naturae” were achievements that suffered from a reputation of impossibility but that might indeed be possible; “for the Transmutation of Species, is, in the vulgar philosophie, pronounced Impossible. And certainly, it is a thing of difficultie, and requireth deepe Search into Nature,” but it was not impossible.

John Parkinson (1567–1650), an apothecary and a founder of the Worshipful Society of Apothecaries, made similar claims to experimental, wonder-working abilities in the pleasure garden. In his 1629 *Paradisi in Sole Paradisus Terrestris*, dedicated to the flower-loving Queen Henrietta Maria, Parkinson asserted that before him nobody had differentiated between “beautiful flower plants, fit to store a garden of delight and pleasure,” and “the wilde and unfit.” Parkinson’s book has been described as the first “devoted entirely to pleasant flowers as distinct from useful and medicinal plants.”

According to Parkinson, the newly global nature of the English garden required a different sort of gardener, able to reason about an exotic plant’s needs; “because our English Gardiners are all or the most of them utterly ignorant in the ordering of these Out-landish flowers, as not being trained up to know them, I have here taken upon mee the forme of a new Gardiner” who would be able to “dispose them according to their naturall qualities.” Over three hundred of the plants Parkinson grew in his own garden were new to England.

Parkinson’s investigations entailed testing many variables (soil, heat, water, and planetary influences) and encompassed theoretical speculation. For instance, wishing to test whether plants might flower double under the influence of lunar phases, Parkinson wrote, “I have made tryall at many times, and in many sorts of plants . . . by planting & transplanting them, but I could never see the effect desired.” From these trials, Parkinson reasoned further to maxims concerning matter

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33 Bacon, *New Atlantis*, pp. 34–36. Regarding contemporary horticultural experiments see Bushnell, *Green Desire* (cit. n. 24), pp. 142, 174.
34 Bacon, *Sylva sylvarum* (cit. n. 32), pp. 81, 149–151; for other *magnalia naturae* see pp. 9, 19, 95, 193. See also Doina-Cristina Rusu and Christoph Lüthy, “Extracts from a Paper Laboratory: The Nature of Francis Bacon’s *Sylva sylvarum*,” *Intellectual History Review*, 2017, 27:171–202, esp. p. 189; and David Colclough, “‘The Materials for the Building’: Reuniting Francis Bacon’s *Sylva sylvarum* and *New Atlantis*,” *ibid.*, 2010, 20:181–200.
35 Bacon, *Sylva sylvarum*, p. 75.
36 John Parkinson, *Paradisi in Sole Paradisus Terrestris* (London: Lownes and Young, 1629), p. 184; and Prudence Leith-Ross, *The John Tradescants: Gardeners to the Rose and Lily Queen* (London: Owen, 1984), p. 18. See also Bushnell, *Green Desire* (cit. n. 24), p. 62.
37 Parkinson, *Paradisi in Sole Paradisus Terrestris*, p. 13, and John Riddell, “John Parkinson’s Long Acre Garden, 1600–1650,” *J. Garden Hist.*, 1986, 6:112–124, esp. p. 113.
ARTFUL GARDENING AND COLONIAL PROSPECTS AT DANVERS HOUSE

In 1622 Sir John Danvers, who was possessed of a “very fine fancy,” according to his relative John Aubrey, FRS, particularly in “gardens and architecture,” opened an innovative garden in Chelsea. It was famed for replacing the Elizabethan garden aesthetic of intimate enclosure and retreat with a new design “of interconnecting spaces whose vital link is the vista.” The Danvers household was situated in a neighborhood of fellow garden amateurs and experimenters, such as the next-door neighbor, the royal physician Sir Théodore de Mayerne (1573–1655).39 Beloved of Danvers’s friend Sir Francis Bacon, the Danvers garden illustrates the settings Bacon would have had in mind late in life when he investigated horticultural magnalia naturae.

Danvers, a servant of Prince Henry’s privy chamber for seven years and a member of Parliament, was a typical early Stuart gentleman projector, investing in forestry, urban redevelopment, alum works, brick- and tile-making, lime, and, above all, colonial plantations; he was a major figure in both the Virginia and the Somers Isles (Bermuda) Companies.40 Danvers bankrupted himself through his garden expenditures, and these ventures could not restore his fortunes.41 His neighbor, Cressy Dymock, noted that Danvers, “one of the greatest Gilliflower Men in England,” spent £40 to journey to France to purchase gilli flowers. Like tulips, gilli flowers were prized blooms associated with daring attempts to alter their color and size through culture or grafting. Dymock himself was undertaking “the art of greating of Gilliflowers.”42

Samuel Pepys called Danvers House, in 1661, “the prettiest contrived house that I ever saw in my life.” This “very elegant and ingenious house” included a room engineered to “meliorate” the sound of an “excellent organ.” Guests could arrive by boat and climb a staircase to the elevated central hall. The house, garden, and view were artfully contrived as a unit.43 Out one...
window in the great hall, ships sailed by on the Thames, while a garden vista stretched out the other, culminating in a grotto and a banqueting house with stained glass windows and summer houses on either end. (See Figure 1.)

At the age of twenty-four, Danvers married the fifty-one-year-old widow Magdalen Herbert, née Newport (1558–June 1627), a good friend of the poet John Donne and an arbiter of taste. Magdalen’s records for her previous London household indicate that, over the course of six

Figure 1. John Aubrey, “A Draught of Sir John Danvers Garden at Chelsey,” Bodleian Library MS Aubrey 2, fol. 59r. © Bodleian Libraries, University of Oxford. Creative Commons license CC-BY-NC 4.0. https://digital.bodleian.ox.ac.uk/objects/9d28eb2a-15d2-4619-8e4d-9e386ad2e7ac.
weeks, she entertained more than a hundred people at her table. Her son, the poet George Herbert, described his mother’s onslaught of hospitality as “a sharp charm, an Athena joined with the Graces.”

According to Donne, who stayed with the Danvers family in Chelsea in 1625, Magdalen Danvers’s “love of hospitality” made Danvers House “a Court, in the conversation of the best, and an Almshouse, in feeding the poore, so was it also an Hospitall, in ministering releefe to the sicke.” Magdalen’s soft spot was reserved for her gardens, her “darling,” according to George Herbert, to which she devoted “gentle care.” Yet even here she displayed a mastery of nature more often associated with male collectors of the period, by yoking “far regions, / Delighting in earth’s store and heaven’s holdings.” Her other son, the philosopher Edward Herbert, also described his pleasure “in the knowledge of herbs, plants, and gums, and in a few words, the history of nature.” While John was a great lover of flowers, the interests of both Magdalen and Edward seem to lie mainly in medicinal plants. Hartlib noted that Edward Herbert “scorned all Physitians excepting Mayerne professing hee was as learned as any of them.”

Francis Bacon benefited from Magdalen’s medical ministrations. John Aubrey recounted how Bacon, who “much delighted” in Danvers’s “curious pretty garden at Chelesy,” fainted while walking about it. “Lady Danvers rubbed his face, temples, etc., and gave him cordiall water; as soon as he came to himselfe, sayde he, Madam, I am no good footman.”

Several members of the family were close friends with Bacon. In 1625 Bacon dedicated his translation of Psalms to Magdalen’s son George Herbert, thanking him for his work on transforming The Advancement of Learning into the 1623 Latin De augmentis. Bacon also submitted his Henry VII to Sir John Danvers for comment, as someone who could provide a perspective differing from the traditionally learned: “Q[ui]ot[d. Sir John [Danvers], Your Lordship knows that I am no Scholar. ‘Tis no matter, said my Lord [Bacon]: I knowe what a Schollar can say; I would know what you can say. Sir John read it, and gave his opinion what he misliked . . . which my Lord acknowledged to be true, and mended it; Why, said he, a Scholar would never have told me this.”

Evidence that women of the household were also interested in natural philosophy can be found in the dedication by next-door neighbor Mayerne’s assistant and future Fellow of the Royal Society Walter Charleton of his 1654 Physiologia Epicuro-Gassendo-Charltoniana to Danvers’s daughter Elizabeth Villiers (by a second marriage). Charleton praised Elizabeth’s “Acuteness of Wit, and Soundness of Iudgement,” recalling how in the past his “Discourses of Nature” had entertained her “eager Curiosity.”

44 George Herbert, Memoriae matris sacrum: To the Memory of My Mother: A Consecrated Gift: A Critical Text, Translation, and Commentary, ed. Catherine Freis, Richard Freis, and Greg Miller (Fairfield, Conn.: George Herbert Journal, 2012), p. 7. On Magdalen Herbert see Amy Charles, “Mrs. Herbert’s Kitchin Booke,” Engl. Lit. Rev., 1974, 4:164–173, esp. p. 166; and Cristina Malcolmson, “Herbert [née Newport, second married name Lady Danvers], Magdalen (d. 1627), estate manager and patron,” Oxford Dictionary of National Biography, https://www.oxforddnb.com (accessed 13 Apr. 2020).
45 John Donne, A Sermon of Commemoration of the Lady Danvers (London: Haviland, 1627), p. 130; George Herbert, Memoriae matris sacrum, pp. 17, 49, 38–39; Edward Herbert, cited in Willes, Making of the English Gardener (cit. n. 24), p. 213 (Willes is citing Herbert’s autobiography); and HP 31/22/57B.
46 Aubrey, Brief Lives (cit. n. 45), Vol. 1, p. 75.
47 Helen Wilcox, “Herbert, George (1593–1633),” Oxford Dictionary of National Biography, https://www.oxforddnb.com/view/10.1093/9780198614126.001.0001/obdnb-9780198614126-e-13025 (accessed 13 Aug. 2019); and Aubrey, Brief Lives, Vol. 1, p. 70.
48 Walter Charleton, Physiologia Epicuro-Gassendo-Charltoniana (London: Heath, 1654), [A2r], [A3r]. See also Lindsay Sharp, “Walter Charleton’s Early Life, 1620–1659, and Relationship to Natural Philosophy in Mid-Seventeenth Century England,” Ann. Sci., 1973, 30:311–340, esp. p. 331.
Danvers House was a gathering place for inventors, musicians, literary figures, philosophers, and colonial projectors. Cressy Dymock moved to a property just behind Danvers’s as a site for his agricultural experiments, and he kept Hartlib apprised of Danvers’s activities. He reported how Danvers had discussed a new invention with Theodore Haack, a future Fellow of the Royal Society. Aubrey turned to Danvers for advice on a patent for an inventor whom Aubrey was promoting.49 Aubrey described how Danvers kept an eight-page printed pamphlet about mines and improvements of their entrances and ventilation by Thomas Bushell, Bacon’s follower, “nayled” “to his parlor wall at Chelsey, with some Scheme: and I beleive is there yet.”50 In a 1651 published letter addressed to Danvers, the poet George Wither (1588–1667) recalled how when he “last enjoyed the sweet Air, and those other pleasurable Refreshments, which you have often vouchsafed unto me at your house in Chelsey, I found with you many Gentlemen of the Sommer Islands [Bermuda] Company.” Danvers repeatedly asked his old associate in the Virginia Company, John Ferrar (1588–1657), a fervent champion of Danvers’s favored project of colonial sericulture, to come stay with him and the Virginian Captain Samuel Matthews (ca. 1580–1657) at his Chelsea estate, so that “our conference may begett the best result & direction for our further labors or Endevors.”51

Danvers’s horticultural showcase afforded a compelling setting for such discussions, since the possibility of transplanting nature around the globe was one of the debates dividing the factions of the Virginia and Somers Isles Companies. Over several decades, Danvers and his allies promoted the project of colonial sericulture, which repeatedly failed owing to the lack of labor and the highly contrived environments silkworms needed to survive.52 In 1622, the Virginia Company published an English translation of a French sericultural manual and sent it to the colonists. The translator, Danvers’s associate John Ferrar, added a conclusion in the voice of “Nature herself,” urging the art of gardening as a means of achieving sericultural success.53

“Nature” demanded the services of the handmaids of “Art and Industry” and, in particular, not “Husbandry at larg” but the “skill of Gardening.” This “skill of Gardening,” contrasted with regular husbandry, suggests an elevated practice of horticulture that could perfect nature. Through the “Arte of skilfull planting, grafting, transplanting, and remoouing, the bad wilde plants are wonderfully bettered.” This art must be practiced by “all and every one in Virginia, men and women too, from the highest to the lowest in some proportion,” “if they minde to thrive, prosper, and haue true delight.” Asked what was the “best Art” to “advance the Plantation and Planters,” Nature answered: “the Garden Art of planting.”54 Rather than conceding that survival, rather than delight, might be a goal more appropriate for Virginia in 1622, Danvers’s allies continually sought to overcome recalcitrant realities through recourse to garden arts that might shift the boundaries of natural possibility.

49 HP 28/1/81B, HP 28/2/34B, HP 28/1/30B, and HP 28/2/43A.
50 Dymock also referred to Bushell’s paper on mines of 1649. See HP 28/1/19A. See also Kate Bennett, “John Aubrey and the Printed Book,” Huntington Library Quarterly, 2013, 76:393–411, esp. p. 399. Bennett is citing Aubrey’s Brief Lives.
51 George Wither, “To the Honourable Sir John Danvers Knight, Governor of the Sommer Islands Company,” in Josias Foster, Copy of a petition from the governor and company of the Sommer Islands (London: Husband, 1651), pp. 26–30, on p. 26, and Sir John Danvers to John Ferrar, 7 May 1653, Ferrar Papers 1221, VCA. See also Ferrar Papers 1218, 1224, VCA. On Matthews see Minnie Cook, “Governor Samuel Matthews, Junior,” William and Mary Quarterly, 14:105–113.
52 Vera Keller, Into the Unknown: Clues, Hints, and Projects in the History of Knowledge, History and Theory, 2020, 59:86–110; and Ben Marsh, Unravelled Dreams: Silk and the Atlantic World, 1500–1840 (Cambridge: Cambridge Univ. Press, 2020).
53 Jean Bonoeil, A treatise of the art of making silke, trans. John Ferrar (London: Kyngton, 1622), p. 60. See also David R. Ransome, “John Ferrar: A Half-Hidden Propagandist for Virginia,” Seventeenth Century, 2020, 35:611–624; and Keller, Into the Unknown, pp. 94–97.
54 Bonoeil, Treatise of the art of making silke, pp. 81, 79, 82–83.
GARDEN CURIOSITIES IN THE ACADEMY: DANVERS, KYNASTON, AND THE SENSITIVE PLANT

The term “experimental philosophy” first emerged, as Feingold noted, in educational proposals of the 1630s and 1640s in association with Samuel Hartlib. Danvers was very interested in these, particularly given his involvement in the founding of Henrico College in Virginia. Hartlib became acquainted with Danvers from at least 1640, and his notes show that new educational institutions remained a frequent topic of conversation at Danvers House. Hartlib listed both Danvers and Danvers’s friend Sir Francis Kynaston (1587–1642) as offering models to follow in designing a new London academy.55

Charles I granted Kynaston’s academy a royal license as well as £100 from the treasury and subscribed himself to the academy, as did Hartlib. The academy did well in 1635 and 1636; Hartlib reported that the “Kenistonians” were making great strides, especially in astronomy and weather observations.56 The institution was, however, short lived, closing by 1639.57

Kynaston employed six professors in philosophy and medicine (“Physick”), astronomy, geometry, music, fencing, and languages. Kynaston himself would teach “Husbandry,” along with other subjects. Faculty were required to teach through “Demonstration and Experiment” and to leave in writing their “most selected Points, Secrets, Experiments and Demonstrations . . . for the greater advancement of learning and knowledge unto the worlds end.” In particular, professors of “Philosophie” and “Physick” and their assistants were to keep two separate books, one for experiments that succeeded and another for experiments that failed, the latter detailing “how and in what manner experiment was made, and how it failed.” Knowledge could only be “accounted and received for the doctrine and learning” of the academy if it were “found true, after sufficient experiment, or demonstration, and no other.”58

The best record of Kynaston’s natural investigations using experiments, newfangled instruments, and probabilistic reasoning survives, bizarrely, in his manuscript commentary to his Latin translation of Chaucer’s Troilus and Criseyde, beginning in August 1629 and concluding in May 1640. Many curious plants figured in his researches, such as the “hour flower,” or marvel of Peru, Kynaston witnessed in the garden of his friend Sir Edward Sackville (1590–1652), an ally of Danvers in the Virginia Company, which “only justly at eleven of the clock suddaily” opened up for one hour. Reasoning about phenomena such as heliotropes and selenotropes, Kynaston offered a theory of the generation, nutrition, and growth of plants and flowers based on planetary influence and universal magnetism, but only probably so (“probabilitur”).59

Kynaston singled out another plant among the most “admirable” things he had ever seen. This was the sensitive plant he saw “growing in the garden of my honor’d friend Sr John Davers [sic] kn[gh]t at Chelsey the seeds whereof being brought from the West Indies were set in a pot of composed earth by his excellent gardiner, John Gilhanke.”60 The sensitive plant may have been collected by John Tradescant, Jr. (1608–1662), who voyaged to Barbados and Virginia in 1637

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55 Feingold, “‘Experimental Philosophy’” (cit. n. 4), p. 4; and Robert Hunt Land, “Henrico and Its College,” William Mary Quart., 1938, 18:453–498, esp. p. 477. Regarding new educational institutions as a topic of conversation at Danvers House see HP 30/4/54A, HP 30/4/56A, HP 30/4/56B, and HP 28/1/66B; on Kynaston as a model see HP 47/9/32A–B.
56 HP 29/3/34B, HP 29/3/35B, and HP 29/3/51B. Regarding Charles I’s grant see Richard Cust, “Charles I’s Noble Academy,” Seventeenth Cent., 2014, 29:337–557.
57 Francis Sheppard, Survey of London, 53 vols., Vol. 36: Covent Garden (London: London City Council, 1970), p. 257.
58 Francis Kynaston, The Constitutions of the Musaeum Minervae (London: Spencer, 1656), pp. 4–5, 6, 13.
59 Bodleian Library, Oxford, Ms. Ashl. C. 287; pp. 147, 85. See also Lawrence Ryan, “Chaucer’s Criseyde in Neo-Latin Dress,” Engl. Lit. Revi., 1987, 17:288–302; and Richard Beadle, “The Virtuoso’s Troilus,” in Chaucer Traditions: Studies in Honour of Derek Brewer, ed. Ruth Morse and Barry Windeatt (Cambridge: Cambridge Univ. Press, 1990), pp. 213–233.
60 Bodleian Library, Ms. Ashl. C. 287, p. 151.
“to gather up all raritye of flowers, plants, shels, &c.” According to Kynaston, it was not possible to keep the plant alive “here in England,” since it died every winter and did not produce seed, “but must be restored by a seed brought out of the West Indies.”

The pot of “composed earth” in which Gilbank planted these seeds seems to have been considered significant for his success in growing this exotic plant. Of the 650 plants depicted by the contemporary florist Alexander Marshal, only the sensitive plant was in a pot.

John Parkinson also observed several sensitive plants planted in the middle of May “in a pot at Chelsey in Sir John Davers [sic] Garden.” Parkinson returned to Danvers’s garden two years in a row to test the plants’ sensitivity; “this I proved in those two severall yeares [1638 and 1639].” The plants became a subject of international discussion between Parkinson, his friend John Morris, and Jan de Laet (1581–1649), a director of the Dutch West India Company and a friend of Danvers. When the Dutch diplomat Lodewijk Huygens (1631–1699) visited Danvers’s garden in the 1650s, he observed in a mirrored summerhouse for rare plants the “pot where in summer the herba mimosa comes up,” suggesting that by that date the problem of overwintering the sensitive plant had been solved.

The sensitive plant had no medical or culinary use. It illustrates the sort of abstruse speculation and trials pertaining to plant life that Danvers’s garden afforded, including in the context of early experimental academies. Tenderly cared for in special composts under glass, the plant continued to furnish “a pioneer physiological investigation which was intimately associated with experimental inquiry” over the next few decades through the founding of the Royal Society.

GARDEN PHILOSOPHY AND COLONIALISM AMONG THE INTERREGNUM

INTERLOCUTORS OF SAMUEL HARTLIB

In the Interregnum, Danvers, a regicide, joined the council of state governing the country and was in a position to revive his favorite colonial projects. His associate Ferrar published a number of works at this juncture championing such projects. In his 1650 Virgo Triumphans, Ferrar dilated on his previous recommendation of gardening, rather than husbandry, as the way to research nature for use in colonial Virginia: “What multitude of flowers have our late Gardens in England seen non native to this soyle or Climate?” This demonstrated how, “by that uncabinetting and deciphering of Nature”—that is, “Garden Philosophy”—any “harsh disposition in the World” could be “refined.”

According to Ferrar, the benefits of moving plants over a distance was one of the tenets or “curious conclusions” of garden philosophy, perhaps because through “their parting from their former grounds they leave there that ranke wilnesse virulency and ill quality from the Forest.” By becoming exotics, plants could shed “the old savagenesse and indomestication” of their “first seat

61 Leith-Ross, John Tradescants (cit. n. 36), p. 101; and Bodleian, Ms. Add. C. 287, p. 151.
62 Prudence Leith-Ross, The Florilegium of Alexander Marshal in the Collection of Her Majesty the Queen at Windsor Castle (London: Royal Collection, 2000), p. 324; and Vera Keller, “A Sensational Collection: Alexander Marshal and the Sensitive Plant,” in A Field Guide to Curiosity: A Mark Dion Project, ed. Earle Havens and Lisa Skogh (Minneapolis: Shapco, 2019), pp. 45–48.
63 John Parkinson, Theatrum Botanicum (London: Cotes, 1640), pp. 1117, 1118; J. A. F. Bekkers, ed., Correspondence of John Morris with Johannes de Laet (1634–1649) (Assen: Van Gorcum, 1970), pp. 14, 18 (see also HP 18/2/9A); and Lodewijk Huygens, The English Journal, 1651–1652, ed. A. G. H. Bacharach and R. G. Colliner (Leiden: Leiden Univ. Press, 1982), p. 71.
64 Charles Webster, “The Recognition of Plant Sensitivity by English Botanists in the Seventeenth Century,” Isis, 1996, 57:5–23, on p. 6; and Guido Giglioni, “Touch Me Not: Sense and Sensibility in Early Modern Botany,” Early Sci. Med., 2018, 23:420–443.
65 Edward Williams and John Ferrar, Virgo Triumphans; or, Virginia in Generall (London: Stephenson, 1650), p. 39; and Ransome, “John Ferrar” (cit. n. 53), p. 615.
and nature.”66 The transplantation by humans of parts of nature to distant locales infused wild plants with human industry, transmuting them into refined curiosities and overriding the natural constraints of the wild.

In 1652 Danvers recruited Ferrar to respond to the pessimistic views concerning Virginian sericulture of Captain Samuel Matthews, who had traveled to London as agent for Virginia and resided with Danvers in Chelsea. The mathematician John Pell (1611–1685), future Fellow of the Royal Society, also disagreed with Matthews, who believed that the coarse nature of Virginian mulberry leaves also made silk coarse. On the basis of the “Philosophy of Husbandry,” Pell countered that the colonists had neglected “cultivating or gardening of those Trees[,] as it is now experienced ordinarily by the art of grafting[,] and other means[,] to make out of wild trees garden- or fruit-bearing Trees.” This was “also one of Mr Dymock’s designes,” a reference to Danvers’s neighbor, Cressy Dymock.67

Showcase pleasure gardens in the London region became touchstones in debates over colonial projects. As a means of lowering the bar of technical requirements for Virginian sericulture, John Ferrar, with the help of Samuel Hartlib, published the experiments of his daughter Virginia Ferrar for raising silkworms outside in trees rather than in specialized silk houses. Hartlib also published an anonymous criticism of this idea, based on the model of horticultural transformation in London area gardens. Since the Deluge, all plants in use were improved from their status as weeds through human “contrivances: so John Tradeskin by Lambeth, by the advantage of putting his Trees, and other Plants into a warm house in winter or a stow, nurses up those things faire and fragrant, which would without that help either dye or be dwarft.”68 The more contrived the setting, the greater the power to civilize the wild, as Tradescant’s artificial overwintering environments demonstrated. According to this reasoning, it was unlikely that silkworms raised out of doors in wild trees, rather than cultivated in expensive, indoor settings, would produce good silk.

The colonial entrepreneur Robert Child (1613–1654) likewise turned to London-area pleasure gardens as a model for more widespread profitable projects. In a contribution to Hartlib’s Legacy of Husbandry, Child surveyed all the defects, or missing parts, of plant knowledge, including the commodity crops that England lacked and had to import. He noted that England’s balance of trade had much improved since Elizabethan times, ever since “about 50 years ago, about which time Ingenuities first began to flourish in England; the Art of Gardening began to creepe into England.” The new plants that gardeners introduced as curiosities might later become widespread, profitable crops. Child held up John Tradescant the Younger, “who dayly raiseth new and curious things,” and John Parkinson, who taught the most sophisticated garden arts, as models. Some, Child noted, “will object” that new plants will “not grow here with us, for your forefathers never used them. To these I reply, and ask them how they know? have they tryed? Idlenesse never wants an excuse.”69 Child much admired contemporary London gardeners as model experimenters. He wrote from Ireland three times in 1651 to recommend that Hartlib meet three gardeners—Edward Morgan, Alexander Marshal, and “Humphrey of York Garden” (likely Humphrey Blackburn, Keeper of the Garden at York House). Child described Marshal as a “new Man of Experiment and Art” and mediated exchanges of plants between John Winthrop, Jr., in New England and Tradescant and Blackburn in London.70

66 Williams and Ferrar, Virgo Triumphans, p. 43.
67 HP 28/2/39A. See also Keller, “Into the Unknown” (cit. n. 52), p. 102.
68 “An Animadversion upon the Letter from Dublin,” in The Reformed Virginian Silk-Worm (London: Streater, 1655), p. 30.
69 Robert Child, “A Large letter concerning the Defects and Remedies of English Husbandry,” in Samuel Hartlib his Legacie, ed. Samuel Hartlib (London: Wodnothe, 1651), pp. 11, 82, 19, 12, 79.
70 For the three recommendations see HP 15/5/7A, HP 15/5/7A, and HP 15/5/9A. For Child’s mediation of plant exchanges see HP 28/1/58A; and Leith-Ross, John Tradescants (cit. n. 36), p. 116.
Child wished for greater knowledge everywhere: "all Country-people" should try to know the medicinal plants "which grow at their doores." Although the "Husband-man" was not usually a "Naturalist," he should become a "petty Philosopher" concerning the nature of earth.71 However, Child located country knowledge and petty philosophy at markedly lower levels of sophistication than that of the London gardeners he so admired. The London garden set a metropolitan standard for curiosity and sophistication that Child hoped could radiate outward to elevate utilitarian husbandry on a national scale.

In the third edition of Hartlib’s Legacy of Husbandry, Child added a query concerning the causes of soil fertility to his agnotological essay delineating the unknown parts of husbandry. This was a question that “strikes at the Root of Nature and may unlock some of her choycest treasures.” While Bacon had gathered some “stubble” for the “bricks of this foundation,” Child acknowledged that further building was “too heavy for my shoulders.” William Petty (1623–1687), future Fellow of the Royal Society, sent a lengthy “Phytological Letter” to Hartlib in response to Child’s query. According to Petty, inquiry into vegetal mysteries, such as the transplantation of exotics and curiosity of fl oral transformation, would “enable us somewhat to know” six levels of possibility and certainty. Only once the “utmost possibility of Art & Industry” was somewhat known could the “oeconomical” or utilitarian study of plants commence.72

Not all the interlocutors of Samuel Hartlib viewed the pleasure garden as the most appropriate locus for philosophical investigation. Some preferred a plain style and the direct utility of the kitchen garden, orchard, and farm, such as John Beale’s nephew Peter Smith, who criticized “fancy” in experiments, seeking instead “to trace the footsteps of nature in a plaine & sensible matter.” In this way, he hoped that “either philosophers become husbandmen, or husbandmen philosophers.” For Smith, even utilitarian husbandry could be “the most delightfull kind of natural Philosophy.”73 At stake was the aesthetic and expense of experimentation and the distance between fundamental inquiries into nature and application to use.

HORTULAN EXPERIMENTAL PHILOSOPHY IN GERBIER’S ACADEMY
Writing to Samuel Hartlib from Paris in 1648, Sir Balthazar Gerbier (1592–1667) described a proposed academy comprising ten subjects, including “Experimentall Philosophie.” He published broadsheet advertisements, pamphlet prospectuses, and a bilingual French-English work called The Interpreter (demonstrating the art of conversation). His advertising thus spread the notion of “true experimentall naturall Philosophy” and “naturall experimentall Philosophy,” which his students were to study every Friday morning.74

Gerbier distinguished experimental philosophy from the speculative sciences. He left the abstract “universall knowledge of things” to Oxford and Cambridge (with which, Hartlib had cautioned him, he ought not to try to compete). His academy would offer instead “that part of the Experimentall Naturall Philosophie, which may serve to the enriching of several profitable, and noble sciences.” This would comprise

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71 Child, “Large letter concerning the Defects and Remedies of English Husbandry” (cit. n. 69), pp. 94, 83.
72 Robert Child, in Samuel Hartlib, Legacy of Husbandry (London: Wodnothe, 1655), p. 38. Regarding Petty’s letter see HP 8/22/1A and HP 8/22/3A.
73 HP 52/20A–52/21A and HP 67/23/7B. See also Michael Leslie, “The Spiritual Husbandry of John Beale,” in Culture and Cultivation in Early Modern England: Writing and the Land, ed. Leslie and Timothy Raylor (Leicester: Leicester Univ. Press, 1992), pp. 151–172.
74 HP 47/8/9A. For Gerbier’s advertisement of his academy see Balthazar Gerbier, To all fathers of noble families and lovers of vertue (London, 1669 [Wing G574]), pp. 3, 8. See also Jason Peacey, ‘Print, Publicity, and Popularity: The Projecting of Sir Balthazar Gerbier, 1642–1662,” Journal of British Studies, 2012, 51:284–307.
the preserving and restoring of man's health, the reducing both of Medecins, and of certaine
kind of foods into a smaller bulke, and more plaisant substance; the diversifying of several
plants of flowers.

The more speedy producing of them, then what is usuall in ordinary gardens. The
mixting of several fruites by the way of certain graftings, and innoculatings, and so pro-
ducing (as it were) new kinds of them. The preserving of divers kinds of fruites, and flow-
er unto seasons wherein they are not used to be seened. The improving of barren soils,
and the enriching of the leane-ones. The way of preserving the fruits of the earth of those
injuries whereunto other ways they are subject.75

Gerbier’s conceptualization of experimental natural philosophy was thus for the most part hortu-
lan in nature, mixing the useful with the aesthetic.

Gerbier’s academy functioned only from the summer of 1649 until February 1650. He invited
a public audience to attend lectures, women as well as men. One of the most prominent atten-
dees at the first lecture was Sir John Danvers. In his volume modeling the skill of conver-
sation to be taught in the academy, he included a heterosocial dialogue starring Artenice, a
nom de clef for the salonnière Catherine de Rambouillet (1588–1665), discussing heroines of
learning such as the medical recipe collector Elizabeth Grey, Countess of Kent (1582–1651).76

Gerbier brought the concept of experimental philosophy, distinct from university studies,
closer to household management than did many of his contemporaries. In a 1654 French calli-
graphic showcase, he compiled many of the subjects taught in his academy, including “natural
experimental philosophy, in examples of secrets, very rare and useful.” He promised that a future
“treatise of natural experimental philosophy” would offer even more “very particular and highly
useful things.”77 Gerbier’s “experimental philosophy” thus aimed for particular secrets, rather
than reasoning about universal causes that might then be applied to use.

GENDER AND SOCIAL DISTINCTIONS IN THE PLEASURE GARDEN:
BEALE AND EVELYN

In many of the experimental settings described above, opportunities and space appeared for
women—such as Virginian colonists, Elizabeth Villiers, Virginia Ferrar, or auditors at Gerbier’s
lectures—to join the emergent fields of philosophical gardening and experimental philosophy.
The new profession of florist employed “men or women especially Women” skilled in “addi-
tion of smels or preserving of odors or accelerating their productions. etc.”78 Working gardeners
figured as model experimenters. However, some future founders of the Royal Society, such as
John Beale (7–1683) and John Evelyn, drew influential distinctions that separated philosophical

75 HP 10/2/10B (Harthib’s caution); and Balthazar Gerbier, “Of Naturlall Experimentall Philosophie,” in Interpreter of the
Academie for Forrain Languages, and All Noble Sciences, and Exercises (London, 1648), pp. 78–81.
76 Myra Reynolds, The Learned Lady in England, 1650–1760 (Boston: Houghton Mifflin, 1920), p. 44; and Gerbier, Interpreter
of the Academie for Forrain Languages, p. 97 (heroines of learning). On Gerbier’s academy and its demise see Timothy Raylor,
“Milton, the Harthib Circle, and the Education of the Aristocracy,” in The Oxford Handbook of Milton, ed. Nicholas McDowell
and Nigel Smith (Oxford: Oxford Univ. Press, 2012), pp. 382–406, esp. p. 396. On Danvers’s attendance at Gerbier’s first lecture
see Peacey, “Print, Publicity, and Popularity” (cit. n. 74), p. 296.
77 Balthazar Gerbier, Formulaire, touchant l’Art de la Plume, et d’un language et Chifre secret, tres utile aux Princes, du Deseing,
de la Geometrie, de l’Architecture militaire, de la Perspective, Cosmographie, Geographie, Minnature, Peinture, Architecture, et de
la Philosophie naturelle experimentale, en exemples de secrets, tres rares et utiles, Wellcome MS 2505, Wellcome Library, Lon-
don. See p. 46: “Le traicté de la Philosophie naturelle experimentelle [sic] satisfira touchant un grand nombre de choses tres
particulières et grandement utiles.”
78 HP 28/1/18B–19A.
gardening, an elite male experimental practice, both from the heterosocial experimental practices of household management and from the daily experience of working gardeners.

In response to Hartlib’s 1655 *Legacy of Husbandry*, John Beale began a weekly correspondence with Hartlib by sending him an account of local agricultural techniques. Hartlib had this account published as *Herefordshire Orchards*, for which Beale wished to present himself as “an ancient, experienced, & Philosophicall Gardiner of Herefordshire,” although the printer instead listed him as “J.B.” Beale corresponded with Hartlib concerning both pragmatic and fanciful gardening. The former was vulgar, thrifty, and heterosocial. Beale described “Ladies & good Housewiefes” emulating “their Husbands Rurall Chymistry” by producing comestibles on wasteland. A liquor made from bushes grown on coarse soil was “well deserving the vulgar Art of Lady-Chymistry.”

Beale sent summaries of two sharply differing gardening works to Hartlib, who communicated them to figures such as John Evelyn, Robert Wood in Ireland, and John Winthrop, Jr., in Connecticut. These were *A Physique Garden and the Preparation of Composts Fit for all kinds of Gardens And fit for experiments of generall use and A Garden of Pleasure . . . Encouraged & Directed by the Ideas of Phantasy and by the Judgment of Authority of the sublimest Wits of Ancient and Modern Ages*. Beale wrote the former with “brevity & plainnes,” in order to make it “the study, as well of Ladies, as of Scholars.” He suggested that it might be dedicated to “Vic. Ra. in Ireland”—that is, Katherine Jones, Viscountess Ranelagh (1615–1691), the sister of Robert Boyle.

In *A Garden of Pleasure* Beale unleashed his fancy, passing from one mysterious phenomenon to the even more abstruse. Succeeding chapters followed “a search,” to “a deeper search,” to a “further scrutiny” in transforming floral colors. Experiments in transplantation, augmentation, and adornment would first “Civilise” wild plants and then discover “improvements to the benefit of Mankind.” Beale distinguished his style in *A Garden of Pleasure* from that of “Dr. Charleton & other philosophers” who “pervert a delight into a toyle.” In an unpublished work on orchards, Beale likewise described a fanciful style, full of “rarityes” and “soe singular, That I cannot read them without blusses. I confesse I gave a wild swing to phantasy, & whilst the pen was in my hand I spard not to tickle myne owne spleene.”

Even Hartlib felt that horticulture demanded fancy. On first being made acquainted with John Evelyn, he wanted assurance that Evelyn would accept heterodoxy in garden matters, since “in these Hortulane Affaires” Hartlib might prove sometimes “Haeretical and shun the vulgar trac[k].” Apparently having been reassured, Hartlib introduced Beale to Evelyn. In a letter written in a utopian vein and signed “Christianus Cosmopolitanus,” Beale presented himself as a “poore philosophical Gardener”; he was a mere porter working in the “summer house of this Newe Atlantis,” while Evelyn was the “Praesident” of “our Hortulane Society.” Beale later suggested an ancient, artificial mound in Herefordshire as a “Heterodoxe” site for a garden. Evelyn embraced the site as one where his horticultural masterpiece, the *Elysium Brittanicum*, could be realized, and not just as a “phantastical Utopia.”

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79 Mayling Stubbs, “John Beale, Philosophical Gardener of Herefordshire, Part 1: Prelude to the Royal Society (1608–1665),” *Ann. Sci.*, 1982, 39:463–489, on p. 479; HP 51/1/18A; and John Beale, *Herefordshire Orchards, a Pattern for all England* (London: Daniel, 1657).
80 HP 51/91B and HP 51/105A.
81 For the titles see HP 25/6/1A–4B; for Hartlib’s communication of Beale’s summaries see HP 67/22/4A, HP 33/1/85B, and HP 52/1/12A. For Beale’s characterization of their style and his suggestion as to the dedication see HP 25/6/2B.
82 HP 25/6/4A, HP 25/6/4B, and HP 51/1/17A.
83 Letter of Samuel Hartlib, 24 Sept. 1659, British Library, London, Addl. MSS 15948, fol. 66r–v. The recipient is likely John Robartes (1606–1685). Cf. HP 9/97A.
84 HP 39/2/68A–69B; HP 67/222A; and Peter Goodchild, “‘No Phantastical Utopia, but a Reall Place’: John Evelyn, John Beale, and Backbury Hill, Herefordshire,” *Garden Hist.*, 1991, 19:105–127.
If Beale approached Evelyn through the rhetoric of fantasy, to Hartlib he lamented how financial realities limited his experiments in transforming the colors of tulips and gilliflowers: “If I had the wealth & leysure of some others, I should hence unfold some pretty riddles.” Such investigations might be more within Evelyn’s reach. Beale suggested that Evelyn should add six or seven more chapters to the *Elysium Britannicum*, including writing on the “transmutation of flowers” and on “wonderfull plants,” such as the sensitive plant. “Hortulane affaires doe require varieteyes of novell & conceited amoenityes,” he advised, asking rhetorically, “shall I adde a phantastical toy (for in Hortulane noveltyes wee must bee phantasticall)?”

In his *Elysium Britannicum*, on which he worked for over forty years, Evelyn developed the persona of an “absolute Philosopher” and a “philosopher-gardiner.” He specifically addressed not “Cabbage-planters,” but “the best refined of our nation who delight in Gardens.” The philosopher-gardener studied fire, air, earth, water, and even “Celestiall influences, particularly the Sun and Moon,” and “climates.” These investigations would allow for tempering the garden “as may best qualifie it for universall productions; by which industry, almost all the inconveniences of our Climate may be rectified.” The garden would offer a platform for trials in “conserving, prooperating [sic], retarding, multiplying, transmuting and altering the Species, Forms . . . and substantial qualities of Plants and Flowers.” These researches would be aided by many contrivances and instruments, such as Evelyn had witnessed in John Wilkins’s Wadham College garden and elsewhere in his travels. In a “Gardiners Elaboratory,” distillations, extractions, and more recondite “rare Experiments” might be performed. Through curiously designed thermometers, the gardener might “not onley decorate his Gardin with an ingenious variety; but become very knowing in the judgment & disposition of the Aer.” A later marginal note adds, “Improve this by the R. Society. Put in an Higroscop or Barometer: for the ayres gravitation, & that for the wind out of Mr: Hooke”—indicating how Evelyn wished to expand the garden’s experimental armature through ever more specialized instruments associated with the Royal Society.

Michael Leslie has argued that Evelyn’s *Elysium Britannicum* had a political message, given its subtitle of the “plan of a royal garden.” Many royalist gardens were threatened during the Interregnum by “conversion of land from unprofitable uses to those of godly productivity,” as in the projects of Samuel Hartlib. According to Leslie, Evelyn covertly worked to shift garden writing from the practical “husbandry or horticultural manual” toward “the literature of aesthetic gardening.” We might nuance Leslie’s argument by pointing out that the aesthetic garden did not obviate eventual utility (even in Hartlib’s view), but it kept such utility at arm’s length. Evelyn described his *Elysium Britannicum* as a “Royall & universall Plantation.” What made it royal was also what made it universal—that is, the gardener’s ability to master global climate and overcome particular constraints.

**Horticulture and Experimental Philosophy in the Royal Society**

Writing to Sir Thomas Browne in 1660 with a synopsis of *Elysium Britannicum*, Evelyn suggested founding a settlement of “paradisean and Hortulan saints, to be a society of learned and

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85 HP 52/62A, HP 67/22/1A, HP 67/22/4A, HP 67/22/1A, and HP 67/22/5B.
86 John Evelyn, *Elysium Britannicum, or The Royal Gardens*, ed. John Ingram (Philadelphia: Univ. Pennsylvania Press, 2001), p. 54; and Willes, *Making of the English Gardener* (cit. n. 24), p. 235 (citing Evelyn).
87 Evelyn, *Elysium Britannicum*, pp. 55–59, 94, 423.
88 Ibid., pp. 34, 559, 251. See also Scott Mandelbrote, “John Wilkins and the Gardens of Wadham College,” in *John Wilkins (1614–1672): New Essays*, ed. Mandelbrote (Leiden: Brill, 2017), pp. 199–215.
89 Michael Leslie, “Bringing Ingenuity into Fashion: The ‘Elysium Britannicum’ and the Reformation of Husbandry,” in *John Evelyn’s ‘Elysium Britannicum’ and European Gardening*, ed. Therese O’Malley and Joachim Wolschke-Bulmahn (Washington, D.C.: Dumbarton Oaks, 1998), pp. 131–152, on pp. 138, 157; and Evelyn, *Elysium Britannicum*, p. 94.
ingenious men.” Horticulture featured prominently in the “experimental philosophy” of the early Royal Society that Evelyn did help found. Abraham Cowley’s Proposition for the Advancement of Experimental Philosophy is a case in point.

Dedicated to the “Honourable Society for the Advancement of Experimental Philosophy,” Cowley’s design for a “Philosophical Colledge” outside London comprised fifty-six personnel. Of these, twenty would be philosophers, at a salary of £120, and two would be gardeners, with a £20 salary. Cowley thus valued philosophers, who would teach and study gardening, and working gardeners very differently.91

Gardening was only one of more than seventeen subjects making up “Natural, Experimental Philosophy,” which also included “Agriculture.” Cowley’s vision of what gardening research would entail was, however, markedly more precise than his plans for other subjects. The college’s gardens would be divided in two, one for “all sorts of plants that our soil will bear,” with the other devoted “only to the trial of all manner of experiments concerning plants, as their melioration, acceleration, retardation, conservation, composition, transmutation, coloration, or whatsoever else can be produced by art either for use or curiosity.” Contrast this list of hortulan experiments to Cowley’s vague suggestions for a “more exact search into the nature of animals,” “observation of celestial bodies,” and “experiments most proper” to subterranean places, “which will be, undoubtedly, very many.” Cowley heightened a social and epistemic distinction between gardening and agriculture by also proposing a separate and humbler college for agriculture in another essay that drew on a previous proposal for a college of husbandry by Cressy Dymock. This college only required four professors to teach “Aration,” “Pasturage,” “Gardens, Orchards, Vine-yards and Woods,” and “Rural Oeconomy.”92

Like Cowley, Evelyn distinguished between working, albeit learned, gardeners, whom he expected to read and understand philosophical texts about gardening, and the author of those texts, himself. In a manuscript normative guide for his and all other working gardeners, Evelyn urged learned gardeners to “continuallly reade and consult my Gardiners Almanac & Discourse of Earth.” The latter referred to Terra, or A Philosophical Discourse of Earth, presented to the Royal Society in 1675, where Evelyn drew a further distinction between his own approach and that of philosophical husbandmen.93

In Terra, Evelyn struck a stance familiar from earlier horticultural guides, censuring both overly vulgar and overly bookish approaches. He disparaged “ignorant Gardners” and “vulgar Gardners” and warned against “single, or over-hasty Experiments.” His material, he boasted, was “not taken and transcrib’d out of Common Receipt-Books and such as pretend to Secrets, but most of them experimented.” He declared an aversion to theorizing and dogmatic assertion, claiming to discuss only that which we “every day cultivate.” Yet Evelyn simultaneously argued that the study of earth supplied “noble and useful Experiments” assisted by “Microscopes, Lotions, Strainers, Calcinations, Triturations, and grindings.”94 This was not a mundane approach, even if the subject was dirt.

90 John Evelyn, BL Additional 78298, fol. 101v. See also Claire Preston, “The Hortulan Saints and The Garden of Cyrus,” in “A Man Very Well Studied: New Contexts for Thomas Browne,” ed. Kathryn Murphy and Richard Todd (Leiden: Brill, 2008), pp. 149–170, esp. pp. 157–158.
91 Cowley, Proposition for the Advancement of Experimental Philosophy (cit. n. 18), p. 16.
92 Ibid., pp. 26, 27; and Abraham Cowley, Works (London: Herringman, 1668), p. 101.
93 John Evelyn, Directions for the Gardiner at Says-Court but which may be of Use for other Gardens, ed. Geoffrey Keynes (London: Nonesuch, 1932), pp. 17, 19, 100; and Evelyn, A Philosophical Discourse of Earth relating to the Culture and Improvement of it for vegetation, and the propagation of plants (London: Martyn, 1676).
94 Evelyn, Philosophical Discourse of Earth, pp. 75, 117, 71, 164, 11, 32.
Evelyn charted a normative course between the two poles of uninformed practice and theory. This course, however, was a wide one, allowing him to veer from practice toward theory and back. Evelyn suggested that, based on the qualitatively undifferentiated matter of Boyle’s corpuscular philosophy, soil might be generated that could grow plants from anywhere on Earth. That hypothesis was not proven, but it was hinted at by the “various Percolations, Concoctons, and Circulations of that fruitful Menstrue” by “that excellent Philosopher Mr. Boyle.”

Experimenting with such unproven hypotheses, especially upon curiosities and exotic plants, could lead to discoveries that might then be applied generally. Evelyn promised that “very unexpected Phaenomenas” might “be brought to light, in vegetable productions, did men seriously apply themselves to make such possible trials, as is in the power of Art to effect.” By this means, not only might “Soils” “be dissembled,” but the very “Air and Water attempered, (at least for some curiosities, which may give light to more useful things).” Impregnating “artificial Dews and Mists” “for the more natural refreshment of Exotic Plants,” he argued, was not so different from what was already practiced in the artificial settings of the hotbed, or those “more confined Reserves . . . for Hyemation [overwintering].” Hints suggested by corpuscular philosophy might further these already sophisticated contrivances. After flirting with such horticultural proposals, Evelyn backed away from “speculations of so abstruse a nature,” unfit for “we Gardiners and Rustics.”

In his rhetorical dance between ambition and performed modesty, Evelyn found the descriptions by older writers such as Plat of the “Philosophical Grinding of Earth” erring too far toward the former. He criticized those who “wrap up easie notions in hard and uncertain terms” when these phenomena “would be of use to the Philosophical Husband-man” were they more easily intelligible. The “industrious Farmer” was capable of instruction in “Calcination, Resolution, Percolation, Evaporation and Separation, put into honest English.”

Evelyn’s distinctions between the “philosophical husbandman” here and the “philosopher-gardiner” in Elysium Britannicum indicate how he wished to relate virtuosic aesthetic gardening to useful agricultural projects. The aesthetic garden provided the platform for trials informed by reasoning about nature and for the authorship of texts. Abstruse investigations into exotic plants might later be applied to use by such figures as the “philosophical Husband-man,” an individual reading and following guidelines set out in philosophical works but not composing them himself.

Despite the elevation of the philosophical gardener above the philosophical husbandman, the hybrid identity of the former retained a degree of rusticity that made it elastic and rhetorically useful. This allowed Evelyn to hint at speculative applications of the most recent matter theory, but also to back away from speculation as improper for “we Gardiners.” The mixture of ambition and humility within the persona of the philosophical gardener permitted the simultaneous suggestion of untold powers of philosophically informed trials and a claim to simplicity averse to overmuch speculation. This was the delicate path that the experimental essayists of the Royal Society often negotiated, whether or not they were writing on garden subjects. They claimed philosophical modesty, accepting merely probable proof and avoiding speculation. At the same time, they positioned their hints, queries, and probabilities at the brink of a transforming world.

95 Ibid., p. 46.
96 Ibid., pp. 47, 50, 109, 111.
97 Richard Nate, “Rhetoric in the Early Society,” in Rhetorica Movet: Studies in Historical and Modern Rhetoric in Honour of Heinrich F. Plett, ed. Peter L. Oesterreich and Thomas O. Sloane (Boston: Brill, 1999), pp. 215–231; and Jan Golinski, “Robert Boyle: Scepticism and Authority in Seventeenth-Century Chemical Discourse,” in The Figural and the Literal: Problems of Language in the History of Science and Philosophy, 1650–1800, ed. A. E. Benjamann et al. (Manchester: Manchester Univ. Press, 1987), pp. 58–82.
98 Rose-Mary Sargent, The Diffident Naturalist: Robert Boyle and the Philosophy of Experiment (Chicago: Univ. Chicago Press, 1995); and Michael Hunter, Robert Boyle (1627–91): Scrupulosity and Science (Woodbridge: Boydell, 2000).
In describing the rhetorical approach of his experimental essays, Boyle presented himself both as a “drudge” digging about in the lowly soil and as a powerful figure advancing “true natural philosophy.” The lowly drudge could “Command” nature, while speculative wits “care only to Know Nature,” proving more “ingenious than fruitful.”101 This dance between diffidence and daring allowed Boyle to demonstrate the gaps between theory and experimental evidence, while still maintaining “a highly developed speculative theory, the corpuscularian hypothesis, which he believed prescribed the basic ontology that one would find should one scale the ladder of causes successfully.” In order to stage this simultaneously masterful and difﬁdent probing of the “abyss between experience and theory,” Boyle situated his Sceptical Chymist as a free-ranging conversation in a garden.100

CONCLUSION: AT THE EDGES OF POSSIBILITY
What can this filiation of the “philosophical gardener” from the context of aesthetic gardening tell us about the nature and development of “experimental philosophy” more broadly? It illustrates a connection to, but deviation from, other widespread and interrelated experimental practices, such as domestic recipe culture, books of secrets, and dearth science. It allows us to distinguish the philosophy of the aesthetic garden from that of several competing alternatives, including immediately practical husbandry, on the one hand, and views of the garden as a meditative retreat, on the other. We see ideas of philosophical gardening and later experimental philosophy evolving over time, as both women and working gardeners came to be excluded. We can also note many features following through over the course of the century.

Segar and Evelyn contrasted themselves with overly textual scholars tied to their desks, copying recipes without ever trying them, and with vulgar artisans who despised anything innovative. This claim to the middle ground between the artisanal and the scholarly is familiar from Bacon’s fusion of experience and text at various levels of inquiry.101 Yet, as the case of Bacon’s Sylva sylvarum illustrates, this opposition between purely textual recipes and manual practices is overstated. None of the content in Bacon’s Sylva sylvarum was new; Elaine Leong compares it to any other manuscript notebook collection of recipes.102 Furthermore, collectors often experimented on recipes, as Leong discusses.

Nonetheless, Cesare Pastorino argues that Bacon moved “beyond recipes.”103 While books of secrets and recipe collections contained much conjectural material, they did not flag doubts. Written in an imperative voice, recipes regularly promised efficacy. By contrast, Bacon stressed “tentativeness, open-endedness, and provisionality.”104 Like Bacon, Segar, Ferrar, and Evelyn opposed the ways recipes presented knowledge as certain and complete. Obstacles to further discoveries in nature, according to John Ferrar, included the glut of “our own Plenty of Receipts” as

99 Steven Shapin, “Pump and Circumstance: Robert Boyle’s Literary Technology,” Social Studies of Science, 1984, 14:481–520, on p. 495; and Robert Boyle, “A Proemial Essay . . . with Some Considerations Touching Experimental Essays in General,” in Certain Physiological Essays (London: Herringman, 1661), pp. 1–36, on pp. 17, 22–24.
100 Anstey, “Philosophy of Experiment in Early Modern England” (cit. n. 2), pp. 119–120; and Peter Walmsley, “Dispute and Conversation: Probability and the Rhetoric of Natural Philosophy in Locke’s Essay,” J. Hist. Ideas, 1995, 54:381–394, on p. 388.
101 Sophie Weeks, “The Role of Mechanics in Francis Bacon’s Great Instauration,” in Philosophies of Technology: Francis Bacon and His Contemporaries, ed. Claus Zittel, Gisela Engel, Romano Nanni, and Nicole C. Karafyllis (Leiden: Brill, 2008), pp. 133–136.
102 Rusu and Lüthy, “Extracts from a Paper Laboratory” (cit. n. 34); Dana Jalobeanu, “Bacon’s Apples: A Case Study in Baconian Experimentation,” in Francis Bacon on Motion and Power, ed. Guido Gigioni, James Lancaster, Sorana Corneanu, and Jalobeanu (Cham: Springer, 2016), pp. 85–114; and Leong, Recipes and Everyday Knowledge (cit. n. 6), p. 6.
103 Cesare Pastorno, “Beyond Recipes: The Baconian Natural and Experimental Histories as an Epistemic Genre,” Centaurus, 2020, 62:447–464; and Leong, Recipes and Everyday Knowledge, p. 75.
104 Pastorno, “Beyond Recipes,” p. 456.
much as the fear of “innovation” and the “too fond a Reference we pay to antiquity . . . as in the ne plus ultra, the Hercules Pillars of Wisedome, beyond which there was no passage.”

Such viewpoints encouraged fanciful experiments with other ways to write about experiments. These included Bacon’s fictional travel account, the New Atlantis, Kynaston’s insertion of experimental research into a commentary on Chaucer, Gerbier’s showcasing of experimental philosophy in a calligraphic exemplar book, and Beale’s Garden of Pleasure . . . Encouraged & Directed by the Ideas of Phantasy. All of these aimed to resituate knowledge in a realm of possibility, closer to fiction and far distant from conventional practices and the appearance of certainty.

Over the course of the seventeenth century, the pleasure garden aesthetically embodied the edges of possibility as an area of experimental risk-taking. As Shapin’s discussion of Boyle’s literary and visual styles established, aesthetics are integral to experimental practice. Much like the horizons stretching beyond the columns of Hercules in the title pages of Bacon’s works, Danvers’s garden opened up design from the meditative retreat of the Neo-Stoic garden to the suggestive sweep of far distant prospects. This was an aesthetic tailor-made for the outlandish epistemic risk-taking that was the subject of discussions held there. Bacon might have chatted with Danvers about Henry VII or with his stepson about the translation of De augmentis, while colonial promoters discussed the best way to transform the limits of possibility in Virginia and Bermuda—perhaps by drawing on some of those transformative horticultural feats achieved by Danvers’s gardener, Gilbank. The garden was a site arranged for sparking ideas, suggesting theories, and hinting at other ways that nature might be transformed through “garden philosophy.”

Such epistemic risk-taking was anathema to the intimate cultures of thrift discussed by Mukherjee, with their careful husbanding of resources and dependence on the hyperlocal circulation of reliable knowledge. Bizarre arguments for taking resource-intensive London pleasure gardens as the model for widespread colonial application often did not result in projects crowned with success. Yet despite the persistent gap that remained between the site of experimental fantasy and later application, this particular knowledge dynamic structured emergent experimental philosophy. The move from inquiry and trial to use was deferred and mediated, not so divorced from sensual apprehension and manual trials as to be pure speculation, but also not pressed into immediate service in ways that might lower the horizons of philosophical possibility.

The explicit delineation of gaps in knowledge sustained research over the long term. Even the gardens themselves remained. In the Restoration, the son of John Gilbank continued to work in Danvers’s garden for Lord Robartes (1606–1685), FRS, supplying the new Chelsea Physic Garden with seeds from plants that Tradescant had likely brought from the Americas to Danvers. In 1717 Hans Sloane purchased the grounds and handed them over entirely to the Physic Garden, in return for fifty plants a year to be supplied to the Royal Society, “setting the seal on an alliance between ‘high’ and ‘low’ botany.” Early Stuart pleasure gardens literally planted the seeds of Royal Society experiments.

105 Shapin, “Pump and Circumstance” (cit. n. 99).
106 Williams and Ferrar, Virgo Triumphans (cit. n. 66), p. 43.
107 James Petiver, “Some farther account of divers Rare Plants, lately observed in several Curious Gardens about London, and particularly in the Company of Apothecaries Physick-Garden at Chelsey,” Philosophical Transactions, 1710–1712, 27:416–426, on pp. 425–426; and Leith-Ross, John Tradescants (cit. n. 36), p. 272.
108 Drayton, Nature’s Government: Science, Imperial Britain, and the “Improvement” of the World (New Haven, Conn.: Yale Univ. Press, 2000), p. 36.