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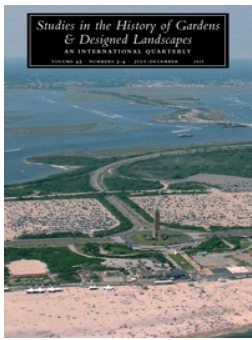
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‘Matchless Stoves’ : the pioneering garden technologies of Mary Somerset, the Duchess of Beaufort (1630–1715)

INDIA COLE 

Abstract: This article consolidates and furthers research relating to seventeenth-century garden technologies, specifically structures for housing plants. Using archival materials, (including letters, architectural plans, and herbarium specimens) alongside an art-historical analysis of paintings of the Badminton estate, I demonstrate how Mary Somerset (1630–1715) was a forerunner in employing cutting-edge heated ‘stove-houses’, which enabled her to successfully grow a large collection of tender and tropical plants. Significantly, Somerset’s stove-houses rivalled those of the monarchs at Hampton Court. Furthermore, this article draws attention to the fact that women played a significant role in pioneering new ways of growing tropical plants.

Keywords: Garden technologies; female horticulture; tropical plant collections; Badminton estate; Mary Somerset, Duchess of Beaufort

As colonial expansion led to tropical plants flooding into Europe in the latter half of the seventeenth century,¹ new garden technologies using heat and glass were increasingly necessary to enable these plants to survive and prosper in the colder European climate.² Mary Somerset, first Duchess of Beaufort (1630–1715), was known for her success in growing plants from all over the world — many of which she was the first to grow in Britain.³ These included ‘ripened’ cotton from Carolina which she grew ‘from seed’, a coconut plant which she grew ‘from a nut’, and even an ‘ananas’ (*Ananas comosus*, or ‘the rare Pine [pineapple]’).⁴ Somerset relied on the latest horticultural technologies of heating buildings to achieve these results, as this article will demonstrate.

Previous scholarship has argued that Somerset relied on tacit knowledge and largely spurned technological advancements (such as stoves and glass cases).⁵ While Somerset (and the gardeners working for her) certainly had excellent horticultural skills, the argument that she gathered her knowledge ‘by doing rather than by knowing in the sense of book learning’ misses that she engaged with the latest botanical developments of her day through diverse

publications — she amassed a large collection of botanical texts and regularly read (and took notes on) the Royal Society’s journal, *Transactions*, for example.⁶ Furthermore, Somerset came from a family of garden enthusiasts and would likely have been familiar with various garden technologies through them, as well as through her epistolary networks. For example, the natural historian John Evelyn (1620–1706) recorded in his diary that he visited the two ‘noble’ and ‘well finish’d’ orangeries of Somerset’s sister and brother-in-law, Lord and Lady Clarendon, in Swallowfield, Berkshire, in 1685; and in 1688 he visited the gardens of her brother, Sir Henry Capel, in Kew, Surrey, where he admired his ‘most beautifull & perfectly well kept’ orangery and ‘Myrtetum’.⁷ The combination of wealth, shared family knowledge, participation in academic (often international and colonial) networks, as well as access to — and engagement with — the latest publications (relating to botany, horticulture, and natural history) enabled Somerset to commission and operate multiple buildings that created the warmth necessary for her tropical plants. Her success in doing this was commented on by several visitors

to her gardens at Badminton House, including the natural historian James Petiver (1663–1718), who specifically praised her ‘Matchless Stoves’, which housed ‘many New Rare and very curious Plants’, most of which were raised to a ‘perfection’ which he had never seen before.⁸

Somerset’s investment in these new types of horticultural buildings demonstrates her agency, financial power, scientific knowledge, and understanding of the pragmatics of building a plant collection. This article will also consider how owning cutting-edge garden buildings enabled Somerset to ‘self-fashion’ herself; they served as a means by which she could use her wealth and status to (somewhat) overcome the obstacles she faced as a woman trying to participate in the practice of botanical experimentation. As Jan Woudstra has said of the garden technologies at Hampton Court during the reign of William and Mary (1689–1702), such edifices were not only technologically and scientifically motivated — they were a ‘development of empire’, and the collections of ‘exotic’ plants which they housed became an ‘expression of status and power’.⁹ Somerset’s stove-houses should therefore be read not only as scientifically motivated investments, but also displays of wealth and colonial power.¹⁰ Somerset benefited from, and contributed to, the ‘colonial botanical scene’.¹¹ Certainly, Somerset’s ownership of stocks in the East India Company testifies to her participation in the means of empire and extraction.¹² And, as Katie Donnington shows, botanical networks often intersected with the slave trade.¹³ Indeed, from at least the 1690s, Somerset was actively engaged in a transatlantic network made possible by the connections forged within British colonies in the Americas, which were in turn typically predicated upon economies driven by the labour of the enslaved.¹⁴ Consequently, Somerset’s collecting intersected with colonial networks and almost certainly benefitted from specimens obtained by those working in the slave trade as well as those who were the victims of it.

Over four sections, this article demonstrates the ways in which Somerset was technologically pioneering. The first section gives an overview of the history of heated garden buildings, including outlining the semantic confusion around them and other relevant contexts. This is followed by a summary of existing scholarship pertaining to the topic, which also shows how previous scholarship has misdated Somerset’s garden buildings. The third section gets into the detail of Somerset’s stove-houses, and the final section uses images of the Badminton Estate from *Britannia Illustrata* (1707) to situate where some of them were located.

I. Contexts

While specialised buildings for growing tender plants have existed in some form since at least the Roman era, it was not until the early-modern period that they became a mainstay of elite European gardens.¹⁵ Before discussing Somerset’s garden buildings, it is worth giving an overview of the different types and the language used to describe them — with the caveat that the distinctions between these different types of buildings and their uses are often blurred in this period. The first type is the oldest — a structure without integrated heating, primarily used for tender plants. These structures are known (seemingly interchangeably) as conservatories, greenhouses, and orangeries.¹⁶ One further name to tentatively add to this list is ‘infirmarium’, which was used to describe structure(s) at both Badminton and Hampton Court.¹⁷ These buildings were generally constructed from masonry, with a solid (not glazed) roof, and windows that were usually quite small; the focus was on generating warmth, rather than light.¹⁸ For the purposes of consistency and clarity in this article, unless quoting another source, I will use ‘orangery’ (rather than ‘conservatory’, ‘greenhouse’, or ‘infirmarium’) to refer to any masonry building without integrated heating that was designed and used for housing plants.¹⁹ Orangeries were primarily designed for tender plants, which were circulating around Europe prior to the mass arrival of tropical plants in the seventeenth century.²⁰ Tender plants were generally only kept inside orangeries when it was too cold for them to be on display outside, and so plants kept in these buildings were kept in pots, making them easier to transport for outdoor display when required.²¹ The first orangery to be constructed in England was perhaps that of Sir Francis Carew in Beddington, Surrey, c.1580.²² The orangery at Ham House, Richmond, (figure 1) is perhaps the oldest surviving example in England, having been built in c.1670s.²³ Although it is now used as a café, it has changed little over the centuries and serves as a useful visual example of what seventeenth-century orangeries looked like, especially the ratio of brick to glass and the generally symmetrical design that accords with classical principles.

Likewise, the illustrated plate of the orangery at Oxford Physic Garden (another early example in England) titled ‘Hortus Botanicus, The Phisick Garden in Oxon’ in David Loggan’s *Oxonia Illustrata* (1675) gives a further visual example of the type of structures built to house tender potted plants at the time (figure 2).²⁴

‘MATCHLESS STOVES’



FIGURE 1. Photo of the orangery at Ham House, Richmond. Courtesy of Tom Parnell (itmpa), CC BY-SA 2.0.

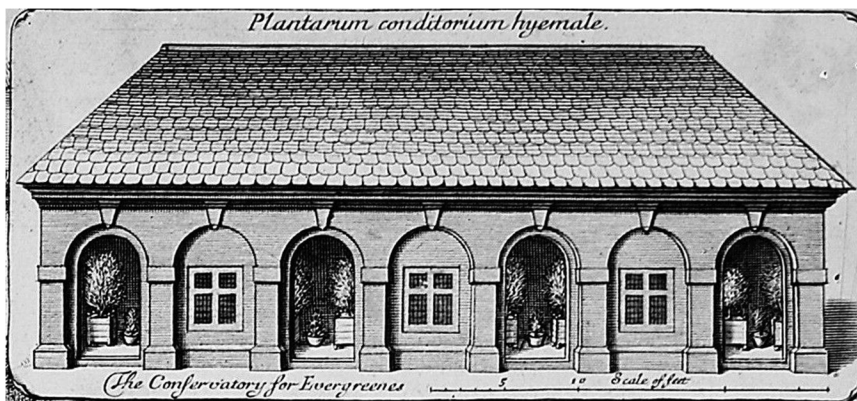


FIGURE 2. Detail from plate 12, ‘Hortus Botanicus, the Phisick garden in oxon’, in David Loggan’s *Oxonia Illustrata* (1675), showing the orangery or ‘plantarum conditorium hyemale’ at Oxford Botanic Garden. Moo16059: *The Botanical Gardens, Oxford*, 1675. Public Domain Mark. Source: Wellcome Collection. Reference: WT/D/1/20/1/143/100.

As these early orangeries did not have integrated heating systems, they required the use of braziers and small portable stoves (occasionally on wheels so that they could be pulled or pushed around with a long crook, to better disperse the heat).²⁵ Whilst providing this additional warmth was vital in the colder months,

placing portable stoves amongst the plants created fumes and smoke which often damaged or even killed them.²⁶

Experiments for better keeping plants warm developed in Italy and were later honed in the Netherlands, where additional heating was necessary if tender and, increasingly, tropical plants were to survive in the colder European climate.²⁷ This led to the emergence of ‘hothouses’, also known as ‘stoves’ or ‘stove-houses’ – buildings with integrated heating systems, either through hypocaust and/or flue systems that would carry heat (generated from a stove in a separate part of the building) through pipes under the floors and (later) in the walls, before releasing the smoke through a chimney or other exterior outlet.²⁸ By the late eighteenth century, the terms ‘hothouse’ and ‘stove-house’ almost always referred to a heated glass structure, but the composition of a ‘stove-house’ (or ‘stove’) in the late seventeenth-century is trickier to ascertain. Based on the descriptions and visual records of ‘stoves’ that survive from this era, they primarily seem to have had a foundation, frame, and north-facing wall made of masonry, with the south-facing side primarily made of glass (either as large windows or glass doors).²⁹ For the purposes of consistency and clarity in this article, unless quoting another source, I will use ‘stove’ and ‘stove-house’ interchangeably (rather than ‘hothouse’) to refer to a building with integrated heating that was designed and used for housing plants.

While it is not certain where in the Netherlands the first stove-house was built, it was likely Amsterdam or Leiden Botanic Garden, both of which were early adopters of the technology in the 1680s.³⁰ The first stove-house to be built at the Hortus Medicus Amsterdam was completed in 1682,³¹ and soon Chelsea Physic Garden in England also had one.³² The keeper of Chelsea Physic Garden, John Watts (fl.1670–1701), travelled to the Netherlands in 1683 to visit his acquaintance Paul Hermann (1646–1695), the director of the Hortus Botanicus Leiden, and it is here that he must have seen the Dutch stove-houses.³³ The details of the subsequent construction of Chelsea’s stove-house are vague.³⁴ John Evelyn recorded a visit to Chelsea Physic Garden in August 1685, and noted how impressed he was by the ‘very ingenious subterranean heate’ which was ‘conveyed by a stove under the conservatory, which was all vaulted with brick’.³⁵ Certainly, when Hans Sloane (1660–1753) visited in November 1684 they were the first stove-houses he had seen, as he described them as a ‘new contrivance (at least in this country)’, and noted how there was a ‘great fireplace’ underneath the floor of the building,

the warmth of which was dispersed through the building by ‘tunnels’.³⁶ This hypocaust system meant that Watts and his gardeners could leave the doors and windows open in the ‘hardest frosts’.³⁷ William and Mary’s arrival in England in 1689 further popularised this Dutch technology — at Hampton Court they built a series of ‘stoves’ — some of which were innovative in using flued walls to disperse the heat, rather than heating beneath the floor.³⁸

Whilst stove-houses continued to develop, albeit in only a handful of gardens across Europe, there was simultaneously experimentation with glass, which led to the development of structures with bigger windows, as well as ‘glass cases’ — structures that were primarily glass rather than masonry, and are closer to our modern understanding of what a ‘greenhouse’ looks like. The experimentation with glass showed it could be used to create warmth (by directing and magnifying the sun’s rays), but the significance of light itself was increasingly understood to be significant.³⁹ In England, Evelyn understood the need for large windows, as he observed that ‘light itself, next [to] Air, is of wonderful importance’.⁴⁰ Notably, in 1698 William and Mary repealed the high taxation on glass which they had introduced only three years earlier.⁴¹ The increased affordability of glass at the end of the seventeenth-century was coupled with advancements in the size and strength of glass panes available, making experimentation with glass structures more viable.⁴² This experimentation was slow and ad-hoc, but, as Laird and Woudstra have discussed, the first glass cases likely came from the Dutch use of glass frames or ‘Broeybacken’, which were placed over hotbeds.⁴³ These were further innovated by people like Evelyn in England. Therefore, both glass cases and stove-houses were Dutch innovations that were adopted and tweaked by English gardeners. It is difficult to trace exactly when and how this knowledge (and indeed, physical glass cases and/or stoves) were transported from Holland to England.⁴⁴ Likewise, the development from unheated or manually heated orangeries to stove-houses with integrated heating cannot be dated with precision.⁴⁵ While there was likely some ad-hoc development around these structures from the sixteenth- into the mid-seventeenth-century, there does not seem to have been much significant change recorded — perhaps because developments were guarded with secrecy in both Holland and England. For example, the Bishop of London’s gardener, George London (c.1640–1714), travelled to Holland in 1685 to purchase ‘stoves’ which he brought back to England to sell on to select clientele.⁴⁶ The fact that the Bishop of London was in contact with prominent

Dutch politicians regarding the secret plan to bring William and Mary to England to seize the throne may have played into these trips and exchanges.⁴⁷

The lack of transparency around these technological developments is compounded by the inconsistent naming of garden buildings. As Woudstra has noted with reference to Hampton Court, a ‘Glass Case’ might also be called a ‘Green House’, and a different ‘Greenhouse’ could be called an ‘Orangery’.⁴⁸ While the exact way in which this technology developed is difficult to ascertain, it is clear that both the introduction of stove-houses (and likewise the adaptation of existing orangeries) and glass cases were significant developments in garden technology. The next section will give an overview of existing scholarship relating to Somerset’s garden buildings, followed by a closer look at the buildings in question.

II. An overview of existing scholarship

Somerset’s garden buildings have long been a puzzle. Back in 1968, Howard Colvin observed that Badminton’s ‘evolution has never been fully worked out’, and this has remained the case.⁴⁹ Colvin’s work on the mysteries of Badminton’s development (the house and estate), along with the work of others — namely Andor Gomme, Gervase Jackson-Stops, and Mark Laird — has served as a vital starting point for this research.⁵⁰ Laird’s work is the most recent examination of Somerset’s orangery and the Badminton estate and has been valuable for my own research. However, it is worth re-examining some of his claims, particularly as he concedes that the evidence informing his argument is ‘at times ambiguous’.⁵¹ In his various publications, Laird argues that Somerset’s horticultural successes are ‘baffling’ in light of his belief that she grew so many tropical plants ‘without [...] technological breakthroughs’.⁵² He also contends that Somerset’s spending was constrained until the death of her husband in 1700.⁵³ On the contrary, not only did Somerset engage in garden improvements at Badminton and Beaufort House (their home in Chelsea, London) both before and after the duke died in 1700; she was also in charge of the household accounts while he was alive.⁵⁴ Indeed, Somerset calculated that she had spent £29,760 13s 5d between 1664 and 1691 on refurbishing Badminton house and building the gardens.⁵⁵

Laird suggests that Somerset had her orangery updated to contain a heating system between 1698–1700.⁵⁶ Furthermore, he makes only passing references to her ‘infirmary’ plants and ‘stoves’, the existence of which, he adds, leaves ‘much unexplained’.⁵⁷ In his *Natural History of English Gardening* (2015), he considers that Somerset’s references to the ‘new stove’ and the ‘great conservatory’ both refer to the updated orangery.⁵⁸ Finally, he suggests that although Somerset was familiar with the most up-to-date technologies, she ‘relied on a “nursing” touch more than on new technologies of fire and glass’,⁵⁹ and while ‘one might expect to find [Somerset] adopting the new glass technology of Hampton Court [...] the (at times ambiguous) evidence suggests the contrary’.⁶⁰ New material has become available which raises questions about this interpretation and reveals a different narrative.

Laird’s primary visual evidence for arguing that Somerset only had an orangery that she converted into a ‘remedial’ stove-house is an undated and unsigned painting of the Badminton house and grounds.⁶¹ This painting shows the orangery which Laird argues had a heating system added to it between 1698 and 1700 (figures 3 & 4).⁶² In earlier work, Laird attributes this painting to a ‘Thomas Smith’, but in *Natural History of English Gardening* (his most recent on the topic), he revises this claim and suggests that it is ‘probably by an unknown artist’.⁶³ The attribution to ‘Thomas Smith’ can be dated to two sources: in a 1968 article for *Country Life*, Howard Colvin discussed this painting and attributed it to ‘a certain T. Smith’, but does not say Thomas.⁶⁴ John Harris, in his *Artist and the Country House* (1979) includes reproductions of several paintings of properties owned by the Duke of Beaufort, including this one and its accompanying piece oriented from the north, both of which he attributed to the ‘Thomas Smith’ who painted the Duke of Beaufort’s Welsh properties — but Harris comments that the paintings of the Welsh properties differed in style and size to the two paintings of Badminton.⁶⁵ Harris dates the paintings of the Welsh properties to c.1680–1690, yet dates the two paintings of Badminton to c.1705.⁶⁶ There is clearly confusion over both the dating and attribution of this painting (and equally of its counterpart oriented from the North). Where Colvin believed these paintings of Badminton to be from the end of the seventeenth or early in the eighteenth century, Harris dates them c.1705 and Laird goes further and dates it to c.1710.⁶⁷ Laird relies on his c.1710 dating when building his argument that Somerset only ever made remedial improvements to her orangery (he argues

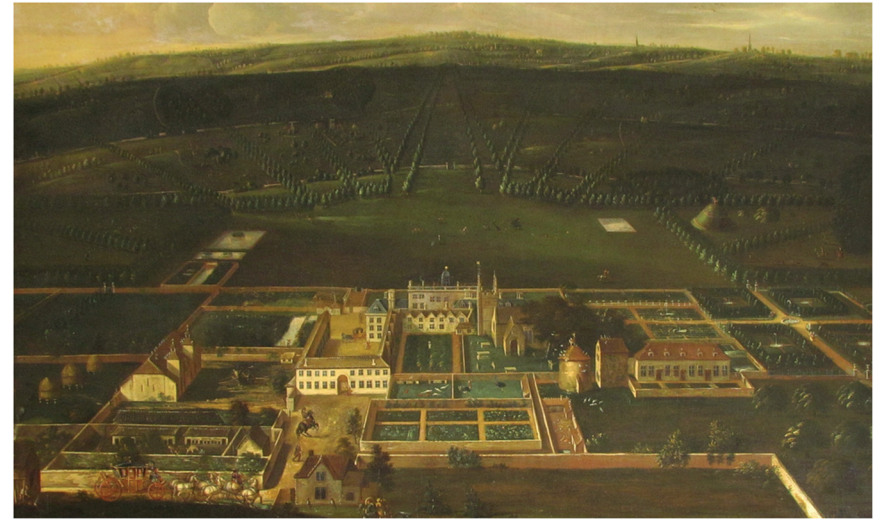


FIGURE 3. View of Badminton from the south, previously attributed to ‘T. Smith’ and dated c.1710s. Oil on canvas, 1000 × 1230 mm. Uncatalogued (from the private collection of the Duke and Duchess of Beaufort). Courtesy of the trustees of the Badminton estate.

that this painting only shows one orangery, and that it does not have any visible chimneys by 1710).⁶⁸

Laird’s dating of these paintings is based on what he believes is a new dairy, seen in the north view.⁶⁹ Laird argues that this dairy was designed by a William Killigrew under the orders of the second duke, and that this shows the transition of control to Somerset’s grandson, the second duke, around 1708–10.⁷⁰ It is unclear what evidence Laird is drawing upon as he does not cite any archival materials linking Killigrew to building a new dairy. In a 2006 article, however, Laird slightly backtracks on his claim: ‘A painting, attributed to Thomas Smith, appears to detail the structure in its post-1700 setting, although the provisional dating to c.1708–10 still requires scrutiny’, and in his *Natural History of English Gardening* (2015), he notes that this painting was ‘previously attributed to Thomas Smith but [is] of uncertain authorship, dated by John Harris to circa 1708–10’.⁷¹ Andor Gomme also acknowledged that due to his misreading of building proposals by a ‘Bateman’, just ‘how much’ and ‘what in particular’ was done ‘during the brief reign of the second Duke is

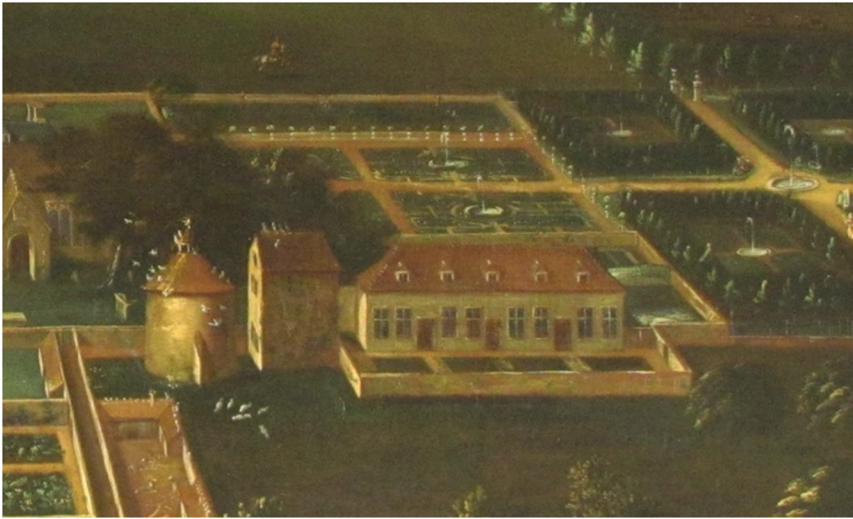


FIGURE 4. Detail of orangery in view of Badminton from the south, previously attributed to 'T. Smith' and dated c.1710s (figure 3). Courtesy of the trustees of the Badminton estate.

probably less certain now than [he] had supposed' in his previous articles on the topic of Badminton's architectural history.⁷²

Regardless of who painted the aforementioned view of Badminton, I would suggest that this painting is much older than Laird believes, and rather than dating from c.1708–10 it is more likely to be from the 1680s or even 1670s. This is not to say that the orangery in the painting did not exist — in fact it did as early as the 1670s, demonstrated by a painting of Badminton from the north, now held at Belvoir Castle and attributed to Hendrick Danckerts (1625–1680), which has a label dating it as '166[?]', confirming that there was an orangery at Badminton prior to 1670.⁷³

That this building just south of the main house shown in both paintings is an orangery is corroborated by a labelled map of the estate (figure 5) that is oriented north. The map is not dated, but it has the Duke of Beaufort's crest on it; as Henry Somerset was made the first Duke of Beaufort in 1682, it was made after that. The location of the south-facing orangery in the map (no. 73 – orange highlight) corresponds with the portrayal of the building in the two paintings by Danckerts and 'Smith', corroborating that an orangery existed at

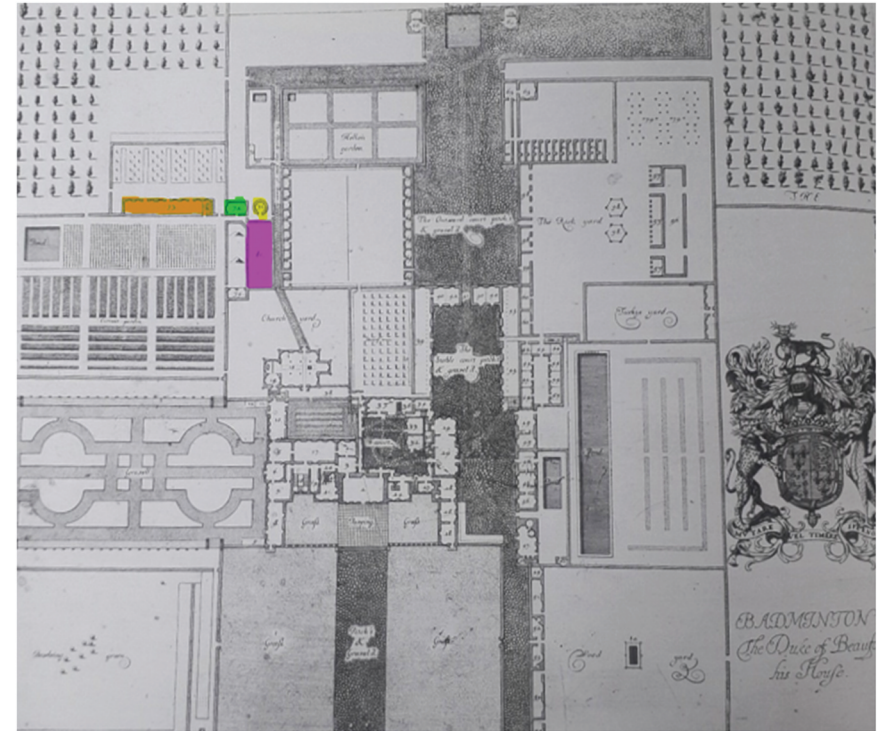


FIGURE 5. Unknown author, map of Badminton oriented from the north, c.1682. Ink on paper, dimensions unknown. Uncatalogued (from the private collection of the Duke and Duchess of Beaufort). Courtesy of the trustees of the Badminton estate. Orange, green, yellow, and pink highlight added by author. The orange shows the orangery, seen in both the Danckerts painting and the anonymous 'south' view of Badminton (previously attributed to 'Smith').

Badminton since the 1660s, when the Danckerts painting was made (and which includes this building). The map also includes the gardener's house (no.72 – green highlight) to the right of the green house, and the dovecote (no.71 – yellow highlight), behind which is a 'phisick-garden' (no.81 – pink highlight) that is not visible in the later painting. The orangery on the map has eight windows and three doors on the front (south-facing) side, which again corresponds with the painting. Consequently, by cross-referencing the

depictions of this building in both the post-1682 labelled map of Badminton and Danckerts’ earlier painting of Badminton from the 1660s, it can be confirmed that Somerset had at least one orangery at Badminton by 1669.

Happily, the orangery survives today, albeit in an evolved form (changes were made to it after Somerset’s time by her descendants) and without the nearby gardener’s house and dovecote (figure 6). The current orangery building at Badminton is approx. 289.56 m² (equivalent to 3,116.85 ft²).⁷⁴ The total length is approx. 33.08 m and the width is approx. 8.76 m.⁷⁵ Today there are eleven windows (some of which function as doors), which differs from the painting’s eight windows and three doors and indicating that the three original doors have been turned into windows.⁷⁶ The original roof has been replaced with a later eighteenth-century style, and adorned with decorative urns.⁷⁷ The orangery has an integrated heating system; there are

back-sheds at the north-facing rear of the building which have a subterranean level and evidence of former stoves, and the plumbing system can still be seen running under the floor into the main orangery building.⁷⁸ Whether or not Somerset was the first to add a heating system to this orangery, as Laird has argued, is likely but uncertain. This section has given an overview of previous scholarship and the claims that need to be re-examined. It has also shown that Somerset had at least one orangery at Badminton by 1669, demonstrating that she was an early adopter of this technology. The next section will introduce new evidence to demonstrate that aside from this orangery, Somerset had multiple cutting-edge garden buildings and stove-houses that made her a pioneer of such technologies.

III. Somerset’s stove-houses

In September of 1692, Somerset received a letter that she had been expecting from her estate manager, John Bale (fl.1690s), in which he gave a detailed description and measurements of ‘ye Queens new stoves at Hampton Court’, which William and Mary had very recently completed.⁷⁹ He tells her that:⁸⁰

There are three new separate stoves standing in a range wth their fronte Direct South all of one figure & Dimention except ye middle one wch is two fte more in Height than ye other two, ye reason of wch will appear in ye following description.

Each stove is 55 ft in length, 8 ft broad at ye bottome, & 5 ft broad at ye top, ye brick wall yt supportes each is 2 brick thick wth a wall of a brick & halfe at each ende, under all wch is a vault from ende to ende, about a yarde deep, in ye deepest place & without any separation, tho there bee four fires in it, at equall distance over each of wch is an iron plate of 3 ft broad & 7 ft long. Ye length lyeth ye longe way of ye vault, & ye plate is above an inch thick, upon wch is sand layd above an inch thick, & on that, Brick tiles 7 inches square, & about an inch & halfe thick layd in mortar, wth wch ye top of ye vault is cover’d, ye two end stoves are 10 ft in hight, covered at ye top wth thinn milld lead, layd on boards, & cover’d wth 1 inch boards to tread on, for at winter men must goe on ye top to shut it up, all ye front is Glass windows, of wch there are 14 doores to each yt are 7 ft longe & 3 ft 4 inches broad, opening back to back, ye hight above ye Doores is Glass but not to open, & ye front is hipd of from ye top, to ye top of ye flore of ye vault 3 ft, as is said above, soe yt ye whole frame seemes



FIGURE 6. *The Badminton orangery, taken from a South-East angle, June 2024. Author’s own photo. Courtesy of the trustees of the Badminton estate.*

to leane backward, & doth by it inwards attract much more heat from ye sunn, then wch is built perpendicular, in ye midst of ye stoves is a stand of 4 shelves standing at such a distance one from ye other as ye greens on them may be all seene, ye reason yt ye middle stove is two ft higher than ye other two is to house ye tallest plants, of wch those yt require ye greatest warmth stand on ye brick flore, ye rest on ye shelves.

In ye midst of each ende of each stove is an ayre hole 6 inches square wch is stop'd with a pane of glass in an wooden frame to open & shut on occations. on ye back side of ye aforesaid brick wall of two bricks thick is a shed of boards from ye top supported by boards from ye Ground 5 ft high incloseing a space of 5 ft in ye cleere from ende to ende wch is to shelter those yt make ye fires under ye stoves, to each stove, (as said before) are 4 fire places to each of is a grate in ye forme of a little wagon, wth upright halfe inch barrs of iron on each side & at ye further ende, ye hither ende is left upon to lay billets in for nothing is burnt in it but oake billets, it runns upon 4 iron wheels yt are 4 inches diameter, & is Drawne out by an iron crooke (the grate is one ft wide, one ft deepe, & 2 ft 10 inches longe) when ye fire is made in it & burns cleere it is runn into ye vault, where ye way is soe directed yt ye force of ye heat reacheth ye middle of ye foresd plate of iron. There is an iron doore & frame in ye wall to shutt it close, ye smoke of two fires is carried off by one chimney ye contrivance of wch I could not see, but every chimney hath a lattice tunnell in it to ye bottome, at ye top it turns off about 3 ft backward like a crane to carry ye smoke from ye stove for ye least ayre of smoke coming into ye stove spoyles all ye greens, to prevent wch ye inside of each stove is lin'd wth 1 inch board all over except ye flore wch is on ye top of the vault & ye front wch is all glass doores, wch boards are rabbited one into ye other as close as arte can doe it, & all painted white soe yt if any smoke should enter it would discolour it soe as to discover ye place. The distance between each of ye 3 stoves is 6 ft, & ye brickwall under ye glass windows in ye fronte is a ft & half in hight wch reaches ye top of ye vault.⁸¹

The level of detail in Bale's report is striking, and Somerset clearly took a keen interest in the technological advancements at Hampton Court that went beyond amateur curiosity. Notably — if the information that Bale reported accurately reflects the information that Somerset desired — she was not interested in the visual or aesthetic appeal of these structures so much as the technological intricacies of the heating systems and the materials used. Indeed, there is no information about what plants (if any) are housed in the structure — the focus is entirely on the technology of the stove-house itself. It is equally significant that Somerset did not send one of her gardeners to perform

this task for her, but instead asked the estate manager, who would have been familiar with the properties of the Badminton estate; this indicates that her interest in the buildings (rather than plants) was paramount.

It seems unlikely that Somerset would have commissioned this detailed report if she were not serious about having her own stove-house built. Given the amount spent on the Badminton estate and Beaufort House in Chelsea (which the duke purchased in 1682), finances were not an issue. It seems odd that Somerset would have waited until 1698 (six years after this report) to convert her existing orangery into a stove-house. Unless, of course, she already had a stove-house and was interested in finding out if those at Hampton Court were better than hers.

In this letter to Hans Sloane, which Laird has tentatively dated to 1699, Somerset discusses a new conservatory at Badminton:

I hope in God my Lords health will not make mee wish you in this place, but if any thing else would bring you this way, it would please mee extreamly to have you see what a great con[servatory] my Lord has made for all curiositys beside the stoves, under a south wall of 18 ft high is a walke of 220 ft long 10 ft broad, the middle is a row of Orreng trees in the ground fill'd up between wth all sorts of stove plants, a border under the wall, halfe of it planted wth Adhatoda Rus Indian Laurell &c most of them reach the top of the wall, the other halfe in pots on a shelf & on the ground resembles a hedge, these being [the next word may be 'almost' but here a whole line is missing] this place has 4 fier places the smoake warming it under two paved walks, one that parts the middle from the border under the wall, the other along by the windows & doores, the rooffe is half glasse the other ^'being next to the wall'^ deale [softwood timber], in manner of windows to raise to let in raine & aire in very hott weather, every thing grows extravagantly, one plant is now in flower that I fancie has not blowne in England.⁸²

Somerset explicitly distinguishes this conservatory from 'the stoves'. Somerset tells Sloane that her 'great conservatory' has a walk of 220 ft, meaning the two paved pathways presumably formed a circular walk, with the row of orange trees and stove plants in the middle.⁸³ Somerset tells Sloane that there are four fires inside, and that the roof is 'half glasse'. Laird argues that in this letter to Sloane, Somerset is describing the same orangery as seen in 'Smith's' painting, but he also acknowledges that 'the painting shows only five dormer windows in addition to the eight main windows that aided ventilation', rather than the roof of 'half-

glasse’ that she describes.⁸⁴ On the contrary, it is clear that by the time of writing this letter, Somerset not only had ‘stoves’ of some kind, but had also either converted her original orangery and/or had a new one built that housed these four fires and had a roof that was half made of glass. Additionally, I suspect that Laird has dated the letter to 1699 as she refers to her ‘Lord’, (her husband, Henry), who died in 1700, in which case 1699 is the latest it could have been, but certainly not the earliest.⁸⁵ That the ‘great conservatory’ is ‘beside the stoves’ could mean that geographically it was physically next to (or adjoining) the stoves, or it could mean ‘in addition to’ the stoves. Either way, by the time of writing (no later than 1699), Somerset clearly had access to multiple garden buildings, and at least some were heated. Evidently, the great conservatory had a roof half made of glass, which strongly suggests she understood the benefits it (and/or light) had for plants. The evidence indicates that Somerset’s plants did well in these conditions. For example, in another undated letter to Sloane, Somerset is pleased to report that her plants are growing so well that some of them had to be cut back as they are growing too high, namely those ‘that are in the ground again[st] the wall in the orengree wch is 18 foot high’.⁸⁶ Despite this, Laird argues that Somerset’s orangery and dormer windows were ‘no match for the vast windows and glass hot houses’ that Magdalena Poulle (1632–1699) constructed at her home of Gunterstein in the Netherlands.⁸⁷ On the contrary, the evidence indicates that Somerset’s garden technologies were every bit as advanced as Poulle’s.

For example, Samuel Doody (1656–1706), keeper of Chelsea Physic Garden, sent Somerset a selection of plants in 1691 that included cotton, guava(s), and mango(s) (whether seeds, seedlings, or mature plants is not stated).⁸⁸ Somerset notes on the accompanying list that some of the seeds/plants Doody sent her are the same as those ‘in the stove’, showing that she in fact had at least one stove-house from 1691.⁸⁹ This is further corroborated by a list of her ‘Sensitive Plants’, in which Somerset notes that her ‘Rivinus Minor’ plants were ‘sow’d Apprill 1691’ and ‘produced a great quantity of seed both in the garden and stove but will not thrive in the gallery nor well in the orreng houses’, showing that by 1691 she also had more than one orangery and a ‘gallery’ that she kept plants in.⁹⁰ Therefore, Somerset not only had an orangery from the 1670s, she also had at least one stove-house by 1691, a year before those at Hampton Court were completed.

Furthermore, in one of Somerset’s (undated) manuscript lists, she refers to a ‘Sophera’ and has noted that it is ‘the plant in the little stove wth the long seed

like a sena’.⁹¹ By distinguishing that it is in the ‘little’ stove, this strongly indicates there was at least one other larger stove too. Additionally, in a letter to her daughter Anne, Somerset uses the plural when she tells her daughter that she is ‘very busy in the stoves where [her] things thrive well’.⁹² The letter can be dated between 1690 and 1700, as Somerset refers to ‘my Lord’,⁹³ meaning that the Duke was still alive at this point (he died in 1700), who sends his best wishes to ‘Mr Coventry’, referring to Anne’s husband, whom she married in 1690.⁹⁴ Consequently, Somerset was aware of — and actively engaged with — the latest horticultural technological developments of her era, and commissioned at least two stove-houses by 1700.⁹⁵ This discovery demonstrates how pioneering Somerset was both technologically and horticulturally. It shows that Somerset not only knew about this technology earlier than most, but had commissioned her own stove-house before William and Mary had their famous ‘stoves’ at Hampton Court.

This section will build on this discovery by examining new archival evidence to gain a fuller understanding of the scope and extent of Somerset’s stove-houses and other garden buildings. There are several relevant manuscripts in the Badminton archives which have been anonymously and provisionally dated (presumably by a previous archivist). There is no extant information about the cataloguing of these items to explain the dates given. These dates may be incorrect and consequently may have muddled the waters in terms of better understanding the timeline of some of the technological developments at Badminton: there are several items that need to be reconsidered. For example, in September 1709, shortly before moving to Beaufort House in Chelsea, Somerset made a list of things that she intended to leave at Badminton, having sold them to the second Duke, her grandson Henry.⁹⁶ This list is broken down by room, and lists several items of furniture to be found in various rooms of the house and garden buildings.⁹⁷ Notably, the list includes the ‘orangere’ with five cane chairs, valued at £10; the ‘great orange house’, with a nest of drawers, two tables, various cane chairs and two stools; the ‘little orange house’ which contained a cane couch and two chairs valued at £12.⁹⁸ This shows that there were at least three orangeries at Badminton by 1709. While it does not mention any stove-houses, this is probably because they likely did not contain any furniture. Additionally, No.46 in her accounts book is a list of ponds at Badminton which includes an entry for ‘the Lillie house’, which is missing from the

inventory list discussed above, confirming that the inventory's focus on furniture means that it is not a comprehensive account of all garden buildings at Badminton.

In one of her account books that has anonymously been dated to c.1700, Somerset has recorded an estimate for the cost of 'building the new stove', which she has broken down into the work to be done by each tradesman:⁹⁹

Mason:

The wall of the Room on each side is to be 20 ft long 15 broad & 14 high. The northside to be made double wall with a span between the whole will amount to 50 perch. The workmanship of it and Lime (there being a sack of lime to every two perch of wall is valued at 1 sh., 6d Perch for making the main pipe that is to lead the smoak from the small pipes up with the sunn[same?] of the orr [orange] House and making the small pipes and fire place and finding Lime for both for breaking a door way into the orr [orange] house and making it up and making the floor and finding Gripps &c; the mason asks ... £11:10:00

Carpenter:

Timber of all sorts. Ab. 2 Tunn valued at 30sh tun and the carpenter works at £4.

£07:00:00.

Plaster:

About 2 perch of Tyle Lime hath nails and workmanship at £3 and about 80[?] yards of plaistering with Lime hair nails hath at £3 more both.

06:00:00.

£24: 10: 00.

This costing shows that Somerset wanted two stove-houses added either side of one of her orangeries. Significantly, it also shows that she intended for them to have double walls (flues) on the north side to conduct the hot air (rather than a hypocaust system whereby the heat is produced beneath the floor). In this instance, the fires were housed in back-sheds behind the north wall. Somerset's envisaged stove was to carry heat through a network of smaller pipes to one larger pipe feeding into a chimney or outlet. It is significant that this quote specifies wall flues rather than underground heating, meaning that Somerset was aware of this new technological advancement at a point when Hampton Court was likely the only other place in the country to have them — indeed, this quote could pre-date the flue stove-houses at Hampton Court.¹⁰⁰ Whether or not these stoves were actually built, this quote demonstrates that Somerset was not only aware of

the latest technological developments, but actively pursued quotes to have the same technologies brought to Badminton (or, possibly, Chelsea).¹⁰¹

The next item of evidence to be reviewed from the Badminton Muniments is a manuscript list in what looks to be the hand of her gardener and catalogue scribe, George Adams (fl.1690s–1710s), entitled 'Dimensions of great and little orange houses', with 'Dimensions of ye Greenhouses & Stoves at Badminton' written on the verso in another hand:¹⁰²

The greate Orrange house at Badminton

Height – 13: Fte

Breadth – 16: Fte

Length – 98: Fte

3: Doores height 11: Breadth 5: ½

7: Window's height 9: Breadth 5: ½

The Stove at the end of that house

Height – 12: Fte

Breadth – 12: Fte

Length – 15: Fte & ½

The fflat at the Top 8: Fte ½. Height of the Wall that the Glasses shootes upon 2: Fte ½.

The Little Orrange House

Height 13: Fte

Breadth 16: Fte

Length 67: Fte

2: Doores 11: Fte

This manuscript has been anonymously dated as c.1711; however, Somerset moved to Beaufort House in Chelsea in 1709, so it seems highly unlikely that she (or Adams) would have made these lists after then.¹⁰³ Notably, none of these edifices match the description Somerset gave to Sloane in her letter describing her 'great conservatory', which had four fires and was 18 ft high. It could be that the great conservatory had been demolished by the time this list was made, or that it had not been built at this point, or that the building she described to Sloane was an integration of this building with a stove attached and modifications to the height and roof. The 'little orange house' does not have a stove, unlike the larger orangery. It is quite possibly the same small green house that Somerset called her 'infirmary', as noted by Sloane on the

front page of one of her herbarium volumes.¹⁰⁴ As noted above, the stove included in the list is seemingly attached to the ‘great orange house’. It is much shorter in length than the others, but roughly the same height and depth. The phrase ‘flatt at the top’ presumably refers to a flat roof that is 8 ½ft. It is unclear whether the measurement of 8½ft refers to the length or width of the roof, but either way it would be significantly less than the orangery (the width of which is 12 ft and the length is 15 ½ft). The use of a smaller flat roof on the stove indicates that the glass windows were fitted at an angle. Importantly, the dimensions state that the windows take up most of the overall height of the stove, with 2 ½ft of wall at the bottom to support the glass, meaning the rest (9 ½ft) was glass. Significantly, this indicates that Somerset had ‘glass cases’ akin to those at Hampton Court. Furthermore, when comparing the dimensions of Somerset’s ‘great orange house’ (with the attached stove) and her little orange house with the dimensions of the glass cases at Hampton Court, it becomes evident that these particular garden buildings at Badminton were bigger in length, breadth, and height than those at Hampton Court, meaning that Somerset had the capacity to house a larger collection of tropical plants than the monarchs.¹⁰⁵

These technologically advanced stove-houses and glass cases explain how Somerset was able to create the various climates needed to successfully grow the seeds and plants sent to her from different corners of the world. Previous scholars have assumed that her tropical and tender plants were all kept in the same building, but due to the health of many of her tropical and arid specimens (as evidenced by her herbarium) this seems unlikely: Somerset’s plant catalogues demonstrate that as early as 1694 she had successfully grown fruiting cotton at Badminton.¹⁰⁶ The presence of this glass-heavy edifice that would concentrate the heat and light goes a long way towards explaining how Somerset was able to grow fruiting cotton in the English climate. Whether this stove is the one she referred to in her 1691 lists or whether it was a later model is unclear, but, regardless, it remains the case that Somerset was one of the first in England (if not the first) to have a Dutch stove or ‘glass case’.¹⁰⁷ This technological advancement corroborates Sloane’s observation that the plants in Somerset’s garden were ‘very well preserved and flourishing there better then [*sic*] in any garden of Europe’, and how ‘sickly and unthriving plants’ were taken to the ‘small green house’ where they were cared for by a female gardener (named Martha Marsh) and Somerset, until they were

brought to a ‘greater perfection then [*sic*] at Hampton Court or anywhere’.¹⁰⁸ Sloane’s words are clear — Somerset’s gardens exceeded those at Hampton Court, due to both the horticultural skill of herself and her team of gardeners (including Martha) and her ‘greenhouse’ technology. This explains why Somerset did not commission a new stove based on the information Bale brought her from Hampton Court in 1692 — she already had her own stove-houses and likely wanted to find out whether or not William and Mary had surpassed her own. Her lack of action at Badminton after receiving the report suggests that they had not.

The final and most compelling piece of evidence is a letter that the botanist William Sherard (1659–1728) sent to Hans Sloane in November 1700, whilst Sherard was living at Badminton. Sherard tells Sloane that:

Monsr Fagon has desired ye plan of my Lady Dutchesses stoves, having just built a serre [stove-house] in ye garden at Paris, & designing stoves; he has a model of those of Amsterdam & I have sent him these here, wch are ye best I ever saw especially ye long one.¹⁰⁹

‘Monsr Fagon’ refers to Guy-Crescent Fagon (1638–1718), the director of the French Royal Gardens and physician to Louis XIV.¹¹⁰ This letter confirms that not only did Somerset have multiple ‘stoves’ by 1700, but that they were the best Sherard had ever seen, ‘especially ye long one’ — and it is important to note that Sherard had travelled Europe and seen the stoves at the botanic gardens in Amsterdam and Leiden.¹¹¹ Furthermore, the fact that the renowned Fagon, working on behalf of Louis XIV, not only wanted to see plans of Somerset’s stoves but thought them worth comparing with those in Amsterdam, is a clear testament to how technologically advanced they were. It is not known whether Fagon proceeded with building replica stoves after those at Badminton, but the fact that he (and Sherard) thought them worth contemplating at all for the premier French botanical garden demonstrates their value and international status.

IV. *Britannia Illustrata* (1707)

Having established that Somerset’s gardens were home to pioneering garden buildings, including cutting-edge stove-houses, I will now use a series of visual sources to uncover where these newly discovered buildings were

located in the grounds. There is one visual source in particular that can better illuminate where these garden buildings were: *Britannia Illustrata* (1707), which includes multiple depictions of the Badminton estate from different perspectives, but the two most relevant images are reproduced below (figures 7 and 8).

Leonard Knyff (1650–1722) and Johannes ‘Jan’ Kip (c.1652–1722) (the artist and engraver of the volume) were known for their detailed depictions of bird’s-eye views of landscapes.¹¹² While visual sources can, of course, be misleading, the Kip and Knyff illustrations from *Britannia Illustrata* are likely to be reliable, based on the accuracy of other illustrations in the volume. For example, the detail of the parterre design shown in their portrayal of

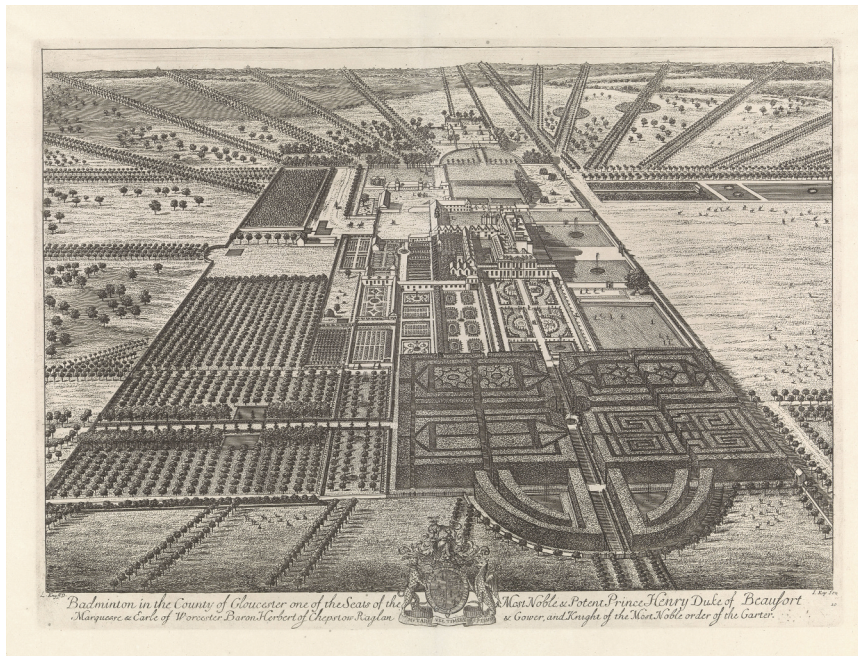


FIGURE 7. Plate 10, ‘Badminton from the East’, from Jan Kipp and Leonard Knyff, *Britannia Illustrata* (1707). Etching on paper, 355x485mm. Record no: RP-P-1949-370. Public Domain. Rijksmuseum, Amsterdam.

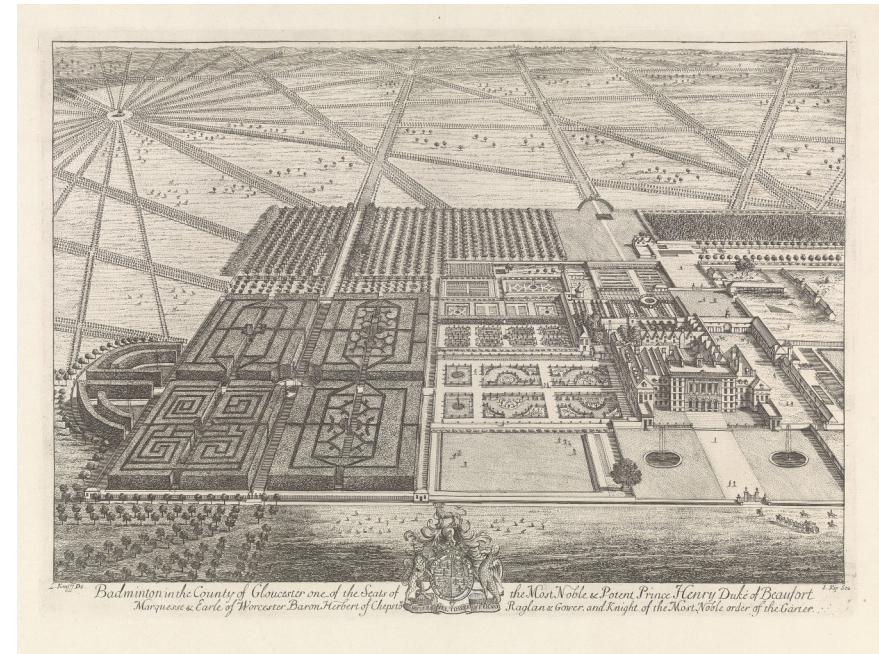


FIGURE 8. Plate 9, ‘Badminton from the North’, from Jan Kipp and Leonard Knyff, *Britannia Illustrata* (1707). Etching on paper, 355x490mm. Record no: RP-P-1949-371. Public Domain. Rijksmuseum, Amsterdam.

Chatsworth House was proven to be accurate in the summer of 2021 when the parched gardens unveiled some of the early eighteenth-century design.¹¹³

Knyff’s original paintings of Badminton, from which the engraving were made, were created around 1699, and show multiple changes compared to (what I argue is) the earlier depiction of the estate and gardens in the previously discussed painting attributed to ‘Thomas Smith’.¹¹⁴ In Knyff’s 1699 depiction, the original orangery from the ‘Smith’ painting remains (figures 9 and 10; yellow highlight) but the older gardener’s house appears to have been replaced with a longer building (figures 9 and 10; blue highlight), the front of which looks onto the embroidered garden in front of the orangery. This new building has back-sheds running along 2/3 of the back wall (on the dovecote side, see figure 10). These back-

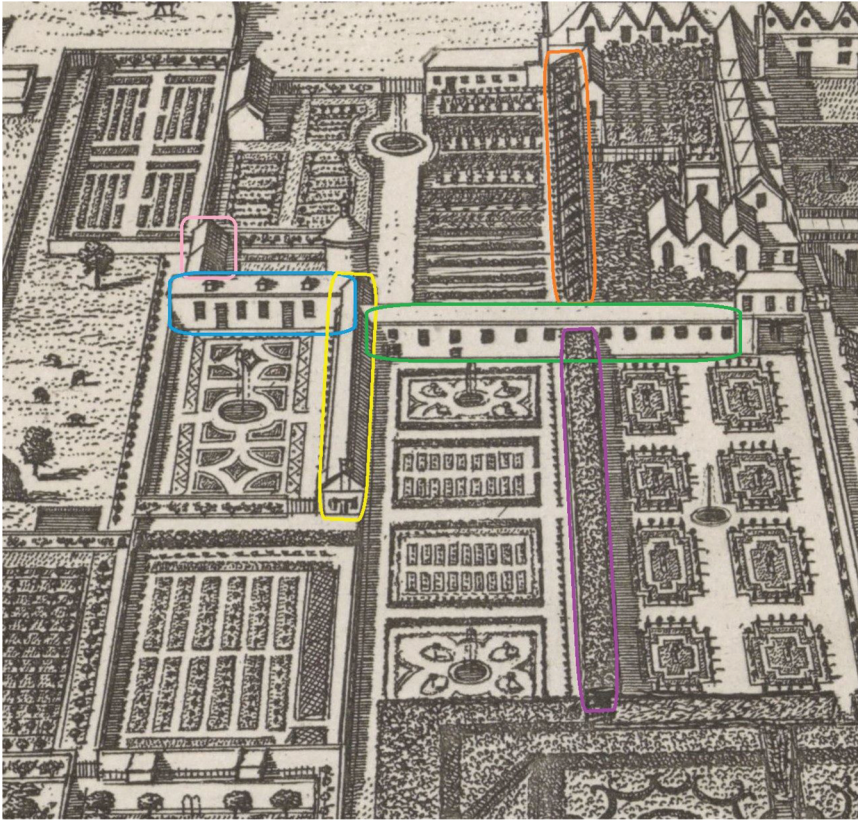


FIGURE 9. Detail from Figure 7 (Kip and Kniff's plate of Badminton oriented from the East). Coloured highlights added by author. The original orangery = yellow highlight; the updated/extended gardener's house = blue highlight; an unknown building = pink highlight; glass cases = orange highlight; greenhouse = green highlight; and covered walk, adjoining greenhouse = purple highlight.

sheds indicate the presence of furnaces, so this building may have been one of Somerset's heated garden buildings. The building perpendicular to this (figures 9 and 10; pink highlight) could plausibly be the new gardener's house, keeping him close to the orangeries. The dovecote remains in the same location and looks to be unchanged. The layout of the garden plots

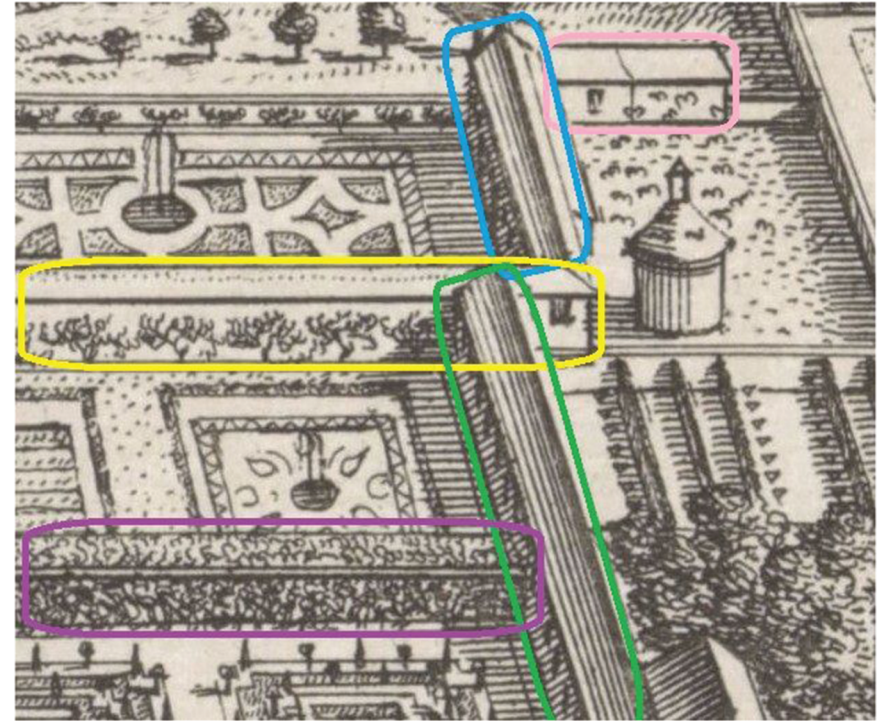


FIGURE 10. Detail of Figure 8 (Kip and Kniff's plate of Badminton oriented from the north). Coloured highlights added by author. The original orangery = yellow highlight; the updated/extended gardener's house = blue highlight; an unknown building = pink highlight; glass cases = orange highlight; greenhouse = green highlight; and covered walk, adjoining greenhouse = purple highlight.

has changed in some superficial respects, but the dimensions look to be roughly the same. Another notable difference in Kniff's depiction (compared to the earlier 'Smith' and Danckerts depictions) is the addition of a long building perpendicular to the orangery, which appears to join onto it (figures 9 and 10; green highlight). This new building (green highlight) looks like it could be an orangery or stove-house, particularly as it adjoins the original orangery to the south, and there appear to be glass cases to the west (figures 9 and 10, highlighted orange).

One contemporary account can clarify what these buildings are.¹¹⁵ Cassandra Willoughby, the Duchess of Chandos (1670–1735), visited Badminton in 1697, and recorded it in her diary.¹¹⁶ Her detailed account includes several observations relating to the gardens, such as her comment on the ‘22 fountains’ which, in her opinion are ‘too small’, as well as the ‘several fish ponds’, and the wilderness of elm trees which is ‘very fine’ with the floor covered with a variety of plants such as ‘primroses [and] periwinkle’.¹¹⁷ The walks throughout the wilderness (the maze) are contrived to ‘center one in another’, with ‘fountains appearing every way’, which ‘render it one of the most surprisingly pleasant places [she has] seen’.¹¹⁸ Notably, she describes a very long shaded canopy ‘Arbour like walk’ (probably similar to the covered arbour depicted in figure 11) that leads from ‘one of the Green houses to the Wilderness’.¹¹⁹ Significantly, this corroborates that there was more than one ‘green house’ by 1697.¹²⁰ It also gives us some idea of where it was located, being linked to the wilderness by a canopied path, and therefore suggesting this was a site to view, and not a nursery that was tucked away from visitors’ eyes. Additionally, Willoughby reports that the gardens are about 50 acres in size, and this includes ‘the courts and all the nurseries for plants &c which with the Green Houses are very neat and very fine’.¹²¹

Furthermore, we can see that the building highlighted in green on the Knyff images (figures 9 and 10) is adjacent to a canopied arbour walk that leads from the building door right up to the wilderness (purple highlight), and so this confirms that the green highlighted building adjoining the original orangery (yellow highlight) is indeed what Willoughby refers to as ‘one of the green houses’. Significantly, this confirms that there was another very large garden building next to the original orangery which has previously been overlooked. It is perhaps this building that Sherard referred to as ‘ye long [stove]’ in his letter to Sloane, discussed above.¹²² The orange highlight shows another development — what appears to be a line of lean-to glass cases (or one long continuous case) that joins up to a building with some sort of furnace or stove (as demonstrated by the chimney) (figures 9 and 12).

Furthermore, Somerset’s glass cases are south-facing, and situated behind what looks like a garden of ornamental plants, in addition to plants in pots placed immediately in front of the glass cases; this context situates it literally and figuratively amongst her other plants. The row of plants laid out in front of it can easily be imagined to be made up of plants that have been brought



FIGURE 11. Detail from Hans Simon Holtzbecker, ‘barockgarten des Caspar Anckelmann (1634–1698) zu Hamburg’, c.1669. Gouache paint on parchment, 324 × 400 mm. Held at Staatliche Museen zu Berlin (GNU licence).

out from these cases, as well as perhaps from the stove building at the end and the orangery. The building with the stove seems likely to be related to plants given its location, but further evidence is needed to corroborate this.

‘MATCHLESS STOVES’

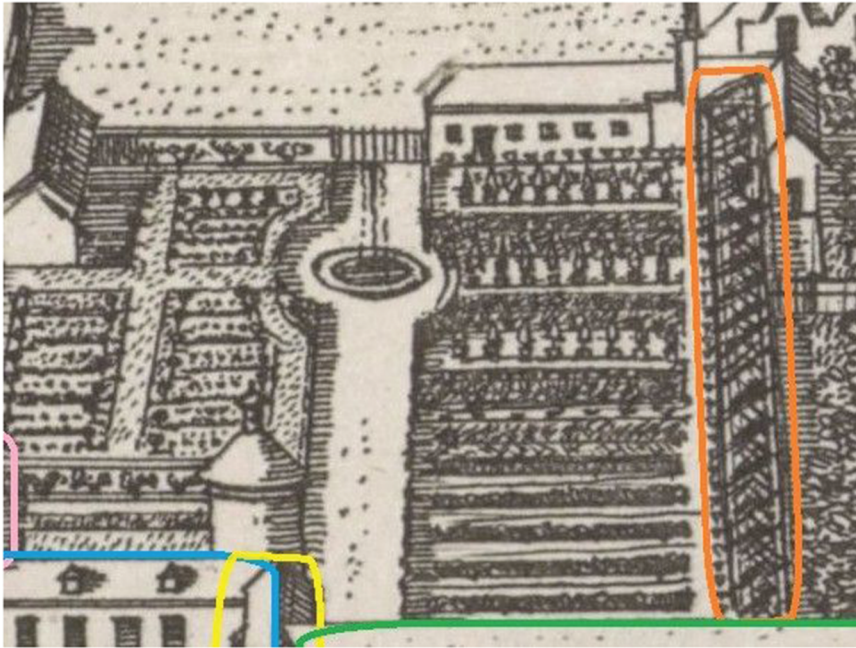


FIGURE 12. Detail from *Figure 8* (Kip and Knyff's plate of Badminton oriented from the East). Coloured highlights added by author. The original orangery = yellow highlight; the updated/extended gardener's house = blue highlight; an unknown building = pink highlight; glass cases = orange highlight; greenhouse = green highlight.

Finally, there is a small structure which flanks the main house (*figure 13*, red highlight). This small structure looks like it has three windows at an angle. The angle of the structure looks similar to the longer row of south-facing glass cases along from the orangery, and although north-facing, this too looks like a small 'case' for plants, especially when compared to other similar structures depicted in contemporary sources. For example, the orangery at Gunterstein in the Netherlands, the home of Magdalena Poulle (a contemporary of Somerset who was renowned for her horticultural abilities) was depicted in c.1680s showing an orangery with a two 'hothouses' - one either side of the orangery (*figure 14*).

While the Kip and Knyff illustrations are unlabelled and therefore unable to confirm whether these unidentified buildings and structures are indeed orangeries and stove-houses, they demonstrate the significance and extent of the scope of garden buildings at Badminton by 1707 (although in reality probably by 1699, assuming dramatic changes did not take place to the paintings during the engraving process), and offers the viewer some clues as to the locations of the Badminton orangeries and stoves.¹²³

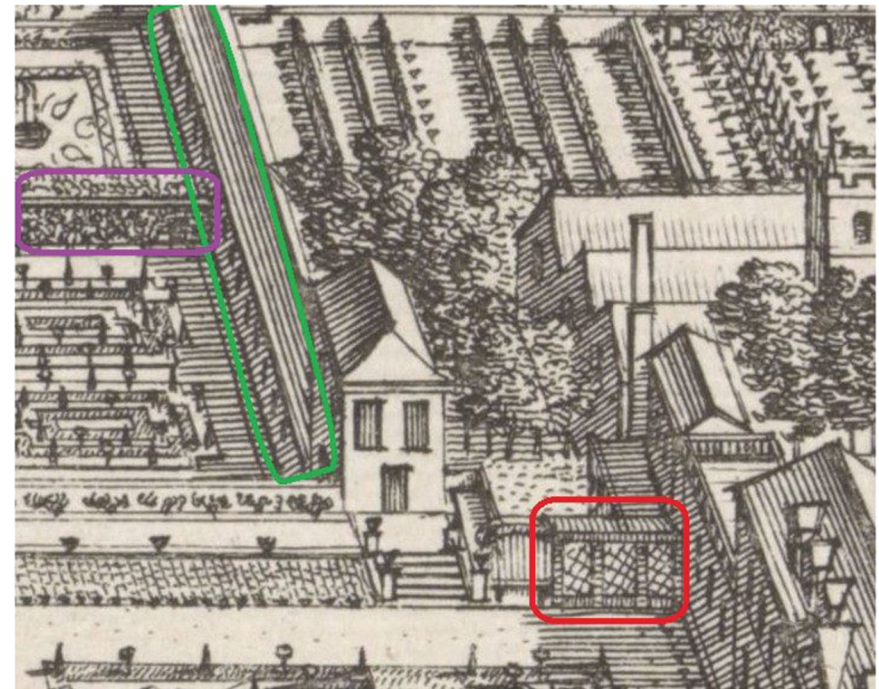


FIGURE 13. Detail from *Figure 7* (Kip and Knyff's plate of Badminton oriented from the north). The greenhouse = green highlight; covered walk, adjoining greenhouse = purple highlight; small structure, possibly stove = red highlight.

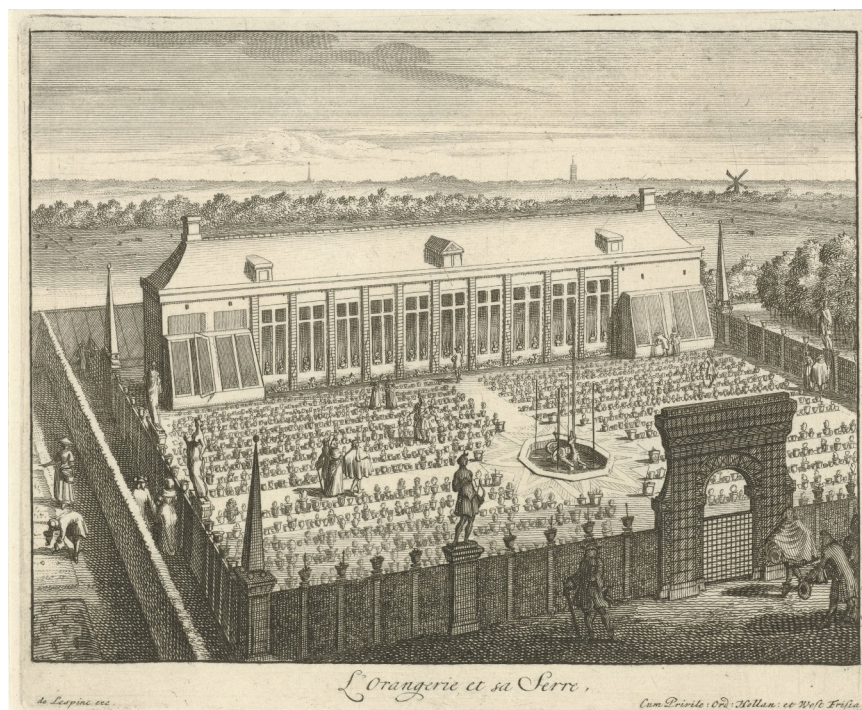


FIGURE 14. Joseph Mulder, 'Orangerie van Kasteel Gunterstein, Breukelen', 1680–1696. Etching, 131 × 160 mm. Rijksmuseum RP-P-1899-A-21594, public domain.

Having multiple garden buildings would have enabled Somerset to create the different microclimates necessary for growing plants from various continents, which partially explains why so many renowned botanists recorded their delight at seeing the variety of plants growing in her gardens. In 1701, Sherard wrote to his friend and fellow botanist, Richard Richardson (1663–1741), to report on 'the noble gardens her Grace my Lady Duchess has', which in a few years will 'outdo any yet in Europe, being furnished with all the conveniences' imaginable 'both for raising and preserving' plants, corroborating that certainly by this point (if not earlier) Badminton housed several types of garden buildings to support its large and diverse collection of plants.–

¹²⁴ This is further verified by a letter from Sherard to Richardson a few weeks later, on the 24 March 1701, in which he tells Richardson that at Badminton

they run 'most upon Stove Plants'.¹²⁵ A year later, Petiver wrote of Somerset's 'matchless stoves' in which he was able to see so many 'New Rare and very curious Plants' that were 'raised to that Perfection' which he had never seen before his visit to Badminton, 'that Paradise of a Garden', in 1702.¹²⁶ While the chronology of these garden buildings is significant in demonstrating that Somerset was a pioneer of garden technology, it is also true that regardless of what garden buildings she had and when, her plant collections were exceptional in their quality and range.

Notably, she was the first to grow a fruiting guava (*Psidium guajava*) in England. As William Aiton noted in *Hortus Kewensis* (1789), Somerset's dated catalogues show she had a guava by 1692 (and actually, she had received them from Samuel Doody in 1691, as discussed above).¹²⁷ By March of 1693 she recorded a guava plant that she had grown to 3 foot.¹²⁸ Somerset not only kept tropical guava plant(s) alive in the English climate, she also managed to get at least one guava tree to fruit by 1699. Minutes from the Royal Society's meeting on 20 December 1699 report that Sloane showed everyone several plants that had been sent from Badminton, many of which were from the East India [Company] seeds that the Society sent her to grow on their behalf.¹²⁹ The plants on display included some fruits that 'never were seen in England', such as 'cotton ripend wch produc'd seed in that garden', the 'china orange[s] and Guavas', which had been 'brought & ripend near & had their flavour[, with] Many of them growing on ye Same branch'. The tree from which they were cut was '15 foot high'. These guavas are described as being 'akin to a pomegranate' except there are no 'partitions in ye fruit'.¹³⁰ Almost thirty years later, in 1728, the botanist Richard Bradley (1688–1732) believed that she was still the only person to have been able to get this plant to fruit in England.¹³¹ Two years after Bradley's remark, John Cowell, in his book *The Curious and Profitable Gardener* (1730), recalls that the first guava he ever heard of ripening in England was at Badminton under the care of Somerset, who he credits with beginning 'Exotic Gardening' in England.¹³² Cowell adds that Somerset was able to grow guava trees more than sixteen feet high in her 'fine Greenhouses', with several of them having ripe fruit in time for Christmas, which she brought to the table for her guests to try — some fresh from the tree, and others preserved in sugar.¹³³ Cowell's account not only corroborates that Somerset had multiple heated buildings, but that she was able to replicate tropical conditions in them so well that she managed to have fruiting guavas at Christmas time in England. It is interesting to note that Somerset was serving the fruits of her labour (literally and figuratively) to guests at the dinner

table; in serving these guavas Somerset was effectively showing her guests how botanically and horticulturally skilled, technologically advanced, fashionable, and powerful she was. Marisca Sikkens-De Zwaan has recorded how Magdalena Poulle’s stove-houses in the Netherlands were a small but significant ‘breakthrough in a new technical science by which the cultivation of exotics made enormous progress’.¹³⁴ The same can be said of Somerset for her impact on the development of these technologies in England.¹³⁵ As a consumer as well as a botanist, Somerset used her wealth to embrace these new technologies from the continent, and in doing so rivalled the monarch’s garden.¹³⁶

This article has shown that both the chronology and scope of Somerset’s garden buildings are open to revision. Woudstra has argued that the ‘application of technology’ in horticulture in the seventeenth century was focused on creating conditions that would enable temperate and tropical plants to survive, rather than thrive. Technology in the era was, he argues, ‘an evolution based on ad hoc techniques that involved wrapping or indoor storage’, which prioritised saving plants from the frost over encouraging growth.¹³⁷ While this may be largely true, Somerset was an exception to this trend. Her financial privilege, scientific and technological know-how, and her consumer awareness enabled her to invest in the latest technology for housing plants in suitable conditions. This, coupled with her horticultural skill, meant that more often than not, her plants survived *and* thrived.

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NOTES

1. James Petiver, ‘An Abstract of some Collections received, not mentioned in my former Centuries’, in *Musei Petiverani* (1695), p.94.
2. Mark Laird, ‘Greenhouse Technologies and Horticulture. The 1st Duchess of Beaufort’s

Badminton Florilegium (1703–5) and J. J. Dillenius’s *Hortus Elthamensis* (1732)’, in *Technology and the Garden*, ed. by Michael G. Lee and Kenneth I. Helphand (Harvard University Press, 2014), pp.55–77 (p.55).

3. See, for example, Gordon Rowley, ‘The Duchess of Beaufort’s Succulent Plants’, *Bradleya*, 5 (1987), 1–16.
4. These plants are listed in her catalogues. While it does not appear that she was able to bring the

- pineapple plant to fruition, the ability to grow the plant at all in the English climate must have depended on a reliable source of warmth and a good deal of horticultural skill. Somerset sent a pineapple plant in 1694, and Adams was offered 'Pines a ffrut' in 1696, so it is possible that Badminton was home to multiple pineapple plants. See: London, British Library, Sloane MS 3343, f.52; and Francesca Beauman, *The Pineapple: King of Fruits* (Chatto & Windus, 2005), p.68. Somerset still had pineapple plants by 1713, as 'A Catalogue of my Lady Dutchess of Beaufort's dry'd Plants in Dec 1713' includes an entry for 'Ananas the rare Pine'. See: London, British Library, Sloane MS 4070, ff.145–176 (f.159^v).
5. See: Gordon Rowley, 'The Duchess of Beaufort's Succulent Plants', *Bradleya*, 5 (1987), 1–16; and Mark Laird, *The Natural History of English Gardening: 1650–1800* (Yale University Press, 2015).
 6. Laird, 'Greenhouse Technologies and Horticulture', p.71. On the contrary, while living at Badminton, William Sherard wrote to Hans Sloane on the 23 November 1700, saying: 'I thank you heartily for ye Books, her Grace has them all'. London, British Library, Sloane MS 4038, f.92^v.
 7. '28 March 1688', *Diary of John Evelyn, Volume IV: Kalendarium, 1673–1689*, ed. by E.S. de Beer, (Oxford University Press, 1955), p.576. See also: Mark Laird, 'Perpetual Spring' or Tempestuous Fall: The Greenhouse and the Great Storm of 1703 in the life of John Evelyn and his contemporaries', *Garden History*, 34 (2006), 153–173 (p.157). This is the only reference to a 'Myrtetum' in print, according to the OED, and it is surmised to mean 'a place devoted to the cultivation of species of myrtle'. Entry 'Myrtetum', *Oxford English Dictionary*, n.d. <<https://www.oed.com>> [accessed 27 May 2026].
 8. James Petiver, 'An Abstract of some Collections received, not mentioned in my former Centuries', in *Musei Petiveriani* (1695), p.94.
 9. Jan Woudstra, 'Much better contrived and built than any other in England': Stoves and Other Structures for the Cultivation of Exotic Plants at Hampton Court Palace, 1689–1702' in *Technology and the Garden*, ed. by Michael G. Lee and Kenneth I. Helphand (Harvard University Press, 2014), pp.79–107 (pp.79–80).
 10. Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World* (Harvard University Press, 2007), p.58. See also: India Cole, 'The Duchess of Botany: The Pioneering Botanical Collecting, Cultivating, and Cataloguing of Mary Somerset, Duchess of Beaufort (1630–1715)', (unpublished thesis, Queen Mary University of London, 2025), pp.58–82.
 11. Jennifer Munroe, 'Mary Somerset and Colonial Botany: Reading Between the Ecofeminist Lines', *Early Modern Studies Journal*, 6 (2014), 100–121, (p.102).
 12. Cole, p.72.
 13. Katie Donington, 'Cultivating the world: English country house gardens, 'exotic' plants and elite women collectors, c.1690–1800', in *Global Goods and the Country House: Comparative perspectives, 1650–1800*, ed. by John Stobart (UCL Press, 2023), pp.381–403 (pp.383–387).
 14. Donington, p.387; Cole, pp.26; 58–59; 73.
 15. It is worth noting that Korea had the technology of 'ondol' underfloor heating since c.5000 BC. However, this technology does not seem to have crossed into Europe.
 16. Woudstra, 'Much better contrived', p.79.
 17. 'By means of Stoves and Infirmarys, many of them have come to greater perfection, than in any part of Europe'. Hans Sloane, *A voyage to the islands Madera, Barbados, Nieves, S. Christophers and Jamaica* (London: 1707) I, p.iv.
 18. Billie S. Britz, 'Environmental Provisions for Plants in Seventeenth-Century Northern Europe', *The Journal of the Society of Architectural Historians*, 33 (1974), 133–144 (p.136).
 19. 'Conservatory' comes from the need to 'conserve' plants from the cold; 'orangery' comes from their initial use, which was primarily of displaying oranges and other Mediterranean citrus plants. Likewise, 'greenhouse' refers to the tender 'greens' that were kept in these buildings.
 20. Britz, p.133.
 21. See, for example, John Parkinson, *Paradisus in Sole, Paradisus Terrestris* (London: 1628), p.584. Parkinson advises his readers to keep oranges in 'great square boxes, and lift them to and fro by iron hooks on the sides, or cause them to be rowled by trundels, or small wheeles under them, to place them in a house or close gallery' when the weather gets cold.
 22. Woudstra, 'Much better contrived', p.81.
 23. James Rothwell, 'History of glasshouses, orangeries and garden sheds', *National Trust Blog*, [n.d.], <<https://www.nationaltrust.org.uk/discover/history/gardens-landscapes/history-of-glasshouses-orangeries-and-garden-sheds>> [accessed 27 May 2026].
 24. Presumably the openings shown in this image were doorways that could be closed to keep in the warmth.
 25. Woudstra, 'Much better contrived', p.79.
 26. Woudstra, 'Much better contrived', p.79.
 27. Woudstra, 'Much better contrived', p.87.
 28. It is unclear if people initially distinguished between integrated heating and portable stoves, indeed, Woudstra adds: 'The iron stove was identified so much with this progress that buildings intended for the cultivation of plants were referred to as 'stoves', even as the heating technology evolved to address the requirements of the more tender plants'. See: Woudstra, 'Much better contrived', pp.79–80. Furthermore, Sally Jeffery has corroborated that the term 'stoves' is interchangeable with 'hothouse'. See: Sally Jeffery, 'George London in the Netherlands in 1685', *Garden History*, 50 (2024), 24–48 (p.33).
 29. See, for example, the detailed descriptions of the stoves/glass-cases at Hampton Court, discussed

- later in this article. ‘Glass case’ may have sometimes been used interchangeably with ‘stove’ and ‘stove-house’, but ‘glass cases’ were not necessarily heated.
30. Marisca Sikkens-De Zwaan, ‘Magdalena Poulle (1632–99): A Dutch Lady in a Circle of Botanical Collectors’, *Garden History*, 30 (2002), 206–220 (p.212). To this I add the caveat that the term ‘stove’ was in use before then, likely referring to orangeries with portable stoves rather than buildings with integrated heating systems, but this is not certain. For example, as early as 1629 John Parkinson advised that the ‘Indian flowring Reede’ needs to be kept in a ‘stove or hot-house, such as are used in Germany’. John Parkinson, *Paradisi in Sole* (1629), xciii, p.376.
 31. Jeffery, p.31; Woudstra, ‘Much better contrived’, p.92.
 32. It should also be noted that the Beauforts purchased their Chelsea home in 1682, which neighboured Chelsea Physic Garden. This is significant in light of the fact that Chelsea Physic Garden possibly had the first stove-house in England. Somerset certainly had a relationship with the Physic Garden and associated people (namely Samuel Doody and James Petiver) in the 1690s, and it is plausible that she would have visited their new stove-houses soon after they were built. Indeed, one of her manuscript notes refers to ‘Mr Watts Stoves’, and gives an overview of the two ‘weather glasses’ in them: ‘the weather glasse on the hottest stove was in march betwixt 8: and 9 – the weather glasse in the other stove between 6 and 7 which they say is as hott as June’ (London, British Library, Sloane MS 3343, f.154^v). This note is undated, and Laird has given it a rough dating of 1689–91 (Laird, *Natural History*, p.85); it cannot have been later than 1692, when Doody took over from Watts, but it may well have been written earlier. See also: Woudstra, ‘Much Better Contrived’, p.85.
 33. Woudstra, ‘Much better contrived’, p.85; Laird, ‘Perpetual Spring’, 153–173; Jeffery p.37.
 34. Woudstra, ‘Much better contrived’, p.85.
 35. ‘6 August 1685’, *Diary of John Evelyn, Volume IV: Kalendarium, 1673–1689*, ed. by E.S. de Beer, (Oxford University Press, 1955), p.462.
 36. ‘Hans Sloane to John Ray, 11 November 1684’, in *The Correspondence of John Ray*, ed. by Edwin Lankester (London: 1848), pp.156–158. Sloane updated Ray on how the plants were faring in these stove-houses in a subsequent letter dated 20 December 1684, which is archived in New York at the Morgan Library, ref: MA4265 (Record ID: 193 916).
 37. Notably, Evelyn calls it a conservatory, rather than a stove-house, demonstrating the inconsistency in terminology for garden buildings at this time. A heated conservatory and stove-house seem to be interchangeable, to Evelyn at least.
 38. Woudstra, ‘Much better contrived’, pp.93–94; p.85.
 39. Woudstra, ‘Much better contrived’, pp.79–80.
 40. John Evelyn, *Kalendarium Hortense* (1699), p.157. Quoted in Laird, ‘Perpetual Spring’, p.158.
 41. Laird, ‘Perpetual Spring’, p.158.
 42. Laird, ‘Perpetual Spring’, p.158.
 43. Laird, ‘Perpetual Spring’, pp.157–158; Woudstra, ‘Much better contrived’, p.79.
 44. Jeffery, ‘George London in the Netherlands’, p.43.
 45. Woudstra, ‘Much better contrived’, p.102.
 46. Jeffery, ‘George London in the Netherlands’, p.85.
 47. Interestingly, Jeffery shows how London’s patron, Henry Compton, was in a network of secret correspondence with Dutch contacts, such as Fagel and Bentinck, about bringing William and Mary to the English throne. They used discussion of garden design and plants to ‘mislead anyone who intercepted their letters’. Additionally, it is worth noting that as London was in contact with Somerset, it is not implausible that he was one source of stoves for her. See: Jeffery, ‘George London in the Netherlands’, p.43.
 48. Jan Woudstra, ‘The Re-instatement of the Greenhouse Quarter at Hampton Court Palace’, *Garden History*, 37 (2009), 80–110, (p.82).
 49. Howard Colvin, ‘Georgian Architects at Badminton’, *Country Life*, (1968), 1–2, (p.1).
 50. Colvin, ‘Georgian Architects at Badminton’, *Country Life*, (1968), 1–2; Andor Gomme, ‘Badminton Revisited’, *Architectural History*, 27 (1984), 163–181; and Andor Gomme, ‘Badminton Once More’, *The Georgian Group Journal*, 5 (1995), 111–114; Gervase Jackson-Stops, ‘Heritage on Record: Country House Archives’, *Country Life*, 166 (1979), 1679–1680; and Mark Laird’s several publications relating to Badminton and the first Duchess of Beaufort, cited throughout this article.
 51. Laird, ‘Perpetual Spring’, p.163.
 52. Laird, ‘Greenhouse Technologies and Horticulture’, p71.
 53. Laird, ‘Greenhouse Technologies and Horticulture’, p.66. It would be a very quick turnaround to go from only owning one orangery to building a range of stoves and converting the orangery within the period of three or four years — particularly as in early 1700, she would have been dealing with the grief of losing her husband alongside the administration of the estate and acting as guardian to her grandson, the now second duke.
 54. See, for example: Gloucestershire, Badminton Muniments, D2700/RF/1. This is an accounts book in Somerset’s hand, titled ‘The House Book, beginning Munday ye 8th of August 1687’, which goes up to 1690. Other examples of accounts books in her hand include FmF 3/3, which is a book of personal and domestic accounts 1660–63; and FmF 3/5–8 and QA3/1, which are accounts and receipts in her hand; all held at Badminton Muniments.

55. Gloucestershire, Badminton Muniments, FmI 3/7. Cited in Hilary A. F. McKee, 'The Bird's Eye Views of L. Knyff and J. Kip, as published in *Britannia Illustrata*, and their use for understanding historic landscapes' (unpublished doctoral thesis, Oxford Brookes University, 2004), p.135.
56. Laird, 'Perpetual Spring', p.164.
57. Laird, *Natural History*, p.104; Laird, 'Greenhouse Technologies and Horticulture', p.67.
58. Laird, *Natural History*, p.102.
59. Laird, 'Perpetual Spring', p.153, p.165.
60. Laird, 'Perpetual Spring', p.163.
61. Laird, 'Greenhouse Technologies and Horticulture', pp.66–67. Laird reproduces the painting on p.97. This painting remains in the personal collection of the current Duke of Beaufort.
62. Laird, *Natural History*, p.102. Furthermore, entry no.50 in one of the Badminton Accounts books (401.1.1) dated 23 October 1710 outlines an agreement with a Willam Stuart, outlining his responsibilities as a gardener at Badminton for which he was to be paid £240. These responsibilities include looking after 'all the plants in the Stoves and Green Houses', demonstrating that there were still stoves at Badminton by 1710, a year after Somerset had been exiled to Chelsea. How much longer they survived after her departure though, is unclear. Gloucestershire, Badminton Muniments, 401.1.1.
63. Laird, *Natural History*, p.97, p.102. Additionally, see: Laird, 'Exotics and Botanical Illustration' in *Sir John Vanbrugh and Landscape Architecture in Baroque England*, ed. by Christopher Ridgway and Robert Williams (Sutton Publishing, 2000), pp.93–113, in which he further discusses this painting. In footnote 42 (p.224), he explains that his dating of these paintings is derived from the opinion of the architectural historian John Harris, who 'suspects that the Smith paintings represent the actual layout in the period after 1706, possibly around 1708–10 when the old laundry was already built'.
64. Colvin, 'Georgian Architects at Badminton', p.800.
65. John Harris, *The Artist and the Country House* (Phillip Wilson Publishers on behalf of Sotheby's, 1979 [1985]), p.95: 'There is a difference between the views of Raglan, Chepstow and Troy and the pair of Badminton, not only in style, but also in size'. Reproductions of paintings by (and/or attributed to) Thomas Smith can be found pp.121–127.
66. Harris dates the paintings of the Welsh properties to c.1680–1690, yet dates the two paintings of Badminton to c.1705. See: Harris, *The Artist and the Country House*, pp.123–124; p.125.
67. Colvin, 'Georgian Architects at Badminton', p.800; Harris, *The Artist and the Country House*, p.125; and Laird, *Natural History*, p.105.
68. Laird relies on his c.1710 dating when building his argument that Somerset only ever made remedial improvements to her orangery (i.e. the building he highlights in this painting is the building where it all happened, and by 1710 it still looked like an orangery without any visible chimneys). Laird, *Natural History*, p.104.
69. Laird, 'Greenhouse Technologies and Horticulture', p.66.
70. Laird, 'Greenhouse Technologies and Horticulture', p.66.
71. Laird, 'Perpetual Spring', p.158; Laird, *Natural History*, p.66.
72. Gomme, 'Badminton Once More', p.112.
73. Hendrik Danckerts (c.1625–1680), 'A View Towards the North Front of Badminton House, Gloucestershire, circa 1670' (indistinctly signed and dated 166[?]). It is held at Belvoir Castle and is part of the private collection of the Duke of Rutland. It is reproduced in Laird, *Natural History*, p.106 and John Harris, *The Artist and Country House from the Fifteenth Century to the Present Day: Exhibition to Benefit the Prince of Wales's Institute of Architecture* [paperback exhibition catalogue edition] (Sotheby's, 1996), pp.26–27.
74. Taken from Google Maps, n.d. <<https://maps.app.goo.gl/rJYNYETFPAPFuC8p6>> [accessed 4 June 2024].
75. Taken from Google Maps, n.d. <<https://maps.app.goo.gl/rJYNYETFPAPFuC8p6>> [accessed 4 June 2024].
76. The raised ground directly in front of the orangery has possibly been added at a later date, explaining why the windows now reach the floor — alternatively the wall beneath the original windows could have been knocked through and replaced with larger windows that reach the floor.
77. For information on the additional works (proposed and actual) done to the orangery in the eighteenth century, see: Gomme, 'Badminton Revisited', 163–181; and Gomme, 'Badminton Once More', 111–139. Gomme posits that the architect Thomas Bateman designed (or, I would argue, updated) the orangery in 1711, due to an elevation in his hand that 'shows a façade very similar in form and proportion to the existing one, though with only eight bays instead of eleven and a balustrade instead of the plain parapet'. Furthermore, there is a 'nearly identical elevation', also in the Badminton archives, that proposes a 'modest extension' to the existing orangery. Gomme believes this is in the hand of Francis Smith, whom he believes to have lengthened and reconstructed the orangery in the 1730s.
78. Indeed, this system is now used to heat the swimming pool which has been added in front of the orangery.
79. Laird, *Natural History*, p.104: 'The Dutch Carpenter Hendrick Floris had built these stoves in 1689 at a cost of £113.12.3 ½, and was granted a gratuity of £2 for the extra effort involved'.
80. See Woudstra's discussion of this letter along with his reconstruction drawing: Woudstra, 'Much better contrived', pp.80–83. 'Mr Harcourt' refers to Godfrey Harcourt, who worked for the Badminton Estate as, it seems, an accountant or debt-collector of sorts. This is surmised from surviving records in the Badminton Muniments.

‘MATCHLESS STOVES’

81. London, British Library, Sloane MS 4062, f.246.
82. London, British Library, Sloane MS 4078, ff.385–86. This manuscript is undated, so the 1699 dating is Laird’s assessment.
83. Rowley, p.3. Rowley makes this suggestion based on a personal communication with the late botanist, David Hunt. It is, of course, possible that she is referring to a much larger conservatory.
84. Laird, *Natural History*, p.101.
85. While it is possible that she might be referring to her grandson (the second Duke of Beaufort) as ‘my lord’, this seems unlikely in the context, particularly as she fears for his health.
86. London, British Library, Sloane MS 4061, f.25.
87. Laird, ‘Greenhouse Technologies and Horticulture’, p.66.
88. Woudstra, ‘Much better contrived’, p.85. See also: London, British Library, Sloane MS 3343, f.11.
89. Sloane MS 3343, f.11. Elsewhere she refers to three lily roots that Doody sent her in 1691 which were ‘kept two year in the stove’. London, British Library, Sloane MS 4070, ff.39–40.
90. Sloane MS 4070, ff.48–52. See also: Roger North, *The Life of the Right Honourable Francis North* (W. Clarke and Sons, 1819), which refers to the family and guests having breakfast in a gallery that ‘opened into the gardens’ (p.258), whilst another gallery provided a passage to the church (p.259), and yet another gallery was regularly used by the ‘diverse gentlewomen’ of the household to ‘work upon embroidery and fringe making’ (p.259). It is tempting to wonder if these women were surrounded by tender plants whilst busy at work with their embroidery.
91. London, British Library, Sloane MS 4070, f.289.
92. Gloucestershire, Badminton Muniments, FmT/B1/2/1.
93. This could possibly be her grandson, but it seems far more likely to refer to the Duke, indicating that this was written prior to 21 January 1700, when the Duke died.
94. Anne married Thomas, Earl of Coventry in 1690. Molly McClain, *Beaufort: The Duke and his Duchess* (Yale University Press, 2001), p.190, citing: Gloucestershire, Badminton Muniments, FmF4/2/2.
95. I use the term ‘technology’ in the sense of definition 4.c. given by the Oxford English Dictionary, namely to denote a ‘process, method, or technique [...] developed from the practical application of scientific and technical knowledge’. Entry: ‘technology’, *Oxford English Dictionary*, n.d. <<https://www.oed.com>> [accessed 27 May 2026].
96. Gloucestershire, Badminton Muniments, D2700/QA3/1, ff.160–177.
97. There are four banqueting houses, which each included one ‘squab’ (sofa), tables, and cane chairs. The banqueting house located ‘near the bowling green’ also contained various gardening tools, namely ‘Diverse rollers and wooden seats[,] copper watering pots &c’ which she valued at £10. The list also includes ‘Mr Steward’s Room’ (the gardener), a room for the ‘under gardeners’, and the bird keeper’s room. D2700/QA3/1, f.177.
98. D2700/QA3/1, f.177.
99. An Accounts Book in Somerset’s handwriting, anonymously and tentatively dated to c.1700. Gloucestershire, Badminton Muniments, 401.1.1.
100. Woudstra, ‘Much better contrived’, p.102.
101. Once again, these measurements do not line up with any of the other orangeries discussed; this could be because this was a quote she chose not to pursue, or it could refer to another stove-house currently unaccounted for.
102. Undated and unsigned manuscript titled ‘Dimensions of great and little orange houses / Dimensions of ye Greenhouses & Stoves at Badminton’. Gloucestershire, Badminton Muniments, FmF2/5.
103. Somerset’s grandson (the second Duke) forced her to leave Badminton in September 1709, when she headed to Beaufort House in Chelsea, where she remained until she died in 1715. See: McClain, p.206.
104. London, Natural History Museum, London, H.S.66. The other volumes are H.S.235, and H.S.131–142.
105. For example, the combined total length of the three garden buildings listed in Somerset’s aforementioned list of dimensions total 180 ft, as opposed to a total length of 165 ft for the cases at Hampton Court.
106. London, British Library, Sloane MS 4070, f.58^v.
107. I am indebted to Dr Stephen Smith for kindly sharing his expertise. His helpful comments on this and other aspects of this work have been invaluable.
108. Martha worked for Somerset in her gardens, as commented on by Sloane in the preface to her herbarium (H.S.66). A letter from Somerset’s gardener to James Petiver dated 17 March 1703 refers to her as Martha Marsh, wife of Issac. London, British Library, Sloane MS 3321, f.115^r. Martha also provided Somerset with plants, as demonstrated by a specimen of some peas ‘sent by Martha’ in Somerset’s herbarium. London, Natural History Museum, H.S.132, f.8.1a. There were certainly other gardeners working for Somerset over the years, although it is not always easy to locate them in the archival records. One notable exception is an entry in one of Somerset’s account books for payment of £720 to ‘Mr Stewart[,] Gardiner’ for his work between 23 October 1710 and 23 October 1713. Gloucestershire, Badminton Muniments, D2700/QA3/1, f.281.
109. ‘William Sherard to Hans Sloane, 23 November 1700’. London, British Library, Sloane MS 4038, f.92.
110. Sloane MS 4038, f.92.
111. Sloane MS 4038, f.92. Sherard was in Holland in 1688.
112. McKee, p.7.
113. Unknown Author, ‘History Revealed’, *Chatsworth House Press Release* (2022), <<https://>

- www.chatsworth.org/news-media/news-blogs-press-releases/history-revealed/>. Compare this to the parterre show in the depiction of Chatsworth House (pl.17) in *Britannia Illustrata* (1707): <https://www.britishmuseum.org/collection/object/P_M-21-16> [accessed 25 May 2026].
114. While the text was published in 1707, McKee has shown that the original surviving Badminton illustrations made by Knyff remain at Badminton and have the date 1699 in the bottom left corner. The date was scraped off the plate of the image when it was later included in *Britannia Illustrata*. See: McKee, p.11. I have also located four payments made to Knyff between 1701–1704 (£20 on 9 October 1701 for ‘doing plates of Badminton’, £10 on 29 December 1701, £7.17 on 8 January 1702, and £7.10 on 8 June 1704). The 1701 and 1702 payments were likely related to the drawings and/or paintings he made in 1699, but the reason for the 1704 payment is unclear. Edinburgh, Natwest Archives, Mary Somerset’s Customer account ledger of Child & Co, c.1700–1715, CH/194/11, ff.130–134.
 115. Elizabeth Hagglung, ‘Cassandra Willoughby’s visits to country houses’, *The Georgian Group Journal*, 11 (2001), 185–202 (p.196). Citing: Cassandra Willoughby, ‘An Account of the Journeys I have taken & where I have been since March 1695’ (manuscript journal). Stratford-upon-Avon, Shakespeare’s Birthplace Trust, Stoneleigh MSS, SCLA,DR18/20/21/1.
 116. Hagglung, p.196.
 117. Hagglung, p.196.
 118. Hagglung, p.196. For an explanation and detailed analysis of wildernesses in this period, see: James Bartos, *The Ornamental Wilderness in the English Garden* (Unicorn, 2022).
 119. Hagglung, p.196.
 120. The wilderness was there from at least 1693, at which point she records there were ‘Wiltshire white bean[s]’ growing there. See: London, British Library, Sloane MS 4070, ff.62–63.
 121. Hagglung, p.196.
 122. ‘William Sherard to Hans Sloane, 23 November 1700’. London, British Library, Sloane MS 4038, f.92.
 123. McKee, p.11.
 124. ‘William Sherard to James Petiver, 11 December 1700’. London, British Library, Sloane MS 4063, ff.54–55. He was hired, ostensibly, to be a companion to the young Duke, but he seems to have primarily been employed to advise Somerset on her plants and aid her in building her collections.
 125. ‘William Sherard to Richard Richardson, 24 March 1701’. Oxford, Bodleian Library, MS Radcliffe Trust c.1 f.48.
 126. Jacob Petiver, *Musei Petiveriani centuria prima, rariora naturæ continens: viz. animalia fossilia, plantas, ex variis mundi plagis advecta, ordine digesta, et nominibus propriis signata. A Jacobo Petiver* (1703), Century 09, Item 890, p.90. The final segment, ‘centuries 9 and 10’ were published in 1703, so he is referring to the summer of 1702. Elsewhere, he recorded how he saw the Cape Bladder Nut growing ‘5 or 6 Yards high’ (approximately 5 metres) in Somerset’s stoves at Badminton. See: *Philosophical Transactions* 28:337 (London: 1713), p.218.
 127. ‘Red Guava. Nat. of the West Indies. Introd. 1692, by the Duchess of Beaufort. Br. mus. Sloan. mss. 525 and 3349. Fl. June and July’. William Aiton, *Hortus Kewensis* (London: 1789), II, p.157.
 128. London, British Library, Sloane MS 4071, f.143.
 129. London, Royal Society, ‘20 December 1699’ in *Journal Book of the Royal Society Volume 10, minutes of meetings 1696–1702*, JBO/10.
 130. ‘20 December 1699’ in *Journal Book of the Royal Society Volume 10, minutes of meetings 1696–1702*, JBO/10.
 131. Richard Bradley, *Dictionarium Botanicum* (1728), I, p.394.
 132. John Cowell, *The Curious and Profitable Gardener*, (London: 1730), pp.35–36.
 133. Cowell, pp.35–36.
 134. Sikkens-De Zwaan, p.212.
 135. It is notable that women were some of the first people to adopt the latest horticultural technologies of stoves and glass cases. Queen Mary (1662–1694) at Hampton Court, and Magdalena Poulle (1632–1699) and Agnes Block (1629–1704) in the Netherlands were all early adopters of heated garden buildings for their tropical plants. See: Marisca Sikkens-De Zwaan, ‘Magdalena Poulle (1632–99): A Dutch Lady in a Circle of Botanical Collectors’, *Garden History*, 30 (2002), 206–220 (p.215). Agnes Block is recorded as the first person to fruit a pineapple in Europe — she accomplished the feat in 1687, and could not have done so without her stove-houses. Block’s stove-houses were operating by 1685, as George London visited her garden (Vijverhof) then and commented on them. See also: Woudstra, ‘Much better contrived’, p.92.
 136. In this respect, her engagement with stove-houses is perhaps also political, serving as a means of displaying her ambitions for her family in a socially acceptable way.
 137. Woudstra, ‘Much better contrived’, p.79.