

The Heated Garden Walls at Belsay Hall

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This paper reports on research commissioned by English Heritage for the purposes of establishing an understanding of the heated walls at Belsay, known as hot-walls, and assessing the significance of the structure in relation to the estate. The information was needed because urgent repairs were required due to structural deterioration at the west end of the wall. Recording was undertaken prior to, and throughout, dismantling and rebuilding. Although the stabilisation of the structure was the priority, English Heritage is now also considering bringing part of the hot-wall back into use.

The English walled garden developed from domestic courts adjacent to large houses. These courts were of varying dimensions and were built to house a range of facilities, such as drying yards and kitchen gardens, which serviced the household. Walls provide excellent shelter and the microclimate they created was increasingly exploited in order to cultivate more tender plants. By the sixteenth century new varieties of apples, pears, plums, nectarines and soft fruits were being introduced from France and the Low Countries. Many of these fruits, originating from a European climate, required warmer growing conditions for their fruit to ripen properly and achieve full flavour. It was this requirement which lay behind the development of hot-walls.

The first recorded English example of this type of wall was at Belvoir Castle, where it was reported by a "Mr Lawrence, who in 1718 observes that he had heard that the Duke of Rutland at Belvoir Castle in Lincolnshire, hastened his grapes by having fires burning from Ladyday to Michaelmas behind his sloped Walls, a report to which he evidently does not

give implicit credence, but which it is easy to conceive. That such however, was the fact was confirmed by Switzer, who further adds in 1724, that they were covered with Glass" (Johnson 1829, 152).

On some estates, especially in the north of England, a system was developed for forcing fruit trees into early growth by warming the walls through heated flues. This heated garden wall provided sufficient warmth to encourage fruit trees to flower earlier than naturally predisposed in a cold climate. Once in flower the blooms required protection from frost until pollination had occurred and the fruits had become 'set'; the hot-wall provided this protection. Not only were the ripening fruits then encouraged to develop by the heated wall but the heat also helped the wood of the tree to ripen, and thus produce viable buds for blossom and fruit the following year.

NORTHERN HOT-WALLS AND BELSAY

Although hot-walls were built in the south of England on estates such as Audley End (Essex) and Parnham (Dorset), the majority were constructed in northern areas, where the late spring frosts were more likely to damage fruit tree blossom. Hot-walls were consequently built at estates such as Tatton Park in Cheshire, Croxteth Hall near Liverpool, and Burton Constable, Kirkleatham, Castle Howard and Norton Conyers in Yorkshire. In the north-east region hot-walls had been built at Gibside by c. 1771 (H. Beamish : personal communication) whilst Lady Monck recorded, in her diary, visiting Woolsington Hall where the gardens had heated walls (EHP&G II). East of Belsay at Meldon Hall a hot-wall was built in c. 1832

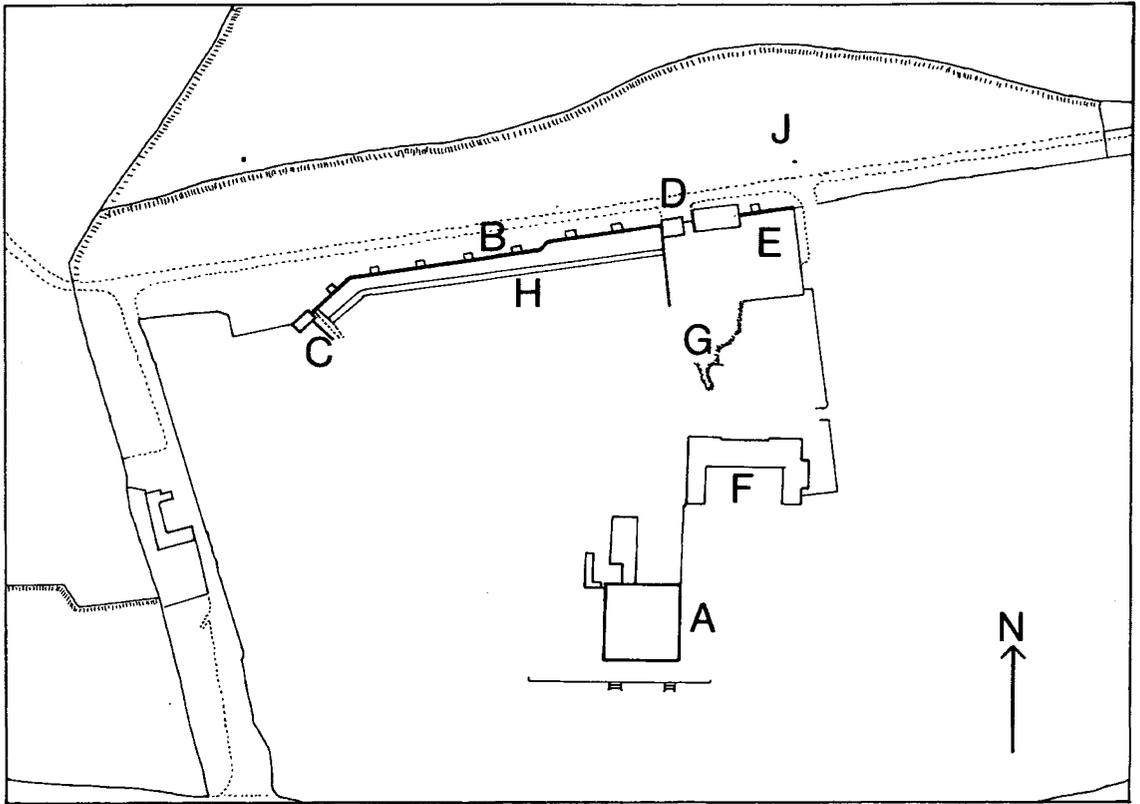


Fig 1. Location of the heated garden walls at Belsay; based on the 1864 Ordnance Survey 25 inch map (not to scale). Key: A: Belsay Hall; B: Hot Walls; C: Unheated Walls; D: Old Garden House; E: Enclosed Walled Garden; F: Stables; G: Quarry; H: Terraced Walk; J: Plantation

for Isaac Cookson (1777–1851). The most influential estate in Northumberland at the time of Sir Charles Monck's improvements at Belsay, however, would have been the property of the Dukes at Alnwick Castle. There the walled garden was undergoing radical development after the introduction of a new conservatory in 1829, which included a lily pond and a parterre laid out on the foreground.

Sir Charles Monck designed his 'state of the art' hot-wall at Belsay Hall in c. 1833 (figs. 1, 2). He was clearly fascinated by the cultivation of fruit and the new hot-wall was an important feature designed to complement the 'modern' hall, which had been completed in 1817. The range of hot-walls were an extension to the enclosed walled garden, the area approached

across a paddock which is planted at the west end with 'Highflyer' walnut trees, so named after a favourite racehorse (NRO ZM1/S/38, 1827). The level of the ground in the paddock rises from the east and the garden walls were constructed to compensate for this, with the planting beds rising in steps accordingly. A stepped wall retains the garden path and also forms a ha-ha which separates the hot-garden from the paddock. Each rise is marked by low stone piers, one set in the ha-ha wall and the other on the opposite side of the path. The ground to the rear of the hot-walls is lower and reveals the degree of infill which was required to raise the hot-walls and garden to a height which would command views to and from the Hall.

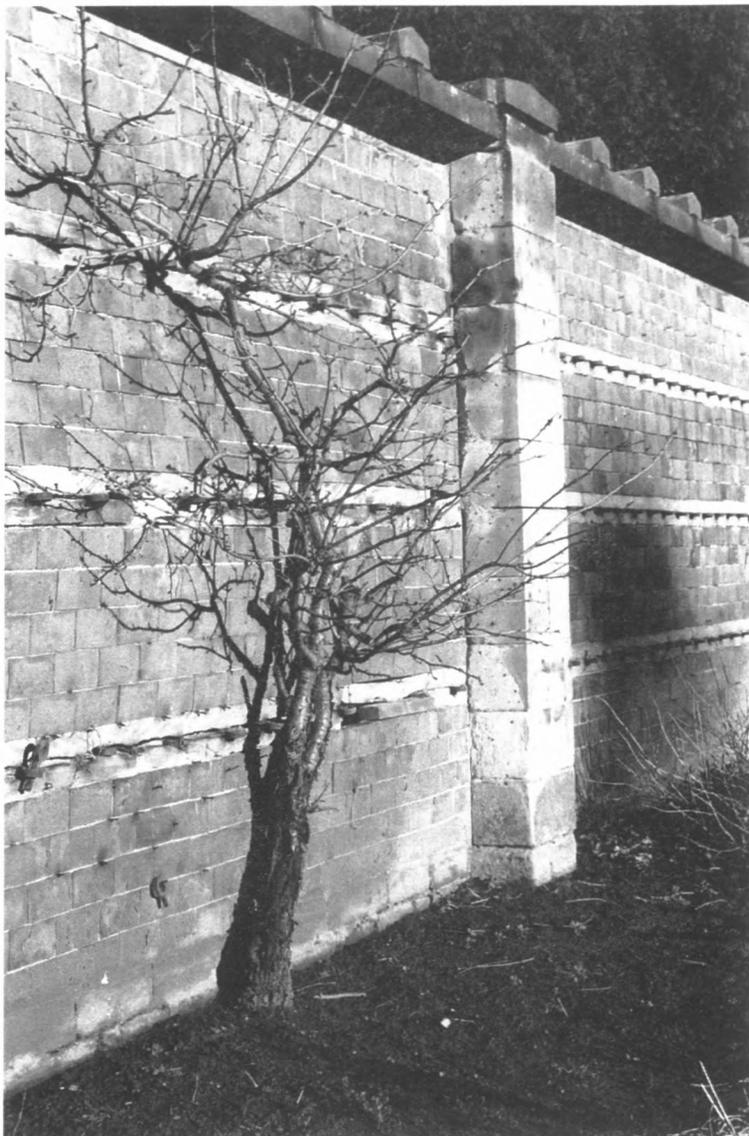


Fig. 2 Belsay hot-walls from the south before repair.

The structure runs from east to west and is now interrupted by two estate cottages. At the west end the wall is angled to face north-west (for approximately 20m.); projecting from this is an unheated wall built of stone which faces west. At the junction with the old garden house, a heated wall was built to the south (extending

for approximately 25m.) with an arch allowing access eastwards into the enclosed walled garden. At this point the east end wall is returned to the south for approximately 30m. and then turns once more to the west for approximately 25m.

Sir Charles designed the wall himself, according to the following notes which annotate a drawing among the Middleton papers (ZM1 S 72 [folder 5]): "A wall to be built of park house stone 10 feet high and 2 feet 6 inches thick with flue, the facing brick of which are to be set on edge, with soles and corners of stone to the flue to be built into the wall so as to tie the facing bricks and loops of iron between the covers and the soles. The piers of stone to be 2 feet broad and advanced one foot beyond the wall. The wall to be 30 feet between the piers and checked in six inches into the piers. The wall to have stone coping projected one foot and extended backwards over the wall its full thickness". The design was probably influenced by contemporary advice dispensed by gardening writers such as John Claudius Loudon (1783–1843). It was accepted that the heat from one fire was sufficient to serve a 40 ft stretch of wall between 10 and 15 ft high (Loudon 1826, 304, item 1560; Miller 1754, 1513). Monck's choice of a 10 ft high wall, with approximately 30 ft long flues was also in accordance with the general guidelines. The 1864 Ordnance Survey shows a number of small square structures at the rear of the hot-walls at Belsay Hall; these were firehouses, whose position corresponds with the stone piers that shield the chimney outlets to each pair of hot-wall flues (fig. 1).

STRUCTURAL ANALYSIS

The dismantling of the brick front to the west end of the hot-wall at Belsay revealed a series of four flues (fig. 3). These are roofed by firestones and run horizontally, one above the other, along the wall; the lowest starts from a curved brick vent coming through from a fireplace at the rear of the wall (fig. 4). Once the heat reached the furthest end of the wall, a gap in the roof of the flue allowed the warm air to rise to the next level. The gap is disguised on the outside by a thin section of stone which is tooled to appear identical to the sandstone firestones which form the roof to the flues (fig. 5). When the heat had travelled in a

serpentine manner to the highest level it was released *via* a brick-lined chimney located behind the stone pier marking the junction of each pair of flued walls (fig. 6).

The roof to each flue chamber is made from a double layer of firestone which is visible on the exterior and is set into the stone wall at the rear. Large-eyed iron rings, with fishtail-shaped ends, are inserted at c.300 mm. intervals in the joint between the firestones (fig. 4). The fishtail ends are fixed by being laid in dowelling recesses which are carved into the lower stone slab. The resulting contrast between the brick, stone and metal is very striking. Although the interior of many hot-walls was often plastered in order to avoid a build-up of soot, Belsay's flues are not treated in this manner.

The rear of the walls is constructed from the local Park House stone; this use of different materials for the two elevations of the same wall is not uncommon in the construction of hot-walls. Bricks were used at the front to conduct and retain heat, and are laid in six courses of stretcher bond pattern on edge, followed by a double string course of stone slabs which are set into the rear stone wall. Though brick might seem to be an unusual choice of building material in this part of Northumberland where stone is common, its use in this context is not unusual and proves its reputation as being more suitable for conveying heat than stone. The dark red Belsay bricks are likely to have been purpose-made stock bricks as there are no other similar bricks elsewhere on the estate; they were made without 'frogs', which probably helped ensure that the heat was conducted consistently. In his 1754 *Gardener's Dictionary*, Miller (1969, 304) suggested that the higher flue runs should be shallower to compensate for loss of heat and in some cases the adjustment was made by using smaller bricks (Hall 1989, 102). At Belsay, however, the dimensions of the bricks do not change higher up the hot-wall.

Sir Charles Monck appears to have followed Loudon's advice on design of the coping (Loudon 1826, 469, item 2468) and included simple provision in the overhang, allowing for a projection of 12 in. set at a discrete angle

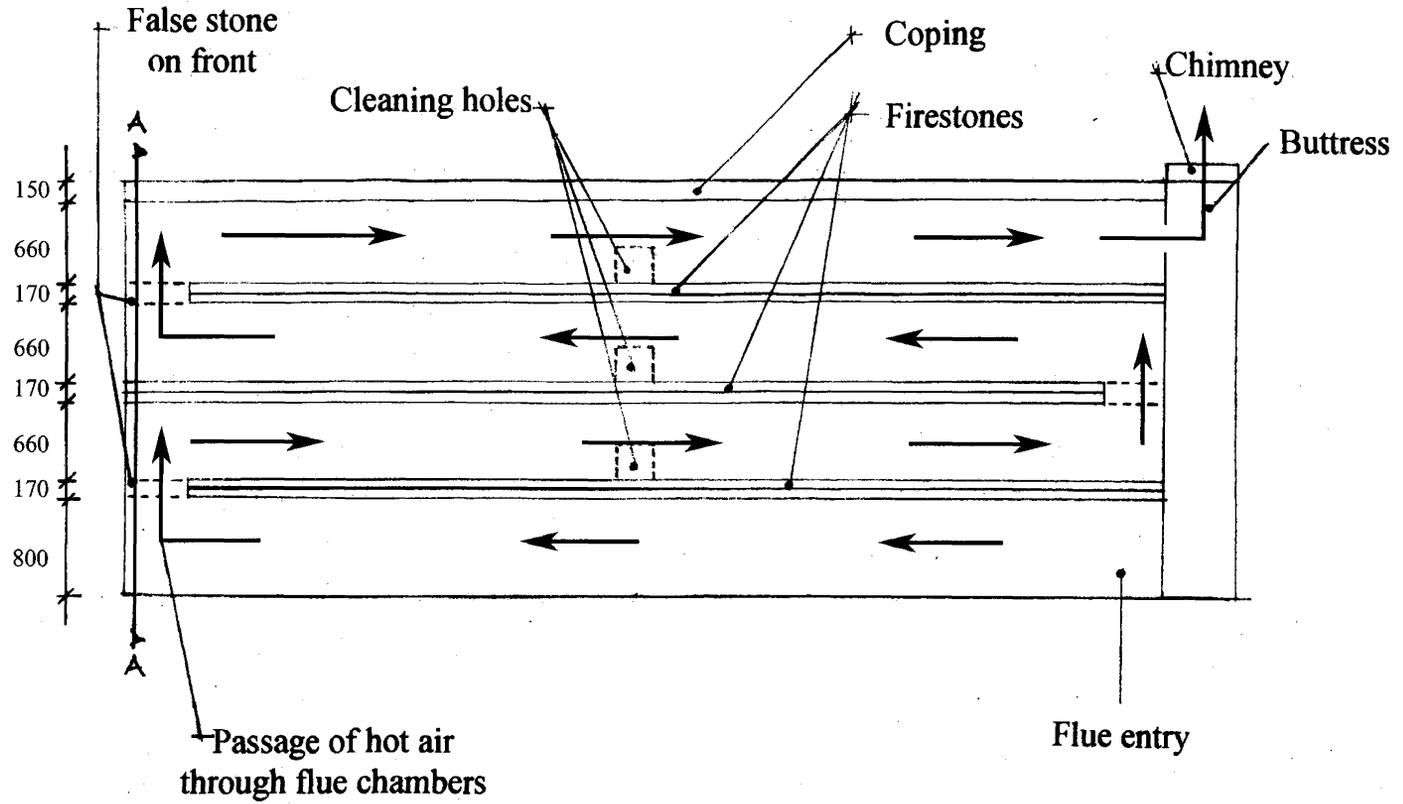


Fig. 3 Longitudinal section showing internal chambers of flue system.

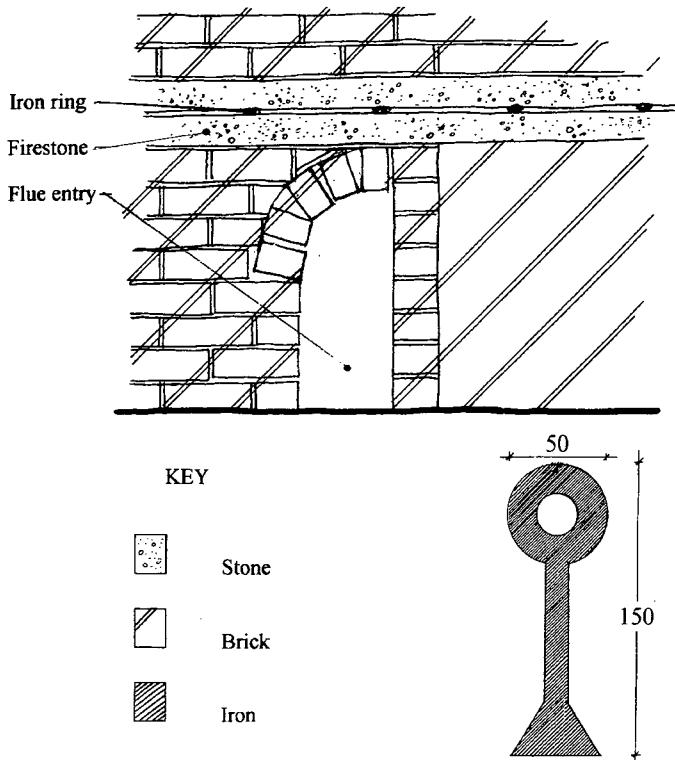


Fig. 4 Elevation of front of flue, 1:20, and detail of iron ring, 1:4.

(fig. 5). Each joint to the stone slabs is capped with a pedimented stone runner, presumably designed to stop damp entering the wall through the joint. The capping gives an eye-catching battlemented effect to the wall.

The stone rear of the hot-wall is punctuated by a series of three cleaning entries which are aligned vertically; some of these have been mortared shut (fig. 3). In several cases ordinary blocks of stone have been used, whilst in others the original stone remains with the iron ring which enabled it to be moved in and out. These cleaning entries had a dual purpose as the stones also acted as dampers, and could be adjusted to regulate the draught in the flues.

The west wall which forms an adjunct to the hot-wall is built entirely of stone and was not heated. A wall facing in this direction would probably be used for growing trees whose fruit was not particularly sweet when ripe, such as

morello cherries; these would not require forcing with heat.

Fruit trees were supported against the hot-wall by cast-iron eyes which were "sunk in the underside of the soles above mentioned, so that when the wall was built the eyes appeared in horizontal rows at one foot distance from each other. . . through these eyes rounded oak rods, as long as the wall is high, were drawn perpendicularly" (Monck 1833, 395). The cast-iron eyes performed an important function in holding the trellis away from the wall, since the proximity of fruit trees to a wall was undesirable because insects could be harboured in small gaps. Direct contact between the hot wall and the wood of the fruit tree could also be harmful to the tree. Almost all the sections of Belsay Hall hot-walls and stone walls are marked on the garden side with holes or nails which held cloth strips, or *lists*, in place for

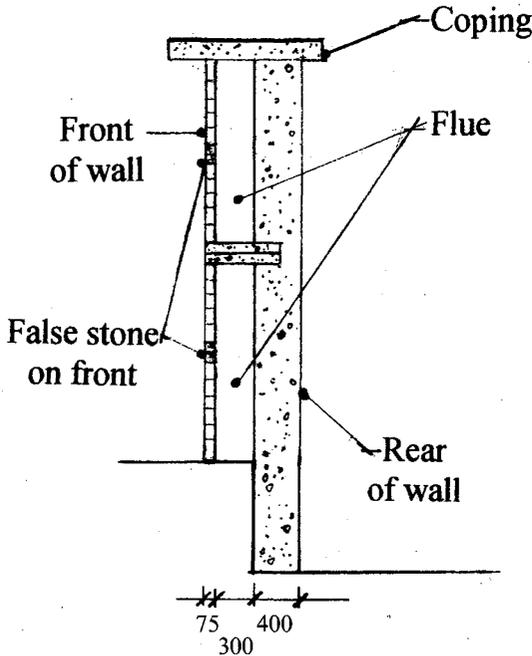


Fig. 5 Section A-A (see fig. 3) through width of wall.

THE HOT-WALLS AND THE LANDSCAPE

It is unfortunate that, in twentieth-century descriptions of the estate, the hot-wall garden is now annexed from the wider landscape scheme. The Belsay location of the unenclosed hot-wall garden in an open landscape can be seen as a progression from the ideals of the landscape gardener Humphry Repton (1752–1818). During the latter part of his career, when he started to become weary of Picturesque preoccupations, Repton began to consider the attractions of pleasure gardens in proximity to the house; these ideas were strongly related to eighteenth-century discussions about the function of beauty and utility. Late in his life Repton wrote: "I have lived to reach that period when the improvement of houses and gardens is more delightful to me than that of parks and forests, landscapes or distant prospects" (Carter *et al.* 1982, 68). Thus he brought the kitchen garden nearer to the house, as seen at Catchfrench, Cornwall (1793), but at this stage it was politely screened by shrubbery from the pleasure garden. In

more delicate training of fruit trees (Campbell 1996, 76).

The borders below the hot-walls would have been planted with fruits, vegetables or flowers which had shallow roots, thereby avoiding competition for sustenance with the fruit trees.

By the mid-nineteenth century hot-walls were considered old fashioned. Heated glass-houses were being developed to offer better conditions for forced fruit growing, and numerous types of specialist glasshouses were marketed to meet the requirements of specific fruits. These included vineries for grapes, peach houses and (by 1848) the more general orchard houses. By c.1873 the Belsay Estate papers reveal a concern for saving costs. Notes were made on unnecessary expenditure in the gardens and the recommendation put forward to grow only such fruit and vegetables as could not be purchased easily, and to buy in Northumberland apples, pears and damsons (NRO ZM1 / S 38).

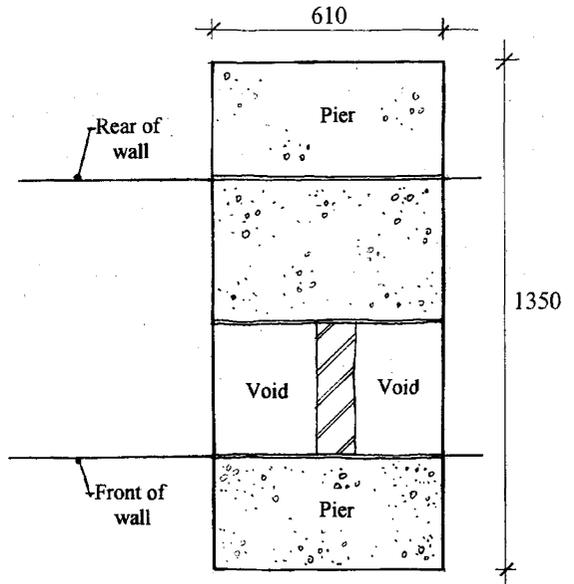


Fig. 6 Plan of chimney at top, 1:20.

1813, however, he proposed that the kitchen garden at Beaudesert, Staffordshire, should become a feature consisting of terraces, rather than being hidden by walls or disguised by planting (Carter 1982, 68). The hot-wall at Belsay seems to have been constructed in this same spirit, as an integral part of the landscaped gardens giving views across the ha-ha towards the Hall and to the plantations.

The heated garden wall at Belsay also links the Hall with the landscape to the north and the castle to the west. The terraced walk is contained by a low ha-ha wall and backed by the magnificent hot-wall which, in turn, is enhanced by plantations at the rear, along the drive to Belsay Castle. Views from the hot-wall garden are directed south to glimpses of the Hall, and south-west towards the plantations; by contrast, the mundane productive area in the garden was screened from the walk by a wall projecting south from the main hot-wall.

Sir Charles Monck's early-nineteenth century design survives largely unchanged, although the technology for heating was improved for the glasshouses which were added after the hot-walls were built. The hot-walls still play a role in the landscape-setting to the Hall, with important views to and from them. At present no similar hot-walls are known. Elsewhere the outer southern face of a walled garden was developed as part of the pleasure ground, as at Croxdale Hall and Windlestone Hall, both in County Durham, or at Little Harle in Northumberland. These, however, were not heated walls displaying cultivation of tender fruit trees. Similarly, whilst the Portico House wall at Wallington was used for displaying fruit trees, it also was not heated. The atmospheric quality of Belsay's hot-walls would have been emphasised by the simplicity

of the elegant architecture contrasting with the richness of the fruit trees which would have adorned them.

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ABBREVIATIONS

EHP&G	English Heritage Register of Parks and Gardens of Special Historic Interest in England
NRO	Northumberland Record Office
ZMI	Middleton papers on loan to NRO

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