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SPRINGHEAD GARDENS AND THE ARCHAEOLOGY OF KENT WATERCRESS BEDS

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INTRODUCTION

In the early years of the nineteenth century Springhead Gardens, near Gravesend, saw the first cultivation of watercress in artificial beds in Britain and so can lay claim to being the birthplace of the modern watercress industry. The Gardens also played an important role in the social life of Gravesend during the latter half of the nineteenth century, but it is the practice of propagation employed at Springhead and the first appearance of the watercress bed as an historic landscape feature that are of wider significance. Yet, these aspects have not been studied and the industry as a whole has been largely neglected by industrial archaeologists and agricultural historians.[1] This paper examines the documentary and field evidence relating to the site to assess the method of cultivation employed at this early stage of the industry's history. This evidence is then compared to the process of cress cultivation as outlined in contemporary literature and to a preliminary typology of nineteenth century Kent watercress beds drawn from documentary and field evidence to consider the place of Springhead in the development of the industry.

WATERCRESS CULTIVATION

Although watercress was an important Roman medicine and enjoyed a revival in Tudor England, the wild cress (*Nasturtium Officinale*) was always gathered from swift-flowing streams where it grew. The

[1] S. Fletcher and D. Goodwin, 'Watercress Growing in Hampshire', Southampton University Industrial Archaeology Group Journal, no. 1, (1996), 15-21

commercial cultivation of watercress under controlled conditions in prepared watercourses first appeared on mainland Europe. Although cultivated on a small scale in northern France during the fourteenth century, it is unclear if this involved true watercress beds, rather than merely a large scale exploitation of the wild cress. In any event the practice does not seem to have been very successful and was not taken up again until the late eighteenth century. The first reported modern industry was in the German Rhineland where beds had certainly been established by the end of the eighteenth century around the town of Erfurt. From there the technique was exported to France where a M. Cardon established beds at Saint Leonard in 1811 and to England, where William Bradbury founded Springhead Gardens in 1805.[2]

Bradbury's choice of the source of the River Ebbsfleet, known as Springhead and otherwise famous as the site of the Roman 'small town' of Vagniacae, is significant as it demonstrates all the conditions required for watercress cultivation. The spring itself supplied clean, relatively warm water with gently sloping topography (cress requires some 5-10 million litres of running water per hectare per day at a temperature of 10.6°C on beds with an optimum fall of 15 cm. per 30 m.).[3] As media for watercress growth sandy soils do not retain enough water or allow an optimum depth to be maintained while clay and peaty soils can also be problematic. Chalk, as found at Springhead, is eminently suitable when given a gravel covering, perhaps on a puddled base, with soil on top for the roots to bed in. Springs issuing from the Kentish chalk downs provide the perfect source of clean water for cress cultivation, but the need for a stable temperature limits the length of the beds, the water cooling as it flows from the source. The excavation of beds may require surprisingly large engineering works, for above all the gradient has to be carefully controlled. While the rate at which water flows around the plants must be kept at a relatively swift pace a balance needs to be maintained to prevent the erosion of soil from the floor of the beds. Although there is a minimum depth of water to be observed the flooding of plants can sometimes be used to protect them in severely cold weather. Cleaning of the beds is usually carried out over two weeks in August and September when the plants are pruned or replaced, the destructive caddis worm removed and the gravel and soil replenished. This process requires draining of the beds and their controlled refilling.[4]

[2] A.J. Dunkin, *Memoranda of Springhead* (1848)

[3] C.P. Stevens, *A New Look at Watercress*, ADAS, Winchester (1986)

[4] W.W. Glenny, 'Watercress: Its History and Cultivation', *Journal of the Royal Agricultural Society of England*, 3rd Series, 8, (1897), 607-22

A final, and perhaps crucial factor in Bradbury's choice of Springhead was its situation near the town of Gravesend, from where the principal regional market in London was accessible. In the capital urban growth was increasing demand for watercress but at the same time rapidly destroying the habitat of wild cress. The same factors were also influential in the foundation of the French industry near Paris and later development of beds in England's Home Counties.

Good links to local markets were also vital as watercress spoils very quickly and rapid packing and transportation were essential in the period prior to refrigeration. As the industry developed special trays were used in order to stop the cress being crushed under its own weight and to provide for the free circulation of air between the bunches, traditionally tied with raffia. At larger beds, Springhead included, packing sheds were built to protect the crop and the predominantly female workforce.

HISTORY OF SPRINGHEAD GARDENS

When Bradbury arrived at Springhead in 1805 he was a gardener formerly employed by a Mr Rafull in nearby Swanscombe and in search of work. It is unclear just what knowledge he had of watercress or its cultivation, but he evidently saw the potential of Springhead and approached the owner, Thomas Colyer, with a proposition to improve and cultivate the stream.[5]

Construction of the beds must have been a substantial task and it may have been some time before the first crop was ready for market. A probably apocryphal tale of Bradbury's early endeavours has him taking this first crop to the London markets in an old tea chest on his back. This does, however, illustrate his pioneering role in the trade.[6] In a few years the beds became a commercial success and Bradbury, whose fame had spread, acquired the nickname 'Watercress Jack'. In 1818, Bradbury received a medal for his work from the Royal Society and the following year was able to retire, selling the lease for £600. The owner, Colyer, was no doubt pleased with the improved value of his land and gave his former tenant a £500 bonus.[7]

Replacing Bradbury as a tenant was a Captain Harris who managed

[5] W.S. Penn, 'History of the Springhead Pleasure Gardens and Water-Cress Plantation c. 1805-1936', *Arch. Cant.*, lxxxi (1966), 65

[6] F.A. Mansfield, *History of Gravesend* (1920, Rochester Press Reprint 1981), 94-5

[7] (Ed.) G.O. Howell, *The Kentish Note Book, Vol.2* London (1894), 42

the beds until 1834. It is unclear if Harris extended or developed the site, though he is known to have introduced a new variety of cress with a celery-like leaf. The major period of development followed Harris' tenure at Springhead when James Silvester took over. Silvester had, by 1844, extended the beds northwards along the Ebbsfleet beyond Springhead and increased production significantly, two van loads per day being taken to London during the peak season.[8] He also introduced a third type of cress, the brown leaf variety called 'cast iron cress'.[9] With this increased volume packing sheds, known to have been at the site, may have become essential for the efficient dispatch of a crop given to spoiling.

Not content with an expanding business Silvester, seeing the potential in Gravesend's popularity as a resort, developed the site as a tourist attraction that also flourished. 'Springhead Gardens', as the site became known, took on a life of its own for the many London visitors and was subsequently developed by Silvester's successors. Fruit trees and strawberries were cultivated, a bath house, tea shop, pavilion and ornamental bridge with lanterns for evening walks were built and a small museum opened displaying the Roman artefacts that were found during excavation of the beds and construction of buildings. Other attractions were more in the vein of pure showmanship and included wheat grown from grains reputedly found in an ancient Theban tomb, a zoo and gypsy fortune teller.[10]

Silvester committed suicide in 1849 and as a consequence a boundary dispute arose between landowners on either side of the Ebbsfleet.[11] John Brenchley claimed the ground to the eastern side of the Ebbsfleet while Edward Colyer, Thomas' son, claimed the western and management of the site was consequently divided. By 1855, Silvester's son Henry was operating the eastern side alone. He died in 1899 when Walter (and later Thomas) Elliot took over. Meanwhile management of the west side of the beds had been given to a Mr Arnold. He relinquished control to a Mr Bratton who stayed for a brief period before the Treadwell family took over in 1888. It is unclear if the beds were operated jointly or by one side only during this period, but the Treadwells certainly employed people to cultivate cress.[12]

[8] 'Springhead and Water-Cress', *Gravesend Reporter*, May 21, 1921, 7

[9] Penn 1966, *op. cit.*, 66

[10] *Ibid.*, 68 and G. Meason, *Guide to the South Eastern Railway*, London (1858), 73

[11] W.S. Penn, 'Mr Silvester Commits Suicide', *Gravesend Reporter*, May 4th, 1960, 35

[12] Penn 1966, *op. cit.*, 74-5

During this period the tourist attractions that had probably become the chief economic benefits of Springhead continued to operate, though following the division of the gardens rival attractions were established. An aviary and some swings were built on the east side while both sides had their own tea rooms and zoos. There were even rival gypsy fortune tellers.[13]

From 1900 nearby chalk quarrying caused an increasingly severe shortage of spring water for the watercress beds and although efforts were made to restore the supply, including installation of wind and gas engine powered pumps and construction of a reservoir by Henry Treadwell in 1903, the beds never recovered. The cultivated area was probably contracted, perhaps back to the spring itself, and cress production reduced. By 1914 parts of the beds had reverted to marsh and eventually the whole system had to be abandoned altogether, although the zoo and tea rooms were retained and cress was brought in from beds near Faversham which Elliot had established in the early 1930s.[14] The Elliots remained at the site after the watercress beds had been abandoned and established the present plant nurseries.[15]

A PRELIMINARY TYPOLOGY OF KENT WATERCRESS BEDS

On considering the Springhead watercress beds, it has become apparent that the form taken by beds elsewhere in Kent differs remarkably from those developed by Bradbury and his successors. An initial study of Kent watercress beds depicted on historic maps was therefore carried out to provide a context in which to place the Springhead site. The map study suggested that several distinct forms of bed were in use by the later nineteenth century which can be classified into broad types. Most simple are those beds which use the bed of a largely unimproved stream and control depth of water and rate of flow by a series of weirs. These have been characterised as 'linear' systems, a more sophisticated variation of which has the stream straightened and widened to increase the growing area. A second, more complex form of bed utilises short branch channels cut out from the stream in which to grow cress. The section of stream from which the branches

[13] B. Lejoindre, *Comic History of Gravesend*, Gravesend (1872)

[14] 'Botannicus' The Beauties of Springhead Part One', *Gravesend Magazine*, April 1914; *Gravesend Reporter*, 30th April, 1942

[15] Penn 1966, *op. cit.*, 75-7

led, and presumably the branches themselves, were controlled by sluices or weirs. A third and quite distinct design uses a 'bypass' channel from the stream, much like a mill race, which is managed by weirs. The basic linear bypass channel can also appear twisted into a serpentine form, doubling back on itself around thin divisions to maximise the cultivable area in a limited space. Hybrid versions of these types are also found which combine branches with unimproved and improved linear channels and bypasses.

Although all these forms existed in the last century in the period before the modern trend of constructing beds in concrete, a detailed chronology has yet to be established. It seems reasonable to suggest the simple linear method was an early one as, in its most basic form, it is merely a development of harvesting wild cress in its natural habitat. Whether bypass channels or branch systems developed first is, at present, unclear. The scale and layout of beds may, of course, have been influenced by the growers' financial state, the construction of new beds being quite labour intensive, but the topographic and hydrological characteristics of each particular site were also very important. For instance, where a single spring was utilised it was desirable to concentrate on a large growing area at that point. At other sites a series of springs might occur along a valley, often rising directly into the stream bed and so allowing much longer channels to be developed from the stream. These kind of factors no doubt played their part in the way Bradbury and his successors developed Springhead.

Archaeology of the Springhead Gardens Watercress Beds

While the history of the site is quite well documented, it is from a combination of archaeological investigation and documentary sources that an insight into working practices at this early stage of the industry can be gained.

The condition of the Ebbsfleet at the time of Bradbury's arrival is uncertain. The river had formerly been a tidal waterway and some form of management had been undertaken to control this. A high bank protected fields adjacent to the Ebbsfleet during the seventeenth century and a sluice controlled the tidal flow. It is not clear where on the Ebbsfleet these flood defences would have been, though the lower part of the river some way below Springhead seems likely. Although the Springhead area was described as a 'swamp' by Bradbury's time it was reported as a formerly tidal watercourse in the 1770s, making it conceivable that some form of

existing water management mechanisms were still in place in 1805, if at some distance from Springhead.[16]

The watercress beds seem to have been in an almost constant state of change and expansion during the 'boom' period of the nineteenth century. Bradbury was widening the beds within two years of starting production and the reclaiming of swamp land (presumably parts of the Ebbsfleet downstream from Springhead) was going on in 1844 under Silvester. While exact details of this progress are lacking, it is telling that when Bradbury returned to the site as a witness in the 1845 boundary dispute he had trouble recognising the layout of the beds. By this time the river had been developed as watercress beds to nearly three quarters of a mile (approximately 1,200 m.) in length.[17]

As will be outlined below evidence from both historic maps and the site suggest two distinct areas of cultivation, the area at Springhead itself (the first 250 m. of the river from TQ 6174 7262 to TQ 6164 7285) and the lower portion of the Ebbsfleet stretching over one kilometre down the valley (to approximately TQ 7165 7389). The Springhead area, being closer to the spring, would have presumably been developed first with control of the water flow and construction of prepared bed surfaces moving down stream as production increased. The difference in character of the Springhead and Ebbsfleet areas also suggests two distinct phases and for this reason the river will be divided approximately into those two parts for the purpose of this study.

The river bed of the Ebbsfleet has largely silted up or become severely overgrown along its entire length making it difficult to identify features relating to watercress production. In addition the Ebbsfleet has been partially filled at the Springhead end where a nursery now stands, while the lower portion of the Ebbsfleet has been completely changed by recent industrial activity.[18]

THE SPRINGHEAD BEDS

None of the available historic maps provide enough detail of the manner in which water was managed at Springhead to determine a

[16] Penn, 1966, *op. cit.*, citing *The Kentish Traveller's Companion* of 1772-6

[17] Penn 1966, *op. cit.*, 66, 70 and 73

[18] It should be noted that a probable watercress bed system near Rectory Farm (300 m. east of the Ebbsfleet) was established by the 1860s, but is being considered as separate and so does not form part of the present study.

convincing layout of watercress beds, although a pattern of branch beds is certainly not shown. The most likely alternatives seem to be a simple linear system with weirs across the Ebbsfleet or a separate bypass channel taken from it. The earliest useful map, the Tithe map of 1838, shows the Ebbsfleet as decidedly wider at Springhead, as if impounded by a dam or a weir.[19] Subsequent Ordnance Survey maps confirm this, with the western side of the river at Springhead appearing as a form of bypass, albeit a rather irregularly shaped one (running from TQ 6169 7276 to TQ 6164 7285) only separated by a thin strip of land perhaps a metre wide. The bypass bed existed in this form until the 1930s when the expanding nurseries caused it to be partly backfilled on the western side.[20]

An illustration of *c.*1839 shows a bridge or weir which appears to have been built as a broad earthen barrier situated just upstream of a thatched cottage.[21] This cottage is probably the one that served as Bradbury's original residence and was later replaced by a brick-built house while the bridge may be the one Penn claimed was supported by a Roman column base discovered by Silvester. The Ebbsfleet before this point does not seem to be divided although the downstream area is not shown. A later illustration shows a flagpole, known to have been erected after the 1845 boundary dispute, situated in the middle of the beds on what may be the same small bridge.[22] In this illustration there is certainly no evidence of a bypass channel or even a widened section of the Ebbsfleet though little detail is given and no weirs can be seen either. Both these contemporary illustrations are perhaps rather fanciful images made principally to depict the gardens' attraction for visitors rather than the operation of watercress beds.

Today the main channel of the Ebbsfleet is only about a metre wide near its point of origin, though below the spring it widens to approximately 6 m. An examination of the stream at the upper point did not reveal any evidence of weirs though fragments of nineteenth-century brickwork were noted lying in the stream bed (at TQ 6171 7269). The stream has now become so heavily silted that any remains may be sealed and situated up to 2 m. west of the present course of the channel, approximately where the bypass channel may have been.

[19] Northfleet Parish Tithe Map, Centre for Kentish Studies ref. IR30/17/272

[20] Ordnance Survey 3rd and 4th edition maps (1908 and 1933) 25 in. scale

[21] Mansfield 1920, *op. cit.*, 95

[22] Penn 1966, *op. cit.*, 67 and 76

The brickwork could be from a weir, though several other buildings have existed on site including an ornamental bridge. The single pier beneath the contemporary concrete footbridge across the river is of similar fabric, perhaps demonstrating the existence of a weir or earlier bridge.

The eastern bank of the stream is flanked by an embankment with an area of levelled ground beyond (around TQ 6169 7281). This levelled area has been terraced into the rising ground to the east and two phases may be discerned. A large quantity of nursery waste and modern building materials have raised the land surface significantly, possibly sealing remains of the cottage, the subsequent later nineteenth-century house and the watercress packing sheds known to have been on the site until the 1960s.[23]

Where the Ebbsfleet widens there is a distinct bank (up to 0.75 m. high) between the present stream bed and nursery to the west. This may have formed a division between the now backfilled bypass watercress bed to the west and the Ebbsfleet to the east, though it could be the product of earth moving during the construction of modern nursery buildings that occupy part of the site. A distinct rise in ground level can be seen which may correlate to the position of the western bank of the bypass bed. This area was still boggy and presented major problems during construction of the glasshouses. The present nursery buildings are light structures probably sited on made ground which may well seal remains of Springhead Gardens' visitor facilities.

This southern section of the Springhead beds terminates at an embankment carrying a trackway from the nurseries across the river at approximately the point where Ordnance Survey maps show the possible bypass ending (at TQ 6164 7285). The embankment and the culvert set into it appear to be modern constructions and no evidence of a previous weir, bridge or sluice can be seen. Adjacent to the upstream side is a pond approximately 7 m. in diameter partially separated from the Ebbsfleet by the raised bank which may be a remnant of the bypass bed or a continuation of the bank seen to separate it from the present river bed just upstream.

THE EBBSFLEET BEDS

The lower part of the Ebbsfleet displays less evidence of significant

[23] Author's conversation with nursery worker, 1995

improvement than the upper, Springhead area. The 1838 Tithe map shows the Ebbsfleet below Springhead as a slightly meandering watercourse connected to a system of surface field drains on its east side but with no obvious points of widening or signs of improvement to the river, and it is quite possible watercress beds had not been developed on the river below Springhead at this time. It is known that Silvester was cultivating cress on a three quarters of a mile length of the Ebbsfleet by 1844 and, on a map of 1865, the river is indeed marked as watercress beds but still displays an apparently unimproved form.[24] However, several features depicted on the map may suggest some form of water management scheme. A pond-like area up to 30 m. wide with a thin island in the middle and what appears to be an artificial channel on the eastern side appears some 240 m. below the embankment across the river at Springhead (at TQ 6161 7315). Along the western side another thin bypass channel can be seen leading from a part of the river just below the embankment and, after joining it briefly, branching off to continue a separate path to the lower part of the valley where the Ebbsfleet makes a dramatic turn to the west. This channel was shortened at its Springhead end by 1908 and had gone altogether by 1933. No weirs, sluices or dams are marked until the 1960s edition when two possible dams (only one being marked as such) appear, one either side of the pond area.[25]

The point on the river where watercress cultivation terminated is also unclear from the documents. A single sluice is marked on the O.S. map of 1865 on the lower reaches of the Ebbsfleet, just before the railway line and over 2300 m. below Springhead and some 1700 m. after the pond area. This is too far for the 1200 m. of beds cultivated by Silvester, though they may have been extended subsequently.

Perhaps as a result of their distance from the tourist attractions at Springhead Gardens the Ebbsfleet beds suffer from a lack of illustrative documentary evidence. A photograph of 1914 shows an area of the beds with no buildings adjacent and of too great a width to be the Springhead beds.[26] The beds, though with cress still growing, appear to be rather overgrown and ill-kempt but a distinct bank of raised ground with the vestiges of timber posts attached can be seen set lengthways in mid stream. This may match the thin island of land marked on maps in the centre of a wide pond between the dams and

[24] Ordnance Survey 1st edition map (1865), 25 in. scale

[25] Ordnance Survey 1965 edition map, 1:2500 scale

[26] 'Botanicus' 'The Beauties of Springhead Part Two', *Gravesend Magazine*, May 1914

suggest the use of timber walkways to aid harvesting and planting of cress.

The Ebbsfleet watercress beds are now severely overgrown with dense reed beds and mature willow trees in addition to being largely silted up making identification of the former course difficult. The first 80-100 m. below the embankment are of a regular appearance suggesting a constructed bed (from TQ 6164 7286 to TQ 6163 7296). Below that the beds narrow, a raised area of land projecting from the western bank into the river. Mature trees have caused a substantial amount of silt to build up in this area but the raised bank may relate to the possible dam marked on later (1960s) maps. No features corresponding to the pond-like areas or midstream linear bank can be identified for certain on the ground though further banks of silt give the probably false impression of earthwork remains. A dam survives in approximately the same position as the lower of the two marked on the maps (at TQ 6162 7298). It is of the arched type and 1.30 m. long and surrounded by a later concrete causeway making a total length of 11.30 m. with earthen embankments closing the rest of the river, at this point some 25 m. wide. Both dam and causeway appear to be of modern construction, but it is quite possible that it is on the site of an earlier structure.

Of the channel noted following the western side of the river no evidence could be found, although the remains of a cast iron pipe of 15 cm. diameter was identified following a similar route. The start and end of this pipeline were not found but it may have acted as a water pipe, perhaps diverting excess water from the river at the Springhead area. This does not necessarily connect it with watercress cultivation since it could equally have served to drain unwanted water from the nursery site.

Of the lowest part of the beds little remains due to extensive landscaping connected with the construction of water treatment and cement works either side of the river in the present estuary. This has also obscured the network of field drains on the east side of the Ebbsfleet. These were connected with the river by a short channel from the river just upstream of the first drain and finally emptied into the river themselves. The area around the site of a sluice, marked on the 1865 Ordnance Survey map has also been covered with quarry soil, making it impossible to assess the form this part of the watercourse took and what role it may have played.

CONCLUSIONS

A combination of documentary evidence and field investigation has

suggested two distinct forms of watercress bed layout were used at Springhead Gardens within the first 30 to 60 years of modern industry's arrival in Britain. The section of the Ebbsfleet at Springhead itself appears to have been augmented by the construction of a broad artificial channel bypassing the river. Though a simple, unimproved linear bed may have been used at first, perhaps just impounding water and encouraging cress growth in a manner not dissimilar to wild cress streams, the bypass was certainly in place by the mid nineteenth century. As such it may well have been Silvester's innovation rather than Bradbury's but, in either case, the use of the bypass system could suggest that the need to periodically drain the beds in order to protect and propagate the crop was recognised and may demonstrate an attempt to maximise the growing area close to the spring. If this interpretation is correct, it may also suggest a full comprehension at that time of the kind of cultivation and commercial practices seen as commonplace at the end of the century.[27]

The bypass bed, as depicted on maps, is of an irregular form quite unlike the complex system of detours from the main channel seen elsewhere (for example at the now destroyed site at Riverhead near Sevenoaks). However, this is not to suggest it is necessarily an unsophisticated version. A very similar form of short, wide, irregular bypass can be seen on an 1897 map of watercress beds at South Darenth.[28]

It is difficult to comment on the form of cultivation carried out on the rest of the Ebbsfleet or even to suggest how much of it was used for watercress. For beds of such length to have been cultivated a series of springs would have been required on the lower reaches of the river. Since none are known to have been channelled to it, they may rise in the bed of the river itself. Other unimproved linear systems are known in Kent that are of substantial length. That at Great Tottington near Burham runs for nearly 800 m. from the two springs that feed it but eight weirs, two sluices and at least one additional spring are used along this length. Bypass beds at Broom Down near Lower Halstow run for some 1600 m. but use some 25 weirs to maintain water depth and presumably harnessed several springs. These examples, both systems developed over the second half of the nineteenth and early twentieth centuries, demonstrate how such long water courses required a great deal of management to maintain optimum growing conditions for the cress. Yet, there is definitive evidence that the

[27] Glenney 1897, *op. cit.*, 607-22

[28] Ordnance Survey 2nd edition map (1897), 25 in. scale

lower Ebbsfleet was producing cress and the business clearly flourished. This form of cultivation, which seems to have precluded the ability to drain sub-sections of the beds, may have been simply an extension of harvesting the plant growing in wild conditions. Far from being a primitive type of cultivation, it seems to have been practised until the present century both at Springhead and Great Tottington.

It is clear that a fully developed typology of watercress beds and more research into the development of cress cultivation during the nineteenth century is required to understand fully the nature of early production at Springhead. In addition, the site itself has a good deal more to tell. The silting up of the Ebbsfleet since abandonment of the beds may have preserved not only the form of the beds but remains of sluices and weirs used to manage the water. Due to inadequate documentary evidence the exact position of such features cannot be determined at this stage, but an excavation, while not necessarily identifying key features such as weirs across the Ebbsfleet and any sluice/weir connection between the river and any bypasses, could at least determine the extent and type of watercress beds present.