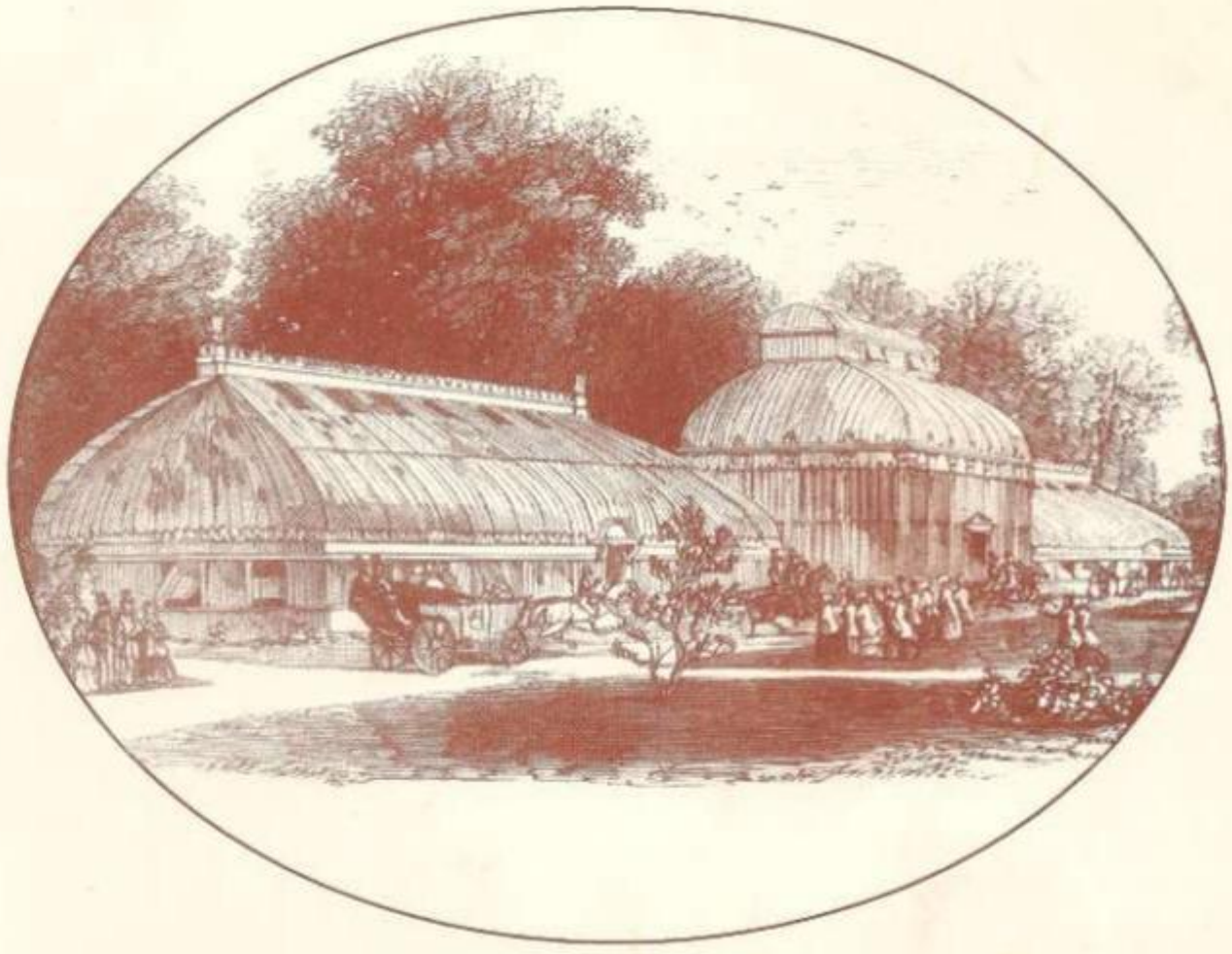
Moorea

Vol 9

The Journal of The Irish Garden Plant Society







MOOREA

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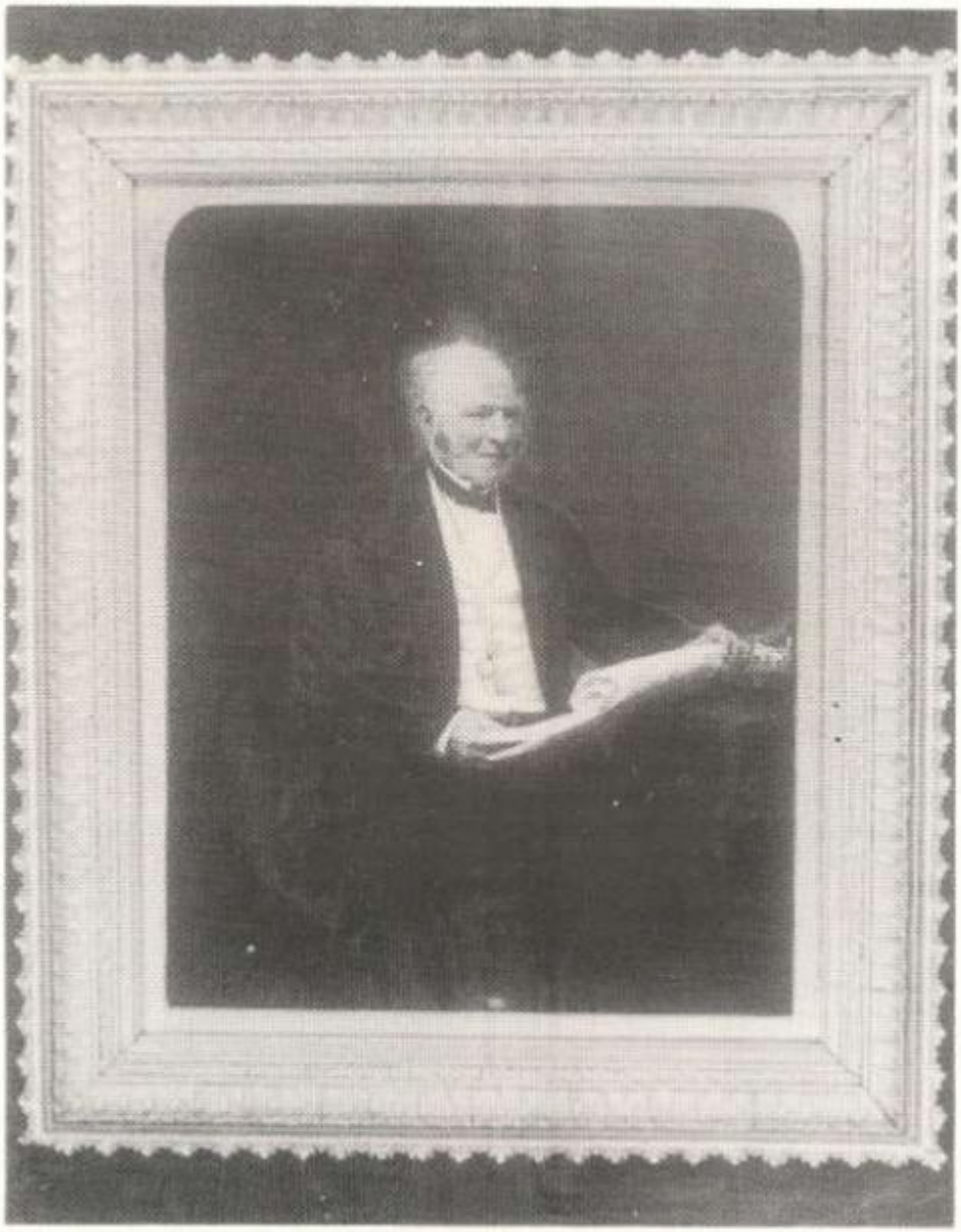
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Front Cover:
Business card of Richard Turner c. 1850 (courtesy of Daniel Gillman, The Gillman Collection).
Curvilinear Range, National Botanic Gardens, Dublin (vignette 1849).

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Richard Turner: photograph hand-coloured in oils, by permission of the Director, National Botanic Gardens, Dublin.

E. CHARLES NELSON

RICHARD TURNER: AN INTRODUCTORY PORTRAIT

> I should much like to take a peep at your Palm house now it is finished, but no Rents, no money for pleasure. I fear my acquaintance and countryman Dick Turner was rather behind hand in completing his contract, at least in point of time. I hope the heating will be complete, he has failed in the new houses in Glasnevin Garden. They cannot in the stove obtain more heat than about 45 in winter. This will not do here, and if he does not manage better in Russia where I hear he is employed he may get himself into a scrape. He is an ingenious, tasty, clever fellow, without a depth of science.
>
> John C. Lyons to Sir William Hooker
> 4 May 1848 [Eng. Lett. 26: f. 330]

In *Moorea 9* we are privileged to be able to publish the detailed account by Dr Edward J. Diestelkamp of the history of the construction of the Curvilinear Range in the National Botanic Gardens, Glasnevin, one of the finest iron-and-glass buildings of the nineteenth century built in sections between 1843 and 1869. That beautiful building is largely - but not entirely - the work of Richard Turner (Diestelkamp, 1990 (this volume); Diestelkamp and Nelson, 1979; Nelson and McCracken, 1987).

Who was Richard Turner and what are the present state and future prospects for his great glasshouse?

Richard Turner, ironmaster of Dublin

One contemporary pen-portrait of Richard Turner was published in *The Building News* of 19 March 1880; Thomas Drew wrote from Dublin to correct Maurice B. Adams' assertion that Decimus Burton was the designer of the palm house at the Royal Botanic Gardens, Kew:

> I had always understood that the credit of the design was due to Mr. Richard Turner, of Dublin, a man of singular inventive genius, in whose acquaintance, in former years, I felt some pride. Many middle-aged architects will remember Mr. Turner in his vigorous days when he was ubiquitous, with a stock of daring and original projects always on hand, remarkable for his rough-and-ready powers of illustration of them, and sanguine belief in them, and his eloquent, plausable, and humour advocacy of them.

Richard Turner (Fig. 1) was indeed intimately involved in the design and was entirely responsible for the construction of the Kew Palm House, now restored for the second time; Dr Diestelkamp's history of that glasshouse was published in 1982 in the *Journal of Garden History* (see also Desmond, 1972; Diestelkamp, 1982b). The Great Palm House at Kew is loftier and more extensive in plan than the Glasnevin range, yet the buildings are 'sisters' - Turner was working on both during the latter half of the 1840s when the Great Famine was at its height. In fact the Kew glasshouse was pre-fabricated in Dublin (Diestelkamp, 1982a) at Turner's Hammersmith Ironworks which was adjacent to the now-vanished Trinity College Botanic Garden on Lansdowne Road, Ballsbridge (the foundry site is occupied today by the Veterinary School).

Richard Turner was 'vigorous, although advanced in years and retired ...' when Thomas Drew (1880) wrote in his 'defence'; he was living in Dublin and undoubtedly took a continuing, lively interested in the family iron foundry which he had done so much to promote.

Richard's antecedents (Fig. 2) had been ironmongers at least from the middle of the eighteenth century. Timothy Turner of College Green, Dublin, who died in 1765 was one; perhaps he was the man who worked with Richard Castle on the Printing House at Trinity College during 1734 (TCD Muniments: Bursar's Vouchers P4/50/43), and later was as among the builders of Merrion Square in 1762 (see Craig, 1969, p. 190). In the early 1760s Timothy Turner provided ironwork for the Provost's House at Trinity College, Dublin (McParland, 1976; Diestelkamp, 1981). A Richard Turner (perhaps Timothy's brother) was living at this same period and was an ironmonger.

At Leixlip in County Kildare, on 10 September 1758, Catherine Sisson and Timothy Turner married - although we cannot firmly link this man to the Timothy mentioned above, this Leixlip couple was almost certainly the grandparents of Richard, builder of glasshouses.

Richard Turner, who built the Kew and Glasnevin greenhouse, was born about 1798 - he was 83 years old when he died on 31 October 1881. Nothing has yet been discovered about his childhood, but later records

point to his marriage about 1816 to Jane Goodshaw, daughter of T. Goodshaw of Collumswell, Leixlip. Two of their infant children who died in 1818 and 1822 are buried in the family plot behind Leixlip parish church, as well as their elder son the Revd Richard Turner (b. 1817, d. 7 February 1849 aged 32) who was a graduate of Trinity College (B.A. 1841). Richard and Jane had at least seven other children, including William (b. 1827, d. 9 June 1888 aged 61) who succeeded as head of the family firm when his father retired in 1863. Richard himself had taken over the family ironmongery from his uncle, also Richard Turner, who was established on St Stephen's Green, Dublin, in 1813. Richard (junior) engaged in building speculation in Dublin during the late 1820s and early 1830s, and with the capital he gained he was able in 1834 to acquire the land at Ballsbridge on which he established the Hammersmith Iron Works (Diestelkamp, 1981).

While Richard Turner is now associated principally with the spectacular wrought iron greenhouses in Kew, Glasnevin, and Belfast (cf. Diestelkamp, 1981; McCracken, 1971), his company manufactured many other, more mundane types of ironwork - gates for large demesnes (for example, Donadea Castle in County Kildare), roofs for railway stations (Broadstone in Dublin had such a roof), and railings for Trinity College, Dublin (the high rails fronting Pearse Street bear Turner's mark). He entertained, as Drew (1880) remarked, many other novel schemes, and competed unsuccessfully in competitions to design 'crystal palaces' for the Great Exhibition in London (1851) and the Dublin Exhibition (1853). As for his glasshouses, the first known commission was built before 1834 at Colebrooke in County Fermanagh and Richard continued to excel in this domain into the 1860s with such gems as the circular house (now destroyed) at Woodstock near Inistioge, County Kilkenny (see Diestelkamp, 1981).

On 13 March 1981 Mr and Mrs Christopher Dobson (Battle, Sussex) presented to the National Botanic Gardens, a pair of hand-tinted photographs dating from early 1865 in original Victorian frames, of Richard Turner (Fig. 1) and his wife Jane, the only known portraits of the couple. Mrs Turner, who was five years older than her husband, died shortly after the photograph was taken aged 72 on 27 June 1865 and was buried in Mount Jerome Cemetery. Richard Turner was also buried in the same plot.

Thomas Drew concluded his letter of 14 March 1880 by stating that

> ... it seems right that Richard Turner, whose brilliant, innovative, and constructive genius did not bring the financial successes he deserved should have, at least, the honour and glory attaching to his connection with this notable achieved work [the Great Palm House, Kew].

Turner's name has always been attached to the Curvilinear Range at Glasnevin, which since 1982 has been featured on the definitive series of postage stamps issued by Ireland (see p. 21). This year, work will commence on the restoration of that notable building.

Glasnevin Curvilinear Range

In 1983 anxiety about the state of the glasshouse, the earliest portion of which was then 140 years old, prompted the Office of Public Works to commission a survey. A feasibility study with outline plans for the restoration of the iron and glass building and the provision of new accommodation for services and a new internal layout, was then prepared (Office of Public Works, 1984). Unfortunately finance for the restoration was not available. At the beginning of 1988, the central pavilion had to be closed to the public, and this necessitated a new search for ways and means of financing the restoration of the glasshouse. Early in 1989 £350,000 was made available for preliminary surveys and the full restoration project was approved by the Cabinet in early September.

On 8 September 1989, Michael O'Kennedy (Minister for Agriculture and Food) announced that the Curvilinear Range would be restored at an estimated cost of £4.4 million taking about four years to complete. The text of the government statement is as follows:

> The restoration of the Curvilinear Range is being superintended by the Architectural Branch, Office of Public Works; at this present time (January 1990) preliminary studies are in progress on the project, consultants engineers will shortly be appointed, and plans are being prepared for the conservation of the iron-and-glass 'envelope', for the redesign of the service area and the installation of modern environmental controls. The over-riding principle in the project is the faithful restoration of the glasshouse using as much of the original iron as possible, replacing only those small portions that cannot be salvaged and returning the greenhouse to a state comparable with that when it was finally completed in 1869. A new heating system will be installed and the growing space refurbished to provide better conditions for the display of plants. It is hoped to include in the renovated Curvilinear Range a permanent exhibition on the life and work of Richard Turner.

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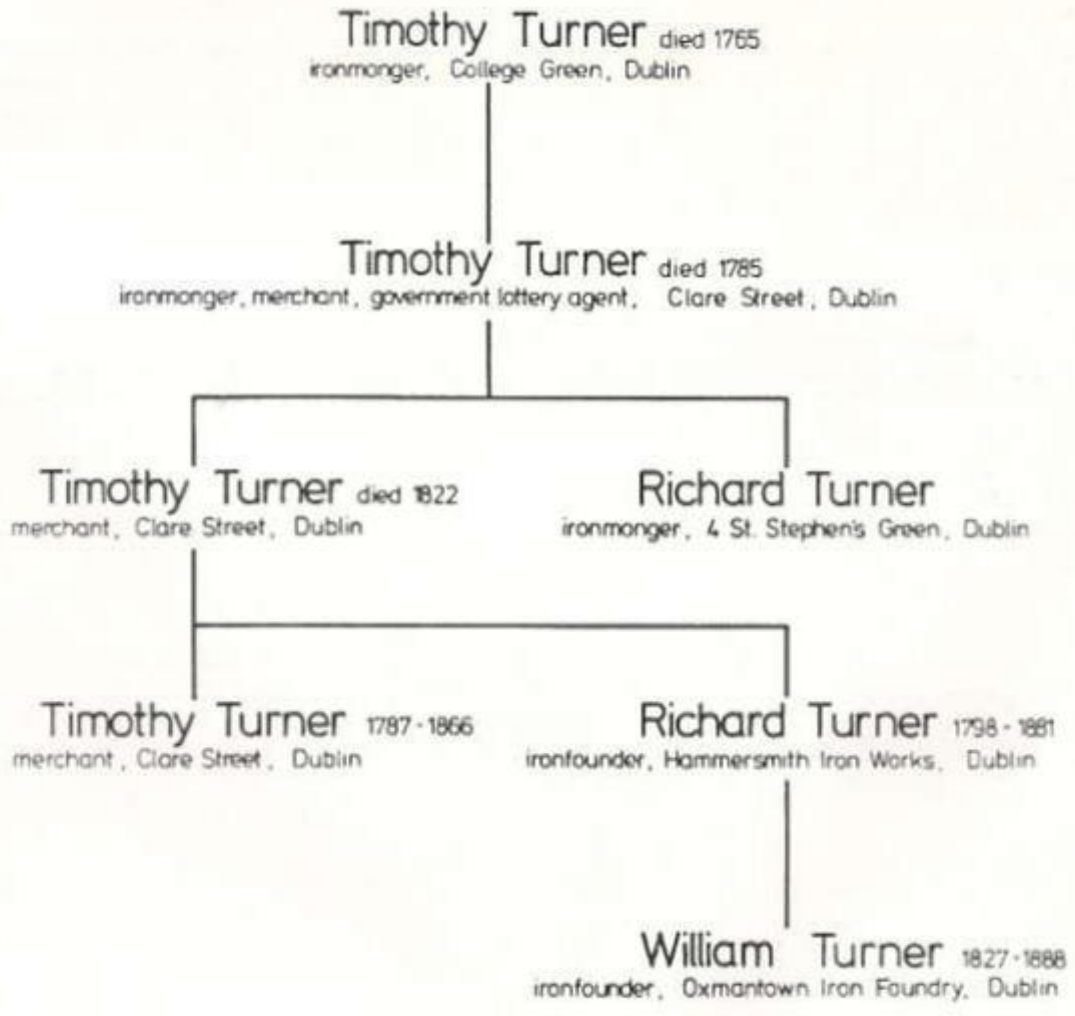


Figure 2. Family tree of Richard Turner (1798-1881).

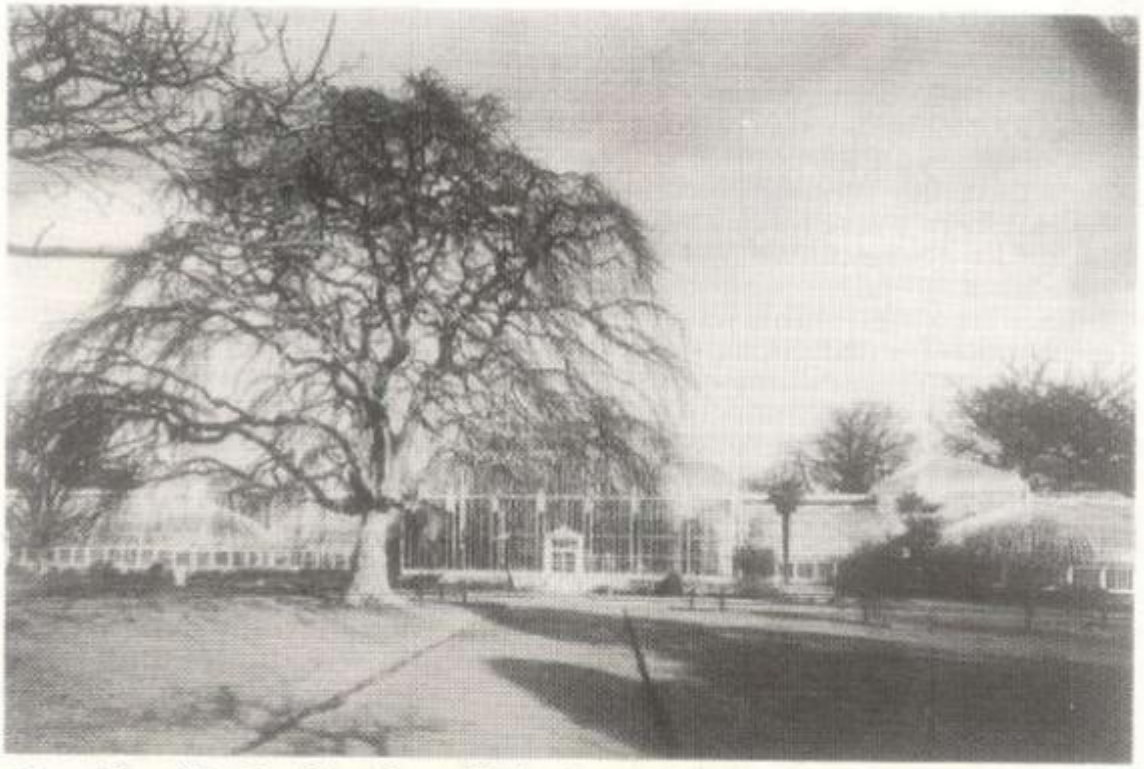


Figure 1. View of the Curvilinear Range, National Botanic Gardens, Glasnevin, Dublin.

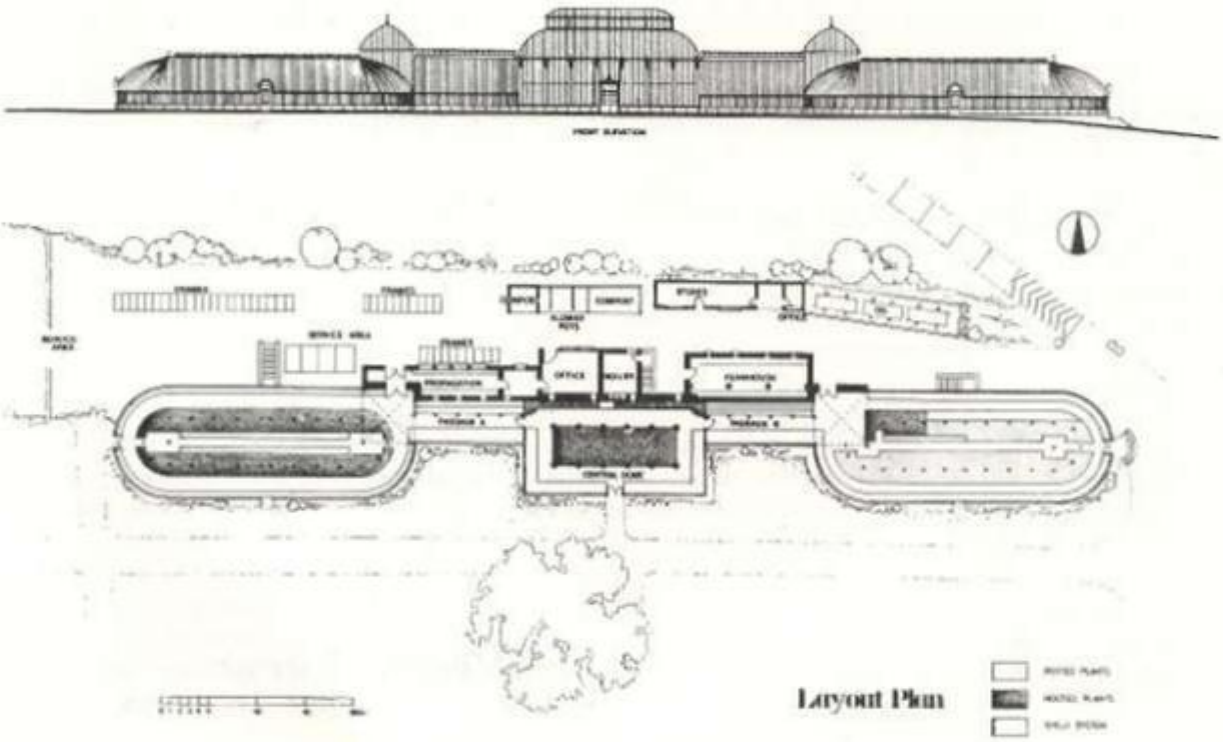


Figure 2. Layout plan of the Curvilinear Range, National Botanic Gardens.

E.J. DIESTELKAMP

THE CURVILINEAR RANGE AT THE NATIONAL BOTANIC GARDENS

The Curvilinear Range at the National Botanic Gardens, Glasnevin, was Richard Turner's largest commission in Ireland (Figures 1-3). Although it is generally recognised as a work of Turner, the history of the building is complicated, involving several other people as well.[1] The Curvilinear Range was erected over a period of five years and during that time two architects as well as another contractor besides Richard Turner were involved in its building (Figure 4). Twenty years after the completion of the range, it was decided to enlarge the structure to provide much needed space for the crowded collection of plants. This work, which considerably increased the size of the range, was also undertaken by Turner's Hammersmith Iron Works.

The Botanic Gardens of the Dublin Society were established during the 1790s.[2] The foundation of a public botanical garden in Dublin had been promoted early in 1790 by Dr Walter Wade, later appointed Professor of Botany to the Society. He received influential support from the Rt Hon. John Foster, the Speaker of the Irish House of Commons.[3] Funded by a series of grants from the Irish Parliament, the lease of a plot of land to the north of Dublin was acquired in 1795. In 1799, Parliament voted a sum for the erection of the first major range of glasshouses. This range, designed by Edward Parke, was constructed entirely of wood.[4] Parke's structure weathered quickly, however, and was found to be badly situated. Within twenty years of its erection, it became necessary to dismantle the structure. Rebuilt nearer the centre of the garden, with a more advantageous orientation, the Principal Range extended nearly 400 ft. in length.[5] Three small hot houses were erected near the entrance gate in 1813, and in 1819-20 a glasshouse known as the Octagon House was built to house a fine specimen of the Norfolk Island pine (*Araucaria heterophylla*). Both of these structures were also of wood.[6] During this early period of expansion, and into the mid-1820s, the gardens were closely controlled by Wade and Foster.[7] From the mid-1820s, however, interest in the Botanic Gardens declined and the Gardens and the glasshouses became dilapidated as a result of neglect. In 1834, on the appointment of Ninian Niven as Curator of the Botanic Gardens, a programme of restoration began.[8] The glasshouses were repaired and the collection of plants inside restocked. During the next four years, under Niven's care, the Botanic Gardens were re-established as a running concern.[9]

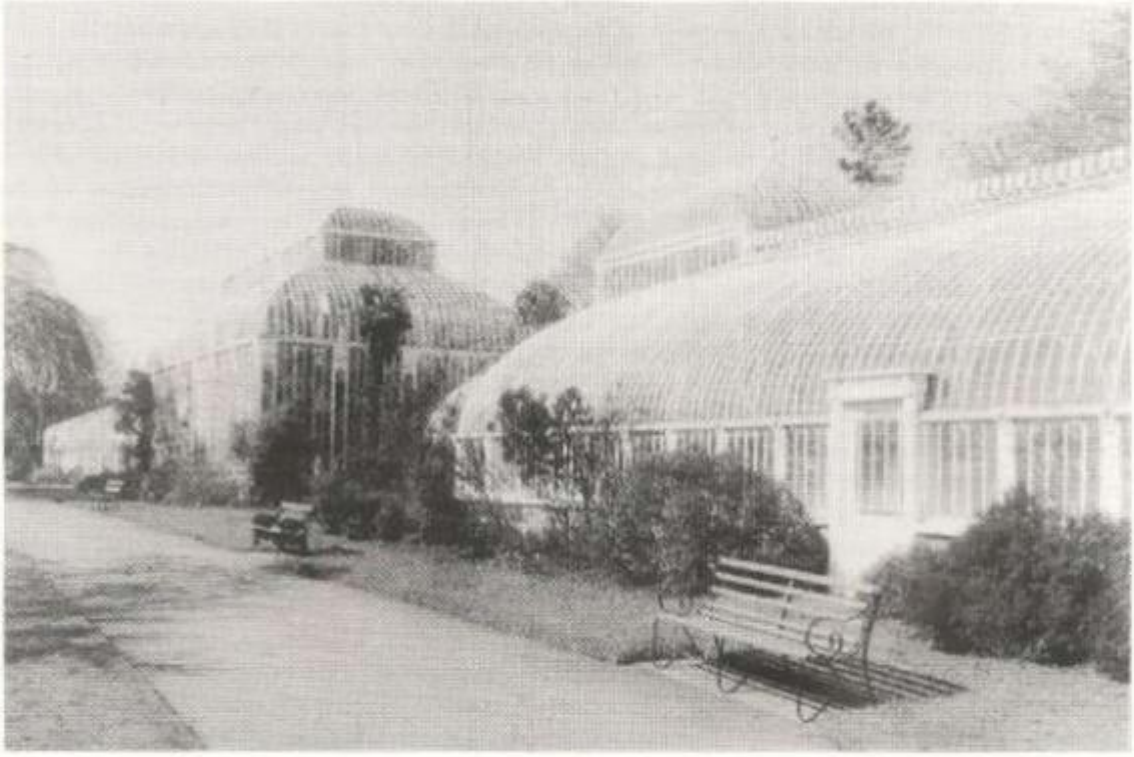


Figure 3. View of the Curvilinear Range from the east, National Botanic Gardens, Dublin.

Following Niven's brief curatorship, David Moore was appointed his successor in 1838. By 1841, Moore was to report the urgent need of further attention to the glasshouses. The Principal Range he considered to be in a very dilapidated state, claiming that the roof let in much rain, endangering the plants inside.[10] Acting on Moore's report, the Council of the Royal Dublin Society asked Jacob Owen, architect and engineer to the Irish Board of Works, to examine the glasshouses thoroughly. Owen's report condemned all the conservatories as dangerous and unworthy of repair, with the single exception of the Octagon House.[11] Following on Owen's findings, the Society resolved in February 1842 to erect new glasshouses at Glasnevin.[12] The Society's Committee of Botany was instructed by the Council to look into the question, and in March 1842, it proposed that a new building be erected to house the existing collection of plants. A figure of £2,500 was suggested as the estimated cost of a structure. The new work, they thought, should be part of a 'well considered arrangement for the whole', indicating their wish that the overall structure should take the form of a range of glasshouses. The existing Epiphyte House and the connected stoves which formed part of the Principal Range they thought would last only a few months longer, and they proposed that a house for these plants be erected at an estimated cost of £1,000, so that it could later be incorporated into a much larger scheme.[13]

The Society no doubt made enquiries about obtaining money from the Government to defray the cost of such a new building. The Lord Lieutenant, Earl de Grey, was approached. However, despite his apparent interest in the project, the Society was refused any financial support at that time.[14] The Society, undeterred by this initial refusal, determined to open a subscription, in order 'to raise a certain sum to lay the grounds for an application to Parliament'. They also resolved to send David Moore to England for plants and for plans of glasshouses.[15] Permission was requested from the Duke of Northumberland, for Moore to visit the gardens at Syon House, in order to inspect the conservatory.[16]

Returned from his trip to England, Moore presented a plan for a new epiphyte house to the Committee of Botany on 20 June 1842. The Committee requested Moore to prepare a further plan and estimate under the direction of an architect. From the available evidence it appears that the Committee sanctioned Moore's suggestion that he should consult Duncan Ferguson, then the Master of Architectural Drawing to the Royal Dublin Society Schools.[17]

In October of that year, Moore wrote despairingly to Sir William J. Hooker, Director of the Royal Botanic Gardens, Kew, 'I was in hopes something would have been done for us this season at Glasnevin, but, there now remains no hope. I have been struggling against the stream to keep matters ongoing'. Doubtless the state of the glasshouses caused him much anxiety.[18] It became necessary to prop up and repair the existing glasshouses for the oncoming winter despite the fact that it had been decided earlier that year not to spend any further money on them.[19] In December 1842, however, David Moore, Duncan Ferguson and Professor Samuel Litton (Wade's successor as Professor of Botany) were asked to attend a meeting of the Committee of Botany, to discuss the proposed new range of glasshouses.[20] Presumably at this meeting the scale and disposition of the range were discussed, for Ferguson was directed to make plans and obtain an estimate for an epiphyte house, which was to be 100 ft. long, 20 ft. wide and 13 ft. high, constructed partly of iron and partly of wood. At the meeting it was proposed the entire range should be 400 ft. long, composed of a centre house to be built of iron and wood, and glazed with sheet glass. Flanking the centre house were to be two side wings, the one to the east being the immediately proposed epiphyte house.[21] Ferguson submitted an estimate in January 1843 but the Committee declined to consider it as he did not submit any corresponding drawings. These Ferguson submitted a few weeks later, when they were exhibited to the Committee.[22]

The subscription for the erection of the epiphyte house was actively promoted at this time by Henry Kemmis QC, one of the vice-presidents of the Royal Dublin Society. The money, £680, was raised in a very short time. On its completion, the epiphyte house was named after Kemmis because of the help and support he offered.[23]

The Committee asked Ferguson to reconsider his plan and estimate which was thought to be excessive.[24] He submitted a revised plan and estimate on 10 April, which met with the approval of the Committee. On the recommendation of the Committee of Botany, the Council sanctioned the advertisement for tenders of the proposed building works, which appeared in *Saunder's Newsletter and Daily Advertiser* on 25 April. In the meantime, the site for the range had been selected and Ferguson had staked out the building. The tenders, reviewed on 8 May, had been submitted by sixteen different contractors.[26] Five days later, however, the Committee was approached by Richard Turner, who had not been one of the contractors to submit an estimate. Turner proposed an alteration to the plans of the new house. On 17 May, at a special Committee meeting, he submitted a design for a conservatory constructed entirely of iron instead of the wooden one which Ferguson had proposed.[27] Doubtless, Turner extolled the virtues of iron construction over that of wood and claimed that iron would be as inexpensive as wood. The Committee immediately resolved to adopt Turner's proposal. They asked him to prepare specifications according to his design. He was

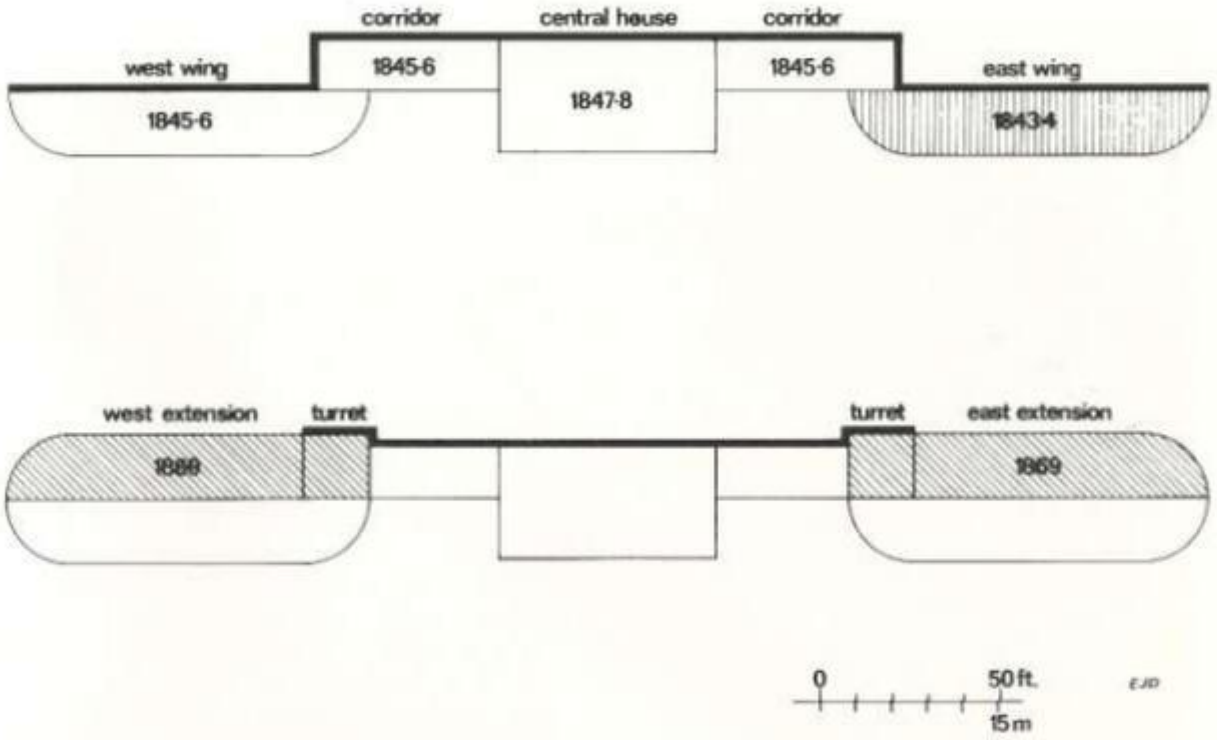


Figure 4. Diagram showing the growth of the Curvilinear Range, National Botanic Gardens, Dublin.

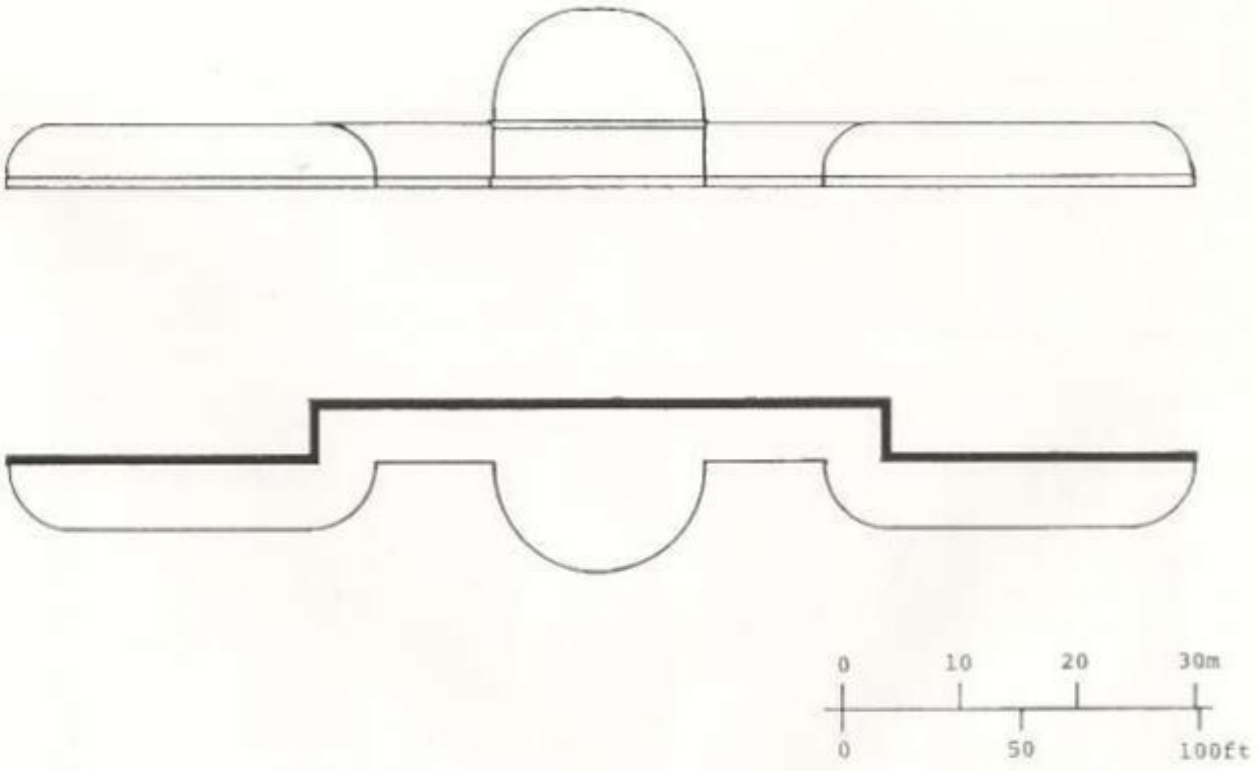


Figure 5. Diagramatic sketch of Frederick Darley's proposal for a domical palm house in the centre of the Curvilinear Range, 1846. Diameter 60'. Height 50'.

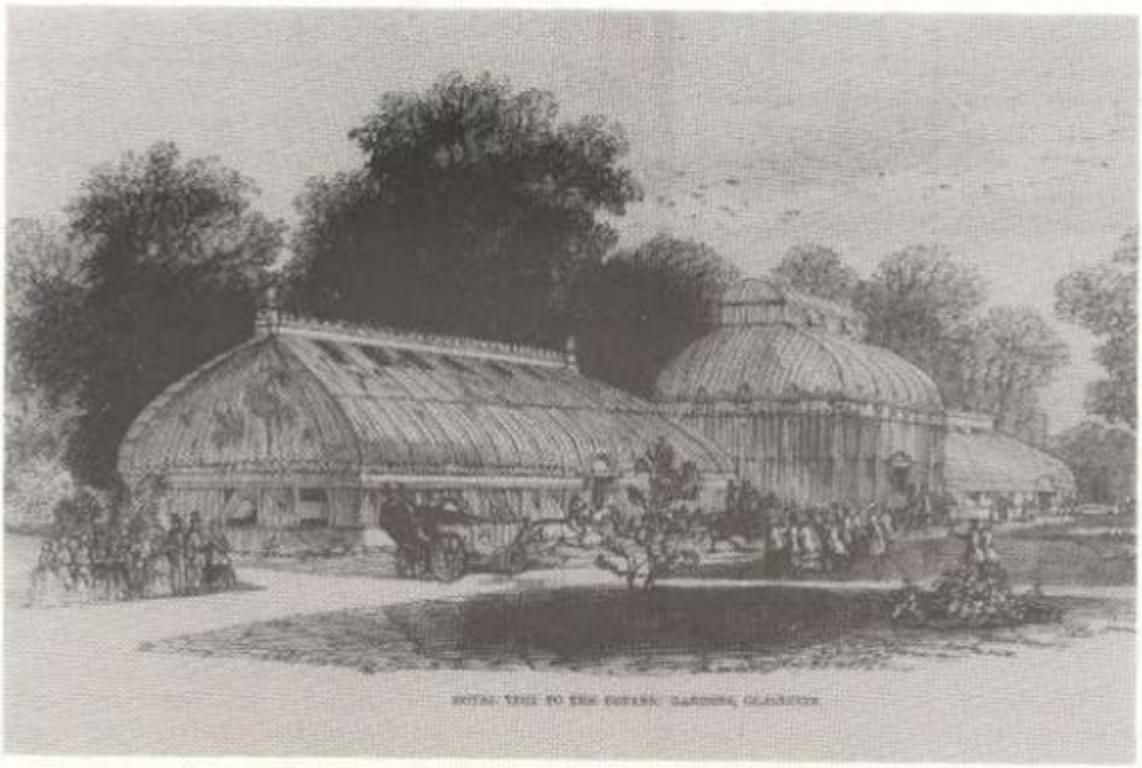


Figure 6. View of the Curvilinear Range from the west, taken from the *Illustrated London News* (18 August 1849).

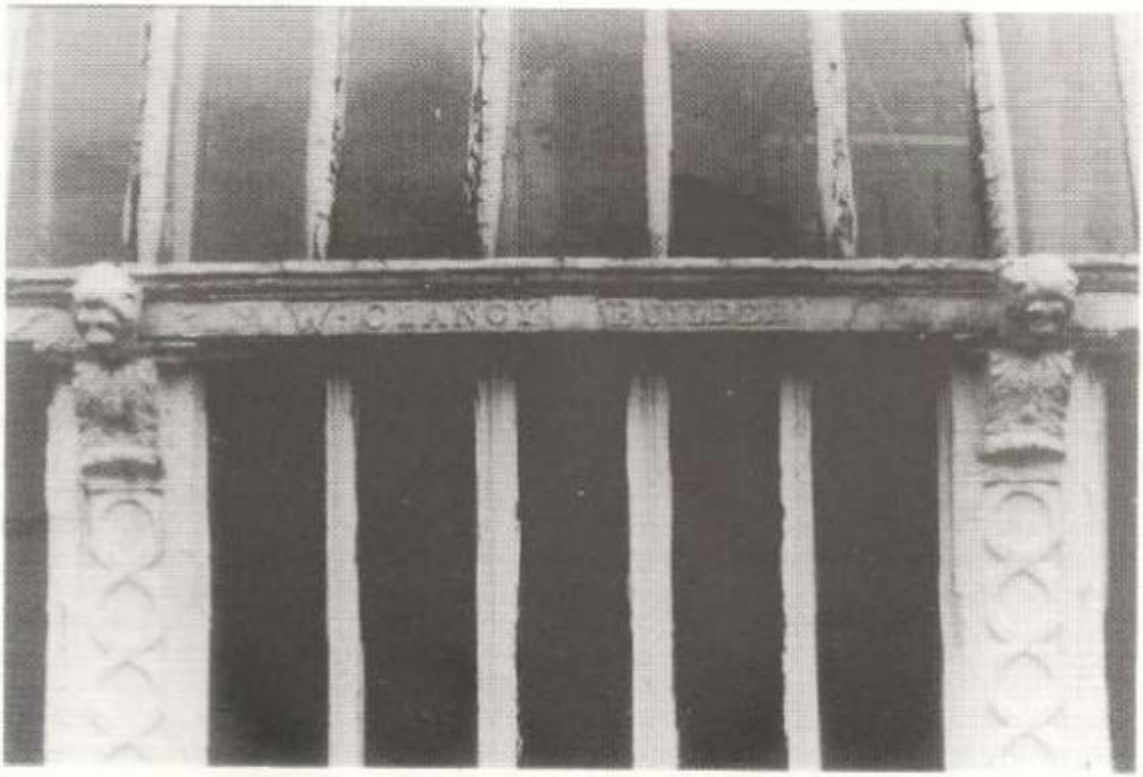


Figure 7. Detail of the gutter on the east wing showing Clancy's name cast into it, Curvilinear Range, National Botanic Gardens, Dublin.

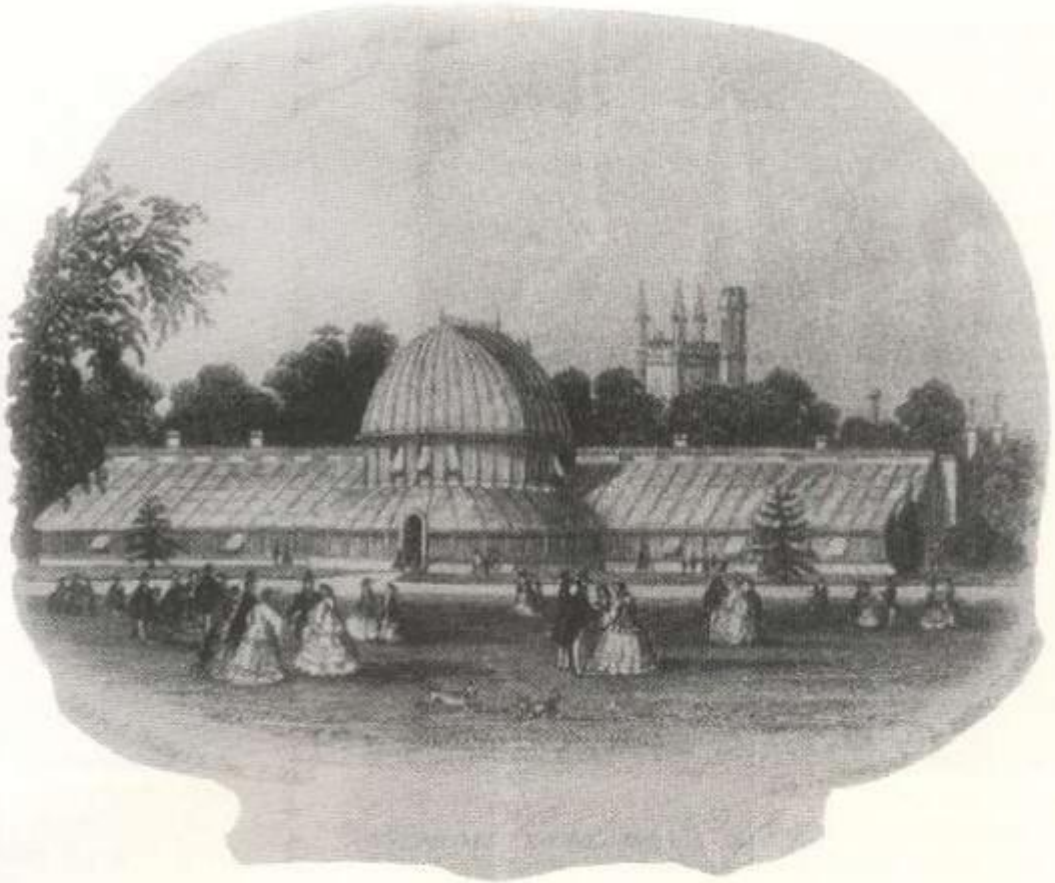


Figure 8. Palm House, Botanic Garden Belfast: only the wings by Richard Turner.

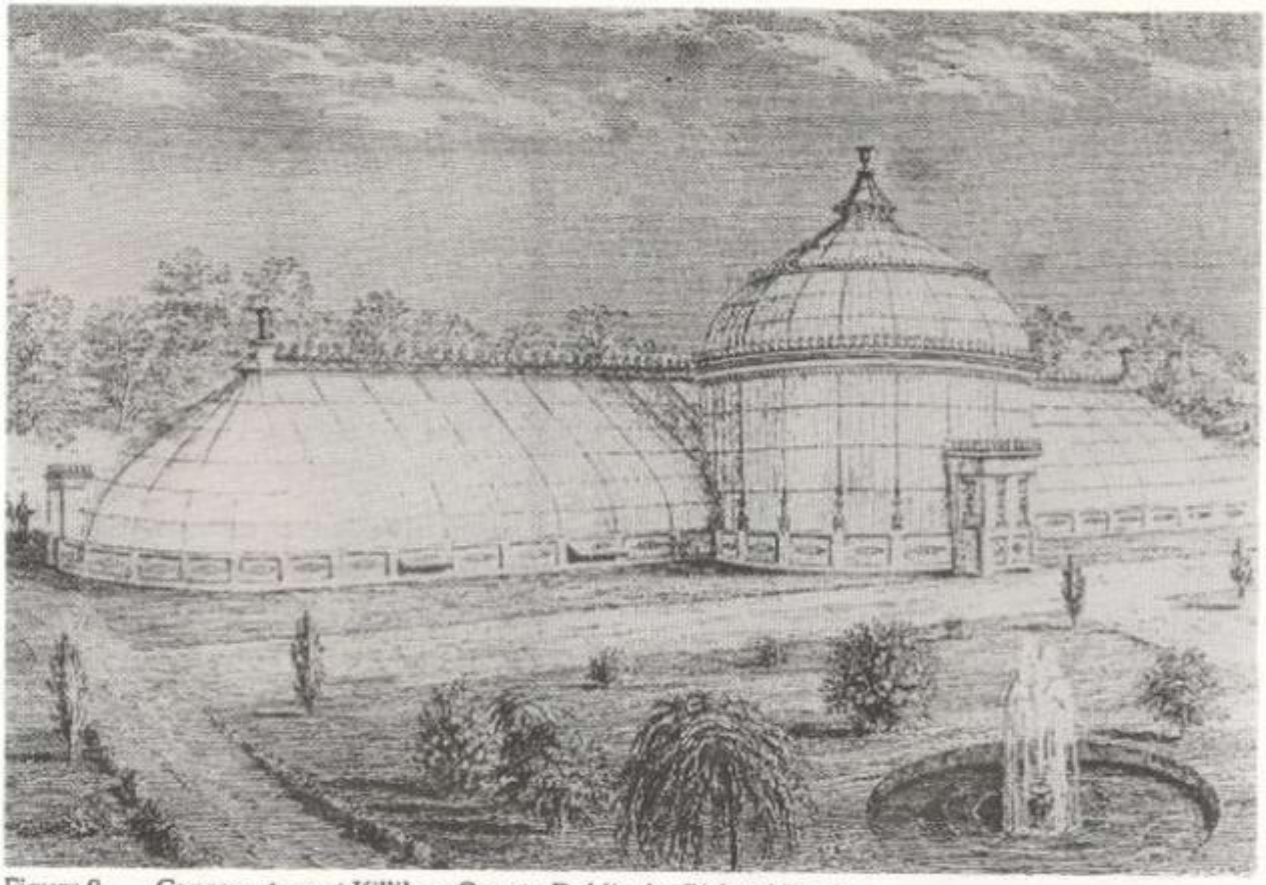


Figure 9. Conservatory at Killikee, County Dublin, by Richard Turner.

requested to attend the next Council meeting on 24 May, one week later, and to present his drawings and specifications at that time.[28] Following the presentation of Turner's scheme to the Council, it was agreed to abandon Ferguson's design. Ferguson was requested to furnish new plans and specifications for a wrought iron curvilinear conservatory, to be 100 ft. long, 18 ft. wide, and 18 ft. high. It is very likely that these plans were based closely on the design submitted by Turner.[29] An advertisement for tenders was placed in *Saunder's Newsletter and Daily Advertiser*, on 9 June 1843.[30]

On the day the tenders were due, 19 June, only two had been submitted, one of them from Richard Turner. Three days later, however, two further estimates were received.[31] John and Robert Mallet's bid of £990 was the second highest and that of Richard Turner for £890 was next. However, a relatively unknown contractor, William Clancy, submitted the lowest bid of £810. Much to Turner's annoyance, no doubt, since he had suggested the proposed design and expended considerable effort in promoting it, both the Committee and the Council recommended the acceptance of Clancy's estimate.[32]

The contract stipulated that the work was to be completed by 1 November 1943, in four months time.[33] This point, in particular, was ill-considered by all involved, as was eventually to be proven. Clancy's experience in work of this kind was very limited, neither was Ferguson familiar with this type of construction. The work dragged on for twelve months, and by the time the epiphyte house was completed Clancy was nearly bankrupt, and the Society had found another architect to supervise the completion of the range.

The epiphyte house formed the east wing of the proposed range (Figure 4). A lean-to house, on the north side of its back wall were a series of rooms for the garden labourers and apprentices, which included sleeping rooms, as well as an office and store room. Ferguson had suggested this arrangement in August 1843, probably after consultation with Moore.[34]

It became obvious early on that the house would not be completed on time, and repairs were again undertaken to the existing plant houses in order that the plants might survive the winter.[35] Clancy applied for a payment of £250 in February 1844, but the Committee only recommended that £100 be paid on the basis of the work he had completed.[36] The Society had become most anxious over the unfinished state of the works, which seemed to progress very slowly.[37] The glaziers, Dawson & Mitchell, who had subcontracted to supply and install the glass, applied to the Society at the beginning of March 1844, asking that they be paid directly by the Society on the completion of their work.[38] Clancy's financial problems were well known to all involved as he had greatly underestimated the cost and amount of time needed to complete the contract. The Society agreed to pay Dawson & Mitchell the amount of their contract, £180, directly. The glazing, however, did not begin until the end of April 1844, presumably because Clancy's work was not far enough advanced for the glazing to start until that time.[39]

The Society addressed an appeal in March 1844, to raise the £250 necessary to finish the east wing, but it did not meet with success. The balance was eventually to be made up from the reserve funds of the Society.[40] However, having proved their intention to proceed with the erection of the glasshouse range without outside financial support, they applied to the Treasury for a grant to complete the remaining portions of the proposed range.[41] The Treasury's response was no doubt positive, for the Council immediately set about renewing interest in the project. The great delay and seemingly inefficient supervision of the works led them to look for another architect. Frederick Darley, who had been asked to attend the Council meeting of 6 May, was formally requested to submit a plan for the completion of the range.[42]

When Duncan Ferguson learned of Darley's appointment he protested to the Committee of Botany, claiming that he had been requested to plan and superintend the entire range of conservatories. He added that the work directed by him up to this time had been executed perfectly. The Committee replied that in their view he had only been 'employed to superintend a separate and detached building'. With reference to Ferguson's statement regarding the 'perfect execution of work in the Gardens', the Committee thought it 'right to state that contrary opinions have been conveyed to them'.[43]

The east wing was still not complete by the middle of June 1844, when Dawson & Mitchell requested payment for the glazing.[44] The Committee urged Clancy to submit a final account, but he refused to attend the appointed meeting despite the fact that he was in serious financial difficulty, and needed the balance of money owed to him.[45] On 8 July 1844, Ferguson claimed the work to be finished and asked that the balance due to Clancy be paid. A final account was submitted on 15 July 1844.[46]

Darley had in the meantime produced a plan for the completion of the range of conservatories, and submitted it to the Committee of Botany on 12 June. The plan was approved and Darley was requested to prepare a plan and estimate to send to the Lords of the Treasury.[47] The plan and estimate were sent to the Treasury on 24 July, accompanied by a letter requesting a grant of £2,000 towards the erection of the range.[48]

The Committee of Botany met at the gardens on 5 August to inspect the newly completed conservatory (Figure 3). One of the things which they discussed was the heating system. From the outset, it had been intended to adopt a 'hypocaust' system,[49] invented by Dr Anthony Meyler of Dublin. Meyler's heating system

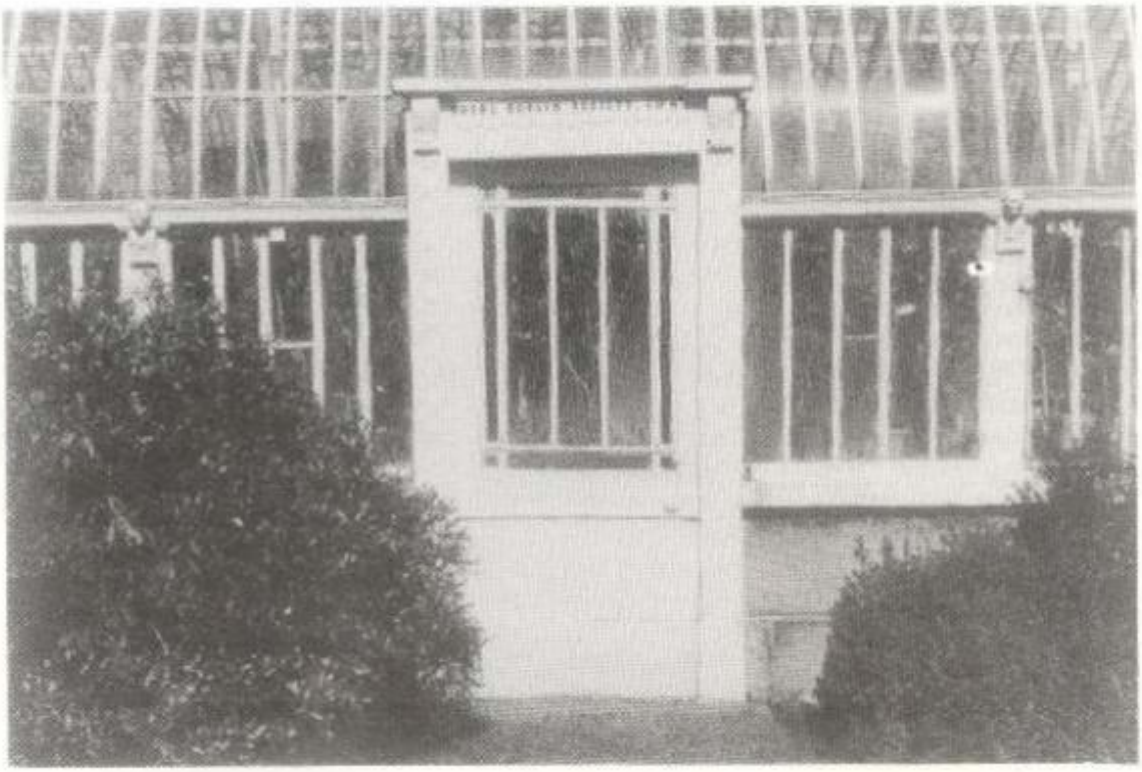


Figure 10 (top). Detail of the central door of the east wing, Curvilinear Range, National Botanic Gardens, Dublin.



Figure 11 (right). Detail of a swivelling sash of the east wing of the Curvilinear Range, National Botanic Gardens, Dublin.

was by means of hot air which was circulated throughout the house and in the back wall through a series of flues. The preference in this case for a hot air system instead of the more widely adopted hot water system was probably due to the drier conditions it would afford during the winter period for the African (Cape) heaths which required a particularly dry atmosphere. The estimate of £60 for the installation of the heating system was approved.[50]

On 10 August the Treasury sanctioned the £2,000 grant toward the erection of the west wing of the range and two connecting corridors (see Figure 4). Darley was asked to prepare the working drawings and specifications in order that tenders could be advertised. The drawings were completed by 21 October and Darley was instructed to prepare the advertisement.[51] The tenders, received on 13 January 1845, were submitted by six competitors, amongst them Courtney & Stephens of Dublin, John & Robert Mallet of Dublin, and Richard Turner; Courtney & Stephens' bid of £1650 was the lowest and Turner's tender of £1945 was the next lowest.[52] The Committee rejected the remaining four estimates as they all exceeded £2,000, the amount of money granted by the Treasury. As it was necessary that the grant include the cost of the heating system as well, the estimates submitted by Courtney & Stephens and by Richard Turner were referred to Darley and he was asked to consider 'the most expedient and economical mode of carrying the objects into effect'.[53]

A week later Darley met with the Committee at which time he presented three different plans for the west wing and the connecting passages. The exact differences between the three are not known; however, it is fair to assume that the linking corridors were the variable features as the west wing was to be identical with the existing east wing. The second plan, which was adopted, contained straight connecting passages joining the intended central house with the wings. Turner had provided for the meeting an amended estimate in the sum of £1695 for the entire work, and it was resolved that his tender be accepted.[54] Darley had approached only Turner for an amended tender, and Courtney & Stephens objected strongly to having been excluded from further consideration.[55] Darley had consulted Turner over the reduction of the cost of the proposed design.[56] Perhaps he knew that Turner was to a great extent responsible for the design of the east wing. It is certain that his choice of Turner was guided by the fact that, of all the competitors for the contract, Turner was the one renowned for his experience and expertise in the design and construction of glasshouses.

The Law Agent was directed to prepare the contract on 3 February 1845. To protect their interests the Society adopted a more stringent penalty clause than had been used for Clancy's contract. Turner requested that the completion date be altered from 1 September to 30 September, which was agreed by the Society.[57] Included in Turner's contract was the dismantling of the former lecture room and library which was adjacent to the professor's house, located inside the Gardens. The materials from the demolished building were used in the front and rear masonry walls of the conservatory.[58] The work progressed quickly. Turner requested the first instalment of payment of £200 on 19 May. On 22 May, the Committee of Botany met at the Gardens to inspect the work. They were pleased with the quality of the materials and the workmanship and directed that Turner be paid.[59]

The Committee addressed a letter to Sir William Hooker in July 1845 asking for his opinion 'of the best and most approved mode of heating'. Hooker's reply in favour of a hot water system recommended the firm of Burbidge & Healy of Fleet Street, London, who had been consulted over the heating system for the Kew Palm House.[60] Possibly the estimate from Burbidge & Healy was too expensive as the Committee asked Turner to submit a bid. Turner's bid of £190 to install a hot water system in the west wing and the corridors was approved on 1 September.[61]

On 13 October, nearly two weeks after the time when the contract was to have been completed, Darley reported the work was 'far from being completed'. The Committee instructed the Law Agent to remind Turner of the penalty clause.[62]

The Chief Secretary, Sir Thomas Freemantle, visited the Gardens at the end of October, and was shown the new conservatory. The Committee of Botany took the opportunity to point out the need to complete the entire range and asked that he might use his influence to obtain the necessary funds from the Treasury. Two days later, on 29 October, the Committee recommended to the Council that an application for £2065, to complete the range of conservatories, be made to the Government.[63]

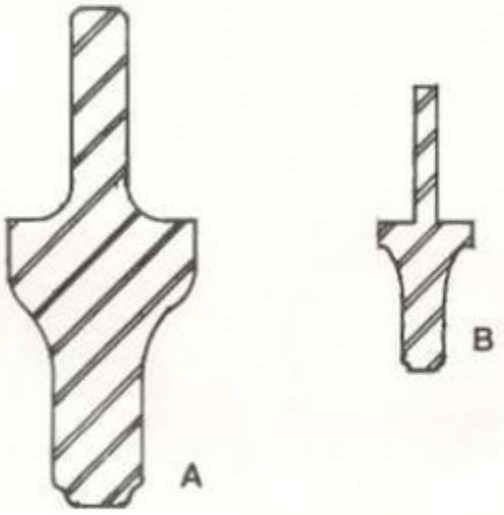
Moore's annual report dated November 1845 referred to the delay in the completion of the conservatories, adding that both Turner and Darley had done everything in their power to lessen the inconvenience. Moore especially commended Darley's unremitting attention during the progress of the work. The back houses, to the north of the rear wall of the conservatory, had been made ready to house temporarily certain tender plants. Moore urged the immediate completion of the range while the Gardens was in a disrupted state. The larger plants intended for the Central House were crowded into the Octagon House.[64]

The west wing and the corridors were finally completed and the keys handed over on 20 March 1846.[65] Turner was paid the balance due to him on 20 April. At the same time he asked for an additional £148 for



Figure 12 (left). Detail of a column supporting a purlin, east wing of the Curvilinear Range, National Botanic Gardens, Dublin.

Figure 13 (below). Full size sections through roof glazing bars.
A, Glazing bar to carry sliding roof sashes;
B, Typical glazing bar.



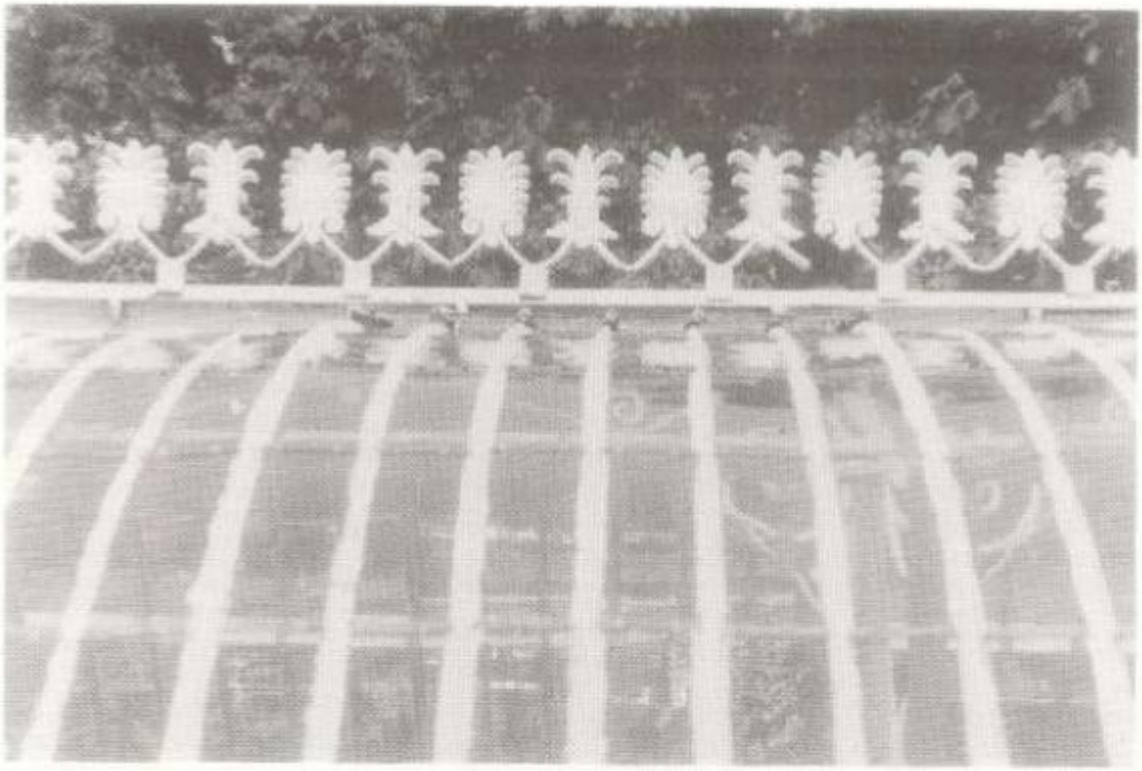


Figure 14. (a) Detail of the ridge ornament on the east wing of the Curvilinear Range, National Botanic Gardens, Dublin.

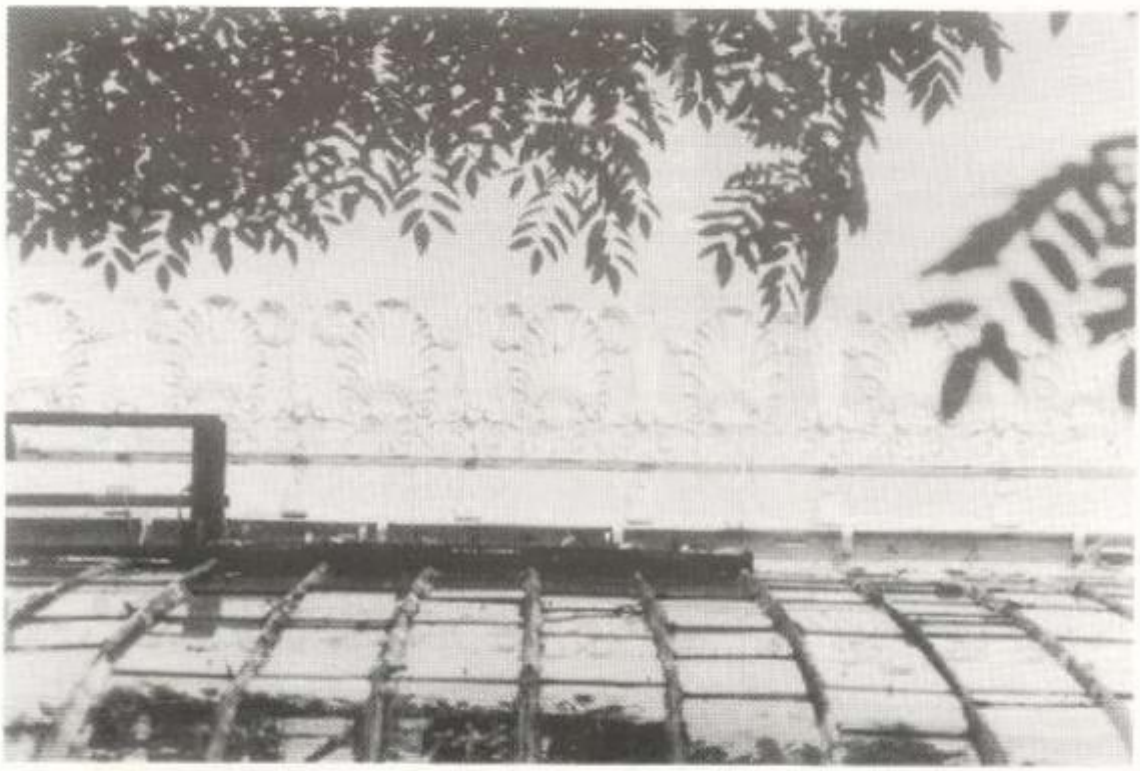


Figure 14. (b) Detail of the ridge ornament on the west wing of the Curvilinear Range, National Botanic Gardens, Dublin.

extras. Turner had on his own initiative introduced flag flooring instead of the asphalt paths specified in the contract, at a cost of £72. Darley only recommended payment of £38 from the £148 requested by Turner.[66] However, a compromise was eventually reached and on 27 July 1846 Turner was paid a considerable portion of the extra amount he had requested.[67] The final account for the west wing and passages, issued on 20 September, came to a total of £1985 0s 8d.[68]

Darley's design for the Central House of the Range was for a circular structure, 60 ft. in diameter, surmounted by a dome 50 ft. in height (Figure 5).[69] The main feature of the Curvilinear Range, it was intended to house the palms and loftier tropical plants. On 8 August the Committee instructed Darley to prepare the working drawings and specifications. These were completed on 12 October, when they were presented to the Committee. It was resolved that an advertisement for tenders be placed in the newspapers.[70]

The Government had not granted the Society's application of £2065 for the completion of the range, during the financial year 1846-7. When the Under-Secretary to the Lord Lieutenant, Sir Thomas Redington, visited the Gardens in August 1846, the Committee pointed out the need of a further grant to complete the range of conservatories.[71]

The tenders for the domed Central House were received in December of that year.[72] The tenders submitted were doubtless far in excess of the estimated cost for which the Society had applied to the Treasury. On 8 March 1847 it was resolved that Darley should 'lay before the Committee with as little delay as possible a plan of so much of the originally designed centre house as can be erected for £2000'. Darley's modified plan, which no longer proposed a circular domed central structure, was submitted the following week. The Committee, satisfied with the scheme, made formal application for a grant from the Government, this time for £2000.[73] It is reasonable to assume that Turner had again been consulted by Darley with respect to the reduction of the cost of the Central House, and it is significant that Turner was the only person invited to submit a tender for Darley's modified design. This design, 'Plan for a Centre House of the New Range of Conservatories of the same character as the wings', as the title implies, was greatly influenced by the existing portions of the range.[74] Turner was clearly involved in the revision of the design for the central building as the executed structure testifies. Many features, such as the glazed pilasters, swivelling sashes of the lantern, the hinged sashes of the elevation, and decorative cast iron features including the capitals of the pilasters and the anthemia and the sunflowers (see Figure 20) positioned along the gutter, had appeared on earlier Turner conservatories.[75]

Turner's tender of £1900 for the Central House was accepted by the Committee of Botany on 17 May 1847. The contract was signed in June and work began immediately.[76] In September 1847, Turner wrote to the Committee offering to glaze the Central House with the green glass which was at that time starting to be placed in the Kew Palm House; this tinted glass was intended to prevent scorching of the plants. The additional cost was to have been £54, but the Committee declined to adopt the suggestion because of the additional expense.[77] The grant from the Government allowed for few extras and the provision of a heating system had not been included in Turner's estimate. Moore's annual report of November 1847, urged that the heating system should be installed as the structure would be of little use without it.[78] Turner submitted an estimate at the beginning of January 1848 for the installation of a 'Polmaise Heating System', which David Moore had recommended; it was a hot-air heating system that had received much attention during the early 1840s.[79] The Central House had been completed in January, with the exception of the flagging which was delayed until the heating system could be installed. Turner requested his final payment on 27 March 1848.[80]

The Committee of Botany applied in March 1848 for a further grant to install the heating system, thereby completing the Curvilinear Range, but the application was refused.[81] In fact, the Central House was not to receive a heating system until two years later. In November 1848, Moore's annual report mourned the uselessness of the Central House.[82] The following June, William Harvey, the newly elected Professor of Botany, held his annual series of lectures inside the then still unoccupied Central House.[83] The Government had for the second year running refused a grant for the installation of a heating system.[84] In August 1849 when Queen Victoria and Prince Albert visited the Botanic Gardens, the Central House had stood empty and unused for over eighteen months[85] (Figure 6). The Government finally approved a grant of £500 for the financial year 1850-51.[86] An advertisement was placed in the newspapers and five tenders were received, John & Robert Mallet and Turner being amongst those to submit estimates.[87] Turner's estimate was the highest and the Mallets' was the next; however, the Committee decided to award the contract to the Mallets because of the savings in the consumption of fuel which they promised their system would effect.[88] The heating system adopted was that suggested by Moore in November 1847, but with additional modifications to what was basically a hot air system.[89] The work was completed by the end of June, when the palms in the Octagon House were removed and installed in the new Central House of the Curvilinear Range (Figures 4 and 6).[90]

The Curvilinear Range was now complete (Figure 6). The east wing constructed by Clancy bears his signature in two places, cast in relief on the cast iron gutter (Figure 7). However, as mentioned previously,

the structure was based on Turner's proposal for a wrought iron curvilinear conservatory. It is extremely likely that Turner's plans and specification were seen and used by Ferguson. The conservatory as executed used many details which Turner had developed and incorporated in other commissions. The east wing shared many similarities with the wings of the Palm House (1839-40) in Belfast Botanic Garden (Figure 8), the wings of the hothouse range for Sir Henry Brooke at Colebrooke, Co. Fermanagh (1830), and the wings of the glasshouse Turner erected for Colonel White at Killakee, Co. Dublin (1843) (Figure 9). The method of construction and the fabrication of the elements used are based on Turner's ideas. The gutter is supported by cast iron pilasters which rest on the front masonry wall (Figure 10). Between the pilasters are mounted swivelling sashes (Figure 11) which allowed fresh air into the house, similar to those that Turner had used at the Vice-Regal Lodge (1836-7) and on the wings of the Belfast Palm House.[91] Originally the width inside was 18 ft. from the sashes of the front elevation to the rear wall, which stood 18 ft. high. A row of 1.5 in. diameter columns carried a purlin bar which supported the roof. This purlin was at the middle of the span between the front and back walls (Figure 12). At the top of the lean-to glass roof a series of sliding sashes, counterbalanced for ease of handling, rolled up and down on large glazing bars.[92] The usual size of roof glazing bar (Figure 13) used by Turner was 1.5 in. deep and 0.5 in. thick at the widest point. However, the large roof glazing bars used at Glasnevin were 2.5 in. deep and 1 in. thick. The house was originally to have had a large plant stand, but due to a lack of funds during the building works, an open pit was substituted and the plants were let directly into the soil rather than being grown in pots.[93] The sheet glass used in the east wing proved to be of a lower quality than that which was used in the rest of the structure. Clancy probably sanctioned the use of 16 oz sheet glass rather than the more normal 24 oz on grounds of economy.[94] Prior to enlargement, the east wing contained mostly plants from Australia and the Cape of Good Hope, though some cacti were housed as well.[95]

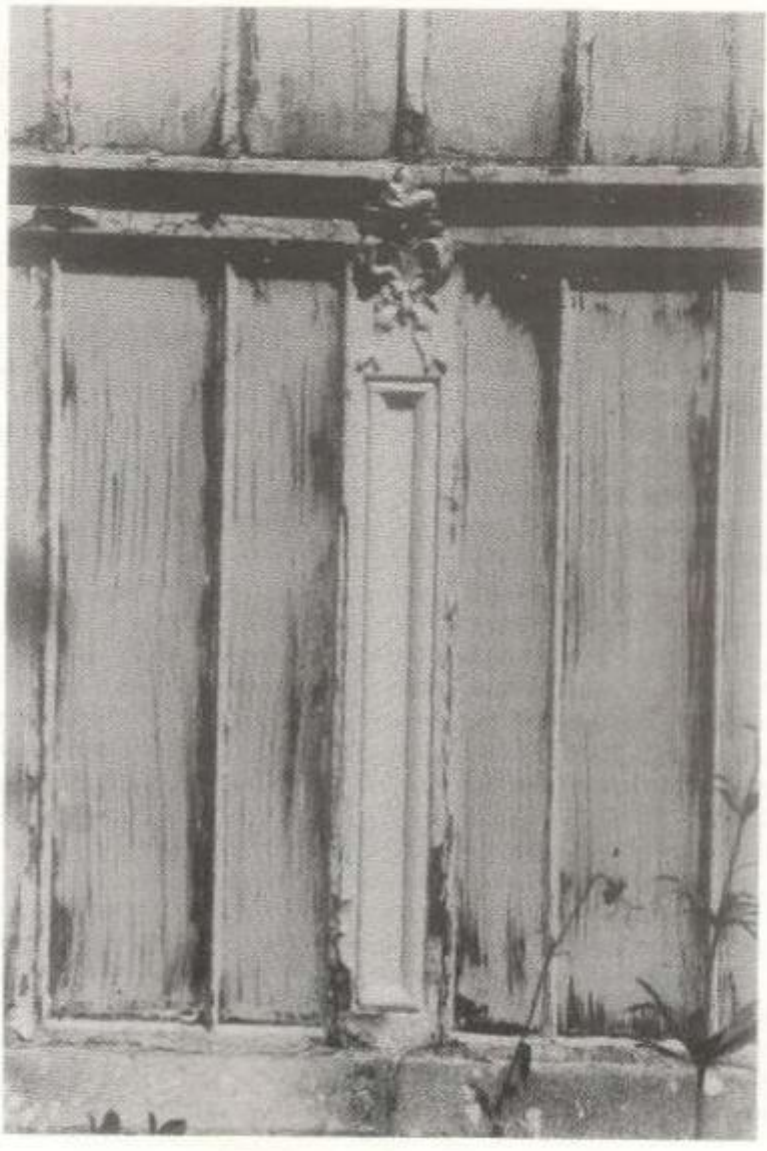


Figure 15. Detail of a pilaster on the west wing of the Curvilinear Range, National Botanic Gardens, Dublin.



Figure 16. Interior view of the west corridor, Curvilinear Range, National Botanic Gardens, Dublin.

A comparison of the east and west wings of the Curvilinear Range produces few differences as they were both constructed alike. Dimensions are identical, as are the actual elements themselves, such as glazing bars, pilasters and sashes.[96] Decorative features, however, are different. The ornament running along the top of the ridge (compare Figures 14a and 14b), the decoration of the pilasters (compare Figures 11 and 15) and the doorcases at the centre of each wing are the most obvious examples. The west wing like the east wing contained two paths, one beside the rear wall, the other beside a plant shelf which ran the length of the front elevation. Between the paths was an open area for planting directly into the ground.[97] Intended as a stove for tropical plants requiring a high temperature, it was found to have an inadequate heating system during the severe winter of 1850-51. John & Robert Mallet contracted to provide new boilers and hot water pipe.[98]

The east and west corridors, originally 50 ft. long, were set behind the rear wall of the end wings (Figure 4). As one would expect, each was constructed in a like manner. The inside width from the glass of the front elevation to the rear wall is 13 ft. 10 in. A row of thin 1.5 in. diameter columns supports a purlin bar which carries the glazing bars of the roof, 4 ft. 6 in. from the rear wall (Figure 16). The arrangement of sashes in the roof and the front elevation is the same as in the east and west wings; the decorative features along the ridge and on the pilasters are identical with the west wing. However, a decorative casting which ran along the gutter of the front elevation was removed at some time during this century[99] (Figure 17). The corridors contain a large stage along the rear wall and a smaller stage next to the swivelling sashes of the front elevation, with a path between the two. This arrangement is probably the same as that adopted on their completion. The east corridor was originally an extension of the east wing, containing Cape heaths. The west corridor housed the cacti and succulents and therefore required a glazed partition to separate it from the more humid tropical stove in the west wing.[100]

Figure 17 (right). Exterior detail of the east corridor (from an old photograph) of the Curvilinear Range, National Botanic Gardens, Dublin. (Photograph at the NBG, Dublin).

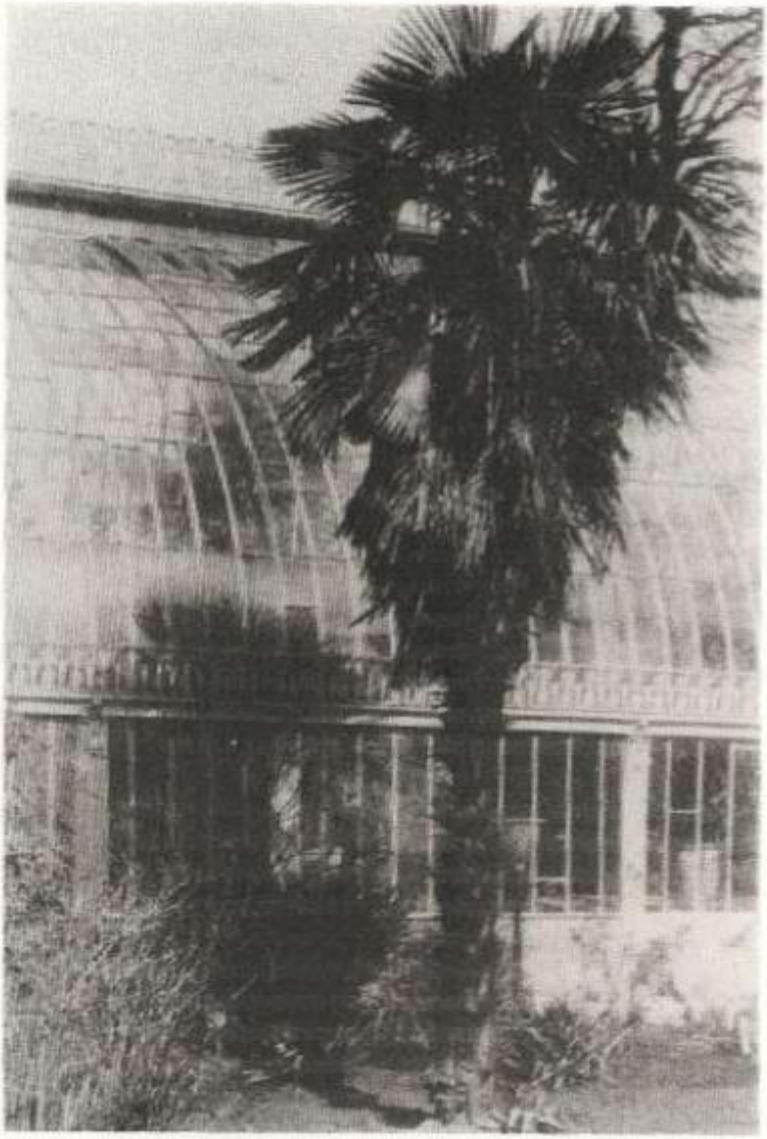
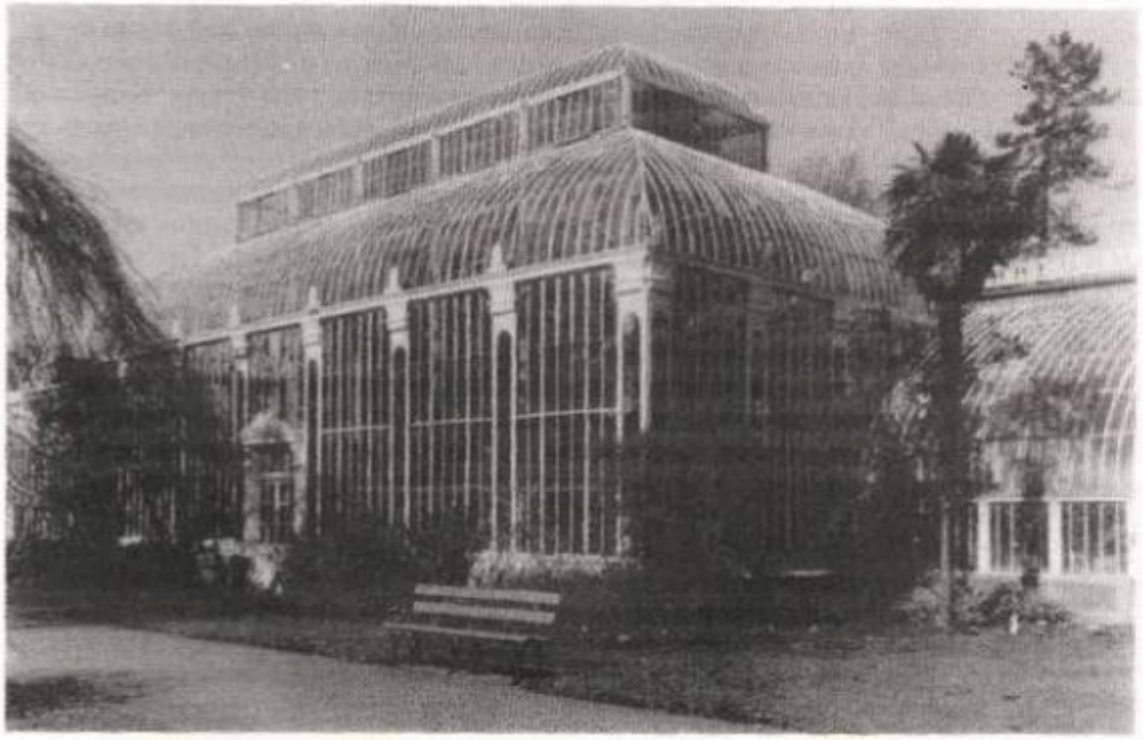


Figure 18 (below). View of the centre palm house, Curvilinear Range, National Botanic Gardens, Dublin.



The palm or Central House (Figures 18 and 19) of the Range, is 59 ft. 8 in. long inside the glass and 30 ft. 10 in. wide from the glass of the front elevation to the rear masonry wall. The south elevation, of seven bays, is composed of large glazed pilasters resting on a granite base 2 ft. 6 in. high. The pilasters, similar to those used on the Winter Garden in Regent's Park, are 16 in. in width and approximately 14 ft. high.[101] The bottom half of the glazed area between the pilasters is in fact a hinged sash approximately 7 ft. wide and 6 ft. high, to provide ventilation.[102] The pilasters support a continuous gutter which receives the glazing bars of the roof (Figure 20). A raised lantern, approximately 40 ft. high, at the centre of the palm house is carried on cast iron columns, which are placed at a distance of 9 ft. from the four walls of the house. The lantern contains swivelling sashes for ventilation, like those used in the Kew Palm House (1844-8). Inside the palm house a central bed is surrounded by a path. Plant stages are arranged along the three glazed sides of the building. Beneath the stages are situated the heating pipes (Figure 21).

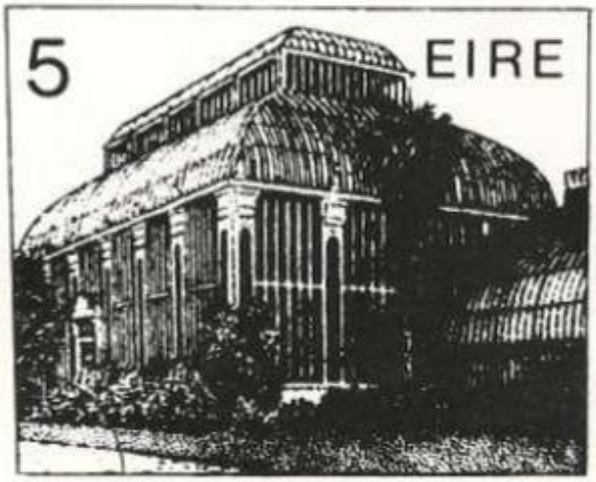


Figure 19.

Following the completion of the Curvilinear Range, the next addition to the glasshouses of the Botanic Gardens was the Victoria Regia House, completed in 1854.[103] The following year (1855), a conservatory built of wood, 90 ft. long and 22 ft. wide, was erected by means of a grant from the Board of Trade.[104] This conservatory was intended to serve as the right wing of a new proposed range, containing a new palm house and a flanking wing on the left, similar to that erected. It must have become obvious very early on that the 40 ft. height of the Central House of the Curvilinear Range was too low for the growth of tropical palm trees. The progress of the new range, however, was halted for a further six years. By the time construction of the new palm house began, it had become necessary to provide a loftier space for the palms as many had actually reached the roof of the Curvilinear Range.[105]

In the summer of 1861, the Gardens opened to the public on Sunday, proving immensely popular. Upwards of 15,000 people were visiting the Gardens every Sunday.[106] The large number of people inside the Curvilinear Range, particularly in the east and west wings where the paths were narrow, resulted in the knocking over of plants. On 9 November 1861, David Moore wrote to the Council complaining of the narrow passages and the danger to the plants.[107] Moore was instructed to consult the architect to the Irish Board of Works about possible solutions to the problem. One of the schemes which the Committee of Botany proposed, so as to gain more space, involved the removal of the offices behind the rear walls of the wings. Though the records do not give further details of the proposal, it is possible that the idea for the solution of the problem emanated from the Committee itself.[108] The Board's architect for the area, Mr Clarendon, met Moore and discussed the possibility of extending the conservatory. As Moore later recorded in his annual report for 1861, Clarendon thought the wings 'could be readily widened by adding a corresponding side to the north of that which now faces south'.[109] No immediate action was taken, however, as the new Palm House was under construction at this time. The subject of widening the wings was again being discussed in 1865, when William Robinson reported the intention to 'improve the handsome curvilinear range of lean-to houses by doubling its width and converting it into a roomy span-roofed range'.[110]

In January 1868 a design was submitted by William Turner, Richard's son[111] (Figures 22 and 23). Though by this time William had succeeded his father as the head of the Hammersmith Iron Works, Richard was still actively involved in the business. The drawings were in fact executed by Richard. This design was probably submitted first to the Committee of Botany.

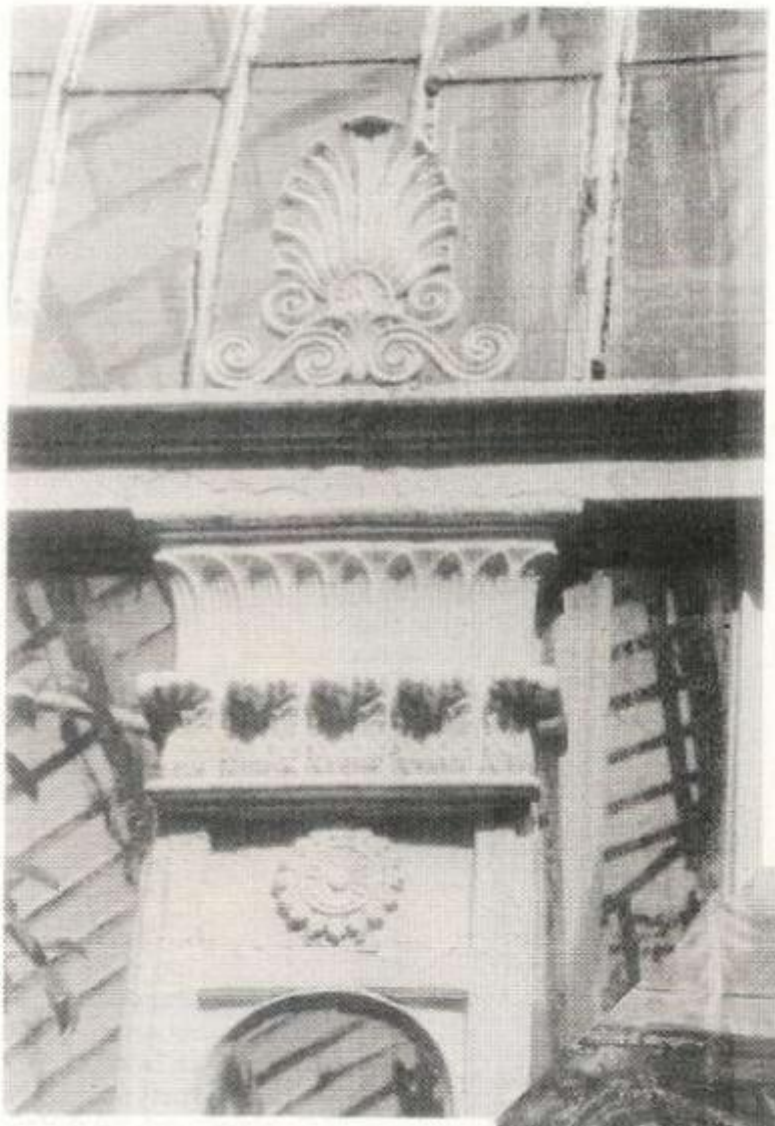


Figure 20 (left). Detail of a capital on the palm house, Curvilinear Range, National Botanic Gardens, Dublin.



Figure 21 (right). Detail of a cast iron stanchion holding the plant shelf in the central palm house, Curvilinear Range, National Botanic Gardens, Dublin.

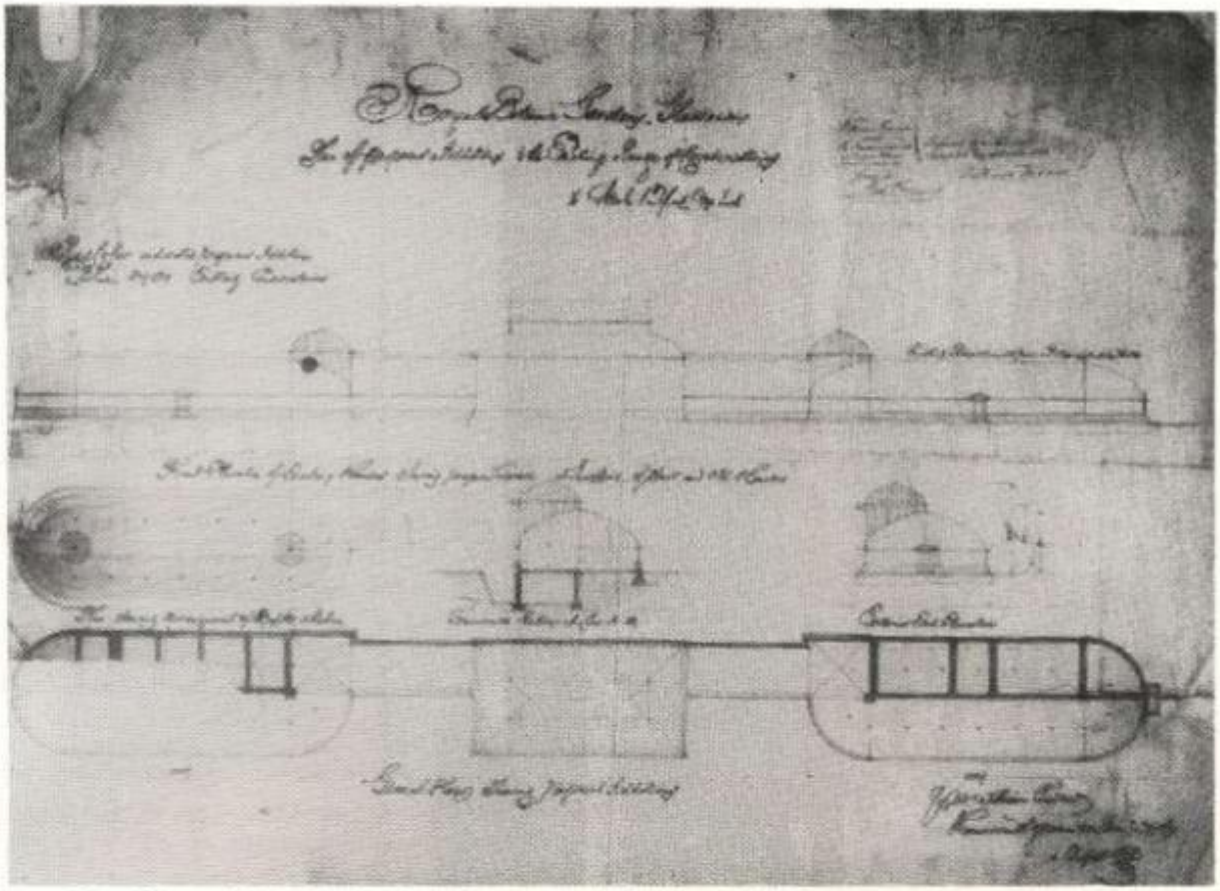


Figure 22. Plan and elevation for the enlargement of the wings of the Curvilinear Range, by Richard Turner, January, 1868. (Office of Public Works, Dublin)

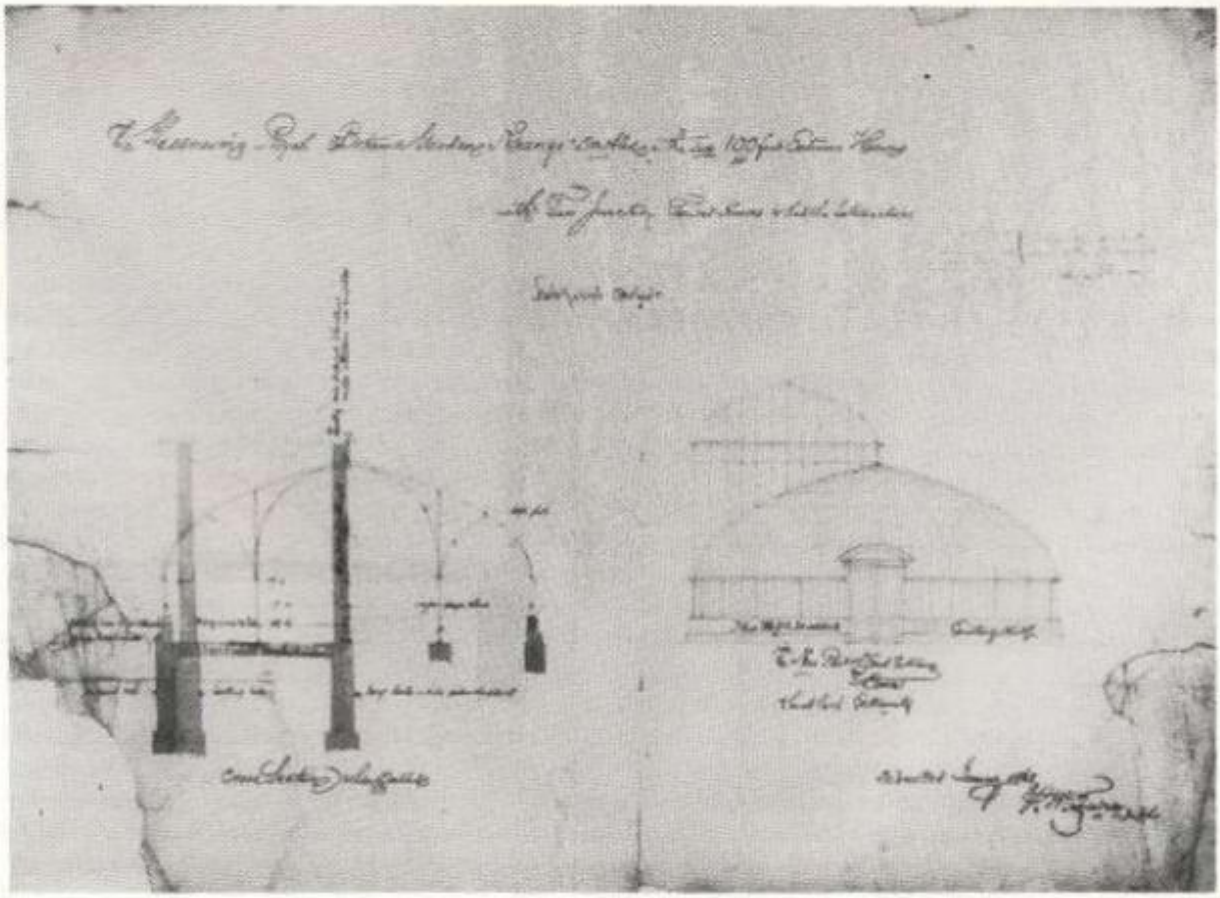


Figure 23. Section and end elevation for the enlargement of the wings of the Curvilinear Range, by Richard Turner, January, 1868. (Office of Public Works)



Figure 24. Turret at the junction of the west wing with the west corridor, Curvilinear Range, National Botanic Gardens, Dublin.

The Committee of Botany applied to the Council on 24 June, requesting that Turner's plans be sent to the Board of Works for approval.[112] The drawings were returned to the Committee on 1 September, having met the approval of the Board of Works. The Committee of Botany resolved to proceed with the work on the understanding that the extension to the north of the rear wall of the wings would be completed before the wall itself was removed. This precaution was for the protection of the plants.[113] The contract was signed on 21 October 1868.[114] To protect the plants from damage it became necessary to remove them from each wing as the work was begun. The students' lodgings and the offices formerly situated behind the rear wall of the east wing were moved temporarily until the new structure then under erection for those purposes was completed.[115] The work on the Curvilinear Range was finished early in October 1869 (Figure 4). Moore, in his annual report for 1869, reported the heating apparatus in the wings as working satisfactorily. He praised the appearance of the additions and claimed that the range had been much improved.[116]

The additions to each wing included a turret approximately 20 ft. high to the springing of the hipped roof (Figure 24). These rectangular turrets, 18 ft. 4 in. long by 17 ft. 9 in. in depth, were placed at the junctions of the corridors with the wings. A portion of each corridor fourteen feet in length was removed to make room for the turrets (Figure 4). The addition to the north side of each wing, 18 ft. in width, was identical in detail and construction with the existing roof and south elevation of each wing.[117] Due to the depth of the existing foundations beneath the rear wall of each wing it was possible to provide cellar spaces under the northern extensions. The existing lean-to roof of each wing on receiving the addition was turned into a span roof (Figure 25). The actual point where the existing roof met the new roof is recognisable in the east wing. The scroll decoration set within the spandrels of an arch beneath the purlin indicates where Clancy's work stops



Figure 25. Interior of the west wing showing the span roof supported by the butterfly trusses, Curvilinear Range, National Botanic Gardens, Dublin.



Figure 26. Detail of the junction of the old roof with the new roof added in 1868-9, east wing of the Curvilinear Range, National Botanic Gardens, Dublin. Note the differences in the scrolls.



Figure 27 (left). Detail of the butterfly truss introduced to support the roof, east wing of the Curvilinear Range, National Botanic Gardens, Dublin.

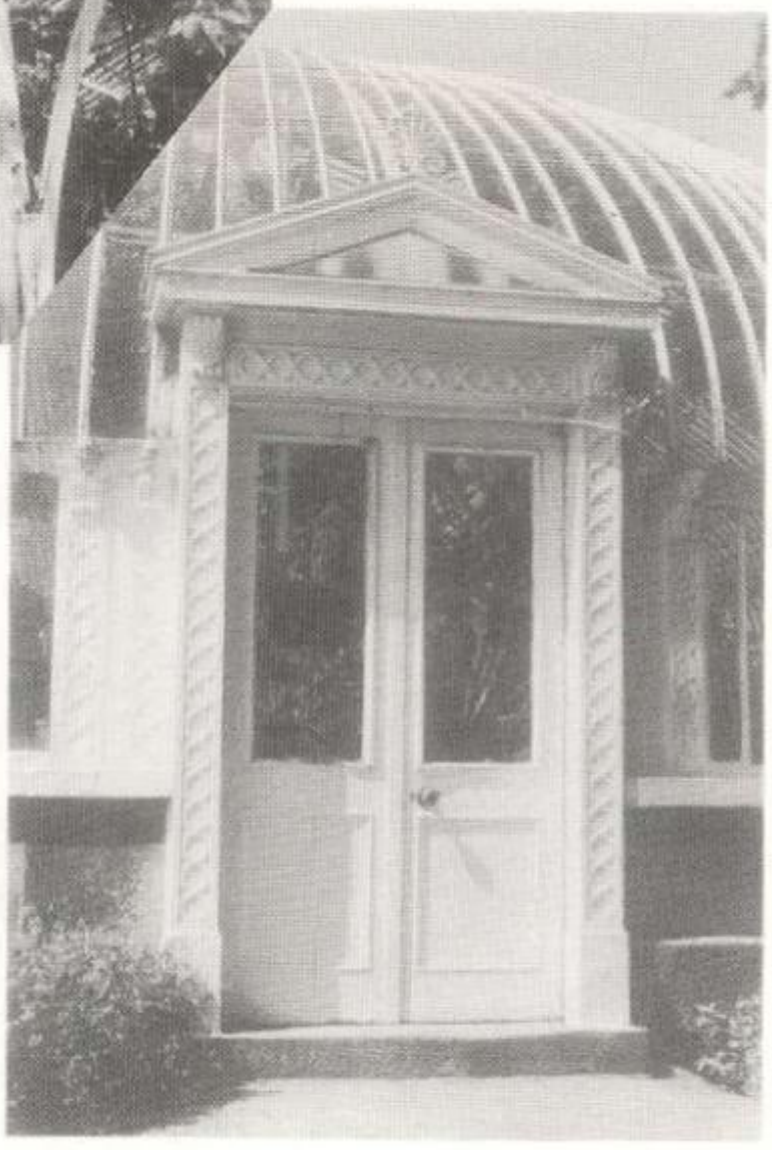


Figure 28 (right). Detail of the door erected in 1868-9 at the end of the east wing of the Curvilinear Range, National Botanic Gardens, Dublin.

Figure 29 (right). Palm House built in 1860; from *The Gardeners' Chronicle*, October 1884. (National Botanic Gardens, Dublin.

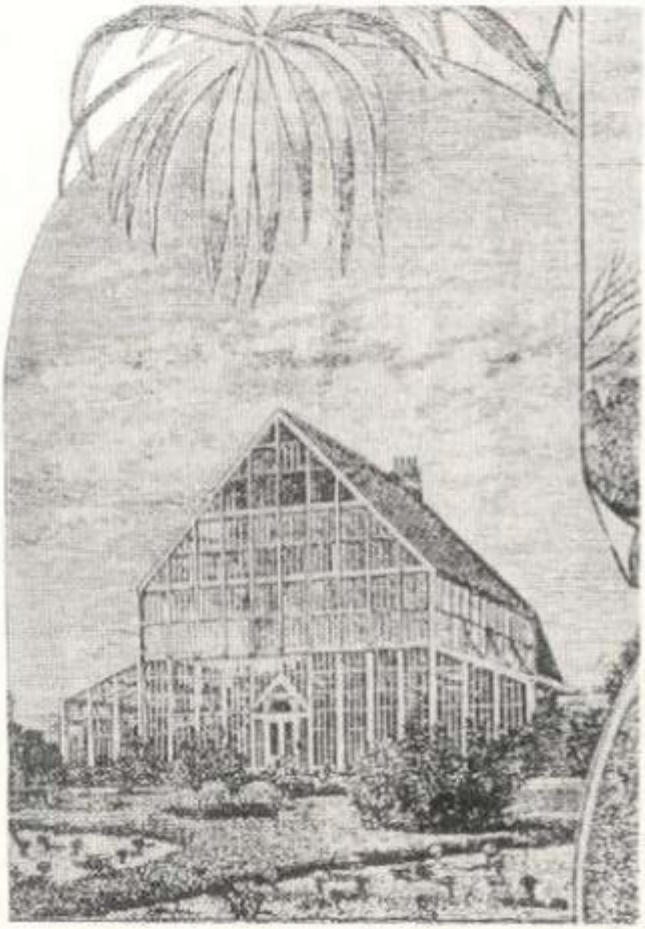


Figure 30 (below). Curvilinear Range from the top of the Palm House.



and Turner's work of 1869 begins. The lighter scroll made of a rod is Clancy's work, while the heavier scroll made of a bar was executed by Turner (Figure 26).

The method Turner adopted to support the roof on the removal of the rear wall was a series of butterfly trusses which he applied to the existing structure (Figure 23). These trusses were built of common 3 inch angle iron and illustrate his ingenious and intuitive approach to the problem. The thin circular columns, far too light to support the additional weight of the roof, were strengthened by 3 inch angle iron. Two new purlins, also constructed of 3 inch angle iron, were introduced to support the roof (Figure 27). The butterfly trusses carried the purlins, which in turn supported the glazing bars of the roof. At Longueville, Co. Cork (1866), Turner had built a conservatory which had an arched higher central span of greater width than the two flanking arched spans, forming a nave and two aisles. Though a different structural system was used at Longueville, both it and the wing houses of Glasnevin were based on this spatial concept which Turner had used previously in the design for the 1851 Great Exhibition Building.[118]

The ends of each wing received new doorways, rendering those on the south elevation of each house unnecessary[119] (Figure 28). The interior of the east and west wings was divided by three paths, greatly increasing the ease of circulation; one in the centre and two on the sides, running beside a plant stand which was set against the exterior wall (Figures 1 and 22).

The Curvilinear Range as erected was to a great extent the result of Turner's ideas. His eager and ambitious nature, always ready with a proposal, coupled with his experience and knowledge in the design and construction of conservatories, were the major reasons for his involvement. Though there is a lack of documentary evidence in the form of drawings, the proof of Turner's participation recorded in the Minutes of the Committee of Botany, and the evidence of the structure itself, indicate his responsibility for the building as it evolved. Turner's initial proposal for the east wing was undoubtedly closely followed by Ferguson.[120] Darley consulted Turner about the design for the remainder of the range. The Central House well illustrates the extent to which Turner was consulted. Unique elements developed for earlier commissions are immediately recognisable.

William Robinson, an admirer of Turner's work, praised the Curvilinear Range at Glasnevin:
'Ornamental, light, useful, and I may almost say everlasting, are Mr. Turner's Palm-houses and conservatories everywhere we see them. None of his works display the characteristics better than the curvilinear range with the Palm-house in the centre adjacent to the Victoria house at Glasnevin.'[121]
Robinson's use of the word 'everlasting' was in reference to the superiority of iron over wood. This argument occupied many nineteenth-century writers concerned with the design of glasshouses. At a time when fashion and taste tended toward the more ornamental and architectural effects that could be obtained by the use of wood and masonry, Robinson held to earlier preferences for lighter structures constructed of iron which he thought to be more durable and lasting.[122] He severely criticised the newly completed Palm House at Glasnevin for its ungainly appearance and prevalent use of wood. Robinson referred to it as a 'barnlinear structure' (Figure 29), comparing it with the Curvilinear Range (Figure 30):
'that as Dove to Dodo, as winged Yankee clipper to swinish Monitor, as Gibson's Venus to a hideous gutta-percha faced Amazon of Dahomey, so is the old Palm-house at Glasnevin to the new.'[123]

Acknowledgements

I would like to thank the Director of the National Botanic Gardens and many other people who helped me during the work on my doctoral thesis; I am most grateful to Dr E.C. Nelson for his generous help in the preparation of this paper. Particular thanks go to G. and T. Crampton Ltd and Daniel Gillman.

Notes

Abbreviations: *P.R.D.S.* - Proceedings of the Royal Dublin Society. *A.P.S.D.* - Architectural Publication Society Dictionary. N.L.D. - National Library, Dublin. P.R.O. - Public Record Office. R.B.G. - Royal Botanic Gardens, Kew. R.D.S. - Royal Dublin Society.

1. The most detailed account of the building's history hitherto published is: Edward J. Diestelkamp and E. Charles Nelson, 'Richard Turner's Legacy', *Taisce Journal*, [Dublin], 3, No. 1 (Feb., 1979), pp. 4-5. For a shorter account see: Lanning Roper, 'Deeply Rooted in Dublin', *Country Life* (17 July 1980), pp. 192-194. The dates of the building's history are incorrect in Eileen McCracken, *The Palm House and Botanic Garden, Belfast* (Belfast: Ulster Architectural Heritage Society, 1971), pp. 37, 42. A brief statement of the building's cost appears in Eileen McCracken, 'The Finances of the Glasnevin Botanic Gardens, Under the Royal Dublin Society, 1795-1877', *Glasra* [Dublin], 5 (1980), pp. 45-50. The construction of the building is incorrectly described by John Hix, 'Richard Turner: Glass Master', *Architectural Review*, 152, No. 909 (Nov., 1972), pp. 287-293.

2. E.C. Nelson and E.M. McCracken, *The Brightest Jewel, a history of the National Botanic Gardens, Glasnevin, Dublin.* (Kilkenny: Boethius Press, 1987).
3. E.C. Nelson, 'A select, annotated Bibliography of the National Botanic Gardens, Glasnevin, Dublin', *Glasra* [Dublin], 5 (1980), pp. 1-20.
4. Nelson and McCracken, op. cit.; the range cost nearly £3,000, see E. McCracken, 'The Finances of the Glasnevin Botanic Gardens, Under the Royal Dublin Society, 1795-1877', *Glasra*, 5 (1980), p. 46. A plan and elevation of the range were engraved and included in, [W. Wade], *Catalogue of Plants of the Dublin Society's Botanic Garden at Glasnevin*, (Dublin, 1802). For Edward Parke, sometimes known as Robert, see *A.P.S.D.*
5. N. Niven, *The Visitor's Companion to the Botanic Garden, Glasnevin* (Dublin: W. Curry, Jun. and Co., 1838), p. 8. The 'Principal Range', as it was referred to by Niven, was considerably restored several times during its long history (it was not demolished until c. 1886). It is illustrated in the engraved frontispiece of Niven's guide. David Moore refers to the erection of a range of 'cast metal' houses in 1830, and it is possible that this relates to an extensive repair to the Principal Range; see D. Moore, *Hand Book for the Botanic Gardens of the Royal Dublin Society, Glasnevin* (4th ed. Dublin: William Leckie & Co., 1865).
6. Niven, op. cit., pp. 10, 33. During the erection of the Octagon, the Norfolk Pine around which it was built was destroyed. In 1834, a large vestibule addition provided more space.
7. Nelson & McCracken, op. cit.
8. Nelson & McCracken, op. cit. An account of Niven's career as a landscape gardener appears in E. Malins and P. Bowe, *Irish Gardens and Desmesnes from 1830*, (London: Barrie and Jenkins, 1980), pp. 36-7.
9. Nelson & McCracken, op. cit.
10. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 78 (1841-2), Appendix No. 1, p. V. 1 November 1841.
11. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.* 79 (1842-3), Appendix No. 1, p. 1. The small range near the entrance gates was so dilapidated that props were used to keep it standing upright. The roof of the Principal Range leaked very badly, the sashes having rotted. Jacob Owen (1778-1870) trained in the Royal Engineers' Department of the Ordnance, later becoming Clerk of Works at Portsmouth. In 1832, he transferred to Dublin as architect and engineer to the Irish Board of Works. He retired from office in 1856. See H. Colvin, *A Biographical Dictionary of British Architects, 1600-1840* (London: John Murray, 1978), *A.P.S.D.* and *D.N.B.*
12. *Minutes of the Committee of Botany*, (R.D.S), minutes of 28 February 1842. I am very grateful to Dr E.C. Nelson (National Botanic Gardens, Glasnevin) for making available to me a complete transcript of the *Minutes of the Committee to Botany*, to which I was not allowed access. The Minutes are the single most important source of information on the history of the Curvilinear Range.
13. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 14 March 1842.
14. English Letters, (Library, Royal Botanic Gardens, Kew), XVIII (1842), Part M-Z., p. 50, D. Moore, letter to Sir William J. Hooker, 23 March 1842. Moore was not optimistic about receiving a grant from the Government as he admitted in his letter to Hooker: 'Some of our plant houses have got into a sad state of decay from age and neglect, so much so, that I am afraid of them tumbling down about the plants. Whether the Lords of the Treasury will consent to afford money to repair them in the present state of financial difficulty appears a doubtful case.'
15. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 14 April 1842.
16. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 18 April 1842. The conservatories at Syon were widely recognised as some of the finest in England. The range designed by Charles Fowler in 1820, and erected in 1827, was an architectural composition with masonry and glass elevations and a roof of iron and glass. The iron was supplied by Richards and Jones of Birmingham, see J. Taylor, 'Charles Fowler (1792-1867) a centenary memoir', *Architectural History*, 11 (1968), pp. 57-74. For a description of the conservatory, see C. McIntosh, *The Book of the Garden*, (Edinburgh: W. Blackwood & Sons, 1853), p. 368 and plate 16. The extensive range of metallic hot houses erected in the kitchen garden, 400 ft. in length was also built by Richards and Jones of Birmingham in 1827; see J.C. Loudon, 'Calls at Suburban Gardens', *The Gardener's Magazine*, 2 (1827), p. 107. J.C. Loudon, 'Some Account of the Duke of Northumberland's Improvements in the Kitchen Garden and Forcing Department at Syon', *The Gardener's Magazine*, 5 (October, 1829), pp. 503-515.
17. The minutes read as follows: 'Resolved that Mr. M. be allowed to consult Mr. Ferguson Architect'. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 June 1842. At this time John Papworth was Master of the School of Architecture. Duncan Ferguson succeeded Papworth as Master of the School in 1852. For a history of the Royal Dublin Society's Drawing Schools, see H.F. Berry, *A History of the Royal Dublin Society* (London: Longmans, Green & Co., 1915), pp. 108-135. Maurice Craig, 'The Society's Buildings', *The Royal Dublin Society, 1731-1881* (Ed. by James Meenan and Desmond Clarke, Dublin: Gill and Macmillan Ltd., 1981), p. 66.
18. English Letters (Library, Royal Botanic Gardens, Kew) XVIII (1842), Part M-Z., p. 54, D. Moore, letter to Sir William J. Hooker, 26 October 1842.
19. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 79 (1842-3), Appendix No. 1, p. 1.
20. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 12 December 1842. Professor Litton was the appointed Professor of Botany to the R.D.S. Besides a salary, he was provided with a house in the gardens (now lived in by the Director of the Gardens). He was responsible for giving a series of lectures on botany each year as part of his duties.
21. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 14 December 1842. Diestelkamp and Nelson, op. cit., p. 5.

22. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 9 January and 6 February 1843. Ferguson's unprofessional judgment in this case, that simply an estimate would suffice, without the aid of drawings, seems rather naive. His experience of working with committees was no doubt limited. Similar misjudgements over professional procedure eventually led to his dismissal.
23. D. Moore, *Hand Book for the Botanic Gardens of the Royal Dublin Society, Glasnevin*, (3rd Edition, Dublin: William Leckie & Co., 1861), p. 24. The amount raised was paid to Clancy as the work progressed, but some £250 was still outstanding when the final account was submitted; see footnotes 40 and 46. McCracken states the amount subscribed to have been £700: see McCracken, op. cit., p. 47. Moore, in a letter to Hooker, claimed that the members of the Society had subscribed over £800 for the new conservatory, but this figure appears to be too high, see: English Letters (Library, Royal Botanic Gardens, Kew), XX (1843), Part I-Z., p. 135. D. Moore, letter to Sir William J. Hooker, 16 September 1843. Kemmis was assisted in raising the subscription by Lundy Foot, a tobacco manufacturer and also a Vice-President of the R.D.S. Moore had been very depressed by the fact that the Government had refused to give any financial assistance for the erection of the new glasshouses, as he recorded in a letter to Hooker, see: English Letters (Library, Royal Botanic Gardens, Kew), XX (1843), Part I-Z., p. 132. D. Moore, letter to Sir William J. Hooker, 15 March 1843.
24. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 March 1843.
25. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 10, 17 and 24 April 1843. The advertisement appeared in *Saunder's Newsletter and Daily Advertiser* [Dublin], 25 April 1843.
26. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 8 May 1843. The tenders submitted by the sixteen competitors are recorded in the minutes.
27. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 and 17 May 1843.
28. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 22 May 1843. Diestelkamp and Nelson, op. cit., p. 5.
29. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 29 May 1843. Diestelkamp and Nelson, op. cit., p. 5. The Committee directed Ferguson to adopt new dimensions so that the width at ground level was equal to the height of the rear wall. Ferguson's earlier scheme had provided a much greater width at ground level (20 ft.) in proportion to the height of the rear wall (13 ft.). The angle of the glass in Ferguson's initial design would have been much lower than the 45 degree angle of the roof in the revised plan, and would have been less effective during the winter months with regard to the optimum angle of the sun's rays to the glass surface. Turner no doubt pointed out the advantage of a roof angle of 45 degrees, which he widely adopted for lean-to roofs. Another feature besides the adoption of a wrought iron structure which Turner had probably suggested was the use of sheet glass, which the Committee also directed Ferguson to incorporate in his design. Ferguson was also told to include a 'hypocaust' hot air heating system, which the Curator, David Moore, had probably proposed.
30. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 5 June 1843. *Saunder's Newsletter and Daily Advertiser* [Dublin], 9 June 1843. The advertisement was directed to 'Builders and Iron Manufacturers - The Committee of Botany are ready to receive proposals from competent persons.' The Committee emphasised the peculiar and unique nature of the wrought iron construction, inviting tenders from only those firms capable of executing such structures.
31. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 19 and 22 June 1843. Patrick Farrell submitted the highest bid, of £1056.17.6. John and Robert Mallet, a well known firm of iron founders and manufacturers of Dublin, submitted two estimates: £1040 if brick were used in the back wall of the conservatory, or £990 if stone were used.
32. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 22 and 26 June 1843.
33. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 26 June, 3 and 10 July 1843. Clancy's sureties, M. West and William Farrell, the architect, agreed to guarantee the security of £400. The penalty for work continuing beyond the completion date was set at a fixed sum of £100. The contract was ordered to be completed on 10 July 1843. One alteration suggested by Ferguson was the substitution of a granite facing to the front wall instead of the specified brick and Roman cement finish, at an additional cost of £7, making the total amount of the contract £817.
34. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 17 August 1843.
35. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 80 (1843-4), Appendix No. III, November 1843. Moore was disappointed that the new house had not been finished on time. One of the repairs to the Principal Range was the installation of a new heating system.
36. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 19 and 22 February 1844.
37. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 September, 23 October and 5 February 1844. The Law Agent had been directed to write to Clancy's securities about the delay of the work, reminding them of the penalty clause.
38. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 4, 7 and 14 March 1844.
39. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 15 April 1844.
40. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 18 March and 15 July 1844. On the basis of the Final Account, submitted on 15 July, the £250 needed represented a figure of £137 still owed to Clancy at the beginning of July, and an unspecified amount of £107.2.0½, which was for additional expenses (the additional sum did not include Meyler's estimate of £60 for the heating, see note 50). Moore later claimed that the difference had been made up from the Society's reserve fund; see D. Moore, *Hand Book for the Botanic Gardens of the Royal Dublin Society, Glasnevin*, (3rd Edition, Dublin: William Leckie & Co., 1861), pp. 16-17.
41. *Treasury Correspondence*, (P.R.O.), T2/8046/16 April 1844. Request by the Dublin Society for a grant to complete the range of conservatories, received 17 April 1844.

42. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 2 and 6 May 1844. Frederick Darley, jun. Architect, is listed in the *Dublin Post Office Directory for 1842*, at 25 Lower Fitzwilliam Street. His work is generally in an austere stripped classical style, following on from the example of Francis Johnston. Darley designed the King's Inns Library (1827), and as College Architect to Trinity College was responsible for the Magnetic Observatory and New Square. For his work at Trinity see E. McParland, 'Trinity College, Dublin', *Country Life* (20 May 1976), p. 1312. Darley was architect to the Royal Dublin Society, having succeeded George Papworth to the position; see M. Craig, 'The Society's Buildings', *The Royal Dublin Society, 1731-1981* (Ed. by James Meenan and Desmond Clarke, Dublin: Gill and Macmillan Ltd., 1981), p. 64.
43. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 May 1844.
44. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 17 June 1844. The glazing having been finished, Dawson and Mitchell applied directly to the Society for payment. The Society asked Clancy to furnish a certificate to the effect that the glazing had been completed satisfactorily: however, he refused to do this. Instead he applied for a further payment of £100 to himself. He was in need of money and appeared before the Committee. They, however, declined to make any further payment until the work was completed and the final account submitted. Dawson and Mitchell were paid on 1 July 1844, after Ferguson had provided a certificate for the work: see minutes for 1 July 1844.
45. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 June 1844.
46. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 8 and 15 July 1844. The final account is recorded in the minutes as:

Contract	£817
Paid	680
	137
Additional	107.12.0½
	£244.12.0½

The figure of £137 was the amount certified by Ferguson on 8 July, as the balance due to Clancy. The figure of £680 listed as 'paid' included the payment of £180 to Dawson and Mitchell for the glazing, the remaining £500 having been paid to Clancy (see note 23). The figure of £244.12.0½ (the sum of the additional expenses and the balance paid to Clancy) represents the figure which the Society had attempted to raise by subscription earlier in March that year, and which in the end was paid from the reserve fund of the Society (see note 40). Ferguson was paid £50 for supervising the work on the east wing. He requested further payment for the designs of the entire range which he had prepared. However, the Committee refused to pay him any more and notified him of his dismissal. Ferguson was later given an additional £5 for supervising the laying of the asphalt walks in the conservatory; see *Minutes of the Committee of Botany*, (R.D.S.), minutes of 12 August, 11 November and 9 December 1844.
47. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 12 June 1844.
48. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 12 August 1844. *Treasury Correspondence*, (P.R.O.), T2/15325/24 July 1844. Statement and estimate regarding grant of £2,000 to erect new conservatories.
49. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 29 May 1843 and 5 and 12 August 1844. The Committee also considered an estimate from Wm. Hunt. Hunt had been one of the original sixteen tenderers to submit an estimate in May 1843. At that time he had tendered to install the heating system for £125.5.6.
50. Dr Meyler's theory on the advantages of a warm air heating system is given in his published lectures, *Observations on Ventilation*. He installed heating systems in several public buildings, including schools, hospitals, and theatres. Meyler considered his system to be beneficial in greenhouses, providing a continual supply of fresh heated air for the plants. A. Meyler, *Observations on Ventilation*, (London: Longman, Hurst, Rees, Orme and Brown, 1822). Record of the installation of Meyler's heating system at Powerscourt House, Co. Wicklow, exists in the *Powerscourt Papers* (N.L.D.) 'unlisted Mss.' *Minutes of the Committee of Botany*, (R.D.S.), minutes of 26 August 1844. The heating system was reported to be functioning satisfactorily by Moore on 16 December 1844. Four days later the Committee of Botany visited the Gardens and judged the heating system to be adequate. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 16 and 20 December 1844.
51. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 12 August and 21 October 1844.
52. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 January 1845. The other estimates received were: Bankier and MacKenzie of Glasgow, whose bid of £2,345 was the highest tender submitted; Lamprey, Rendall and Lamprey, £2,160; Wm. Mackie, £2,111; and John and Robert Mallet, £2,160.
53. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 January 1845.
54. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 January 1845.
55. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 27 January 1845. Courtney and Stephens had appealed directly to the Council over the matter and the Council directed the Committee of Botany to reconsider their decision to employ Turner. The Committee decided to stick to their decision which they had 'adopted on mature consideration'.
56. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 17 January 1845. Darley reported that there had been objections, presumably from Turner, to the approved plans.
57. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 3 and 17 February and 3 March 1845. The penalty clause stipulated that a sum of £10 a week for the first four weeks and £20 a week thereafter should be exacted if the contract was not completed on time. See note 33.

58. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 19 May 1845. The lecture room, designed by E. Parke, had been erected in 1800 and was connected to the original range of hot houses by means of a glazed corridor. The library books were moved to the office and study room adjacent to the gardeners' and apprentices' lodgings, behind the east wing of the Curvilinear Range. See: E. McCracken, 'The Origins of the library at Glasnevin Botanic Gardens', *Irish Booklore*, 2, No. 1 (Spring 1972), pp. 82-88.
59. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 19 and 22 May 1845. The granite which Turner had used for the front wall was described as 'of a quality far superior to that contracted for'.
60. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 14 and 28 July 1845. Burbidge and Healy supplied twelve of their patent hot water boilers to heat the Kew Palm House, see: 'The New Palm House, Kew Gardens', *The Builder*, 6 (15 January 1848), p. 31. Burbidge and Healy also supplied the boilers for the Winter Garden, Regent's Park, also erected by Richard Turner during the 1840s.
61. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 1 September 1845.
62. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 October 1845.
63. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 27 and 29 October 1845. The application was not sent to the Treasury until 22 December 1845, see: *Treasury Correspondence*, (P.R.O.), T2/24793/22 December 1845. Request for a grant of £2,065, to complete conservatory range, received 26 December 1845.
64. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 82 (1845-6), November 1845.
65. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 March 1846.
66. The balance due to Turner included the sum of £305 which was for the glass supplied by Messrs. Tilly and Sons, agents for Messrs. Chance and Co. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 April 1846. Turner had received the following payments: 19 May 1845 - £200, 12 June 1845 - £200, 14 July 1845 - £350, 15 September 1845 - £300, 23 February 1846 - £200, and 2 March 1846 - £80 (£50 plus an extra £30 for the partition between the west wing and corridor not included in the contract). See minutes for: 19 May 1845, 12 June 1845, 14 July 1845, 15 September 1845, 23 February 1846, and 2 March 1846. Turner is known to have undertaken extra work and to have provided materials of better quality than was required so as to improve the building. The granite of the front wall is a case in point; see note 59. He had similarly provided extra items not stipulated in the contract for the Kew Palm House; see J. Mordaunt Crook and M.H. Port, *The History of the King's Works, 1782-1851*, ed. H.M. Colvin, VI (London: H.M.S.O., 1975), p. 446, n. 3; and E.J. Diestelkamp 'The Design and Building of The Palm House, Royal Botanic Gardens, Kew, *Journal of Garden History*, Vol. 2, No. 3, p. 261, and E.J. Diestelkamp, 'Richard Turner and the Palm House at Kew Gardens', *Transactions of the Newcomer Society*, Vol. 54, 1982-3, p. 19.
67. Turner was paid £200, which included the £38 Darley had approved, £62 (presumably a portion of the £72 requested for the flagging), and an unspecified sum of £100. The total of all the recorded payments made to Turner comes to £1835. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 27 July 1846.
68. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 September 1846. Turner submitted an estimate of £113 to provide a water cistern and pipes which was approved on 24 August; see minutes of 24 August 1846.
69. *The United Gardener's and Land Steward's Journal*, (5 December 1846), p. 776.
70. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 8 and 24 August, and 12 October 1846.
71. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 8 August 1846.
72. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 7 December 1846.
73. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 8 and 15 March 1847.
74. The revised design, recorded in the Minutes of the Committee of Botany, is not extant. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 19 April 1847. Diestelkamp and Nelson, op. cit., p. 5.
75. Turner had developed the glazed pilaster at an early stage in his career, as a means of obtaining an architectural elevation without greatly impairing the quality of light admitted to the house. The most extensive use of these glazed pilasters was in the Winter Garden at Regent's Park (1845-6). He had also used them at Colebrooke, Co. Fermanagh (1834), and at Roxborough, Co. Tyrone (1845). The capitals of the pilasters (see Figure 20) had appeared on a conservatory Turner erected at Roxborough, Co. Tyrone (1845). The sunflower, a favourite motif, had appeared on the Belfast Palm House (1839), while the anthemia were the same as those along the ridge of the west wing at Glasnevin (1845-6). For the large sashes of the elevation, see note 102, and for the sashes in the lantern see page 16.
76. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 17 May and 7 June 1847. Turner asked that the completion date be extended to 31 January 1848, which the Committee approved on 7 June. Turner had put forward J. Goodshaw, M.D., a relative of his wife, and Timothy Turner, his brother, as sureties. However, the Committee declined to accept Goodshaw for the reason that they preferred someone in business: see minutes of 31 May 1847.
77. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 23 September 1847. See references to the Kew Palm House, note 66.
78. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 84 (1847-8), Appendix No. VI, November 1847.
79. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 6 January 1848. Moore recommended that a Polmaise heating system be adopted with the addition that the flue from the fire would be arranged so that the heat of the escaping exhaust and smoke could also be used to advantage. The Polmaise system is described and evaluated with all its faults and advantages (if any) in C. McIntosh, *Book of the Garden*, (Edinburgh: Wm. Blackwood, 1853), pp. 219-224.

80. The final payment was £150. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 6 January and 27 March 1848. Turner had received payments throughout the work: 14 June 1847 - £500, 26 July 1847 - £300, 16 August 1847 - £300, 23 September 1847 - £300, 15 November 1847 - £200, and 6 January 1848 - £150. See minutes of 14 June, 26 July, 16 August, 23 September, 15 November 1847, and 6 January 1848.
81. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 5 June 1848.
82. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 85 (1848-9), Appendix No. V, November 1848.
83. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 7 May, 21 May and 9 July 1849.
84. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 86 (1849-50), Appendix No. IV, 19 November 1849.
85. *The Illustrated London News* (18 August 1849), p. 117. Note in the engraving (Figure 6) the absence of a door at the end of the west wing. The chimnies on the rear wall of the wing appear very similar to those once on the Belfast Palm House.
86. D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 87 (1850-51), Appendix No. V, 13 November 1850.
87. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 29 April, 8 and 13 May 1850.
88. The contract with John and Robert Mallet was approved on 20 May. It stipulated that the system maintain an interior heat of 80° F. when it was 40° F. outside. They were given six weeks in which to complete the installation. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 and 20 May 1850.
89. See notes 78 and 79. Moore's system incorporated three distinct heating methods: a powerful hot water system, a hot air apparatus, and a metal flue conducted around the interior of the house through which the smoke passed. See D. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 87 (1850-51), Appendix No. V, 13 November 1850.
90. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 May 1850. Moore, 'Annual Report of the R.D.S. Botanic Garden', *P.R.D.S.*, 87 (1850-51), Appendix No. V, 13 November 1850.
91. The bowed swivelling sashes at the curved ends of the wings of the Curvilinear Range are also intended to open.
92. An identical arrangement for the roof was used in the Belfast Palm House (1839-40).
93. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 7 March 1844.
94. In April 1850, a terrific hurricane swept through the gardens causing great damage and breaking over 30,000 panes of glass, some 7,100 square feet. Of the glass in the Curvilinear Range, that in Clancy's wing suffered far greater damage than did the rest. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 20 April 1850.
95. D. Moore, *Hand Book for the Botanic Gardens of the Royal Dublin Society, Glasnevin* (Dublin: William Leckie & Co., 1861), pp. 24-6.
96. One significant difference between the wings is apparent in the swivelling sashes of both buildings. The sashes are the same in overall size, 3 ft. 3 in. wide and 3 ft. 6 in. high. In Clancy's sashes, the glazing bars are spaced equally and the intermediate panes of glass are 7.5 in. wide. This arrangement, however, means that the bars of the sashes are not aligned with those of the roof. The glazing bars of Turner's sashes in the west wing are aligned with those of the roof, an arrangement he normally favoured, and as a result the panes of the glass within the sash are of two widths so as to compensate for the width of the iron pilaster which separates each swivelling sash. The two outermost panes are 5.5 in. wide, the inner three panes are 8.5 in. wide (compare Figures 7 and 15).
97. The paths were each 3 ft. 6 in. wide. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 98 (1861-2), 13 January 1862.
98. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 88 (1851-2), Appendix No. III, November 1851.
99. This casting on the gutter was also used on the conservatory at Edermine, Co. Wexford (c. 1850), which was designed by Turner and executed by James Pierce of Wexford. The casting also appears on a wooden range at Kelvin Grove, Carlow.
100. D. Moore, *Hand Book for the Botanic Gardens of the Royal Dublin Society, Glasnevin* (Dublin: William Leckie & Co., 1861), pp. 26-7, 35-46.
101. In fact the glazed pilasters at Glasnevin are the same width and only slightly longer than those used at Regent's Park; see note 75.
102. At Ballynagall, Co. Westmeath (1845-6) Turner had developed the elevational treatment which he later applied to the Central House of the Curvilinear Range.
103. To raise money for the Victoria Regia House, a fête was held in 1853: Nelson and McCracken, op. cit. Four thousand people attended. The building was under way that same year: see D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 90 (1853-4), Appendix No. III, 30 November 1853. The structure was completed in May 1854: D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 91 (1854-5), 30 December 1854. The cost of the Victoria Regia House was £600, the Government meeting half the cost and the remainder coming from the proceeds of the fête: E. McCracken, 'The Finances of the Glasnevin Botanic Gardens, Under the Royal Dublin Society, 1795-1877', *Glasra*, [Dublin], 5 (1981), p. 47.
104. After 1854, application for special grants, such as those for new building works at the Gardens, had to be made to the Board of Trade. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 92 (1855-6), 31 December 1855. In 1854, the maintenance grant from the Government for the upkeep of the Gardens was drastically cut from Irish £10,000 to £5,300. At the same time the money was made available from the Science and

Art Department of the Committee of the Council on Education; formerly the grant had been channelled through the R.D.S.: see D. Moore, *Hand Book for the Botanic Gardens of the Royal Dublin Society, Glasnevin* (Dublin: William Leckie & Co., 1865), p. 18.

105. 'It is evident that more room must speedily be supplied for the noble-looking plants, and we were glad to be informed that an estimate is now before the Lords of the Treasury for a sum to build a house of much larger dimensions': 'Glasnevin Botanic Garden', *The Gardeners' Chronicle*, (14 April 1860), p. 339. The Government having granted £2,500 toward the new Palm House, work was begun in October 1861, to the designs of J.H. Owen, Architect of the Irish Board of Works, and son of Jacob Owen: D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 98 (1861-2), 13 January 1862. The new Palm House was completed in 1863, whereupon the Central House of the Curvilinear Range was turned into an 'intermediately warm house' for hardier palms and cycads. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 100 (1863-4), Appendix No. I, 31 December 1863.
106. Diestelkamp and Nelson, op. cit., p. 5.
107. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 December 1861.
108. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 13 December 1861.
109. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 98 (1861-2), 13 January 1862.
110. William Robinson, *The Gardeners' Chronicle*, (30 September 1865), p. 914.
111. Of the two drawings, one entitled 'The Glasnevin Royal Botanic Gardens Range Doubled in the two, 100 feet Extreme Houses with two Junction Tower houses to suit the Intersections', is inscribed in Richard Turner's hand, 'Submitted January 1868, per William Turner, Dublin'. These drawings are preserved in the archives of the Board of Works, St. Stephen's Green, Dublin (Figs. 22 and 23).
112. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 24 June 1868.
113. *Minutes of the Committee of Botany*, (R.D.S.), minutes of 7 September 1868.
114. Both drawings (see note 111) are inscribed 'William Turner with the Commissioners of Public Works Referred to in Contract dated 21 October 1868'.
115. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 105 (1868-9), Appendix No. 1, 2 January 1869.
116. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 106 (1869-70), Appendix No. I, 24 December 1869.
117. The roof on the north side of each wing had sliding sashes, and the north elevation received pilasters and swivelling sashes identical to those of the south elevation.
118. For Turner's design for the 1851 Exhibition Building, see M.D. Wyatt, 'On the Construction of the Building for the Exhibition of the Works of Industry of all Nations in 1851', *Minutes of the Proceedings of the Institution of Civil Engineers*, X (1850-51), p. 167; *The Illustrated Exhibitor*, (London: John Cassell, 1851), p. 142.
119. The doors on the south elevation had been the only means of public access to the wings before they were enlarged; (see Figures 3, 6 and 10).
120. Diestelkamp and Nelson, op. cit., p. 5.
121. William Robinson, 'Notes on Gardens, No. XX', *The Gardeners' Chronicle*, (22 October 1864), p. 1011.
122. For a contemporary opinion of a leading architect of the day as to the form a glasshouse should assume, see the article by T.L. Donaldson, 'Botanic Gardens: Conservatory Additions', *The Builder*, 26 (4 July 1868), p. 495.
123. W. Robinson, op. cit. For the new Palm House, see note 105. The year following Robinson's scathing criticism of the Palm House it was necessary to insert structural strengthening as it swayed visibly in the wind. D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 102 (1865-6), Appendix No. 1, 1 January 1866. In 1871 it was necessary to replace the rotten wooden uprights and horizontals of the structure with cast iron members: D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 108 (1871-2). Two years later the wood work of the elevations was found to be rotten: D. Moore, 'Annual Report of the Curator of the Botanic Garden', *P.R.D.S.*, 110 (1873-4), 31 December 1874. Despite extensive repairs during its short life, the Palm House was in a perilous state by 1883, when it was replaced by another slightly larger structure, designed and erected by J. Boyd and Co. of Paisley, nr. Glasgow: see C. Joly, 'Note sur la nouvelle serre à Palmiers de Glasnevin (1)', *Journal de la Société Nationale et Centrale D'Horticulture en France*, [Paris], (1885), pp. 216-222.

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CHARLES ACTON

KILMACURRAGH

My family owned Kilmacurragh in County Wicklow and had a long history of planting there. For instance, in 1736, when an ancestor married Jane Parsons of Birr Castle, he seems to have celebrated the event by planting the long avenue of beeches, together with many beech hedgerows around the property.

At the end of the eighteenth century his daughter-in-law, Sidney (daughter of one Joshua Davies, barrister and for many years a member of Dublin Corporation) earned premia from the Dublin Society for growing small plantations and with the money she bought specimens of then-rare trees.

Her grandson, my great uncle Thomas, owned Kilmacurragh from 1854 until 1908 and virtually created the collection that became world-famous, thanks to his co-operation with David Moore and, principally, with Sir Frederick Moore.

As Sir Frederick told me, when his father or he himself at Glasnevin received seeds or plants of calcifuge species from botanical explorers, they took them to Kilmacurragh to try out in that lime-free soil and surprisingly temperate environment. Only after that did they try to grow those plants at Glasnevin or elsewhere. Thus we had what was a unique collection of species rhododendrons, including what Sir Frederick told me was the only specimen in Europe of *Rhododendron* 'Shepherdii', which I believe is still there.

Sir Frederick was far more interested in species than in hybrids or cultivars, even though there is at Kilmacurragh a beautiful May-flowering tree rhododendron with a creamy-white flower; it has been called *Rhododendron* "Actonii". He also brought in many more Ericaceae, several of which are still there, and some New Zealand plants which have amazed New Zealanders by their size.

My own memory of Sir Frederick is of infinite kindness and patience. Of his saying "If you want someone to do something for you, get him to think it is his own idea; teach him by getting him to think that he is teaching you". Alas, I was a timid young man as well as botanically ignorant, woefully aware of my ignorance and too shy to milk him of his great knowledge of Kilmacurragh. Now as an old man I am very sad not to have had the civil courage to try to acquire more of all that would have gladly been given.

As *Moorea* commemorates him, and as he was a fine shot, I pass on a story of his. Once when staying at Kilmacurragh, he woke in the morning to find outside the bedroom door the usual jug of hot water but also a bottle of champagne and a note from Tom (a late bird like me) telling him to drink the champagne and go out to the deer-park and shoot a deer so that they could dine on it next week. "How he thought I would be able to shoot straight on a bottle of champagne before breakfast ..."

My great uncle and Sir Frederick Moore together also created a remarkable collection of conifers at Kilmacurragh. In 1891 they sent to the Royal Horticultural Society's International Conifer Conference an exhibit of specimens; Thomas Acton was awarded the Sir Joseph Banks medal for the largest collection of conifers in private hands.

In 1931 there was another conifer conference and Sir Frederick again submitted an exhibit of Kilmacurragh plants; again the Banks medal was awarded (Kew asked for it for their museum). Although my mother and I strove to have Sir Frederick's name on the medal, he would not permit that, and insisted on it bearing my name.

According to Sir Frederick, Kilmacurragh had excellent, lime-free soil, a particularly equable microclimate, and Uncle Tom's dedication: more than that he denuded his home farm of manure so that each new plant was well nourished. Sir Frederick once upbraided Uncle Tom for starving his farm and got this answer (in what I could identify from his imitation as Bernard Shaw's accent in the Wicklow high-pitched voice): "I hate commercial, Freddie, don't talk to me about it. I hate commercial."

According to one of his gardeners, Woollahan, my great uncle once said as an old man, "When I am gone this place won't be worth a penny to anyone". He spoke more truly than he knew, because, when my mother inherited the place in 1916, there were three lots of death duties to pay, followed by The Troubles and the post-war collapse of agriculture, so that there was no money to spend on the collections during the 1920s, '30s and '40s. My mother and Sir Frederick Moore repeatedly tried to get the place taken over by the Department of Agriculture to act as an annex for the National Botanic Gardens, especially for calcifuge and coniferous species.

At least four times they were on the brink of success, when something like an election or a recession came just at the wrong moment. Then the Forest and Wildlife Service acquired Kilmacurragh, established

a research station there, and its staff has done wonderful work in putting the place in order again. I must pay tribute to the late John O'Driscoll and Jim O'Dowd who succeeded Eric Joyce (the forester from acquisition until his tragic death in a car accident) for their work at Kilmacurragh. I like to feel that it is now part of Sir Frederick's memorial, and that its beauties are also a memorial to Eric Joyce.

Editorial Notes on *Rhododendron*

a) *Rhododendron* 'Shepherdii' is a scarlet-flowered hybrid of uncertain parentage; *R. arboreum* is stated to be one of the parents, but the other is not known.

b) The name "Actonii" apparently has not been published, and is therefore not valid either at specific or cultivar levels.

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E. CHARLES NELSON

'THIS GARDEN TO ADORNE WITH ALL VARIETIE' THE GARDEN PLANTS OF IRELAND IN THE CENTURIES BEFORE 1700

The first plants deliberately cultivated in Ireland were useful, food-yielding species. Later culinary herbs (for flavouring food) and medicinal plants were brought from Europe and grown in gardens. Perhaps centuries after that, the first purely ornamental plants were imported and the lengthy process of introducing foreign species, simply for their beauty, was begun. A few of the ornamental and useful plants grown in the gardens of Irish houses in the sixteenth and seventeenth centuries would have been familiar to us, as they were the forebears of our own garden flowers, but many others are no longer popular and have almost vanished from the ordinary garden, maybe surviving only in botanical gardens and in special collections.

The choice of plants available to a gardener before 1700 was much poorer than today; we may select from an embarrassment of riches, a plethora of cultivars, but the further back in time that one goes, the smaller was the number of species cultivated. Of course many plants which were not introduced into cultivation until the nineteenth and twentieth centuries were absent from gardens; *Fuchsia*, pampas grass (*Cortaderia*) and *Dahlia* from South America, innumerable species of *Rhododendron* and *Magnolia* from the mountains of Burma and China, cacti and conifers from North America, bulbs and succulents from southern Africa remained to be discovered, imported and tested in Europe, or at most were just beginning to trickle in for botanists to classify and name. Also absent were today's scientifically-bred plants which provide us with endless, if ephemeral variety, multitudes of colours and subtle scents. Indeed the majority of the fine garden plants which we take for granted were unknown to gardeners in pre-Georgian Ireland, including the Irish yew, that signal mark of mid-nineteenth century demesnes and gardens.

This does not mean that the gardens of Ireland before 1700 were dull or colourless; there were many plants available and each decade that passed saw an increase in the number of species grown. In trying to determine what plants were available it is necessary to search manuscripts, books and garden archives but these are scattered, few in number, and often difficult to interpret. Plant names present the greatest obstacles, for both the vernacular and the scientific name of a plant may have altered in the intervening centuries. In the case of common names, applications can change, and there was no consistency in the use of scientific names before modern times. Sometimes it is impossible to identify accurately the plants mentioned in books and manuscripts.

The records of plants grown in individual gardens are especially poor; very few garden catalogues are extant for the period before 1700. However, some gardeners retained the bills for plants which they bought from nurserymen, and some of these list the gardener's purchases in detail. Irish nurserymen only began to publish catalogues of plants and seeds in the last two decades of the eighteenth century,[1] so that the bills are useful in establishing the variety of plants available in commerce before 1800.

In this paper, I have used as many different sources as possible to reconstruct the progress of gardening in Ireland from the beginning of agriculture to 1700, and I have tried to avoid using scientific names, but for absolute clarity some have to be given; as far as possible I use the generally accepted English vernacular names.

Prehistoric gardening

The earliest gardeners in Ireland were the Neolithic people who introduced agriculture to the island about 5,500 years ago.[2] They cleared the native woodlands of oak and ash, and planted grain crops; the cereals they grew included barley and primitive wheats such as eincorn and emmer. These people were concerned only with the production of food, and they did not grow ornamental plants, medicinal herbs or dye plants.

At the beginning of the Christian Era, the Romans introduced many new species into Britain including peas, beans, radishes and various culinary herbs. Bishop's weed (*Aegopodium podagraria*), used as a vegetable, was another Roman import. Although the Romans did not colonise Ireland, their influence filtered across the Irish Sea through trading contacts. It is possible that a wild leek (*Allium babingtonii*) which grows today on sand dunes in western Ireland was introduced about this period as a seasoning herb; it is related to species found in south-western Europe and it has been argued that 'its occurrence ... in isolation ... suggests strongly that it is a relict of ancient cultivation that has survived over the centuries ... and [that it] probably came to Ireland from the Iberian Peninsula.'[3]

Information obtained during archaeological excavations gives some indications of the plants cultivated throughout prehistoric times and the early Christian Period. At Lough Gara, County Sligo, seeds of barley, wheat, blackberries, raspberries, *Polygonum* and *Chenopodium* species have been found, as well as flax. While the fruits could have been collected in the wild, the other food plants and the flax must have been cultivated.[4] Similar collections of seeds were found associated with eleventh and twelfth century sites in Dublin.[5] While the excavations give some clues, no comprehensive list of plants can be assembled. Gardening was little more than small-scale agriculture until perhaps the thirteenth century. Only food plants were deliberately grown; fruits and herbs could generally be gathered in the wild. Flowers certainly were not grown by the general populace.

Monastic gardens

Evidence from manuscripts written in the early Christian Period suggests that monks maintained vegetable and herb gardens. Irish monks who visited the continent probably brought plants from Europe, especially herbs used in cooking and medicines. The evidence for gardens associated with early monastic sites in Ireland is tenuous. On the extremely hostile site of Skellig Michael, there are artificial terraces which may represent the remains of gardens used by the hermit monks for cultivating vegetables.[6] The vegetation of Skellig Michael is, and was, sparse, offering no substantial source of food. Vegetables, essential for a healthy diet, either had to be shipped from the mainland, which is improbable, or cultivated on the island. Unfortunately gardens, even those enclosed by walls, leave few clues for identification during archaeological excavations. Thus it can only be guessed that the terraces on Skellig Michael were used as garden plots.

Ancient manuscripts mention *lubgort* - herb-garden or kitchen-garden. An eighth century gloss includes the word for a gardener, *lubgartoir*.[7] The monastic gardener would have supplied the cabbages and kales which sometimes supplemented the diet of the monks. Leeks and onions were also cultivated, and are mentioned in early manuscripts. Apples were cultivated - on great festivals the Culdees were allowed to eat apples.[8] Some of the best evidence for gardening is the pigments used to colour the illuminated manuscripts. For example, crimson was obtained from a plant called *rud* (or *roid*) which was cultivated and required great attention (it may have been a species of bedstraw (*Alchemilla*)).[9] Woad (*glaisin*), with which the ancient Britons painted their bodies blue, was also cultivated.

The arrival of the Normans in Ireland in the twelfth century resulted in the construction of substantial stone castles. Continental religious orders arrived about the same time, and formed large, well-organised communities. There is a group of plants found with remarkable regularity today growing wild around the ruins of Norman buildings. Many of these had culinary or medicinal uses in medieval times, including henbane (*Hyoscyamus niger*), milk thistle (*Silybum marianum*) and annual nettles (*Urtica urens*). The coincidence is strange, but it has been suggested that these plants were introduced into Ireland and deliberately cultivated by the Normans. Thus the Normans were to Irish gardening, medicine and cooking, what the Romans were to these skills in Britain.[10]

The religious orders would have had a marked impact on gardening: monastic settlements were established according to guidelines laid down by their founders. Orders such as the Cistercians included manual labour in their daily routine. St Bernard had stressed the importance of work for monks, and encouraged them to cultivate gardens. And, moreover, gardens were a basic necessity providing the monastery with fruit, vegetables and herbs. In Benedictine monasteries, the day-to-day administration was assigned to the cellarer, under the abbot; the cellarer, in turn had various subordinate monks running different departments, including the kitchen to which the kitchen garden was attached.[11] While the main emphasis in medieval monastic gardens was on food production, herbs for medicines were also grown; an unrealised plan preserved in the Benedictine monastery of St Gall in Switzerland - it was founded by Gall of Bangor - shows an ideal medieval monastery replete with a kitchen garden and physic garden. In that epoch, members of the religious orders acted as apothecaries and physicians, and herbs cultivated in the monastery physic garden were collected and used to concoct medicines. The St Gall plan (Figure 1) shows that beans, roses, lilies and irises were grown in the physic garden as well as traditional herbs such as mint, rosemary, sage and fennel.[12] In the kitchen garden were cultivated onions, garlic, leeks, shallots, parsley, chervil, coriander, dill and poppy. Similar gardens would have been attached to Irish monasteries, although direct evidence is lacking.

The Venerable Bede (673-735) noted that Ireland had a milder climate than Britain, that milk and honey were readily available, and that there was 'no lack of vines'.[13] Vines continued to be grown until about the seventeenth century, with varying success. The vine is susceptible, when grown out-of-doors, to cool temperatures at the beginning and end of its growing season. Historical evidence suggests that during the period 900 to 1400 there were warmer, milder conditions throughout western Europe, and these favoured the cultivation of the vine in areas where it was at the limit of its climatic tolerance. In England after the Norman



Figure 1. Plan of the medicinal garden at St. Gall (redrawn by M. Davies). The names of physical herbs were inscribed on the beds where they were cultivated.

conquest, and especially after about 1100, the acreage under vines increased rapidly. There was considerable demand for wine for the monasteries and the communities which developed around them - each Benedictine monk at Battle Abbey in Sussex was allowed a gallon of wine a day! A series of cold summers in the mid-thirteenth century damaged the English vineyards and wine had to be imported. In south-eastern Ireland, extensive vineyards survived until about the mid-sixteenth century, but these also suffered, especially after 1550 when the so-called 'Little Ice Age' began - temperatures during the summer fell below those pertaining today.[14]

Thus monastic gardens were probably the earliest well-organised gardens in Ireland, and they were probably also the first flower gardens. Flowers may have been cultivated in small quantities for decorating the church on great festivals, especially those of the Virgin Mary. Popular medieval flowers were roses and lilies, which were regarded as symbols of faith.

> *Christ by His holy word and life sanctified*
> *The pleasant lily; dying*
> *He gave its colour to the rose.*[15]

Other plants, including a number of native species, have been linked with the Virgin Mary for many centuries - lady's smock (Our Lady's Smock, *Cardamine pratensis*) and marigolds (Mary's Gold, e.g. marsh marigold, *Caltha palustris*) incorporate this association in their common names.[16]

Direct evidence for the cultivation of roses in the fourteenth century is found in property deeds for the period. A number of deeds include reference to the payment of chaplets of roses and single rose flowers (including individual red blossoms) as rent for land. These flowers were usually handed over on the feast of the Nativity of St John the Baptist. Elias de Mullon granted to Joan de Guchelesford and her heirs for ever, ten marks out of all his land in Ireland, rendering a rose at the feast of St John the Baptist yearly; the deed is dated 1279. William Perceval had to pay his brother a rosebud. Sir Walter de la Haye was obliged to 'render a red rose' yearly for land.[17] The roses were given in like manner to root ginger, peppercorns, cummin, and cloves - these exotic spices were undoubtedly imported.[18]

By the end of the fourteenth century there was substantial interest in ornamental gardening in eastern Ireland. A scribe, perhaps working in County Kildare, recorded a version of a poem about gardening late in the century. The poem, attributed to a Master Jon Gardener, is the earliest work on gardening in the English language, and remarkably the earlier surviving manuscripts of it both have Irish connections.[19] Jon Gardener's verse provides accurate instructions for the cultivation of cabbages, rosemary, saffron, onions and herbs. There are sections on trees, grafting and the cultivation of vines. All the information is rendered in doggerel, and there are lists of plants which can be grown from seeds.[20]

The Kildare manuscript of the poem is a scissors-and-paste job, obviously derived from several sources which are now lost. However, it does include the lines

All of the herbys o Ierlonde
Here thow schalt ham knowe eueri onde.

These lines are absent from English manuscripts and were perhaps intended to please an Irish (or Norman-Irish) patron. The poem does give a fair indication of the sorts of plants grown in gardens of this period, most of which we may assume were available to the Norman-Irish gardeners.

Pellitory, ditany, rue and sage
Clary, thyme, hyssop and orach
Mint, savory, cress and spinage
Lettuce, calamint, avens, wormwood and ribwort
Herb John, Herb Walter, Herb Robert and wallwort,
Hartstongue, polypody, yarrow and comfrey
Gromwell, vervain, hindheal and betony
Gladwin, valerian, villet and spearwort,
Wormwood, wood sorrel, waterlily and liverwort
Mouse-ear, agrimony, honey-suckle and bugle
Henbane, chamomile, wild thistle and stitchwort,
Waybread, brooklime, ditany and bruisewort,
March, lavender, radish, sanicle and horseheal,
Groundsel, wolf-thistle and lily
Cresses, strawberries, motherwort and tansy
Half-wode, felwort, horehound and orpine
Violet, redmay, primrose and oculus-Christi
Fennell, southernwood, feverfew and caraway,
Rose red, rose white, holyhock and pimpernel.
All those herbs by Saint Michael
Must been set in the month of April.[21]

Monastic gardens are recorded in the records of the inquisitions that took place at the dissolution of the monasteries in the middle of the sixteenth century. These are among the earliest extant records of gardens in this island. They are not especially informative about the plants grown, but they indicate that the skills required for the cultivation of vegetables on a relatively large scale were well-established here, and that orchards were maintained. At dissolution, the Prior of All Saint's, Baldoyle, had twenty gardens under his charge.[22] At Grace Dieu, County Dublin, a convent included within its estates two orchards and a garden, as well as thirty-three cottages, each with its own garden. Possibly the best known monastic garden in Dublin, was that attached to the hospital at Kilmainham. This was a foundation of the Order of Knights Templar, which had formed a famous garden in London in the twelfth century. At dissolution, there were, at Kilmainham Abbey, 'three gardens and an orchard with the walls, four towers erected on the walls, three other gardens and an orchard.' At the castlehouse in Kilmainham, there were sundry burrages, gardens and parks, and as early as 1338 a nursery garden was established at the priory, outside the walls.[22]

Elizabethan gardens (c. 1550 to c. 1600)

The dissolution of the monasteries may have led to a temporary decline in gardening in Ireland. However, kitchen gardens would have been maintained around the larger houses. The common people in towns and in the countryside are unlikely to have indulged in flower gardening, for that presupposes the existence within society of a settled class, and stable political state.[23]

The monasteries which had hitherto acted as places of learning and leading centres for horticulture, were replaced towards the end of the sixteenth century by a university, which had rules and an ethos not dissimilar to that of the monasteries - the staff and students were unmarried, and lived and worked in a closed, residential community.

The College of the Holy and Undivided Trinity was founded by Queen Elizabeth I in 1592. The campus was established on the eastern side of Dublin, on the site of the Priory of All Saints.[24] The college soon acquired land elsewhere and was able to lease plots. On 1 October 1594, the college let two plots of land, one lying south of the college and the other south-west. The leases were for ten years, and the lessee was required to 'make three fair gardens planted with good and profitable herbs and fruit trees.' The Fellows of the College had the right to walk in the gardens 'for their recreation.'[25] A decade later in 1605, Harry Holland signed a deed allowing him 'the use and possession of the College's five gardens and the great orchard (except the little garden without the brick wall ...)'. He was permitted, under the terms agreed, to take half of 'all the herbs that grow, lavender, roses, fruit of the trees', and in return he was required to 'dig, dung, prune, set and plant the garden with some herbs, especially the garden known as Dr. Challoner's which [was] already half under herbs, the remainder [was] to have only herbs and under the brick wall such roots as shall be thought fit.'[26] The complicated lease continued by stipulating that Hollander was to cultivate in the rest of the garden 'reserved to his charge ... turnip, parsnip, carrot, artichoke, onions, leeks', and in the 'low garden outside the wall and great orchard ... cabbages, turnips, and other things as they shall need for 30 persons or 8 messes as the cook hall think good ...' while the Provost and Fellows got the other half of the herbs, flowers, fruit and vegetables, the College agreed that Hollander should have a chamber in which he could keep his seeds.

The list of plants grown by Hollander is the earliest garden catalogue known for any Irish garden. The roses were cultivated for their beauty and scent. Lavender had many uses; perhaps it was required as a perfume to dispel the stench of the city, perhaps it was used to make lavender water, a tonic and heart cordial. The other vegetables and herbs as well as the fruit were for the College kitchen, as the Fellows and Scholars were provided with 'Commons'.

An early 'bird's-eye' view of the campus,[27] shows several gardens outside the walls. There are formal knot-gardens, one of which apparently contained roses. Other areas are planted with rows of bushes or trees, probably the orchards. The Fellows were allowed to walk in the gardens. In a lease dated 1613, the scholars were also permitted to walk 'or sport themselves' in a garden on the edge of the campus. Later in the century a bowling green was provided for their recreation.

While other formal gardens and kitchen gardens attached to large houses were probably also planted with lavender, roses, fruit trees and vegetables, interest was being shown outside Ireland in the native plants of the island. The strawberry tree (*Arbutus unedo*), which is found in quantity around the loughs of Killarney, was probably Ireland's first horticultural export. In 1586, a bundle of saplings of the 'oolaghan tree' (i.e. *ubhla caithne*) was sent from Munster to Lord Leicester and Mr Secretary Walsingham with instructions to plant them 'near some ponds, or with a great deal of black moory earth.'[28] As it was an evergreen tree, *Arbutus* would have been specially prized by gardeners, and its attractiveness was enhanced by the scarlet fruits and white flowers. It has the strange characteristic of having 'blossoms and fruits green or ripe, all the year long, and the same of a very pleasant taste.'[28] *Arbutus* was planted around Dublin about this time, for there was a tree at Ballymount, north of the city, about 1650, which may have been planted late in the sixteenth century.[29]

The traffic in plants had always been in two directions. Tradition records that Sir Walter Raleigh, who received large grants of land about Youghal during the Plantation of Munster at the end of the 1500s, introduced a sweet-smelling wallflower from the Azores.[30] He is also credited with introducing cherry trees and the potato. Certainly the potato came to northern Europe about this time;[31] it was illustrated in John Gerard's famous herbal in 1597 (Figure 2).[32] But how, when and precisely whence it came to Ireland is not known.[33] The tradition incorporates an element of truth, that plants from other continents were reaching Ireland and being grown in gardens simply as curiosities.

By the close of the sixteenth century, flower gardening was an established art in Ireland. The houses of the wealthy undoubtedly had a pleasure garden within their grounds, as did the university in Dublin. The flower gardens contained roses and sweet-smelling herbs, including new exotic species from abroad. The vegetable gardens were stocked with a wide range of kinds, including some which are not commonly grown today.

The seventeenth century to c. 1650

Gardens of this period were formal, subdivided into regularly-shaped plots which were usually symmetrically ordered within each garden. The plots were separated by gravelled or paved paths,[34] and each plot was edged either by dwarf shrubs (such as lavender or box) or by stone setts or slates. The plots contained either a selection of flowers and herbs, or 'knots' which were intricately patterned arrangements of clipped



Of Potatoes of Virginia. Chap. 335.

Battata Virginiana ſiue Virginianorum & Pappus.
Potatoes of Virginia.

* *The deſcription.*

VIrginia Potatoes hath many hollowe flexible branches, trailing vppon the grounde, three ſquare, vneuen, knotted or kneed in ſundry places at certaine diſtances; from the which knots commeth foorth one great leafe made of diuers leaues, ſome ſmaller, & others greater, ſet togither vpon a fat middle rib by couples; of a ſwart greene colour tending to rednes. The whole leafe reſembling thoſe of the Parſnep, in taſte at the firſt like graſſe, but afterward ſharp & nipping the toong: from the boſome of which leaues come foorth long rounde ſlender footſtalks, whereon do grow very faire and pleaſant flowers, made of one entire whole leafe, which is folded or plaited in ſuch ſtrange ſort, that it ſeemeth to be a flower made of ſixe ſundrie ſmall leaues, which cannot eaſily be perceiued, except the ſame be pulled open. The colour whereof it is hard to expreſſe. The whole flower is of a light purple color, ſtripped down the middle of euery folde or welt, with a light ſhew of yellownes, as though purple and yellow were mixed togither: in the middle of the flower thruſteth foorth a thicke fat pointell, yellow as golde, with a ſmall ſharpe greene pricke or point in the middeſt thereof. The fruite ſucceedeth the flowers, round as a ball, of the bignes of a little bulleſſe or wilde Plum, greene at the firſt, and blacke when it is ripe; wherein is contained ſmall white ſeede, leſſer than thoſe of Muſtarde. The roote is thicke, fat, and tuberous; not much differing either in ſhape, colour or taſte from the common Potatoes, ſauing that the rootes hereof are not ſo great nor long; ſome of them round as a ball, ſome ouall or egge faſhion, ſome longer, and others ſhorter: which knobbie rootes are faſtened vnto the ſtalkes with an infinite number of threddie ſtrings.

* *The place.*

It groweth naturally in America where it was firſt diſcouered, as reporteth *C. Clуſius*, ſince which time I haue receiued rootes hereof from Virginia, otherwiſe called Norembega, which growe and proſper in my garden, as in their owne natiue countrie.

Figure 2. The entry on potato from J. Gerard's Herbal (1597).

shrubs or other suitable perennial plants. The knots could be very elaborate, the clipped lines of shrubs interlacing rather in the manner of the designs on Celtic artifacts. The variety within knot-gardens was provided by the different patterns, rather than by a display of colourful shrubs and flowers.

Knot-gardens are shown on the earliest representations of garden in Ireland, such as the plan (noted above) of Trinity College.[27] Other gardens are depicted on maps dating from the early 1600s, which are not accurate in a modern sense, but often show details of towns and estates which indicate plausible gardens. A map of Youghal, published in 1633 in Thomas Stafford's *Pacata Hibernica*, takes the form of a 'bird's eye' view of the town. It shows a series of five rectangular plots with the walls near the church. Each plot is depicted containing a different pattern, presumably indicating that each was a knot-garden. A series of estate maps of the properties of the London guilds in County Derry also show gardens of this type. A map of Limavady shows Sir Thomas Phillip's castle with two gardens.[35] The one near the castle appears to have clipped trees (perhaps laurel), incorporated into the design. Further from the castle is another garden with six separate plots, each containing the same knot. Between these gardens and the river is an orchard or avenue of trees. In contrast, the houses in 'Sir Thomas Phillips Bildinge at Newtown A mile from Limma Vadde' have unadorned gardens, probably simple vegetable plots.

Other maps provide similar details. John Speed included plants of the cities of Limerick, Cork and Galway in his *Theatre of the empire of Great Britaine;* each town is shown with gardens, some of which are knot-gardens.

Plant lists for the early seventeenth century are scarce; there are no catalogues extant nor lists of plants purchased. Two writers, both living outside Ireland, provided some information on the gardens cultivated in this country, but their references are brief and general. Dr Peter Lombard wrote *De regno Hiberniae* in 1600 but it was not published until 1632, seven years after his death. Numerous manuscript copies of *De regno* were made and the work was widely circulated. It was dedicated to Pope Clement VIII and was written before Lombard was made Archbishop of Armagh. In *De regno* Lombard commented that the climate of Ireland was suitable for the cultivation of a range of plants which, though not generally cultivated, did better in Ireland than in their countries of origin. Among the plants he noted were globe artichokes, squashes, cabbages and hops. He also mentioned that vines yielded grapes which were not inferior to those grown in France and Germany. The tone of his remarks indicates that Lombard considered that gardening was not in a flourishing state in Ireland at the turn of the sixteenth century.[36]

Apart from native though exiled writers, visitors to Ireland in the early decades of the seventeenth century described or mentioned gardens in their diaries and books. In 1590, Fynes Morison, a highly prejudiced and biased writer, had observed that 'the best sorts of flowers and fruits are much rarer in Ireland than England, which notwithstanding is more to be attributed to the inhabitants than to the ayre.'[37] Morison's opinion was supported by Lombard, and was also that given *inter alia* by L. Gernons, who in the early 1600s reported that gardens and orchards were attached to houses in Limerick and that Kilkenny 'is praysed from the wholsom ayer, and delightful orchards and gardens, which are somewhat rare in Ireland.'[38]

In 1635, Sir William Brereton toured eastern towns and recorded his experiences and views. At Carrickfergus, he found that 'the only grace of this town is Lord Chichester's house' which had been built on the site of a suppressed Franciscan monastery. There was, according to Brereton, 'a graceful terrace and walk before the house ... a fine garden and mighty spacious orchards, and they say they bear good store of fruit.' He observed that there was a dovecot in the garden and suggested that 'twixt the garden and orchards [was] a most convenient place for apricots or some such tender fruit, to be planted against the dove-house wall, that by the advantage of the heat thereof they may be rendered most fruitful, and come sooner to maturity.' Brereton remarked that 'this use is not made thereof'. Lord Chichester also had 'another dainty stately house in Belfast; the very end of the loch toucheth upon his garden and backside; here also are dainty orchards gardens and walks planted out'. Brereton visited Lord Conway's estate at Lisnagarvey, near Belfast; the house was situated on a hillside which was planted with an orchard and garden. The Conways and their agents were perhaps the most important promoters of gardening and horticulture in north-eastern Ireland, as shall be shown below. At Drogheda, Sir William Brereton called upon the Lord Primate of Ireland at his palace, which was then in that town and not in Armagh. Although the palace was a 'rough-cast' wooden building it had a 'pretty neat garden and over against the window in the gallery end, upon a bank, these words in fair great letters are written: 'O MAN, REMEMBER THE LAST GREAT DAY. The bank is bare, the proportion of the letters is framed out in grass.' In Dublin, Sir William visited the University and remarked that within the college was 'a pretty little convenient garden.'[39]

Previous writers have suggested that gardens were virtually non-existent in Ireland in the seventeenth century, that the wars and scorched earth policies of the English and the Irish prevented the establishment of gardens. This is only partly correct; certainly it is rather unlikely that gardens were maintained during periods of hostilities, but upper and middle class residents of the towns and cities did have gardens and these were cared for and developed even during the shortest periods of calm in the seventeenth century.

Cromwell's campaign in Ireland paradoxically brought some stability, and, rather than destroying the will to create and maintain gardens, it seems to have had the opposite effect in some quarters. Land was confiscated and reassigned to Cromwell's supporters, adventurers and soldiers. Although some learned men who supported the monarchy had left Ireland, other intellectuals came to Ireland with the Cromwellian army and government. The most notable was William Petty, who arrived in 1651 on leave from the University of Oxford, as physician to the army. While residing in Dublin he attempted to set up a physic (botanic) garden in co-operation with another army physician, Benjamin Worsley.[40] This physic garden may have been connected with the establishment, one year later in 1654, of a Fraternity of Physicians in Dublin. A physic garden was one in which plants were cultivated for teaching students of medicine (physic); the species grown in it were those used in contemporary medicines. Whether this physic garden was established is unknown but it shows that there was, at least, the beginning of an academic interest in botany and horticulture at this time in Dublin.[40]

The last half of the seventeenth century c. 1650 to c. 1700

The scientific interest implied in the plan for a physic garden was complimented by a general appreciation of gardens among the middle-class, educated people who supported Cromwell. Benjamin Worsley had a strong interest in plants and gardening and he corresponded with Samuel Hartlib, a Sheffield-based publisher with a special concern for horticulture.[41] For example, Worsley wrote to Hartlib from Dublin in May 1654:

> Hearing upon Inquiry that there was Madder grow in this country wilde of it selfe and that the Rootes were very faire and good in compliance to the Example of Sir Arch Crispe i imployed poore people abroad to gather what they could fine of it and have got a smal Nursery of the roots in my Garden.[42]

On 28 June 1654 he wrote again, having successfully cultivated the plant for over a month saying:

> For Madder the Husbandry of it is but little. Planting of it and weeding of it being all that is required until it comes to be gathered and mill'd.[43]

Madder (*Rubia peregrina*) was valued as a source of a red dye.

About this time too, an 'honourable person in Ireland' wrote to Hartlib about the cultivation of roses. This letter, dated April 1654, is of interest as it indicates that people skilled in gardening were active in various parts of the country, not just in Dublin. The anonymous writer recorded that

> Upon the way from Youghal to Dublin I had an occasion to oblige an ingenious Gentleman, who hath been a great traveller in the Easterne Countrys of the world and came some years since to settle himselfe in Ireland where he hath made himself eminent for Husbandry, in wch I hope to be much improved by his conversation, as soone as my perpetuall distractions will allow it me. One curiosity he hath practised which may not be altogether unworthy your notice, and that is a way to have Roses twice a yeare which he performed by pruning off divers of the branches upon which the Roses grow as soone as ever they are gathered and then the same places will shoot forth fresh branches and roses too about Autumne.[44]

Hartlib must have told Worsley about this, for Worsley wrote to him in a letter dated 28 June 1654 that

> Beside what you speake of Roses bearing twice a yeare, there is a species of Roses call'd the Monthly Rose that beares all the yeare save in one or two months. I have had 2 or 3 very good experiments communicated to mee about the Husbandry of Roses wch i shal communicate to you as I find the succis of them.[45]

In an earlier letter, dated 16 May, Worsley had informed Hartlib that he had just obtained a thousand 'young setts of Roses.' Worsley clearly was interested in the cultivation of roses and he intended propagating these young plants. He told Hartlib that roses were the plants

> I the soonest of any expect advantage from in this Country where they are as yet scarce enough And purpose, if it please God they thrive with mee, to make mys the Greatest master of them of any man in this Country at that wch will bee but small thought and charge to me.[46]

The roses of this time were mere varieties of species; there were no artificial hybrids although double-flowered and variegated (streaked petals) cultivars were well-known. Most of these roses flowered only once each year, hence the interest in obtaining a second flush of blossom, and in the so-called 'Monthly Rose' which flowered more than once a year.

While people like Worsley were obtaining plants from the wild as well as propagating roses, without doubt from imported material, other gardeners were actively improving their orchards. In December 1653, John Percival imported fruit trees through the good offices of his cousin Samuel Percival from Arnold Banbury of London; they were packed and shipped *via* Chester.[47]

A particular of trees sent to John Percivalle in Ireland 1653 December 15

13 Apricockes trees	16.- 0.
6 May cherry trees	6.- 0.
4 Red Woman Necterines	16.- 0.
2 Man peaches	4.- 6.
2 Nuttmege peaches	10.- 0.
2 Newinton peaches	4.- 0.
2 Malagatoones	4.- 0.
2 Portugall peaches	4.- 0.
2 Cornation peaches	4.- 0.
2 Violett peaches	4.- 0.
6 Windsor peares	8.- 0.
3 Summer burgamotts	4.- 0.
3 Winter burgamotts	4.- 0.
6 Boonecritones [Bon Chretien]	8.- 0.
4 Blake peare plumes	3.- 0.
4 Mussell plumes	3.- 4.
2 Queen mother plumes	1.- 8.
2 Premordin plumes	1.- 8.
2 White amber plumes	1.- 8.
2 Damazene plumes	1.- 8.
2 White date plumes	1.- 8.
2 Red pescod plumes	1.- 8.
2 Turkey plumes	1.- 8.
2 Oysterly greene plumes	1.- 8.

The total cost was £5 16s 6d with £1 for the cost of transport. Percival obviously had a large establishment for he was also advised by Val Savage of Chester in December 1653 that he '... could send ... a very good gardener, who would be satisfied with the little house of two rooms in the corner of the garden, and the benefit of the garden beyond what is needed for the house.'[48] Savage also indicated that he could obtain 'trees as cheap as in London.'[49]

The fruit trees imported by Percival included well-known cultivars of pears, cherries and plums, as well as peaches which are not fully hardy in Ireland and will rarely set and ripen fruit out-of-doors here; nowadays they are cultivated in glasshouses, but there is no evidence that there were even primitive glasshouses in Irish gardens in the mid-seventeenth century.[50] The peaches were probably grown in a walled garden against a south-facing wall where they would receive the full benefits of the sun.

The Commonwealth ended with the restoration of the monarchy in 1660. A new era started in the British Isles which was marked by relatively stable politics and this engendered confidence in the landed classes; they felt able to build new houses and embellish them with gardens large and small. William Petty noted this in his study, *The political anatomy of Ireland*, saying that 'in domestick wealth of which sort is building fine houses and gardens, orchards, groves, ... as also furniture for houses, coaches, &c, In which kind I guess the improvement of Ireland has since the year 1642, [to] 1673 advanc'd from one to four, and I think to a better state that before 1641, that is, than perhaps ever it yet was.'[51]

In the north-east, about Lisburn, and especially at Moira in County Down, there was at least one family with a considerable interest in horticulture. At this time George Rawdon undertook much planting especially of orchards; he imported many plants from England. Rawdon was agent for Lord Conway, whose estate at Lisnagarvey had been visited in the 1630s by Sir William Brereton. Rawdon managed the Conway estates after 1654 and also had his own lands around Moira which he received after the Restoration for service

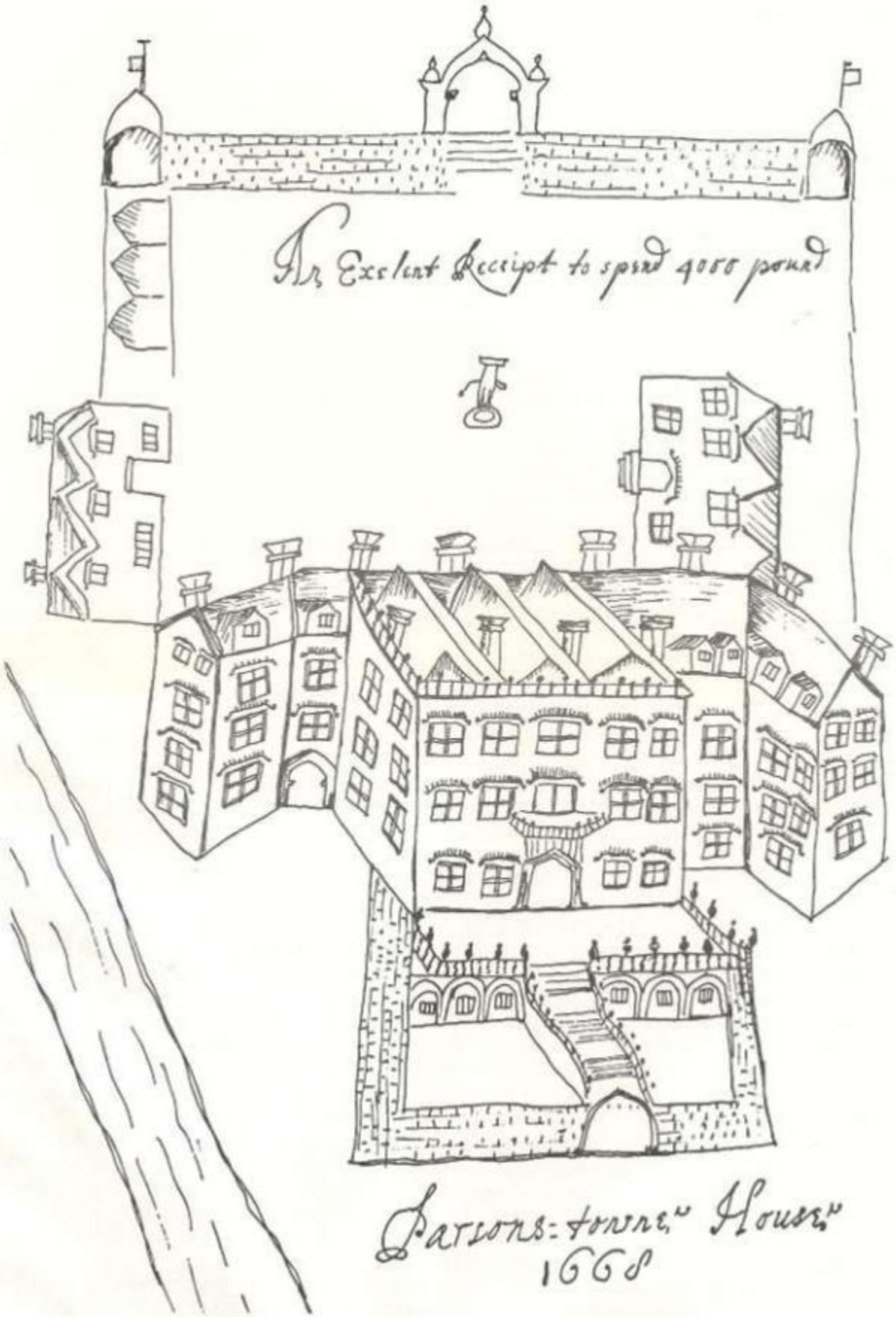


Figure 3. Birr Castle, County Offaly - formerly Parsons:towne House in 1668 from Dorothy Parson's Book of Choyce Receipts (courtesy of the Earl and Countess of Rosse).

rendered to the king. In October 1664, Rawdon wrote to Lord Conway saying that he intended to start 'an orchard under [*sic*] the new house, and I hope to have it furnished this winter with trees ... the objection of the orchard is chiefly to make cyder. I wish your lordship could find us some young trees of that naughty apple only fit for that use. I have forgot its name ...'[52] By September 1665, Rawdon had been promised trees which he planned to plant in rows thirty-two feet apart and he was studying the cultivation of cider apples and the making of cider. In April 1667 he wrote to Lord Conway about the progress, saying that fruit trees planted against walls in the estate were 'fairly' blossoming - these may have been apples and pears, but could also have been peaches and nectarines. He expected that it would be a good year for fruit, especially from the wall fruit 'on the new walk.'

Rawdon clearly had to obtain his young saplings from outside Ireland; both his correspondence and that of John Percival imply that there were few, if any, nurseries in Ireland at this period producing young plants for the local market. In October 1667, Rawdon reported to Lord Conway that 'but one or two of the trees ... brought over had produced apples, and prove to be base sweetings and not red strakes.' He continued, saying that Francis 'desires some red strake sciences [scions] to graffe [graft] here, and to be sent over in a box, he having near 1,000 stocks which he says is the surest, easiest and cheapest way .... We have made two hogshead of good cider this year ...' Rawdon sent instruction about the 'manner and way to send [the scions] safe.' The scions for budding onto the stocks arrived in Ireland in March 1668 and were transshipped from Dublin to Belfast. They reached Lisburn at the end of March and Rawdon told Conway that they had 'come safely and time enough but the labels, being of paper, were rotted off, and we have had to guess at the various sorts, and I think have hit right of the golden pippins.'[53] Within four days the grafts had all been done, a large undertaking, but one which indicates the problems associated with horticulture in Ireland at the period.

Similar methods were adopted by other gardeners. In April 1683, Christopher Crofts wrote from Cork to Sir John Percival saying that he was 'afraid the sainses [scions] should be spoiled with lying so long so that I have opened them, they having no earth about them, and have put some fresh earth about them and water in the box, so that now I want nothing but carriage for them ...'[54] Percival had been anxious a few days earlier about the scions and he had written to Sir Robert Southwell saying that 'the westerly wind will make us lose the season for grafting a great many cuttings of fruit trees ... which are still detained in the River of Thames.'[55] The contrary winds must have been a considerable nuisance to gardeners in Ireland anxious to get their plants safely from England.

The kitchen gardens of Caroline Ireland contained more than apples however. In 1666, Dorothy Parsons began to compile 'her book of choyce receipts all written with her own hand ...' at Parsonstown (now Birr). Many of her recipes ('receipts') used fresh fruits and vegetables which could only have been collected from the kitchen gardens of Parsonstown House (Birr Castle, Figure 3). Among the vegetables she used were 'Hartichokes' and 'cowcumbers', mushrooms, onions and potatoes. The pies and pickles were often flavoured with herbs, which would also have been cultivated. The list of fruits is of considerable interest: apricots were dried, preserved and used to make apricot cheese; apples and quinces were used to make jellies; 'cherys' were preserved and, like the quinces, used to make marmalade; grapes, surprisingly, are also mentioned, although it is unlikely that these were a regular item on the menus. Damsons, 'curance', 'respas', 'goosberris' and 'barberys' are included in the long series of recipes. Among the more exotic 'receipts' are instructions for the manufacture of perfume from damask roses, syrup from violets and how to candy cowslips.[56] Given Birr's isolated situation in central Ireland, the Parsons family surely relied on their own gardens for many of these fruits, vegetables and flowers, as it would have been virtually impossible to obtain them from outside Ireland.

The use of grapes in Birr should be considered in the light of comments made in 1667 by a French traveller, Albert Jouvain, who, during a visit to Dublin, went, like any modern tourist, to Trinity College. There he saw the library and the gardens which he described as '... very well taken care of, wherein was a great parterre representing a sub-dial, and in the middle a tree that served as a gnomon. There was a vine nailed against the black part of a chimney exposed to the mid-day sun, and yet nevertheless its grapes never would ripen, the climate being too cold, which is the case with many fruit trees that cannot live here, or at least bring their fruits to maturity ....'[57] Jouvain's comments suggest that there were still no glasshouses in Dublin at that time, although the Parsons's recipe book may imply that grapes were successfully ripened in some gardens.

Apart from utilitarian plants, the plants named in records for this period are mainly trees. Like the fruit trees, the exotic species were generally obtained from Great Britain.

There are relatively few native trees - oaks, ash, whitebeam, rowan, wych elm, elder, willows, alder, yew and the strawberry tree are the main ones.[58] Sycamore, beech, lime, chestnut and Scots pine,[59] and many others, are all alien plants, although some are now naturalised here. The exact dates of introduction are unknown, but sycamore and beech were probably first brought here in the sixteenth century, along with English elm. The sweet chestnut (*Castanea sativa*) may have been planted in the late sixteenth century, and

there are some old trees still standing at Cranmore in Belfast which are reputed to have been planted about 1610.[60]

Documentary evidence for tree planting in the seventeenth century is sparse and relates almost exclusively to the last few decades. The exploitation of the native woodlands accelerated during the sixteenth and early seventeenth centuries, until the authorities enacted legislation at the end of the 1600s to promote the planting of large tracts of woodlands. Until the beginning of the 1700s little tree planting was carried out and in the preceding century this consisted almost entirely of the planting of orchards and probably ornamental planting around houses including avenues and shelter belts. The planting of trees, clearly, was only an occupation for the large landowner, and a few, but only a few, did so for pleasure.

One of the first of the Irish landowners to take a serious interest in exotic trees seems to have been the Viscount Granard. In 1682, Thomas Dowdall described the demesne at Castle Forbes, County Longford, and mentioned several plants which were growing there at the time and were possibly the earliest introductions of the species into Ireland.[61] At that time, Lord Granard had established 'orchards, groves, hopyards &c. and hath by much industry managed the soile that it beareth all sorts of Plants and Flowers that are set or sowed. There is now growing there in great order large groves of Fir of all sorts with Pines, Juniper, Cedar, Lime trees, Beech, Elm, Oak, Ash, Asp [aspen] and the famous Platanous tree I suppose now growing anywhere besides in this kingdom ....'[62] This list is interesting in several respects. The mention of cedar indicates that this tree from Lebanon had reached at least one Irish garden within a short time after its introduction into England; the first definite record of the cedar of Lebanon in an English garden dates from 1659 when Sir Thomas Hamer recorded having 'of late had some few plants rais'd from seed, which are yet very small.'[63] It is known that John Evelyn 'frequently rais'd it of the seeds' before 1664. The 'famous Platanous' is the oriental plane (*Platanus orientalis*) which even today is very rare in Irish demesnes and arboreta; some years ago the only ones recorded were at Belgrove near Cobh, Clonmannon, Glenstal and in the now destroyed Botanic Garden of Trinity College at Ballsbridge in Dublin.[64]

Lord Granard's estate included '... a fair and specious house with lovely gardens of Pleasure enclosed by high stone walls against which plenty of fruit of all sorts grows and in the said garden are all kinds of flowers and Flower trees that grow in this kingdom as the Lelaps. Liburnum [sic] and many more, with Philarea hedges, Lawrel &c. and the Tubirosa [*Polianthes tuberosa*] beareth here which is not to be raised but with ye assistance of glasses.'[65] The tuberose, a Mexican bulbous plant introduced about 1627, was highly regarded for its strong perfume, but it was tender and required cultivation in a pot indoors or in a greenhouse; the reference to 'glasses' may indicate that there was a greenhouse at Castle Forbes, but it may equally be a reference to a cloche or bell-jar which would suffice.[66]

Other landowners at this time were somewhat less adventurous. In December 1683, Sir John Percival imported one hundred lime trees and two hundred Dutch elms as well as fruit trees which included thirty-six peach and nectarine, eighteen fig, thirty apricot, fifteen pear, thirty-seven plum and forty cherry trees.[67] In April 1684 he obtained 'an ounce of Scotch fir seed, which cost 5 shillings.'[68] In November 1685 he must have requested more elms for he received a letter from Bristol saying that 'so soon as I [Henley] got your letter I went to Kings Weston and set two men to work to pick up young elms and which we got shall go as you order ... I see you lay a foundation that posterity may reap ther fruits of it.'[69] Robert Henley of Bristol had previously supplied Percival with 'a parcel of young elms, I think about 70 or 71, nor have I forgot my Lady's pippens.'[70] The quantities of trees purchased by Percival were not sufficient for full-scale plantations, rather he probably used these for ornamental groves in his demesne, or, in the case of the lime trees, to create avenues or vistas - at Castletown House, County Kildare, there is a fine lime avenue planted in the 1730s.

Even in the final decades of the seventeenth century, as affairs became unsettled again following the accession of King James II, there is evidence that gardening continued almost without interruption. There were various fashions being followed. Canals and fishponds were popular, as at Rathcline near Lanesborough, and the estate of the Earl of Longford which was '... adorned ... with groves enclosures orchards and most delightful gardens affording great variety of trees and flowers with most pleasant Fishponds and Canalls.'[71] About this time too, formal gardens were being created at Kilruddery near Bray, where two parallel canals, an avenue of lime trees and an extensive complex of high hornbeam hedges - The Angles - still survive.[72] These may have been the work of Mr Bonet who had been gardener to William Petty between 1672 and 1684, but left to join the employ of the Earl of Meath in 1684.[73]

Another late eighteenth century garden which remains intact (but neglected) today, is that of Antrim Castle which was the home of Sir John Skeffington, the second Viscount Massereene, in the 1680s. On 24 November 1686, Massereene wrote to his cousin Sir Richard Newdigate saying that '... My health is impared of late, & my greatest intertainmt is Planting; in wch I saw yu were curiojs and yr nurseries fully stored; I therefore desire a Paper of seeds of yr greenes [i.e. evergreen plants], of all yr best & most curious kinds - at least of yr Pines, firs & other sort of trees, wth wch yu are well stocke & so am I. But because yr kinds are

different from ours I beg some more variety from yu, wth yr advice to sow and raise ym - & ye best season. If any other trees or of your flowers or rarities can be spared & may be sent in seeds, I can I hope safily get ym planted here; wch is a favourable climate. I want Spanish Gessimine [*Jasminum grandiflorum*] but wth out potts know not how to convey it. If anything in root or seeds can be spared, that you think worth sending: My son will take care to transmit ym & yr directions therewth."[74] Sir Richard obviously sent seeds to Antrim, but they do not seem to have met Lord Massereene's expectations. On 20 February 1687-8, Massereene told Newdigate that '... none of ye seeds yu sent add to our plantation, because they do not come up ...'[75] He passed on the blunt comment that his cousin, William Bunbury, who was studying at Brasenose College in Oxford, had sent seeds which had germinated. This misfortune does not appear to have interfered with the friendship for a few months later, on 6 June, Lord Massereene wrote, noting his previous letters '... upon the subject of rootes & seeds to be begd out of yr fine plantations, & some (if you pleased) to be bought also from any gardener yt I might trust; wch inlargemt yu would excuse I hope as yu would ye freedome used on so innocent a designe as that of partaking wth yu of such things as might reside in this climate."[76] It is impossible to ascertain if there was any further exchange of plants, for Massereene left for England shortly after this - in June 1688 he was 'impatient to leave' Ireland due to the increasing tensions. It is evident, however, that Lord Massereene planted extensively and was keen to obtain new plants for his Antrim garden.

These reports of flower gardens and the evidence of large-scale garden design and construction contradict the notion that there was little horticulture in Ireland before the Battle of the Boyne in 1690. Documents preserved in Trinity College, Dublin, provide further evidence of the plants cultivated, although as with the earlier records they appear to give emphasis to kitchen gardening. Clearly, institutions such as Trinity College and the larger houses in Ireland, had extensive gardens in which vegetables were grown for the use of the households. The Viceroy, Lord Clarendon, approved of the standard of cultivation, noting that '... the sallet are very good and the roots generally much better than our in England; asparagus here is very good large and green."[77]

The Trinity College documents record the kinds of 'sallets' and 'roots' grown and also indicate that by the 1680s commercial seedmen had set up business in Dublin; these merchants provided seeds and also young seedlings of some vegetables, but they do not appear to have supplied Trinity College, at least, with shrubs or trees. In 1683 John Cole was paid £1 16s 2d for seeds including 'parsley, lettos, tungras [probably = 'touncresis' - *Lepidium sativum*] corn sallat [or lamb's lettuce] nursterssuon, survicgras [scurvey grass?] winter cole winter cabbage, purslon, tyme, winter savoroy, sweet marjoram' and six quarts of beans and three quarts of peas. Cole also supplied five hundred 'cabbidge' plants and 'half a hundred of hortichot artichoke plants'.[78] Between January 1684 and 28 August 1685, Nicholas Sheapeard supplied the College with beans, peas, 'lettis seed, spinag, parsely, garden cresses, coucumbers, colyflowers, turnap, radish, sweet marjoram, curled endive, corn salatt, clary buglas, purslan' and four hundred 'cabbag' plants[79] - cabbage seems to have featured frequently on the menu! Sheapeard also supplied seeds of carnation gillyflower;[80] this is the earliest record of seeds of a purely ornamental plant being sold to the College and these annuals were probably used in the Fellows' Garden. A second account for seeds supplied by Sheapeard included 'rodish, spinag, lettis, parsoly, garden cresses, coucumber, ternap, coloyflower, beans, hotspur peas, kidney beans and purslan seed'.[81] He also provided a hundred 'hartichoke' and two hundred cabbage plants. On this occasion 'stock gilyflows' were required by the College.[82] In 1685 a summer house was built in the Fellows' Garden, and the carnations and stocks may have been planted nearby to perfume the air for the Fellows as they took their recreation. Another account in the College archives provides a unique and remarkable list of the tools available to gardeners at this time. John Young supplied the following items for a total cost of £2:[83]

2 spads	12.- 00.
2 Rakes one fine the other coores	05.- 00.
2 hoes	03.- 00.
a rool and line	03.- 00.
a wire sive	04.- 00.
a hammer	01.- 00.
a sickell	01.- 00.
a sithe and what belongs to it	04.- 00.
for a whell barrow	00.- 06.

Although the College's kitchen garden was actively cultivated as a vegetable plot in 1685, in June 1687, the Provost and Fellows decided to convert it into a Physic Garden '... at the charge of the college."[84] Thus it ceased to have a simple mundane role and was used as a teaching garden, stocked with plants used in the preparation of medicines. The establishment of this first botanical garden on the campus of the College means that the University of Dublin has one of the longest traditions of botanical gardens in the world.

The change from a kitchen garden to a physic garden only meant that a new kitchen garden was established elsewhere, for on 27 February 1687-8, John Young supplied a thousand 'cabag' plants as well as seeds of 'roadis, lettis, spinig, parsly and carott'.[85]

The accession of James II and the resulting political and civil turmoil eventually led to the departure from Ireland of many of the Protestant landowners, such as Lord Massereene, and some of the Fellows of Trinity College. Gardening must have become less actively pursued, and as military skirmishes occurred up and down the island from 1689 to 1691, there was destruction of property. However, the countryside was not utterly laid waste, and despite the political tensions and the warfare, normal life went on and some people continued to tend their gardens. Indeed a major new innovation took place, the erection of glasshouses.[86]

Jouvain's remarks about grapes not ripening in Dublin about 1667 may be argued as indicating that glasshouses were not available at that period. Dowdall's comments about 'glasses' at Castle Forbes is not sufficiently clear to allow the deduction that there was a glasshouse there in the 1680s. Lord Massereene probably did not have a greenhouse at Antrim as he only requested plants which 'might reside in this climate'. The first definite record of a greenhouse in this country is found in the diary of one of the officers in the army of William of Orange. A few days before the Battle of the Boyne, Captain Thomas Bellingham visited Moira and saw the conservatory belonging to Sir Arthur Rawdon.[86]

Arthur Rawdon was the son and heir of Sir George Rawdon, and he was undoubtedly the most remarkable gardener living in Ireland in the seventeenth century. He achieved results unequalled anywhere else at a time when historians generally consider Ireland to have been in a state of chaos.

Rawdon's remarkable life was short.[87] Born in 1660, he was a sickly child. In 1670 he was sent to France, partly for health reasons and partly to learn the language. On his father's death in 1684 he inherited the estate at Moira and began to tend the garden there. He was also involved in politics; as a Protestant he opposed King James II and he mobilised his own troops in support of King William III. Rawdon was a close friend of Sir Hans Sloane, the most eminent natural historian of the period who later became president of the Royal Society - his extraordinary collections form the nucleus of the British Museum. In 1687, Sloane went to Jamaica as physician to the island's governor and Rawdon wrote to him in May 1688 saying that he had '... heard yt in Jamaica on the tops of the mojntains tis usuall to have frost, I desire to be resolved whether tis so or no, & I must beg the favour of you by the first ship comes to Dublin if yu would send me some seeds ... & if you can by any convenience procure seeds out of New England New York &c: they will I beleeve agree much better wth our climate than those of Jamaica, & I am informed they have several sorts of Cedars, Pines &c ....'

It seems unlikely that this letter produced any results, certainly as far as North American seeds are concerned, but it shows that Rawdon was keenly interested in acquiring unusual plants. It had become fashionable in Europe in the latter half of the seventeenth century to amass collections of plants (either living or dried), animals, fossils and such like, in gardens, menageries or museums. Hans Sloane was one of the greatest of these intellectual magpies. Rawdon clearly was most interested in a collection of living plants and often asked Sloane for seeds. On 29 April 1690, only a few weeks before the Williamite forces travelled to Ireland, Sloane dispatched '... a packet of seeds ... in which are at least 40 several seeds, and if you please to sow the dust as well as the larger seeds, there will certainly rise a great many of them.' Sloane commented that 'when you [Rawdon] are settled anywhere about gardening you shall not want all the seeds I can scrape together for you, and them I design you some more I reserve for you till that time ....' But Rawdon's plans were obviously well advanced for he had already had a conservatory constructed at Moira for the cultivation of tender exotic plants. In June 1690, Sloane wrote saying that he had been to Chelsea Physic Garden and had inspected all the plants Rawdon had requested. These, Sloane said, would be packed for him and sent shortly. He regretted that '... the cedrus libani and cyclamen you desired, could not be sent; the one was too big, and the othr could not be found ....' Before all this Rawdon had met and commissioned James Harlow, a gardener, to travel to Jamaica to collect plants for him; Harlow had been employed earlier in similar tasks by James Watt, curator of the Chelsea Physic Garden. There were other collectors active in the West Indies at this time; James Reed, a Quaker, collected seeds in Barbados which reached subscribers in England in 1690 and some of Reed's seeds were given to Rawdon. 'About sixty Barbados plants' were raised at Moira from Reed's seeds.[87]

Harlow's job was arduous and fraught with difficulties. No news of his progress reached Ireland and by the beginning of 1692 Rawdon thought he had been deprived of success. But, late in April 1692 Harlow reached Carrickfergus '... wth 20 cases of shrubs & trees, each containing above 50, well condition'd, & considering ye advantage of ye season they come at, I hope they will continue well. Harlow brought little else, not about 6 shells & but one new, to ye little knowledge I have of them his dry'd plants are pretty well preserv'd; his collection of ferns very large, but as for herbaceous things & grasses very few, seeds he has not above 100 ....' The bulk of his seed collection had been shipped on another vessel and was lost, but Harlow provided a thousand different tropical plants for Sir Arthur Rawdon's conservatory. This was an outstanding achievement, for the transportation of plants across the oceans was not easy; many died due to contamination

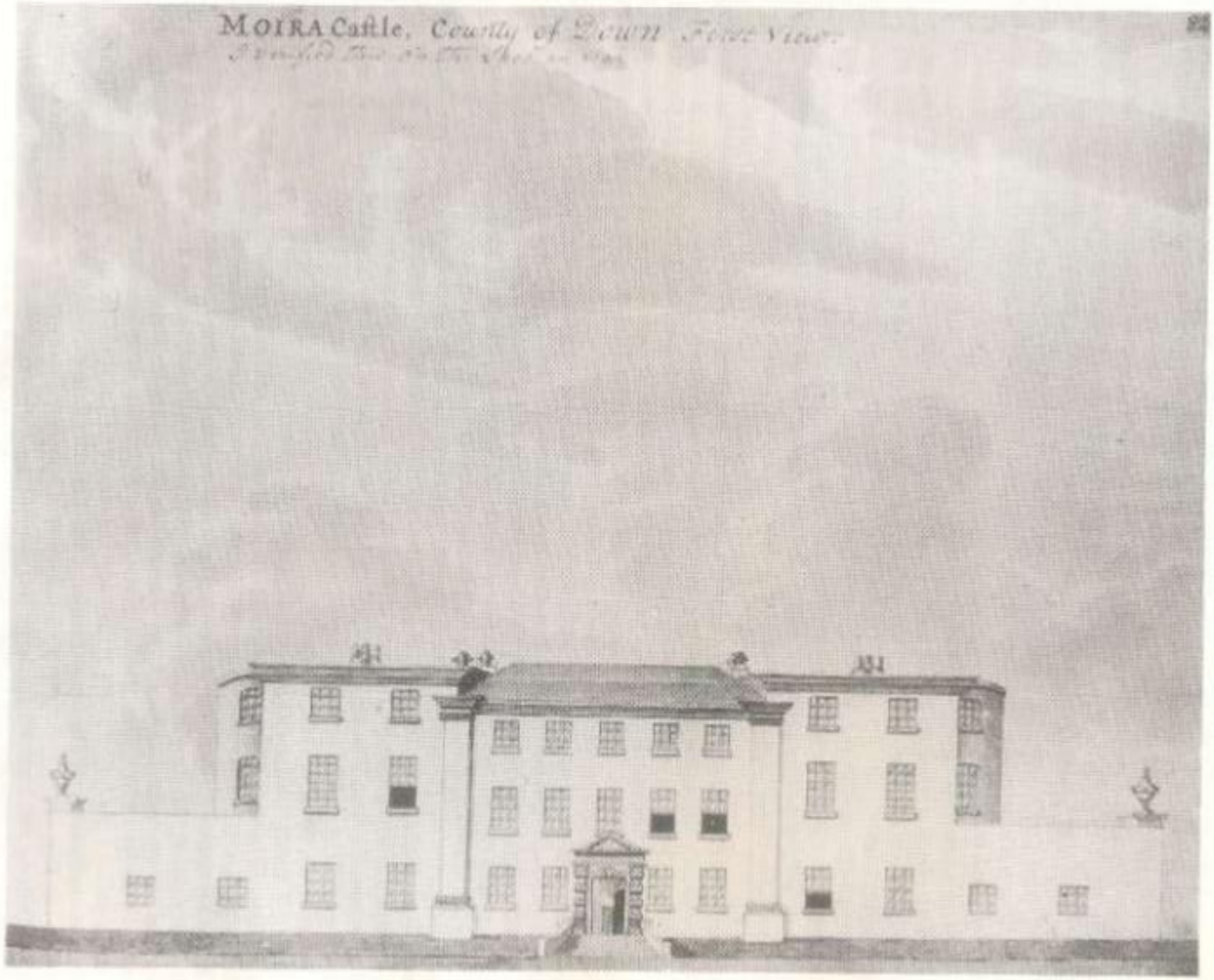


Figure 4. Moira, home of Sir Arthur Rawdon, in 1799, painted by Gabriel Beranger (see E.C. Nelson, 1983) (courtesy of the Royal Irish Academy, MS: 3.C.30, p. 80).

of their soil by salt water. To transport successfully so many tropical plants to a much colder country in the winter and spring makes the achievement all the more remarkable.

Rawdon's collection of Jamaican plants was an exception; nothing like it is known to have existed in Ireland before 1690 and only in a well-equipped botanical garden could such a collection be assembled today. Rawdon liberally distributed plants to other connoisseurs such as the Duchess of Beaufort and Bishop of London, and to botanical gardens in Leiden and Oxford. Not only did he temporarily make Moira a remarkable centre of horticulture but he also enriched botanical knowledge, for the dried specimens, collected both in Jamaica and from the collection at Moira, were used to aid botanists in the study of Jamaica's flora; these dried specimens eventually were given to Sloane and today are preserved in the British Museum (Natural History), London.[88]

Sir Arthur Rawdon died three years later in 1695, and within a few years his Jamaican collection was much depleted. His son, Sir John Rawdon, wrote to Sloane in October 1711 saying that '... as for ye plants yu take notice of, I find that, whether the climate is not so proper, as allowing them (after a great deal of trouble) only to live, without any degree of flourishing or perfection, or by the carelessness of servants, & death of Mr. Harlow, not long since, who my father employed into Jamaica, I find that most of those foreigne southern plants are dwindled to nothing ....'[89]

Notes and References

Abbreviations used in the following notes:
CSP - *Calendar of State Papers, Domestic.* CSPI - *Calendar of State Papers, Ireland.* HMC - *Historical Manuscripts Commission Reports.* TCD - Trinity College, Dublin.

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2. Mitchell, G.F. (1982). The influence of man on vegetation in Ireland; *Journal of Life Sciences, Royal Dublin Society 3:* 7-14. There are other references in, e.g. Mitchell, G.F. (1976). *The Irish landscape.* Collins, London.
3. See Nelson, E.C. (1988). *Allium babingtonii,* in Walsh, W.F. and Nelson, E.C., *An Irish Florilegium II,* pp. 50-51. Thames & Hudson, London. Other references are cited in the accompanying bibliography.
4. Mitchell, G.F. (1976). *The Irish landscape,* p. 155. For a general review see, e.g. Helbaek, H. (1952). Early crops in southern England. *Proceedings of the Prehistoric Society 18* (new series): 194-233.
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7. Joyce, P.W. (1903). *A social history of ancient Ireland.* Vol. 2, p. 148. Longmans, Green & Co., London.
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14. Ford, M.J. (1982). *The changing climate: responses of the natural flora and fauna,* pp. 59-62. George Allen & Unwin, London. For information on monks and wine, see Seward, D. (1979). *Monks and wine.* Mitchell Beazley, London.
15. Quoted from Strabo, W. (1966). *Hortus* (translated by Payne, R.). Hunt Institute for Botanical Documentation, Pittsburgh.
16. The best discussion of the English vernacular names of plants is Grigson, G. (1955). *An Englishman's flora.* Phoenix House, London.
17. *HMC,* Ormond: vol. 1, pp. 156, 163, 164, 186, 192, 225, 235, 237, 266, 277, 289, 298, 300, 301, 305, 313, 324, 339, 340, 345, 349, 356, 367, 382, 408, 450, 464, 588, 612, 629.
18. The spices are listed in the Ormond deeds (see note 17 above, e.g. pp. 164, 186, 277).
19. See Zettersten, A. (1965). The virtues of herbs in the Loscombe manuscript. A contribution to Anglo-Irish language and literature. *Acta Universitatis Lundensis, Sectio 1.* The original manuscript is in the Wellcome Historical Medical Library, London.
20. For a detailed discussion of the Loscombe manuscript see Harvey, J. (1985). The first English garden book. Mayster Jon Gardener's treatise and its background. *Garden History 13:* 834-101.
21. I have slightly modified the text from Zettersten's transcript to make it more easily understood (see notes 19 and 20 above).

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29. This was noted by William How in a manuscript annotation to his personal copy of [How, William] (1650). *Phytologia Britannica*. London. See Nelson, E.C. (1984). *An Irish flower garden*, p. 14, and Nelson, E.C. (1983), *An Irish Florilegium*, plate 14.
30. cf. Pim, S. (1979). The history of gardening in Ireland, in Nelson, E.C. and Brady, A. *Irish gardening and horticulture*, pp. 44-69. R.H.S.I., Dublin.
31. The earliest authentic report is that of Charles d'Ecluse (Clusius) who recalled receiving tubers in 1588 whilst in Vienna; see Hawkes, J.G. (1967). The history of the potato. *Journal of the Royal Horticultural Society 92*: 249.
32. Gerard, J. (1597). *The Herball*. London. Gerard is shown holding a sprig of potato in bloom on the title-page.
33. For a history of the potato see Salaman, R.H. (1949). *History and social influence of the potato*. University Press, Cambridge. See also Hawkes, J.G. (1967), *loc. cit.*
34. One example of a garden from this period was unearthed at Tully Castle on the shores of Lough Erne - the bawn had paths surrounding two plots which may have been gardens. See Meek, M. (1984). *[Guide to] Tully Castle*. Department of the Environment for Northern Ireland, Belfast. No archaeological evidence was found at Tully Castle to confirm that the bawn was cultivated nor would such survive.
35. See Nelson, E.C. and Brady, A. (1979), *op. cit.*, p. 47.
36. Lombard, P., quoted by Pim, S. (1979), *loc. cit.*
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40. This information is contained in a letter from Robert Child to Samuel Hartlib, 28 October 1653. Hartlib Mss. 15/5/25. University of Sheffield. See also, Hoppen, K.T. (1965). Sir William Petty: polymath 1623-1687. *History Today 15*: 126-134. Hoppen, K.T. (1975). The Hartlib circle and the origins of the Dublin Philosophical Society. *Irish Historical Studies 20*: 40-48. Widdess, J.D.H. (1963). *A history of the Royal College of Physicians of Ireland 1654-1936* (Livingstone, Edinburgh & London) provides more details on Petty and his circle.
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43. Hartlib Mss. 70/7. University of Sheffield.
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45. Hartlib Mss. 70/8/2. University of Sheffield.
46. Hartlib Mss. 70/8/2. University of Sheffield.
47. *HMC*, Egmont I, p. 531.
48. Savage to Percival, 2 December 1653: in *HMC*, Egmont I, p. 528.
49. Savage to Percival, 2 December 1653: in *HMC*, Egmont I, p. 528.
50. See Nelson, E.C. (1983). Some records (c. 1690-1830) of greenhouses in Irish gardens. *Moorea 2*: 21-28.
51. Petty, W. (1691). *The political anatomy of Ireland*, p. 91. D. Brown, London.
52. Rawdon to Conway, 5 October 1664: in *CSPI 1663-1665*, p. 441.
53. Rawdon to Conway, 31 March 1668: in *CSPI 1666-1669*, p. 587.
54. Crofts to Percival, 6 April 1683: in *HMC*, Egmont II, pp. 129-130.
55. Sir J. Percival to Sir R. Southwell, 6 April 1683: in *HMC*, Egmont II, pp. 129-130.
56. Details of this manuscript were kindly supplied by the Countess of Rosse.
57. Quoted in Faulkner, C.L. (1904). *Illustrations of Irish history*, p. 409, *et seq*. Dublin.
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62. The original text is contained in N. Dowdall's manuscript 'A description of the County Longford 1682' (Phillips ms 6682) - see note 61.
63. For a history of *Cedrus libani* in Britain see Jarvis, P.J. (1974). A history of the cedar of Lebanon in Britain. *Journal of the Royal Horticultural Society 99:* 539-546. Jarvis, P.J. (1975). A cedar gallimaufry. *The Garden 100:* 319. For details of historic specimens, see Mitchell, A.F. (1972). *Conifers in the British Isles,* pp. 65-67. H.M.S.O., London.
64. This list was appended by Fitzpatrick to the note he and Sherrard published (see note 61 above). M. Forrest (1985). *Trees and shrubs cultivated in Ireland* (An Taisce, Dublin) noted *P. orientalis* in Abbeyleix, Castlewellan, Fota, Kennedy Park and Mount Stewart.
65. See note 61 above.
66. See Nelson, E.C. (1983). Some records (c. 1690-1830) of greenhouses in Ireland. *Moorea 2:* 21-28 - see especially footnote 12, p. 26.
67. 'Bill for trees ...' 5 December 1683; in *HMC,* Egmont II, p. 137.
68. Philip Madox to Percival, 10 April 1684; in *HMC,* Egmont II, p. 137.
69. Henley to Percival, 11 November 1685; in *HMC,* Egmont II, p. 137.
70. Henley to Percival, 26 November 1683; in *HMC,* Egmont II, p. 137.
71. Loeber, R. (1973). Irish country houses and castles of the late Caroline period: an unremembered past recaptured. *Quarterly Bulletin of the Irish Georgian Society 16:* 1-69.
72. See the photograph in Nelson, E.C. and Brady, A. (1979). *Irish gardening and horticulture,* opposite p. 58. R.H.S.I., Dublin.
Kilruddery was described in *The Dublin Intelligence* (14 April 1711) when it was '... to be Sold by Cant to the fairest Bidder, at Dick's Coffee House in Skinner-Row, Dublin, on Saturday the 28th of this Instant April 1711, between 5 and 6 of the clock in the Afternoon: ... being a large House ... and in good Order, with Pleasure Garden, Cherry Garden, Kitchen Garden, New Garden, Wilderness, Gravel Walks, and a Bowling-Green, all Wall'd about, and well Planted with Fruit Trees, with several Canals or Fish-Pods, well stor'd with Carp and Tench ... with a Deer-Park and other Inds thereunto Commodious ...'
73. R. Loeber, pers. comm. (*in litt.* 14 August 1983): 'In 1653 Petty was completing the Down survey, while in the next year (and perhaps earlier) he and his staff for the Survey of the Forfeited Irish Lands were stationed at Crow's Nest near Dame Street in Dublin ... this later became the site of the herb garden of the Dublin Philosophical Society, but whether the two can be connected at this early date is pure speculation. In 1657, Petty probably lived in Back Lane in a house called the 'Cradle' ... [and] sometime fore the early 1670s Petty moved to St. George's Lane in Dublin and created a garden there ... He was enclosing the garden in 1677 with walls '1000 foot apart, [to be?] planted with the best walled fruit that Ireland affords'. Elsewhere he writes 'In this ground ... [I will create?] the handsomest garden in Dublin before Midsummer next.' By 1686 he writes his wife that the garden is in good order, as is the gardener Mr Bonnet ... However, Bonnet was to leave him soon in order to work for Lord Meath, presumably at Kilruddery'. My thanks are due to Dr Loeber for his generous help with this and other information.
74. Newdigate-Newdegate, Lady (1901). *Cavalier and puritan in the days of the Stuarts,* pp. 249-242, London. The original manuscripts are in the Warwickshire County Record Office, Warwick (CR 136/B). This quotation is from CR 136/B.288(a); in this and the following examples, I have quoted the original manuscript, not Lady Newdigate-Newdegate's edited version.
75. CR 136/B.289(b); quoted in Newdigate-Newdegate, Lady (1901), *op. cit.,* p. 241.
76. CR 136/B.290(a) - Antrim, 6 June 1688.
77. Quoted in Simms, J.G. (1965). Dublin in 1685. *Irish Historical Studies 14:* 212-226.
78. TCD Muniments: Bursar's vouchers P/4 F2/7. For an account of vegetables, see Harvey, J. (1984). Vegetables in the Middle Ages. *Garden History 12:* 89-99.
79. TCD Muniments: Bursar's vouchers P/4 F2/25.
80. TCD Muniments: Bursar's vouchers P/4 F2/25.
81. TCD Muniments: Bursar's vouchers P/3/27.
82. TCD Muniments: Bursar's vouchers P/3/27.
83. TCD Muniments: Bursar's vouchers P/3/29.
84. Nelson, E.C. (1982). The influence of Leiden on botany in eighteenth century Dublin. *Huntia 4:* 133-145. Nelson, E.C. (1988). Introduction, in Walsh, W.F. and Nelson, E.C., *An Irish Florilegium II.* Thames and Hudson, London. Jackson, P.S.W. (1987). The Botanic Garden of Trinity College Dublin 1687 to 1987. *Botanical Journal of the Linnean Society 95:* 301-311.
85. TCD Muniments: Bursar's vouchers P/4/11.
86. Nelson, E.C. (1983), *loc. cit., Moorea 2:* 21-28.
87. For full details of Arthur Rawdon, see Nelson, E.C. (1983). Sir Arthur Rawdon of Moira, his life and letters, his family and friends, and his Jamaican plants. *Papers and Proceedings of the Belfast Natural History and Philosophical Society 10 (series 2):* 30-52.
88. Dandy, J. (1958). *The Sloane herbarium.* British Museum (Natural History), London.

National Botanic Gardens, Glasnevin, Dublin 9.

Thomas A. REINHARDT, Martina REINHARDT and Mark MOSKOWITZ. *Ornamental grass gardening*. 1989. pp. 126; illustrated. London: Macdonald Orbis. ISBN 0-356-17514-6. UK£12.95.

Gardening with grasses seems to have become a fashion in some circles. I suspect that this type of 'monocultural' application will become as limited in its use as any other restrictive horticultural practice, so that the grass garden will join the heather garden, the rose garden, the dwarf conifer bed and other similar layouts as examples of singular designs planted in the hope that the one over-riding virtue of the plant type will out-weigh the ensuing boredom.

The authors of *Ornamental grass gardening* have been indulged by their publishers in the lavish illustration of their subject. And it must be admitted that used skilfully, grasses are a very seductive plant material, strong in line, in form and sometimes in colour. That said, there is a sameness about them that limits their wholesale use. The most successful layouts in this book are without question the now famous herbaceous prairies created by Wolfgang Oehme and James van Sweden, where the grasses are mixed with robust perennials like *Rudbeckia, Achillea* and *Coreopsis*.

The gardens designed by one of the authors, Thomas A. Reinhardt, are of a different calibre and don't seem to possess the same vigour, the same strength of purpose. This is exemplified by the pictures on pp. 76 and 77 where an exquisite cameo on the left is juxtaposed with a maquis-type planting on the right - both designs attributed to Mr Reinhardt, but the gem is in fact by the Japanese master Hiroshi Makita, who receives nary a credit. Inevitably some of the layouts have been photographed from different aspects, but why use the same photograph twice, as on pp. 32 and 39 - the latter ostensibly suggesting that grasses combine successfully with flowering perennials, but the only flower illustrating the point is a single clump of catmint!

The text is divided into four sections, 'Understanding Grasses', 'The Basics of Ornamental Grass Gardening', 'Designing with Ornamental Grasses' and 'A Catalogue of Grasses'. Each section is very well illustrated, and the text generally is readable and informative, without being too technical. The fourth section is a highly selective gazetteer of only 59 varieties, omitting many important on this side of the world - neither *Stipa gigantea* nor *S. arundinacea* gets a mention, although *S. calamagrostis* is described under the genus *Achnatherum*. Bamboos get very short shrift - only four described - and the photograph of *Arundinaria viridi-striata* (now *Pleioblastus*) depicts so pallid and globular a specimen, I have to doubt its identity.

However, the book is valuable for introducing gardeners to the uses and misues of grasses. Its photographs are its strength.

Niall O'Neill

Myra STOKES. *Flower arranging from an Irish garden*. 1989. pp. 55; illustrated. Bray: Myra Stokes. ISBN 0-9514426-0-0. IR£7.95.

This is an attractive and lively book and the author is not only thoroughly familiar with her subject and material, but writes with a gentle sense of humour that makes it easy to read as well as instructive.

There are eight chapters each dealing with different aspects of flower arranging to help beginners and those with a competitive spirit. The first chapter 'Beginners only' is clear and should encourage and give confidence even to the most timid of flower arrangers. I found the chapter 'Choosing colours' interesting, as the author obviously has a good understanding of how colour works. This must be the most personal aspect of flower arranging - and perhaps the hardest to teach, as a knowledge of the way in which colours react and behave together, is a complicated subject.

Myra Stokes emphasises the use of foliage either on its own or in combination with flowers, or indeed, with the bits and pieces that most of us would find quite near to hand without the expense of florist shops and suppliers. I find the text of this book more interesting than the photographs which, although beautiful, are of formal and professional flower arrangements. Perhaps more informality in the arrangement, fewer exotic containers and more substantial backgrounds would have better illustrated the title.

However, this book is full of useful information and should be enjoyed by everyone interested in bringing a little bit of their garden indoors.

Lesley Fennell

John KELLY. *Perennials*. 1989. pp. 137; illustrated. Women's Institute Creative Gardening. London: Unwin Hyman. ISBN 0-04-440376-3. UK£10.95.
Christine SKELMERSDALE. *Bulbs*. 1989. pp. 169; illustrated. Women's Institute Creative Gardening. London: Unwin Hyman. ISBN 0-04-440377-1. UK£10.95.

John Kelly describes modern creative gardening as 'an art, available to everyone'. He sets out to help us to appreciate the qualities of perennials, so that even with limited space, we can learn to use them to maximum effect. The

information in this book is invaluable to the unwary or inexperienced gardener. It will save hours of frustration and backache when we discover too late that our 'treasures' are thugs. He has this to say about *Petasites* ... 'Do not accept pieces of it even if offered with assurances by an Archbishop or a High Court judge'. His suggested planting distance? One per square mile. Another member of the Compositae, *Bupthalmum speciosum* gets the following reference. 'Beware! A plant beloved of landscape gardeners who 'do' gardens and then leave town'. If we buy either of these we certainly know what to expect!

The plants are described under two headings, 'Perennials in the sun' and 'Perennials in the shade'. There are verbal portraits of each species or cultivar, not all as unflattering as the quotes suggest! Whether we want to grow perennials formally or informally, in herbaceous borders, mixed borders, or as isolated specimens, all the information we need is here. The author shows how plant combinations and succession of flowering are as important as colour in creating a harmonious garden, providing continuous interest. This is a well-illustrated book written in a witty and direct style. It would be particularly useful to a beginner, or someone who feels that their present 'creative' efforts could be improved upon.

If you have ever come home with a bag of bulbs bought on impulse and then thought "Where on earth am I going to put them?", this is the book for you. The author, Lady Skelmersdale, runs Broadleigh Gardens bulb nursery in Somerset, so she knows what she is talking about. She is also a keen plant photographer and many of the beautiful photographs in the book were taken by her at Broadleigh.

Her philosophy is that the garden is to be considered first and the bulbs then chosen to 'enhance an uninspiring border or add a spot of interest to a drab lawn in February'. For the purposes of the book, the term bulb is used in the loosest sense to mean a swollen underground storage organ corms, true bulbs, tubers and rhizomes, which for part of the year are completely dormant. They are also 'hardy', surviving outdoors in Britain with minimal protection. Plants like *Schizostylis* and *Dierama* which behave more like herbaceous perennials are excluded. Her selection is a personal one, geared for the gardener who wishes to be more adventurous in planting, and by the clever use of bulbs, to add another dimension to gardening.

The book is well-laid out, comprehensive and full of great ideas. The photographs alone, showing bulbs planted in sunny borders, shady borders, grass and 'special places' (containers, rock gardens and window-boxes) are irresistible. Anyone who buys this book will certainly be bringing a bag of bulbs home in the autumn and should have no problem at all knowing where and how to plant them!

Shirley Musgrave

Deni BOWN. *Alba: the book of white flowers.* 1989. London: Unwin Hyman. ISBN 0-88192-157-2. UK£ (not stated).

There is a white lilac in bloom as I write, and tiny white stars on the hollies presaging fruits for the autumn, *Choisya ternata* is cloaked in white, and white candytuft carpets the rockery. White is perhaps the only non-colour about which a gardener might write a book, for black is too rare and too sombre for anyone to admire exclusively.

Deni Bown's entrancing book is not just an encyclopaedia of white flowers, but contains a fascinating scientific explanation of whiteness. White flowers are often free of the pigments which yield colours, although some near-white anthocyanins can give a paler shade of white.

I enjoyed this book. Particular congratulations to Unwin Hyman and Timber Press (the American publisher) for a superlative index (24 dense columns of plant names); would that other publishers of horticultural monographs were so careful. There are numerous excellent colour photographs and some line drawings. In short, this is a model volume, elegantly designed and well written, and it should attract all discerning gardeners.

E.C. Nelson

Sarah COTTON [Ed.]. *Guide to the specialist nurseries and garden suppliers of Britain and Ireland:* 1989, pp. 355; illustrated. Antique Collectors' Club. ISBN 1-870673-06-9. UK£8.95.

Are you looking for a Gothic Arch, an artificial tree, a fresco, a pheasant pen net or just a left-handed tool? Or are you hunting for a special *Acer*, carnivorous plants, a rare conifer or old-fashioned pinks? Whatever your quest you are likely to track it down in this 1989/90 edition. This hard-backed book is so crammed full of interesting information that I'm sure it will lead to jealousy on the part of Irish gardeners - our counterparts in Britain have so much choice.

I suppose it is just about possible to import a dovecote or a sundial or whatever is your fancy - but just think of the complications! And when it comes to the importing of plants, we all know from bitter experience that very few British nurseries these days are willing even to consider the provision of Plant Health Certificates; even if they do so (for a hefty fee), you end up paying VAT on the doorstep before you can take delivery of your parcel. Incidentally, although there is information in this Guide on the importation of plants into the United States, there is nothing about Ireland's regulations.

There are nearly 800 nurseries listed of which only 42 are Irish (you might do better with the Irish Garden Plant Society's Guide!). There are at least eight lists of various sorts and a large number of illustrations, most of them of doubtful value in

what is primarily a reference book. In fact, if the number of illustrations was reduced and the hard back replaced by a soft cover, maybe the price would be lower. UK£8.95 seems a lot to pay for a book that is out of date after a year.

Certainly this is a fascinating book to browse through, but of limited use for Irish gardeners. If you are visiting Britain with a car, however, this book might be invaluable.

Verney Naylor

Carol HENTY. *For the people's pleasure: Australia's botanic gardens.* 1989. pp. 186; illustrated. New York: Rizzoli. ISBN 0-8478-1014-3. UK£35.

The book describes fourteen of the main botanic gardens of Australia, which were created as an integral part of their cities, and gives a brief summary of the history of each. The 300 colour photographs are of good quality. I was delighted to see the photograph of the French Memorial Fountain of Huon Pine, in the Tasmanian Botanic Gardens, as it was one of the features that I remembered most from my all-too-brief visit to the gardens many years ago.

From the descriptions, the majority of the gardens are 'gardenesque' in style which was of paramount importance during their construction as they would also be used as regional parks by the local inhabitants. Thus they would appeal far more to the general public than to a committed plantsman. My main criticism is that there is no map showing the location of each garden in relation to the sea, mountains and rivers. This would help to identify species of Australian plants that could be tested for hardiness in Ireland, which is noted for its large collection of Australian plants, some of which were introduced by the late Lord Talbot de Malahide who had an estate in Tasmania. Temperatures and rainfall levels are given but light levels and height above sea-level are equally important.

The earlier gardens (e.g. Sydney, Tasmanian Botanic Garden, etc.) had many connections with the Royal Botanic Gardens, Kew, as their main function was to provide recreational areas, to acclimatise plants (particularly those of economic importance) which had been sent from Kew, and to send back seed and plants of the native Australian flora. By 1872, Brisbane Botanic Gardens had supplied to Queensland growers 50,000 cuttings of sugar-cane and 5,000 cuttings of white mulberry.

The book emphasises the richness of the Australian flora; few of the species mentioned actually grow in the Talbot Botanic Gardens, Malahide, but many more might be tried, particularly those listed as growing in the same habitats as the few species which have thrived in the Irish climate.

It is well written, easy to read and gives a good indication of what each garden contains. Gardeners visiting Australia would be well-advised to read it.

Anne James

C. PHILIP and Tony LORD, *The plant finder.* 1990. (4th edition '1990/91'). Headmain Ltd. for the Hardy Plant Society, Whitbourne. ISBN 0-86190-385-4. UK£9.99.
P. TREHANE. *Index hortensis, volume 1: perennials including border plants, herbs, bulbous plants, non-woody alpines, aquatic plants, outdoor ferns, ornamental grasses.* 1989. Quarterjack Publishing, Wimborne. ISBN 0-948117-00-1. UK£25.

The plant finder, in its fourth edition, hardly needs a review. It is now well known to all gardeners who love plants, and has not just the status of a best-seller, but also the title 'The essential garden book of the late 20th century'. This new edition contains fruit trees and bushes as well as perennials, trees, shrubs and sundry other groups of plants. Its Irish coverage is improving, but why is it taking so long for some of our better nurseries to respond. The woeful tale of nurserymen's indolence has been well demonstrated also in this society's own guide to nurseries and garden-centres. A 'glitch' in the typesetting of the 'Additional Nursery Index' means that 72 (Eden Plants, Rossinver) appears between 21 and 22 (indeed all numbers beyond 68 are cunningly concealed!). No book is perfect, and this minor confusion does not in any way detract from the undoubted value of this book as a means of tracking down sought-after plants. If you still have not got a copy, buy one now, and if you are already addicted make sure you obtain this edition as all the others are out-of-date.

The plant finder sells for ten pounds; *Index hortensis* retails at twenty-five pounds. What is the reason for this? What are the differences, if any?

Index hortensis is a listing of species and cultivars of herbaceous perennials, arranged alphabetically according to genera; the source of plant names was about 2,800 nursery catalogues issued in 'Northern Europe over the years 1984-1987'. The editor assessed each name, decided its validity and the resulting list of names is claimed to be authoritative. Each species name has its authority (i.e. the name of the original author(s)) appended, sometimes with its date of publication, and more infrequently abbreviations indicating where descriptions have been published. For cultivars the original raiser/introducer is named, if that information could be traced.

In short, *Index hortensis* is a plain dictionary of names - it contains no information of import to that mythical person the "common gardener", nothing about woody plants, nothing about where plants can be purchased. Moreover this is only the first of several volumes. In my view it is not worth spending twenty-five pounds on it, unless you are

a taxonomist, nurseryman or gardener requiring another work of reference in which to dig for elusive names. The "common gardener" using *The plant finder* will obtain all the information that is required about correct names therein, at (ultimately) a fraction of the cost of *Index hortensis*.

That may seem a harsh conclusion for a book on which must have been expended a vast amount of time; compiling such a directory of names is tedious work, and Piers Trehane may be congratulated for his perseverance. As a compendium it undoubtedly has value as the subtitle on the title-page indicates: *Index hortensis* is 'a modern nomenclator for botanists, horticulturalists [*sic.*], plantsmen and the serious gardener' - the first two categories will find it helpful (but not infallible), but the plantsmen and the lonesome 'serious gardener' will be baffled. On the dust-jacket and cover is the extraordinarily pompous subtitle 'The Authoritative Guide to the Correct Naming of Our Garden Plants'. This cannot be taken seriously (does it comply with trade description legislation?); any writer daring to string together 'The Authoritative' and 'the Correct' is asking for trouble. *Index hortensis* is not authoritative, nor entirely correct; it is pretentious and contains errors, most of which could have been eliminated if the author had widely circulated, as he had intended, his typescript to practicing taxonomists in several countries. Misspellings abound (e.g. on p. 363 William Henry Harvey becomes 'Harvy' on several occasions, and Lady Leitrim is 'Lady Liatrum') and several new combinations are invalidly made.

Index hortensis is a hard-back, printed on good paper and well designed, but the price is far too high; it could have been issued at about the same price as (or less than) *The plant finder*, and might then be recommended as a worthwhile purchase.

It sometimes seems as if the whole of the botanic fraternity (headed by taxonomists) is conspiring to make life intolerable by deliberately, even perversely, changing plant names. The unfortunate taxonomists - a much-maligned fraternity! - are really only doing their proper work within internationally prescribed rules, although too often they fail woefully in their efforts to explain this to fellow plantsmen. We all need dictionaries of plant names, preferably compiled with the full co-operation of nurserymen, gardeners and botanists. Frequently in my own work I need to consult dictionaries; I do use *Index hortensis* and *The plant finder*, but only as two among a battery of works. If I had to recommend one work for the lay person I would suggest *The plant finder*; it is all *Index hortensis* claims to be, without the pomposity and spurious claim of perfection, and is inexpensive.

E.C. Nelson

F. Nigel HEPPER [Ed.]. *Plant hunting for Kew*. 1989. pp . 232; illustrated. London: HMSO. ISBN 0-11-250038-2. UK£17.95.

From the mid-eighteenth century the Royal Botanic Gardens, Kew, has sent expeditions abroad to seek out plants previously unknown to science. Although fewer new plants are discovered every year, Kew has a responsibility for the evaluation and distribution of such material, thereby furthering its chances of survival in cultivation. This book is a collection of essays by those scientists based there.

The first section deals with Kew expeditions before World War Two. These early expeditions are condensed into two chapters written by Kew's former librarian. The second section recalls general expeditions by Kew staff during the last few decades, including personal recollections of expedition incidents and geographical descriptions. There are absorbing stores about treks to Tropical Africa, hunting for the forest coconut in Madagascar, searching for new ornamental plants and other adventures in Nepal, China, Cyprus, the Near East and Brazil. The third section contains accounts of specialist botanical expeditions based on subjects such as ferns, ornamentals, fungi and seed-bank collecting.

As David Attenborough says in the foreword to the book, 'The heroic days are by no means over. Here is a chance to savour them while they are still dawning'. In his 'Quest for useful legumes' Gwilym Lewis' quarry was a tree known locally as tanadi (*Alexa canaracunensis*) whose seeds and leaves yield compounds that look promising in the war against modern-day viruses. Says Lewis 'this little-known species, of no apparent local use, might prove to be one of the most economically important tree species in the tropics'.

In the chapter 'Plant collecting and conservation', Grenville Lewis, Keeper of the Herbarium and Chairman of the Species Survival Commission, IUCN, draws the whole book together and tells of the philosophy behind the expeditions. It is a salutary reminder that we all depend on plant life and increasingly plant life depends on us. The more we know about it, the better we can conserve it.

As with any such collection, the literary style is uneven with a noticeable difference in approach. The chapter on East Africa tells more of the mishaps with the truck and the unceasing rain than about plant collecting: 'Long walk but not very satisfactory collecting - nine numbers in all' leaves one wondering what on earth they found. In contrast 'Here we are skimming in a tiny dugout on the Indian Ocean, over the most exquisite coral in sight of the forested shoreline of one of the most wonderful islands. Great trees of *Barringtonia*, *Terminalia*, *Intsia* and *Sideroxylon* hung over the beach, festooned with epiphytes. Occasionally we would see and smell curtains of the climber *Stephanotis grandiflora*'. That's more like it; here we

meet the plants, some of them new to us and about which we can feel excited and curious.

The book is beautifully presented and illustrated by excellent, apt photographs. Each chapter contains a map of the area with place names as mentioned in the text. These areas in turn are put in a global context by reference to world maps inside the front and back covers. A bibliography and a comprehensive index complete the book. *Plant hunting for Kew* is a tribute to the new collectors who, despite many hardships, have served the cause of botany and horticulture well. The book will be a source of pleasure for all those fascinated by the story of plants and their importance in our world for food, medicine, industry or ornament. It will also interest those who enjoy tales of travel and discovery.

Chris Fehily

Jack WHALEY. *The gardens of Ireland - a visitor's guide.* 1990. pp. 241. Dublin: Poolbeg Press. ISBN 1-85371-073-3. IR£6.50.

It was with eager anticipation that I picked up this book, with its enticing jacket photographs of Powerscourt. There is a real need for a pocket-sized guide to those gardens in Ireland which are open to the public, but I am afraid that this one will not satisfy that need!

The author, Jack Whaley, is a journalist and keen gardener and most of this book is based on a series of articles which were published in *The Irish Times* during the mid 1980s. Unfortunately, one's immediate reaction is a feeling of disappointment and *déjà vu*. Two major errors of judgement, either on the part of the author or the publisher, have led to a total absence of illustrations, not even a map pinpointing the gardens' localities; this will not endear the guide to visitors. The text varies considerably for the 27 gardens: just over three pages for the Ashbourne House Hotel in County Cork to eight pages for Birr Castle. The average treatment hovers around four and a half pages, but there are some interesting inconsistencies as the reader will no doubt notice!

Altamount in County Carlow starts the running and I read the text with interest, having not come across this garden before. A more banal description I have yet to read and I now know little more than when I started. A few gardens are described in depth - Kilruddery and Birr for example - but in many cases there is no mention of the family history or indeed the various gardeners, who played significant roles in the shaping of the gardens.

It is also a great pity that the text was not checked through by a competent botanist as many elementary mistakes could have been avoided; while *Azara microphylla* comes from Chile, its cultivar 'Variegata' does not. *Viburnum plicatum* 'Mariesii' has layers of flattish white flowers, while the true Snowball (not Snowbell) bush is *V. plicatum* forma *plicatum*. *Magnolia campbellii* is described as a magnificent shrub tree at Fota, while generic collections as a whole are described as a genus collection! Finally, the X sign for a hybrid should be in the lower case (x) and cultivars should be in single rather than double quotes.

A brave attempt but not good enough.

Susyn Andrews

Sue MINTER. *The greatest glasshouse: the rainforests recreated.* 1990. pp. 228; illustrated. London: HMSO. ISBN 0-11-250035-8. UK£25.

Sue Minter is Supervisor of the Palm House at Kew and was one of the design team during its recent restoration and replanting to suit the modern needs of recreating 'the palm-rich rainforests of the world, in microcosm ...' The book is divided into two sections. The first contains chapters on various aspects of the original Palm House, the growth of the Victorian plant collections and glimpses into the daily routine of several generations of Kew gardeners who nurtured and loved these plants - for it *was* a labour of love under conditions of extreme heat and humidity and ghastly fumigation methods now banned by health regulations.

There are several chapters on palms and associated genera from the different geographical areas, with excellent photographs or botanical drawings to whet one's appetite for a visit to Kew. The second section deals with the historical background to the use of iron in the early glasshouses. Early restorations are also covered. The chapter on the design and specifications for refurbishment makes particularly interesting reading now that the long-awaited restoration of the Curvilinear Range at the National Botanic Gardens, Glasnevin - contemporary to the Palm House - has just commenced. There is always a fear that finance or lack of it is the final decider in the quality of the project. It did not happen at Kew - it cannot be allowed to happen at Glasnevin.

In a chilling sentence in the foreword, Ghillean Prance, Director of The Royal Botanic Gardens, Kew, writes: 'It will be a hundred years before the Palm House needs refurbishing and a hundred years is longer than the tropical forests will last unless their destruction is slowed or halted'. With the inclusion of chapters on tropical fruits, crops, medicines and the marine display (housed in the original basements), the book is aimed at a wide audience and is intended not just as a record of a job well done but as a very good explanation in easy language of the absolute necessity to educate people in the conservation of tropical flora.

Will *we* have an equivalent book when the restorations at Glasnevin are complete?

Finola Reid

The Irish Garden Plant Society was formed in 1981 to assist in the conservation of garden plants, especially those raised in Ireland. It also takes an interest in other aspects of the preservation of Ireland's garden heritage.

This journal will be devoted to papers on the history of Irish garden plants and gardens, the cultivation of plants in Ireland, the taxonomy of garden plants and reports of work carried out by the society and its individual members.

The editorial committee invites contributions from members of the society and others. Please submit manuscripts typed on A4 sheets, double-spaced and typed on only one side of each sheet to the Editor, E. Charles Nelson, National Botanic Gardens, Glasnevin, Dublin 9. Books for review or reviews should be sent to the Asst. Editor, Judy Cassells, Department of Plant Science, University College, Cork.

Irish Garden Plant Society
Dublin



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