EXPLOITATION OF DECORATIVE STONE IN VICTORIAN IRELAND: FROM QUARRY TO BUILDING

Ph.D. Thesis
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SUMMARY

Ireland contains a diverse range of rock types that are characterised as igneous, sedimentary or metamorphic in origin, which have been widely utilised for building, and to a lesser extent decorative, purposes over the past 2000 years and more. Nineteenth century Britain and Ireland experienced a revival of medieval Gothic style architecture, inclusive of polychromatic design features, which paralleled with industrial advancement, as well as a sweeping curiosity for science, including geology, certainly increased the demand for coloured stone and encouraged the development of the Irish decorative stone industry. In consequence the mid-nineteenth century marked the departure point for widespread investigation and exploitation of varicoloured decorative stone on a commercial scale. An interdisciplinary investigation of native decorative stone in Victorian Ireland (1837-1901), this study, which was achieved primarily through historical research allied with scientific considerations and site visits, endeavoured to develop a holistic interpretation of its extraction, fabrication and utilisation.

Initiatives, including countrywide mapping by Ordnance Survey Ireland and the Geological Survey of Ireland, the advent of industrial education, founding of the Museum of Irish Industry, advancements in transport and infrastructure and the promotion of industry at trade exhibitions gave impetus to widespread industrialisation of decorative stone. The interweaving of disparate activities be they government supported or promoted by enthusiastic capitalists or members of the architectural fraternity allowed for rapid development of an extensive stone extractive and fabrication industry in Victorian Ireland. While Irish decorative stone was excavated and exported as far back as the early seventeenth century commercialisation of the industry was not established until 1730 in Kilkenny and spread to Galway at the beginning of the 1800s. Timeless black limestone and Connemara green serpentinite marble, comparable to the acclaimed verde antico, were extracted in these localities. The Kilkenny and Galway enterprises paved the way for widespread quarry development in the latter half of the nineteenth century and the emergence of polychrome architecture created a market for the stone. Decorative stone quarries surfaced throughout Ireland, the locations of which were boundless on account of the extensive and dominant underlying limestone lithologies, which were worked as superior marbles. Some quarries operated for a short time and remained small scale, opening only to meet local demand, while others steadily prospered and widely traded their stone in domestic and foreign markets. The primary locations of decorative limestone and marble extraction (outside of Kilkenny and Galway) were Armagh, Donegal, Offaly, Westmeath, Clare, Limerick, Cork and Kerry.
The development of quarrying corresponded with a growth in native marble fabrication and the expansion of mills. The nineteenth century was an important time for marble working in Ireland when mechanisation of fabrication processes allowed for increased accuracy and output, which was imperative to the success of the trade. By the latter part of the Victorian period many proprietors of prominent marble mills were also leasing decorative stone quarries, from which they sourced cheap native polychrome stone. The Killaloe Marble Works, operated by Messrs Manderson in the mid-1800s, was a unique standalone provincial mill unlinked to quarries. Mandersons pioneered the use of Irish stone in architectural decoration and structural polychromy and were responsible for the fabrication of stone in the Museum Building of Trinity College Dublin (1853-57). The conception of this building, which marked the commercial debut of a wide variety of indigenous limestones and marbles, was pivotal in the development of the decorative stone industry. It showcases the first instance of native polychromy and promoted a taste for coloured stone, which spread across Ireland and beyond. During the Victorian era stone and architecture danced with each other around the same paths, but regrettably the Irish stone industry never reached its true potential largely due to an inherent prejudice against native materials and manufactories. By the 1930s the majority of quarries and marble works had closed permanently and the growth in popularity of concrete during the twentieth century inevitably resulted in the ultimate demise of the industry. The innovation of Victorian quarry owners and marble workers and their success, albeit short lived, in raising and fabricating native decorative stone to a high standard is largely unknown, however their legacy survives through the buildings and monuments that display their skilful craft.
Contents

Introduction ...................................................................................................................................................... 1

Overall aim and specific objectives .............................................................................................................. 1

Central inquiries within each chapter ........................................................................................................... 2

Methodology ................................................................................................................................................. 3

Chapter 1 The impetus to widespread industrialisation of the decorative stone trade in Victorian Ireland ........................................................................................................................................... 5

An interdisciplinary approach in Victorian Ireland ......................................................................................... 5

Establishment of Ordnance Survey Ireland and the Geological Survey of Ireland ................................. 7

Ordnance Survey geological mapping ......................................................................................................... 7

Griffith’s parallel geological mapping .......................................................................................................... 8

Geological Survey mapping .......................................................................................................................... 8

Robert Kane and the Museum of Irish Industry ............................................................................................. 11

Post Famine Industrialisation ....................................................................................................................... 23

Transportation ............................................................................................................................................... 23

Industrial Exhibitions ................................................................................................................................... 26

Conclusion ................................................................................................................................................... 33

Chapter 2 The initial commercialisation of Irish decorative stone quarries in Kilkenny, Connemara and Galway ........................................................................................................................................ 34

Early Irish marble ........................................................................................................................................ 36

Initial commercialisation of Irish marble .................................................................................................... 40

Kilkenny black limestone ............................................................................................................................... 40

Connemara marble ..................................................................................................................................... 54

Galway black limestone ................................................................................................................................. 74

Conclusion ................................................................................................................................................... 87

Chapter 3 Expansion and diversification of decorative stone quarrying in Victorian Ireland .............. 88

Armagh “marble” quarries ............................................................................................................................. 88
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donegal marble quarries</td>
<td>95</td>
</tr>
<tr>
<td>Offaly and Westmeath “marble” quarries</td>
<td>103</td>
</tr>
<tr>
<td>Limerick and Clare “marble” quarries</td>
<td>115</td>
</tr>
<tr>
<td>Cork and Kerry “marble” quarries</td>
<td>143</td>
</tr>
<tr>
<td>Conclusion</td>
<td>174</td>
</tr>
<tr>
<td>Chapter 4 Marble fabrication in Victorian Ireland</td>
<td>176</td>
</tr>
<tr>
<td>The London Marble Working Company</td>
<td>177</td>
</tr>
<tr>
<td>The Killaloe Marble Works</td>
<td>183</td>
</tr>
<tr>
<td>The Kilkenny Marble Works</td>
<td>192</td>
</tr>
<tr>
<td>Other provincial marble works: Cork and Galway</td>
<td>198</td>
</tr>
<tr>
<td>Marble works in Dublin city</td>
<td>209</td>
</tr>
<tr>
<td>Conclusion</td>
<td>216</td>
</tr>
<tr>
<td>Chapter 5 The Museum Building of Trinity College Dublin</td>
<td>218</td>
</tr>
<tr>
<td>Decorative and dimension stone in the Museum Building</td>
<td>218</td>
</tr>
<tr>
<td>Native polished stone in the Museum Building</td>
<td>230</td>
</tr>
<tr>
<td>Limestones</td>
<td>230</td>
</tr>
<tr>
<td>Cork red limestone</td>
<td>231</td>
</tr>
<tr>
<td>Connemara marble</td>
<td>233</td>
</tr>
<tr>
<td>Descriptions of Irish decorative stone types in the Museum Building</td>
<td>235</td>
</tr>
<tr>
<td>Procuring and fabrication of stone for the Museum Building</td>
<td>243</td>
</tr>
<tr>
<td>Considering decorative stone types for the Museum Building</td>
<td>247</td>
</tr>
<tr>
<td>The allure of native polychromy in Victorian Ireland following the construction of the Museum Building</td>
<td>249</td>
</tr>
<tr>
<td>Conclusion</td>
<td>256</td>
</tr>
<tr>
<td>Conclusion</td>
<td>258</td>
</tr>
<tr>
<td>Appendices</td>
<td>265</td>
</tr>
<tr>
<td>Appendix 1 Maps</td>
<td>265</td>
</tr>
</tbody>
</table>
**INTRODUCTION**

Ireland contains a diverse range of rock types that are characterised as igneous, sedimentary or metamorphic in origin, which have been widely utilised for building, and to a lesser extent decorative, purposes over the past 2000 years and more. Nineteenth century Britain and Ireland experienced a revival of medieval Gothic style architecture, which architectural and art critic John Ruskin described as the most “honest” form of architecture in relation to materials.¹ During the mid-1800s architects, such as William Butterfield, embarked on designing buildings, which drew features from the original gothic style, inclusive of polychromy. Butterfield’s designs embodied constructional polychromy, principally in the form of lavish multicoloured brickwork, often in combination with stone. This re-established style also embraced the use of marble for both decorative and structural components in buildings; an example of which is Deane and Woodward’s expertly executed Museum Building at Trinity College Dublin (1853-57).² Victorian gothic paralleled industrial advancement, as well as a sweeping curiosity for science, including geology, across the British Isles. In consequence the mid-nineteenth century marked the departure point for investigation and exploitation of Irish varicoloured decorative stone on a commercial scale.

**Overall aim and specific objectives**

A study of native decorative stone in Victorian Ireland (1837-1901), this research ultimately seeks to develop a holistic interpretation of its extraction, fabrication and utilisation. The relationship between geology and the built environment will be explored with the purpose of revealing the richness and particularity of Ireland’s decorative stone deposits and their capacity as economic assets. The socio-economic, political, cultural and architectural reasons for the development of the decorative stone industry will be examined. The diversity of Irish decorative stone extraction will be investigated in relation to both stone type and geographic location, and the precise timing of its commercial establishment and expansion will be determined. Fabrication and utilisation of native decorative stone during the nineteenth century will also be considered. The key figures involved in promoting, quarrying, working, and employing the stone will be identified and discussed. Finally, the ultimate demise of the industry will be briefly looked at. The scope of this study confines the discussion of Irish decorative stone and its extraction to limestones and

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marbles. Although when considering fabrication processes the native rock types are extended to include decorative granites, quarrying of granites is not dealt with in any great detail in this thesis.

Central inquiries within each chapter
Chapter 1 investigates the impetus to widespread industrialisation of the Irish decorative stone industry in Ireland:

- Was the growth of the extractive decorative stone industry in nineteenth century Ireland a consequence of uncoordinated events or did the work of a network of individuals and institutions drive it?
- Did the development of decorative stone quarries and marble mills happen in response to increasing economic prosperity?
- How did the expansion of transport systems in Victorian Ireland influence the decorative stone industry?
- How influential were the trade exhibitions of the mid-1800s in Ireland and London in promoting and internationalising Irish decorative stone?

Chapter 2 examines the initial commercialisation of Irish decorative stone quarries:

- Was the early exploitation of Irish decorative stone conducted in a logical scientific way or was it intermittent and rather random?
- At what point did commercialisation of Irish decorative stone extraction take place; in what regions did it occur; and who were the main players involved?
- What native stone types were first commercialised for decorative use and what were the geological processes that produced them?

Chapter 3 analyses the expansion and diversification of decorative stone extraction in Victorian Ireland:

- Was commercial quarrying successful in all areas in Ireland where decorative stone was extracted during Victorian times? If not, where and why was this so?
- In what regions did the expansion of decorative stone quarrying occur; can specific quarry locations be identified?
- Who were the key figures involved in the development of decorative stone extraction in Victorian Ireland?
- How unique and varied was Ireland’s suite of polychromatic decorative stones and what were the geological processes that produced them?

Chapter 4 explores marble fabrication in Victorian Ireland:

- In what ways were marble fabrication processes advanced and mechanised during the Victorian period in Ireland?
- How did Victorian marble works in Ireland compare with those in London?
- Where were the principal marble works situated in Ireland and who operated them?
- Was there a connection between decorative stone quarries and marble works?
• What were the main stone types worked in Irish marble mills and what types of articles were fabricated using them?
• Was there a preference for the use of native stone over imported stone?
• Was marble fabrication a successful industry in Victorian Ireland?

Chapter 5 looks at the Museum Building of Trinity College Dublin as an example of a mid-nineteenth century building in which native structural polychromy was employed to spectacular effect:

• What is the provenance of the stone utilised in the Museum Building?
• How important was the promotion of Irish elements in the Museum Building?
• Who procured the decorative stone for the Museum Building?
• How influential was the Museum Building in defining later tastes - were subsequent architects committed to using native stone in their designs?

Methodology
This research is intended to be an interdisciplinary approach to understanding the decorative stone industry in Victorian Ireland. Methodology primarily consisted of historical research with scientific considerations, allied with quarry visits and site visits.

Initial research explored secondary literature relating to Irish decorative stone, its extraction, fabrication and utilisation in architecture, specifically within the Victorian period. Secondary literature on the geological processes that produced the stone was also consulted. Relevant primary sources were subsequently identified and examined. These included geological, architectural and government record archives; pioneering Victorian books and journal articles by George Wilkinson, Sir Robert Kane, George Henry Kinahan, John Watson and others, which first documented the decorative stone of Ireland; Victorian building journals; newspaper archives; quantity surveying papers; building manuscripts; letters; photographs, drawings; memoirs of the Geological Survey of Ireland and Ordnance Survey Ireland; Board of Works minute books; etc. The findings were evaluated within the temporal scope of the Victorian period (with brief divergences outside of this timeframe for the purpose of providing context in certain scenarios) regarding their relevance and contribution to developing the understanding of the Irish decorative stone industry.

This historical research was supplemented with site visits and minor scientific analysis. Visits to several nineteenth century buildings throughout Ireland containing native polychrome decorative stone were undertaken to ascertain stone types. By using the built environment as an urban laboratory of Victorian decorative stone linkages to quarries and marble works were revealed. Where possible site visits to historical quarries were also undertaken to confirm locations and collect rock samples, which were cut and polished to reveal decorative surfaces. Comparison of these polished specimens to decorative stone in buildings often verified provenance. Thin
sections of a selection of the decorative stone utilised in the Museum Building were prepared and petrographic descriptions were produced. Personal communication with proprietors of former decorative stone quarry sites provided some useful information on ownership, excavation methods and application of the stone. Visits to modern decorative stone quarries and marble works in Kilkenny and Connemara provided an authentic insight into extraction and fabrication processes.
CHAPTER 1. THE IMPETUS TO WIDESPREAD INDUSTRIALISATION OF THE DECORATIVE STONE TRADE IN VICTORIAN IRELAND

Ireland hosts rich and diverse deposits of decorative stone, which have long been extracted and utilised for ornamentation and monuments, however it was not until the Victorian period (1837-1901) that this activity experienced industrialisation and considerable expansion. The Victorian momentum for the acquisition of information endowed the people of Ireland with a knowledge of native geology, which propelled adventurous landowners and entrepreneurs to pursue mineral and stone exploitation, inclusive of decorative stone. The commercialisation of indigenous decorative stone quarrying, the development of marble mills and cultivation of artisan craftsmanship early in the 1800s was further accelerated by post-famine industrial drive.

This chapter aims to determine the impetus to widespread industrialisation of decorative stone, as well as identify the key figures who encouraged it. Initiatives, including countrywide mapping by Ordnance Survey Ireland (hereafter OSI) and the Geological Survey of Ireland (hereafter the GSI), the advent of industrial education, advancements in transport and infrastructure and the promotion of industry at trade exhibitions, will be assessed and discussed in relation to their impact on the development of the decorative stone industry in nineteenth century Ireland.

An interdisciplinary approach in Victorian Ireland

Modern academia separates and alienates humanist and scientific disciplines, a practice that differs from the fruitful transdisciplinary world of Victorian Ireland. In 1845 George Wilkinson (1814-1890), architect to the Poor Law Commissioners in Ireland from 1839 until 1855 and author of *Practical Geology and Ancient Architecture of Ireland*, wrote eloquently of the relationship between geology and architecture, “The science of architecture... may be considered as combining with appropriate design the conversion and fit application of the solid materials which compose and cover the surface of the globe... This science, therefore, of all others, especially requires an acquaintance with geological phenomena and a knowledge of the various products of the simple inorganic masses of rocks... These are the materials which the architect has to employ, and in which... he has to embody his ideas”.

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3 The Victorian period refers to the time of Queen Victoria’s reign in the United Kingdom, from 20 June 1837 until her death on 22 January 1901.
4 Chapters 2 and 3 of this thesis provide an in depth account of the establishment and expansion of decorative stone quarrying during the Victorian period.
5 [https://www.dia.ie/architects/view/4918/Wilkinson-George](https://www.dia.ie/architects/view/4918/Wilkinson-George) [accessed 10 June 2021].
Prominent and pioneering Victorian polymaths endorsed the vital links between geology and architecture. John Ruskin (1819-1900), prior to his involvement in architecture and aesthetics, yearned to be a geologist. He studied geology and assembled an extensive mineral collection, which he publically displayed and used for teaching design aesthetics, architecture and geology. Throughout his teachings Ruskin established essential connections between art, architecture, philosophy and geology and endorsed the use of building materials derived from nature. In *The Stones of Venice* he emphasised the importance of geological understanding for architecture. He also praised the effects of weathering in allowing a building to develop within a landscape. A contemporary “master-mason”, Charles Harriot Smith (1792-1864), pioneered a geological approach towards architecture in England. A central figure in the commission to select stone for the new houses of parliament at Westminster following its destruction by fire in 1834, he tested the potential resilience and qualities for carving of each candidate stone for the new parliament and later published accounts on the chemical and physical characteristics of building stones, leading the way for Wilkinson’s later experimental analysis of the structural viability and suitability for building of various rock types from Ireland. Wilkinson urged architects to understand the origin and structure of building stone and promoted the use of natural building stone in Ireland and abroad.

As well as Wilkinson, the Dublin-born chemist and educationalist, Sir Robert Kane (1809-1890), was a key promoter of the Irish extractive industry through his seminal book *Industrial Resources of Ireland* and his directorship of the highly influential Museum of Economic Geology (later to become the Museum of Irish Industry) in Dublin, established in 1845. Later in the nineteenth century, a third influential figure in the promotion of stone was George Henry Kinahan (1829-1908). A geologist at the GSI, an archaeologist and a natural historian, Kinahan mapped the geology of much of the west of Ireland during the first national geological survey and extensively documented Irish building stone and associated quarries, which he published in his influential work *Economic Geology of Ireland* in parts of the Journal of the Royal Geological Society of Ireland between 1885 and 1889. The synergetic approach of these men, amongst many others, is reflected in the commercialisation of Irish decorative stone during the Victorian period and the

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10 Robert Kane, *The Industrial Resources of Ireland* (Dublin: Hodges and Smith, 1844).
construction of the Museum Building at Trinity College Dublin in 1853 and other buildings that followed.

Establishment of Ordnance Survey Ireland and the Geological Survey of Ireland

Ordnance Survey geological mapping

OSI was formed in 1824 under the direction of Lieutenant Colonel Thomas Frederick Colby\(^\text{12}\) and topographical mapping of the entire country at a scale of six inches to the mile took place between 1829 and 1846. Memoirs chronicling the topography, antiquity and valuation of each district were planned to accompany the maps. The first memoir of the parish of Templemore, Co. Derry was long and comprehensive and included descriptions of various fossils and lithographs drawn by George du Noyer who later worked with the GSI\(^\text{13}\). A member of the Geological Society of London, founded in 1807, Colby recognised the economic advantage of conducting simultaneous geological and topographical surveys of Ireland. At the end of 1826 he appointed Captain John Pringle\(^\text{14}\) to manage the geological survey, which was being largely undertaken by the Royal Engineers\(^\text{15}\), however, advancement was limited due to lack of enthusiasm and inadequate formal geological training and in 1828 activity was suspended. An official geological branch was established in 1832 under the management of Captain Joseph Ellison Portlock and in 1837 he opened an office, museum and soil laboratory in Belfast. Unfortunately, this second geological pursuit within OSI was also short-lived and financial difficulties resulted in its closure at the beginning of 1840. This was not helped by Portlock expending time and considerable expense on his Londonderry volume, which appeared in 1843\(^\text{16}\). It was not until the passing of the Geological Survey Act in 1845 that the Irish geological survey was formally sanctioned and geological mapping became independent of the military\(^\text{17}\).

\(^{12}\) OSI was initially formed as part of the Department of Defence and only military staff were employed until the 1970s when the first civilian workers were integrated. [https://www.osi.ie/about/history/](https://www.osi.ie/about/history/) [accessed 16 June 2021].


\(^{17}\) Bate, “Sir Henry Thomas De La Beche and the Founding of the British Geological Survey.”
Griffith’s parallel geological mapping

At much the same time Richard John Griffith (1784-1878), best remembered for his full-scale valuation of property in Ireland between 1847 and 1864, also compiled a geological map of Ireland, much of the data for which was collected by his surveyors unbeknownst to the authorities paying for the valuation. Griffith, a mining engineer and Professor of Geology at the Royal Dublin Society (hereafter RDS) between 1812 and 1829, commenced mapping in 1810 and compiled many geological sheets about which he presented lectures to the RDS, the Geological Society of Dublin (of which he served as president on several occasions) and the British Association for the Advancement of Science prior to the first publication of the quarter inch map by the Railway Commissioners Ireland (of which he was a member) in 1839. The map, widely known as “Griffith’s Map” or “the Railway Map” underwent several revisions until 1855 when it assumed its final edition. Griffith’s Map was the first accurate geological map that covered the whole of Ireland, akin to William Smith’s map of England and Wales (1815) and John MacCulloch’s map of Scotland (1836), however he remained sceptical of the GSI and doubted their capability to compile maps of equal standard to his own.

Geological Survey mapping

Henry De la Beche (1796-1855) founded the Geological Survey of Great Britain in 1835. De la Beche became a member of the Geological Society of London in 1817 and in the following years he conducted methodical geological mapping of parts of Pembrokeshire, Cornwall, Somerset, Devonshire and Dorset using the one inch Ordnance Survey map of England as a base, as well as the island of Jamaica where he had inherited family estates. In 1832 he presented a selection of the sheets to the Master General of the Board of Ordnance and requested a sum of £300 to supply an accurate, properly coloured map format of the geological structures and formations of Devonshire and portions of the adjoining counties. The Board forwarded his proposal to Colby, [accessed 18 June 2021].

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who was already attempting to add geological content to the OSI maps, and he accepted it subject to certain conditions.23

By 1835 De la Beche had completed a geological map of Devonshire, which the Geological Society of London praised and recommended his services be extended to the rest of England. Ergo, the Ordnance Geological Survey, an auxiliary branch of the Board of Ordnance, was set up under the superintendence of Colby, involving De la Beche and other geological assistants. In the same year De la Beche secured funding from the Board of Works to set up a Museum of Economic Geology. In 1837 Lord Duncannon, Chief Commissioner of Woods and Forests, designated no. 6, Craig’s Court, Whitehall, London, to the museum, which opened its doors to the public in 1841. An important early donation to the museum was a selection of proposed building stones for the new Houses of Parliament.24 The Geological Survey Act of 1845 provided a legal framework designed “to facilitate the completion of a geological survey of Great Britain and Ireland”. The Geological Survey of Great Britain and Ireland, now under the command of De la Beche, was transferred from the Board of Ordnance to the Office of Woods, Forests, Land Revenues, Works and Buildings and geological officers were no longer required to wear military-style uniform;25 the office of the Irish Survey was initially located in the Custom House, Dublin,26 which also housed the Geological Society of Dublin and its small museum.27 In 1847 De la Beche’s standing in the geological community was confirmed when he was appointed president of the Geological Society of London, a post he held for two years, and in the following year he was knighted.28

“To secure uniformity and to afford the clearest insight into the comparative geology of the two countries” the Geological Survey of Ireland was incorporated into that of Great Britain and placed under the superintendence of Henry De la Beche as Director General, initially assisted by Captain Henry James, of the Royal Engineers, as Acting Director of the Irish branch.29 James was soon

23 Bate, “Sir Henry Thomas De La Beche and the Founding of the British Geological Survey.”
29 “Geological Survey of Ireland,” Dublin Evening Mail, March 21, 1843, 3; GSI, FS.2-1.01.001, Guard Books (incoming) 1844-1849, 29 March 1845, p. 11/1-11/5; GSI, FS.2-1.01.001, Guard Books (incoming) 1844-
replaced by Professor Thomas Oldham of Trinity College Dublin, as Local Director of the Irish Survey\textsuperscript{30} and Professor John Philips\textsuperscript{31} was appointed to examine fossil remains, while Professor Robert Kane became the assistant for chemistry and also assumed responsibility for the curation of a Museum of Economic Geology in Dublin, the same as that in London.\textsuperscript{32} For the first ten years of its existence the Irish branch of the Survey was worked by the director and three field surveyors; in 1854 the number of staff and their rate of pay increased.\textsuperscript{33} Formation of these institutions in Britain and Ireland activated systematic countrywide geological mapping of Ireland, the deposition of fossils, minerals and rocks in the Irish Museum of Economic Geology, and ultimately by 1890 the publication of 209 geological maps at a scale of one-inch-to-the-mile and accompanying explanatory memoirs that covered the whole of the island. This fundamental research led to the acquisition of in-depth knowledge regarding valuable natural commodities, including building and decorative stone.

\begin{flushright}
1849, 22 May 1845; GSI, FS.2-3.01.001, Letter Books (outgoing) 1844-1850, 22 May 1845, p. 64; GSI, FS.2-3.01.001, Letter Books (outgoing) 1844-1850, 24 May 1846, p. 69.
\end{flushright}


\textsuperscript{31} Phillips was the nephew of William Smith and had been appointed as the first chair of Geology at Trinity College in December 1843. He wished to hold this post concurrently with that of the Local Directorship but De la Beche was not keen to appoint him as this might have given Phillips too much influence in Ireland. Nevertheless, he maintained links with Ireland for a while through his palaeontological assessments. Ironically De la Beche did not object to appointing Oldham, Phillips' successor in the Trinity chair, to the Local Directorship. Gordon L. Davies, "The University of Dublin and Two Pioneers of English Geology," \textit{Hermathena} 109 (1969): 24–36; Patrick N. Wyse Jackson, \textit{In Marble Halls: Geology in Trinity College, Dublin} (Dublin: Department of Geology, Trinity College, 1994).

\textsuperscript{32} "Ordnance Memoir of Ireland;" "Geological Survey of Ireland," \textit{The Dublin Monitor}, May 7, 1845, 2; "Geological Survey of Ireland," \textit{Warder and Dublin Weekly Mail}, May 10, 1845, 5; GSI, FS.2-1.01.001, Guard Books (incoming) 1844-1849, 01 July 1846, p. 64; Jukes, \textit{Her Majesty's Geological Survey of the United Kingdom, and Its Connection with the Museum of Irish Industry in Dublin, and That of Practical Geology in London}.

For a detailed description of the mode of operation of the Irish Survey see Jukes, p. 10.

\textsuperscript{33} In 1854 the Irish branch of the Geological Survey consisted of the local director, five senior and two assistant geologists, two fossil collectors and one office messenger with a combined annual salary of £2750 plus £800 for expenses and travel. In April 1855 De la Beche died and the following month he was succeeded by Sir Roderick Impey Murchison, who directed that every one-inch sheet should be accompanied by a memoir. Jukes, \textit{Her Majesty's Geological Survey of the United Kingdom, and Its Connection with the Museum of Irish Industry in Dublin, and That of Practical Geology in London}; Herries-Davies, \textit{North from the Hook: 150 Years of the Geological Survey of Ireland}.
Robert Kane and the Museum of Irish Industry

“EDUCATION. – What sculpture is to a block of marble, education is to the human soul. The philosopher, the saint, and the hero – the wise, the good, or the great man is very often hid in a plebeian, which a proper education would have disinterred and brought to light”.  

The national school system in Ireland, founded in 1831, educated the growing manufacturing and artisan class. These newly educated men and women frequented public lectures and exhibitions for self-improvement and career progression and Kane’s Museum of Economic Geology was the foremost institute to serve their learning needs. Although early in 1845 the Board of Works declared the unavailability of any public building suitable to the purpose of a geological museum, by late 1846 Kane had obtained possession of a large, converted townhouse at 51 St Stephen’s Green; in addition to housing the geology collections, the offices of the Geological Survey were also moved from the Custom House to this building. At this point in time the people of Ireland needed knowledge regarding the industrial resources of the country and advice on how to capitalise on them. Rev. Samuel Haughton, Professor of Geology at Trinity College Dublin, despite holding the opinion that the RDS, which maintained its own collections, could fulfil many of the objectives outlined by the Irish Museum of Economic Geology (see below), acknowledged Kane as “the fittest person to undertake the office of guiding the industry in Ireland into new and profitable channels, to develop the resources of our infant industry, to free it from its swaddling clothes, to nurse it in its hour of weakness, and ultimately to conduct it in triumph to a successful and active completion with the industry of England and of Scotland”.

34 “Education,” Kings County Chronicle, January 24, 1849, 4.
36 NAI, I/1/2/8, Board of Works Letter Books, 29 March 1845, p. 72.
37 The building was originally the town residence of Lord Castlecoote and was afterwards occupied by Lord Chancellor Manners. “The University Magazine for This Month Contains.,” Limerick and Clare Examiner, May 5, 1849, 1.

Nonetheless, not everyone agreed with Haughton’s appraisal of Kane; perhaps publicised begrudgery was one of many factors impeding the growth of Ireland’s industrial resources. At the end of 1848 the Evening Packet wrote, “But this ‘Museum of Irish Industry in Dublin’, of which nine-tenths of our citizens never have even heard, smells so consumedly like a Job... Now, be it observed that the fortunate gentleman, Sir ROBERT KANE, who, as chemist and curator to this mysterious museum, receives 300l. per annum, enjoys the Presidency of the ‘Godless’ College, not yet built, at Cork, with a salary of 800l. yearly, and in addition
In July 1843, prior to the establishment of the Dublin Museum, questions were submitted to Kane, then Professor of Natural Philosophy to the RDS, from the Ordnance Survey Commission in London regarding the benefits of accessible mineral, stone and fossil collections to the public and establishing a Museum of Economic Geology in Dublin, similar to that in London. Kane responded, “A collection of fossils, and other objects of natural history illustrative of the local circumstances and structure of Ireland, would, in my opinion, be most valuable as a means of education and enjoyment to the people; and from the number of specimens collected in the [ordnance] survey, there might be established such museums in all the chief towns of Ireland... I attach the very highest importance to the establishment of a central museum of economic geology, on the plan of that in London. It is, as I have found in my own person, almost impossible to collect specimens of the various minerals and rocks capable of useful application, without a personal survey, the expense of which to an individual is of course prohibitory. The exhibition of these, in the forms best calculated to show their technical value, such as pillars, vases, &c., goes far beyond any private means”. For several years previous Kane had been anxious to form an Irish Technical Museum and devoted his free time and money to that venture, however he concluded that it could only be achieved by public means.40

Figure 1. Museum of Irish Industry, 51 St Stephen’s Green (1857).41

thereto is still, we believe, a Professor in the Royal Dublin Society, with an annual stipend of 150l. Add to these some hundreds paid to him for reporting on the potato disease, and we think we may congratulate Sir Robert on being a lucky, as he unquestionably is a learned, gifted, and indeed, in any sense of the word, an illustrious Irishman”. “More Jobbery,” Evening Packet, November 30, 1848, 2.

40 Report of the Commissioners Appointed to Inquire into the Facts Relating to the Ordnance Memoir of Ireland, Together with the Minutes of Evidence, Appendix, and Index. (London: William Clowes and Sons, 1844), Appendix No. 8, Questions submitted to Dr Kane and replies, p. 77-79.

The principal objectives of the Irish Museum of Economic Geology were: “to represent and exhibit the materials for agricultural, mining, and manufacturing industry, which Ireland contains, and to elucidate and expose the means by which those materials may be rendered available for the improvement of the country”; “to embrace a chemical department destined for carrying on such investigations as may extend our knowledge of the physical history and industrial capabilities of Ireland, and supply that analytical information, as to the nature of our soils, upon which sound agricultural improvement must be based”; and “to include a department of documents and records of an economic or descriptive character regarding the past history and present condition of our mining, manufacturing, and agricultural industry”.  

Both the Irish and British Museums of Economic Geology contained lecture theatres, exhibition galleries, offices for the geological surveyors and laboratories for chemical research. The first collections admitted to the Dublin museum were the geological, zoological and botanical specimens assembled under Captain Portlock by the subordinate geological unit of the Ordnance Survey. In 1847, under the instruction of Lord Morpeth (later the Earl of Carlisle), the then First Commissioner of Woods and Forest, the names of the Dublin and London Museums of Economic Geology were changed to the Museum of Irish Industry and the Museum of Practical Geology respectively.

In January 1847, the Dublin museum received 166 native building stones, assembled principally by the officers of the Royal Engineers in Ireland; some were procured by the assistants of the Geological Survey of Ireland. In June 1847 Kane issued a circular in newspapers and journals, such as Bell's *Weekly Messenger* and *Freeman's Journal*, announcing the Museum of Irish Industry.

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44 164 cubes, six inches on the side and prepared and tooled according to forms issued from the Museum of Economic Geology, and accompanying information regarding each specimen, were transferred to Kane by Oldham in late December 1846; two additional specimens were forwarded in early January 1847. Duplicates of the building stones of Ireland were sent to the London Museum of Economic Geology. GSI, FS.2-1.01.001, Guard Books (incoming) 1844-1849, 18 July 1845, p. 59; GSI, FS.2-1.01.001, Guard Books (incoming) 1844-1849, 22 July 1845, p. 60; NAI, I/1/2/8, Board of Works Letter Books, 23 July 1845, p. 124; GSI, FS.2-3.01.001, Letter Books (outgoing) 1844-1850, 26 December 1846, p. 192; GSI, FS.2-3.01.001, Letter Books (outgoing) 1844-1850, 31 December 1846, p. 194; GSI, FS.2-3.01.001, Letter Books (outgoing) 1844-1850, 07 January 1847, p. 193; GSI, FS.2-3.01.001, Letter Books (outgoing) 1844-1850, 17 January 1847, p. 198; Report of Robert Kane, Director, Museum of Economic Geology, 23 March 1847. *Estimates, &c. Miscellaneous Services; for the year ending 31 March 1848. Public Education, Science and Art, House of Commons Parliament Papers* (1847), p. 24.
and inviting donations. In 1848 the Irish building stone collection was augmented by Wilkinson’s donation of an additional 202 specimens, a collection that remained following his testing of their strength and other practical qualities. In furthering his aims Wilkinson also donated a suite of building stone specimens to the Museum of the Geological Society of Dublin, which eventually was merged with that of Trinity College Dublin; the whereabouts of his specimens remain unknown. Additionally, by the direction of the Chief Commissioner, the Director of the Museum of Economic Geology in London donated ninety seven duplicate samples of English building stones that the commissioners had examined when assessing stone for the new Houses of Parliament in London. Kane continued to accrue building stone specimens for the museum through the Board of Works; in 1849 he produced a diagram of a building stone and an accompanying table headed with the information sought in relation to each specimen (figures 2 and 3), which the Board forwarded to their contractors requesting samples of building stone used in their current projects in accordance with the diagram to be sent directly to Kane.

47 Wilkinson, Practical Geology and Ancient Architecture of Ireland, p. 345.
49 Report of Robert Kane, Director, Museum of Economic Geology, 09 March 1848, p. 30.
50 Contractors in receipt of the request for building stone specimens included Deane (Sir Thomas), Cork College; Hague, Omagh Lunatic Asylum; Gregg, Queen’s College Belfast; Brady, Queen’s College Galway; Deane (Alexander), Lunatic Asylum Cork; and Caldwell, Lunatic Asylum Sligo. NAI, I/1/2/8, Board of Works Letter Books, 06 March 1849, p. 126.
51 NAI, I/1/2/8, Board of Works Letter Books, 06 March 1849, p. 126.
Figure 2. Diagram of building stone intended for the Museum of Irish Industry.\textsuperscript{52}

\textsuperscript{52} NAI, I/1/2/8, Board of Works Letter Books, 06 March 1849, p. 126.
By March 1848, Kane had plans to procure panels, pedestals and pilasters of Irish marbles and decorative limestones, deserving of public attention, for display in the entrance hall and cross gallery of the museum, though he noted that obtaining such a range of samples could take some time as not all were to be found in commerce. He presented to the Chief Commissioner plans and estimates for panelling the entrance hall with slabs of polished decorative stone, separated by ornamental stucco work, “in such manner as would fully bring out the ornamental uses of the marbles”. The early work of the GSI no doubt aiding Kane in his quest to gather diverse samples of Irish decorative stone (at least from the southern districts they had surveyed to that date), so that by March 1849 he was able to announce, “The collection of Irish marbles, for the fitting up of the entrance hall, is nearly completed” (figure 4). In January 1853 he confirmed receipt of four marble vases, one Seven Churches (Offaly) bust column, one green (Connemara) slab, one red (Cork) slab, and one mottled (Carlow) slab into the Museum, costing a total of £45. Kane was

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53 NAI, I/1/2/8, Board of Works Letter Books, 06 March 1849, p. 126.
54 Report of Robert Kane, Director, Museum of Economic Geology, 09 March 1848, p. 30; TNA, Works 16/183/2, 8992, n.d.
57 TNA, Works 6/183/2, 18311, 26 January 1853.
praised for his tasteful arrangement of the coloured stone, “that, whilst they are all in perfect harmony with one another they still preserve their individual characteristics; so that you can with facility judge the merit of each specimen separately, at the same time that coup d’oeil presents to the visitor the principal marbles of Ireland”.\textsuperscript{58} The entrance hall was “employed for illustrating the applications of Irish marbles to the purposes of decorative architecture”\textsuperscript{59} and a number was placed beneath each panel, which referred to a catalogue of detailed stone descriptions and localities from which they were obtained.\textsuperscript{60}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{image}
\caption{Entrance hall, no. 51 St. Stephen’s Green (former Museum of Irish Industry).}
\end{figure}

While Kane was preparing the marble hall in Dublin, the Museum of Practical Geology in London, under the directorship of De la Beche and curatorship of Richard Phillips, was changing accommodation from Craig’s Court to Jermyn Street. The new building was erected in the Italian style by Mr. J. Pennethorne for the Office of Woods and Works, the Chief Commissioner at that

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\textsuperscript{59} General Descriptive Guide to the Museum of Irish Industry Dublin, p. 6.
\textsuperscript{60} “Museum of Irish Industry,” Sligo Champion, August 4, 1849, 4.
\end{flushleft}

The entrance hall of 51 St Stephen’s Green now contains an official notice documenting the provenance of all the stone panels. Limestones were sourced from counties Cork (Mitchelstown, Churchtown, Carrigaline, Doneraile, Monkstown and other unnamed red quarries), Kilkenny, Offaly (Clonmacnoise and Clonony), Limerick (Pallaskenry), Armagh and Galway while marbles came from Connemara (Clifden and Ballinahinch) and Antrim (Scaughthill). Further details and descriptions are given in Patrick N. Wyse Jackson and Louise Caulfield, The Building and Decorative Stones of Dublin: A Walking Guide, 2nd ed. (Dublin: Geological Survey of Ireland, in press) while images of the stone can be seen in Lincoln, Mansions, Museums and Commissioners.
time being the Earl of Lincoln. Intended as a didactic building, the very doorway gave a short lesson in the geology of England – “the steps at the entrance are of the red granite of Peterhead; at the door is a great slab of slate from the Penrhyln quarries of North Wales; the pavement and steps are of Portland stone; the base of the vestibule of Cornish granite, the upper portion of Derbyshire alabaster, and the pilasters of the gray granite of Peterhead”. Like the entrance hall of the Dublin Museum, the new London Museum contained a ground floor apartment, also referred to as the marble hall, which displayed panels, pilasters, columns and other ornamental features of English and Irish polished stone to promote their use in decoration.

It is documented that William Manderson of the Killaloe Marble Works in Co. Clare provided the Museum of Practical Geology with a frame containing eight polished slabs of Irish decorative stone, a large tazza of Ballinahinch (Connemara) marble (figure 5), and pilasters of Ballinahinch marble and Clonony and Mitchelstown limestones; it is likely that Manderson prepared the majority of the Irish decorative stone for the London Museum. Manderson wrote to De la Beche on 01 August 1848 regarding a delay in the dispatch of the pilasters for the Museum, the reason owing to difficulties in obtaining Connemara marble for the green pilasters due to “the great danger affecting the coast where the green marble is got”. This is an interesting insight into some of the adversities Manderson, and no doubt other marble workers, experienced in trying to ship raw and worked stone. Although there is no documentation confirming the marble works in which the panels for the Museum of Irish Industry were fabricated, it is probable that Manderson,
given his involvement in the provision of decorative stone for the Museum of Practical Geology in London, prepared some, if not all, of them.\textsuperscript{67}

Figure 5. Tazza of Connemara marble fabricated by William Manderson of the Killaloe Marble Works in 1850 for the Museum of Practical Geology in London. This piece is now situated in the old geological museum entrance hall of the Natural History Museum in London.

In May 1851, the year of the Great Exhibition in London, the Museum of Practical Geology was formally opened by Prince Albert in London who declared, “I rejoice in the proof thus afforded of the general and still increasing interest taken in scientific pursuits; while science herself, by the subdivision into the various and distinct fields of her study, aims daily more and more at the attainment of useful and practical results. In this view it is impossible to estimate too highly the advantages to be derived from an institution like this, intended to direct the researches of science and to apply their results to the development of the immense mineral riches... It will always give me the greatest pleasure to hear of, and, as far as I am able, to contribute to, the continued success of the Museum of Practical Geology”.\textsuperscript{68} Kane’s hall of indigenous marbles was unveiled two years later in time for the 1853 Great Industrial Exhibition in Dublin.\textsuperscript{69}

\textsuperscript{67} All of the marble panels exhibit the same bevelled edge and finish, which would suggest that they were fabricated in the same marble works.


\textsuperscript{69} The establishment of museums in England and Ireland prompted the Scottish media to point out the benefits of an industrial museum to the people of Scotland. The Industrial Museum of Scotland, initially housed in temporary buildings in Edinburgh, was founded in 1854. Renamed the Edinburgh Museum of Science and Art, it opened in its first customised buildings in Chambers St. in 1866. “More Arguments For A National Museum,” \textit{The Scotsman}, June 15, 1850, 2; “Tenth Report of the Science and Art Department of the Committee of Council on Education” (London: George E. Eyre and William Spottiswoode, 1863);
In August 1853, the *Cork Examiner* described the Museum of Irish Industry and its influence on the revival of the marble trade in Ireland, which by that time was “all but extinct”: “Simulated by the example of the hall of the Museum of Irish Industry, the Board of Works have directed the substitution of Irish for foreign marble in buildings erected under their charge. The architects of the new buildings to be erected in Trinity College propose to decorate the hall and staircase with Irish marbles; and the Royal Dublin Society have exerted themselves to provide for the Great Industrial Exhibition specimens of some of the same marbles which are in the Museum in Stephen’s-green...”

Mr John Radcliffe, Commissioner of the Board of Works, saw the polished limestones, referred to as “marbles”, from Mitchelstown, Fermoy and the vicinity of Cork for the first time in the Museum of Irish Industry and insisted that all proposed foreign marble chimneypieces for the Cork Lunatic Asylum (1847-52) be replaced with Cork limestone.

Connemara marble was considered for the chimneypieces, but deemed “expensive and not suited”; instead limestone procured at Mitchelstown and fabricated and polished at Manderson’s Marble Works at Killaloe was employed. “Ballintemple marble” was designated for use in the bedrooms. Evidently Manderson was the approved supplier of decorative stone for public works during the mid-nineteenth century and he valiantly welcomed the task of fabricating uncharted native stone; he went on to supply large structural columns of native limestone and marble to the Museum Building of Trinity College Dublin in 1853.

In the Dublin Museum visitors progressed from the marble hall to the lower cross-gallery, which housed the building stone collections, illustrative of structure, behaviour, and workability (figure


72 John Francis Maguire, *The Industrial Movement in Ireland, as Illustrated by the National Exhibition of 1852* (Cork: John O’Brien, 1853).

73 NAI, I/1/2/12, Board of Works General Letter Books (main series), 20 March 1851.

74 Ballintemple marble was better known as “Beaumont dove limestone” in the stone trade. It was extracted from Beaumont quarry in Cork city until the 1830s; the present site is a nature reserve. It is a pale grey, close grained, compact, easily worked limestone that was extensively used as a building stone and to a lesser extent as a marble. Wilkinson, *Practical Geology and Ancient Architecture of Ireland*, p. 178; Kinahan, *Economic Geology of Ireland*, p. 168.

75 NAI, I/1/2/12, Board of Works General Letter Books (main series), 25 April 1851.

76 See Chapter 5 of this thesis for further details on Manderson’s involvement with the Museum Building.

77 The lower cross gallery was “devoted to collections illustrative of materials used in the arts of construction, such as the building stones of Ireland and England, flags, slates, cements, marbles, porphyries, serpentines, &c.”. Some materials of this class that were too large for the gallery were displayed near the staircase at the end of the lower south gallery; a block and a slab of white marble from Dunlewey, Co. Donegal, was situated beside the door of the physical preparation room.
3). The adjoining doorcase was enclosed by pilasters and panels of Carlow and Kilkenny limestones, again displaying the practical application of native materials in internal decoration. Among Kane’s primary objectives in founding the Museum was to “exhibit what we have done, and are doing, so as to register and establish the merit of our success as well as to point out our ignorance or our indifference to the abundant means of far more extended and varied industry which nature has endowed us with”. This intention was evident in the instructive collections of indigenous stone, as well as other commercially viable natural assets such as mineral specimens, textiles, wool, sea-weed etc., which informed and propelled resource exploitation in Victorian Ireland. Referred to as “The Working Man’s College”, the Museum of Irish Industry offered courses in geology, botany, chemistry and physics, however the scope and approach of the scientific lectures were essentially practical and focused primarily on industrial application. Examinations were held at the end of each course and “An Industrial Degree” was granted, thus empowering “the manufacturer, the artisan, and the mechanic” to pursue industrial advancement.

Subsequent development of institutions such as universities, geological and local societies, the British Association for the Advancement of Science, the Royal Irish Academy and the RDS, together with advances in publishing led to widespread appreciation of geology among many classes of society and no doubt aided the development of the decorative stone industry. Eventually control of the Museum of Irish Industry was wrested from Kane and its functions taken over by the RDS in the form of the National Museum of Ireland. For some time the GSI occupied St Stephen’s Green, but later moved around the corner to Hume Street.

In the lower cross gallery Cases A contained building stones of Ireland, mechanically tested collection; Cases B contained building stones of England, duplicates of the collection made to determine the best materials for the Houses of Parliament in London; Cases C and D contained building stones of Ireland, topographical collection. General Descriptive Guide to the Museum of Irish Industry Dublin, p. 6, 17, 113.

81 Cullen, “The Museum of Irish Industry, Robert Kane and Education for All in the Dublin of the 1850s and 1860s.”
Figure 6. Plan of the offices and lower galleries of the Museum of Irish Industry (1857).[^83]

Post famine industrialisation

Post famine Ireland experienced a degree of prosperity and industrialisation, much of which was driven by government incentives, such as the GSI and OSI, and by investment of private financiers hoping to make good returns on their funding. Mechanisation of processes within industries, including farming, quarrying and stone working, as well as academic interest in geology, played a part in the evolution of the stone industry, however the development of transport networks and the initiation of industrial exhibitions were fundamental in its advancement.

Transportation

“Rivers, lakes, and inland seas are the first natural highways of commerce and intercourse between peoples, and, as everyone knows, they play a most important role in the earlier stages of civilisation. Roads and canals followed as the first artificial highways, and, finally, with the application of steam power came the railroad and the steamship”. Despite the laying out of an extensive railway system in Ireland during the Victorian period, water carriage remained the most popular method for stone transportation. The concept of inland water navigation was first considered in 1664 by the Duke of Ormond who appealed to a Council of Trade regarding “making of rivers navigable”. His request was dismissed and despite the subject being put before parliament on several occasions during the early 1700s it was not until 1751 that the Board of Inland Navigation was formed to develop the waterways. In 1756 the construction of the Grand Canal, which connected Dublin city to the River Shannon, was commenced. The inland waterways were constructed and maintained throughout the nineteenth and early twentieth century and provided a vital system of arterial trade routes throughout the country. By the beginning of the twentieth century Ireland’s inland waterways

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84 Chapter 4 of this thesis discusses the mechanisation of marble fabrication in Victorian Ireland.
88 Below are the principal waterways in each county in Leinster as listed in Slater’s Directory in 1846. Carlow: The Barrow and the Slaney rivers with chief tributaries, the Deereen and the Burren respectively. Dublin: The River Liffey, the Grand Canal and the Royal Canal. Kildare: The Liffey, the Barrow and the Boyne with the Feagle, the Blackwood, the Finnery, the Griese and the Leer tributaries. The Grand Canal and the Royal Canal. Kilkenny: The Nore, the Suir and the Barrow rivers, all of which are navigable. Offaly: The Shannon, which connects northward with the great lakes and southward with Limerick and the sea, and the Grand Canal. Longford: The Camlin, the Kenagh, the Inny and the Shannon rivers and the Royal Canal. Louth: The Flurry, the Stranarn, the Culy, the Creaghan, the Fane, the Lagan, the Glyde, the Dee, and the Boyne rivers. Meath: The Boyne and Blackwater rivers. Laois: The Barrow and the Nore rivers and the Mountmellick and Athy branches of the Grand Canal. Westmeath: The Brosna and the Inny rivers. Wexford: The Barrow and the New Ross rivers. Wicklow: The Slaney, the Avoca, the Vartrey, the Liffey and the Derry or Aughrim rivers.
network consisted of the Grand Canal, the Royal Canal, the Lagan Navigation, the Upper and Lower Bann Navigations, the Ulster Canal, the Ballinamore and Ballyconnell Canal, the Shannon Navigation, the Barrow Navigation, the Newry Navigation, the Tyrone Navigation, the Boyne Navigation, Lough Corrib Navigation, and the Maigue Navigation. Coastal counties also benefited from the option of sea transportation.

Commencement of the railway system in Ireland occurred in 1833 with the construction of the Dublin-Kingstown (Dun Laoghaire) railway. The initial plan for the line was prepared by Scottish engineer, Alexander Nimmo, who was responsible for building roads, bridges and harbours in Connemara, but upon his death in 1832 Charles Blacker Vignoles was appointed. William Dargan, regarded as the father of the Irish railways, was the selected contractor for the project and he occupied a prominent position in the expansion of the railways across Ireland. Dargan was not only a pioneer in the Irish railway movement but also in the social and industrial advancement of the country. Development of the rail network “required a surpassing degree of enterprise” as the challenges of contending with untrained workmen and scanty data for calculations were sufficient “to discourage the most adventurous”. However, wherever Dargan’s operations extended a change manifested in the workers and their character was elevated; there was “a consciousness that they would be dealt with firmly as well as kindly”. Liberal wages, prompt payments and honourable dealings attracted labourers and prevented resistance to the authority required to carry the projects to fruition. Dargan was responsible for the construction of the majority of Irish railways, including the Ulster, the Dublin and Drogheda, the Great Southern and Western and the Midland Great Western lines.

Although the railway system in nineteenth century Ireland undoubtedly aided industrial advancement, high tariffs are alleged to have contributed significantly to the underdevelopment


Further information about Ireland’s waterways is available on https://www.waterwaysireland.org/ [accessed 13 July 2021].

A contemporary history of inland navigation in Victorian Ireland can be found in IRELAND Industrial and Agricultural, p. 104-119.

Michael Barry, Tales of the Permanent Way (Dublin: Andalus Press, 2009).

Experienced in road and canal building, Dargan was also responsible for the construction of Holyhead road and the Ulster Canal early in the nineteenth century. John Sproule, ed., The Irish Industrial Exhibition of 1853: A Detailed Catalogue of Its Contents (Dublin: James McGlashan, 1854); Barry, Tales of the Permanent Way.


By the middle of the nineteenth century Dargan had only two or three competitors. The only important railways that he was not involved in were the Londonderry-Enniskillen and Londonderry-Coleraine lines, which were constructed by William McCormick, another Irish contractor who mainly worked on English projects. Sproule.
of the Irish stone trade. Indeed, disdain for Irish materials and Irish manufactures also had an impact. Architect, Thomas Newenham Deane, stated when erecting the Museum of Science and Art and the National Library, “I am using the Mount Charles stone for all dressings and finer portions of the stone-cutting. It is a stone far more beautiful than Portland, quite as capable of being cut into any moulding, and if used in London would be found to defy all attacks of climate. It has the further advantage of being quarried near the sea and of being independent of railway rates”. During the development of the railways a vital mistake was made in that the canal systems, which could transport goods at a more economical rate, were not maintained as independent competitive routes; many of the canals of the United Kingdom passed unconditionally into the hands of the railway companies. This meant that the railways only had to gain control of a section of a navigation, consisting of one or more waterways, to interfere with competition along its entire length. A series of acts were passed in the latter portion of the nineteenth century to secure free development of the inland waterways, however it was too late and by 1888 one-third of the total canal mileage of the United Kingdom belonged to the railway companies. Throughout the nineteenth century bulky raw materials, including stone, constituted the larger share of canal freight. However, in the absence of affordable water transport railway freights were often disproportionate to the value of the products, thus rendering profitable industry impossible.

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95 For information on Thomas Newenham Deane see [https://www.dia.ie/architects/view/1429/DEANE-THOMASNEWENHAM%28SIR%29](https://www.dia.ie/architects/view/1429/DEANE-THOMASNEWENHAM%28SIR%29) [accessed 13 July 2021].

96 For architectural information on the building see [https://www.dia.ie/works/view/56981/building/CO.+DUBLIN%2C+DUBLIN%2C+KILDARE+STREET%2C+NA TIONAL+MUSEUM](https://www.dia.ie/works/view/56981/building/CO.+DUBLIN%2C+DUBLIN%2C+KILDARE+STREET%2C+NATION+MUSEUM) [accessed 13 July 2021].

97 Some of the Mount Charles sandstone was later replaced with Ardbraccan limestone due to decay.

98 Dennis, *Industrial Ireland: A Practical and Non-Political View of “Ireland for the Irish”*, p. 83.

99 The main reasons that rendered transport by canal cheaper than transport by rail were: In canal transport there is no item of cost corresponding to the wear and tear of rails, sleepers, and fittings, or to the replacement and maintenance of permanent way. In canal transport a corresponding saving is made in the repairs of vehicles and locomotives, due to the damage caused by the reaction of the rigid way. The maintenance of the works on the canal is on average much less costly than the corresponding outlay on a railway (at the turn of the twentieth century the average cost of the railways of England and Wales was £46000 per mile while that of the canals was not more than £3350 per mile). Traction on the railways in the United Kingdom costed 16 percent of the expenditure; it was half that figure on the canals. The item of traffic expenses, which forms 30 percent of railway expenditure on railways, was much lighter on canals. The items of duty and general expenses, which amounted to 15 percent of the English expenditure on railways, were equally proportionate to the English canals. There was an overall economy of 64.7 percent by canal in comparison to rail transport. Department of Agriculture and Technical Instruction for Ireland, *IRELAND Industrial and Agricultural*, p. 96, 97.

100 Department of Agriculture and Technical Instruction for Ireland.
Furthermore, in many remote parts of Ireland road transportation was chosen over available rail carriage, notwithstanding that railway lines, working at 10 percent capacity, ran parallel to the roads. In all other countries the locomotive had replaced road transport, but in Ireland a short-sighted policy of earning a secure dividend with heavy rates rather than developing traffic by implementing the very lowest rates consistent with reasonable expectations prevented this from occurring. “Through rates” meant an unfair advantage was given to goods from other countries; the Irish railway companies were obliged to carry English goods from the Irish port of arrival into the interior at a much lower rate than they charge for goods which do not come “through”. In some cases this resulted in carriage from England and Europe to an inland Irish town being cheaper than that to the same town from Irish ports through which the foreign goods passed en route. “By the operation of this arrangement, the London, or Birmingham, or Manchester manufacturer is enabled to beat the Dublin, Belfast, or Cork manufacturer in all the markets in Ireland”.101 See Appendix 1 for maps showing locations of railway networks (Victorian) in relation to decorative stone quarries.

Industrial Exhibitions

“It was emulation that, through the rivalry of public display, drew forth the genius of the susceptible Greek; that inspired the soul of the poet; that imparted fire and pathos to the pen of the dramatist and the historian; that dipped the pencil of the painter in the hues of life, and light, and beauty; that guided the chisel of the sculptor, as, from the rude lumpish block of marble, he created types of human loveliness and grandeur, which have survived the crash and ruin of empires and of nations, and are to this day sources of inspiration to the artist, delight to the scholar, and refinement to all”.102

In the wider context of natural resource capitalisation in nineteenth-century Ireland stone extraction was a minor subsidiary, with mineral mining of copper and lead at the forefront of the extractive industry.103 The contents of Kane’s Museum of Irish Industry also reflected this imbalance. Nevertheless, mineral specimens juxtaposed with building stone represented Ireland’s geological commodities at the industrial exhibitions of the 1850s and elevated the Irish decorative stone industry throughout Ireland and Britain. It must be mentioned that prior to the large international trade shows of the mid-nineteenth century the RDS, founded in 1731, organised and hosted well attended industrial exhibitions on their premises.104 In 1833 a committee was

101 Dennis, Industrial Ireland: A Practical and Non-Political View of “Ireland for the Irish”, p. 183, 184.
102 Maguire, The Industrial Movement in Ireland, as Illustrated by the National Exhibition of 1852, p. 8.
104 The Illustrated Record and Descriptive Catalogue of the Dublin International Exhibition of 1865 (London and Dublin: E. and F.N. Spon and John Falconer, 1866).
appointed to organise exhibitions of commodities and manufactured products of Ireland.\footnote{105} Between 1834 and 1847 exclusively Irish manufactures, including Irish marbles,\footnote{106} were exhibited until 1850 when the council decided to hold an international exhibition, the first of its kind in the United Kingdom. Until then “the exclusion of foreign products was one of the leading principles adopted”, however the introduction of international goods meant “Irish exhibitors were made sensible of their progress and strength by the warm commendations of their competitors”.\footnote{107} This aspect of the RDS’s activity was significant in that it may well have been the catalyst for the Great Exhibition of 1851.

The Great Exhibition was held in the specifically built Crystal Palace at Hyde Park in London and overseen by a Royal Commission. Prince Albert announced that the intention was “to give a true test and a living picture of the point of development at which the whole of mankind had arrived in this great task, and a new starting point from which all nations will be able to direct their future exertions”.\footnote{108} In an exhibition supplement the \textit{Illustrated London News} forecasted Ireland’s failure at the exhibition, stating, “We do not expect much success from Ireland in the Exhibition… she cannot exhibit what she does not produce. From so many of her landed proprietors, too, residing abroad, there is no market for the product of many arts, and in Ireland they are not called into existence. For all the talents that should be engaged in them, England is the market; and the arts in England are accordingly enriched by the genius and skill of the Irish. They must be judged by their works in England, rather than by their works at home”.\footnote{109} It was the determination of Robert Kane and others that would change this pessimistic attitude towards Ireland’s manufactory. Furthermore, the Roman Catholic Relief Act of 1829\footnote{110} and the disestablishment of the Church of Ireland in 1869,\footnote{111} which resulted in a changing fashion in church building and the introduction of

\begin{thebibliography}{99}
\item[107] \textit{The Illustrated Record and Descriptive Catalogue of the Dublin International Exhibition of 1865}, p. 1-2.
\item[108] \textit{The Illustrated Record and Descriptive Catalogue of the Dublin International Exhibition of 1865}, p. 2.
\item[110] Also known as the Catholic Emancipation Act, it repealed the remaining Penal Laws, which imposed civil disabilities to Catholics, and permitted members of the Roman Catholic Church to sit in the Westminster parliament.
\item[111] The Church of Ireland was disestablished by the Irish Church Act of 1869, an Act of Parliament of the United Kingdom that separated the Church of Ireland from the Church of England.
\end{thebibliography}
colour, combined with the willingness of Irish architects and manufacturers to use native decorative stone, boosted Ireland’s reputation in the world of arts and industry.

Irish decorative stone was exhibited in two branches of the 1851 Great Exhibition - “Manufactures in Mineral Substances for Building and Decoration” (Class 27), situated in a compartment sometimes known as the “Building Court”, and “Mining and Mineral Products, and Metallurgical Operations” (Class 1). Specimens from William Manderson’s Killaloe Marble Works, supplier of native polychrome decorative stone for the Museum of Practical Geology, Museum of Irish Industry and other Board of Works buildings; Connemara marble from Ballinafinch, Co. Galway; polished black limestone from Phineas Franklin’s quarry in Menlough, Co. Galway; polished black limestone from Colles’ quarry in Kilkenny; Cork red limestone from Churchtown; and white marble from Donegal were displayed. From a social point of view one of the most interesting sections of the entire exhibition was that of the Manufactures in Mineral Substances for Building and Decoration as it displayed “the progress made in the working and application of the numerous beautiful natural stones with which these islands abound”, which undoubtedly imparted knowledge and inspired further extraction, fabrication and utilisation of Ireland’s native materials among exuberant enterprising visitors.

Ireland’s first industrial exhibition took place in Cork in 1852, just three years after the end of the Great Famine, which left the country in a state of crisis. It was held in the Cork Corn Exchange, to which a building known as the “Fine Arts Court”, designed by architect John Benson, was added. The aim of the exhibition, initiated by Cork businessman Daniel Corbett, was to display Ireland’s resources, to develop its manufacturing industry, to vanquish prejudice against Irish-made goods and to inspire confidence to both consumers and producers. In the words of John Francis Maguire, Mayor of Cork, the “patriotic zeal”, “untiring energy” and “noble spirit of cordial and even fraternal union” of the Executive Committee of the National Exhibition carried it to a successful issue and credibly displayed Irish capability. Sir Thomas Deane, prominent architect and avid supporter of using Irish decorative stone, was the vice-chairman of the committee at Cork and a member of the building committee and Sir Robert Kane was also a member of the Cork committee.

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112 Personal Communication, Alistair Rowan.
113 See chapters 4 and 5 for further details on the use of native stone in Irish buildings and the fabrication of said stone.
115 “Mineral Manufactures - The Building Court.”
116 Maguire, The Industrial Movement in Ireland, as Illustrated by the National Exhibition of 1852.
117 For information on Sir Thomas Deane see https://www.dia.ie/architects/view/1430/DEANE-THOMAS%28SIR%29 [accessed 08 July 2021].
Kane later served on the Dublin committee whose rooms were situated in the Museum of Irish Industry.\textsuperscript{118} In anticipation of the exhibition Deane travelled to London to seek the support of successful Irish artists, many of whom agreed to exhibit their works in the Fine Arts Court at Cork.\textsuperscript{119} He promoted the use of native stone, stating that “he could line the walls of an apartment with the most beautiful Irish marbles, at but 10 per cent over the ordinary cost of Scagliola”.\textsuperscript{120} A national approach in pursuit of a successful exhibition was evident; the Galway Harbour Commissions extended free port charges to any American sailing vessel or steamer bringing passengers or goods to the exhibition\textsuperscript{121} and the railway companies actioned free transmission of all articles intended for the exhibition.\textsuperscript{122} The exhibition opened on 10 June 1852 and remained opened until 11 September of that year. 74095 attendees paid at the doors, 54936 visitors had season tickets and 9244 school children were given free admission; the total income was £8733 and the expenditure was a few pounds in excess, which deemed the show a success.\textsuperscript{123}

A range of Irish decorative stones were exhibited at the Cork trade show, including Limerick black from Ballysimon quarry, Kilkenny black, Connemara marble from Clifden, Clonony limestone, a grey fossil limestone from the vicinity of Clonmacnoise, Mitchelstown limestone and variegated red limestone (location not specified but presumed to be from either Cork or Pallaskenry, Limerick).\textsuperscript{124} In his synopsis of the exhibition Mr Maguire remarked, “but very few of the many thousands of visitors who have entered the walls of this Exhibition knew anything of the resources of country in this valuable material [marble]. We have been using, as a matter of course, foreign marbles, in our mantle pieces, in the decoration of the walls of our public buildings, and in various forms of elegance and luxury. But here we have proof, not alone in the raw material, but in the manufactured article, that our native marbles can be applied to every purpose of use and ornament, save perhaps the higher purposes of art”.\textsuperscript{125} Surprisingly, though Manderson exhibited at the Crystal Palace Exhibition, the Cork Exhibition and the New York Exhibition (1853),\textsuperscript{126} he did not participate in the Dublin trade show in the same year.

\begin{itemize}
\item \textsuperscript{118} Official Catalogue of the National Exhibition of the Arts, Manufactures, and Products of Ireland; Held in Cork, 1852 (Cork: John O’Brien, 1852).
\item \textsuperscript{119} Maguire, The Industrial Movement in Ireland, as Illustrated by the National Exhibition of 1852.
\item \textsuperscript{120} Maguire, p. 28.
\item \textsuperscript{121} NAI, I/8/2/3, Board of Works Letter Books, 30 January 1851, p. 328.
\item \textsuperscript{122} “National Exhibition. Mr. Maguire’s Lecture.”, The Cork Examiner, August 9, 1852.
\item \textsuperscript{123} The Illustrated Record and Descriptive Catalogue of the Dublin International Exhibition of 1865.
\item \textsuperscript{124} Official Catalogue of the National Exhibition of the Arts, Manufactures, and Products of Ireland; Held in Cork, 1852 (Cork: John O’Brien, 1852), p. 4, 20, 27.
\item \textsuperscript{125} Maguire, The Industrial Movement in Ireland, as Illustrated by the National Exhibition of 1852, p. 28.
\item \textsuperscript{126} Official Catalogue of the New-York Exhibition of the Industry of All Nations (New York, 1853).
\end{itemize}
The Great Industrial Exhibition, funded by William Dargan, took place in Dublin in 1853. The triennial Exhibition of Manufactures of the RDS was due to occur in that year and in June 1852 Dargan proposed to the Society a pledge of £20000, subject to conditions, in pursuit of erecting a suitable building on the lawn of the Society and expanding the exhibition; they accepted his proposal and a Special Executive Committee was assembled to organise the show.127 “In the then transition state of Ireland he [Dargan] felt assured of the great service that would be rendered by an Exhibition in the Irish capital”. Given his extensive and vital involvement with railway construction in Ireland, together with his sole sponsorship of the Great Exhibition, it is not surprising that he was referred to as a pioneer of social progress. Mr Dargan was held in high esteem by all classes such that on announcement of the exhibition “a feeling of confidence was inspired in the public” regarding its success and “the most cordial response was made”; treasures of art were forwarded to the Committee, which had never before been out of the possession of their owners, and valuable contributions were received from Queen Victoria and Prince Albert, the French Emperor, the King of Belgium, the King of Holland and the King of Prussia.128 On 12 May 1853 the Board of Works gave all of its workers a half day for the opening of the Great Exhibition,129 It was attended by Queen Victoria and Prince Albert where they viewed Richard Griffith’s geological map much to his delight,130 and during the week Dargan hosted the royal couple at his house at Mount Argus in Dundrum where he declined baronetcy.131 The exhibition remained opened until 31 October of that year and the popularity of the show was reflected in the number of visitors; 589372 visitors paid at the door and there were 366923 season ticket holders, excluding exhibitors.132

The Great Industrial Exhibition in Dublin featured “The Irish Marble Court”.133 As at Cork, Kane was a committee member for the Dublin show and a range of Irish coloured decorative stone

129 NAI, I/1/2/15, Board of Works Letter Books, 11 May 1853, p. 121.
132 In proportion to the local population of Dublin versus London, the Dublin exhibition showed much better results in attendance than the London Exhibition of 1851. The Illustrated Record and Descriptive Catalogue of the Dublin International Exhibition of 1865.
specimens, together with larger manufactured articles, were exhibited. The first extensive collection of polished Irish decorative stone featured in the entrance hall of Kane’s Museum of Irish Industry influenced the RDS’s assembly of a similar collection for display at the exhibition. Mr James Penny, curator of the Museum of Irish Industry, contributed a small case containing a large range of polished square native decorative stone specimens from about fifty localities, which illustrated the variety of available colours and their adaptation to inlaid work. Marble manufacturers and private individuals also contributed specimens and articles of decorative stone.

The Ulster Gazette described the selection process of Armagh decorative limestone intended for display at the Great Exhibition. Mr David McCullough, of the Armagh Marble Works, was a key figure in manufacturing and finishing local stone, and he exhibited a chimneypiece, executed in polished Armagh limestone, at the Dublin Exhibition. This was met with the admiration of the committee who sent a messenger, Mr R.J. Hannigan of the geological department, to acquire more of the stone and to ascertain its aesthetic qualities and abundance in the area. He explored several quarries, which he declared to be of much value and capable of producing articles of great beauty and variety. Upon approval from the town commissioners, street flagging of the Armagh stone was lifted from the town of Armagh in order to obtain specimens of diverse colour and were forwarded to Dublin for the exhibition. The shades included fossil brown, purple, mottled blue, yellow shell, purple shell, red and white, yellow shell with other fossils, and red and yellow spotted. The quarry belonged to the Archbishop of Armagh, Lord John Beresford (1773-1862).

The extreme and swift actions undertaken to assure acquisition of an array of Armagh stone reflect the industrial fervour surrounding the exhibitions and the momentum towards manufacturing and sales.

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135 All the marble varieties assembled by the RDS were already well known. There were 38 marble slabs exhibited from 26 localities, 34 of which were provided by the RDS and 12 bust pedestals from 10 localities, 8 of which were from the RDS. There were 7 Irish marble chimneypieces from 7 localities, which were presented by 6 exhibitors; 1 Kilkenny black baptismal font; and 1 Churchtown red door case from the RDS. Additionally there were 3 blocks of rough marble from 2 localities. Sproule, The Irish Industrial Exhibition of 1853: A Detailed Catalogue of Its Contents, p. 83.
137 “Armagh Marble at the Exhibition,” Ulster Gazette, June 1853.
139 Griffith’s Valuation, Dec 01, 1864.
140 The exhibitions in Britain and Ireland, which took place between 1851 and 1853, were followed by numerous exhibitions worldwide; the principal ones included New York International Exhibition, 1854; Munich Exhibition, 1854; Paris International Exhibition, 1855; Manchester Fine Arts Exhibition, 1857; Royal
Dublin Society’s Fine Arts Exhibition, 1861; Florence Exhibition, 1861; London International Exhibition, 1862; Amsterdam Exhibition, 1864; Royal Dublin Society’s Exhibition, 1864; New Zealand International Exhibition (Otago), 1865; Dublin International Exhibition, 1865. *The Illustrated Record and Descriptive Catalogue of the Dublin International Exhibition of 1865*, p. 4.

141 “The Great Industrial Exhibition of Ireland,” June 1853.
Still, not all critics of that period praised the representation of Irish decorative stone at the Dublin Exhibition. A reporter from The Illustrated London News in June 1853 admired the many coloured native marbles and described them as “specimens of great and inexhaustible quarries”, but later in the article condemned their display when compared to specimens of Cornish Serpentine presented by the London and Penzance Serpentine Company nearby. “The compartment occupied by the Serpentine Company speaks of individual enterprise, and proclaims commercial success. In the Irish marbles the articles exhibited, with few exceptions, are either contributed by the Dublin Society, or the Museum of Irish Industry – both institutions wholly or part supported by Government grants... We sincerely trust the display of specimens from native quarries will lead to the formation, among a few spirited capitalists, of a company like the Serpentine Company, determined to force a thriving trade in Irish manufactured marble”. Concern about the absence of Irish entrepreneurialism was not confined to the second half of the nineteenth century, nor solely linked to English newspapers. In 1838, more than a decade before the trade exhibitions, The Dublin Weekly Register reprinted an article from The Times declaring, “If these marble quarries were situated in any other country than Ireland they would long ago have enriched the owners of the soil, and afforded employment to the poor of the neighbourhood”.

Conclusion

The interweaving of disparate activities be they government supported or promoted by enthusiastic capitalists or members of the architectural fraternity, such as George Wilkinson and Sir Thomas Deane, allowed for the rapid development of an extensive stone extractive and working industry in Victorian Ireland. It cannot be emphasised strongly enough that the work of the Museum of Irish Industry allied to that of the GSI, together with the penchant for industrial exhibitions, was instrumental in the commercialisation of Irish decorative stone, which saw a diversification of output from the 1850s in terms of the lithologies, fabrics and colours available. An extensive water transportation network, and to a lesser extent road and rail, facilitated movement of both raw and worked stone and markets opened up in Ireland and abroad. The eagerness of inspired landlords, quarrymen and stone fabricators (the roles of whom will be discussed in subsequent chapters) to engage with native decorative stone assured advancement of the industry throughout the nineteenth century.

142 “The Great Industrial Exhibition of Ireland,” June 1853.
143 “The Great Industrial Exhibition of Ireland”, p. 455.
CHAPTER 2. THE INITIAL COMMERCIALISATION OF IRISH DECORATIVE STONE QUARRIES IN KILKENNY, CONNEMARA AND GALWAY.

This chapter will investigate the initial commercialisation of decorative stone quarrying in Ireland; at what point in time did it occur and who were the key initiators? In this regard pre-nineteenth century excavation activities will be briefly looked at, followed by an in depth examination of extensive decorative stone quarrying in Kilkenny, Connemara and Galway in the early 1800s. Expansion of the industry in these districts later in the Victorian period, and slightly beyond, will also be dealt with in this chapter. Further details and maps of the quarries are provided in Appendices 1 and 2.

Figure 1. Geological map of Ireland 1850 (left). Geological map of England 1849 (right). Pale blue represents the areas of Carboniferous limestone on both maps.\textsuperscript{145}

While advocating for the advancement of the Irish marble extraction and fabrication industries in 1845, George Wilkinson declared, ‘The colours of the marbles in Ireland are almost as numerous as those obtained from Italy’.\textsuperscript{146} In this reference to Irish “marbles”, Wilkinson is for the most part denoting the uniform, level limestone beds of the midland districts; most designated Irish ‘marbles’ are in fact polished coloured limestones, which formed during the Carboniferous geological period when Ireland lay in tropical latitudes and was submerged by a shallow sea,

\textsuperscript{145} https://www.davidrumsey.com/ [accessed 27 September 2017].
creating a carbonate shelf with enclosed deep-water basins such as that at what is now Dublin and in which Calp was deposited.\textsuperscript{147} The diverse coloured nature of Irish limestones is due to the admixture of various minerals. Ireland’s limestone deposits are three times greater than those of the United Kingdom, extending for some 15000 square miles or half of the island’s land mass. The abundance and variability of Irish limestone explains its extensive exploitation for building and decorative purposes throughout the Victorian period.

\begin{figure}
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\caption{Geological timescale illustrating geological periods and their numerical ages in millions of years (Ma). Dates are extracted from the International Chronostratigraphic Chart 2022.\textsuperscript{148}}
\end{figure}

In terms of stone that is considered to be of commercial value, the stone trade and indeed clients to whom the stone is provided often consider that a marble is that which is attractive and susceptible to a polish; these ‘marbles’ may include limestone, true marble, serpentine, even granite. However, in geological terms, a marble is a metamorphic rock whose parent rock or protolith was a limestone, a sedimentary rock, consisting mostly of calcium carbonate (CaCO\textsubscript{3}) or dolomite (calcium magnesium carbonate, CaMg(CO\textsubscript{3})\textsubscript{2}). During metamorphism limestone is altered by heat and/or pressure and a resultant marble is formed, in which the original


\textsuperscript{148} Appendix 3 of this thesis contains the detailed International Chronostratigraphic Chart (2022), which provides numerical ages for the geological eras, periods, epochs and stages referred to in the below text.
sedimentary features and fossils of the limestone are obliterated. The carbonate is recrystallised to produce an interlocking granular mosaic of roughly equal-sized crystals. Non-calcareous minerals are also metamorphosed and new mineral assemblages created. Ireland contains very limited tracts of true marble, most of the country being underlain by limestone (figure 1), and not all of these areas were commercially exploited while extraction of workable stone was more successful in some than others.

**Early Irish marble**

Prior to its widespread development during the 1800s native coloured marble was used throughout Ireland for local interior ornament and monuments. While Ireland hosts very ancient structures of local marble, such as the pink pillars of the cloisters of Askeaton, Co. Limerick, and the monastic site at Clonmacnoise, King’s County (Offaly), Kinahan states, “the first written record of Irish marbles seems to be that of Gerard Boate, written in 1652”. Boate spoke of “red marbles streaked with white, and black marbles curiously streaked with white and some all of one colour” and he specifically referred to the Kilkenny marble quarry located less than a mile outside of the town. This current research has drawn together evidence of much older ventures, dating from the sixteenth and seventeenth centuries, to exploit Irish coloured marble and export it to Denmark, Spain, Morocco and Britain. In 1617 Richard Boyle, first earl of Cork, supplied Cork red marble (more correctly a polished limestone) from Little Island intended for Queen Anne of Denmark’s house at Greenwich; British architect Inigo Jones (1573-1652) was engaged and construction began in 1616. Building ceased in 1618 when Queen Anne became ill; she died in 1619 and building only re-commenced in 1629 and finished in 1635. Although there is no evidence of the red marble being used at Greenwich, perhaps on account of Inigo Jones changing his mind after the Queen’s death, there is a record

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153 Calendar of State Papers, Ireland, Elizabeth, 1574-1585. (London: Longmans, Green, Reader, & Dyer, 1867).

that Boyle “Paid Der Water of the little Iland [Little Island] for bringing 25 tonne of Ranse stoan [Cork red marble] for her Majesty from the quarry to the sea syde”\textsuperscript{155}

Donegal marble was also allegedly used by Jones in alterations to Lord Arundel’s London house early in the seventeenth century.\textsuperscript{156} Thomas Howard, 14\textsuperscript{th} earl of Arundel (1585-1646) was described as “an entrepreneur of the arts” by David Howarth on account of him being “as much a patron as a collector”.\textsuperscript{157} He frequently visited Italy and commissioned paintings and sculptures to be sent back to Britain; after his return in 1619 he sent his Italian secretary, Francesco Vercellini to Rome to persuade the sculptor, Clemente Coltreci to come to London to establish a restoration studio. In 1634 Lord Arundel came to Ireland to claim estates that had belonged to his grandfather, the Duke of Norfolk. During this visit he heard about an excellent quarry of black marble, about which he wrote to his close friend Thomas Wentworth, Earl of Strafford (King Charles’ Lord Deputy in Ireland, appointed in 1632): “My Lord, I cannot omitted to recomende unto y’ best favor this bearer Mr Page well known unto y’, Lo\textsuperscript{5}: that he may have use of his Privilidges in that kingdome, w\textsuperscript{th} he is confidente will prove of greate use to the publicke, as well as his gaine, and therefore worthye of y’ Lo\textsuperscript{PS}: protection. I have wished him likewise to enforme himself of Marbles the best he maye, and to that purpose, have sent along w\textsuperscript{th} him, one Sig’ Clemente an excellent Sculptor whoe works for me, and knowes well Marbles, to the ende, that if they prove soe well, as is enformed me, I may not only make use of them myself for a little rome I am aboute, but sette up a trade of them hither, and increase shipping w\textsuperscript{th} the good of both kingdoms and benefitte to the undertakers”.\textsuperscript{158} Although the whereabouts of the black marble quarry is unknown\textsuperscript{159} there is a record of Irish marble being abandoned on the city wharf of the Thames after Lord Arundel’s death. In 1659 the Thames waterman, Thomas Bellinger supported the claims of the Arundel family to the marble and it was transferred to Arundel wharf.\textsuperscript{160} During his time in Ireland Clemente Coltreci investigated quarries in Ulster and evidently discovered a white marble quarry, the location of which is unknown but it was possibly situated in Donegal. It is said that Coltreci unashamedly took possession of the quarry from under the very nose of Thomas Wentworth.\textsuperscript{161} Presumably it was this white marble that was used by Inigo Jones in the alterations of Lord Arundel’s London abode.

\textsuperscript{155} Rynne, “Colonial Entrepreneur and Urban Developer : The Economic and Industrial Infrastructure of Boyle’s Munster Estates.”
\textsuperscript{156} Rynne.
\textsuperscript{157} Howarth, “Lord Arundel as an Entrepreneur of the Arts, p. 690.”
\textsuperscript{158} Howarth, p. 690.
\textsuperscript{159} There is a strong possibility that it was black limestone procured in Kilkenny.
\textsuperscript{160} Howarth, “Lord Arundel as an Entrepreneur of the Arts.”
\textsuperscript{161} Williamson, Inigo’s Stones: Inigo Jones, Royal Marbles and Imperial Power.
A letter, dated 14 July 1637, from Inigo Jones to Thomas Wentworth requesting marble for the west portico of St Paul’s Cathedral in London provides further evidence that Irish marble was extracted for exportation during the early seventeenth century. Prior to receiving the order in 1637, Wentworth had agreed to supply Inigo with a variety of other Irish marbles, in addition to the black paving marble for St Paul’s. On 14 September 1635, Wentworth wrote, “Certainly I am persuaded they will find very good black and mingled wth white about Gallway. And in some parts of Mounster excellent good white and Redd...” However, by 10 August 1638, Wentworth queried the viability of extracting white Irish marble and expressed doubt regarding the longevity of the Munster red and white variegated marbles. He stated, “For the marbles I will do my uttermost that lyes in me, the black Marbles I trust to finish according to the Scantlings. But as for the white... I should totally disadvise meddling with them, for I am utterly out of Hope to effect anything that will be liked of... so I would think to have it as good cheap out of Italy. As for the Spotted marbles, such as white and black, which I hear are to be had in Munster, I will do my best to provide, but their white and red Ranse, set in Work, looseth their Colour quickly, and then looks very ill favouredly. So as I have no fancy to trade in that neither...” At this early stage of marble exploration the Lord Deputy articulated potential issues involving Irish decorative stone, namely the probability of the variegated red ‘marble’ to weather unfavourably on exterior façades, as observed in many later Victorian buildings, such as the Museum Building of Trinity College Dublin. His recommendation to look to Italy rather than Ireland for white marble correctly forecasted the unfruitful nature of the Irish white marble quarries, which never produced stone on any commercial scale.

Charles Smith M.D. (1715-1762), the Irish topographer and historian, described the marbles of Cork in his second volume of *The Ancient and Present State of the County and City of Cork*. He said, “All our marbles in this county are of the variegated kind, of which we have a great variety; and I have not heard of any that we have of one single colour only”. He described various marble types found throughout the county (including black coralloid marble and blue and white variegated marble near Churchton; and purple and white variegated marble at Churchton, near Mitchelstown, at Little Island, near Cork harbour and at Midleton), and likened them where

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162 Williamson, p. 264.
163 Williamson, p. 265.
164 Ranse means variegated.
166 See chapter 5 of this thesis for details on the native decorative stone utilised in the Museum Building.
167 See chapter 3 of this thesis for an account of the Donegal white marble quarries.
suitable to John Hill’s marble descriptions in *A History of Fossils (1748).* Charles Smith associated and paralleled the characteristics of Cork red marble with John Hill’s description of “Marmor albo purpureum, variegatum. Purple and white variegated marble.”

**Figure 3.** Barrymore Mausoleum (built about 1747) in Castlelyons Graveyard, Co. Cork, has a circular interior which houses a classical monument commemorating James Barry, Earl of Barrymore, carved in 1753 by Sheehan and Houghton of Dublin. This monument exhibits Cork Red Marble panels, pilasters and columns. (Photos by Frank Keohane)

**Figure 4.** 18th century monument in Doneraile Cemetery, commemorating David Fleury, son of James Fleury and Louise Le Marchand (born in the parish of Torchand, Lower Normandy France, in 1667 and died in Doneraile in 1720) and his wife Barbara, which incorporates Cork Red Marble decoration. (Photos by Frank Keohane)

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170 Hill, p. 473-474.

During the 1770s Armagh ‘marble’ (more correctly a polished limestone) internally decorated houses in the vicinity. "By the instrumentality of the late Primate Robinson, a person of the name Louche was brought to the city to work the marble"; Richard Louch was an architect and builder, of London and Armagh. Artisans incorporated local variegated red ‘marble’ into memorial monuments in County Cork during the eighteenth century and similar early local usage of indigenous decorative stone occurred across the island. Bryan Bolger’s inventory of a Dublin stone yard in 1801 included pieces of Cork red ‘marble’ and Connemara green marble, as well as a range of coloured European marbles. The coloured Irish and foreign decorative stone were likely used in architectural detail rather than in large scale pieces.

Prior to its coast-to-coast industrial development and commercialisation during the 1800s, as we have seen native coloured marble was not only exploited for exportation but also used throughout Ireland for local interior ornament and monuments (figures 3 and 4). Its value during the eighteenth century was recognised by none other than George Berkeley (1685–1753), Bishop of Cloyne, who wrote in July 1722 to Sir John Percival encouraging him to speak with William Conolly, then in the throes of erecting Castletown House, and to “recommend to him the making use of all the marbles he can get of the production of Ireland for his chimneys.” As it happened Conolly obtained a fine Kilkenny black marble chimneypiece for the main hall and smaller examples are seen in lesser rooms, but the chief reception and bedrooms have chimneypieces of Italian marble.

Initial commercialisation of Irish marble

Kilkenny black limestone

Eighteenth century quarries and the establishment of the Kilkenny Marble Works

With the exception of the Kilkenny quarries and marble works, widespread commercialisation of the marble trade in Ireland only commenced in the third decade of the nineteenth century. Alderman William Colles of Abbeyvale (1702-1770), premier lessee of the Black Quarry, south-east

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173 https://www.dia.ie/architects/view/3220/LOUCH-RICHARD%5B1%5D [accessed 31 August 2021].
174 This is interesting as it predates the opening of the first Connemara marble quarry in 1824, which is discussed later in this chapter. Documentation of Connemara marble in a Dublin stone yard in 1801 suggests that stone was being extracted when requested without the existence of an official quarry.
175 Bryan Bolger, “A Record of the Contents of a Dublin Stone Yard,” 1801, Appendix X.
178 Refer to chapter 3 of this thesis for an in depth account of the widespread commercialisation of decorative stone extraction in Victorian Ireland.
of Kilkenny city in the townlands of Archersgrove and Gallowshill, and founder of the Kilkenny marble works at Millmount in the townland of Highrath near Maddockstown in 1730, was the early exemplar for the Irish decorative stone industry; he extensively extracted, fabricated, transported and effectively promoted Kilkenny black limestone at home and abroad during the eighteenth century. The Lower Carboniferous (Middle Mississippian, Viséan) Kilkenny black limestone is a bituminous, highly fossiliferous, calcarenite whackestone/packstone\(^{179}\) (see Appendix 2 for a detailed description of the stone and chapter 5, figure 14 for an image of the Kilkenny limestone in thin section). Prior to Alderman William Colles’ management of the Black Quarry it apparently belonged to nobody in particular; Gerrard Boate wrote of the quarry in 1652, “The Quarrie out of which they have their Marble at Kilkenny, is not above a quarter of a mile distant from the Town, and belongeth to no body in particular, lying common for all the Townsmen, who at any time may fetch as much out of it, as seemeth good onto them, without paying any thing for it... This Marble, whilst it is rude, and as it cometh out of the ground, looketh grayish, but being polished it getteth a fine blewish colour, drawing somewhat towards the black”\(^{180}\). In Kinahan’s seminal account of Irish quarries, *Economic Geology of Ireland*, he disputed Boate’s statement about the Kilkenny stone being free to anybody who wanted it prior to Alderman William Colles leasing the quarry. It appears that ownership of the Black Quarry was for years the subject of a case in the Court of Chancery between the Jacob and Minchin families, from both of whom Colles took leases in 1737.\(^{181}\)

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<tr>
<td>Silver bed, from</td>
<td>1</td>
<td>6 to 2f.</td>
</tr>
<tr>
<td>Bad bed</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Half moon bed</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Bottom bed</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Lower thin bed</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Black bed</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Griddle bed</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

*Figure 5. Succession of marble beds in the Black Quarry.*\(^{182}\)

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\(^{179}\) Sevastopulo and Wyse Jackson, “Carboniferous: Mississippian (Tournaisian and Viséan)” outlines the depositional environment of Irish Mississippian limestones.

\(^{180}\) Boate, *Ireland’s Natural History*, p. 150.


\(^{182}\) William Tighe, *Statistical Observations of the County of Kilkenny, Made in the Years 1800 & 1801* (Dublin: Graisberry and Campbell, 1802).
At the turn of the nineteenth century Colles employed forty to fifty men on varying incomes from 8s. to 20s. per week and fifty tons of marble were exported from Kilkenny annually. Those strata referred to as the “half moon bed”, so called due to its inclusion of numerous crescent-shaped Productus brachiopod shells, and the “bottom bed” were considered among the best marble horizons in the Black Quarry, while the “black bed” and the “silver bed” were also valuable. William Tighe observed within the Kilkenny marble “a great variety of impressions, of madrepores (corals), of bivalve (brachiopod), and of turbinate (gastropod) shells. Mytilites, turbinites, pectenites, tellinites, tubiporites, nautilites and ammonites, may be distinguished”. Although the varied fossil content imparts a unique appearance to each individual block raised in the Black Quarry, those nearing pure black were held in highest esteem. Later in the nineteenth century stone from the “half moon bed” was better known as “shelly black” in the industry and was regarded as “par excellence” and world-famed under that name. The other two popular stone varieties raised in the Black Quarry were titled “pure black” and “dark-grey”. Regarding the shelly black marble, there “was the curious general belief, that the stones when first procured are perfectly black, the white shells appearing subsequently, being gradually developed when the marble is subjected to heat”. This notion was confirmed to be a fallacy by Colles when he declared that he had never known a case in which this occurred and maintained that the fossils were always to be seen from the first.

The burgeoning marble industry in nineteenth century Ireland is indebted to the intrepid nature of Alderman William Colles, as reflected in a further account by Tighe, “[he was a man] of great mechanical abilities, and abounding in a variety of those eccentric schemes which mark original genius, though success only, in the eyes of the world can stamp them with rationality; one of which was an attempt to make dogs weave linen by turning wheels; another, the supplying the Corporation of Dublin with bored marble tubes as pipes for distributing water through the city, was defeated only by a combination of pump borers and other mechanics, who rose in a mob and destroyed them on their arrival”. Notwithstanding of his minor foibles, Colles was the first person in Ireland and Britain to cut and polish marble using waterpower and his fabrication processes set standards to which other marble mills aspired. His entrepreneurial spirit was

183 Tighe.
184 Tighe, p. 100, 101.
185 Tighe, p. 101.
186 Tighe.
188 Kinahan, p. 142.
189 “A Stranger’s Impression of the County of Kilkenny...,” *The Kilkenny Moderator*, August 23, 1851, 1.
190 A detailed description of the processes in the Kilkenny marble works is provided by Hand, “The Kilkenny Marble Works: A Family Business Enterprise.”
highlighted in his attempts to establish the Nore navigation and though a navigable waterway connecting Kilkenny to the port at Waterford was not completed during his lifetime, this did not impede him transporting stone by road to the port for shipment to Dublin.\textsuperscript{191} Britain and further afield.\textsuperscript{192}

In colonial North America there was interest in Irish marble, which was sought by George Washington for use for flooring in Mount Vernon. He asked an agent to procure samples of black and white Irish marbles, the former undoubtedly being Kilkenny limestone, but examples of each were not sent and in the end a pale flagstone from Whitehaven, England was used.\textsuperscript{193} However, some examples of Colles’ work can be found with the most significant chimneypieces being at George’s cousin Samuel Washington’s house Harewood in Virginia, built in 1770; this was described in a register of the US Historic Places as being dark green, but is actually black.\textsuperscript{194} Later in the 1830s a pair were installed in Fairvue, Sumner County, Tennessee.\textsuperscript{195} Kilkenny black limestone may also have been used for ledgerstones in early Virginian colonial churches, but this material could be from Britain or Belgium as the micropalaeontology content doesn’t allow for clearer provenance determination.\textsuperscript{196} Echoing an earlier statement by Tighe, \textit{The Kilkenny Moderator} in 1851 commended Colles: “such was the impression that his abilities made on the common person, that to this day his feats are proverbial among them, and they speak of him as a necromancer.”\textsuperscript{197}

\textbf{Development of the Kilkenny marble industry}

Richard Colles of Riverview (1774-1849), grandson of Alderman William Colles, and Richard’s son, Alexander Colles of Millmount (1815-1876), inherited the Kilkenny marble works and the Black Quarry, which they operated for much of the Victorian period.\textsuperscript{198} Following in their forefather’s footsteps, they not only amply supplied the domestic market with both raw and fabricated


\textsuperscript{196} Key, M.M., Jr., personal communication, March 2021.

\textsuperscript{197} “A Stranger’s Impression of the County of Kilkenny...”

\textsuperscript{198} Hand, “The Kilkenny Marble Works: A Family Business Enterprise.”
Kilkenny marble but also focused their attention on export. In 1802 Richard shipped blocks principally destined for Glasgow and Liverpool in return for white Carrara and Parian marbles (obtained from Liverpool), which were worked into superior chimneypieces; this stone exchange with Liverpool continued into the mid-nineteenth century. Contemporary newspaper articles document the importation of slabs and scantlings of Kilkenny marble to Stamford in Lincolnshire and London in the second decade of the nineteenth century while raw blocks and fabricated chimneypieces of the stone were shipped as far as Sydney and Tasmania in Australia during the following two decades; 33 tons of Kilkenny marble along with whiskey, stout, turf, pork, buttermilk, oatmeal etc. were shipped from Ireland for arrival in Sydney on 9th June 1828. Of course, finished chimneypieces were being crafted at the Kilkenny marble works at this time but an importation duty of two shillings per cubic foot prevented export of finished marble pieces to Scotland and Britain. Therefore, Irish crafted chimneypieces were not traded on the British market and raw blocks exported from Kilkenny across the Irish Sea were fabricated upon arrival into chimneypieces and other ornaments for ensuing internal sale or consignment elsewhere. Despite there being documentary evidence that a portion of raw Kilkenny marble, which was transported to London in the early 1800s, was manufactured into chimneypieces and sent shortly thereafter to Sydney, simultaneous shipment of Kilkenny made chimneypieces, accompanying raw blocks and other native produce, from Ireland to Australia is also conceivable.

199 “Variegated Black Marble,” Manchester Mercury, April 10, 1804, 1; Tighe, Statistical Observations of the County of Kilkenny, Made in the Years 1800 & 1801; “A Stranger’s Impression of the County of Kilkenny...”
200 “To Marble and Stone-Masons, Builders, &c.,” Stamford Mercury, August 30, 1811, 3.
205 “Builders of Good Houses...“
With a workforce of forty men and still under the management of Richard Colles, the Kilkenny marble works was exporting one hundred tons of stone to England annually by 1842, again in exchange for Italian marble, which was combined with other coloured marbles and worked into chimneypieces. At the end of his tenure in 1849 Richard Colles’ marble quarry, located on land leased from Miss Anne Flood and Rev. Benjamin Jacob in Gallowshill, had a net annual income of £40. By this time he had greatly improved the power and capacity of the mills founded by his grandfather over a century ago. Fortunately, he had established connections and secured substantial recurring orders for marble with English houses, which affirmed continuous excavation at the quarry and fabrication at the mills.

Subsequently, Alexander Colles exhibited Kilkenny marble chimneypieces at two industrial exhibitions in London in 1851 and 1862 with the intention of further promoting export of the stone to Britain. In October 1866 a Danish schooner loaded a cargo of Kilkenny marble and some Cork variegated marble; this was the third vessel within 12 months to transport cargoes of Kilkenny marble overseas, implying a steady rise in the foreign interest of Irish decorative stone.

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206 The ring-fenced townland of Archersgrove was advertised for lease in 1855. The holding included “an inexhaustible quarry of beautiful black marble… being even now [1855] profitably worked on temporary hire, but in skilful hands, and with greater energy, the profits could be greatly increased”. “The Interest in the Lease of the Townland Known as Archersgrove,” General Advertiser for Dublin, and All Ireland, February 3, 1855.

207 This quarry in Archersgrove was not listed in Griffith’s Valuation, July 23, 1849, nor was it illustrated on Griffith’s map. The Black Quarry is illustrated on the 6” OSI map (1837-1842) in Gallowshill only and by the time of publication of the 25” OSI map (1888-1913) it had extended into the townland of Archersgrove. Alexander Colles must have been responsible for significantly expanding the quarry from Gallowshill into Archersgrove in the 1850s.

208 Griffith’s Valuation, July 23, 1849.


210 Hand, “Kilkenny Marble in the Victorian Period.”

211 “Irish Marble,” Irish Examiner, October 26, 1866, 4.
forgetting the importance of domestic trade, Alexander appointed Dublin agents, Maurice Brooks of 43 Grafton Street in 1859 and G. Cooper & Co. of 58 Westland Row in 1862, to display and sell his chimneypieces, tables, fonts, monuments etc. and advertised the collaborations several times later in the respective years in various native newspapers including *The Evening Freeman, Enniskillen Chronicle and Erne Packet* and *Dublin Daily Express.* In 1866 he employed “not less than 200 to 300 hands in the manufacture of monuments, mantlepieces, columns, and in fact, every ornament required in architecture”. Truly akin to his industrious father, *Freeman’s Journal* described him as an “esteemed fellow-citizen... whose enterprise and energy are an honour to Ireland, and more especially to Kilkenny...”. The complimentary article concluded, “we have much pleasure in bearing our own testimony to... Mr Colles, as well as to his kindness as an employer”.

**Expansion of quarry ownership to several localities across Ireland**

In the latter part of the Victorian period the considerably extended marble works, consisting of five water driven mills connected by tramways, descended to Alexander’s son, Richard Colles of Millmount (1844-1924), who by 1888 employed an average of 100 men. His enterprise was then registered as The Irish Marble Company Ltd. with head office at the marble mills in Kilkenny and two other offices at 20 St Mary Axe, London and 3 College Green, Dublin. He expanded his quarry leases in Kilkenny from Gallowshill and Archersgrove further east to encompass a quarry at Butlersgrove located between Gowran and Paulstown (figure 7). While the quarries at Gallowshill and Archersgrove were situated in the Ballyadams Formation, comprising crinoidal wackestone/packstone limestones, the Butler’s Grove stone is a very dark grey argillaceous mudstone/wackestone limestone from the Butlersgrove Formation, which is fine-grained and

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215 “The Kilkenny Marble Works.”
216 See chapter 4 of this thesis for a detailed account of Richard Colles’ development of the Kilkenny Marble Works in the late 1800s.
produces a pure black marble when polished. The deep black marble from Butlersgrove was frequently utilised alongside the marble from the Black Quarry adorned with natural white fossil shells. In their pamphlets The Irish Marble Company Ltd. offered four types of “The World-Known Kilkenny Marbles”: “Kilkenny Black Marble”, which was a jet black marble, highly susceptible to a polish and presumably sourced from Butler’s Grove; “Kilkenny Black Fossil Marble” from the Black Quarry decorated with natural fossil forms that imparted an added interest and beauty; “Kilkenny Bird’s Eye Marble” from the Black Quarry, which when polished resembled the pure Butler’s Grove Kilkenny Black Marble but also contained evenly distributed minute white specks; and “Castleduff Grey Limestone”, which was finely sanded and extensively used for crosses, headstones and kerbs. Bird’s Eye Marble gained its colloquial name on account of it containing small crinoid ossicles and brachials, the fossil remains of the disarticulated stem and arms of these marine creatures.

In the wage books of Richard Colles for the years 1885 to 1921 additional Kilkenny limestone quarries worked during that time are listed. A quarry at “Clara” is registered between 1903 and 1905. While several small quarries are displayed on the OSI 6 inch maps (1837-42) in the adjacent townlands of Clarabricken and Clara Upper, by the time of publication of the 25 inch maps (1888-1913), which coincides with Richard Colles’ quarry lease in Clara, all but one quarry have either disappeared or been marked as disused. The remaining sizable quarry, just north of the ruins of Clarabricken Castle, was situated in the Clogrenan Formation, which consists of crinoidal, cherty, muddy, calcarenitic limestone (figure 8).
Figure 7. The pure black marble quarry at Butlersgrove, between Gowran and Paulstown, Co. Kilkenny, situated in the Butlersgrove Formation, leased by Richard Colles in the late 1800s (OSI 25" map (1888-1913)).

Figure 8. Quarry at Clarabricken, Co. Kilkenny, situated in the Clogrenan Formation, leased by Richard Colles between 1903 and 1905 (OSI 25" map (1888-1913)).
Figure 9. Threecastles quarry (also known as Killaree quarry) in the townland of Killaree, just south of Threecastles in Co. Kilkenny, situated in the Clogrenan Formation, leased by Richard Colles between 1901 and 1920 (OSI 25" map (1888-1913)).

Also featured in the wage books was “Threecastles” quarry and “Killaree” quarry; these quarry names appear to have been interchangeable but indicative of the same location. For some unknown reason the quarry was referred to as Threecastles between 1901 and 1916 and then changed to Killaree between 1917 and 1920. Despite being in the townland of Killaree, just south of Threecastles, the extant quarry, presently owned by McKeon Stone, is still referred to as Threecastles (figures 9 and 10). Comparable to the site at Clarabricken it is also situated in the Clogrenan Formation and a sample presented by E.S. Glanville, Marble Merchant of 11 to 13 Lower Erne Street Dublin, to the Sedgwick Museum in 1916 for the British and Foreign Building Stone Collection was termed “Fossil Grey”. This specimen was intended to represent the grey marbles of Kilkenny and reveal the attractive crinoidal (entitled “encrinital” at the time) fragments highlighted in the dark matrix when polished. By the early 1900s the single economical dark grey bed in the Black Quarry was probably worked to its capacity and Threecastles was likely the main source of grey limestone used in monumental and decorative works at the Kilkenny marble mills.

226 Like at Clara, many quarries are displayed on the OSI 6” maps (1837-42) in the neighbouring townlands of Threecastles and Killaree, but by the time of publication of the 25” maps (1888-1913) and Richard Colles’ management of the quarry all of the quarries in the townland of Threecastles were marked as disused and one large working quarry remained in Killaree.

227 Watson, British and Foreign Marbles and Other Ornamental Stones: A Descriptive Catalogue of the Specimens in the Sedgwick Museum, Cambridge, p. 64.
Daringly venturing away from the monotone stone of Kilkenny, Richard Colles also held quarries of the sought-after Cork and Kerry reds and treasured Connemara green marbles. Limestones, named “Cork Red” and “Pink Sunset” in the marble trade, were extracted to a limited extent by Colles from Ramhill quarry at Ballynacorra, located 1.5 miles south-east of Midleton (figure 11). The sunset marble is a red and pink stained grey crinoidal wackestone limestone from the Little Island Formation and the Cork red marble is a lime conglomerate from the underlying Cork Red Marble Formation; the sunset marble occurs at the interface of the Little Island and Cork Red Marble Formations where fine red sediment from the conglomerate was injected into the grey limestone. Both marbles were recommended by The Irish Marble Company Ltd. for architectural work including dados, pilasters, panelling, pavements, frames, mural tablets, altars, mosaic and mantelpieces. The red Kerry marble, known as Golden Breccia in the trade, was raised 1.5 miles

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south of Castleisland along the main road from Castleisland to Killarney at Lisheenbaun (figure 12). The quarry is situated in a conglomeratic horizon within the Waulsortian Limestone and is referred to as a breccia on account of the inclusion of angular fragments, as well as rounded pebbles, of calcite and fossils within a haematitic stained matrix.

Figure 11. Ramhill red marble quarries in the townlands of Ballynacorra West and Ballynacorra East, south of Midleton in Co. Cork, situated in the Cork Red Marble Formation, leased by Richard Colles in the late nineteenth and early twentieth centuries (OSI 25" map (1888-1913)).

"Connemara Green" and “Erin White” marbles were quarried from a vein, which was variegated with green, grey and white streaks, located slightly east of Streamstown Bay in the townland of Letternoosh, about two miles north of Clifden (figure 13). The green marble was popular with architects for monumental and architectural work and employed similarly to the Cork red marbles. The Glen Erin stone was a veined white marble patinated with pale green and brown streaks, which resembled the valuable Italian Pavonazza in appearance. Richard Colles had skilled Connemara marble workers specially employed making hand-crafted ornaments and trinkets in the translucent green variety, which were much sought after especially by visitors to Ireland as souvenirs. These pieces were sold in many shops throughout Dublin from high end establishments on Grafton Street to little shops on side streets and on the Quays. The marble workers were “encouraged to produce either quaint, or original articles, as their fancy, or imagination may inspire, from the homely ‘Stage Irish’ Pig, to the exquisite little reproductions of the Celtic Crosses, being in much the same relation to the higher Sculptors of our time, as were the Vase Painters and Tanagra figure workers in the days of Ancient Greece, to the Sculptors of their time”.

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Figure 13. Streamstown marble quarry in the townland of Letternoosh, west of Streamstown Bay and north of Clifden in Co. Galway, situated in the Connemara Marble Formation (blue), leased by Richard Colles from the 1880s into the early twentieth century (OSI 25” map (1888-1913)).

Further information on the Connemara marble quarries is given later in this chapter and comprehensive accounts of the Cork and Kerry red marble quarries is provided in chapter 3.

Still, in the late nineteenth century, the absence of a canal from Kilkenny to New Ross hindered the marble works reaching its full potential, yet Richard Colles succeeded in profitably raising, manufacturing and trading an assortment of coloured native marbles; he exhibited at international trade shows, such as Chicago in 1893,234 and distributed his wares to every county in Ireland as well as to England, Scotland, Wales, Belgium, the United States, Canada and Australia.235 The highest awards in prize medals for the Kilkenny marble were obtained at the Dublin exhibitions in 1872, 1882 and 1883, at the Cork Exhibition in 1883 and in Liverpool in 1886.236 He sold the marble works in c. 1921237 and “though the radical polychromy of the mid-nineteenth century diminished its [Kilkenny marble] central role in Irish building practice, its dark colour and rich fossilised composition retained its appeal until the present day”.238 David Page, in his Advanced Book of Geology published in 1856, beautifully epitomised the “not indifferent beauty” of Kilkenny marble with his remarks on “the joints and stalks of encrinites, the star-like pores of the corals and sections of shells, shining out from the darker matrix in which they are embedded”.239

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234 “The Irish Marble Company (Richard Colles).”
238 Hand, p. 103.
Outside of Kilkenny most of the Victorian limestone and marble quarries were worked on an ad-hoc basis and it appears that stone was supplied to meet local demand. Nevertheless, Galway proved to be a key locality for the beginning stages of commercialisation of decorative stone in early nineteenth-century Ireland. While strong competitors to Kilkenny black limestone emerged along the banks of Lough Corrib and at Merlin Park close to Galway city, the most prized stone in the region was Connemara serpentinite marble. Early usage of this stone was documented in Galway in the seventeenth century when “the city was adorned with green marble walls, flanked by numerous towers”.

*Connemara marble*

**Geological setting**

Connemara marble crops out in County Galway and is part of the Grampian Connemara Metamorphic Complex. The Connemara marble belongs to the Lower Dalradian (Appin Group) and forms part of the Connemara Marble Formation, which is situated between the older Clifden Formation and the younger Barnanoran Formation. These three formations of the Lower Dalradian and the Middle (Argyll Group) and Upper (Southern Highland Group) Dalradian of Connemara are correlated with Dalradian rocks in Donegal and Scotland. The Dalradian succession was deposited on the south-eastern continental margin of Laurentia, a palaeocontinent, which 500 million years ago (Ma) was located 30 degrees south of the equator and encompassed the north-western regions of Ireland and Great Britain, including Connemara. The older Connemara rocks of the Appin Group were laid down as impure limestones approx. 650 Ma in a shallow marine coastal setting while the younger Argyll and Southern Highland Groups were deposited in basins surrounded by faults. At this time the south-eastern regions of Ireland and Great Britain were part of another micro palaeocontinent, Avalonia, and the Iapetus Ocean separated the two landmasses. During the Cambrian the Iapetus began to close; a series of

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tectonic events, termed the Caledonian Orogenic Cycle, were associated with the ocean’s closure. In an early Devonian event (approx. 405 Ma), titled the Acadian Orogeny, the Laurentian and Avalonian continents finally collided, resulting in closure of the Iapetus Ocean and the formation of the Iapetus suture (the boundary between Laurentia and Avalonia).\textsuperscript{244}

During closure of the Iapetus, approx. 475-460 Ma, the Grampian orogeny, a mountain building event arising from arc-continent collision, took place. Laurentia collided with an oceanic arc terrane, which was produced by subduction of oceanic crust within the Iapetus. Resultant deformation, folding and metamorphism of the Laurentian continental margin of north-west Ireland (i.e. the rocks north-west of the Iapetus suture) occurred and heat and pressure converted the impure limestones in the Appin Group to Connemara marble.\textsuperscript{245} All the commercially significant marbles are concentrated in one stratigraphic horizon, the Connemara Marble Formation\textsuperscript{246}. Connemara marble protoliths comprised both calcareous and clastic lithologies;\textsuperscript{247} it is a metamorphosed impure siliceous dolomitic limestone, or ophicarbonate, interbedded with Dalradian schists and quartzites, which is often referred to as serpentine marble.\textsuperscript{248} This ophicarbonate defines the base of the formation and a thin bed of grey or buff marble, a siliceous dolomite that is generally serpentine free, marks the top of the formation.\textsuperscript{249}

Late in the Grampian orogeny the sediments were metamorphosed to amphibolite grade\textsuperscript{250}, which activated the growth of olivine, diopside, forsterite, tremolite, talc, calcite, dolomite and phlogopite (also known as magnesium mica). The relative proportions of these minerals varied


\textsuperscript{247} The marbles were originally deposited as siliceous dolomites interstratified with fine-grained limy muds and quartz rich sands. B. E. Leake, P. W. G. Tanner, and A. Senior, “The Composition and Origin of the Connemara Dolomitic Marbles and Ophicalcites , Ireland,” \textit{Journal of Petrology} 16, no. 2 (1975): 237–77.


\textsuperscript{249} Treloar, “The Stratigraphy and Structure of the Rocks of the Lissoughter Area , Connemara.”

\textsuperscript{250} Evidence for serpentinization of earlier-formed amphibolite-facies diopside is present in thin section where relatively unaltered diopside crystals are surrounded by serpentine. Also, areas now almost completely composed of serpentine reflect the original presence of higher grade Ca-Mg silicates, such as forsterite and tremolite. Wyse Jackson et al., “Connemara Marble, Co. Galway, Ireland: A Global Heritage Stone Resource Proposal.”
due to the layered nature of the protoliths but silicate-rich and calcite-rich strata occurred. Subsequent hydrothermal metamorphism of the earlier formed high-grade silicates (e.g., olivine and diopside) led to serpentinitization and the greening of the marble. High coloured portions of the Connemara marble represent serpentine-dominated mineralogy and are referred to by local quarry men as “the jewellery grade marble”. Alick McDonnell and members of his family at Clifden, who were self-taught artists, manufactured ornaments, brooches and various other decorative objects by hand using Connemara marble during the late 1800s and Ambrose Joyce, current proprietor of the Streamstown and Cregg quarries, still fabricates sought after ornaments and jewellery from the stone on site today. Though the cause of hydrothermal metamorphism is not certain, it may have been linked to the generation of hydrothermal fluids during emplacement of the Galway granites and/or a regional temperature decrease after the metamorphic peak.

Geological characteristics and economic value
The economic value of the marble is directly linked to its aesthetic qualities, namely colour and texture. The shades are determined by the extent and diversity of the coloured minerals present, such as amphiboles, serpentinized olivine, chlorite, talc, mica, diopside and chalcedony, varying from white to green with increasing serpentine content. Maximum hydration of magnesium silicates during alteration created the deepest green coloured ophicarbonates, which occur particularly in the Lissoughter area in Connemara. Magnesium silicates also occur to the west, but phyllosilicates become more common. A white variety with hints of green is found at Cregg Hill, while another, Pink Grenna, shows traces of pink colouration. Connemara marble typically consists of a groundmass of calcite (white to grey colour sometimes with traces of pink) and creamy white dolomite in which metamorphic minerals create decorative bands of green and darker colours. A limited portion of the Connemara marbles contain enough carbonate to be

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251 Wyse Jackson et al.
252 Leake, Tanner, and Senior, “The Composition and Origin of the Connemara Dolomitic Marbles and Ophicalcites, Ireland.”
253 Leake, Tanner, and Senior; Max, “Connemara Marble and the Industry Based upon It”; Martin Feely, Galway in Stone (Dublin: Geoscapes, 2002); Martin Feely and Alessandra Costanzo, Galway City Walks: Buildings in Stone (Galway: Galway Civic Trust, 2014).
254 Kinahan, Economic Geology of Ireland.
257 Max, “Connemara Marble and the Industry Based upon It.”
classed as a true marble. However, this impure chemistry, resulting in the variable proportions of the metamorphic minerals mentioned above, is highly important to economic value of the Connemara marble.\textsuperscript{259} The complex patterns exhibited in the marbles are due to folding of original parallel sedimentary banding, and secondary foliation formed during several phases of deformational events.\textsuperscript{260}

![Geological Map of Connemara](image)

\textit{Figure 14. Geological Map of Connemara, Co. Galway showing the locations along strike of the principal Connemara marble quarries - Streamstown and Cregg near Clifden, Baranoran near Ballinahinch, Lissoughter and Derryclare near Recess.}\textsuperscript{261}

\textbf{Early quarries, speculation and investment}

Connemara marble may have been utilised as early as Neolithic times for construction of axes,\textsuperscript{262} and as previously mentioned the stone was documented in Dublin stone yards at the turn of the nineteenth century, however there is no evidence to suggest that it was commercially extracted at this time. John D’Arcy (1785-1839) of Clifden Castle, and founder of the town of Clifden, first quarried Connemara marble in significant volume in the early 1820s and initial exports to London occurred in mid-1824.\textsuperscript{263} The quarries were situated near Streamstown; in the valley between Streamstown Bay and Loughauna in the townland of Lettnenoosh where raised blocks were carted to Clifden for shipment, and further east at Loughnahillion in the townland of Cregg where the blocks were transported more easily northwards by road to Barnaderg Bay.\textsuperscript{264} The discovery of this marble, described as surpassing the cherished \textit{verde antico}, was rejoiced as the only other

\textsuperscript{259} Max, “Connemara Marble and the Industry Based upon It.”

\textsuperscript{260} Max.

\textsuperscript{261} Modified from Max, “Connemara Marble and the Industry Based upon It”, fig. 2.


\textsuperscript{263} “Importation of Green Marble from Ireland,” \textit{Morning Post}, October 5, 1824, 3.

\textsuperscript{264} Kinahan, “On The Economic Geology of Ireland.”
green marbles found in Britain at that time were unsuitable Welsh\textsuperscript{265} and Scottish\textsuperscript{266} varieties; in post-Napoleonic Britain, Ireland and Egypt were the only potential suppliers of this high quality decorative stone.\textsuperscript{267} The Napoleonic Wars (1799-1815) inhibited the importation of continental marbles to Britain and hence encouraged exploration for indigenous stone capable of receiving a polish. In a letter to the Society for the Encouragement of Arts, Manufactures, and Commerce in 1813 Isaac Jopling of Gateshead, Durham, provided a detailed account of quarries of marble in the north of Scotland.\textsuperscript{268} Following the cessation of stone imports from Italy in 1789\textsuperscript{269} Jopling, a marble mason seeking native substitutes for white statuary Carrara marble, embarked on his expedition to north Scotland in 1799. He spent seven summers and two winters searching for quarries, building roads, excavating potentially viable marble, fabricating chimneypieces from said marble, and with his report he provided sixteen specimens of white Scottish marble to the Society. It is probable that the effects of the French Revolutionary Wars (1789-1794) and the proceeding Napoleonic era motivated similar investigation of Irish decorative stone resources during this period.

The early 1800s proved to be a time of speculative investment in Ireland; joint stock companies, including the Hibernian Mining Company and the Mining Company of Ireland, were in existence and engineers were widely employed to prospect for natural commodities on private estates.\textsuperscript{270} A public plea from the \textit{Connaught Journal} in 1824 urged the newly established Mining Company of Ireland to consider exploiting a lately discovered “rich and valuable quarry of marble of a light green colour” for fear of this precious stone being left to “lie in rude and useless blocks” and the “poor people of a miserable and peaceable district” doomed to poverty and unhappiness.\textsuperscript{271} The aforementioned marble was situated on the D’Arcy estate and although the Hibernian Mining Company had attained prospecting rights from Thomas D’Arcy (father of John D’Arcy) since 1794

\textsuperscript{265} “Importation of Green Marble from Ireland.”

\textsuperscript{266} There is evidence that green marble, similar to the mottled variety of Connemara marble, was quarried on the Isle of Iona since medieval times. In the \textit{Statistical Account of Scotland} in 1795 the local minister recalled the Duke of Argyll commencing quarrying of the stone on his estate a few years previously. However, the inability to procure large enough blocks combined with transportation difficulties resulted in the quarry only being worked on a part-time basis to meet local demand. It was not until the first decade of the twentieth century that the quarry, then leased by The Iona Marble Company, was worked on a commercial scale and shipments of the stone were sent to Belgium. David Viner, \textit{The Iona Marble Quarry}, 2nd ed. (Argyll: The New Iona Press Ltd., 1992).

\textsuperscript{267} “Importation of Green Marble from Ireland.”

\textsuperscript{268} “Account of Marble Quarries in the North of Scotland,” \textit{Scots Magazine}, February 1, 1813, 93–96.

\textsuperscript{269} Jopling’s marble merchant informed him that France had taken possession of Carrara and that it was not likely that marble could be imported from Italy to Britain for many years to come. “Account of Marble Quarries in the North of Scotland.”

\textsuperscript{270} Casey, “The Museum Building’s Radical Polychromy: Impetus and Influence.”

\textsuperscript{271} “The Mining Company,” \textit{Freeman’s Journal}, March 11, 1824, 4.
it was only in 1825, under the charge of John D’Arcy, that the quarries came into their possession.  

The Hibernian Mining Company commenced working the quarries in the mid-1820s but this arrangement only lasted a short while after which the operation was run by the landlord himself.  

In 1825, Thomas Weaver, Engineer to the Hibernian Mining Company, compiled a report on the geology and the economic viability of the Connemara marbles as well as the associated crucial transport networks in the area. An active member of the Geological Society of London, Weaver studied geology and mineralogy under Abraham Werner from 1790-1794 in the Frieberg School of Mines and he was awarded fellowship at the Royal Society in 1825 for his work on “gigantic elk” remains found in a bog in Co. Down. “Known as a strict if considerate manager of mines in Ireland”, he was responsible for the investigation of gold deposits in Avoca, Co. Wicklow shortly after completing his studies. Weaver’s important contribution to Irish geology lay in his publications and reports; he produced monographs and geological maps of the east (1819) and south (1837) of Ireland, which were published by the Geological Society of London. His comprehensive report on Connemara marbles assuredly determined the Hibernian Mining Company’s investment in D’Arcy’s quarries, albeit short lived.

Thomas Weaver investigated and reported on both white and green marble deposits on D’Arcy’s estate (figure 16), which were interbedded with the predominant “micaslate”. This rock type that he referred to as micaslate is more correctly a schist; the Connemara Marble Formation frequently alternates with the Barnanoran Schist Formation, which consists of aluminous schists and hornblende rocks, and the Streamstown Schist Formation, which is made up of psammitic and pelitic schists. The Bennabeola Quartzite Formation also features in interspersed layers with the marbles and schists. Weaver described the green marble on D’Arcy’s estate, located at Letternuse (=Letternoosh), as “a compound of ingredients, serpentine and limestone. The latter...

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272 NLI MS 658, Hibernian Mining Company letters and minutes, August 10, 1825.
274 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
276 Peadar McArdle, Dissenting Spirit: Thomas Weaver, Geologist and Mining Engineer (Dublin: Liffey Press, 2018).
277 Wyse Jackson, “Irish ‘Rock Stars’: Thomas Weaver (1773-1855).”
278 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
279 A micaslate is a low-grade metamorphic rock; the protolith is mica rich mudstone or shale.
280 A schist is a medium-grade metamorphic rock; a pelitic schist is formed from a mudstone or shale while the parent rock of a psammitic schist is a sandstone.
281 Bedrock Lithology 1:100,000, GSI.
varies in colour from dark bluish grey to white, and from a fine granularly foliated texture to compact. The serpentine varies from dark green to yellow. From the intermixture of these two substances and the mode of their association, or incorporation, arise the different aspects of the marble”. He considered the most beautiful kind to be that “which proceeds from a distinct compound of deep bluish grey limestone and yellow serpentine, these two colours affording great reliefs to each other”. Another attractive variety “consists of a base of white limestone diversified by streaks and spots of yellow and green” while “the heaviest looking specimens are formed from dark grey limestone with a sparing intermixture of serpentine”. He sent specimens of every variety to the board of the Hibernian Mining Company to give them a sense of the spectrum of colour and texture available in the quarry.282

The Letternoosh green marble forms a wedge-shaped unit, which “extends about 90 yards upon the range, from the head on the SE where it is 120 ft broad, to the edge on the NW where it is only 9 or 10 ft wide” (figure 15). It terminates abruptly to the SE, “the head of the wedge abutting directly upon what is called the black rock by the workmen, being in fact principally composed of massive mica with some hornblende, and containing casually also a good deal of disseminated iron pyrites”. Along with the various specimens of green marble Weaver also sent samples of this black rock to the Board. The marble exhibits its widest range of varieties towards the NW where the green marble “appears to merge gradually into white limestone, agreeably mottled in the first instance, with bluish yellowish, and greenish streaks and spots, and subsequently taking more the characters of that simple substance”. As previously stated, Weaver considered the marble of varied tonality to be the most attractive. The green marble encompasses two volumes of coarse quartz, one of small size in the SW region of the bed and one of substantial size close to the quarry;

282 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
283 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
the occurrence of quartz within the green marble was also observed by Weaver at Richard Martin’s quarry at Ballinahinch.\footnote{NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.}
Figure 16. Weaver’s map of white and green marble deposits on D’Arcy’s estate in 1825.

NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
Weaver estimated the cost of excavating, cutting and transporting the green marble on D’Arcy’s estate and deemed the operation viable. He valued the marble at £6 per ton, however he remarked that blocks exceeding 7 feet in length would obtain a higher market price. In his report he also stated that Richard Martin had reached an agreement with a London trader to supply him with his decorative stone. The price per ton (or 12 cubic feet) of Martin’s green marble began at £6 for blocks and slabs “extending between 2 and 7 feet in length, by not less than 1 foot broad, and of indeterminate thickness” and a supplementary £1 for every foot of additional length. Martin’s statuary marble was to obtain £12 per ton for slabs of 12 feet to 14 feet in length with an added £2 per ton “for every additional foot of length exceeding 14 ft. So that a column of 20 ft in length would be worth £24 per ton”. Weaver concluded, “What length of a column may be obtained in Letternuse quarry can scarcely be judged of with certainty until the bed be properly laid upon, the operations hitherto having been carried out in a very insufficient manner on the surface of the bed”. As reflected in Weaver’s account, it appeared that the attainable price for Connemara marble, both the green and white varieties, was very much dependent on the size of the blocks that could be excavated from the quarries.

Weaver determined that the two principal deposits of white marble were at “Coolacligh” (=Coolacloy), just north of Kingstown Harbour, and Letterdeen, the townland south of Leternoosh. At Coolacloy white marble prevailed with unit thicknesses varying between 10 and 100 feet. At intersections with the surrounding schists the marble acquired impure components, which resulted in the mainly white stone being shaded by bluish and greyish lines and tints of yellow, brown and green. The finest portion of the white marble occurred in the south, however even here hints of contamination were evident (figures 17 and 18). Weaver deduced that the white marble at Coolacloy was not satisfactory for statuary purposes, nor was it suitable for common marble because the impurities were not prominent enough to create a desired variegated effect.

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286 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825; Casey, “The Museum Building’s Radical Polychromy: Impetus and Influence.”
Figure 17. Diagram illustrating the interbedded situation of the Coolacligh [Coolacloy] white Connemara marble (referred to as primary limestone in the diagram) with what Weaver referred to as micaslate [Streamstown Schist Formation and Barnanoran Schist Formation] just north of Kingstown Bay.  

Figure 18. The eastern extremity of the townland of Coolacloy (referred to as Coolacligh by Weaver in his report) contains white marble in the Connemara Marble Formation (turquoise blue) interbedded with schists in the Streamstown and Barnanoran Schist Formations just north of Kingstown Harbour (OSI 6" map (1837-1842)).

He remarked that the marble at Coolacloy is coarser grained than that at Letterdeen, however at both locations the stone partially assumes the granular texture of primary dolomite. At Letterdeen the marble largely consists of two beds, ranging from 40 to 50 feet in thickness, until the strata converge and form one large bed towards the SE portion of the deposit. Just south of the eastern extremity of this deposit occurs another small isolated layer of marble, which comprises the white variety but also a compact bluish grey stone in the SE quarter (figure 19). Weaver sent several specimens from the uppermost to the lowest stratum to the Board and he concluded that the white Letterdeen marble surpassed the Coolacloy marble with regards both colour and structure. Although he considered that deep excavations at Letterdeen may yield valuable blocks and slabs of pure statuary marble “analogous to the Carrara marbles, a

287 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
predominant base of white traversed occasionally by slight veins of light and faint grey”, he was however “principally apprehensive of the evil effects of interposed portions of micas that may casually occur” at this locality. He concluded that the economic viability of extracting this marble could “be ascertained only by direct experiment”. White statuary marble was not exploited on any commercial scale at either Coolacloy or Letterdeen.

The rudimentary uncovering of marble in Connemara suggested the presence of exploitable statuary white marble in addition to the green variety. During the mid-1820s a contemporary British newspaper, The Morning Post, repeatedly encouraged the replacement of imported continental marbles with superior native British stone, namely green and white marbles from Connemara. A shipment of green, dove and white marbles from Richard Martin’s estate at Ballinahinch lay at a wharf near Waterloo Bridge in the summer of 1826 waiting to be fabricated into architectural ornament in the capital. Regardless of the white marble’s pure colour and fine crystalline texture, the incorporation of numerous coloured streaks on account of its interbedded situation with schists prohibited excavation of adequately sized unblemished cubical blocks; pristine marble of “limited thickness, but of several feet square” could however be procured. The principal white marble quarry in Connemara is at Cregg, about four miles east of Streamstown; this locality does not feature in Weaver’s report on potential white marble deposits.

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288 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
289 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
290 “Some Quarries of White and Green Marble...,” Freeman’s Journal, June 19, 1823, 3.
291 “Importation of Green Marble from Ireland”; “British Marbles,” Morning Post, August 26, 1826, 3.
292 “British Marbles.”
on D’Arcy’s estate. Kinahan described the Cregg stone as white to cream white in colour, coarsely crystalline to compact and fine-grained, suited for delicate cut-stone purposes, however it could not be raised in large blocks.\(^{294}\) In time it was realised that the white variety of Connemara marble was not equivalent in volume, structure or purity of tone to its Italian or Greek counterparts and large scale exhumation of the stone did not come to fruition.

\(\text{Figure 20. Streamstown Marble Quarry in the townland of Letternoosh presently owned and worked by Ambrose Joyce Jr t/a Connemara Marble Industries Ltd.}\)

\(^{294}\) Kinahan, *Economic Geology of Ireland*, p. 179.
### Streamstown Quarry, Letternoosh
1794: Hibernian Mining Company gained prospecting rights from Thomas D’Arcy (but the quarries did not come into their possession until 1825)
1824 - mid 1840s: John D’Arcy, landlord, opened and worked the quarry
1825: Hibernian Mining Company leased and worked the quarry for a short time
1850s: Thomas Eyre of Bath purchased the D’Arcy estate and marble quarry
1880s: Richard Colles of Kilkenny leased the quarry
1895: Rober C. Fisher & Co., Marble Merchants, New York leased the quarry
1930s: Captain Waithman, leased the quarry
1960s: Terence Bourke, 10th Earl of Mayo, owner
Current: Ambrose Joyce, Jr t/a Connemara Marble Industries Ltd.

### Cregg Quarry
Current: Ambrose Joyce, Jr t/a Connemara Marble Industries Ltd.

### Ballinahinch Quarries, Barnanoran
1825 - c. 1846: Richard Martin, landlord, opened and worked the quarry; later worked by his son, Thomas Martin
1851: A.C. Lambert of Cong Abbey, owner (exhibited two tables at the Great Exhibition)
1859: Law Life Assurance Co., owner
1872: Richard Berridge, owner
1870s: H. Sibthorpe and Son leased the quarry
1900s: Peter Rafferty leased the quarry
Current: Joyce

### Tievebreen Quarry
1855-1859: Law Life Assurance Co., owner

### Derryclare Quarry
1820s: Richard Martin, owner
1855: Law Life Assurance Co., owner

### Lissoughter Quarry
1825 - c. 1846: Richard Martin, landlord, opened and worked the quarry; later worked by his son, Thomas Martin
1855-1859: Law Life Assurance Co., owner
1872: Richard Berridge, owner
1870s: H. Sibthorpe and Son leased the quarry
1890s: Rober C. Fisher & Co., Marble Merchants, New York leased the quarry
1900s: James Rafferty leased the quarry
Mid 1900s: Festus Joyce leased the quarry
1960s: Michael Joyce of Recess, owner
1983 - current: Stephen Walsh t/a J.C. Walsh and Son

Table 1. Ownership and/or operators of Connemara marble quarries

In the early 1820s another local landlord, Richard Martin of Ballinahinch, known as ‘Humanity Dick’ on account of his championing of animal welfare, opened a quarry on his estate that
employed between 150 and 170 men who were engaged in extracting and sawing the stone.295 Like at D’Arcy’s quarries further west at Clifden, Thomas Weaver of The Hibernian Mining Company also examined and reported on the extraction potential of Martin’s quarries.296 The area was visited in 1825 by Charles Lewis Giesecke, Professor of Mineralogy at the Royal Dublin Society, who reported that Martin’s quarries produced “solid masses of an enormous size”, which were cut into slabs on site for tables.297 Stone from this locality was used in the columns of the Museum Building (1853) and in the Oxford Museum (1860).298 Good examples can also be found in the National Museum of Ireland and in the National Gallery of Scotland. It is probable that the Connemara chimneypiece that was presented to George IV and which is now in the Carlton Club, London,299 came from Ballinahinch. Much of the marble utilised during the early nineteenth century was obtained from the famous “Ballinahinch Quarries” situated in the valley on the Owenglin River at Barnanoran. The raised blocks at Barnanoran were either manufactured by water power at the quarries or left raw. From there the blocks were transported over a steep ridge, between Owenglin and Ballinahinch, six miles to Cloonisle pier for shipment;300 Martin laid out this road and had the noted public works engineer Alexander Nimmo301 construct a pier. Such investments suggested confidence in the long-term viability and future of the family quarrying trade. Ultimately, in the mid-nineteenth century both the Martins and the D’Arcys were forced to sell their estates, including the quarries.302 Other veins of Connemara marble where small quarry openings occurred, but were not exploited on an economical scale, were located at Derryclare and Tievebreen, however the commercial sources of high quality marble were primarily at Streamstown, Ballinahinch and Lissoughter.303

296 NLI MS 658, Hibernian Mining Company letters and minutes, Report of Thomas Weaver, December 16, 1825.
298 Kinahan, Economic Geology of Ireland, p. 154.
301 Alexander Nimmo was the public works engineer for the western region of Ireland and contractor to the Hibernian Mining Company. For further information on Nimmo and other early nineteenth century civil engineers who influenced the emerging Irish stone industry see Casey, “The Museum Building’s Radical Polychromy: Impetus and Influence.”
Later operations

Thomas Eyre of Bath purchased the D’Arcy estate and quarry during the 1850s, and the quarry was later leased by Richard Colles of Kilkenny in the 1880s and by Robert C. Fisher, Marble Merchants, of New York City, in 1895. In 1872, Richard Berridge purchased the Martin estate, including quarries at Ballinahinch and Recess. By the late nineteenth century the Ballinahinch quarries, leased by Messrs. Sibthorpe and Son of Dublin since 1870, had fallen into disrepair due to the severe road, which entailed a steep ridge between Owenglin and Ballinahinch over which the blocks had to be carted. Sufficient stones for the market could be raised cheaper at another quarry at Lissoughter, near Recess. This quarry was initially worked to a slight extent by the Martins, but much more extensively exploited by Sibthorpes from about 1870 until the end of the century, at which point Fisher assumed the lease. There was high demand for Connemara green marble at the time when Sibthorpes began leasing the quarries and working the stone at their manufactory on Great Brunswick Street in Dublin. Unfortunately, architects’ insistence on using Connemara marble, as well as other Irish marbles, on the exterior of buildings soon generated a bad reputation for the stone. They weathered badly and became unsightly when exposed to the elements, and undeserved prejudice against the green marbles emerged.

In the mid-1800s Connemara marble was not as sought after as later in the century. George Wilkinson, author of Practical Geology and Ancient Architecture of Ireland, a volume which did much to promote the use of natural stone in building in Ireland, observed a decline in the use of Connemara marble in the 1840s. He stated that Connemara marble was much more extensively used in the past and lamented that it was not likely that this marble would come into general use again at that present time at least: “owing to the great facility of obtaining foreign marble, in favour of which there is a strong popular prejudice, and which the marble workers also prefer. The inconvenient locality, and the bad roads to the quarries where these native marbles are raised, make the cost of obtaining them considerable; in addition to which, it is considered that the proprietors ask too high a price for the material”.

He also attributed the use of gunpowder during the removal of overburden, which damaged the marble, to a prejudice in sale of the

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304 Griffith’s Valuation, March 31, 1855.
305 Kinahan, “On The Economic Geology of Ireland.”
308 See chapter 4 of this thesis for further information on Sibthorpe and Son, their marble works on Great Brunswick Street and their expansion into quarry ownership.
Connemara marble at that time. The Victorian travel writers, Samuel Carter Hall (1800–1889) and his wife Anna Maria Hall (1800–1881) toured Ireland during the 1840s, during which time they visited Connemara, including the marble quarries. While proclaiming the “precious serpentine” to be synonimic in structure and appearance to the esteemed verde antico of Italy and “undoubtedly the richest and finest ornamental stone yet found in these kingdoms”, the Halls also noted this prejudice against the marble in the English market, which only “time and perseverance” would overcome, and observed a neglect of the stone in Ireland.\textsuperscript{311} An article in the \textit{Anglo Celt} in 1853 recorded a tactic to counter such bias: Connemara marble was shipped to Italy and then sold back to the British aristocracy through the London market under the name of Italian marble at an enormous price – “valued as the produce of Italy – despised as the produce of Ireland”.\textsuperscript{312} This prejudice disappeared over time and Connemara marble was widely exported to Britain and America later in the nineteenth century.

During the final decade of the nineteenth century and first decade of the twentieth century Connemara marble was championed in America by Robert C. Fisher & Co., Marble Merchants, New York who leased quarries at Streamstown and Lissoughter (figure 21) and imported over $1 million worth of marble.\textsuperscript{313} Previous to this stone was imported in small quantities and sold by the pound (weight).\textsuperscript{314} Magnificent examples of its use in New York include the interior of the University Club, 5th Avenue, the main rotundas of the Gould Memorial Library of New York University in the Bronx and the Low Memorial Library of Columbia University where stone for only two of the planned eighteen columns could be obtained. Other buildings in the USA that showcase Connemara marble include the Capitol Building, Harrisburg, Pennsylvania (1906); St Patrick’s Church, Mission Street, San Francisco (re-built after 1906 fire); and Chicago Public Library, now the Chicago Cultural Centre (1893).\textsuperscript{315}

King Edward VIII and Queen Alexandra visited the Lissoughter quarry, then under the management of James Rafferty, on 29 July 1903 where they were shown wire saws in operation before being presented with a harp and inkstand made from the green marble.\textsuperscript{316} The introduction of wire


\textsuperscript{312} “Connemara Marble,” \textit{Anglo Celt}, June 30, 1853, 4.


\textsuperscript{315} A comprehensive list of buildings in the USA in which Connemara marble is used is given in Wyse Jackson et al., “Connemara Marble, Co. Galway, Ireland: A Global Heritage Stone Resource Proposal.”

\textsuperscript{316} “The Marble Quarries,” \textit{The Irish Independent}, July 31, 1903, 5; Walsh, \textit{Connemara Marble: Ireland’s National Gem}. 
saws by the American firm, which were reportedly the first ever used in the British Isles, ensured the extraction of merchantable blocks; “if the quarry had been operated after the manner usually adopted in Europe, by blowing out vast masses and then cutting them up by hand”, this would not have been achievable.317 The stone was not unknown to the royals with Prince Albert having recommended it for ornamental use to the Society of Arts, of which he was the president, over half a century prior to this royal visit.318


318 “Irish Marbles,” Reading Mercury, September 5, 1846, 4.
319 “New Capital for Irish Quarries.”
In July 1911 Connemara Green Marble Quarries Limited was formed with a capital of £100000, divided into 100000 shares of £1 each, to acquire a lease for a term of 99 years of approx. 1000 acres of land at Recess “containing vast deposits of the celebrated Connemara green marbles of many different shades”. The prospectus, which was advertised at the beginning of November 1911 in several newspapers including Freeman’s Journal, The Northern Whig, The Belfast Newsletter, The Daily Express and The Cork Examiner, estimated a profit of £24620 per annum and proposed to establish the necessary processing plant as soon as possible to enable the execution of orders for columns of over 20 ft high and unusually large slabs when required. Extracts from reports on the marble reserves by the marble agents, Fenning & Co. Ltd., of Palace Wharf, Hammersmith; Mr T. Thackray Deakin, a renowned green marble and quarry expert of that time; and William McDonnell, Connemara marble expert, were cited in the prospectus to encourage investment. The company assuredly stated, “Marble is now used so extensively by architects, that almost every building of any importance has considerable quantities set out in the specifications when the funds permit. The demand in England, if regular supplies are guaranteed, will be of itself more than sufficient to keep the Company’s quarries in full employment”. £50000 was offered for subscription at par between the 2nd November and 6th November 1911, “payable 1s per share on application, 4s on allotment, 5s one month after allotment, 5s two months after allotment, and the balance when required”. The company was established to “revive an industry that had its most prominent development at the hands of the Americans” at the beginning of the century. Expert advice and working capital to explore the extent of the marble deposits along with advancement of the Midland Great Western Railway to within a mile of the quarry, establishment of a mill for sawing, polishing and finishing the marble on site and the stone’s heretofore positive reputation overseas were promising factors in facilitating the success of this company in comparison to past ventures.

After a post-World War 1 decline in popularity, a brief revival of the Streamstown quarry occurred in the 1930s under the ownership of Captain Wyndham Waithman, who was also proprietor of the Merlin Park black marble quarries (discussed later in this chapter); Captain Waithman’s son

323 “Prospectus. Connemara Green Marble Quarries, Limited.”
326 “Connemara Marble Quarries,” Belfast Evening Telegraph, November 4, 1911, 7.
327 “Development of Irish Marble.”
was responsible for the management of Streamstown. The Captain persuaded various marble traders in London, including Messrs. Whitehead of 64 Kensington Oval; in Belgium, such as the firm of De Fryne of Antwerp; and others in America and Canada to promote the sculptural value of the stone and so “it came to pass that an indigenous industry came alive once more... quarries that had not been worked for forty years began to write the records of their deeds, not in running water, but in lasting marble”. At the end of 1930 eight men were employed at the Streamstown quarry and it was anticipated that early in the new year this would increase to at least 24. For the first time an air drill was employed to allow the removal of blocks, a process that removed the shattering effect of the saw. Much of this stone was transported to the Irish Marble Industries Ltd. works at Merlin Park, where the necessary machinery had been installed, and worked alongside the black marble of the locality.

![Figure 22. Church of Saints Peter and Paul, Athlone (left) and Cathedral of Our Lady and St Nicholas, Galway (right).](image)

The stone was widely used in church building in Ireland during the mid-twentieth century, the most famous of which are the Church of Saints Peter and Paul, Athlone, (figure 22) built in 1930-

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329 “Connemara Marble Demand - Orders from Sculptors in Chicago - Improved New Methods.”
331 A full description of this building is available at https://stonebuiltireland.com/heritage-sites-by-county/westmeath/
1936 to the designs of William Henry Byrne & Sons, and the Cathedral of Our Lady and St Nicholas, Galway,\(^{332}\) (figure 22) began in 1957 and designed by John Joseph Robinson. 120 tons of green marble from Streamstown was ordered for the building of Saints Peter’s and Paul’s Church in Athlone. The stone was taken in rough form to the marble works at Merlin Park, which was under the direction of Captain Waithman, and columns were turned and polished. The rich, black, fossiliferous panelling in this church is of Merlin Park limestone, which was also fabricated at the marble works.\(^{333}\) Today, the three major Connemara marble quarries at Streamstown, Ballinahinch and Lissoughter remain operational and most of the extracted stone is fabricated into jewellery and tourist trinkets, while some is utilised in high end architectural decorative cladding and furniture. Unfortunately, the same cannot be said of the once highly acclaimed Galway black stone.

**Galway black limestone**

Galway black limestone, which is also commercially referred to as Galway black marble on account of its ability to take a polish, played a significant role in the initial commercialisation of native stone in the Victorian period. Menlough (also Menlo) and Anglingham quarries on the shores of Lough Corrib (figure 25), three miles north of Galway, as well as the Merlin Park quarries (figures 23 and 24) to the east of Galway city, all located in the estate of Sir Valentine Blake (1780-1847), 12th Baronet, yielded Galway black limestone at a manufacturing scale for native use and export since the 1820s. The quarried Galway limestone belongs to the Burren Formation (Viséan), which consist nearly entirely of shallow water shelf facies. It is a bituminous, fine-grained, relatively unfossiliferous packstone/wackestone, which is susceptible to a good matt polish. On the surface colonial corals, solitary corals and brachiopods are visible. In thin section the stone from the classic quarry at Anglingham is peloidal and contains numerous unicellular foraminifera but little shelly fragments, whereas the Merlin Park stone contains algae, corals, bryozoans, a variety of foraminiferan species, and amorphous opaques (see chapter 5, figure 13 for an image of the Anglingham limestone in thin section). The presence of algae indicates deposition of the lime sediment in very shallow water. Shellbeds with brachiopods and corals are generally confined to the shallowing phase of the Upper Viséan limestones.\(^{334}\)

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332 A full description of this building is available at https://stonebuiltireland.com/heritage-sites-by-county/galway/
333 “Irish Marble - Location of Deposits - Development of Resources.”
Merlin Park quarries

The early nineteenth century Merlin Park quarries were situated in the neighbouring townlands of Merlin Park and Doughiska, about four miles east of Galway city (figure 23). By the time of publication of the 25" OSI map in the late 1800s quarrying of the decorative stone prevailed in Doughiska with the opening in Merlin Park no longer depicted on the map (figure 24). The Merlin Park quarries (which were known as the “Royal Quarries”) were opened in 1814 by the landlord who exploited two beds of the stone and commenced exportation of manufactured or worked stone prior to 1820; in the following year marble chimneypieces from Merlin Park were sent to Carlton House in London. In 1822 Georgina Blake of 5 Gardiners Row, Rutland Square, Dublin, sent two letters to the Chief Secretary’s Office, Dublin Castle, requesting financial support for the Royal Quarry to provide local employment for the poor. In the first letter, dated 4th January 1822, she claimed that the quarry had enjoyed a degree of commercial success and stressed necessity of providing greater local employment for the poor, who were subject to want of food, as well as having suffered due to ‘floods and storms’. She reiterated this sentiment midway through the same year in another letter, which relayed the vital role of the quarry in providing employment for the poor and further stressed the quarry’s need for support for general relief of working families in the vicinity. Valentine and his son Thomas Blake (1805-1875), 13th Baronet, continued to support famine relief in the Menlo district throughout the 1840s and voiced the people’s need for employment.

Henry Hodgson, originally of Whitehaven in Cumberland, purchased the Merlin Park estate in the Encumbered Estates’ Court in 1852. Already engaged in mining speculation in different parts

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335 There were two specimens of Galway black marble in the Collection of British and Foreign Marbles in the Sedgwick Museum: a deep black, fine-grained variety from Doughiska and a less pure type with occasional white spots from Merlin Park. The Merlin Park stone was supposedly used in the steps of the portico of St Paul’s Cathedral, London, in the staircase of Marlborough House (c. 1709) and in Christopher Wren’s staircases of Kensington Palace (1700). Watson, British and Foreign Marbles and Other Ornamental Stones: A Descriptive Catalogue of the Specimens in the Sedgwick Museum, Cambridge, p. 60, 61.
337 “Royal Marble Chimney Pieces,” Dublin Evening Post, October 2, 1821.
of Ireland, he took possession of the quarry in Doughiska in 1853 with the intention of working it on an extensive scale; by this time the quarry in Merlin Park had ceased operations. In 1868 the Merlin Park estate, including the quarries, was advertised for sale in the Landed Estates’ Court, but it was not until 1876 that Robert William Waithman, grandfather to Captain Wyndham Waitman, purchased it. The Doughiska quarry lay idle for much of the second half of the nineteenth century until the 1880s when Messrs Sibthorpe and Son of Dublin leased and worked it; they continued to exploit the black decorative stone, as well as other varieties of native polychrome limestones and marbles, into the twentieth century. Captain Wyndham Waithman inherited ownership of the quarry after the first World War and extracted stone until 1944 when it was put back on the market again. The quarry was worked until 1969.

Figure 23. Merlin Park black marble quarries in the townlands of Merlin Park and Doughiska, east of Galway City (OSI 6’’ map (1837-1842)).

342 The Hodgson family owned mines in Avoca, before moving to the west of Ireland in the mid-nineteenth century where they mined copper and lead on their estate, mainly located in the parish of Kilcummin, barony of Moycullen, Co. Galway. http://landedestates.ie/LandedEstates/jsp/family-show.jsp?id=656 [accessed 31 August 2021].
344 Hodgson held leases for the Steward’s house, land and the marble quarry in Doughiska together with the house, offices, gatehouse and land in Merlin Park; at this time a quarry was not listed in Merlin Park. Griffith’s Valuation, March 07, 1855.
345 Originally from Lancashire, Robert William Waithman came to Ireland in the 1860s and purchased estates in the Landed Estates’ Court, including Merlin Park. http://landedestates.ie/LandedEstates/jsp/family-show.jsp?id=656 [accessed 31 August 2021].
349 “Famous Galway Marble Quarries In The Market,” Connacht Tribune, June 17, 1944, 11.
Menlough and Anglingham quarries

Mr and Mrs Hall, during their scenic tour of Ireland in the 1840s, considered the subject of Irish marbles to be “one of vast importance” and so they included a visit to the Menlough quarry and saw mill. In an exchange with Phineas Franklin, the then owner of the quarry and mill, they enquired about the history of the black quarries on the banks of Lough Corrib. He explained, “An Englishman, whose name and occupation are lost, exploring the country for minerals more useful than ornamental, chanced to discover a stone of fine texture, which, on polishing by a mason, was pronounced marble of a fine colour. He was unable to work from the want of means, but the fame of the discovery induced two brothers by the name of Ireland, then in a humble sphere, to get permission from the late baronet, and on exporting a cargo to London, it met with an immediate sale among the merchants, at a high price. This was thirty years ago...” The identities of the three brothers involved in the discovery and exploitation of the black decorative limestone at the beginning of the second decade of the nineteenth century were John, Arthur and Stanley Ireland; the principal prospector being Stanley. He established a marble yard in the town of Galway and “employed several workmen who wrought a variety of elegant monuments, plain and sculptured chimney-pieces, tablets, slabs, side-board tables, &c.” He advertised his

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352 Hall and Hall, p. 463.
product in newspapers\footnote{These included the \emph{Chester Chronicle} and the \emph{Bath Chronicle and Weekly Gazette}. Advertisements in these British newspapers in 1812, prior to the establishment of Merlin Park in 1814, verify early export of black marble from the quarry at Lough Corrib. “On Sale. Six Tons of Black Galway Marble.,” \emph{Chester Chronicle}, August 28, 1812, 4; “Bristol Weekly Imports,” \emph{Bath Chronicle and Weekly Gazette}, September 17, 1812, 2.} and exported the stone to various Irish, British and American markets.\footnote{The UK imported several shipments of Galway marble between 1814 and 1820; lack of reference to specific quarries in newspaper advertisements leaves it unknown as to whether the stone was sourced from Merlin Park or Lough Corrib, or a combination of both. “To Be Sold by Auction,” \emph{Manchester Mercury}, December 1818; “Galway Black Marble Shortly Expected,” \emph{Hull Advertiser and Exchange Gazette}, March 9, 1821, 2.} By 1820 this trade had begun to decline.\footnote{Hardiman, \emph{The History of the Town and Country of the Town of Galway}.}

In 1825 Stanley Ireland, who by then was calling himself Stanley De Courcey Ireland, Esq, had moved to London where he was promptly branded a swindling extraordinaire in the British media. This title emerged due to his dishonesty and false representations when assuming tenancy of a property owned by Captain Burton at 91 Gloucester Place. Seemingly “a person of good address and gentlemanly manners”, Stanley described himself as “a man of property” who “banked with Coutts and Drummonds, and was connected with the Dean of Westminster”, Rev. John Ireland (1762-1842). He managed to secure a reference from Richard Martin of Galway, a respected landowner and member of the House of Commons. Martin stated, “Dear Sir – I know Ireland and his family, and believe him capable of discharging what he contracts to pay”. He took possession of the house, which he shared with “a gentlemanly person named Ponsonby”, and hired a housekeeper, a cook, a butler, a valet, a groom, a foreman and a personal servant.\footnote{“Swindling Extraordinary,” \emph{Bell’s Life in London}, October 30, 1825, 346–47.} He pursued an extravagant and sumptuous lifestyle, albeit it short lived for a period of about 6 weeks; he failed to pay his accrued debts to established tailors, china merchants and silversmiths amongst others and it unfolded that he had pawned many of the valuables that had been delivered to his residence on credit and in good faith. The creditors went to his Marylebonne office and obtained a warrant against him on alleged charges of swindling and conspiracy, however before the officer who was instructed to apprehend him could reach the house Ireland had escaped and disappeared.\footnote{“Swindling Extraordinary.”}

Stanley Ireland was later discovered in the Borough where he was residing and passing by the name of Jones. He was detained and examined in court at which Richard Martin was called as a witness.\footnote{“Marylabonne. Charge of Swindling.,” \emph{Freeman’s Journal}, November 1, 1825; “The Re-Examination of Stanley De Courcey Ireland,” \emph{Morning Post}, November 24, 1825, 2.} When questioned about the grounds on which he recommended Ireland for rental of a mansion costing 450l. per year, Martin stated that he conceived him to be a man of property and the lessee of Mr Blake’s [Sir John or Valentine Blake] marble quarry in Galway, which earned
him 8l. to 10l. per ton of marble. Martin, also involved in marble excavation in the west of Ireland, knew the value of the black marble and had seen large quantities of it in both London and Liverpool, which he believed were extracted from Ireland’s quarry. The outcome of several court hearings was the committal of Ireland to Coldbath Fields Prison, Clerkenwell for felony while abandoning his seventeen year old daughter in a London boarding school for which he could no longer pay tuition fees. It appears the industrious entrepreneur who pioneered the extraction and exportation of the Galway black marble deteriorated into a swindling felon when he migrated across the Irish Sea. Nevertheless, the Galway stone cultivated popularity throughout the 1800s, even rivalling the established Kilkenny black limestone in purity of tone and block dimension, and was profitably exploited by less counterfeit individuals than Stanley Ireland later in the century.

George Wilkinson wrote of the Anglingham quarries in 1845 (figure 26), “The view of one of these quarries shows the position of the marble beds and the mode of working them. The upper portion of the rock is coarse limestone, suitable for building purposes, for which it is sold. This part is quarried with gunpowder, but on coming to within three feet of the marble, no further blasting is permitted, to avoid the risk of fracturing the good stone; and the heavy labour of raising the stone

Figure 25. Menlough and Anglingham black marble quarries on the verge of Lough Corrib (OSI 6” map (1837-1842)).

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362 “The Re-Examination of Stanley De Courcey Ireland.”
365 “The marble... is of a beautiful jet black colour, and is susceptible of the highest polish; it is fine-grained, soft and easily wrought, and is much prized by artists. It occurs in considerable masses, with a straight fracture... and solid blocks, often weighing upwards of four tons, and measuring from 18 to 20 feet long, and from 8 to 10 feet broad, are frequently raised, particularly at Anglingham”. Hardiman, The History of the Town and Country of the Town of Galway, p. 288.
by mechanical means, adds of course to the cost of obtaining the marble”.

At the outset of its export the Anglingham black marble sold for £12 per ton, however by 1837 it only received £7-£8 per ton in London and New York. The quarries were leased by Henry Abbott in the 1850s, who also managed the manufactory at Anglingham. The quarry contained three beds of high-quality black marble of which the uppermost “Thin Bed” at 8-11 inches thick was the finest. The middle “London Bed” (11-13 inches thick) was preferred by London marble workers for its capability of being cut economically, while below was located the “Double Bed”, 14 inches in total thickness, comprising jet-black marble with a 2-inch central seam filled with fossil shells. Beneath the Double Bed lay an earthy black stone unsuitable as marble and in 1845 there was approx. 20 feet of clearing (grey limestone) above the marble beds, which increased to 40 feet by 1869. Blocks of stone, 7-10 feet long and 3-5 feet wide were generally raised as this size was favoured in the contemporary market, and in 1869 it was sold at the quarry at 5s. per foot, or on the quay of Galway at 5s. 6d. per foot, to the principal markets in London, Liverpool, Bristol and Glasgow.

In his volume, *Economic Geology of Ireland*, Kinahan recalled the only instance that he could “learn of saws being used to cut stone in situ”, which occurred at Anglingham marble quarry. “Somewhere about the year 1860, Mr. Abbott erected a sawing-frame and engine; but when the block was about half cut through, the saws broke off, leaving, as Mr. Sibthorpe [John Sibthorpe] points out, a puzzleite for future geologists to explain how parallel narrow seams of oxide of iron occur in the blocks”. The quarry was operational until the mid-twentieth century at which time

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367 “First Report of The Commissioners Appointed to Inquire into the Manner in Which Railway Communications Can Be Most Advantageously Promoted in Ireland” (London: W. Clowes and Sons, duke Street, Stamford Street, 1837), Appendix B, No. 8, Mines and Quarries, p. 67.
370 Wood Quay and Anglingham Quay were localities where black marble was sold in Galway. Two middle men who were involved in the sale of marble here were Doolan and Bateman. Charles Haig, William Beauchamp Stoker, and Ross S. Moore, *Irish Equity Reports Particularly of Points of Practice Argued and Determined in the High Court of Chancery, the Rolls Court, and the Equity Exchequer, from Michaelmas 1839, to Trinity 1840, Inclusive, in the Third and Fourth Years of the Reign of Queen*, vol. ii (Dublin: Hodges and Smith, 1840), p. 176.
the interior walling of the Cathedral of Our Lady and St Nicholas in Galway city was built using this stone.\textsuperscript{373}

During the 1840s and 1850s Phineas Franklin of Liverpool managed the neighbouring black marble quarries at Menlough\textsuperscript{374} where he employed “seldom less than 30 men, and sometimes 150”, whom he described as “fine athletic fellows; a distinct race, full of superstition, peaceful, and strictly moral and honest.”\textsuperscript{375} The number of workers in the quarries at any given time was determined by the extent of incoming orders.\textsuperscript{376} At Menlough there were four marble beds, the first was 8 inches thick, the second was one foot, the third was 15 inches and the bottom bed was 6 inches thick,\textsuperscript{377} and like at Anglingham the valuable marble was surmounted by twenty five feet\textsuperscript{378} of clearing.\textsuperscript{379} Franklin commended his marble without hesitation, “I have yet the pleasure of knowing that it retains the highest reputation for its purity from white specks, its jet colour, and the large sizes that can be obtained.”\textsuperscript{380} The largest block raised from the Menlough quarries was 10 feet by 5 feet by 1.25 feet and in 1869 the marble cost £5 per ton.\textsuperscript{381}

\textsuperscript{373} Feely and Costanzo, \textit{Galway City Walks: Buildings in Stone.}
\textsuperscript{374} The entrepreneurial Franklin brothers, of which there was nine, leased the Menlough quarries in the mid-1800s; “House of Lords Sessional Papers,” (1846), vol. 12, p. 177 lists Joseph Lewis Franklin as the “proprietor of marble quarries” in Galway and Griffith’s Valuation, March 07, 1855, lists Phineas Franklin as the immediate lessor of the Menlough marble quarry.
\textsuperscript{375} Hall and Hall, \textit{Ireland: Its Scenery, Character, &c.}, 1846, p. 465.
\textsuperscript{376} Hall and Hall.
\textsuperscript{377} This description of the Menlough marble beds was given by Phineas Franklin to the Halls in the mid-1840s. Later, in the late 1860s Kinahan stated that the black marble in Menlough occurred in two beds, one 13 and the other 15 inches thick; he reiterated this in his volume in 1889. It is likely that by this stage in the century much of the marble had been excavated and only two beds remained, rather than the original four.\textsuperscript{378} Like at Anglingham, by 1868 the depth of overburden had increased to 40 feet. Kinahan, “On The Economic Geology of Ireland.”
\textsuperscript{380} Hall and Hall, \textit{Ireland: Its Scenery, Character, &c.}, 1846. p. 465.
\textsuperscript{381} Kinahan, “Explanation to Accompany Sheet 105, with That Portion of Sheet 114, That Lies on the North of Galway Bay, of the Geological Survey of Ireland.”
Figure 26. Black marble quarry, Anglingham, Co. Galway. This quarry was incorrectly referred to as being Menlo[ugh] by George Wilkinson.

Figure 27. Currently unworked Anglingham black marble quarry (2018).

382 Wilkinson, Practical Geology and Ancient Architecture of Ireland, p. 41.
383 Personal Communication, Martin Feeley.
The first process in working the quarry was “stripping”, which involved removing the limestone overburden through the process of blasting until the marble beds were revealed. The overburden occurred in beds of 1-2 feet thick and therefore the blast could only extend to the shallow thickness of each bed; consequently, the operation was “tedious and expensive”. The waste was removed by cart for local road building and the construction of quays and upon exposure the layered marble lay “as even as a billiard-table”. Joints between marble blocks were then traced, holes were created between joints using a mallet and chisel, and wedges were carefully driven down until the blocks were released from their position. The blocks were removed from the quarry using strong “crabs” and underwent the process of “blocking and “dressing” before being loaded onto boats and transported three miles down the lake to the Galway quays for onward distribution. The location of the Anglingham and Menlough quarries on the verge of Lough Corrib was convenient for water carriage, which contributed hugely to the prosperity of the venture. Conversely, the depth of both quarry floors, which were level with Lough Corrib by 1845 and had extended below the lake by 1869, was a costly, hindering circumstance. The task of removing overlying stone, which by 1868 had reached a thickness of 40 feet, and continuous pumping of water to keep the quarry floors dry were expensive undertakings. Nevertheless the operations proved worthwhile and the marble was widely exported, namely to London, New York, Paris and Carrara.

Franklin sent marble to the London Marble and Stone Working Company on Esher Street in London, which was commissioned by Hamilton Palace, near Glasgow, to manufacture a bracketed double staircase for the long gallery (figure 28). Alexander, 10th Duke of Hamilton (1767-1852), refurbished the old palace, which was originally built in 1695 and almost completely rebuilt at the beginning of the eighteenth century, in the late 1820s and early 1830s. It was during this time that he “developed a love – indeed, an unhealthy passion – for Irish black marble, from quarries situated near the city of Galway”. He installed two colossal chimneypieces of black marble to the London Marble and Stone Working Company on Esher Street in London, which was commissioned by Hamilton Palace, near Glasgow, to manufacture a bracketed double staircase for the long gallery (figure 28). Alexander, 10th Duke of Hamilton (1767-1852), refurbished the old palace, which was originally built in 1695 and almost completely rebuilt at the beginning of the eighteenth century, in the late 1820s and early 1830s. It was during this time that he “developed a love – indeed, an unhealthy passion – for Irish black marble, from quarries situated near the city of Galway”.

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385 Hall and Hall.
387 “Real Justice to Ireland,” The Armagh Guardian, February 4, 1850; “Exportation of Marble from Galway,” Dublin Evening Mail, April 1, 1853.
390 https://sites.scran.ac.uk/vhp/longgallery41.html [accessed 23 February 2021].
marble in the Long Gallery and erected a black marble doorway at the west end of the gallery.\textsuperscript{391} The chimneypieces were designed by architect David Hamilton and were installed in 1830. Hamilton provided a quotation for three or more chimneypieces in 1833, however most orders for items in black marble were placed directly with the London Marble and Stone Working Company, which was able to source high quality Irish black marble in large quantities. The London Marble and Stone Working Company was commissioned in the mid-1830s to create a further two chimneypieces and door surrounds, also designed by David Hamilton (1768-1843), for the new entrance hall on the first floor. The components were shipped to Hamilton Palace (via Leith and Port Dundas) between 1840 and 1845 at a total cost of over £9000.\textsuperscript{392}

![Figure 28. The black marble staircase at Hamilton Palace, 1840s, photographed for Country Living in 1919.\textsuperscript{393}]

The exact source of the Irish black marble for the chimneypieces is not specified, however it is likely to have come from Menlough, which is the source of the 1840s staircase. The Duke

\textsuperscript{391} The chimneypieces were in a hybrid Neo-Baroque/Neo-Classical style; they were in New York in 1970 but their present whereabouts are unknown. https://sites.scran.ac.uk/vhp/longgallery41.html [accessed 23 February 2021].

\textsuperscript{392} Hand, “Kilkenny Marble in the Victorian Period.”; https://sites.scran.ac.uk/vhp/longgallery42.html [accessed 23 February 2021]; https://sites.scran.ac.uk/vhp/longgallery44.html [accessed 23 February 2021].

\textsuperscript{393} http://www.nms.ac.uk/explore/stories/art-and-design/the-rise-and-fall-of-hamilton-palace/ [accessed 23 February 2021].
completed the new extension and refurbishment of the palace with the installation of the grand staircase, which connected the ground and first floors and was still under construction in 1842. He supplied blocks, up to 16 feet in length, at a price of £1700 to the London Marble and Stone Working Company who prepared and polished the magnificent staircase, for which they received a sum of £5000. Wilkinson reflected on the Galway marble staircase in 1845, “the wide steps, large landings, and solid carved balustrades being formed of this marble, worked to a jet black polish; and doubtless when brilliantly lighted and surrounded by other accessories appertaining to a palatial residence, they will reflect on the rude labour of those who raised it, in ignorance of its destiny after it left its native bed, and also on the numerous persons and skilful artists to whom it has given employment in its passage to its present position”. Hamilton Palace was demolished in the 1920s having become unstable due to subsidence caused by the extensive coal mining in the vicinity, which was ironically a significant source of the 10th Earl’s wealth that had allowed for the elaborate refurbishment of the house.

Franklin was one of 9 brothers, who in 1850 operated thirteen marble quarries, as well as several depots for preparation and sale of the stone, in various localities including Ireland (Galway), England (Liverpool and Bristol), Italy (Carrara, Naples and Leghorn) and the United States (New York and California). They advertised their appointed agents, based in London, Bristol, Glasgow, Paris, New York, Hamburg and Liverpool, who held a sample stock of marble and to whom orders could be directly given. The Franklins established the Black Marble Works at Nun’s Island (figure 29), which Phineas operated until its sale in 1855. This water powered mill was erected for the purpose of cutting blocks into slabs of any thickness. The machinery was supplied by Messrs Lee, Watson, and Co., of St Helen’s, Lancashire, and “for the first time put in practice an invention of theirs – that of raising or lowering the water wheel three feet! as also the bed of the river!”.

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394 Hand; https://sites.scran.ac.uk/vhp/longgallery44.html [accessed 23 February 2021].
399 “Galway Black Marble Quarries Messrs. Franklin,” The Builder 1, no. 43 (December 2, 1843): 511.
400 See chapter 4 of this thesis for an account of Franklin’s involvement in the Nun’s Island marble works, as well as further information on subsequent ownership and expansion of the mill.
401 I. Slater, I. Slater’s National Commercial Directory of Ireland (Manchester and London: I. Slater (late Pigot & Co.), 1846); Griffith’s Valuation, March 07, 1855; “Town of Galway Ireland. Leasehold Property to Be Sold Situated at Nun’s Island...” General Advertiser for Dublin, and All Ireland, December 15, 1855.
402 Hall and Hall, Ireland: Its Scenery, Character, &c., 1846, p. 463.
One block, twelve feet long by six feet high, with the use of water and 14 blades could be cut through in eight days.\textsuperscript{403}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure29.png}
\caption{The marble works located on Nun’s Island, Galway City (OSI 25” map (1888-1913)).}
\end{figure}

The success of the Menlough quarries is primarily attributed to the industrious spirits of the Franklins and is evident in the widescale use of the stone. For example, it is believed that the basement for the monument to Napoleon in Paris is of black marble from Menlough.\textsuperscript{404} Franklin’s black marble was widely distributed throughout Ireland and overseas and the enterprising brothers even succeeded in importing it into Italy and selling it at Carrara.\textsuperscript{405} The \textit{Armagh Guardian} exclaimed, “...as singular an event as sending coals to Newcastle, has occurred in the transmission, by Messrs. Franklin, of marble from Galway, to the world renowned marble regions of Carrara itself”.\textsuperscript{406} This daring endeavour demonstrated Franklin’s unflappable confidence in the quality of the Galway stone and proved that Irish marble could be sold in the same market as the distinguished Italian marbles.

\textsuperscript{403} Hall and Hall.
\textsuperscript{404} “Real Justice to Ireland,” February 4, 1850.
\textsuperscript{405} “Real Justice to Ireland”; “Exportation of Marble from Galway.”
\textsuperscript{406} “Real Justice to Ireland,” February 1850.
Conclusion

Excavation of decorative stone in Ireland was not an activity that commenced in the nineteenth century. It has been alleged that the prized green marble of Connemara was crafted into axes during Neolithic times, and black limestone from Kilkenny, variegated red limestone from Cork and white marble from Donegal were extracted and utilised for architectural decoration and commemorative monuments as far back as the early seventeenth century. Upon leasing the Black Quarry, south-east of Kilkenny city, and establishing the Kilkenny Marble Works in 1730 Alderman William Colles initiated commercialisation of native decorative stone extraction and fabrication in Ireland. He, and his heirs, excelled in the marble trade and set a standard to which subsequent quarry owners and marble workers aspired. The Colles enterprise successfully worked Kilkenny black throughout the eighteenth and nineteenth centuries and the inherent determination and bravery of the Colles lineage saw a diversification of the firm into other stone types at the end of the nineteenth century. By the 1880s Richard Colles, descendent of Alderman William Colles, was leasing quarries of varicoloured limestones and marbles in Cork, Kerry and Galway, as well as expanding the mill in Kilkenny. The Kilkenny Marble Works remained at the forefront of mechanisation with regards stone extraction and preparation throughout its existence until the company was eventually sold in c. 1921.

During the eighteenth century and at the beginning of the nineteenth century most decorative stone quarries, outside of Kilkenny, were worked on an ad-hoc basis. It was Galway that emerged as a central locality for the beginning stages of commercialisation of decorative stone quarrying in the 1820s. This county had the advantage of hosting deposits of two popular stone types, green serpentine marble in Connemara and black limestone, which would rival that in Kilkenny, around Galway city. Two entrepreneurial landowners in Connemara, Richard Martin of Ballinahinch and John D’Arcy of Clifden, engaged the Hibernian Mining Company to prospect for green and white marble on their estates, which proved successful. They both began exploiting and exporting the green marble in the 1820s and by the beginning of the Victorian era the quality of the stone had been proven and the industry was established. At the same time in Galway city extensive quarrying of black limestone was being commenced on Sir Valentine Blake’s estate at Merlin Park and at Anglingham and Menlough beside Lough Corrib; like in Connemara, it was the landlord himself who opened the quarries.

The initiation of decorative stone quarrying in Galway must be credited to the investment of speculative landowners and the development of the industry throughout the nineteenth century is attributed to the industrious spirits of entrepreneurs. It was through the efforts of the following
individuals and firms that extraction of Galway decorative stone gained momentum throughout the 1800s: Stanley Ireland, the Franklins and Henry Abbott in Menlough and Anglingham; Henry Hodgson in Merlin Park; Thomas Eyre, Richard Berridge and Robert C. Fisher in Connemara; and later Sibthorpe and Son and Captain Wyndham Waithman who were involved in quarrying both the black limestone and green marble at multiple localities.

The longstanding Kilkenny marble enterprise, together with the early nineteenth century trailblazing ventures in Galway prompted widespread commercialisation of decorative stone throughout Ireland during the mid-1800s. Of course, the timeless Kilkenny and Galway black marbles were continually sought after for architectural and ornamental purposes and the Connemara green marble had the advantage of being likened to the acclaimed *verde antique*; the changing architectural taste and shift towards polychromatic design in the Victorian period propelled the quarrying and fabrication of widespread Irish Carboniferous limestones, which flaunt varied tonality and texture.
CHAPTER 3. EXPANSION AND DIVERSIFICATION OF DECORATIVE STONE QUARRYING IN VICTORIAN IRELAND

As emerging polychromatic architectural design created high demand for coloured stone across mid-nineteenth century Ireland, existing quarry owners and industrious prospectors who were drawn to unearthing the subterranean treasures had the benefit of observing the precursory operations at Kilkenny and Galway, which continued to grow throughout the Victorian period (outlined in chapter 2). For the most part Irish stone capable of being worked as marble is Carboniferous limestone,\textsuperscript{407} which occurs in various shades of black, grey, pink, red, brown, and other colours and is usually of a variegated texture. Decorative stone quarries surfaced throughout Ireland, the locations of which were boundless on account of the extensive and dominant underlying limestone lithologies. Some quarries operated for a short time and remained small scale, opening only to meet local demand, while others steadily prospered and widely traded their stone in domestic and foreign markets.

This research reveals that the primary locations of Irish decorative limestone and marble extraction (outside of Kilkenny and Galway) in Victorian times were Armagh, Donegal, Offaly, Westmeath, Clare, Limerick, Cork and Kerry. These quarries are described in this chapter broadly from north to south. The geological settings of the various decorative stone types are discussed; the sources of colouration and texture, which deemed the stone “decorative”, are examined; specific quarry locations are identified (further details of the quarries and supplementary maps illustrating their locations are provided in Appendices 1 and 2); ownership of the quarries throughout the Victorian period is investigated; and utilisation of the stone in Victorian architecture is illustrated.

Armagh “marble” quarries

Armagh limestone is probably the best recognised of Northern Ireland’s limestones and it was extensively quarried and used for building and decorative purposes in Armagh and the surrounding areas during the eighteenth and nineteenth centuries; the most important quarries were situated west of Armagh city and they produced stone mainly of a light grey colour with

\textsuperscript{407} George D. Sevastopulo and Patrick N. Wyse Jackson, “Carboniferous: Mississippian (Tournaisian and Viséan),” in The Geology of Ireland, ed. Charles H. Holland and Ian S. Saunders, 2nd ed. (Edinburgh: Dunedin Academic Press Ltd., 2009), 215–68 provides a detailed account of the geological setting and major lithologies of the Mississippian (Lower Carboniferous) in Ireland, to which most of the decorative stone exploited in Victorian times belongs. Appendix 3 of this thesis contains the International Chronostratigraphic Chart (2022), which provides the numerical age of the geological eras, periods, epochs and stages referred to in the below text when discussing the decorative limestones and marbles of Ireland.
some strata incorporating tints of yellow to reddish-purple. Armagh limestone shows little deterioration over time, with only mild decay resulting from weathering along stylolites and where fossils are present, thus rendering it a durable and lasting building and decorative stone.

**Geological setting and petrological characteristics**

The initial geological mapping of County Armagh was carried out by the Geological Survey of Ireland (GSI hereafter), which led to the publication of a one-inch to the mile geological map and an accompanying explanatory memoir in 1873. Some decorative Armagh limestone deposits, commonly referred to as marble, were highly fossiliferous and consisted almost entirely of compressed fragments of shells and abundant remains of fishes, while others yielded a purplish-brown mottled compact stone, which took a good polish. At the time of the Irish comprehensive geological assessment of Armagh the uppermost ten feet of marble was described as being variegated bluish-red occurring in beds of one to three feet thick, below which lay a three-foot bed of pale, crystalline “white marble”. Two feet beneath the latter there was a purplish-brown coloured “shell bed” variegated with green and yellow of about one foot in thickness. The deepest marble bed was known as the “thrush marble” bed; this ten-foot-thick bed consisted of a mottled-purplish rock, marked somewhat like the breast of a thrush. The Armagh marble appears to have been highly variable in colour, even within a single bed; in the explanatory memoir Egan refers to a manufactured example “in which variously coloured portions of the same bed were selected for different parts of the work, so as to appear as if they were formed of quite distinct varieties of marble”. Another lithology noted in the early 1800s by Sir Charles Coote was described as the “plum-pudding marble”, which was probably the reddish conglomeratic

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410 Egan, “Explanatory Memoir to Accompany Sheet 47 of the Maps of the Geological Survey of Ireland, Including the County around Armagh.”


413 Egan, p. 35.

414 Egan, p. 35.
The area was re-surveyed by the Geological Survey of Northern Ireland (GSNI hereafter) in 1984 at which time the Armagh Group, comprising undifferentiated limestone strata, was defined. Somerville et al. revised the Armagh Group in 2001, which is now restricted to the chiefly fossiliferous, coarse-grained platform limestone formations of Upper Viséan (late Asbian-Brigantian) age and divided into three formations, Wilson’s Bridge Limestone Formation, Loughgall Limestone Formation and Carganamuck Limestone Formation (figure 1). The Armagh marbles belong to Wilson’s Bridge Limestone Formation, which consists of pale pink to dark grey, thickly bedded bioclastic limestones interstratified with calcareous shales. The limestones are dominantly skeletal, peloidal packstones and grainstones and become argillaceous and sandy into the lower portion of the formation. Both limestones and shales are commonly stained red. The limestones contain thin red clay seams (stylolites) and possess a rich and varied microfauna, with

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415 Somerville et al.
ample fasciculate (*Siphonodendron*) and cerioid (*Lithostrotion*) coral colonies of Asbian age. The formation indicates a shallow-water open-marine shelf environment.\(^{417}\)

An unusual feature of the stone is that it contains fossilised shark teeth that were first observed in the 1850s in the stone used for paving slabs. The best flags, which were extensively used in the town of Armagh, were supplied from the Armagh marble quarry, together with a quarry west of Armagh at Navan\(^ {418}\) and another quarry about 600 yards east of Red Barn.\(^ {419}\) The fossil fish were highly prized by a number of collectors. The quarrymen would set specimens aside, which were then purchased, most notably by Admiral Theobald Jones (1790-1868) whose collections were the basis for a large monograph on Carboniferous sharks published by the Royal Dublin Society (RDS hereafter) in 1883.\(^ {420}\) The Natural History Museum in London, the National Museum of Ireland and the Geological Museum, Trinity College Dublin hold significant collections. In polished stone these fish teeth appear as dark blood red to brown blobs (figure 2).

![Figure 2. Armagh marble column in the Museum Building, Trinity College Dublin (right). A fossilised shark tooth appears as a dark reddish brown blob in the polished limestone (left).](image)

\(^{417}\) Somerville et al.

\(^{418}\) The large quarry at Navan Fort, which extended 60 feet below the surface, was located a mile and a half west of Armagh. The beds ranged in thickness from six inches to two feet and generally produced a light grey coloured stone, which was extensively used for building and burning. Towards the bottom of the quarry variegated brown and purple beds occurred from which many of the street flags for Armagh were procured. Egan, “Explanatory Memoir to Accompany Sheet 47 of the Maps of the Geological Survey of Ireland, Including the County around Armagh.” In 1864 there were two limestone quarries and four lime kilns operating in Navan, which were leased by William Leeman and Arthur McGlone from Anne Porter. Griffith’s Valuation, Dec 01, 1864.

\(^{419}\) Egan.

The principal Armagh “marble” quarry

As noted in chapter 2 Armagh marble was in use since at least the 1770s when Thomas Ogle, Sovereign of the city, discovered the stone on the episcopal demesne. Realising its potential he established a marble polishing mill near the old Francisca Abbey. It is possible that he opened the quarry in the townland of Drumarg or Downs (see below), but this has not been verified. Ogle noted that there were nine varieties of stone, some of which he stated were “preferable to any foreign marble he had seen”. The stone was favoured by Archbishop Robinson, Lord Rokeby, who used it to build his palace, designed by Thomas Cooley in 1770, as well as Armagh Library the following year. It was recommended that the marble mill be removed as it was thought that pollution from it would be detrimental to the estate, and no doubt the health of the landlord, but it did not move. The principal Armagh marble quarry, producing what was known in the trade as “Armagh Red”, was situated three-quarters of a mile south of the city of Armagh in the townland of Drumarg or Downs and had been commercially operating since at least 1835 (figure 3). During the mid-nineteenth century this quarry was still under the ownership of the Lord Archbishop of Armagh. By 1907 it was no longer active and a larger quarry operated just to its south at Caragh, which had expanded from a number of smaller individual quarries (figure 3); whether the quarry at Caragh produced decorative stone or mainly dimension stone is unknown, but by this time the demand for the Armagh marble was low.

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421 The Sovereign was the head of the municipal government of a city that had received a Royal Charter. Ogle was a significant person in the city of Armagh who in 1751 suggested opening two streets to improve connections in the south of the city; in 1759 these were named Thomas Street and Ogle Street in his honour. Catherine McCullough and W.H. Crawford, “Irish Historic Towns Atlas (IHTA),” Royal Irish Academy, no. 18 Armagh (2007), p. 4.


423 Edward Rogers, “Record of the City of Armagh from the Earliest Period to the Present Time,” Armagh Guardian Office, 1861, 9. The history of this mill is unknown.

424 Thomas Ogle was making representations to the Irish Parliament to fund a canal to Armagh, which he noted would allow for the supply of marble to the Dublin market at a cheaper rate. Journals of the House of Commons, of the Kingdom of Ireland, vol. 12, 1764, p. 540.

425 Rogers, “Record of the City of Armagh”, p. 9. The exact location of the mill is unknown.

426 Egan, “Explanatory Memoir to Accompany Sheet 47 of the Maps of the Geological Survey of Ireland, Including the County around Armagh.”; Watson, British and Foreign Marbles and Other Ornamental Stones: A Descriptive Catalogue of the Specimens in the Sedgwick Museum, Cambridge. There was another small marble quarry in the townland of Aghamoat, a little south-east of the principal marble quarry in Drumarg or Downs.

427 Between 1822 and 1862 the quarry was owned by Lord John George de la Poer Beresford (1773-1862), then Anglican Archbishop of Armagh and Primate of All Ireland, who may have employed an agent to operate it on his behalf. Following his death in 1862 his cousin Marcus Gervais Beresford (1801-1885) succeeded him in both posts, which he held until his death in 1885. His ownership of the quarry is verified in “Belturbet Church,” Northern Whig, November 13, 1863, 3; Griffith’s Valuation, Dec 01, 1864.

The polished Carboniferous limestone presenting “varying tints of light red, passing into purple, yellowish-brown, and dove-colour” was popular throughout the mid-nineteenth century. The dark red variety was said to equal the Cornish serpentinite in beauty at “not more than half the cost”. Large blocks suitable for columns were procured from the pinkish-grey coloured principal bed that exhibited a warm yellow hue when polished, while associated reddish beds alternating with white were quarried for internal ornamental work and chimneypieces in Belfast and in the north of Ireland. Armagh decorative polished stone can be seen throughout Ireland in buildings such as the Roman Catholic Cathedral, Armagh (1873), University Church in Dublin (1855) and

431 “Belturbet Church.”
433 For architectural detail see https://www.dia.ie/works/view/3980/building/CO+ARMAGH%2C+ARMAGH%2C+CATHEDRAL+ROAD%2C+CATHEDRAL+OF+ST+PATRICK%2C+CAR%29 [accessed 30 August 2021].
the Museum Building in Trinity College Dublin (1853)\(^{435}\) (figure 2). The stone was also exported to Britain, a good example being some of the columns in St John’s College Chapel (1869) in Cambridge.

Armagh marble was showcased at the Great Exhibition in Dublin in 1853\(^{436}\) in the form of an elegant mantlepiece executed by David McCullough of the Armagh Marble Works on Dobbin Street, Armagh.\(^{437}\) McCullough succeeded Benjamin Brown and took ownership of the marble works in 1841 where he manufactured tombs, monuments, mural tables, chimney pieces, fonts etc. from native and foreign marbles.\(^{438}\) The mantlepiece was “so much admired by the Committee of Management” that they dispatched a messenger, Mr R. J. Hannigan of the geological department, direct to Armagh to fetch more of the marble and “to ascertain the extent in variety of colour that existed in the district”. Hannigan explored several quarries, which he declared “of much value, and capable of producing an article of great beauty and variety”.\(^{439}\) In order to obtain a selection of colours in a timely manner the Committee applied to the Town Commissioners “to select from common street flagging, specimens of marble for the Exhibition”; the request was accepted and several flags were raised in different parts of the town and forwarded by Hannigan to Dublin for the exhibition.\(^{440}\) The diverse specimens we described as “fossil brown, purple, mottled blue, yellow shell, purple shell, red and white, yellow shell with other fossils, red and yellow spotted”.\(^{441}\) McCullough also exhibited an Armagh marble chimneypiece at the Dublin International Exhibition in 1863 for which he received an “Honourable Mention”.\(^{442}\)

The marble quarry at Armagh was extensively worked both for building stone and marble; however later in the century Kinahan noted, “The rocks formerly raised seem to have been better than those at present obtained; or else tastes may have changed, as now the rocks are considered light in colour and unsatisfactory, and their place has been taken by the Cork and Belgian ‘reds’”.\(^{443}\) By 1916 the marble was only being extracted intermittently and foreign marbles exhibiting richer

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\(^{435}\) See chapter 5 of this thesis on the Museum Building of Trinity College Dublin.

\(^{436}\) This exhibition is discussed in chapter 1 of this thesis in relation to the promotion of native decorative stone.

\(^{437}\) “Armagh Marble at the Exhibition,” \textit{Ulster Gazette}, June 1853.


\(^{439}\) “Armagh Marble at the Exhibition,” June 1853.

\(^{440}\) “Armagh Marble at the Exhibition.”

\(^{441}\) “Armagh Marble at the Exhibition,” \textit{Armagh Guardian}, June 18, 1853, 2; “Armagh Marble at the Exhibition,” June 1853.

\(^{442}\) “Armagh Marble,” \textit{Newry Telegraph}, October 19, 1865, 2.

\(^{443}\) Kinahan, \textit{Economic Geology of Ireland}, p. 165.
hues of colour dominated.\textsuperscript{444} At present some marble quarrying continues with stone being polished and worked locally for construction, interior and exterior decoration, and memorials by the Armagh Marble Natural Stone Company.\textsuperscript{445}

**Donegal marble quarries**

The Donegal marbles are true marbles, which belong to the Dalradian supergroup consisting of the Grampian Group (oldest), the Appin Group, the Argyll Group and the Southern Highland Group (youngest).\textsuperscript{446} They are interbedded with grits, schists and quartzites. The Dalradian of Donegal are correlated with Dalradian rocks in Connemara and Scotland.\textsuperscript{447} Descriptions of the various decorative marbles are given below and they are allocated to Dalradian groups, or to specific successions within the groups where possible.

*Dreene (or Drean)*

The discovery of white marble quarries in Donegal at the beginning of the seventeenth century is attributed to the Italian sculptor, Clemente Coltreci and to Captain Sir Thomas Dutton (d. 1634). Coltreci had moved to London in 1619 to establish a studio to restore artifacts coming from Italy.\textsuperscript{448} Although the location of Coltreci’s quarry, which he supposedly claimed from under the nose of Thomas Wentworth (see chapter 2), is unknown, the location of Dutton’s quarry is restricted to the north of county Donegal.\textsuperscript{449} In 1618 Dutton leased large areas of land in northwest Donegal from John Murray of Cockpool (later the earl of Annandale);\textsuperscript{450} this location, which is rich in white marble deposits, was extensively explored later during the nineteenth century and limited outcrops were exploited around Dunfanaghy and Dunlewey. Marble quarries\textsuperscript{451} did occur in the townland of Drean on the eastern banks of Lough Swilly, as depicted

\textsuperscript{444} Watson, *British and Foreign Marbles and Other Ornamental Stones: A Descriptive Catalogue of the Specimens in the Sedgwick Museum, Cambridge*. The 6 inch to the 1 mile OSNI county series edition 3 (1900-1932) map, sheet 12 (1905-1906) no longer shows the marble quarry in Drumarg or Downs, which suggests it was no longer in use by this time. Watson in 1916 may be referring to this quarry, which was no longer a commercial extraction site, but still possibly being worked intermittently, and so was omitted from the map or he may be referring to a different quarry from which limited quantities of marble was being extracted, such as that at Caragh further south.\textsuperscript{445} [http://armaghmarble.com/](http://armaghmarble.com/) [accessed 31 August 2021].


\textsuperscript{447} Chapter 2 of this thesis contains a brief description of the depositional environmental and alternation processes of the Dalradian succession.


\textsuperscript{450} Williamson.

\textsuperscript{451} The Drean quarries were situated in the Lough Foyle Succession, which consists of schist and grit with thin marble units (the Lough Foyle Succession is part of the Southern Highland Group in the Dalradian
on the OSI 6 inch map (figure 4), however there is no evidence to date that Dutton leased land or quarried stone at this location. The “Dreene” marble may have been raised at Drean or at another location called Dreene on Dutton’s holdings in the northwest of the county.\textsuperscript{452}

Figure 4. Quarries in the townland of Drean on the eastern shore of Lough Swilly. The underlying lithologies consist of schist and grit with thin marble units and they belong to the Lough Swilly Succession (OSI 6” map (1837-1842)).

Gartan

In 1825 Charles Lewis Giesecke (1761-1833),\textsuperscript{453} Professor of Mineralogy at the Royal Dublin Society, embarked on a mineralogical tour in Ireland, which included County Donegal. He produced a report that was illustrated by a descriptive catalogue of 202 mineral specimens, which he collected and deposited in the Museum of the Royal Dublin Society.\textsuperscript{454} He retrieved a sample

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\textsuperscript{452} Williamson, \textit{Inigo’s Stones: Inigo Jones, Royal Marbles and Imperial Power}.

\textsuperscript{453} Giesecke had a varied career, first as an actor and composer and later as a skilled mineral collector. He spent a considerable time in Greenland where he assembled several collections, one of which was stolen en-route to Copenhagen and sold to the Scottish collector Thomas Allan. Allan later recommended Giesecke for the post of mineralogist in Dublin to which he was appointed despite having no English at the time. Giesecke’s mineral collections are in the National Museum of Ireland and a small suite of specimens are in Trinity College. Patrick N. Wyse Jackson, “Sir Charles Lewis Giesecke (1761-1833) and Greenland: A Recently Discovered Mineral Collection in Trinity College Dublin,” \textit{Irish Journal of Earth Sciences} 15 (1996): 161–68; Karl Whittaker, “Karl Ludwig Giesecke: His Life, Performance and Achievements,” \textit{Mitteilungen Der Osterreichischen Mineralogischen Gesellschaft} 146 (2001): 451–79.

\textsuperscript{454} Charles Lewis Giesecke, \textit{Account of a Mineralogical Excursion to the County of Donegal} (Dublin: R. Graisberry, 1826); Charles Lewis Giesecke, \textit{Second Account of a Mineralogical Excursion to the Counties of Donegal, Mayo, and Galway} (Dublin: R. Graisberry, 1828).
of fine, granular white marble\textsuperscript{455} from Mr Johnston’s estates at Gartan, situated northwest of Letterkenny on the eastern shore of Lough Gartan.\textsuperscript{456} At this locality Giesecke was hosted at the mansion of Mr Alexander Stewart, who hospitably acquainted him with the surrounding areas. Alexander’s youngest son, John Stewart, who later took over the estate,\textsuperscript{457} promised to provide his fine collection of Irish quadrupeds and birds to the museum upon request.\textsuperscript{458} The white marble at Gartan does not appear to have been quarried on a commercial scale.

\textit{Marble Hill and Ballymore}

Beds of marble ranging in colour from pearl white, greyish white, bluish grey and ash grey to flesh red and rose red occur at the foot of Muckish Mountain; the pale white and greyish white varieties exhibit a fine grained texture while the other colours are more granular.\textsuperscript{459} The bluish grey stone was extensively worked at Marble Hill, east of Dunfanaghy (figure 5), from at least the 1750s. Dr Richard Pococke visited the quarry during his tour in 1752 where he observed a six to seven feet thick bed of “white marble with some blewish veins”, which contained one superior three-feet-thick layer. He incorrectly classified the stone as alabaster and dismissed the quarriers’ more accurate limestone identification, which he “imputed to their ignorance”.\textsuperscript{460} The stone is a true marble that belongs to the Sessiagh-Clonmass Formation within the Appin Group, which consists of quartzite, dolomitic marble and schist.\textsuperscript{461} It is a white ash grey or rose-tinted colour, coarsely crystalline and slightly schistose in texture, and susceptible to a good polish.\textsuperscript{462}

At the time of Giesecke’s visit to Marble Hill in the 1820s the quarry was located on the estates of George Barclay, Esq., a solicitor. Excavated marble blocks were split into very large flags and used both for building and decoration; a spotted variety was particularly favoured for chimneypieces, two of which were seen by Giesecke in the house of Mrs Colhoun in Letterkenny. Mr John Boyd,

\textsuperscript{455}The underlying lithologies at Gratan belong to the Dalradian Supergroup (Appin and Argyll Groups), which consists of pelitic and psammitic schist and marble. Bedrock Lithology, 1:500,000, Geological Survey of Ireland (GSI) (This data represents a seamless bedrock geological dataset encompassing the Republic of Ireland and parts of Northern Ireland. The seamless geological dataset was created from the GSI Bedrock 1:500,000 scale digital geological map series. This is a subset of the MINLOCS database held by Minerals Section in the GSI).

\textsuperscript{456}Giesecke, Second Account of a Mineralogical Excursion to the Counties of Donegal, Mayo, and Galway.

\textsuperscript{457}John Stewart had possession of the estate at Gartan in 1858, Griffith’s Valuation, Feb 15, 1858.

\textsuperscript{458}Giesecke, Account of a Mineralogical Excursion to the County of Donegal.

\textsuperscript{459}Giesecke.


\textsuperscript{461}Bedrock Lithology, 1:100,000, Geological Survey of Ireland (GSI) (This data represents a seamless bedrock geological dataset encompassing the Republic of Ireland and parts of Northern Ireland. The seamless geological dataset was created from the GSI Bedrock 1:100,000 scale digital geological map series. This is a subset of the MINLOCS database held by Minerals Section in the GSI).

\textsuperscript{462}Giesecke, Account of a Mineralogical Excursion to the County of Donegal; Kinahan, “On The Economic Geology of Ireland.”
the secretary (and later vice president) of the Royal Dublin Society, provided a slab of the Marble Hill stone for the museum. Quarrying at Marble Hill continued throughout the 1800s and further south at Ballymore (figure 5) a creamy white marble occasionally clouded with brown, also part of the Sessiagh-Clonmass Formation, was worked in the latter portion of the nineteenth century.

![Figure 5. OSI 6” map (1835-1844) illustrating the multiple white marble quarries at Marble Hill (top left) and OSI 25” map (1888-1913) illustrating only one quarry in operation later in the nineteenth century (top right). OSI 25” map (1888-1913) illustrating the small white marble quarry at Ballymore, just south of Marble Hill (bottom). This quarry was not depicted on the earlier OSI 6” map. All the above quarries are situated in the Sessiagh-Clonmass Formation within the Appin Group, which consists of dolomitic marble, schist and quartzite.

**Dunlewey**

At Dunlewey, six miles east south east of Gweedore Hotel (about thirty miles west of Londonderry), there was an extensive vein of white, saccharoidal marble surrounded by the Thorr Granite; this Caledonian granite, which intruded 418 +/- 26 Ma, was responsible for metamorphosing pure limestone into marble. This marble belongs to the Cresslough

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463 Giesecke, *Account of a Mineralogical Excursion to the County of Donegal.*
464 Bedrock Lithology, 1:100,000, GSI.
466 A crystalline or granular texture, like that of granulated sugar.
467 Bedrock Lithology, 1:100,000, GSI.
468 Silurian-Devonian age.
Formation, consisting of pelitic schist and marble, which, like the Marble Hill and Ballymore marbles, is part of the Appin Group. Giesecke declared the Dunlewey white marble “as the best in Ireland” and likened its texture and whiteness to Parian marble; however, the exceedingly poor access to the quarry, which could only be reached on horseback, and there being no pier to ship from deemed the superior marble unproductive. Twelve years before Giesecke’s excursion a Mr Walker had raised some marble blocks at the locality, which Giesecke found and observed to be of various dimensions. At the time of Walker’s attempt to quarry at Dunlewey an Italian artist, Christopher Prosperi, carved a two feet long recumbent statue from a block of Irish white marble, which most likely was the Dunlewey stone.

James Dombrain (1794-1871), Inspector General of the Irish Coastguard, purchased an estate at the beginning of the 1830s in Donegal, which encompassed Dunlewey. He soon learned of the formally worked white marble quarry, which he investigated “accompanied by several scientific gentlemen”. They discovered several blocks, the four largest of which were from five to nine feet in length, but he was unable to remove the marble due to the absence of a road. He succeeded in transporting one small block, regarded only as a surface specimen and hence not truly indicative of the underlying strata, which he sent to the Royal Society for the Encouragement of Arts, Manufacture and Commerce for examination together with a pamphlet describing Giesecke’s earlier mineralogical excursion to the area. Giesecke considered the Dunlewey marble suitable for the “finest works of common sculpture” and did not doubt that fine blocks “fit for statuary” could also be raised. Dombrain sent a small block of the marble to the Dublin sculptor, John Hogan (1800-1858), who roughed out a head from it and reported that “the grain is coarse, but that it would answer extremely well for colossal statues; and that it has the rare quality of being entirely free from metallic substances”.

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470 Bedrock Lithology, 1:100,000, GSI.
471 Giesecke, Account of a Mineralogical Excursion to the County of Donegal, p. 8; “Donegal Steatite,” The Dublin Penny Journal, 1832, 389.
474 Dombrain probably sent his specimen to the Society in London as he would have been aware that several decades earlier in 1802 they had offered a premium to anyone who discovered a viable statuary white marble in Great Britain or Ireland. Although no truly suitable white marble was presented in the first decade the Society nevertheless awarded Isaac Jopling a gold medal in 1810 for his collections of British marbles, which included some whitish varieties from Scotland. Gordon Walkden, “Promoting Art, Manufactures and Commerce in One - the Society’s Role in the Development of a British Marble Industry,” Earth Sciences History 37 (2018): 363–79.
475 Dombrain, “No. II. Irish Marble.”
477 Dombrain, “No. II. Irish Marble”; “Donegal Steatite.”
An appointed committee representing the Society examined Dombrain’s specimen and divided it into three slabs. One sculptor examined the slabs and declared the marble “to be decidedly inferior to that of Carrara, in being composed of larger crystalline grains, with interstices between, in which the putty and other polishing powders imbed themselves, producing black spots”. He stated that if large blocks, equal in quality to the sample, could be raised that they would be applicable to colossal works in sculpture. Another sculptor thought it to be inferior to Parian when cut parallel to bedding due to its porous and less compact nature. He thought that it could be applied to paving and common chimneypieces subject to the cost not exceeding half a guinea per foot, which was about half the price of Italian veined marble at that time. An additional committee member, also a sculptor, commented that all British marbles hitherto were known to be harder than Italian and the reasonable cost of Italian marble (between one and a half to three guineas per cubic foot) meant that the use of native marbles had been entirely discontinued. The Society concluded that “magnitude, and tolerable uniformity of colour, are essential requisites in marble for the higher uses of art” and Dombrain’s specimen was not large enough to enable them to form a fair opinion of it in those respects.478

Figure 6. Dunlewey marble quarry, situated in the Cresslough Formation, which belongs to the Appin Group (OSI 6” map (1835-1844)).

This outcrop was re-discovered by James Russell when he purchased the Dunlewey estate and in the late 1840s he began working the stone and advertising for experienced quarrymen (figure 6).479 A bust of Henry Grattan in this marble was exhibited at the Great Exhibition in London in 1851 and although the stone displayed fractures due to improper blasting of the procured block, it demonstrated “the fine polish it is susceptible to” and “resembled Parian marble in grain and

478 Dombrain, “No. II. Irish Marble.”
479 “Donegal Marble Quarries,” Armagh Guardian, July 24, 1848, 3; “Industrial Resources of Donegal,” Kings County Chronicle, August 9, 1848, 2.
The western end of the seam was hard, coarse, pure white, durable rock which was used both as building stone and marble. Unfortunately, its coarsely crystalline nature ultimately rendered it unsuitable for statuary purposes, but it could be employed for non-elaborately carved ornamental work. The eastern portion of the bed comprised cream coloured stone along with pink-, blue-, and green-tinted varieties in extremely thin beds that could only be raised in very small pieces with little commercial value. The quarry was only worked along the surface of the bed to a depth of approx. twenty feet. Some years following the death of James Russell his estates, including the marble quarry, were sold by auction in 1865 under direction of the trustees of his will. The Dunlewey quarry is not depicted on the OSI 25 inch map (1888-1913) and there is no evidence that the quarry was worked on a substantial scale later in the nineteenth century. Unlike the Connemara white marble, Giesecke’s and Dombrain’s accounts of the Dunlewey marble confirm early removal of large sized blocks from the quarry. Russell’s blasting methods in the mid-1800s evidently fractured the stone, which no doubt limited its manufactory potential; the white marble was mainly used for local building purposes in structures such as Poisoned Glen Church (1853) at Dunlewey, Glenalla Church (1850) near Rathmullan and Church of St John the Baptist (1868-1886) at Carrigart (figure 7). Small triangular pieces of the Dunlewey stone were used for decorative work in Deane and Woodward’s Museum Building, Trinity College Dublin (1853-1857) and it was notably exported and used for two columns in the upper north gallery of the Oxford Museum (1855-1860) (figure 7). The columns are noticeably cracked, which

480 “A Bust of White Donegal Marble...,” Freemans Journal, March 19, 1851, 2.
484 “Sales by Auction,” Londonderry Sentinel, June 23, 1865, 3.
485 Dunlewey marble from Russell’s estate was used for dressing, walling and rubble in the Poisoned Glen Church, which Jane Russell had built as a memorial to her husband, James, who was laid to rest in a vault beneath the church floor. Kinahan, Economic Geology of Ireland, p. 199; https://www.irishcentral.com/culture/old-church-of-dunlewey [accessed 18 March 2021].
486 Dunlewey marble was used for dressed work in the windows, doors and buttresses. Kinahan, p. 199; https://www.dia.ie/works/view/55789.
487 Given the date of the church and the whitish blue appearance of the marble, it was most likely sourced from Dunlewey. The exterior walling is of local Lackagh schist and the Dunlewey white marble is utilised in internal and external dressings and in large columns flanking the sanctuary. Kinahan, p. 456; https://stonebuiltireland.com/heritage-sites-by-county/donegal/ [accessed 18 March 2021].
488 See chapter 5 of this thesis for an account of the decorative stone employed in the Museum Building.
489 Oxford University Museum (OUM) archives, The History of the Building of the Museum (hereinafter cited as HBM) 2/7, Documents relating to the shafts by John Philips, May 1853.
exhibits the effects of blasting, and consist of two drums, suggesting that sufficiently large blocks could not be raised to form monoliths.

In other districts, such as Fanad, Drumlackagh, Dunfanaghy, Kinclevin, Glenveigh Castle, Gartan, Magheranan, Kilmacrennan and Kiltale trials were undertaken and white marbles were reported on but very little else appears to have been done. Despite the valiant efforts of various nineteenth century academics, scientific tourists and landowners to locate, unearth and promote the Donegal white marble very little of the stone found its way into the hands of marble workers.

Figure 7. Column of Dunlewey marble between two columns of Connemara serpentinite in the upper north gallery of the Oxford Museum (top). Exterior of the Church of St John the Baptist, Carrigart, Co. Donegal with Lackagh schist ashlar walling and Dunlewey white marble dressings (bottom left). Multi drum column of Dunlewey white marble inside the church at Carrigart (Bottom middle and right).

490 “Marbles - XXII. Irish Marbles (Continued).,” The Builder 61 (November 28, 1891): 408.
Offaly and Westmeath “marble” quarries

Ireland is abounding with Carboniferous grey limestone, which was quarried in many counties for building purposes and lime. However, “only those with peculiarities” were much sought after as marbles. Superior grey marbles with attractive, varied appearances were especially procured in the midlands, particularly in Offlay (formerly called King’s County) and Westmeath. In the main these belong to the Waulsortian.\(^{492}\)

**Clorhane**

In Declan Ryan’s *The Marble of Clonmacnoise*\(^ {493}\) he provides an in-depth account of quarrying activities at Clorhane (also spelled Clerhane) in the parish of Clonmacnoise in Co. Offaly where a highly fossiliferous crinoidal grey packstone/grainstone limestone was formerly raised and most extensively worked as marble at the Killaloe Marble Works, to which it was transported by barge on the River Shannon. The stone at Clorhane was quarried from pale grey massive Waulsortian limestone strata of Tournaisian-lower Viséan age.\(^ {494}\) The marble producing limestone of Clonmacnoise is very similar in appearance to and of the same geological period as the rarely used Castle Caldwell marble from Fermanagh, another from Clonowen, and the Derbyshire fossil marble, which was quarried near Bakewell and broadly used throughout nineteenth century Britain for architectural decoration. All of these marbles are largely composed of longitudinal and transverse sections of crinoid stems, which were known locally at Clonmacnoise and Derbyshire as “screws”, interspersed at all angles in a medium grey groundmass (figure 11).\(^ {499}\)

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\(^{491}\) Kinahan, *Economic Geology of Ireland*, p. 144.

\(^{492}\) The Waulsortian represents a phase of submarine bank development during the Tournaïsian. Lime mud mounds containing shelly marine fossil fauna and complex cavity systems, commonly infilled with muds and sparry cements, were formed.


\(^{494}\) Kinahan, “On The Economic Geology of Ireland.”

\(^{495}\) Bedrock lithology, 1:500,000, GSI.

\(^{496}\) This stone was utilised in the Museum Building; see chapter 5 of this thesis.

\(^{497}\) The location of Clonowen has not been determined but may be close to Clonmacnoise in the Midlands. The stone was used for one of the chancel steps in William Butterfield’s Chapel (1880) at St Columba’s College, Rathfarnham and in columns in Thomas Newenham Deane’s National Museum of Ireland (1890). Patrick N. Wyse Jackson and Louise Caulfield, *The Building and Decorative Stones of Dublin: A Walking Guide*, 2nd ed. (Dublin: Geological Survey of Ireland, in press).


embedded fossils are emphasised when polished and produce a marble that Watson described as “curious, if not handsome”.  

Figure 8. OSI 6” map (1835-1844) indicating locations of Clorhane marble quarries with yellow dots (top) and OSI 25” map (1888-1913) illustrating locations of said quarries (bottom). The eastern quarry was operated by Egans and the western quarry was operated by Hughes and later Claffeys. Mannion’s quarry is not illustrated on the OSI maps.

The Clonmacnoise marble quarries in Clorhane on the east bank of the Shannon, east of Devenish Island, were the most economically important quarries in the district; the proximity of the quarries to the river resulted in easy transportation of the stone. The beds varied from four to eighteen inches in thickness and blocks could be raised of any size up to twenty feet square. During the initial geological survey of the district in 1865 the surveyors, Frederick Foot and Joseph O’Kelly, were shown a mirror frame and a small table that had been fabricated from this stone by one of the quarry workers. At this time the cost of finished tombstones was 1s. per square foot; rough field gate posts were 18s. and finished were 27s. 6d; and demesne gate posts ranged from £4 to

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£50, according to finish.\textsuperscript{501} There were three separate quarrying enterprises in Clorhane; Hughes and later Claffeys operated the western quarry, Egans managed the eastern quarry, and another quarry adjoining Egans at the north-east corner was run by Mannions (figures 8 and 9).\textsuperscript{502}


\textsuperscript{502} Griffith’s Valuation, August 17, 1854: Ryan, The Marble of Clonmacnoise.
The quarries were extensively worked during the nineteenth century and supplied stone for a range of building and decorative purposes, including tombstones, gate posts, chimneypieces etc., as well as in the navigation works of the Shannon. There is also evidence of very early stone excavation at this locality; structures at Clonmacnoise, including the round tower (O’Rourke’s
Tower built in 1124) and various other parts of buildings, were built using this stone and in the north doorway of the cathedral it was applied for delicate carving (figure 10).  

**Tullamore**

East of Clonmacnoise at Tullamore “several varieties of very excellent limestone occur”, which is grey with a purplish hue, crystalline, massive, thickly bedded and can be raised in large blocks. This stone is a Viséan shelf limestone that is Arundian in age. Building stone is still quarried at this locality but some varieties of this stone were extensively used in the past for decorative purposes, principally in chimneypieces and ornamental slabs, on account of their superior quality and unique, pleasing appearance. The preferred tone of the decorative material was grey graduating into dove and some of the beds were beautifully clouded with a dark tint (wackestones) while others contained an abundance of crinoids (packstones/grainstones); both varieties took a good polish (figure 14). The quarries containing strata of limestone, which was worked as marble, were situated on the property of Sir Charles Coote at Ballyduff House in the townland of Srah, one mile north-west of Tullamore. The quarries were leased by John Molloy (figure 12) since at least the early 1850s and he exhibited a table and dish and a carved fish at the Irish Industrial Exhibition in 1853, all fabricated from the stone of the Ballyduff quarries. He also showed articles at the 1882 Dublin exhibition, for which he was awarded the First Class Gold Medal for the colour, durability and susceptibility to high polish of his stone.

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Figure 12. John Molly, proprietor of the Ballyduff limestone quarries during the mid to late nineteenth century.  

During the geological mapping of the area in 1865 Molloy, who at that time was in partnership with a Mr Fitzpatrick, provided information on the quarry and applications of the stone to the surveyors; the weight per cubic foot was 168 lbs and the price of the best Ballyduff limestone in rough form delivered in Dublin was about 1s. 6d. per cubic foot, strongly chiselled ashlar was about 2s. per superficial foot and four inch thick tombstones were about 2s. per superficial foot. The Ballyduff stone has been used in the tracery, windows and dressings in St Patrick’s Cathedral, Dublin; for the external columns and cornice of the Kildare Street Club in Dublin (figure 13); in the Roman Catholic Church at Monasterevin; in monuments in Prospect Cemetery, Glasnevin; and in columns in the Oxford Museum (figure 14). It was frequently used in buildings in Dublin, however later in the nineteenth century it was replaced by Ballinasloe limestone due to cheaper carriage of the latter stone.

511 For architectural detail see https://www.dia.ie/works/view/36397/building/CO.+DUBLIN%2C+DUBLIN%2C+KILDARE+STREET%2C+NO.+001+%28KILDARE+STREET+CLUB%29 [accessed 31 August 2021].
512 For architectural detail see https://www.dia.ie/works/view/3236/building/CO.+KILDARE%2C+MONASTEREVIN%2C+CHURCH+OF+SS+PETER+%26+PAUL+%28RC%29 [accessed 31 August 2021].
Figure 13. Tullamore limestone in the columns, cornice, band course and arches above windows (alternating with Portland stone) of the Kildare Street Club, Dublin.

Figure 14. Columns of Tullamore limestone in the upper north gallery of the Oxford Museum. The middle column is of the crinoidal variety and the two outside columns are of the clouded grey variety (left). Close up of Tullamore crinoidal column (right).

Molloy’s celebrated stone was transported as far as Ballarat in Melbourne, Australia in the late 1880s. On the suggestion of Mr Timothy Daniel Sullivan, M.P., Lord Mayor of Dublin between
1886 and 1888, Molloy fabricated a slab of Ballyduff marble on which the statue of famous Irish poet, Thomas Moore,\textsuperscript{514} was mounted; the monument was unveiled in December 1889 and still stands in its original position in Ballarat.\textsuperscript{515}

\textit{Clonony}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{clonony_map.png}
\caption{Two disused quarries at Clonony in the townland of Clonony More illustrated on the OSI 25” map (1888-1913).}
\end{figure}

West of Tullamore and south of Clonmacnoise two marble quarries of distinctive, fossil rich brownish grey wackestone limestone occurred at the village of Clonony. One quarry was located to the rear of Clonony Castle, a late medieval structure that was restored by Edmund Maloney, a local barrister, in the 1830s.\textsuperscript{516} Stone for the castle was presumably sourced from the nearby quarry and specimens of the distinctive Clonony limestone can been seen in the surrounding walls (figure 16); the castle quarry was commercially worked since at least 1803.\textsuperscript{517} A second quarry was located just south of the castle grounds. These marble quarries were not mentioned in the texts by Wilkinson or Kinahan\textsuperscript{518} and they are not illustrated on the OSI six inch map (1837-42), while they are marked on the OSI twenty five inch map (1888-1913) as disused (figure 15). This

\textsuperscript{514} https://monumentaustralia.org.au/themes/people/foreigners/display/30235-thomas-moore [accessed 01 April 2021].
would suggest that they were commercially worked on a small scale for a short period of time during the nineteenth century.

![Clonony Castle and Clonony marble](image)

**Figure 16. Clonony Castle (left). Clonony marble in the rubble walls surrounding the castle (right).**

The Memoir of the Geological Survey around Clonony reported beds of “bluish, buff, red, and grey compact variegated limestone, which polish well, making a good marble, for which purposes they have been worked”\(^ {519} \). The castle quarry was situated in the Waulsortian while the quarry further south was situated in the Navan Group, which consists of shallow and marginal dark grey Carboniferous limestone, mudstone, sandstone and minor evaporite.\(^ {520} \) Clonony limestone featured as marble in the Museum of Practical Geology, Jermyn Street, London;\(^ {521} \) in a column in the Museum Building of Trinity College Dublin;\(^ {522} \) in panelling in University Church Dublin and in the Museum of Irish Industry (figure 17) on St Stephen’s Green; and in columns in the Oxford Museum.

The Clonony quarries were located beside the Grand Canal, which connected to Dublin via Tullamore, and the Clonmacnoise quarries at Clorhane were on the banks of the River Shannon, which joined the Grand Canal to the south. The proximity of the three aforementioned quarrying locations in Offlay to the Grand Canal and the Shannon undoubtedly enhanced production on account of easy transportation to the capital, as well as to the marble works at Killaloe.

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\(^ {520} \) Bedrock Lithology, 1:500,000, GSI.


\(^ {522} \) See chapter 5 of this thesis.
Figure 17. Two Clonony marble panels in the entrance hall of 51 St Stephen’s Green, former Museum of Irish Industry. Brown variety (left) and grey variety (right).

Moneen

In the latter part of the nineteenth century a good quality “grey [lime]stone, splashed with white” was raised in Westmeath and utilised as marble in many buildings around Ireland and Britain. The quarry was in the townland of Moneen near Hall, three miles SW of Moate; the exact location of the quarry is unknown. The stone was referred to as Irish Grey, Moneen marble and Moate marble in the contemporary market and it was quarried and worked by Messrs. Kinahan.

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524 There are no quarries indicated on the OS maps at Moneen. The townland contains Waulsortian mudbanks in the southern half and the Ballysteen Formation, which consists of argillaceous dark grey bioclastic limestone and subsidiary shale, in the northern half. The Moneen limestone is consistent with Waulsortian facies and therefore it is likely that the quarry location was in the southern portion of the townland. Bedrock Lithology, 1:100,000, GSI.
526 “Manchester Royal Exchange, Completion of the Large Room,” *The Manchester Courier, and Lancashire General Advertiser*, October 19, 1874, S.
527 “A Reredos Erected as a Memorial...,” *The Building News* 33 (October 5, 1877): 329; Archive of Petterson, Shortall & Kempster, quantity surveyors (PKS), Bill of Measurement of cut stone executed by Mr. A.P. Sharp for Kylemore Memorial Church for Mitchell Esq. M.P.
Sibthorpe\textsuperscript{528} since at least the early 1870s.\textsuperscript{529} This attractive dark grey limestone, which exhibits a typical Waulsortian fabric with white calcite filled cavities, was first employed in 1874 in the Manchester Royal Exchange together with Cork red marble; thirty three feet high and three and a half feet wide Corinthian columns of Cork red were mounted on dark Moneen marble plinths in the large room of the Exchange, which was in the style of an ancient basilica.\textsuperscript{530} In 1877 Messrs Sibthorpe erected a reredos in St John’s Church in Ballinasloe, which consisted of a Moneen marble base surmounted by Caen stone, which was divided by columns of Cork red and Connemara green marbles.\textsuperscript{531}

The following year building commenced of a memorial church at Kylemore Abbey, commissioned by Mitchell Henry (1826-1910), a Manchester cotton merchant and M.P. for Galway County, in memory of his wife Margaret who had died in Egypt in 1875.\textsuperscript{532} The gothic revival church was built by Henry Sharpe of Kells to the designs of James Franklin Fuller and singular columns, as well as cluster columns of Moneen marble were installed within the polychromatic interior, which also included colonnettes of Cork red, Midleton pink, Connemara green, Clonmacnoise fossil and Kilkenny black marbles (figure 18).\textsuperscript{533} The interior walls and ceiling are of ornately carved Bath stone while the exterior dressings are of Ballinasloe limestone\textsuperscript{534} and the exterior walls are built from a greenish-grey metasediment, which is a Dalradian psammitite most likely sourced locally just west of the church.

Continued application of Moneen limestone for decorative purposes occurred in the final decades of the Victorian period. It was used for columns in the rotunda of the National Museum on Kildare Street (1884-1890)\textsuperscript{535} and in 1891 Carlisle Cathedral received an elaborately carved font of Hoptonwood (Derbyshire) stone, which was placed upon a hexagonal base of polished Moneen limestone.\textsuperscript{536} The stone was exhibited amongst other marbles at the Cork Exhibition in 1902 and

\textsuperscript{528} See chapter 4 of this thesis for information on Messrs. Sibthorpe and their involvement in native marble quarrying and fabrication.
\textsuperscript{529} “Marble Mantlepieces. H. Sibthorpe and Son,” \textit{Dublin Evening Mail}, December 27, 1875, 2; “Manchester Royal Exchange, Completion of the Large Room”; A salesman example box of Irish marble specimens from H. Sibthorpe & Son, Dublin was sold on Ebay on 11 October 2020. This box contained samples from Sibthorpes’ quarries, including Moneen.
\textsuperscript{530} “Manchester Royal Exchange, Completion of the Large Room.”; Kinahan, “On The Economic Geology of Ireland.”
\textsuperscript{531} “A Reredos Erected as a Memorial...”
\textsuperscript{532} https://www.dia.ie/works/view/6862/building/CO.+GALWAY%2C+KYLEMORE%2C+CHURCH+%28CI%29 [accessed 07 April 2021].
\textsuperscript{533} Archive of Petterson, Shortall & Kempster, quantity surveyors (PKS), Bill of Measurement of cut stone executed by Mr. A.P. Sharp for Kylemore Memorial Church for Mitchell Esq. M.P.
\textsuperscript{534} Archive of Petterson, Shortall & Kempster, quantity surveyors (PKS), Bill of Measurement of cut stone executed by Mr. A.P. Sharp for Kylemore Memorial Church for Mitchell Esq. M.P.
\textsuperscript{536} “Gift to Carlisle Cathedral,” \textit{Carlisle Patriot}, March 6, 1891, 6.
its superior appearance and quality continued to be promoted in newspapers into the twentieth century."37

Figure 18. Interior of Kylemore Church (1878-1881); Bath stone walls and ceiling and polychromatic Irish limestone and marble columns (top). Moneen limestone cluster columns with Connemara marble, Cork red limestone and Kilkenny black limestone columns (bottom left). Moneen limestone cluster columns (bottom right).

Limerick and Clare “marble” quarries

*Limerick black “marble”*

Carboniferous Limestone occupies more than half the county of Limerick, some of which has been worked as marble, namely the black, grey and red varieties. Superior black limestones of Viséan age were procured in and around Limerick city for many centuries and during the Victorian era most extensively fabricated at the Killaloe Marble Works; the best stone was exported to London. Beds of varying quality occurred, the most valuable being those of even texture and free from silica. The presence of silica resulted in the rock being hard, difficult to work and less capable of receiving a polish. In the early nineteenth century up to twenty seven limestone quarries were operating in Limerick city, which supplied building stone as well as ornamental stone. The primary quarry locations for black marble in Limerick city included Thomond Gate, Carey’s Road, Garryowen, Ballysimon, Rosbrien, Southill and alongside the railway at Roxborough Road. The various quarries were operational at different periods from medieval times through to the twentieth century. Another Visean limestone, which when polished produced a jet black marble, was also quarried at Foynes in the townland of Corgrig outside of the city. In *The Limestone Industry of Limerick* Margaret Browne provides an in-depth account of the Limerick city black marble quarries and uses of the stone, but this is not dealt with in any further detail here. Very little is known, until this present research, about the fascinating and varied Limerick red “marbles”.

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539 See chapter 4 of this thesis for an account of the Killaloe Marble Works.
543 Browne, “The Limestone Industry of Limerick.”
Limerick and Clare red “marbles”

Adare Manor: visualisation of Limerick and Clare red “marbles”

Much of what is now known about the decorative red limestones of Limerick and Clare hinges on archival material relating to Adare Manor and detailed petrological assessment of the material in situ in the building. This shows that the variety of stone used was far more extensive than previously understood and the locations of most of the quarry sources have been confirmed (see table 1 in this chapter for the list of quarries; further information on the quarries and maps showing their locations is provided in Appendices 1 and 2).

Adare Manor was the former seat of Lord Dunraven (Windham Henry, 2nd earl of Dunraven) and Lady Caroline Dunraven who were responsible for the Gothic revival alteration and expansion of the manor, which began in 1832.\(^\text{544}\) The building was still unfinished at Lord Dunraven’s death in 1850, but Caroline and her son, the 3rd earl, oversaw the completion of the south and west fronts by architect Philip Charles Hardwick.\(^\text{545}\) Much of the day to day building and stone working between 1831 and 1852 was entrusted to the local stonemason James Conolly who is commemorated in a plaque on the side of the building. The old house was a square tower to which a modern front had been added. Some of the walls of the former house remained and were

\(^{544}\) Caroline Countess of Dunraven, Memorials of Adare Manor (Oxford: Messrs. Parker, 1865); https://www.dia.ie/works/view/4325/building/CO.+LIMERICK%2C+ADARE+MANOR [accessed on 09 April 2021].

\(^{545}\) https://www.dia.ie/architects/view/2389/HARDWICK-PHILIPCHARLES%23 [accessed on 31 August 2021].
amalgamated with the new structure, “but could only be recognised by one who had watched the progress of the alterations” (figure 20).  

Figure 20. Adare Manor, 1812, pre-expansion: south façade (top). Adare Manor, post-expansion: north west façade (bottom left), south east façade (bottom right).  

546 Caroline Countess of Dunraven, p. 7.
547 Caroline Countess of Dunraven.
Provenance of stone in Adare Manor

“The new house is built of large blocks of hammer-dressed limestone of different colours, grey predominating, but relieved by occasional blocks of red and brown, all found in quarries of this county [Limerick]” (figures 21 and 22). The Countess of Dunraven’s account of quarry sources states that the grey stone was obtained principally from Tuogh, while the red and yellow stone came from “Donoman” (Dunnaman) and other localities and the brownish red variety from “Cloonagh” (Clonagh). Extensive quarries were also opened at Clorhane from which large amounts of red stone were extracted for the erection of Adare Manor. The red colouration is imparted by iron and in 1860 Rev. Jones of Adare and George Fosbery, owner of the Clorhane quarry, remarked that some of the limestone in the part of the manor that was longest built had become stained with iron due to “atmospheric influence” (i.e. oxidation of iron in the stone). “All of the ‘red’ was taken away” from Clorhane during the building of the manor,

548 Caroline Countess of Dunraven, p. 7.
549 Caroline Countess of Dunraven, p. 7.
551 Griffith’s Valuation, December 20, 1850.
however Fosbery observed that “sometimes in the same quarry, and seemingly in the same bed, the limestone is red or purple near the surface of the ground, and when followed down is of the ordinary grey colour”; some years after the mass removal of red stone from Clorhane the grey stone below began to assume a red pigmentation.\textsuperscript{553} The parapet carvings, including gargoyles, heads, animals, plants, tracery and lettering, are of local grey limestone, which is difficult to work but extremely durable.\textsuperscript{554} The \textit{Memorials} claim that all of the carved work in Adare Manor was executed by local stone carvers.\textsuperscript{555}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{image.png}
\caption{Tonally varied Limerick hammer-dressed limestone ashlar on the exterior of Dunraven House, Adare Manor.}
\end{figure}

ExCEPTING Clorhane, only small exploratory openings in the bedrock occurred on estates local to Adare and a few blocks of coloured decorative limestone were removed to be wrought into chimneypieces for the manor.\textsuperscript{556} The Dunravens had an enthusiasm for geology; they attended public lectures in Limerick by geographer and geologist William Francis Ainsworth. The 3\textsuperscript{rd} earl corresponded with Henry de la Beche (later director of the Geological Survey)\textsuperscript{557} and Edward Sabine on geological matters and the 2\textsuperscript{nd} earl and Lady Caroline visited Valentia slate quarries.\textsuperscript{558}

\begin{footnotes}
\item[554] Caroline Countess of Dunraven, \textit{Memorials of Adare Manor}.
\item[555] Caroline Countess of Dunraven.
\item[556] Kinahan, “On The Economic Geology of Ireland.”
\item[557] Chapter 1 of this thesis discusses Henry De la Beche and his involvement in the Geological Survey.
\end{footnotes}
In her diaries the countess recorded many visits to local quarries, including Tuogh, and recollected gathering fossils. The conscious exploitation and exclusive utilisation of locally sourced coloured limestone in the Adare Manor façade and interior decoration further attests to the Dunravens’ eager interest in native geology and its use in architectural design.

Figure 23. Ground floor plan of Adare Manor.560

559 University of Limerick (UL) Special Collections, Dunraven Papers, D3196/E2/29, D3196/E2/30, D3196/E2/35, Diaries of Caroline, countess of Dunraven, 10 August 1826, 12 August 1826, 15 August 1826, 10 Sept 1827, 20 July 1831 and 07 April 1832.

560 Caroline Countess of Dunraven, Memorials of Adare Manor.
Table 1. Stone used in Adare Manor and associated quarry sources.

<table>
<thead>
<tr>
<th>Quarry name</th>
<th>Townland, County</th>
<th>Owner/Operator</th>
<th>Lithological unit</th>
<th>Stone colour, description</th>
<th>Quarry notes</th>
<th>Use in Adare Manor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuogh</td>
<td>Tuogh, Limerick</td>
<td>Lord Dunraven(^{561})</td>
<td>Waulsortian limestone</td>
<td>Grey, fine-grained packstone rich in crinoidal debris.</td>
<td>A quarry is illustrated on the OS 6” and 25” maps.</td>
<td>Exterior ashlar; Pugin’s chimneypiece in the main hall.(^{562})</td>
</tr>
<tr>
<td>Donoman (Dunnaman)</td>
<td>Dunnaman, Limerick</td>
<td></td>
<td>Waulsortian limestone</td>
<td>Variegated grey and orange wackestone.</td>
<td>A quarry is illustrated on the OS 25” map.</td>
<td>Exterior ashlar; chimneypiece in the saloon;(^{563}) grate in Lady Dunraven’s sitting room; slate over the hot-air aperture in the hall.(^{564})</td>
</tr>
<tr>
<td>Clonagh (Clonagh)</td>
<td>Kilscannell and Reens East, Limerick</td>
<td>D.M. Maunsell(^{565})</td>
<td>Waulsortian limestone</td>
<td>Variegated Brownish-red.</td>
<td></td>
<td>Exterior ashlar.(^{566})</td>
</tr>
<tr>
<td>Clorane (Clorhane)</td>
<td>Clorhane, Limerick</td>
<td>George Fosbery Jun. Esq.(^{567})</td>
<td>Waulsortian limestone</td>
<td>Variegated reddish-brown with small patches of grey,</td>
<td>A small quarry is illustrated on the OS 25” map in</td>
<td>Exterior ashlar;(^{568}) chimneypiece in Lord</td>
</tr>
</tbody>
</table>


\(^{563}\) Caroline Countess of Dunraven, p. 7.

\(^{564}\) UL Special Collections, Dunraven Papers, D/3196/1/24/436, 24 June 1862.


\(^{567}\) Griffith’s Valuation, December 20, 1850.

<table>
<thead>
<tr>
<th>Kilbreedy</th>
<th>Kilbreedy, Limerick</th>
<th>Waulsortian limestone</th>
<th>Yellowish-red.</th>
<th>There are no quarries marked on the OS maps in Kilbreedy, which is located between Askeaton and Clorhane, just north of Tuogh.</th>
<th>Interior of colonnade.570</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballingarry</td>
<td>Ballynaroogan, Limerick</td>
<td>Lower limestone shale</td>
<td>Dark greyish-purple, fine-grained, packstone, pink blotches, abundant crinoidal debris.</td>
<td>A quarry is illustrated on the OS 6&quot; and 25&quot; maps.</td>
<td>Western chimney piece in the gallery; chimney piece in the reception room adjacent to the main hall.</td>
</tr>
<tr>
<td>Rathkeale Commons</td>
<td>Rathkeale (Commons), Limerick</td>
<td>Waulsortian limestone</td>
<td>Reddish-grey, stylolitic, packstone, crinoidal debris, well developed breccia texture.</td>
<td>A quarry is illustrated in the northern extremity of Rathkeale (Commons) on the OS 25&quot; map.</td>
<td>Chimney piece in Lady Dunraven’s sitting room; the eastern and central chimney pieces in the gallery and Pugin’s chimney piece in the library (former drawing room)572 – see Currah chase quarry for alternative source.</td>
</tr>
</tbody>
</table>

570 Caroline Countess of Dunraven, p. 7.
571 UL Special Collections, Dunraven Papers, D/3196/1/24/436, 24 June 1862; Caroline Countess of Dunraven, p. 7.
572 Caroline Countess of Dunraven, p. 7.
<table>
<thead>
<tr>
<th>Location</th>
<th>Additional Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currah Chase</td>
<td>Varieties include variegated red, purple, pink, flesh colour, sky blue and dove packstones. There are no quarries illustrated in Currah Chase on the OS 6” or 25” maps. The eastern and central chimney pieces in the gallery and Pugin’s chimney piece in the library (former drawing room) see Rathkeale (Commons) quarry for alternative source.</td>
</tr>
<tr>
<td>Ballyengland</td>
<td>Dove/silver coloured and red variegated packstones. There are no quarries illustrated in the townlands of Ballyengland Upper or Ballyengland Lower on the OS 6” or 25” maps. Hardwick’s chimney piece in the library (former drawing room) see Cratloe quarry for alternative source.</td>
</tr>
<tr>
<td>Thomond Gate</td>
<td>Dark grey, fine-grained, compact, wackestone/packstone. Two large quarries on the Clare side of the River Shannon are marked on a very early French map dated 1690/1 reproduced in The Limestone Industry Columns and arches in the main hall.</td>
</tr>
</tbody>
</table>

574 Griffith’s Valuation, December 20, 1850.
575 Foley, “To the Editor of the Limerick Chronicle.”
576 UL Special Collections, Dunraven Papers, D/3196/1/24/436, 24 June 1862.
577 Foley, “To the Editor of the Limerick Chronicle.”; Griffith’s Valuation, May 20, 1852.
578 “University Intelligence,” *Limerick Chronicle*, May 25, 1842, 2; “We Have Just Seen Two Small Blocks of Marble...,” *Enniskillen Chronicle and Erne Packet*, June 16, 1842, 4.
579 UL Special Collections, Dunraven Papers, D/3196/1/24/436, 24 June 1862.
<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pallaskenry</td>
<td>Pallas, Limerick (?) Boundary of the Waulsortian limestone and the underlying Ballysteen formation Red, rich in crinoidal debris, packstone, well developed breccia texture. Kinahan describes it as similar to the “Cork reds”. Only the three northern quarries, which are situated off Sexton Street N. at Quarry Lane, are marked on the OS 6” and 25” maps. The Pallaskenry marble is raised near the Shannon, about 8 miles west of Limerick.</td>
<td></td>
</tr>
<tr>
<td>Rynana (Rineanna)</td>
<td>Rineanna North, Clare Waulsortian limestone Peach-grey variegated wackestone/packstone with crinoidal debris. A small quarry is situated just east of the roadway at Rineanna Head on the OS 25” map. Chimneypiece in the dining room; chimney piece in the billiard room.</td>
<td></td>
</tr>
<tr>
<td>Cratloe</td>
<td>Cratloe, Clare Augustus Stafford(^{586}) Waulsortian limestone Red.(^{587}) A quarry is illustrated on the OS 6” map. Columns in the library (former drawing room), which have been removed; Hardwick’s chimney piece in the library (former drawing room).(^{589})</td>
<td></td>
</tr>
</tbody>
</table>

\(^{581}\) Browne, “The Limestone Industry of Limerick.”, p. 175.


\(^{585}\) Caroline Countess of Dunraven, p. 7.

\(^{586}\) Griffith’s Valuation, March 08, 1852; UL Special Collections, Dunraven Papers, D/3196/1/24/390, 01 July 1862.

\(^{587}\) UL Special Collections, Dunraven Papers, D/3196/1/24/390, 01 July 1862.

\(^{588}\) UL Special Collections, Dunraven Papers, D/3196/1/24/390, 01 July 1862; Caroline Countess of Dunraven, *Memorials of Adare Manor*, p. 7.

\(^{589}\) Caroline Countess of Dunraven, p. 7.
see Ballyengland quarry for alternative source.
The internal walls and floor of the cloister arcade on the south front, which was originally open to the elements but was closed in during a recent refurbishment to create a dining area, are particularly rich in colour (figure 24). The Memorials state that the stone was chiefly sourced from Kilbreedy,\textsuperscript{590} which is situated between Askeaton and Clorhane, just north of Tuogh. The diversity of coloured stone in the cloister suggests that it was derived from several local limestone localities.

![Figure 24. The cloister arcade at Adare Manor (left) and the polychrome tiled floor of the cloister arcade (right).](image)

The outer hall contains carved doorways and a fireplace in the Hiberno-Romanesque style. The entrance doorway is of grey Limerick stone,\textsuperscript{591} which is a typical Waulsortian limestone, however the precise source locality is not revealed. The source of the grey stone surrounding the small doorway adjacent to the entrance doorway is unidentified, but it is also Waulsortian and presumably from Limerick. The stone in the small fireplace is a mix of pinkish grey Waulsortian limestone and deep red Waulsortian limestone with a well-developed breccia texture; the quarry source is unknown (figure 25).

The main hall has great polygonal piers with chamfered arches supported by ribs resting on prismatic corbels, all constructed from Thomond Gate limestone\textsuperscript{592} (Viséan) and copied directly from the church of the nearby Franciscan friary (figure 26).\textsuperscript{593} Greyish-orange Waulsortian

\textsuperscript{590}Caroline Countess of Dunraven, p. 7.
\textsuperscript{591}Caroline Countess of Dunraven, p. 7.
\textsuperscript{592}Caroline Countess of Dunraven, p. 7.
\textsuperscript{593}Personal Communication, Dr Andrew Tierney.
limestone from his Lordship’s quarry at Dunnaman “forms the slate [slab] over the hot-air aperture in the Hall” (figure 27). The Dunnaman stone was also utilised for the chimneypiece in the saloon (figure 28).

Figure 25. Outer hall: main entrance doorway and small adjacent doorway (left) and chimneypiece (right).

Figure 26. Columns and arches in the main hall (left) and Hiberno-Romanesque doorway in the main hall leading to the outer hall (right).

594 Caroline Countess of Dunraven, Memorials of Adare Manor, p. 7.
Figure 27. Pugin’s chimneypiece (left) and the hot-air aperture (right) in the main hall.

Figure 28. Chimneypiece in the saloon.
There are many ornately carved chimneypieces throughout Adare Manor, all wrought from richly coloured local limestones. At least two were designed by Augustus Welby Northmore Pugin in a late medieval Irish style - that in the main hall of dark grey Tuogh limestone (figure 27) and the eastern chimneypiece in the library (figure 30). Lady Dunraven provided a detailed description of the library (figure 29) in the Memorials: “The billiard-room and the library are still unfinished. The latter was opened at a series of entertainments given to celebrate the coming of age of Lord Adare, February 1862. This noble room measures 66 ft. long, 21 wide, and 18 high; and is partially divided by a lofty arch resting on red marble columns. The great bay window in the eastern division is 18 ft. wide. The ceiling is divided into square panels formed of moulded oak ribs, at the intersection of which are carved pendants; the panels themselves being filled with plaster decorations in low relief. There are two magnificent chimney-pieces, the eastern one designed by Mr. Pugin, the other by Mr. Hardwick, both of red marble of the neighbourhood, the carvings of which are elaborate and beautifully executed” (figures 30 and 31). She continued, “An old man, who died nine years ago, in his eightieth year, told me that some little time after he came to Adare as a boy, he remembered seeing the fine row of beech-trees west of the house planted; he also recollects the house being raised, and the bow-window added to the drawing-room”.

The library on the new plan of Adare Manor (figure 24) was the drawing room in the old house. The bow windows in the library (the former drawing room) are of Limerick limestone (figure 29), the exact quarry location of which is unknown, while the red columns, which have since been removed, were of limestone from Cratloe, Co. Clare. There are contradictions within the documentary sources regarding the provenance of the stone in both Pugin’s and Hardwick’s chimneypieces in the library. The Memorials state that the fabric of Pugin’s chimneypiece is from Rathkeale Commons, Co. Limerick and Hardwick’s is from Co. Clare, while the Dunraven papers assign the respective stone sources to Rintulla near Currah Chase and Ballyengland close to Askeaton, both in Co. Limerick. Mining engineer and prospector Pierre Foley was contracted by landowners in the early 1840s to conduct agricultural surveys on estates in Limerick, Clare and

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595 [https://www.dia.ie/architects/view/4430/PUGIN-AUGUSTUSWELBYNORTHMORE%23](https://www.dia.ie/architects/view/4430/PUGIN-AUGUSTUSWELBYNORTHMORE%23) [accessed on 31 August 2021].
596 Personal Communication, Dr Andrew Tierney.
597 Caroline Countess of Dunraven, Memorials of Adare Manor, p. 7.
598 Caroline Countess of Dunraven, p. 27.
599 Caroline Countess of Dunraven, p. 159.
601 Caroline Countess of Dunraven, p. 7.
602 UL Special Collections, Dunraven Papers, D/3196/1/24/390, 01 July 1862; Caroline Countess of Dunraven, p. 7.
603 Caroline Countess of Dunraven, p. 7.
604 UL Special Collections, Dunraven Papers, D/3196/1/24/436, 24 June 1862.
Tipperary, some of which belonged to Sir Aubrey De Vere, Bart., Thomas Arthur, Esq., Sir Hugh Dillon Masay, Bart., the Earl of Clare, the Earl of Powis, Smith Barry, Esq., Christopher John Delmege, Thomas Davenport and William Hewson, Esq. He investigated the presence of potentially commercial stone commodities including decorative stone, which he referred to as marble. In 1842 he described the discovery of “splendid varieties” of marble on Sir Aubrey De Vere’s estate at Currah Chase and William Hewson’s estate at Ballyengland, which is just east of Askeaton.  

Figure 29. The library (formerly the drawing room).

The uninterrupted marble bed on De Vere’s estate was one mile and a quarter in length and nearly half a mile in breadth, and consisted of finely textured, variegated red, purple, pink, flesh colour, sky blue and dove varieties. The large bed, about 1000 feet in breadth and over a quarter of a mile in length, of sparkling bright grey or dove coloured and delicately shaded pinkish red variegated marbles at Ballyengland was of superior quality and polished easily to produce “an exceedingly elegant” surface. Given Lord Dunraven’s known interest in geology, Foley’s

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605 Foley, “To the Editor of the Limerick Chronicle.”
606 Foley.
607 “University Intelligence”; “We Have Just Seen Two Small Blocks of Marble...”
exploration for marble on Hewson’s and De Vere’s estates nearby Adare in the early 1840s, and indeed his subsequent discoveries, may well have led to these Waulsortian limestones being raised and wrought into marble chimneypieces for the manor. Furthermore, in 1829 Sir Aubrey De Vere, poet and amateur architect, submitted an unexecuted design to the 2nd Earl of Dunraven for a proposed addition to Adare Manor; this early interaction between De Vere and Lord Dunraven may have assisted talks in the following decades regarding the discovery of marble on the Currah Chase estate and its potential use in Pugin’s chimneypiece.

![Figure 30. Pugin’s chimneypiece in the library.](image)

The stone in Pugin’s chimneypiece (figure 30) is greyish red, contains crinoidal debris and red clay, exhibits a brecciated texture and is characteristic of the Waulsortian limestone; the entire chimneypiece is composed of the same rock type. It is likely that the stone was sourced from either Rathkeale Commons or De Vere’s estate at Currah chase since the two townlands overlie the Waulsortian limestone. It is not probable that the stone came from Rintulla, as suggested in the Dunraven papers, considering the dominant lithologies at this locality are limestone and calcareous shale, which do not resemble the texture of the stone in the chimneypiece, and this townland was also not owned by De Vere.

The fabric of Hardwick’s chimneypiece (figure 31) is deep red, brecciated Waulsortian limestone with stylolites and crinoidal debris. Lady Dunraven’s attribution of the stone to Co. Clare raises some doubt. The other Clare marbles documented in Adare Manor are from Cratloe and

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608 [https://www.dia.ie/works/view/4325/building/CO.+LIMERICK%2C+ADARE+MANOR](https://www.dia.ie/works/view/4325/building/CO.+LIMERICK%2C+ADARE+MANOR) [accessed 09 April 2021].

609 Griffith’s Valuation, March 04, 1851.
Rineanna. The Rineanna stone is a distinctive peach-grey colour with a typical Waulsortian texture (unbrecciated), which does not correspond to the red stone in Hardwick’s chimneypiece. The Cratloe marble, which is polished Waulsortian limestone, used in the Library columns was described in the Dunraven papers as red in colour, however these columns are no longer present and therefore the stone cannot be observed. Contrarily, the Dunraven papers assign stone from Ballyengland to Hardwick’s chimneypiece. Like Cratloe, Ballyengland is also situated in the Waulsortian and therefore it is conceivable that the stone for the chimneypiece was sourced from either Sir William Hewson’s estate in Ballyengland, Co. Limerick or Mr Stafford O’Brien’s property in Cratloe, Co. Clare.

Figure 31. Hardwick’s chimneypiece in the library.

The origin of the grey-peach coloured stone in the chimneypiece in the billiard room (formerly the saloon in the old house)⁶¹⁰ is unknown although it resembles Rineanna limestone in Co. Clare (figure 32), which was also used in the dining room chimneypiece (figure 33).⁶¹¹ The quarry sources of the red stone in the fenders of the billiard room and dining room chimneypieces cannot be determined in the absence of a written source, nor can the red stone surrounding the small doorway in the dining room (figures 32 and 33).

⁶¹¹ UL Special Collections, Dunraven Papers, D/3196/1/24/390, 01 July 1862; Caroline Countess of Dunraven, p. 7.
Figure 32. Chimneypiece in the billiard room (left) Rineanna limestone in a stone wall at the location of the former quarry (right).

Figure 33. Chimneypiece in the dining room (left) and small doorway in the dining room (right).
Figure 34. Chimneypieces in the dining room: eastern chimneypiece (top left), central chimneypiece (top right), western chimneypiece (bottom left and right).

The *Memorials* and the Dunraven papers claim that the chimneypieces in the gallery are of carved stone procured from Ballingarry, Co. Limerick.\(^{612}\) The eastern and central chimneypieces are of a

\(^{612}\) UL Special Collections, Dunraven Papers, D/3196/1/24/436, 24 June 1862; Caroline Countess of Dunraven, p. 7.
reddish-grey Waulsortian limestone, which is stylolitic, rich in crinoidal debris and exhibits a well developed breccia texture. This stone is very similar in appearance to that in the Pugin chimneypiece in the library, which was obtained from Rathkeale Commons or Currah Chase. The western chimney piece is of a fine-grained, dark greyish-purple limestone with pink blotches and abundant crinoidal debris. Perhaps the greyish-purple stone was sourced from Ballingarry for the western chimney piece, which concurs with the underlying lower limestone shale lithology at this locality, while the stone for the eastern and central chimney pieces is Waulsortian limestone from Rathkeale Commons or Currah Chase (figure 34).
Lady Dunraven assigns red Rathkeale Commons limestone to the chimneypiece in her sitting room while the Dunraven papers state that the grey-orange stone that forms “the grate” [inner
The enigmatic Pallaskenry “marble”

While Kinahan maintained that Pallaskenry stone was used in Adare Manor he did not indicate where in the building it was employed. He specified that unlike the other Limerick reds, which are “clear-coloured, varying from shady or coloured red to variegated, with grey, green, yellow and other tinges”, the Pallaskenry stone “is of the type known as the ‘Cork reds’” (although is at a lower stratigraphic level and so probably had a different origin – see below). Wilkinson stated that it was a hard and somewhat laminated stone occurring in nearly horizontal beds, which produced large slabs capable of receiving a polish, and was used as punched ashlar work, mixed with ordinary blue limestone, at Lord Clarina’s mansion at Elm Park (figure 38) and in chimneypieces and other polished decoration within the mansions of Co. Limerick. There is also a panel of polished Pallaskenry red limestone in the entrance hall of the former Museum of Irish Industry, 51 St Stephen’s Green, Dublin.

The Pallaskenry stone is red, contains clay seams and crinoidal debris, and exhibits a brecciated texture (figure 38). There are no documentary sources specifying the location of the quarry and it is not indicated around Pallaskenry on the OS maps, however Wilkinson described the locality as “about eight miles west of Limerick, near the Shannon”. A stratigraphic position of the Pallaskenry red marble at the base of the Waulsortian limestone is likely given the outcrop pattern and proximity of the Ballysteen-Waulsortian boundary to Pallaskenry (figure 39). The stratigraphy of the Pallaskenry borehole further supports the occurrence of the marble within the basal portion of the Waulsortian limestone strata, which exhibits well developed breccia fabric similar to that described at Lyon’s Hill, Co. Kildare. The Waulsortian limestone in the Limerick area

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613 UL Special Collections, Dunraven Papers, D/3196/1/24/436, 24 June 1862; Caroline Countess of Dunraven, p. 7.
614 Griffith’s Valuation, December 20, 1850; Caroline Countess of Dunraven, p. 7.
616 https://www.dia.ie/works/view/3526/building/CO.+LIMERICK%2C+ELM+PARK+%28CLARINA%29 [accessed 27 April 2021].
618 Wilkinson, p. 223.
conformably overlies the Ballysteen Formation (dark muddy limestone and shale) and is conformably overlain by the Lough Gur Formation. The Knockroe volcanics are interstratified with limestones at the top of the Lough Gur Formation and they also intrude into the underlying Waulsortian limestone.620

Figure 38. Clarina gate lodge (top left). Pallaskenry red limestone and blue limestone punched ashlar surrounding the front doorway of Clarina gate lodge (top right). Pallaskenry red limestone and blue limestone door frame in the entrance hall of Clarina gate lodge (bottom left). Pallaskenry red limestone in the top slab of the door frame in the entrance hall of Clarina gate lodge (bottom right).

Source of colouration and texture in the Limerick and Clare “marbles”

An investigation by Teck Ireland into lead-zinc mineralisation at Stonepark Prospect, which is situated within the Limerick volcanic centre south east of Pallaskenry, provided textural evidence that subsequent hydrothermal dissolution brecciation of the Waulsortian limestone and Knockroe


intrusions occurred. Unlike other Irish-type deposit settings there is no large controlling fault identified at Stonepark Prospect. Instead, intrusions (dykes and sills) provided a mechanism for brecciation and a plumbing system for the introduction of mineralising fluids. Further west at Pallaskenry, still within the vicinity of the volcanic centre, an equivalent process could be responsible for the formation of the Waulsortian hosted breccia. Fluid dynamics also account for the introduction of minerals (iron, probably derived from the underlying Old Red Sandstone) causing the red colouration of the brecciated zone at this location from which decorative stone was extracted.

![Image](image.png)

*Figure 39. OSI 6” map (1835-1844) showing outcropping Waulsortian limestone (pink) and Ballysteen Formation (blue) in the area surrounding Pallaskenry, west of Limerick city.*

All of the Waulsortian limestones of Limerick and Clare outlined in Table 1 are pigmented; some display weak brecciation while others remain unbrecciated and retain a typical Waulsortian fabric, but they all probably had their genesis in hydrothermal dissolution systems. The unbrecciated varieties likely experienced minimal hydrothermal alteration, involving the introduction of coloured minerals and minimal textural changes, while the brecciated varieties were subjected to highly pressurized hydrothermal fluids, which resulted in hydrofracturing of the rock. The presence of stylolites, which are compressive features that appear as irregular seams or wavy lines, in some of the rocks indicates the process of pressure dissolution where calcite was removed and insoluble clays and oxides remained.

621 McCusker and Reed.
622 Pressure dissolution is a process where ions are dissolved and deposited in another location. Dissolution occurs in high porosity (low pressure) areas and deposition occurs in low porosity (high pressure) areas.
Other uses of Limerick and Clare red “marbles”

None of the Limerick and Clare reds appear to have been extracted to a substantial extent; they were principally used in Adare Manor and in a small number of local Victorian churches, including James Joseph McCarthy’s St Mary’s Church, Rathkeale (1866-81), the Redemptorist Church of Mount Saint Alphonsus (1858-62) and St John’s Cathedral (1855-61). The latter two churches in Limerick city were designed by Philip Charles Hardwick who was also responsible for the completion of the south and west fronts of Adare Manor and the design of one of the chimneypieces in the library in the 1850s. The use of red marble from Rineanna, Co. Clare is recorded in St John’s Cathedral, which was constructed using limestone from Garryowen, Altamira, Rosbrien and Ballysimon, however the specific areas of the church to which the Rineanna stone is applied is unknown. In his contemporary text on Limerick Maurice Lenihan documented alabaster, red Limerick marble and other marbles in the altar of St John’s; it is possible that the stone referred to as Limerick marble is in actuality Clare red limestone, which is lithologically very similar to the Limerick red limestones that were worked as marble.

Inside the Redemptorist Church of Mount Saint Alphonsus large columns of Clare red marble flank the entrance to the apse (figure 40). The material used for the construction of the church is local dark grey limestone, relieved with banding of red limestone on the western façade, a large cross of the red stone on the rounded exterior of the apse and a column at the front entrance; this red stone was most likely also quarried in Co. Clare (figure 41). Kinahan described the

where the dissolved minerals form stylolites. The likelihood of stylolite formation is higher in areas of high stress. [accessed 30 April 2021].


624 The nave columns in St Mary’s are unusual in that they were constructed of both brecciated red limestone on their lower levels and a reddish brown Waulsortian limestone above, which may have been sourced from Ballyengland or close by. Chapter 5 of this thesis contains images of this church.


628 The reredos stands on a base inlaid with a variety of richly sculpted Irish marbles, which are separated from each other by red marble shafts. The altar is principally fabricated from Caen Stone accompanied by columns and inlay of Cork red and Connemara green marbles. The communion rail consists of a balustrade of red marble columns surmounted by capitals of sculptured stone that bear a rail of polished Sicilian marble. The steps of the three principal alters are of polished red marble. “Limerick, Sunday,” *Irish Examiner*, December 9, 1862, 4; Lenihan, *Limerick; Its History and History and Antiquities*, p. 675 - 678.

source of Clare red marble, which was used for ornamental purposes in Adare Manor, as south Co. Clare, a little east of the River Fergus between Newmarket-on-Fergus and the River Shannon.\textsuperscript{630} The locations of the Waulsortian limestone quarries at Rineanna and Cratloe (see Appendix 3 for coordinates), both of which supplied Adare Manor,\textsuperscript{631} concur with Kinahan’s description and therefore it is likely that red stone was sourced from this South Clare locality for use in the Church of Mount Saint Alphonsus. Furthermore, while Hardwick was building the Church of Mount Saint Alphonsus he was also building St John’s Cathedral, which allegedly contains Rineanna red marble (figure 42), and designing the chimneypiece for the library in Adare Manor, which Lady Dunraven stated was fabricated using Clare stone. Both churches display early use of Clare red marble and it is highly likely that Hardwick used the same red stone in both contemporary buildings, most likely obtained from Rineanna but possibly from Cratloe.\textsuperscript{632}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure40.jpg}
\caption{Red Clare limestone columns flanking the apse in the Redemptorist Church of Mount Saint Alphonsus, Limerick city (left). Close up of the red Clare Waulsortian limestone in one of the columns flanking the apse (right).}
\end{figure}

\textsuperscript{630} Kinahan, \textit{Economic Geology of Ireland}, p. 134, 167.
\textsuperscript{631} UL Special Collections, Dunraven Papers, D/3196/1/24/390, 01 July 1862; Caroline Countess of Dunraven, \textit{Memorials of Adare Manor}, p. 7.
\textsuperscript{632} Although the Rineanna stone observed at the former quarry location and in the chimneypieces in Adare Manor is a greyish peach colour, the texture is very similar to the slightly more reddish stone attributed to Rineanna in the alter of St John’s Cathedral, which also highly resembles the Clare stone columns flanking the apse in the Redemptorist Church of Mount Saint Alphonsus.
Figure 41. The Redemptorist Church of Mount Saint Alphonsus, Limerick city (top). Red limestone features on the exterior of the church (bottom left and right).
Subsequent to their considerable use in Adare Manor, and in the Limerick churches described above, there is very little evidence supporting the application of Limerick and Clare reds elsewhere, however their superior colour and texture paved the way for large-scale removal of Cork red conglomeratic limestone in the latter half of the nineteenth century, which was worked as marble. The stratigraphically higher conglomeratic horizons in Cork were more extensive, traceable and exploitable than the spatially erratic patches of coloured Waulsortian limestone in Limerick and Clare, which was highly variable in terms of pigmentation and texture over extremely short distances. Widespread extraction of various limestones, which were worked as marbles, occurred in Cork and to a lesser extent Kerry during the Victorian period.

**Cork and Kerry “marble” quarries**

**Mitchelstown “marble”**

A distinctive black and white Waulsortian limestone was quarried at Mitchelstown in the townland of Brigown and worked as marble since at least the beginning of the nineteenth century (figures 43 and 44). The texture of the stone, which exhibits large (up to 10 cm in length) conjoined white calcite clots (thromboids) in a dark, muddy, fine-grained matrix, is indicative of a thrombolite mound. This attractive mottled marble was exhibited at the 1851 Great Exhibition in Cork at which time the quarry was owned by the Earl of Kingston and leased by Michael Canty.

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634 Thrombolites (a form of microbialite) are rock-like, non-layered sedimentary formations generated by cyanobacteria (similar to stromatolites, but stromatolites have a layered structure).

The quarry was later worked by both Michael Canty and his son, also Michael, who was a monumental sculptor and fabricated many pieces from the Mitchelstown marble, at the beginning of the twentieth century Timothy Canty managed the operation.

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Figure 43.. Location of the Mitchelstown marble quarry, Baldwin Street, Brigown (situated in the Rathronan Formation) on the OSI 6” map (1835-1844) (left) and the OSI 25” map (1888-1913) (right).

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636 “A Remarkable Irish Sundial.”
Figure 44. Mitchelstown marble quarry at Brigown: former quarry face (top left) and former quarry workshops.

Figure 45. Mitchelstown marble chimneypiece originally from Bowen’s Court and now housed in the Georgian Society, City Assembly Hall, South William Street, Dublin.

The stone was utilised decoratively in many Victorian buildings and monuments including the former Museum of Irish Industry, 51 St Stephen’s Green; the Museum Building of Trinity College.

I would like to thank Paul Finn, proprietor of the former quarry site in Brigown, for allowing access to his farm and providing samples of the stone.
Dublin; the National Museum, Kildare Street; Cork courthouse, Washington Street; the plinth beneath the bust of Thomas Hayden in the great hall of the College of Physicians, Kildare Street; and a chimneypiece originally in Bowen’s Court, Co. Cork that is now housed in the Georgian Society, City Assembly Hall on South William Street, Dublin (figure 45).

Other decorative limestones quarried in Cork included blacks at Donerail and mottled greys in several districts, however, the most acclaimed marbles procured in the county were the reds. Reference to a red Mitchelstown marble fender in a fireplace at the former offices of Messrs Robert Smyth and Son, wine merchants (6 St Stephen’s Green) suggests that red stone was quarried around Mitchelstown in the second half of the nineteenth century. However, extraction in this area was undoubtedly small-scale and other more southerly locations were preferable in terms of stone quality and the extent of the deposit.

Cork red “marble”

Figure 46. Distribution of Cork red limestone quarries within the Cork syncline around Boreenmanagh (south east of Cork), Little Island and Midleton.

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639 Refer to chapter 5 of this thesis.
641 The bases of the piers and pilasters in the courthouse are Mitchelstown marble. See figure 61.
642 “The Late Dr Thomas Hayden, M R I A.,” Dublin Daily Express, June 20, 1883, 7.
644 “Street Architecture - Business Enterprise,” Evening Freeman, November 2, 1870, 4; “Street Architecture,” The Irish Builder, November 15, 1870, 263–64.
645 The Johnstown Red Marble Formation outcrops to a limited extent in the Mitchelstown syncline but more significantly in the Fermoy syncline. Elizabeth Patricia Shearley, “The Carboniferous Geology of the Fermoy and Mitchelstown Synclines, Southern Ireland” (University of Dublin, 1988). The stone for the fender may have been sourced from a quarry in the townland of Shanrahan or Killballyboy in the vicinity of Clogheen, Co. Tipperary; these quarries were situated in the Johnstown Red Marble Formation outcropping in the Mitchelstown syncline. Bedrock Geology, 1:100,000, GSI.
Cork red marble was not widely exploited before the time of the original GSI surveys of the county in the early 1850s, which made no mention of quarrying activities, although outcrops of the stone were located outside Little Island and Fermoy. The Railway Commissioners Report of 1837, which comprehensively lists all of the working marble quarries in Ireland, records quarries on Little Island that produced 56,000 tons of fine grained grey dimension stone, but no decorative Cork red marble quarries. Kane referred to a marble, similar to that of Armagh red and “elegantly variegated with yellow and purple”, being available at Churchtown in 1844, while Wilkinson the following year described various Cork grey limestones quarries, none of which yielded Cork red marble. The first explicit reference by the GSI to the extraction of the red marble was published in an explanatory memoir in 1859 following a survey of the Churchtown area: “North of Churchtown, in the townlands of Ballyvaheen, Ballynaboule, and Rath, and in the strike of the Ballyhoura anticlinal, black shaly and cherty, calpy looking, limestone occurs in detached quarries... Apparently, the lowest seen of these beds, in the demesne north of Churchtown House, are cherty, blotchy looking, compact and variegated, red and gray marble –

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647 Cork red marble is a lime conglomerate, which was worked as marble.
648 The geology of Cork (encompassing Little Island, Midleton and Cork harbour), surveyed by W.L. Wilson and A. Wyley, was first published in map format in October 1857 by Sir R.I. Murchinson F.R.S., Director General, and J. Beete Jukes M.A. F.R.S., Local Director. This geological map was later revised by J. Beete Jukes in 1863 with an accompanying explanatory memoir published in 1864. Marble quarries were not indicated on the geological map nor mentioned in the memoir. Kinahan was involved in this survey and he failed to document notable marble quarrying activity. In October 1857 the geological map of Fermoy, surveyed by A. Wyley, was also published and in 1861 the accompanying memoir was released, neither of which referred to marble extraction in the Fermoy area. (See footnotes 649 and 650 for citations).
649 “… Little Island, bluish gray crystalline limestone may be seen on its north shore, opposite New Glanmire; and pale gray crystalline limestone, with chert veins and bands of red colour, along the southern part of the Island. The quarries along the south shore of the Little Island and near Rock Farm are very fossiliferous…” C. Galvan et al., “Explanation of Sheets 187, 195, and 196, of the Maps and Part of Sheet 5 of the Sections, of the Geological Survey of Ireland Illustrating Part of the County of Cork,” Memoirs of the Geological Survey, 1864, p. 44.
650 “The Carboniferous Limestone consists chiefly of two varieties, a black, dark grey or bluish, sometimes cinoidal, and in some places shaly, limestone, which prevails near the base of the subdivision, but occasionally appears again near the top; and a compact pale whitish grey variety, which takes a middle place in the group and is very widely spread over the space coloured blue. In the latter kind the bedding lines are seldom traceable; it is massive and amorphous looking, and is sometimes variegated and streaked with red...” C. Galvan et al., “Explanations to Accompany Sheets 176 and 177 of the Maps of the Geological Survey of Ireland, Illustrating Parts of the Counties of Cork, Waterford, and a Small Portion of Tipperary,” Memoirs of the Geological Survey, 1861, p. 11.
651 “First Report of the Commissioners appointed to inquire into the manner in which Railway Communications can be most advantageously promoted in Ireland” (London: W. Clowes and Sons, Duke Street, Stamford Street, 1837), Appendix B, No. 8, Mines and Quarries, p. 67-68.
652 Kane, The Industrial Resources of Ireland, p. 244.
653 Wilkinson acknowledges “a peculiar seam of reddish limestone” raised at Boreenmanagh and Haulbowline Island in the vicinity of Cork, which was a dull colour, compact and of a slaty texture; it was difficult to work but formerly used to some extent for chimneypieces. Wilkinson, Practical Geology and Ancient Architecture of Ireland, p. 177; George Wilkinson, “On the Marbles of Ireland,” Journal of the Geological Society of Ireland III (July 7, 1845): 273–74.
(polished specimens of which may be found among the panels and the pilasters of the hall of the Museum of Irish Industry, Stephen’s green, Dublin). The beds of marble exposed form part of a very flat anticlinal curve, exhibiting but a small thickness; others of the group adjoining them may, however, be concealed”.

Figure 47. OSI 6” map (1835-1844) (top) and OSI 25” map (1888-1913) (bottom) showing the location of the Boreenmanagh red marble quarry in the townland of Knockrea on the south eastern edge of Cork city, which is situated in the Cork Red Marble Formation. By the time of publication of the 25” map the quarry was no longer in use.

Edward Hull in 1872 referred to reddish and variegated marbles at Midleton, Churchtown and Little Island quarries, and later, in 1889, Kinahan documented marble quarries producing “the best Irish reds in the market” in the localities of Boreenmanagh, Little Island and Churchtown near Cork and at Fermoy, Midleton and Buttevant. He stated that all except those at Boreenmanagh, Fermoy and Midleton are of one type, known in the market as “Cork Reds”. This type refers to the conglomeratic variety observed in the columns of the Museum Building of Trinity College Dublin, which is composed of clasts of calcite, crinoidal debris and stylolites in a haematitic clay matrix. Kinahan described the Midleton stone as a “warm-dove colour to a rich variegated marble”, while those at Boreenmanagh and Fermoy were “semi-transparent, mottled, or clouded with white and grey”, and he remarked that the Midleton stone had only lately been known, but it had rapidly taken a place in the market. The Midleton variety was sometimes referred to as “Victoria Red” among marble workers. It was not until the publication in 1905 of the GSI memoir, which accompanied a new geological map of the city of Cork and Cork harbour, that the workings of Cork red marble were discussed. At this time the surveyor, George W. Lamplugh, disclosed that the principal locality for red limestone that was quarried as ornamental stone was at Midleton. The formerly extensively exploited “Cork reds” from Little Island and Boreenmanagh were no longer productive (see figures 47 and 48).

**Little Island “marble” quarries**

As discussed in chapter 2, red marble, intended for royal dwellings in Britain, was being extracted on Little Island since the early seventeenth century. Little Island comprised five main quarries, which primarily produced grey limestone, but also Cork red marble (figures 48 and 49). Three grey limestone quarries were located on the shores of Lough Mahon, the two largest of which were named Rock Farm quarries. Situated 6 miles east of Cork in the townland of Ballytrasna, the Rock Farm quarries in 1837 extended a mile along the verge of Lough Mahon, which joins Cork Harbour to the south. At this time the annual produce was 12,000 tons of manufactured stone (cost 13s.

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655 Hull, *A Treatise on the Building and Ornamental Stones of Great Britain and Other Countries*.
657 See chapter 5 of this thesis for images of Cork red columns in the Museum Building.
658 Kinahan, p. 135.
660 G.W. Lamplugh et al., “The Geology of the County around Cork and Cork Harbour. (Explanation of the Cork Colour-Printed Drift Map.),” *Memoirs of the Geological Survey*, 1905, p. 28, 110. (The boundaries of the map were arranged to embrace the country around the city of Cork and including the whole of Cork Harbour. This area formed part of four sheets of the previous “solid” geological maps. The objective of the 1905 survey was to map glacial drifts and other superficial deposits which were not included within the scope of the original survey. Carboniferous limestone is discussed in Part I General Description, Chapter III. Building stone and ornamental marble is discussed in Part III Economic Geology, Chapter IV.).
per ton) and 44,000 tons of rough stone (1s. 4d. per ton). Superior quality marine shelf limestone (Little Island and Clashavodig Formations) was raised from these quarries, which was generally used for built stone purposes on account of its fine grained nature, and the refuse was utilised for ballast and road building or converted into lime. Prior to the railway installation stone was transported by horse and cart. The stone was shipped from 4 wharfs within 150 yards of each quarry; the average cost of carriage per ton per mile via water was estimated at 2d. and by land was 6d. During the third decade of the nineteenth century 100 men were daily working these quarries, however, if the quarries were operating at full capacity it was anticipated that the daily employment would have been 6 times that number.661

The western quarry was situated in the Little Island Formation and excavated stone was massive, crinoidal, fine grained, wackestone and a light grey colour. It was paler in colour, easier to work and considered higher quality than stone in the eastern quarry.662 Beds in the eastern quarry included the “blasting rock”, “glass-bed”, “cockle bed” and “grey bed”; the latter was most favoured by monumental sculptors.663 The eastern quarry produced limestone from both the Little Island Formation and the Clashavodig Formation, which is characterised by oolitic, peloidal, cherty, fine, wackestone limestone. Stone raised from the eastern quarry was lower quality, more varied in colour and sometimes darker than that that in the western quarry, and not as easily worked.664 The massive nature of the Little Island Limestone Formation in the western quarry most likely allowed for biggish blocks of dimension stone to be removed, whereas the variability in the east and cherty characteristic led to it probably being used more for ballast (and perhaps some building works, but possibly not for fine ashlar and exterior work).

662 Personal communication, Tim O’Connell, proprietor of O’Connell Stone (http://www.oconnellstone.com/).
664 Personal communication, Tim O’Connell, proprietor of O’Connell Stone (http://www.oconnellstone.com/).
Figure 48. OSI 6” map (1835-1844) (top) and OSI 25” map (1888-1913) (bottom) showing the locations of limestone and red marble quarries on Little Island and their expansion throughout the nineteenth century.
Two red limestone quarries, producing “the celebrated Park Red Marbles”, were situated in the Cork Red Marble Formation just north of the two most westerly coastal grey quarries on Little Island; the precise time of commencement of quarrying is unknown. One large quarry is displayed on the 6 inch OS map, however, by the time of publication of the 25 inch OS map this quarry was no longer in use and a smaller quarry was opened to the east (figure 49). Griffith’s Valuation of Little Island in 1853 records John Cantillon as proprietor of the Rock Farm limestone quarries, however, the marble quarry just north of Rock Farm in the townland of Wallingstown is not

665 “To Marble Merchants, Masons, and Others,” Irish Examiner, June 2, 1869, 1.
documented. In 1864 Cantillon’s Rock Farm quarries were advertised for rental and in 1869 the marble quarries were put up for sale, together with the steam factory, machinery, and stock-in-trade called “The Cork Steam Marble Works” at nos. 2 and 3, Wandesford Quay in Cork City, then occupied by Messrs W.J. Goodman & Co. However, Cantillon remained in possession of the Rock Farm quarries until at least the beginning of the twentieth century and in 1903 he exhibited a specimen of red marble from Little Island at the Greater Cork International Exhibition.

Chuchtown “marble” quarries

A rich vein of predominantly red marble, interspersed with green, was situated on the land surrounding Chuchtown House, which was discovered in 1702. The stone was primarily used for local road building until the early 1800s, at which time its value was realised and it was widely

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666 Griffith’s Valuation, April 02, 1853.
667 “To Be Let,” Irish Examiner, December 17, 1864, 3; “To Marble Merchants, Masons, and Others”; “To Be Sold by Auction…,” Irish Examiner, August 4, 1869, 1. Chapter 4 provides information on this marble works.
669 Griffith’s Valuation, June 20, 1851.
670 Although the quarry is situated within the Waulsortian, the Cork Red Marble Formation outcrops throughout this area and may well have been quarried at this locality. Denis J. Hickey, The Annals of Chuchtown (Mallow: Chuchtown Heritage Society, 2019), p. 94.
employed for decorative purposes. During the first half of the nineteenth century the land in Churchtown, or Bruhenny as it was formerly known, was considered generally good and mostly in pasture with some areas of bog and outcrops of limestone and red marble. By the 1840s the greater part of the parish was the property of Sir Edward Tierney, Bart, agent and solicitor to the 5th Earl of Egmont; before this time it was chiefly owned by the Earls of Egmont. Tierney was responsible for the operation of the quarry until his death in 1856, after which his representatives managed the quarry until the 1860s when it, along with the rest of the Egmont estate, was regained by the 6th Earl of Egmont. The bed from which the Churchtown marble was quarried is sometimes referred to as the “Churchtown House bed” (figure 50). The village of Churchtown was rebuilt by Sir Edward Tierney between 1833 and 1849, an event that was commemorated on its 150th anniversary in 1999 with the erection of a piece of locally quarried red Churchtown marble bearing a bronze plaque at the Low Pump or Pound Corner in Churchtown. As previously stated, the quarry was no longer in operation during the latter part of the nineteenth century when the Midleton stone monopolised the market.

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671 Hickey.
674 Upon his death in 1841 the 5th earl, Henry Frederick Joseph James Perceval, left part of his estate to Sir Edward Tierney and when Tierney died in 1856 his son-in-law, Rev Sir Lionel Darrel, inherited this land. In the early 1860s the 6th earl, George James Perceval, took legal action for the return of the family estates, which he achieved out of court, but at a cost of £125,000 payable to Sir Lionel. http://landedestates.nuigalway.ie/LandedEstates/jsp/estate-show.jsp?id=2612 [accessed 25 May 2021].
Fermoy “marble” quarries

The Fermoy red marble quarries were situated in the townlands of Johnstown East and Johnstown West, north west of Fermoy, Co. Cork (figures 51 and 52). The Hoares of Annabelle incipiently owned the estate, which included the townland of Johnstown East in the barony of Fermoy. During the Cromwellian conquest in Ireland (1649-1653) land was confiscated and dwellings were seized while natives fled west leaving their vacant farms to be divided among officers of the Cromwellian army. Two members of the Cromwellian command, brothers Edward and Abraham Hoare, received 3468 acres of land in Cork in 1667. Land in this area remained in possession of the Hoares until the mid-nineteenth century. Specifically, William O’Bryen Hoare owned the townlands of Johnstown, in which the red marble quarries are situated, until they were advertised by the Commissioners for the sale of Encumbered Estates in 1854 and Frederick Bell purchased them. 676 Frederick Bell was born in Hatton Garden, London on 19th May 1805 and he died in Fermoy on 4th February 1876. 677 Griffith’s Valuation 678 places him in Cork from at least 1852 where he lived on Thomas Street in Fermoy. 679

677 https://www.ancestry.co.uk/ [accessed 23 Sept 2020].
678 Griffith’s Valuation, May 01, 1851.
679 Carey Joyce alleged that Colonel Bell of the Cromwellian period was the proprietor of the Johnstown East quarry. Given the documentary evidence supporting the endowment of the Johnstown area to the Hoares after the Cromwellian conquest in Ireland and Frederick Bell’s ownership of the estate in the mid-nineteenth century, it appears that Joyce has mistaken Frederick Bell as a descendant of Colonel Bell. Carey Joyce, “The Quarry,” in Glanworth Millenium 2000, ed. Mary McNamara and Maura O’Neill (Glanworth: Glanworth I.C.A., 2000), 105–9.
In 1851, still during the proprietorship of the Hoares, John Sherlock was the immediate lessor of the Johnstown East quarry region (now referred to as Marble Farm) and Michael Keeffe was the occupier, however, Richard Griffith\(^{680}\) does not list an operational quarry in this locality in the primary valuations, albeit a quarry is indicated on the 6 inch OS map (figure 51).\(^{681}\) It is likely that

\(^{680}\) Griffith’s Valuation, May 01, 1851.

\(^{681}\) Hunt, *Mineral Statistics of the United Kingdom of Great Britain and Ireland for the Year 1858 (Part I)*, documents John Hyde as the owner of a limestone quarry in Johnstown East (not listed as a marble
Frederick Bell developed, if not initiated, quarrying of the red marble in this area, which he continued until 1872. Contemporary newspaper articles confirm that James Pierse/Purse worked the quarry from 1874. Dove coloured marble was also quarried in Johnstown. Although a small quarry was indicated on the 6 inch OS map in Johnstown West, the principal marble quarry was in Johnstown East (figure 53). Now located on Marble Farm the remnants of the quarry are still visible and extracted boulders of marble remain on site. Remaining late nineteenth century farm buildings, which may have been used as stone cutting workshops, were built using red limestone retrieved from the adjacent quarry. Recently built stables and walls are also of the attractive red limestone, honouring the former quarrying activities of the venue (figure 54).

This record probably refers to the Waulsortian limestone quarry located north of Bell's marble quarry (fig 47). Griffith’s valuation of this region on 01 May 1851 does not record a limestone quarry. Part of Bell’s estate, including Johnstown East, was advertised for sale in 1872. “In the Matter of the Estate of Frederick Bell, Owner and Petitioner.,” Irish Examiner, January 15, 1872, 1.

“Situations Vacant. To Quarrymen.,” Irish Examiner, October 17, 1874, 1; “To Quarrymen.,” Irish Examiner, July 21, 1875, 1.


This quarry is not documented in Griffith’s Valuation; in 1851 the land on which it was located was managed by Francis Mullins’ representatives and was occupied by William Leonard. Griffith’s Valuation, May 01, 1851.

I would like to thank Tom McGrath of Marble Farm for allowing access to his land, showing the former red marble quarry and supplying samples of the stone.
Figure 54. Former Johnstown East red marble quarry on Marble Farm (top), original late-nineteenth century red limestone buildings (middle) and recently built stables using the same red limestone retrieved on site (bottom).
Figure 55. Existent nineteenth century red limestone pavement in Fermoy, which was sourced from the Johnstown East quarry (bottom). The location of the pavement in Fermoy, as indicated on the OSI 25" map (1888-1913), was Old Market Street (top), currently named Fitzgerald Place.

Midleton "marble" quarries

Although marble quarries around Midleton are illustrated on the early 6 inch OS maps, it was not until the latter part of the nineteenth century that it became the principal district for Cork red marble extraction with operations in the townlands of Baneshane, Castleredmond, Carrigshane

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687 Personal Communication, Tom McGrath, current proprietor of Marble Farm.
and Ballynacorra (figures 56, 58 and 59). The red conglomeratic seam, which was worked as marble, occurs at the top of the Waulsortian along the axis of a compressed, faulted synclinal fold and it is overlain by the Little Island Formation. “Midleton Red” was most extensively raised at Baneshane, nearly a mile west of Midleton, close to the road leading southwards from Whitegate Rock to Ballyannan Castle. The quarry was located on the Midleton Estate, which belonged to Lord Midleton, and for many years it was believed that marble abounded the area. At the insistence of Mr James Penrose Fitzgerald, Lord Midleton’s agent, a geological survey of the estate was conducted in quest of red marble. Numerous excavations were made and experiments conducted with a view to commencing quarrying in the locality until eventually a shallow but extensive bed “of a particularly excellent variety of red marble” was located on a farm in Baneshane; the bed extended seven miles in length and continued to a considerable depth. Permission from the tenant on whose land the marble was discovered was acquired and owing to Lord Midleton’s “judicious investment of capital” quarrying in the district was initiated and maintained thereafter by the quarry manager, Mr Patrick Foley.

The output of Baneshane marble, which was of “splendid quality and colour”, was considerable from the outset due to a growing demand for the decorative material across the Irish Sea; additionally, excavation of large, heavy blocks was achievable at the Baneshane quarry, which led to the robust stone being more sought after in the British market. Slabs, weighing from four to ten tons and frequently measuring twelve feet in length, were detached, removed, hoisted to the surface, and blocked into shape using modern onsite machinery, included a 15-ton capstan, a 10-ton crane and other necessary equipment. The majority of the raised Baneshane stone was prepared for export. In January 1904 the largest slab to date, weighing close to 10 tons and measuring 14 feet in length, was raised from a depth exceeding 20 feet and transported to England for fabrication. Midleton marble was also supplied to Irish marble firms, in blocks usually weighing from four to six tons, and Lord Midleton exhibited a block of the stone at the 1903

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690 Lamplugh et al., “The Geology of the County around Cork and Cork Harbour. (Explanation of the Cork Colour-Printed Drift Map.).”
691 “Serious Accident Near Midleton,” *Irish Examiner*, September 23, 1890, 2; *List of Quarries (under the Quarries Act. 1894) in the United Kingdom of Great Britain and Ireland, and the Isle of Man; “Marble Quarrying at Midleton. An Interesting Industry.,” *Irish Examiner*, April 6, 1904, 3.
692 “Marble Quarrying at Midleton. An Interesting Industry.”
693 “Marble Quarrying at Midleton. An Interesting Industry.”
Greater Cork International Exhibition. Appreciation and admiration for the superior red marble grew amongst the public as its application in architectural decoration became more prevalent, however operations ceased during the first decade of the twentieth century.

![Map of Baneshane and Castleredmond red marble quarries](image)

**Figure 56.** Locations of Baneshane and Castleredmond red marble quarries at Midleton on OSI 6” map (1835-1844) (top) and OSI 25” map (1888-1913) (bottom). Note that the principal Midleton marble quarry at Baneshane is not marked on either map.

During the last quarter of 1923 an order for 20 tons of the marble, intended for use in the decoration of the London Stock Exchange buildings, was received and executed at the quarry, now

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696 See chapter 2, figure 11 for the OSI 25” map illustrating the Ramhill quarry in the townland of Ballymacoraa, south of Castleredmond, which Richard Colles of The Irish Marble Co. worked in the late nineteenth/early twentieth century. The quarry in Carrigshane, located east of Castleredmond, is not depicted on either of the OS maps.
under the management of the Irish Marble Co., for Messrs Jenkins and Co. of Torquay. On this occasion the Midleton stone was “pitted against” a similar marble from the south of Wales and the former was chosen on account of its superior quality and rich tonality. In 1924 operations had resumed in two of the four Midleton quarries, Baneshane and Ramhill, and the Castleredmond and Carrigshane quarries were in the preliminary stages of re-opening; these quarries had lay idle for almost twenty years. The Midleton quarries were ideally located as regards both rail and sea transportation and were capable of providing much employment in the local area. At the time of commencement of operations Mr M. Hughes, the local manager of the company, anticipated reasonable demand for the stone and employment for 150-200 people for up to 40 years. Orders for marble primarily consisted of blocks of an average length of nine feet, which he stated, “necessitated a considerable waste of labour and material in the matter of quarrying”, but he hoped that demand for smaller sized blocks would occur in the near future. Some of the stone quarried at this time was exported to Belgium.

Figure 57. Baneshane red conglomeratic marble in Westminster Cathedral: panelling in the nave (left) and colonnettes in the Chapel of St Patrick.

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698 “Old Industry Revived”;
699 “Old Industry Revived.”
I would like to thank the current occupier of the former Baneshane quarry site for allowing access to the property and for supplying samples of the stone. I would also like to thank Tim O’Connell for locating this quarry site.

I would like to thank the owners of O’Brien’s farm for allowing me to access their farmyard and photograph the red limestone boulders. I would also like to thank Tim O’Connell for bringing me to this site.
Towards the middle of the twentieth century the Midleton quarries, then largely exhausted, were again abandoned and left to fill with water. Baneshane red marble, fabricated by Farmer and Brindley of Westminster Bridge Road, had been extensively used in Westminster Cathedral in London early in about 1910 (figure 57). The cathedral was left unfinished and decoration only recommenced in the 1950s at which time the cathedral art committee agreed that the nave should be clad with marble in line with the original designs. The contracted marble workers, John Whitehead and Sons of Kensington Oval, proposed a salmon pink Portuguese marble, but Aelred Bartlett, future administrator of the cathedral, rejected the suggestion and approached the Irish Embassy in London to enquire about the availability of Cork red marble. Aided by the Geological Survey of Ireland, Bartlett travelled to Baneshane; the quarry was inspected, drained and re-opened, whence the stone for the cladding of the cathedral nave and narthex was unearthed between 1956 and 1964. The quarry has not been worked since and despite considerable potential for extraction it currently lies overgrown and filled with rubbish (figure 58).

**Geological setting of the Cork red “marbles”**

The traditional name, “Cork red marble”, is used to describe the Tournaisian-Viséan (Chadian) red limestone conglomerate horizons within the Cloyne, Cork, Fermoy and Mitchelstown synclines. The Cork Red Marble Formation, exposed in the Cloyne and Cork synclines (figure 46), is lithostratigraphically similar to the Johnstown Red Marble Formation, which outcrops further north in the Fermoy syncline and to a lesser extent in the western part of the Mitchelstown syncline; both formations are stratigraphically positioned at the top of the Waulsortian. The red strata in the Mitchelstown syncline are less developed than those within the Fermoy syncline, and they thin eastwards to where they finally terminate.

The Cork red marbles are positioned between the deeper water Waulsortian limestones and overlying, relatively shallower carbonate shelf limestones; shallowing occurred at the top of the Waulsortian prior to deposition of the marbles. There are several theories regarding the origin of the Cork red marble. Neville suggests that they were “poured out upon a surface which was


704 Shearley, “The Carboniferous Geology of the Fermoy and Mitchelstown Synclines, Southern Ireland.”

705 Shearley.
more or less planar, and their pebbles of calcite mudstone belong to a facies other than reef”. He proposes that the red clay grade detrital matrix is the original colour of the sediment when first deposited or alternatively the reddening may be a penecontemporaneous occurrence following uplift of the sediments and subsequent sub-aerial weathering. Finally, he notes that the conglomerate, “in its distinct grading and poor sorting, has the attributes of a turbidite”; back reef deposits were re-worked and deposited by turbidity currents. Whether the Cork red marble is designated a lime-conglomerate or a turbidite, he concludes that it is undoubtedly an off-shore deposit.706

Shearley disagrees with the turbidite proposal and states that the Cork red marble horizons are not graded and do not resemble typical turbidite deposits. She also states that the clasts are derived from a more local source than Neville proposes. She agrees that the lime-conglomerate horizons are generally conformable with no evidence of interruption in sedimentation, and that the iron content is primary and most likely syn-depositional or early diagenetic in origin.707 Whitbread claims that the Cork red marbles represent a stratigraphically continuous change in sedimentary facies throughout the county.708 It is now recognised that red marbles occur at different stratigraphic levels on both local and regional scales across south-central Ireland, and that on a regional scale they young northwards, e.g. the previously described Pallaskenry red marble in Limerick (which resulted from localised hydrothermal brecciation) occurs at the base of the Waulsortian in comparison to the Cork red marble horizons, which are positioned at the top of the Waulsortian. Therefore, red marble horizons in this region cannot be used as a single isochronous marker.709

Heselden puts forward that the brecciation in the Cork Red Marble Formation is not primary, but entirely, or largely, resulting from deep burial pressure dissolution overprinted by Variscan compression. A stylobrecciation model suggests that the development of interconnected stylolite sets during compression is coupled with rotation and fracture, which gives the appearance of apparently rounded clasts.710 While several phases of generation and modification are evident in the Cork red marble horizons, the presence of discrete pebbles and cobbles indicates a primary conglomerate origin rather than secondary brecciation. In some instances, stylolites and pressure dissolution have altered the clasts so significantly that the rock could be texturally referred to as

708 Whitbread, “Facies Changes in the Carboniferous Succession of Southern Ireland.”
709 Shearley, “The Carboniferous Geology of the Fermoy and Mitchelstown Synclines, Southern Ireland.”
a breccia, however it has its genesis in sedimentary deposition. Proximity of the marble beds to the Old Red Sandstone supports the existence of primary iron in the matrix and the resultant red colouration.

It is observed that the grey, homogeneous micrite at the top of the Waulsortian, which lies adjacent to the conglomerate beds in the four Cork synclines, commonly acquires injections of fine red sediment that results in a pinkish red hue. In addition to the red conglomerate beds, this pinkish grey horizon, commonly referred to as “Midleton red”, was also worked as marble. Although the name “Midleton red” would suggest that it was only quarried at Midleton, this stone was extracted, where viable, at all the Cork red marble quarry sites.

Utilisation of Cork red “marbles” in Victorian buildings

Considering Kinahan’s description of the conglomeratic “Cork reds”, procured at Little Island and Churchtown, combined with the post-1854 establishment of the Johnstown quarries, the late rise in importance of the Midleton stone, and Griffith’s record of substantial limestone extraction at Little Island, it is probable that the Cork red marble in buildings erected during the early 1850s, such as the Museum Building of Trinity College Dublin, was sourced from Little Island or Churchtown, or from both locations. While the Cork stone in the Museum Building is conglomeratic, other varieties of red limestone occur in thin and inconsistent horizons adjacent to the conglomeratic beds, more correctly referred to as grey limestone with injections of red colour. Architectural features fabricated from this stone are solely decorative and not load bearing; they occur in many buildings in Cork, including faced pilasters in Cork Courthouse (rebuilt in 1891 after a fire) (figure 60) and colonnettes in St Coleman’s Cathedral (1867), Cobh, (chapter 5 contains images of the varieties of Cork red marble used in St Coleman’s Cathedral)


712 Griffith’s Valuation, April 02, 1853.

713 Refer to chapter 4 of this thesis for a detailed account of the Museum Building.


715 Kinahan, Economic Geology of Ireland, p. 135.


the Church of Saints Peter and Paul (1859) in Cork city\textsuperscript{718} (figure 63). This stone is seldom seen in buildings outside of Cork, although the University Chapel in Maynooth, Co. Kildare contains specimens in colonettes.

![Image of marble columns in Cork Courthouse](image)

**Figure 60.** Piers and pilasters faced with polished Cork red marble (quarry unknown) and other Irish marbles in the hallway of Cork Courthouse, Washington Street. Two varieties of Cork red marble are used: red lime conglomerate (left) and greyish pink limestone (right).

Later Victorian buildings, notably churches, throughout Ireland and Britain frequently incorporate Cork red conglomerate marble elements. The walls of the nave of St Fin Barre’s Cathedral (1865)\textsuperscript{719} are veneered with red marble from Little Island on the south side and with Fermoy puce on the north side. Eight columns in the chancel, the font and the Great War Memorial also contain Fermoy and Little Island red marbles (figure 61).\textsuperscript{720} St Lappan’s Church (1865)\textsuperscript{721} in Little Island exhibits a polychromatic exterior and is exclusively built of red and grey limestone from the

\textsuperscript{718} For architectural detail on the building see Keohane, p. 82-84; [https://stonebuiltireland.com/heritage-sites-by-county/cork/](https://stonebuiltireland.com/heritage-sites-by-county/cork/) [accessed 20 May 2021]; [https://www.dia.ie/works/view/2563/building/CO.+CORK%2C+CORK%2C+SS.+PETER+%26+PAUL+PLACE%2C+CHURCH+OF+SS.+PETER+%26+PAUL%2C%28RC%29](https://www.dia.ie/works/view/2563/building/CO.+CORK%2C+CORK%2C+SS.+PETER+%26+PAUL+PLACE%2C+CHURCH+OF+SS.+PETER+%26+PAUL%2C%28RC%29) [accessed 20 May 2021].

\textsuperscript{719} For architectural detail on the building see Keohane, p. 143-150; [https://www.dia.ie/works/view/602/building/CO.+CORK%2C+CORK%2C+BISHOP+STREET%2C+CATHEDRAL+OF+ST+FINN+BARRE%2C%28CI%29](https://www.dia.ie/works/view/602/building/CO.+CORK%2C+CORK%2C+BISHOP+STREET%2C+CATHEDRAL+OF+ST+FINN+BARRE%2C%28CI%29) [accessed 02 June 2021].


\textsuperscript{721} For architectural detail on the building see [https://www.dia.ie/works/view/49630/CO.+CORK%2C+LITTLE+ISLAND%2C+CHURCH+OF+ST+LAPPAN%2C%28CI%29](https://www.dia.ie/works/view/49630/CO.+CORK%2C+LITTLE+ISLAND%2C+CHURCH+OF+ST+LAPPAN%2C%28CI%29) [accessed 21 May 2021].
neighbouring quarries (figure 62). Columns in the Oxford Museum (1860) are of conglomeratic red marble, some of which can be traced back to the Little Island quarries. The towering conglomeratic columns flanking the nave of St Coleman’s Cathedral in Cobh were procured in Fermoy while the pinkish grey stone in the delicate colonnettes was obtained from Midleton.

The Church of Saints Peter and Paul appears to be the first church building that employed Cork red marble in structural columns some years after their inaugural utilisation at Trinity College Dublin. The conglomeratic stone for the robust stone columns supporting the arches on either side of the nave was sourced from Edward Tierney’s quarry in Churchtown and Frederick Bell’s quarry in Johnstown while the greyish pink variety in the colonnettes in the side chapel, alter

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722 Personal communication, Tim O’Connell.
723 Some of the columns in the Oxford Museum are labelled “Little Island, Cork” while others are simply labelled “Cork”.
725 Refer to chapter 4 of this thesis for details on the use of Cork red marble in the Museum Building of Trinity College Dublin.
and choir was procured in Little Island. In 1861, the *Irish Examiner* described the columns of red mottled marble in the new church as “the produce of our own County, now first brought into use, of a beauty unsurpassed by any continental”. Later, in 1866, the *Liverpool Daily Post* also remarked on the use of native coloured stone in the church, “The use of native materials, hitherto unemployed for the purposes to which they have now been adopted – such for instance as the beautiful Rossa marble, from Churchtown in this county, hitherto used in mending roads, now forming the plinths and columns of the principal pillars round the nave – is another novel feature, and one likely to show its results in subsequent buildings of the same class”. Again, it was the conglomeratic limestone that was selected for wide diameter columns while the pinkish grey limestone was employed in decoration. The red conglomerate is also seen on the exterior of the church and although a source is not documented in the literature it was likely obtained from the same quarries that supplied the stone for the internal decoration.

![Figure 62. St Lappan’s Church, Little Island, constructed from grey and red limestone from the neighbouring Little Island quarries.](image)

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727 “Opening of SS. Peter and Paul’s Church.”
729 “Opening of SS. Peters & Paul’s Church in Cork.”
Kerry “marble” quarries

Red “marble” beds occur in several localities across the south of Ireland, including parts of Kerry. The initial geological surveys of the county between 1859 and 1861 revealed “a band from fifty to seventy feet in thickness of pale pink, grey, and milky-white, thin compact limestone laminae, divided from each other by purple and green, earthy, and non-calcareous shale, the whole forming a variegated-looking marble”.

It was profitably quarried at Victoria Point, west of Mine Paddock Bay in Muckross Demesne since at least the second half of the eighteenth century. The lenticular and flaggy Muckross marbles display the same lithological characteristic as the red marbles observed in various localities in Co. Cork. During the 1770s the quarry, which consisted of a shore of multicoloured, “prettily veined” rocks, was worked by Rev. Thomas Herbert. The hallway of Rev. Herbert’s house at Muckross, a precursor to the present Muckross House, showcased a pavement of red and white stone from

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733 Young, *Arthur Young’s Tour in Ireland (1776-1779)*, p. 351.
Muckross House (1839) was built of imported sandstone ashlar except for the rear façade, which is a rubble stone wall of local grey to pink marble, red sandstone and purple siltstone. Muckross red marble was also used to pave paths around the gardens (figure 64).

Unearthing of the Kerry marble was trialled in many places within the county, including Killarney, but with limited success. It was not until the late nineteenth century that profitable extraction of the stone occurred south of Castleisland, at which time it was often referred to as “Golden Breccia” or “Sunset Glory”. The red Castleisland conglomeratic limestone is similar in

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735 For architectural detail on the building see https://www.dia.ie/works/view/2517/building/CO.%28KERRY%29+MUCKROSS+HOUSE+%28KILLARNEY%29 [accessed on 03 June 2021].
736 Kinahan, Economic Geology of Ireland, p. 207.
737 Kinahan, p. 135.
appearance to and at the same stratigraphic level as the Cork reds except it has been exposed to much less pene-contemporaneous and post-contemporaneous deformation on account of being further north of the Variscan front.\textsuperscript{739} The Castleisland marble, also known as Lisheenbawn marble, was discovered by Edward Shanahan while ploughing at the beginning of the 1880s at the time of erection of the RC church in Castleisland (1881).\textsuperscript{740} The attention of Archdeacon O’Connell, parish priest, was directed to “the beauty of the stone by a local quarryman; at that time its quality was unknown, and not being limestone, it was principally used in building walls and filling drains on some land near the town”. Archdeacon O’Connell presented the stone to experts who pronounced it “marble of a high quality”.\textsuperscript{741} The deposit, situated on the estate of Mr Henry Arthur Herbert at Lisheenbawn,\textsuperscript{742} was immediately exploited by Mr John Hussey\textsuperscript{743} and stone was extracted and fabricated into columns and arches for the church.\textsuperscript{744} The fortuitous location of the quarry on the road leading from Castleisland to Killarney and its proximity to the railway station allowed easy transportation of the stone, much of which was shipped raw to the United States.\textsuperscript{745} In 1890 the McKinley Tariff Act, intended to protect American


\textsuperscript{741} Another source states that the marble was discovered by a Tralee tradesman, Mr John Looney, in 1875. “It Was, We Believe, a Tralee Tradesman...,” Kerry Champion, February 23, 1935, 1.

\textsuperscript{744} “Native Marble,” The Kerry Evening Post, July 7, 1889, 4.

\textsuperscript{745} Henry Arthur Herbert was also the proprietor of Muckross Demesne. See chapter 2, figure 12 which displays the location of the Castleisland quarries on the 25" OS map.

\textsuperscript{746} T.M. Donovan, “Our Kerry Poets,” The Liberator (Tralee), 1928, 8.

\textsuperscript{747} “Native Marble”; Kinahan, Economic Geology of Ireland, p. 200.
industries from foreign competition, was passed and the average duty on imports rose to almost fifty percent. Mr Bussy, the New York vendor, declared that the duty on undressed blocks was too expensive for him to make any profit and he suggested that machinery be installed at the quarry to dress and polish the blocks before shipment; this suggestion was not carried out, exportation of the stone to the United States ceased and the quarry was forced to close. Richard Colles of The Irish Marble Co. leased and worked the Castleisland quarry for a short time at the end of the nineteenth century/beginning of the twentieth century. One of the last major uses of Castleisland red marble in a church setting was in Honan Chapel, University College Cork (1914-16).

Local monuments, such as the Pikeman in Tralee, were constructed from the stone during the 1920s but it was not until 1935 that a government incentive encouraged the resumption of quarrying. The Department of Industry awarded a relief grant of £240 and twenty men, under the foremanship of Mr Tom Lawlor, were engaged in clearing land on Mr Savage’s property at Sandville, north of Lisheenbawn, for test drilling to commence. Upon hearing about this exploratory operation on Mr Savage’s land, Thomas Shanahan, son of Edward Shanahan who discovered the seam of marble at Lisheenbawn over 50 years previous, retorted in a letter to the editor of the Kerry Champion that the proven red marble quarry with an exposed face and good access road on his Lisheenbawn property should be examined and re-opened. Following further investigations it was found that the stone at Sandville was not viable for excavation and “back to Lisheenbawn!” must be the motto, however the Lisheenbawn quarries were never extensively worked again. Minor extraction was attempted at both Lisheenbawn and Sandville in the early 1990s and although the stone raised was high quality, very attractive and polished well, drilling indicated that the reserves were limited. Some of this lately quarried stone was used for

746 “Castleisland Marble.”
747 See chapter 2 of this thesis for further details on Richard Colles’ quarry.
750 “It Was, We Believe, a Tralee Tradesman...”; “Red Marble,” The Liberator (Tralee), February 26, 1935, 6.
751 Shanahan, “The Castleisland Marble (To The Editor).”
753 Pracht, Geology of Kerry-Cork: A Geological Description to Accompany the Bedrock Geology 1:100,000 Scale Map Series, Sheet 21, Kerry-Cork, p. 48.
polished tiles in Dublin Airport and more recently some loose stone was procured and worked for use as setts on Grafton Street in Dublin.\textsuperscript{754}

**Conclusion**

The Victorian period embraced the growth, consolidation and subsequent decline of decorative stone quarrying in Ireland. The long standing marble extraction and fabrication industry in Kilkenny, and later Galway, paved the way for widespread quarry development in the latter half of the nineteenth century and the emergence of polychrome architecture created a market for the stone. Decorative stone, or “marble”, was commercially defined by its attractive appearance and ability to receive a polish; durability was also an important factor for stone being utilised in structural polychromy. Therefore, the critical characteristics that prospectors considered were colour, texture and robustness. Although the locations of the quarries were fundamentally dictated by the underlying lithologies, their advancement was dependent on other factors such as proximity to transport networks, ongoing investment, the inclination of landowners to explore and exploit the stone on their estates, and the influence of changing architectural taste on the demand for certain stone types.

Armagh limestone, which was substantially quarried and sought after for much of the nineteenth century, was considered too light in colour by the 1880s and replaced by red limestones of a richer hue, such as those raised in Cork or imported from Belgium. Much investigation into the white marbles of Donegal was undertaken and limited extraction occurred. It was thought that this stone may rival the continental statuary marbles, however, impurity of colour and insufficient block size, combined with remote quarry locations, rendered it unsuitable. The chimneypieces in Adare Manor, fabricated exclusively from local varicoloured limestones in the mid-1800s, highlighted the devotion of the landowner, the 2\textsuperscript{nd} Earl of Dunraven, to the use of native stone. Despite his enthusiasm, and the continued eagerness of his wife and son after his death, the extent of decorative limestone deposits beneath the Dunraven estate and the surrounding localities was determined too fragmentary for commercial exploitation to occur. Nevertheless, it was pioneers like the Dunravens who exposed the potential of Ireland’s decorative stone resources to others and no doubt influenced exploration elsewhere, such as Cork and the midlands where largescale extraction of decorative limestones ensued. Ultimately the underlying geology, together with the demand for the stone, determined the success or failure of the quarries.


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The development of decorative stone extraction saw a contemporaneous growth in native marble working and the expansion of mills. In many cases successful fabricators of Irish stone were also involved in the leasing of quarries, from which they sourced their raw material. The Kilkenny Marble Works possessed quarries and a marble mill since its establishment early in the eighteenth century and other nineteenth century firms of a similar arrangement will be discussed in chapter 4. Several attempts to revive the Irish marble industry occurred during the twentieth century, including a government tariff on imported marbles in the 1930s. Architects were encouraged to recognise and acknowledge the beautiful native marbles in Victorian buildings, such as the Museum Building, and to support Irish industry, but alas it remained the fashion to import marbles. The growth in the popularity of concrete during the twentieth century inevitably compounded the decline of stone quarrying, including decorative stone, in Ireland. Today, decorative stone is commercially extracted in only two regions, Kilkenny and Connemara; the majority of which is exported to the continent. This is in stark contrast to the bustling nineteenth century industry, which displayed ample potential for expansion and longevity.

756 Although the Egyptians were using early forms of concrete and the ancient Romans used a material remarkably similar to modern concrete, the invention of modern cement is attributed to Joseph Aspdin, a bricklayer from Leeds, in 1824. He named the product “Portland cement” on account of its resemblance to Portland stone. John F. Ryan, “The Story of Portland Cement. Part 1,” Journal of Chemical Education 6, no. 11 (November 1929): 1855–68.
CHAPTER 4. MARBLE FABRICATION IN VICTORIAN IRELAND

“So far as stone is employed in large blocks for the construction of buildings, strength and durability are the chief qualities for which the material is valued; but when we have a substance such as marble, in which delicacy and purity of colour are combined with a susceptibility of receiving a high polish, and of being cut into elegant forms, a new measure of value is obtained, our notions of taste and beauty are at once appealed to, and the refining influence which objects of taste exert on mankind is shared by this substance in common with others”.

As outlined in chapters 2 and 3, extraction of indigenous decorative stone did not originate in Victorian Ireland, however, during this period the activity was significantly developed and commercialised. Correspondingly, Irish marble workers extended their use of local stone alongside continental marbles, which had long been imported and fabricated for architectural decoration and memorials. The rise in polychromatic architecture, together with native quarrying, incited marble masons to advance their skills, expand their workshops and experiment with native stone. Many manuals were published during the Victorian period to guide workers through hand tooling and machining of the marble and to provide information on the various stone types available. Some of these included The Marble Workers Manual (1860), Marble and Marble Workers (1888), Practical Masonry (1904) and Marble and Marble Working (1909). London was at the forefront of marble working during the 1800s and a comprehensive outline of the processes and machinery at the London Marble Working Company on Esher Street, published in the Penny Magazine in 1841, allows for an indication of the sort of work taking place in Ireland also. The preparation of marble, which by trade definition is decorative stone susceptible to a polish, is far more labour intensive than that of common dimension stone. During the 1800s manual processes of sawing, grinding, polishing etc. were mechanised to increase precision and rapidity of fabrication.

762 The London works was more correctly referred to as the London Marble and Stone Works as other types of stone besides marble were also worked here. “A Day at the London Marble-Works.”
763 “A Day at the London Marble-Works.”
This aim of this chapter is to explore the general processes of marble fabrication, with a focus on advancement in mechanisation, during the Victorian period in Ireland and to discuss the prominent marble mills working at this time. This will be achieved by firstly using the London Marble Works as a case study for marble fabrication during the mid-1800s; detailed descriptions of the machinery and processes at the London Works are available and in many instances this can be applied to contemporary Irish marble works. The key Irish marble works operating during the Victorian period will then be examined in terms of their establishment, advancement, various ownership, fabrication processes and types of work executed, and examples of buildings and monuments in which the marble was utilised will be given. Their ultimate success or failure will be ascertained and their significance will be discussed.

The London Marble Working Company

Established in the mid-1820s, the London Marble Working Company announced the completion of their Works in the first quarter of 1827 and advertised “the largest and most select collection of Foreign Marbles” in England, which they could supply by means of improved patented machinery. Mr James Tulloch, described as “an independent gentleman of great taste”, was responsible for the invention of the machinery at the Works. Based on his observations of extensive marble use in Italy he endeavoured to introduce marble into more general use in England by reducing manufacturing costs through the application of machinery. The Works consisted of several ranges of workshops and sheds connected to one another with open courtyards. Some courtyards contained large blocks of marble in rough and prepared form; amongst these were blocks of Galway black marble (more correctly a limestone in geological terms) “of the unusually large dimensions of thirteen feet by ten or eleven” and much smaller blocks of white Italian marble “exhibiting examples of the rude manner in which the hand-sawing of the Italians is effected”. Other yards contained cut slabs of coloured and statuary marble waiting to be fabricated. An arched front entrance accessing an open courtyard was flanked by two doors leading to offices and counting offices on the left and a room containing near completed marble articles and plaster casts of which marble copies had been made on the right. A staircase led to the gallery-style showroom, which exhibited finished works of assorted marble, such as...


765 James Tulloch was born in London on 7 February 1788. He was particularly interested in industrial progress and advancement, and during visits to the continent in the early 1800s his attention was drawn to the extensive use of marble and its accessibility on account of its low price; this was not the case in England at this time. In 1820, under the advice of Brian Donkin (developer of the first paper making machine and commercial canning factory), he patented machinery for preparing marble and in 1821 he formed a joint stock company for importing and working marble using his machinery. “James Tulloch, F.R.S.,” Journal of the Royal Society of Arts 12 (1864): 127.
chimneypieces, pilasters, pillars, vases, urns, tables, table tops, statues, busts, monumental tablets, mouldings, etc. (figure 1). The grand staircase of Galway black limestone, obtained from Franklin's quarry at Menlough, for Hamilton Palace in Scotland was prepared at this establishment.

Several different types of machinery, sustained by a steam-engine, were employed to fabricate rough marble and limestone blocks, sourced from Italy, France, Ireland and England, into decorative articles. The account in the *Penny Magazine* traced the progress of a block of marble through the various processes that it, or the pieces into which it was cut, underwent until its final conversion into decorative articles. The initial actions carried out on the stone were various forms of cutting. The first machine used was a large sawing machine (figure 2), which was set up according to the purpose to which the marble was to be applied e.g., pieces of marble for monumental tablets, chimneypieces, steps, pavements, table tops etc. were broad, flat and thin slabs and strips; the majority of articles made from marble comprised flat slabs rather than

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767 See chapter 2 of this thesis for further information on the Menlough quarry and the Hamilton Palace staircase.
768 “A Day at the London Marble-Works”, p. 337.
massive pieces and in many cases the marble was merely a veneer encasing a foundation of commoner stone or brick or wood or cement. There were five or six of these sawing machines in operation at the Works,\textsuperscript{769} each of which consisted of a set of parallel saws inserted into 12 feet long cast iron frames. Each saw was a blunt, smooth, straight edged piece of sheet iron, whose purpose, with the addition of clean sand and water, was to separate the particles of the stone by friction rather than cutting. The water softened the stone and the sand aided the slicing action of the saw. The quality of the sand varied in accordance with the type of stone being cut; coarse, sharp sand was used for soft stone while very fine sand was used for harder stone types. The saws could be fixed at any required distance apart by means of pins and wedges. The utilisation of these saws, in replacement of hand sawing, considerably increased the accuracy of cutting, which consequently decreased the process of grinding necessary to produce a level surface and reduced the amount of waste material incurred during the process.\textsuperscript{770}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{saw-frame.png}
\caption{Saw frame at the London Marble and Stone Works.\textsuperscript{771}}
\end{figure}

\textsuperscript{769} Some years previous to Mr Tulloch’s invention of this sawing machine, Sir George Wright and Sir James Jelf formulated similar design mechanisms, which were unsuccessful. “A Day at the London Marble-Works.”

\textsuperscript{770} Two halves of a large, valuable block of Italian statuary marble, which had been cut by hand prior to exportation, were observed in the central courtyard of the marble works. The surfaces of both pieces were about nine inches out of a true plane (off square), the saw having twisted in various directions during the cutting process. If cut into slabs, the portion wasted by the irregular sawing would have been worth an estimated sum of nearly £150. “A Day at the London Marble-Works.”

The marble slabs were transferred to a “ripping bed” (figure 3) to be cut into narrow strips for articles such as chimneypieces or into small various shaped pieces. The “ripping bed” incorporated a flat cast iron table, twelve to fourteen feet long, six to seven feet high and three feet wide. A plank was placed on the iron bed, upon which the slabs to be cut into strips were temporarily fixed with plaster of Paris. A revolving horizontal axel with several fixed vertical cutters, consisting of eight-inch diameter discs of soft iron, “ripped” the marble slabs into strips; the number of cutters on the axel could be adapted to produce strips of any required width. Again, sand and water were applied to aid the cutting process.

This “ripping bed” could only produce rectilinear cuts and so if curved cuts were required other machines had to be employed. There were two circular cutting machines at the works, one capable of cutting circles of large dimensions, up to six to eight feet in diameter, and one for smaller work. The machine for large circular cutting consisted of a flat bed in a horizontal orientation above which was positioned a vertical pillar with revolving curved saws attached to the lower end. The curved saws could be fixed at any distance from the centre, thus cutting a circle of any required diameter. The smaller circular cutter acted on a similar principle to the larger cutter, except instead of curved saws at the lower end there was a hollow cylinder of sheet iron, which acted as the cutter; cylinders of different sized could be attached to achieve circles of varying diameters and three or four sheets of marble could be laid on top of each other and all cut at once. Cylindrical pieces of marble, such as pillars and pedestals, were turned on a lathe (figure 4); a workman initially shaped a rough block of marble with long, sharp-pointed steel tools.

Figure 3. “Ripping bed” (left) and “moulding bed” (right) at the London Marble and Stone Works. 772

and finished it with other instruments, such as gouges, etc. Some slabs, which were cut into strips at the ripping stage, were simply polished and utilised in their plain form, but more commonly embellishment with mouldings occurred. A “moulding bed” (figure 3) worked the pieces of marble into the architectural form of moulding, such as squares, fillets, beadings, hollows and ovalos. It resembled a “ripping bed” in terms of the flat table and revolving axel above the table, but the cutters were different; rather than circular pieces of sheet iron, the cutters were pieces of iron that had been shaped into the various mouldings to be produced.

![Figure 3](image3.png)

**Figure 3.** A “ripping bed” for the production of marble slabs.

After the stone had been cut into various forms by appropriate mechanisms the processes of levelling, smoothing and polishing took place. A “grinding bed” (figure 4), which consisted of a swaying wooden bed and large cast iron plate, removed all irregularities on the surfaces of large, flat slabs. The plate, pierced with round holes, permitted sand and water to penetrate through, which aided the grinding action on the large marble surface. A different machine was necessary to grind cut stone surfaces of smaller marble items and the edges of slabs (figure 5). This consisted of a revolving horizontal iron plate, referred to by the workmen as a “roundabout”, which acted as a work bench; the plate was moistened with sand and water and the pieces of marble to be ground were manually pressed down firmly upon it. “One of the chief beauties for which marble is admired is the brilliant gloss which its surface presents when highly worked”, and so the final process that the stone underwent was polishing. The “polishing bed” (figure 5) was about twelve feet long, four to five feet wide, and three feet high. The marble was laid on a flat bed and a polisher, consisting of a heavy substance, such as lead, faced at the bottom with a layer of special

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773 A chisel with a cutting edge bent into a curve.

774 “A Day at the London Marble-Works.”

polishing felt, moved back and forth over the marble; several polishers could work at the same time. The first substance used in the polishing process was the sharpest sand, which was rubbed with an iron plate and applied until the surface became perfectly flat. Second and third sands of increasing fineness were then applied, before emery and tripoli, and finally tin putty (white oxide of tin) were employed; these substances were rubbed with a lead plate as opposed to the iron plate used for the coarse sand.

Figure 5. “Grinding bed” for small marble pieces attended by workmen (left) and “polishing bed” in the London Marble and Stone Works.

Besides machinery workshops there were also marble-working studios situated at the London Marble Works where carvers and sculptors manually worked stone with mallets and chisels. Automated cutting machinery could not be applied to prepare the stone destined for ornamental carving; instead, handsaws (without teeth, like the automated saws) were utilised. The stone was then hand carved into decorative articles before being hand ground and hand polished, using substances such as cast iron, gritstone, smooth stone and slate, to achieve a smooth, glistening finish. The Galway black limestone balustrades for the grand staircase in Hamilton Palace were fabricated in this way. Each balustrade, which was about a yard in length and five to six inches thick, was formed from one piece of unjointed limestone intricately hand carved by carvers at the London establishment. Etching and engraving of figures, objects or lettering was carried out on

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776 “A Day at the London Marble-Works.”
779 “A Day at the London Marble-Works.”
polished surfaces if desired by the client. This was especially popular for black marble and achieved through the application of an acid or by “diamond engraving”. For the first method the object to be depicted was traced upon the polished surface with a wax or varnish, which was left to set before being covered with acid. The acid slightly dissolved the polished surface void of wax/varnish leaving the coated etching in minor relief. The wax/varnish was cleaned off to reveal the embossed decoration. The latter method was considered more specialised and seems to have been exclusively practiced in England in the 1840s. Engraving was produced by gravers’ points and diamonds, hence the name “diamond engraving”, and when performed on black marble produced a grey inscription, which was the colour of the marble before polishing.  

Another important marble working region in England was Devonshire. Limestone quarries in Devonshire paralleled those in Ireland in that they produced a diverse range of polychromatic decorative stone. Gordon Walker describes the geology, extraction and uses of the Devonshire marbles, as well as the marble workers who fabricated them, in *Devonshire Marbles: Their Geology, History and Uses*. While London and Devonshire were evidently very important centres for stone working during the Victorian period, Ireland was certainly not a backwater since advanced mechanisation of marble fabrication was taking place there also. Marble works opened across Ireland to accommodate both native and continental stone. Provincial mills were often affiliated with nearby decorative stone quarries, which supplied a cheap source of raw material. This was the case in Kilkenny, Cork and Galway, however, Killaloe was unique in that it was an independent enterprise, separate from any quarries, which handled a diverse range of native stone sourced from several Irish localities.

**The Killaloe Marble Works**

The Killaloe Marble Works, situated on the canal bank from Dublin and Limerick near the important slate quarrying district (figure 6), was a prominent marble working enterprise in Ireland.

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780 “Etching and Engraving in Black Marble,” *The King’s County Chronicle and General Provincial Intelligencer*, February 14, 1849.
782 The London Marble Works was only but one of the many marble works operating in London at that time. The London Marble and Stone Working Company closed down in 1859 and Mr Hartley of the Westminster Marble Works on Earl Street purchased the whole of the works, including its machinery, which he re-opened in February 1859. “Westminster Marble Works, Earl Street,” *The Building News* 5 (February 4, 1859): 121.
since the 1830s and an instigator of native marble consumption.\textsuperscript{784} Constructed and owned by engineer Charles Wye Williams (1779-1866),\textsuperscript{785} the marble works was leased to Messrs. W. & W. Manderson in 1840,\textsuperscript{786} which comprised father, William Manderson (1781-1854), and son, William Richard Manderson (1805-1876).\textsuperscript{787} During a visit to Killaloe in 1838 Lady Chatterton remarked on the marble works: “The machinery is very curious. A series of eight saws simultaneously divide a piece of marble into slabs; the gain is more by the number done together, than by the rapidity of the work. We were shewn some fine specimens of Galway marble; the green appeared to me quite equal to the \textit{verde antico}, and the red marble is also very beautiful. Italian and Belgian marbles are also worked up here. There is besides a curious machine for polishing flags, but it was not at work, owing to a want of water”.\textsuperscript{788} It appears that Messrs. Manderson assumed occupancy of the marble works shortly after Lady Chatterton’s visit. Immediately they commenced widespread advertisement of their extensive stock of Irish and foreign marble chimneypieces, monuments, columns, bust pillars, wash tables, dressing tables tabletops, and various other ornaments, together with rough and mill rubbed flags, windowsills and headstones available for inspection at the premises; transportation and fitting services were also offered.\textsuperscript{789} In March 1842 William Manderson donated a large selection of polished Irish marble specimens, procured from

\textsuperscript{784} In 1837 the Killaloe Marble Works was the principal consumer of marble excavated in the counties of Galway, Limerick and Tipperary; approx. 3000 cubic feet of grey shell limestone procured from the Seven Churches Quarry in King’s County (Offaly) was sent via the River Shannon to Killaloe to be worked as marble. “First Report of the Commissioners Appointed to Inquire into the Manner in Which Railway Communications Can Be Most Advantageously Promoted in Ireland” (London: W. Clowes and Sons, 1837).

\textsuperscript{785} Charles Wye Williams was a marine engineer and founder of the Dublin Steam Packet Company (1825), the first steam cargo service between Dublin and London, and Inland Steam Navigation Company (1829), which focused on improving the Shannon Navigation. https://www.dib.ie/biography/williams-charles-a9048 [accessed 31 July 2021].

\textsuperscript{786} Christine Casey suggests that architect James Pain may have assisted Mandersons’ move to Killaloe. Pain trained in London under architect John Nash, who during that time also employed William R. Manderson’s father as a leading craftsman. Pain came to Ireland in about 1812 and settled in Limerick, where he became a leading architect and was employed on several projects, including bridges for the Shannon Navigation Company, which connected him with chief engineers of the region, presumably including Charles Wye Williams. Pain may have linked Wye Williams with Manderson regarding the marble works lease. Christine Casey, “The Museum Building’s Radical Polychromy: Impetus and Influence,” in \textit{The Museum Building of Trinity College Dublin. A Model of Victorian Craftsmanship.}, ed. Christine Casey and Patrick N Wyse Jackson (Dublin: Four Courts Press, 2019), 53–77. It is not clear what involvement Manderson senior had in the business, but his son was certainly the driving force in the enterprise.


16 counties, to the Museum of the Philosophical and Literary Society of Limerick;\textsuperscript{790} this was perhaps one of the first didactic collections of native marbles exhibited in Ireland.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig6}
\caption{Killaloe Marble Works in the townland of Moys was illustrated on the OSI 6 inch map (1837-1842) (top), however by the time of the OSI 25 inch map (1888-1913) (bottom) the marble mills had been replaced with a corn and woollen mills.}
\end{figure}

During their early tenancy of the marble works Messrs. Manderson soon acquired a “high character for the state of polish and workmanship” of the articles dispatched from the establishment, particularly church memorial monuments.\textsuperscript{791} In 1841 they erected two monuments in Killaloe Cathedral to commemorate William C. Purdon, Esq. and Rev Colthurst, which were described in the \textit{Clare Journal} as “specimens of Irish art, and purely native manufacture” that “may rival, both in design and construction, similar works of much more

\textsuperscript{790} “Philosophical and Literary Society,” \textit{Limerick Chronicle}, March 16, 1842, 4.
\textsuperscript{791} “We Direct Attention to the Advertisement of the Messrs. Manderson in Our Columns Today...,“ \textit{Waterford Chronicle}, August 26, 1843, 9.
pretending character in the sister country”. Other acclaimed marble monuments executed by Mandersons included a memorial to Rev Josiah Crampton in Castle-Connell Church (1841), exhibiting “another proof of the excellence now being attained by our countrymen in every department of fine arts”, and memorials of “chaste design, and beautiful execution” to the Archdeacon Butson in Clonfert Cathedral, Rev Holmes in Templeharry church, Joseph Gore Esq. in Ennis Church and Thomas Browne Esq. in Tulla Church. The glowing media reviews of the decorative and monumental work leaving Killaloe and comparisons to English sculpture, recognised for its superior design and execution, no doubt elevated the reputation of Messrs. Manderson and placed them among the fine arts of the country. By 1847 Mandersons had considerably expanded their enterprise, were employing more workers and were being referred to as “celebrated sculptors and statuaries”.

Besides monumental pieces, the Killaloe Marble Works also produced exceptional architectural decoration and chimneypieces. Four richly ornamented Italian white marble chimneypieces for Dromoland Castle (1843), “fully equal to any executed in the sister kingdom”, were prepared at the works, as well as native marble chimneypieces for many Board of Works buildings in Ireland. Messrs. Manderson were commissioned to prepare various articles of Irish marble for De la Beche’s Museum of Practical Geology in London, including a large Connemara marble tazza for which he was paid £57 8s. 6d., and Kane’s Museum of Irish Industry in Dublin before bravely accepting the task of fabricating structural columns of native marble for the Museum Building of Trinity College Dublin, which was not without its challenges. Since 1842 the products of the Killaloe Marble Works were on show at James Hogg’s hardware rooms in Limerick and in 1849, due to positive sales figures, this was extended to his Cork premises where he purpose built new show rooms “expressly for the sale of Killaloe Marble Work”. Hogg stocked a large and varied range of Mandersons’ Irish and Italian chimneypieces and retained drawings of other available

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792 “Messrs. Manderson, of the Killaloe Marble Works...,” Claren Journal, and Ennis Advertiser, May 3, 1841, 2.
793 The body of the monument was 8 by 4 feet with monumental sculpture on either side and an inscribed central marble slab. “Monument to the Rev. Josiah Crampton,” Limerick Chronicle, November 23, 1842, 2.
794 “A Marble Monument Has Been Recently Erected...,” Tuam Herald, May 15, 1847, 4.
795 “We Feel Pleasure in Noticing, That Several Proprietors of Large Manufactories Have...,” Limerick Chronicle, May 2, 1846, 2; “A Marble Monument Has Been Recently Erected...”
797 National Museum of Wales, De la Beche Papers, 1118, Letter from Thomas Oldham to Sir Henry De la Beche, 20 March 1850. See chapter 1 of this thesis for an image of the tazza, which is now in the Natural History Museum in London.
798 See chapter 1 of this thesis for information on Mandersons’ contributions to Public Works buildings in Ireland, the Museum of Irish Industry and the Museum of Practical Geology during the 1840s. See chapter 5 of this thesis for an account of William R. Manderson’s difficulties while fabricating marble for the Museum Building.
pieces, such as marble monuments, baptismal fonts, bust columns, tables etc., for which he took orders. By 1851 Mandersons had invested in improving their machinery, which ensured an accurate, high quality finish unattainable by hand, and enabled them to offer considerable price reductions.

Messrs. Manderson resided in Killaloe fabricating marble until Sheehan & Crotty commenced a contract of tenancy with Williams for the marble mill and yard in 1855 where they employed master tradesmen from London and Dublin to fabricate large varieties of marble. Joseph Sheehan superintended the Killaloe Marble Works for 8 years before the takeover and so knew the full particulars of running the mills, as well as having established working relationships with many clients throughout the south of Ireland. By this time William Manderson Senior had died and William Richard Manderson was only occupying a stone yard, also leased from Williams, on the canal bank in the town of Killaloe, which he presumably used as a marble store, and given its close proximity to the waterways enabled easy transport of the stone. Charles Wye Williams died in 1866, leaving his “universally respected” widow responsible for the operation of the Killaloe marble works. In 1868 she installed new and expensive machinery for cutting, turning, polishing, etc., as well as woollen machinery, and the mill resumed under new management with Sheehan still overseeing operations.

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801 “Killaloe Marble Works,” *Nenagh Guardian*, January 24, 1855; Griffith’s Valuation, November 21, 1855.
802 William Manderson Senior was living in Surrey in 1851 and he died in Liverpool in 1854. 1851 Census, [www.ancestry.co.uk](http://www.ancestry.co.uk) [accessed 01 August 2018].
803 Griffith’s Valuation, November 21, 1855.
804 In June 1841 William R. Manderson’s five year old son slipped into the canal and drowned. “Melancholy Accident,” *Dublin Morning Register*, June 15, 1841, 1.
Figure 7. Killaloe Marble Works at present: the mill (top), the swing bridge leading to the mill (middle left), the old water gate to the mill (middle right), sawmill waggon (Philip Bedford photo) (bottom left), remnants of a millstone (bottom right). Photos supplied by the late Brian J. Goggin, Limerick.
In 1875 the Killaloe Marble and Woollen Works, as it was then called, was sold by public auction. By this time the premises occupied two acres of land and comprised the mills, dwelling house, cottage, offices, stores, workshops, storerooms, with a steam engine, boilers, water wheels, woollen, carding, spinning, weaving, tucking and washing machinery, and extensive equipment for sawing, rubbing and polishing blocks of marble and preparing flags. Mr R.C. Smith, marble manufacturer of Warrington, England, commended the organisation of the works: “I have very great pleasure in saying that I consider these works second to none in the United Kingdom. I have frequently heard the Killaloe Marble Works spoken of in England, and expected to see something good when I came here, but I must confess I was perfectly astonished at the reality so much exceeding my anticipations. The roomy, substantial buildings and spacious yard, the scientific, admirably constructed and powerful machinery for the purposes intended, the never-failing cheap waterpower, the facilities for transit both by water and by rail, and the many varieties of the cheap and beautiful Irish marbles at your doors – all these advantages combined render the place a very valuable property”.

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806 “Killaloe Marble and Woollen Works. To Be Sold by Public Auction.”
In addition to their lease on the Killaloe Marble Works, Messrs. Manderson had by 1842 opened a marble and slate outlet at 23 Lennox Street, Dublin; given its proximity to Portobello Harbour on the Grand Canal this premises would have been highly convenient for unloaded stone transported from Killaloe. By 1845 they had moved and established a workshop at 172 Great Brunswick Street, which by 1854 had again changed address to 174 Great Brunswick Street (figure 9). By the late 1850s William Richard Manderson was promoting himself as a sculptor rather than the proprietor of a marble works, which coincided with the cessation of the lease in Killaloe. From the commencement of the Crimean War (1853-1856) he had secured a contract for the execution of memorial monuments and by 1859 he had completed 183; one such Crimean memorial in St Nicholas Church, Moyliscar, near Mullingar, commemorated Captain Francis W.T. Caulfeild in 1855 and inscribed at the bottom was “Manderson Dublin”. At this time he was

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808 The Dublin Almanac, and General Register of Ireland, for the Year of Our Lord 1842 (Dublin: Pettigrew and Oulton, 1842), p. 491.
809 Thom’s Irish Almanac and Official Directory, with the Post Office Dublin City and County Directory, for the Year 1846 (Dublin: Alexander Thom, 1847).
810 NAI, I/1/2/16, Board of Works Letter Books, 30 May 1854, p. 297.
811 “W.R. Manderson, Sculptor,” The Dublin Builder, January 1, 1859.
812 An image of this memorial is available on https://www.flickr.com/photos/23885771@N03/6981926242/in/photostream/ [accessed 12 August 2021].
also identifying Irish marbles in his advertisements, which included Green (Connemara marble), Red (Cork red limestone), Fossil Grey (Clonmacnoise limestone), Black (Limerick, Galway and Kilkenny limestones), Armagh and Kilkenny;\textsuperscript{813} native marbles were becoming more popular and he likely wanted to make known the various types he had to offer.

![Figure 10. Memorial by William Richard Manderson’s successor, John Coates, in the Church of the Assumption, Castledermot, Kildare. (Photographs by Patrick Wyse Jackson)](image)

At the end of 1862 William Richard Manderson’s workshop at 174 Great Brunswick Street, including all the stock and equipment, was advertised for sale by auction. The equipment included a quantity of mason’s and polishers’ benches with tools, etc.; polishers’ blocks with weights; water boxes; bubbing poles and floats; sawyers’ plate heads and saw poles; ladders; rollers, trestles and crowbars; splitters’ mallets, bench, vices and a variety of tools; several carts and figures; wareroom tables, desks and compact office enclosure; drawing boards, etc. Additionally, the entire household furniture was to be auctioned off.\textsuperscript{814} John Coates, former foreman at 174 Great Brunswick Street, succeeded William Richard Manderson and set up a marble manufactory in 1863 next door at number 173;\textsuperscript{815} he inherited some of Manderson’s accounts, including the Crimean

\textsuperscript{813} Italian marbles, including Statuary, Vein, Sicilian, Black and Gold, and Berdilla, and Penzance Serpentine were also advertised. “Irish Coloured Marbles,” \textit{Warder and Dublin Weekly Mail}, February 7, 1857, 4; “W.R. Manderson,” \textit{Irish Examiner}, April 3, 1857, 2.

\textsuperscript{814} The articles of Irish stone included blocks of Kilkenny marble, Connemara marble, Mitchelstown marble, Fossil Grey marble.

\textsuperscript{815} “John Coates,” \textit{Commercial Journal}, August 29, 1863, 1. Coates continued to promote himself in newspapers as the late foreman and successor to the esteemed W.R. Manderson into the 1870s; presumably Manderson’s reputation for supplying high quality marble advanced business. Examples of Coates’ adverts include “John Coates,” \textit{The Dublin Builder}, September 1, 1866, 4; “John Coates,” \textit{Commercial Journal}, August 31, 1872, 1.
memorials (figure 10).\textsuperscript{816} It was at this time that Manderson was preparing to emigrate to Australia. By 1865 he had arrived in Sydney where he lived on Campbell Street and continued to deal in marble.\textsuperscript{817} In March 1865 he donated a collection of Irish and Italian marbles to the Australian Museum (figure 11),\textsuperscript{818} and in 1866 he was living at 353 Macquarie Street and was listed in \textit{Sands Directory} as a “mason, stone cutter”.\textsuperscript{819}

![Image](image)

\textit{Figure 11. Specimens of Irish marble donated by William Richard Manderson to the Australian Museum in 1865: Cork red marble (left), Galway black marble (second from left), Meath marble (third from left) and King’s County marble (right).}\textsuperscript{820}

Although no primary archival material, such as wage books or invoices, relating to the Killaloe Marble Works survives, the stature of Messrs. Manderson’s clients and the quality of their surviving work executed in native stone, for example in the Museum Building, is evidence that they played a central role in the initiation and development of Irish marble fabrication.

**The Kilkenny Marble Works**

The Kilkenny Marble Works, established by Alderman William Colles in 1730, was the epitome of native marble fabrication since the mid-eighteenth century and an enterprise on which many

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816 A Crimean memorial in St Nicholas Church Moystat, near Mullingar, commemorating Lieutenant Colonel John Caulfeild in 1865 was inscribed at the bottom with “Coates Dublin”. [accessed 13 August 2021].

817 “Marriages,” \textit{Sydney Mail}, April 4, 1868, 2. There is little evidence to suggest that he was successful.

818 “List of Donations to the Australian Museum during March, 1865,” \textit{Sydney Morning Herald}, April 10, 1865, 5; “List of Donations to the Australian Museum during March, 1865,” \textit{Bell’s Life in Sydney and Sporting Chronicle}, April 15, 1865. These were probably examples of his trade samples brought by him to Australia.

819 \textit{Sands Postal Directory} (Sydney: John Sands Ltd., 1866).

820 Imagery of Manderson’s specimens supplied by Ross Pogson, Collection Manager, Geosciences (Mineralogy & Petrology), in the Australian Museum.
other Irish marble mills based their workings. During the 1700s and for much of the 1800s the Kilkenny Marble Works mainly prepared black limestone from their nearby quarries and fabricated ornamental articles, such as chimneypieces (figures 15 and 16), rather than large structural marble work.\footnote{See chapter 2 of this thesis for information on the Colles lineage and their roles in the development of the Kilkenny marble quarries. For a detailed account of the Kilkenny Marble Works during the eighteenth century and the beginning of the nineteenth century see Tony Hand, “The Kilkenny Marble Works : A Family Business Enterprise” (Trinity College Dublin, 2011) and Tony Hand, “Kilkenny Marble in the Victorian Period,” in The Museum Building of Trinity College Dublin. A Model of Victorian Craftsmanship., ed. Christine Casey and Patrick N Wyse Jackson (Dublin: Four Courts Press, 2019), 103–19.} By the 1880s Richard Colles, descendant of Alderman William Colles, had advanced the Kilkenny Marble Works considerably, as well as expanding his quarry leases to Cork, Kerry and Galway where he diversified into the extraction of decorative red limestones and green and white marbles.\footnote{Chapter 2 of this thesis outlines Richard Colles’ diversification into the quarrying of other native stone types, besides Kilkenny limestone, during the 1880s.} It was only at this time, long after Manderson had departed Ireland, that the Kilkenny Marble Works began to offer structural work, as well as ornamental decorative work, in a range of native marbles.

An excerpt in the \textit{Kilkenny Moderator and Leinster Advisor} in 1884 described the approach to the mills: “Long before reaching the main gateway, the attention of the stranger is divided between the charming view of the river, as seen through a wood belonging to Mr. Colles, and huge blocks of Marble, lying about in picturesque carelessness. Presently the road to the works comes into sight. Further along, the residence of Mr. Colles, Millmount, and its long line of conservatories, and, finally, the old road to the Mills, past the ancient graveyard of Blackrath, and its ivy-mantled ruin. Here an opportunity is afforded to test the wonderful durability of Kilkenny marble. Many monuments, bearing inscriptions a hundred years old, look as fresh in the lettering as if the chiselling has been done less than ten years ago.”\footnote{“The Kilkenny Marble Mills,” \textit{The Kilkenny Moderator and Leinster Advertiser}, June 28, 1884, 2.} The marble works, driven by five water powered wheels, had a slab-cutting capacity of between three and four thousand superficial feet (square feet) per week, and each mill was connected by tramways. The River Nore supplied an ample amount of water to the mills, which in the driest summer never failed.\footnote{“The Kilkenny Marble Mills”; NLI MS UR 092768, Two pamphlets re. Irish Marble Co. Ltd. Kilkenny and Wages book of Richard Colles, Kilkenny Marble Works, January 1885 to August 1921; “Irish Marbles,” \textit{The Irish Builder} 30, no. 693 (November 1, 1888): 274–75.} Every stage of the process of marble manufacture could be observed at the Kilkenny works from the primary actions of hewing\footnote{Meaning to cut.} and extracting the blocks at the nearby quarries through the fabrication
phases, including sawing, chiselling, moulding, turning, rubbing, gritting and polishing, to the final steps of fitting and packing for transit.  

Figure 12. Imagery of a selection of processes at the Kilkenny Marble Works during the late 1800s.

The stone was withdrawn in large blocks and immediately dressed square by workers in the quarry. From there it was transferred to the mills where it was cut using large and powerful saw frames, “working horizontally, with a number of saws stretched parallel to each other, extending from end to end of the frame”. The saws, which worked until midnight and recommenced after 6 hours, were of the same design as those in the London Marble Works; they consisted of soft iron with no teeth and slicing arose through application of sharp sand and water. The slabs were then sized to the required dimensions before being placed on a “rubbing bed” to achieve a smooth texture. If columns were required blocks were turned on a lathe. Gritting proceeded to achieve

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826 “Irish Marbles,” November 1, 1888.
827 NLI MS UR 092768, Two pamphlets re. Irish Marble Co. Ltd. Kilkenny and Wages book of Richard Colles, Kilkenny Marble Works, January 1885 to August 1921
a fine surface and finally the slabs or columns were polished in a polishing machine with emery and putty powder before being fitted together into mantlepieces and other decorative articles.\(^{828}\)

The Kilkenny Marble Works achieved a reputation for the closeness of their joints, such that several joined slabs resembled a solid block “and none other than a highly practiced eye could detect the points of junction”, but the procedure in which Colles truly excelled was polishing; the black and coloured limestones and marbles of Ireland received a superior lustre at his establishment. Employed at the marble works were stone carvers and letterers, polishers and stone masons capable of executing any request submitted by architects.\(^{829}\)

The Kilkenny Marble Works fabricated a variety of decorative architectural features, as well as bespoke monuments, for both Irish and foreign contracts. The striking varicoloured pavement of native polished limestones and marbles in the chancel of St Canice’s Cathedral in Kilkenny, sourced exclusively from Colles’ quarries and worked at the mills, was fitted between 1864 and 1870 during the restoration of the cathedral by architect Thomas Newenham Deane (Figure 13). On seeing the pavement during her visit to the cathedral Queen Victoria said it was certainly the most beautiful pavement she had ever witnessed. The stone included Kilkenny black and Castleduff grey limestones from Co. Kilkenny; “Cork Red” and “Pink Sunset” limestones from Ramhill, Co. Cork; and green Connemara marble from Streamstown.\(^{830}\) Thomas Newenham Deane, an avid supporter of Irish stone like his father, proclaimed the quality and diversity of Irish marble, “As to Marble, where can you find greater variety in colour or more beautiful stone, than in Ireland? – black, green, red, grey, and every possible shade. I know the Marbles of Italy and, with the exception of those which are very costly, none can be compared to the Irish Marbles”.\(^{831}\)

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\(^{828}\) Other decorative articles included fenders, slabs, tabletops, columns, altars, pulpits, shop fittings, counters, clock cases, memorial crosses, headstones, sundials, as well as flooring, walls and staircases. NLI MS UR 092768, Two pamphlets re. Irish Marble Co. Ltd. Kilkenny and Wages book of Richard Colles, Kilkenny Marble Works, January 1885 to August 1921; “Irish Marbles”.

\(^{829}\) NLI MS UR 092768, Two pamphlets re. Irish Marble Co. Ltd. Kilkenny and Wages book of Richard Colles, Kilkenny Marble Works, January 1885 to August 1921; “Irish Marbles”.

\(^{830}\) NLI MS UR 092768, Two pamphlets re. Irish Marble Co. Ltd. Kilkenny and Wages book of Richard Colles, Kilkenny Marble Works, January 1885 to August 1921; “Irish Marbles”.


It has been suggested that the four types of stone used in the chancel pavement represented one lithology from each province. It is clear, given that two were quarried from Leinster, that this is a fallacy. For further information on the quarries leased by the Irish Marble Company Ltd. see chapter 2 of this thesis.

Substitutes for nearly all imported Italian marbles could be found in Ireland, apart from white statuary marble. See chapters 2 and 3 of this thesis for information on the variety of decorative coloured limestones and marbles available in Ireland and the shortfall of statuary marble, despite white marble being quarried in Connemara and Donegal.
Figure 13. Pavement of coloured Irish marbles in the chancel of St. Canice’s Cathedral, Kilkenny laid by the Irish Marble Company Ltd. between 1864 and 1870 during the restoration by Thomas Newenham Deane.
The Kilkenny Marble Works manufactured and finished headstones or supplied the raw slabs and blocks, sawn, sanded or highly polished, to the trade for preparing the monuments. They also specialised in designing and executing church memorials, such as reredoses, altars, pulpits, holy water fonts, etc. (figure 14). They specifically recommended polished Kilkenny Black Bird’s Eye Marble for use in fonts and a combination of Kilkenny black and coloured native marbles, especially Connemara green, in backgrounds for brass memorials or as a foil to lettered white marble. In promotion of his mantelpieces Colles stated, “Whilst in the humblest cottages in and near Kilkenny some of the finest Marble Mantlepieces are found, in more pretentious mansions – not much further afield – foreign and less appropriate Marble importations are often used”.

Richard Colles continued to operate the Kilkenny marble works into the twentieth century until it was sold in c. 1921.

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832 NLI MS UR 092768, Two pamphlets re. Irish Marble Co. Ltd. Kilkenny and Wages book of Richard Colles, Kilkenny Marble Works, January 1885 to August 1921. Although this opinion was true of many mantelpieces in prestigious houses around Ireland, some buildings, such as Emo Court, Castletown House and Ballinahinch Castle, included a mix of Irish and foreign marble chimneypieces, while others, such as Adare Manor (see chapter 3 of this thesis for a detailed account of the native limestone chimneypieces in Adare Manor) and Cahirmoyle House (discussed in chapter 5), opted for chimneypieces fabricated from almost exclusively Irish materials.

Figure 15. Staircase hall in Castletown House with Portland stone staircase and checkered Kilkenny black limestone and Portland stone floor (top left) and Kilkenny black limestone chimneypiece (top right). Kilkenny black limestone chimneypiece in Ballinahinch Castle (bottom left). Kilkenny black limestone chimneypiece in Emo Court (bottom right).

Figure 16. Simple mantlepiece designs from the Irish Marble Co. Ltd. pamphlet with an accompanying statement that bespoke requests would be accommodated. ⁸³⁴

Other provincial marble works: Cork and Galway

“We are not sent into this world to do anything into which we cannot put our hearts. We have certain work to do for our bread, and that is to be done strenuously; other work to do for

our delight, and this is to be done heartily. Neither is to be done by halves or shifts, but with a will; and what is not worth the effort, is not to be done at all. Perhaps all that we have to do is meant for nothing more than an exercise of the heart and the will, and is useless in itself; but, at all events, the little use it has may well be spared, if it is not worth putting our hands and our strength to. – Ruskin.835

Cork

There were numerous marble works situated throughout Ireland during the Victorian period, many of which were linked to specific quarries. As illustrated in chapters 2 and 3, outside of Kilkenny, Galway and Cork were two of the largest decorative stone quarrying districts in the latter part of the nineteenth century and it is not surprising that notable marble works were operating within these localities. In 1866 Messrs. W.J. Goodman & Co. undertook a thirty five year lease, at a yearly rate of £70, at nos. 2 and 3 Wandesford Quay, Clarke’s Bridge, Cork where they established the Cork Steam Marble Works. The Works comprised modern machinery, including a ten horsepower engine, boiler, saw frames, grinding float, turning lathes, cranes, and the full working plant of a marble cutter. At this time Goodman & Co. also held the lease, at a yearly rent of £45, for the red limestone quarries at Little Island, which produced the celebrated Park Red Marbles.836 They executed orders in Park Red, as well as other Irish and Italian marbles at the Works.837

Galway

During the 1840s Galway benefited from several marble manufactories in the city; Samuel Moone owned a marble works on Forster Street North, Henry Clare operated out of a workshop on Frenchville Lane East and Christopher Yorke was based on Long Walk North.838 The industrious entrepreneur Phineas Franklin, proprietor of the black limestone quarries at Menlough,839 managed the principal marble mill at University Road North on Nun’s Island (more specifically Earl’s Island) until 1855, at which time the net yearly rent was £24.840 The mill was ideally situated

836 See chapter 3 of this thesis for information on the Little Island red limestone quarries.
839 See chapter 2 of this thesis for information on Franklin and the Menlough black limestone quarries.

199
on the River Corrib with unlimited water supply and direct water carriage from the workshops to the Galway docks (figure 17). The water powered marble works was established during the 1830s and in 1837 a turning machine, a polisher and a patent saw were installed. The machinery was propelled by prisoners forced to run on two treadmills in the neighbouring county gaol; this laboursome activity was terminated in 1883 when the treadmill shed was demolished.

![Figure 17. OSI 25 inch map (1888-1913) showing location of the marble works on Nun’s Island in Galway city.](image)

Marble merchant Messrs. Staunton and Co. of Lombard Street, Dublin were appointed agents and orders for Galway and Italian marble chimney-pieces, monuments, tables, floor tiles, etc. could be lodged through them or directly at the mill. Robert Mercer succeeded Phineas Franklin as manager of the Nun’s Island mill where he also prepared articles in Galway black limestone, Connemara green and various Italian marbles, as well as native fossil limestone; bedroom chimney-pieces sold for 18s. upwards. The once prosperous Galway Marble Works lay idle for many years in the latter part of the nineteenth century until Messrs. Miller and Moon resumed it

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in 1884. Scotsman and Galway resident Mr John Miller Esq. simultaneously began working the black marble quarries on the banks of Lough Corrib, as well as drawing marbles from the Connemara marble quarries further west.

Figure 18. The Church of St Mary, Claddagh Quay, Galway (1891). Exterior Shantalla granite ashlar walling with blue limestone dressings (top) and interior polished shafts of Shantalla granite, prepared at the Galway Marble and Granite Works under the management of John Miller.

During a visit to the newly reopened marble works in March 1885 the Galway Express described “some splendid specimens of workmanship”, one of which was “a most exquisitely wrought black marble altar, intended for the new Catholic church at Renmore military barracks. This magnificent

\[845\] The Franklins leased the marble mill until 1875 (Walter Franklin and Brothers, 1855-1875; Fredrick Franklin, 1875) and in 1880 it was vacant. Alex Moon, who was the proprietor of a large department store in Galway, took over the mill in 1884 and John Miller entered a partnership with him in 1885. Griffith’s Valuation, March 07, 1855; Prunty and Walsh, “Irish Historic Towns Atlas (IHTA)”, p. 31.

\[846\] “Irish Industries. Galway Marble Works.,” Galway Express, November 18, 1899, 4.
structure is 7 feet wide, 3 feet 6 inches high, and 3 feet in depth, with arches spandrel. The columns are composed of Cork red marble bases, with Connemara green pillars, covered by a cap of white Italian marble. The whole is surmounted by a tabernacle of exquisite device, about three feet in height, standing on green columns, with a neatly executed door of Cork red marble, on which a beautiful white marble cross is brought out in relief. Above all is fitted a cap of black marble, on the summit of which is placed an ivory cross, which gives a most beautiful effect to the whole. On the front of the altar is embedded on a slab of the most superb polish the letters ‘I.H.S.’, artistically entwined, and composed of white Italian marble. To endeavour to eulogise this work of art, would require the pen of an art critic, but suffice it for us to say that anything of a similar style it has not been our lot to see outside the confines of the Galway Marble Works”. 847 The depiction of the altar conveys all of the heretofore manufacturing processes described in this chapter and thus verifies the skilful arrangement of workers and machinery at the Galway Works.

By the 1890s John Miller and Son were exclusively running the marble works and, under the vigilant management of Mr Clair, not only native limestones and marbles were prepared at the establishment, but also locally quarried granite. 848 From the 1880s a significant extractive granite industry was established in Galway and stone was raised from over ten localities in the county. 849

848 “Galway Marble Works,” Galway Express, May 21, 1887, 3; “Galway Granite and Marble Works,” Galway Express, November 1, 1890, 3; Prunty and Walsh, “Irish Historic Towns Atlas (IHTA)”, p. 31.
849 A detailed account of the extraction and fabrication of Irish granites is not within the scope of this thesis. Coloured granites, which were worked to a limited extent as decorative stone in the latter part of the Victorian period, were quarried in counties Galway and Donegal. An overview of Irish granites, used for
The principal quarries close to the town of Galway, which were operated by Miller, were Shantalla (also spelled Shantallow); St Helen’s, Taylor’s Hill; Letteragh (north of Rahoon house); and Ballagh. Miller’s quarries, except Ballagh, were situated in veins of granite where blocks suitable for general purposes, but not of a large size, were obtainable. The granite veins produced decorative stones of diverse texture and colour, which were highly suited to interior decoration. The St Helen’s Stone was fine grained, clouded red and yellow with flecks of black and white, polished well and could be raised in five to seven feet long blocks. The Shantalla stone was also fine grained, mottled red and white with some black speckling, polished well, and was extracted in similar sized blocks to that at St Helen’s; a chocolate-coloured granite with bright red feldspar (orthoclase) and clear quartz crystals was also quarried at Shantalla. The Letteragh stone was coarser grained than the St Helen’s and Shantalla granites, mottled green and purple with large bright red isolated crystals and blebs of quartz, and 6 feet long blocks were attainable. Unlike the aforementioned granites, the Ballagh stone was porphyritic; it was red and greenish yellow with large flesh-coloured crystals, polished well, and could be excavated in long and very large blocks. The pedestal for William Dargan’s monument at the entrance to the National Gallery in Dublin is of Ballagh granite. The triangular obelisk of the Parnell monument on O’Connell Street (figure 19) is of Shantalla granite, the platform on which the monument stands is inlaid with a large trefoil of Barna granite, and the surrounding bollards are also of the Barna stone; the granite was prepared in the Galway Marble Works. Also prepared at the Marble Works were Shantalla granite shafts for the interior of the Church of Saint Mary, Claddagh Quay, Galway, erected in 1891 to William Hague’s design. The exterior of this church is of Galway granite both decorative and building purposes, is available in George Wilkinson, *Practical Geology and Ancient Architecture of Ireland* (London: John Murray, Albemarle Street, 1845); G.H. Kinahan, *Economic Geology of Ireland*, vol. 18 (new series vol. 8) (Dublin and London: Hodges, Figgis, and Co. and William’s & Norgate, 1885-1889); “Granite,” *The Dublin Builder?* (March 15, 1865): 73–76; John Hussey, “Granite Quarrying and the Migration of Quarrying Communities from Golden Hill to Ballyknockan, Co. Wicklow, c.1700 - c.1850,” in *The Museum Building of Trinity College Dublin. A Model of Victorian Craftsmanship*., ed. Christine Casey and Patrick N Wyse Jackson (Dublin: Four Courts Press, 2019), 79–101. Examples of Irish granite employed in Dublin city buildings are outlined in Patrick N. Wyse Jackson and Louise Caulfield, *The Building and Decorative Stones of Dublin: A Walking Guide*, 2nd ed. (Dublin: Geological Survey of Ireland, in press).


851 A porphyry is a type of igneous rock consisting of large-grained crystals such as quartz and feldspar scattered in a fine-grained groundmass composed of indistinguishable crystals.


ashlar walling, obtained from one of Miller’s quarries (probably also Shantalla), and local blue limestone dressings, the source of which is unknown (figure 18).

Figure 20. Plan of the proposed works at Dungloe for the dressing and polishing of the Donegal granites by geological surveyor Philip Brannon (1887).

At the same time in Donegal there was a proposed plan for establishing a marble works at Dungloe (also spelled Dunglow) for the dressing and polishing of local granites. The Dungloe region contained viable decorative granites “from dark and almost purple reds into graphic, mottled and cloudy; rich bright red; bright red; faint tones of red (salmon, pink, rose, &c.); through deep grey, or blue, and very light silvery grey, into a beautiful resplendent white granite”. The stone was fine grained, received a good polish, could be obtained in large blocks, and was regularly jointed, which allowed extraction with little waste. It was intended to supply from the works cut and polished slabs, columns, lintels, sills, steps, basements, stringcourses, facing, dressing, bespoke requirements for monumental or decorative architectural work, together with rough stone suitable for paving, kerbing, facings, etc. Regrettably, the Dungloe Works did not materialise, and the Donegal granites were never extracted or worked to their full potential.

858 Kinahan.
In 1905 the Galway Granite and Marble Works, as it was then named, was transferred from Messrs. Miller and Son to the newly founded Galway Granite Quarry and Marble Works Ltd. company, the chairman of which was Col. Arthur H. Courtenay.\textsuperscript{859} In addition to Courtenay, Mr Raoul Joyce, Captain John Beresford Campbell and Mr Martin McDonagh were company directors, Mr Tennant was secretary and Mr Seal was the manager of the works.\textsuperscript{860} A prospectus\textsuperscript{861} was published in \textit{Freeman’s Journal} in March 1905, which disclosed the company capital at £25000 and offered 12500 shares at £1 each for subscription. It stated that the new company “has been formed to acquire and develop the Shantallow Quarry and Miller’s Granite and Marble Works at Galway. Hitherto neither the Quarry nor the Marble Works have been worked to anything like their full capacity, but the Directors are confident that under energetic management and by the introduction of modern machinery, both the Quarry and the Mill will be developed to an extent which will afford extensive employment at Galway, and yield a satisfactory return to the Shareholders”. The lease undertaken for both the quarry and marble works was for a period of 200 years at an annual rent of £76 with royalties of 6d. per ton on large blocks and kerbs, 3d. per ton on setts and 2d. per ton on macadam commencing in 1906. Following acquisition of the Shantalla granite quarry, which encompassed 13.5 acres of Courtenay’s estate, the company immediately installed an appropriate drainage system to enable the development of a proper extraction face.\textsuperscript{862} The anticipated cost of opening the quarry was £2500, which included instatement of an explosive house, tramway and smithy, purchase of steel tipping waggons and a large steam crane, and wages for 6 months. A further £1000 was allocated for a traction engine and various waggons.\textsuperscript{863}

At the time of hand over the demand for ornamental polished work far exceeded the supply capacity of the Galway Works and hitherto orders of any magnitude had been repeatedly refused. The new company intended to improve the facility with the introduction of modern machinery, which they hoped would result in large orders being executed promptly, thereby greatly increasing the volume of trade and profit. £1500 of the company capital was allotted to new machinery and repairs and extensions to the works.\textsuperscript{864} One vital piece of equipment, the


\textsuperscript{860} “Prospectus,” \textit{Freeman’s Journal}, March 18, 1905, 7; “Galway Marble Works and Granite Quarries,” \textit{Galway Express}, June 17, 1905, 2.

\textsuperscript{861} “Prospectus.”


\textsuperscript{863} “Prospectus.”

\textsuperscript{864} “Prospectus”; Washington Government Department of Commerce and Labour, “Daily Consular and Trade Reports.”
“somewhat primitive water wheel”, was to be replaced with a modern turbine. The use of waterpower was highly beneficial at the Galway Works because the process of cutting and polishing the hard, close-grained granite was so “slow and laborious. An ordinary toothless saw... will only cut through a granite block at the rate of from six to twelve inches per day; hence the great economy of waterpower”. Large granite blocks, weighing up to forty tons, were received into the mill, which could be transformed into monolithic columns of two feet in diameter and up to ten feet or more in length. Under the new management the average wage of a stonemason was 32s. per week.

In July 1905, to conclude their tour of the West of Ireland, the Lord Lieutenant and Countess of Aberdeen officially opened the Galway Granite and Marble Works. Mr Tennant, in his welcoming address, stated that “the granite and marble of Galway could now be turned out with the most modern machinery, and that no expense would be spared to bring the superior quality of the Galway products before the public at large”. The Lord Lieutenant replied that “coming from a city which was sometimes called the ‘granite city’, he took peculiar interest in the undertaking... and he would look, not only with sympathetic eyes, but with a kind of practical knowledge on the fitness of the machinery in the factory, and upon the work which it was going to turn out”. He concluded, in support of the Galway enterprise, that the new house, which he and Lady Aberdeen had lately built in Aberdeenshire, contained mantelpieces and other articles of Galway marble.

Some years before Col. Courtenay’s involvement with Galway marble, John Miller, former proprietor of the Galway Works, aware of the value and abundance of the local granite, had brought over expert marble workers from Aberdeen to teach his employees how to fabricate the local stone. They quickly mastered the process and were “found to possess taste and no small amount of originality and capacity in designing”. The Galway granite was often compared to the distinctive red Aberdeen granite, extracted from the long-established quarries at Peterhead. The Dublin Builder attributes the first use of the Aberdeen stone in Dublin city to no. 36 Merrion Square East, formerly no. 2 in the terrace, in 1860 where James Tyrrell Esq.

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865 “Galway Granite Marble. A New Development.”
866 In March 1910 a dispute over proposed reduction of wages occurred, which resulted in a number of stonemasons going on strike. “Galway Labour Dispute. Stonemasons on Strike.,” Belfast Telegraph, March 5, 1910, 8.
868 “Galway Granite.”
869 Granite has been quarried at Aberdeen for building purposes since at least the early 1600s. It was not until about 1822 that Mr Alexander Macdonald, of Aberdeen, introduced the local granite for architectural decoration by shaping and polishing it. Extraction and Manufacturing of ornamental granite became one of the most important industries in north Scotland during the Victorian period. “Granite,” The Dublin Builder 7 (March 15, 1865): 73–76, p. 74.
870 “Notes of New Works,” The Dublin Builder 2, no. 14 (February 1, 1860), p. 203.
commissioned architect Edward Henry Carson (1822–1881) to adorn the entrance to his residence with the exotic granite. Here, this reddish-pink stone was employed for polished columns and pilasters in the portico at the entrance door where it pleasantly contrasts with the yellowish grey Leinster granite entablature (figure 21).

![Figure 21. The first use of Aberdeen red granite in Dublin at 36 Merrion Square East.](image)

There are some commentators who lament the introduction of this stone into Ireland as it rapidly became popular, perhaps to the detriment of some Irish decorative stone, including Galway granite. The Galway stone yielded superior test results to Aberdeen granite and had the ability to contend favourably in the open market, even with the rudimentary extraction methods carried out in the quarries. Alas, the *Galway Express* in 1906 lamented, “The Aberdeen granite which, with our usual predilection for foreign stuff, as peculiar to Irishmen, is so fashionable in our buildings, and which can only be obtained here at great cost, is demonstrably and palpably inferior in its finished appearance to what can be produced and sold at half the expense at our own doors [i.e., Galway granite]; yet how many of our private and public buildings have in them the foreign stone standing as a reproach to and a lesson of our want of enterprise and our lack of patriotism…

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872 Wyse Jackson and Caulfield.
873 “Galway Granite Marble. A New Development.”
the yet prevailing fashion may cease and the practice of going abroad for what can be got at home, may not be henceforth found or tolerated in Ireland at any rate.”

At the end of the business year in 1909 Galway Granite Quarry and Marble Works Ltd. were regretfully not in a position to declare a dividend, although Col. Courtenay expressed hope regarding the future of the industry. In 1911 the company secured a contract with the Midland Great Western Railway Company for the supply of between 300,000 and 500,000 tons of crushed Shantalla granite over ten years to re-ballast the permanent way. An extension to the Galway-Clifden railway line was constructed to service the quarry and convey the stone, which was crushed on site, to the railway tracks. Although this was a positive arrangement in terms of continuous employment at the quarry, it was a disappointing divergence from the superior decorative articles capable of being fabricated at the Galway Works. Like many operations in granite and limestone districts elsewhere in Ireland, quarrying and working of the Galway granite rapidly declined in the 1930s and at present this stone is commercially unavailable. During the time of operation of the Galway quarries and Marble and Granite Works the native granite, despite its potential, never managed to compete with its Aberdeen counterpart in domestic or foreign markets; many contemporary media sources attribute this to an incessant national and international prejudice against Irish manufactories and produce.

![Figure 22. Streamstown green marble columns and Merlin Park black limestone bases in the Church of Saints Peter and Paul in Athlone (1930-1936), which were fabricated at Captain Waithman’s marble works at Merlin Park.](image)

During the 1930s, when the Galway Marble and Granite Works was winding down, Captain Wyndham Waithman was redeveloped the Irish Marble Industries Ltd. Works at Merlin Park.

875 “Dividends, Reports, and Meetings - Galway Granite and Marble Works.”
876 “Good News for Galway,” Galway Express, May 13, 1911, 5.
877 Messrs. Sibthorpe of Dublin worked the Merlin Park quarry in the latter part of the nineteenth century; this is discussed later in this chapter.
which prepared black limestone from the local quarry, also operated by Waithman. He was among those who founded the Galway Foundry, the establishment that manufactured all the new machinery for the Merlin Park quarry and marble works. In 1933 Messrs. Whitehead of London took over the Streamstown marble quarry and Waithman was appointed agent. He organised machinery, also made at the Galway Foundry, to be sent to the quarry immediately. This included a wire saw, which cut the blocks out of the bed rock without the aid of blasting and hence eliminated troublesome cracking and unnecessary waste. The Merlin Park Marble Works fabricated marble for many diverse buildings, including Stormont Castle and the Church of Saints Peter and Paul in Athlone. One hundred and twenty tons of Connemara green marble, raised from the Streamstown quarry over a period of 12 months, was shaped and polished at the Works for columns for the church in Athlone; the bases of the columns are of Merlin Park black limestone. Irish Marble Industries Ltd. was sold with all its assets and mining rights in 1944 and quarrying at Merlin Park eventually ceased in 1969.

**Marble works in Dublin city**

Other prominent marble works in Victorian Ireland included the firm of David McCullough in Armagh, John Drew’s marble and stone works in Ballysimon, Limerick, John Robinson and Son (Ulster Granite, Marble and Stoneworks Ltd.) in Belfast, to name a few, and of course the capital was also a major marble working hub. Great Brunswick Street (now Pears Street) was the nexus of the building industry in Dublin during the nineteenth century. It hosted many acclaimed stone workers, including those who specialised in marble; albeit there were a few outliers of significant marble workers whose establishments were located outside of the Great Brunswick

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878 See chapter 2 of this thesis for a history of the Merlin Park black limestone quarries and Captain Waithman’s involvement in the 1930s.
880 See chapter 2 of this thesis for images of the Church of Saints Peter and Paul in Athlone.
881 “Galway Marble Quarries. A Big Athlone Order.”; “Irish Marble - Location of Deposits - Development of Resources,” * Munster Express*, October 27, 1933, 2; “Captain Wyndham Waithman.”
883 See chapter 3 of this thesis for information on David McCullough and his contribution of pieces, executed in Armagh marble, to the Great Exhibition in 1853.
885 PRONI D1586, Papers of John Robinson & Son, The Ulster Granite, Marble and Stoneworks Ltd. 1873-1928; Casey, “The Museum Building’s Radical Polychromy: Impetus and Influence.”
886 See Wyse Jackson and Caulfield, *The Building and Decorative Stones of Dublin: A Walking Guide* for descriptions of the buildings on Great Brunswick Street, which housed the prominent Victorian firms associated with the building and stone trade.
Irish Victorian marble workers can be separated into two categories. Firstly, there were those who mainly carved and assembled marble elements, assumably prepared to a certain standard in other marble works, into decorative articles such as monuments, ecclesiastical ornament, chimneypieces, etc. This class of artisan included Charles William Harrison, James Pearse and Edmund Sharp, all of whom occupied workshops on Great Brunswick Street and were considered monumental sculptors and architectural carvers who utilised a variety of stone types, inclusive of marble (figure 23). Sharp’s workshop at 42 Great Brunswick Street contained an in-house coal gas plant and according to his obituary in the Irish Builder “he was the first to introduce pneumatic and other modern machinery into the marble work’s craft in Ireland. He possessed Rosse’s patent machinery for carving figures and foliage, which operated using air and pressure and “enabled the artist to get 8000 to 10000 strokes per minute, as against about fifty by hand in the ordinary way”.

Kirwan was also a marble worker of this description, renowned for his design and execution of altars, which often combined Irish and Italian marbles to great effect. In 1859 the Catholic

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890 https://www.dia.ie/architects/view/4302/PEARSE-JAMES%2A#tab_biography [accessed 16 August 2021].
Telegraph applauded Kirwan for his contribution to ecclesiastical art while describing an altar in his workshop: “No one has contributed more to this branch of church adornment than Mr M. Kirwan, the eminent sculptor, of Bolton-street, Dublin. The lovers of ecclesiological art will be well repaid by a visit to his studio, where they can have an opportunity of examining one of those beautiful marble altars for the construction of which he has now become so justly celebrated. A short description of this chef d’oeuvre may not be out of place here. The table of the altar is composed of Italian veined marble, and is supported by pillars of beautifully variegated peacock marble. The tabernacle rests on the altar and is composed of pure Carrara, with a door of rich Sienna, on which is a monogram, and over it is placed a dove in the purest white. The tabernacle is surmounted by a cupola, supported by many pillars, on the apex of which is a ball and cross – all of the purest Carrara. The panels are composed of Cork marble, and the frieze of Connemara marble... as this beautiful work of art will be removed in a short time, the admirers of native genius would do well to inspect it.” 894

The other distinct type of marble worker primarily fabricated marble, i.e., they took stone in its raw state and processed it through all the necessary stages to produce a finished product. These marble works were often associated with quarries; they supplied marble components to the trade, as well as finished marble articles to architects and individuals, and they were more likely to execute structural architectural work, together with smaller ornamental pieces. The previously described mills in Killaloe, Kilkenny, Cork and Galway were of this description. Most of the marble works in Dublin belonged to the former category, excepting Messrs. Manderson (discussed earlier in this chapter) and Messrs. Sibthorpe; both of whom resided on Great Brunswick Street. Sibthorpes were decorators, glass merchants, ironmongers, plumbers, stone merchants and marble workers. The firm was founded in 1747 by Henry Sibthorpe, who prior to his death in 1824 took his son John (1799-1878) into partnership; the enterprise traded under the name Henry Sibthorpe and Son for about a century and a half. John Sibthorpe died suddenly in 1878 and was succeeded by his two sons, Thomas (1840-1898) and John (1851-1940), both Justices of the Peace. Henry originally operated a glazier’s business at 18 Exchange Street until 1815 when he altered the description of his profession to “painter and glazier” and moved to 11 and 12 Cork Hill. The firm remained at Cork Hill until at least 1883 and then expanded their showrooms and stores to

894 “Ecclesiological Art,” Catholic Telegraph, October 22, 1859, 5.
different premises around the city later in the 1880s. One of their properties was a marble works at 114-121 Great Brunswick Street, which they first occupied in c.1869.

Sibthorpe's were probably the largest marble fabrication operation in Dublin during the eighth and ninth decades of the nineteenth century. Their enterprise on Great Brunswick Street was called the Steam Power Marble Works and they advertised themselves as Irish marble quarry owners and manufacturers. In 1869 a highly critical article, titled “Imitation in Architecture”, in the *Irish Builder* condemned the enhancement of marble with paint and French polish, a process supposedly carried out by the Belgians, amongst other fakeries. At the same time, the author

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895 [https://www.dia.ie/architects/view/4957/SIBTHORPE-HENRY%26SON%2A](https://www.dia.ie/architects/view/4957/SIBTHORPE-HENRY%26SON%2A) [accessed 18 August 2021].

896 Henry Sibthorpe and Son, of 11 Cork Hill and marble works, Great Brunswick Street, exhibited a collection of specimens of marbles from their Irish quarries at the Conversazione of the Royal Institute of the Architects of Ireland at their offices at 212 Great Brunswick Street on 16 December 1869. “Conversazione of the Royal Institute of the Architects of Ireland,” *Irish Builder* 12, no. 241 (January 1, 1870): 2–4.

commended Sibthorpes for “sending out true, genuine work in Irish marble, of some dozen different colours and patterns” and stated that “this trade is now not dependent on the chances of half-opened quarries, and work turned out by ignorant, hand-to-mouth craftsmen, without skill or resources”. 898 Unlike Mandersons, but parallel to Richard Colles, from the late 1860s Sibthorpes leased decorative limestone and marble quarries in Galway, Cork, and Westmeath from which they extracted black, green, white, red and grey stone for the works. 899 They operated the longstanding green Connemara marble quarries in Ballinahinch and Lissoughter. 900 Working of the Ballinahinch quarry under Sibthorpes began in c.1870, however by 1878 they were no longer extracting from this area because stone for the market could be raised cheaper at Lissoughter. Blocks of what was known as “Lissoughter green marble” were squared on site and carted to Cloonisle Pier for shipment to the marble works on Great Brunswick Street. The average value of fair-sized blocks of the stone in the rough was about 16s. per cubic foot. 901 According to Mr John Sibthorpe, the “London bed” at Anglingham in Galway produced “the best black marble known”, but unfortunately by the 1870s the quarry had subsided considerably below Lough Corrib, resulting in removal of stone being near impossible. Nevertheless, Sibthorpes extracted and worked a bed of black limestone at the Merlin Park (Doughiska) in Galway city, which Mr Sibthorpe considered nearly equal in quality to the “London bed”. 902

899 “Marble Mantlepieces. H. Sibthorpe and Son.”
900 An extensive history of the Connemara marble quarries is given in chapter 2 of this thesis.
In c. 1897 the original Portland stone floor in City Hall, Dame Street, Dublin was replaced with a concrete floor into which a central mosaic bearing the city arms was set. The remainder of the floor is laid with octagons of Sicilian marble and smaller black marble squares, which is surrounded by a ringed arrangement of green, red and black Irish marbles. Sibthorpes prepared the floor and presumably sourced the red stone from their quarry in Midleton, the green from Lissoughter and the black from Merlin Park. Sibthorpes may also have been responsible for the mosaic given their diversification into this art.

Sibthorpes also leased quarries in Midleton, Co. Cork and Moneen, Co. Westmeath, from which red and grey decorative limestones were extracted respectively. These marbles were installed

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904 A salesman example box of Irish marble specimens from H. Sibthorpe & Son, Dublin was sold on Ebay on 11 October 2020. This box contained samples from Sibthorpes’ quarries at Midleton (red), Merlin Park (black), Lissoughter (green) and Moneen (mottled grey). There were also samples labelled “Clonowen”
in the large room in the Manchester Royal Exchange in the mid-1870s; thirty three feet high and three and a half feet wide Corinthian columns of Cork red were mounted on five feet high Moneen marble plinths, and large pilasters were cased with red and grey marble from Sibthorpes’ quarry, presumably at Midleton. According to John Sibthorpe’s obituary in the Irish Builder in May 1878 the firm were by this time “well known throughout Great Britain and Ireland as extensive marble quarry-owners, stone and marble merchants, dealers in foreign and native building stones, supplying the home and foreign trade with columns, pulpits, fonts, altars, pavements, monuments, Irish crosses, chimneypieces, grates, and every article connected with marble masonry and house and church ornamentation.” In August of that year Professor Edward Hull (Local Director of the Geological Survey of Ireland) was notified by the manager of Sibthorpes’ marble works, Mr Grenville, that the premises would be open to members of the British Association for the Advancement of Science “for the inspection of the various Irish marbles as they come from the quarry, or manufactured”. He declared that there was no finer marble works for cutting or polishing in the United Kingdom and assured that a visit would be found most interesting. Sibthorpes installed marble into many significant buildings in Dublin. Examples of their work includes the floor in the cash office of the Bank of Ireland in 1876, consisting of white marble and polished Cork red limestone (presumably sourced from their Midleton quarry); Cork red marble steps (also probably from their Midleton quarry) in St Patrick’s Cathedral in c. 1881 (figure 24); and the replacement floor in City Hall on Dame Street in c. 1897, which contains native red, black and green marbles likely from their quarries in Midleton, Merlin Park and Lissoughter respectively (figure 25).

Given the diverse range of trades offered by Sibthorpes it is obvious that they were always keen to demonstrate entrepreneurial fervour and continue progressing their products and services within the market. In the late 1880s they initiated a new Irish industry providing native marble

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905 Kinahan, *Economic Geology of Ireland*, p. 135 states that Little Island red and Midleton red marbles were employed at the Manchester Exchange. The stone for the columns may have come from Little Island or Sibthorpes’ quarry at Midleton.


907 “Mr John Sibthorpe,” *Irish Builder* 20, no. 441 (May 1, 1878): 130.


mosaic pavements. The ancient Romans used primarily fragments of marble, with some pieces of glass and terra cotta, to create mosaic pavement, while in nineteenth century Italy marble fragments were principally used. Sibthorpes brought over Italian craftsmen to teach their Irish workers the art of creating mosaic pavement. At the end of 1886 as the construction of Leinster Hall on the site of the old Theatre Royal on Hawkins Street, Dublin approached completion, Sibthorpes laid the floor of the vestibule approaching the concert hall with polychrome Irish marble mosaic sourced from their quarries. The marble works on Great Brunswick Street operated until 1892, after which the site was used for new parochial St Andrew’s schools built to the design of William Hague. Henry Sibthorpe and Son continued to trade at their various other Dublin premises until the firm eventually closed in the 1970s.

Conclusion: the successes, defeats and significance of Victorian marble works in Ireland

The 1820s was a pivotal point for marble fabrication in Britain and Ireland when mechanisation of processes allowed for increased accuracy and output. Prior to Messrs. Manderson’s establishment of the Killaloe Marble Works in the mid-1800s fabrication of native stone was primarily confined to black limestone for ornamental decoration in Georgian buildings, e.g., the Kilkenny Marble Works for the most part produced chimneypieces of black Kilkenny limestone. Mandersons pioneered the use of native decorative stone in both ornamentation and structural polychromy. During the latter part of the Victorian period many prominent Irish marble fabricators, including Richard Colles of Kilkenny, Miller and Waithman of Galway and Sibthorpes of Dublin, were also leasing several decorative stone quarries around Ireland. These quarries provided them with a cheap source of native polychrome stone for fabrication at their marble works. The Killaloe Marble Works was unique as a standalone large provincial mill, which was not linked to any quarries.

While Richard Colles and Sibthorpes leased decorative limestone and marble quarries in various locations around Ireland, they never ventured towards granite; in 1870 Sibthorpes did prepare a

913 “The Leinster Hall,” Freeman’s Journal, October 18, 1886, 3.
Donegal red granite specimen for Mr William Harte, County Surveyor, Donegal and then proprietor of the Dungloe granite quarries at Seskinroan, however there is no evidence that suggests the firm’s diversification into granite fabrication.\textsuperscript{917} Meanwhile, Miller, and later Col. Courtenay, of the Galway Marble and Granite Works quarried and worked Galway black limestone, Connemara green marble and Galway granite. The attempted expansion into native decorative granite appears to have come about in reaction to the success and growing popularity of the comparable red Aberdeen granite in Irish architecture following its introduction in Dublin in 1862. In 1870 Harte declared, “The introduction of granite into buildings is now so general that the question of what is the best granite in colour and durability is of the greatest importance, and in these qualities this granite [Donegal granite from Dungloe] will compete with the best in Scotland”.\textsuperscript{918} Decorative granite extraction and fabrication was somewhat successful in Galway for a limited time, but the industry was a regrettable failure in Donegal. Many attribute this to an inherent national and international prejudice towards Irish materials and manufactories.

There seems to have been two main factors that contributed to fabricators of native marble being able to remain in operation throughout the Victorian period: their resourceful expansion into quarry ownership as a means of sourcing cheap coloured Irish stone and the devotion of certain architects and patrons to Irish materials in place of foreign imports. Adare Manor, reviewed in chapter 3, and Deane and Woodward’s Museum Building at Trinity College Dublin, together with other later buildings, discussed in chapter 5 supports the former statement. Many marble works closed in the 1930s, coinciding with the decline in quarrying. Lord Mayo re-established works at Merlin Park in the 1960s and quarried Connemara marble at Streamstown with short term limited commercial success, and in recent years extraction of Connemara marble has seen a revival in its fortunes. “Irish Blue Limestone” is today quarried from at least two areas in Leinster but is not marketed as “black marble”. The innovation of Victorian marble workers and their success, albeit short lived, in fabricating native stone to a high standard is largely unknown, however their legacy survives through the buildings and monuments that display their craft.

\textsuperscript{917} “Conversazione of the Royal Institute of the Architects of Ireland”; \url{https://www.dia.ie/architects/view/2430/HARTE-WILLIAM} [accessed 21 August 2021].
\textsuperscript{918} “Conversazione of the Royal Institute of the Architects of Ireland”, p. 3-4.
CHAPTER 5. THE MUSEUM BUILDING OF TRINITY COLLEGE DUBLIN

The erection of the Museum Building at Trinity College Dublin (1853-1857) marked the culmination of endeavours to extract, fabricate and promote the use of Irish decorative stone. The building not only exhibits a blend of architectural features from disparate sources,\textsuperscript{917} but also a rich and diverse range of natural materials from several counties across Ireland. Native polished marbles and limestones are displayed to spectacular effect. It stimulated widespread use of these decorative stones in architecture, and it represents the first thoroughgoing instance of polychromy derived from indigenous stone in Ireland and Britain. The building, as stated by Professor Christine Casey, highlights the process of making (rather than meaning)\textsuperscript{918} and it clearly demonstrates the industrial links between regional quarrying communities and architectural production in the capital. The sometimes alienating history of architectural design and patronage can be balanced by alternative stories of construction, materials, craftsmanship and transport. By diversifying the narratives surrounding elite Victorian buildings a greater understanding of the properties’ geological fabric is permissible. The aim of this chapter is to provide information on the provenance of the stone in the Museum Building, as well as widening the understanding of the building in respect of the craftsmen and architects who produced it and its importance in Victorian geological and architectural synergies. This will be achieved by examining the stone, disclosing quarry sources, discussing the main players involved in its construction, and considering its influence on later Victorian buildings.

Decorative and dimension stone in the Museum Building

Twenty two different stone types were employed in the construction and decoration of the Museum Building. Initially identified by Dr Patrick Wyse Jackson,\textsuperscript{919} my new research on the fabric of the building and associated historic quarries permits more detailed description of provenance of its polychrome decorative stone. Nine inch cut blocks of Ballyknockan granite, a Silurian (404


Ma)\textsuperscript{920} fine-grained intrusive igneous rock composed of clear quartz, white feldspar and black and silver mica (biotite and muscovite) from Co. Wicklow, faces the exterior of the building. The vibrancy of the Ballyknockan granite contrasts with the warm-hued façades of Golden Hill granite in TCD’s Parliament Square (Front Square), sourced from Blessington, Co. Wicklow.\textsuperscript{921} The exterior dressings, comprising carved stringcourses, quoins, pilasters and capitals, are in Portland stone. This Upper Jurassic (c. 145 Ma) stone formed in a shallow marine, sub-tropical environment. It is an extremely pure, pale yellow-white, fine-grained, fossil rich (in certain beds), oolitic limestone occurring in well-joined beds on the Isle of Portland, Dorset,\textsuperscript{922} which has long since Roman times been a highly regarded building stone and is still quarried today (figure 1).\textsuperscript{923}

\textit{Figure 1. Western façade of the Museum Building displaying Ballyknockan granite facing, Portland stone dressings and coloured marble roundels. (Photograph by Ray Keavney)}

The internal walls are faced with Caen stone (figure 4) as is the carved tympanum bearing the College crest above the door (figure 2). Notably Caen stone is only utilised in this small but


\textsuperscript{923} https://www.albionstone.com/ [accessed 20 July 2018].
centrally positioned and sheltered feature of the Museum Building’s exterior. Placement of this esteemed stone would appear to be carefully considered by the architects. Caen stone is a Middle Jurassic (c. 170 Ma) fine-grained, oolitic, cream-to-yellow coloured limestone from Normandy in France, which was imported and extensively used as a building material in England and Ireland during the eighteenth and nineteenth centuries. However, by this time the building community perceived limestone quarried at Caen to be of inconsistent quality, when compared to beds raised and imported during the preceding eras (large-scale use of Caen stone commenced in England during the eleventh century). As early as 1845 *The Builder* released an article concerning the varying quality of Caen stone used in the restoration of prestigious buildings, such as Canterbury Cathedral and Westminster Abbey. It stated, “In quality it is very various, containing vents and faults hardly discoverable ‘till opened. It is a good stone, but must be selected with care: few people in England know much about it.” Throughout 1848 *The Builder* not only published a series of articles addressing the quality of historical and contemporaneously extracted Caen stone, but also sent correspondents to Caen to inspect the quarries. The building journal discussed the quarries and buildings of Caen, informed readers of the stone properties and varieties, and furthermore highlighted durability concerns and raised awareness around preservation of earlier Caen stone buildings. An article from *The Builder* in January 1849 described Caen stone in English and French buildings constructed within the previous twenty or thirty years as varying from extremely durable and resistant to “the most trying atmospheric influences” to highly perishable “from the first day after [it has] been placed in the building.” A month later *The Builder* published results of experimental analysis of Caen stone and revealed that, with precaution, the same excellent quality stone extracted several centuries back was again

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925 The extensive British use of this prestigious building stone, from Normandy in France, followed the Battle of Hastings in 1066 and the accession of William, Duke of Normandy. The importation of this material into England continued until the Reformation, at which stage the destruction of monastic buildings made available much Caen stone for re-use. Blows, Carey, and Poole, “Preliminary Investigations into Caen Stone in the UK; Its Use, Weathering and Comparison with Repair Stone.”
926 “To Correspondents. ‘R. C.,’” *The Builder* 3 (October 18, 1845): 507.
obtainable.\textsuperscript{929} Still, the perceived variable nature and unpredictable resilience of the stone during the mid-1800s likely influenced its weather protected position on the exterior of the Museum Building.

Sandwiched between the exterior Ballyknockan granite and the interior Caen stone is a concealed central layer consisting of Calp limestone, a dark stone probably quarried at Rathgar or Lucan. This muddy Lower Carboniferous limestone, particularly favoured for Georgian buildings, underlies much of Dublin and contributes to its name “Dirty Old Town”, coined by Sydney Owenson (Lady Morgan).\textsuperscript{930} Richard Kirwan (1733-1812), a natural science polymath of Cregg Castle, Co. Galway and one of the founders of the Royal Irish Academy, first introduced the word Calp to distinguish the extensively quarried black building stone of Dublin.\textsuperscript{931} Col. Thomas Burgh

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{image}
\caption{The tympanum in Caen stone above the main entrance of the Museum Building, Trinity College Dublin. (Photograph by Adrian Lantry)}
\end{figure}

\textsuperscript{930} Wyse Jackson, \textit{The Building Stones of Dublin}.
\textsuperscript{931} Kirwan described Calp as the 15\textsuperscript{th} species of the Argillaceous Genus: “Calp, or black quarry stone of Dublin. Colour, bluish black, or dark greyish blue, variously interflacted with veins of white calcareous spar, and often invested with the same. Found in large masses. Lustre, O, except a few shining particles of spar. Transparency, O. Fracture, exceeding fine splinterly, passing into the even, and sometimes into the imperfect, conchoidal. Fragments, 2. In the direction of its strata it easily splits into large flags. Hardness, from 6 to 7. Sp. Gr. From 2646 to 2700. It gives a white streak. It effervesces with mineral acids. Gives an earthy smell when breathed on. At 130° melts into a black compact glass. Contains 50 per ct. mild clax, the remainder silex, argil and iron. The argil seems, however, to preponderate. It seems to be the calcareous
selected rusticated ashlar blocks of Calp, quarried at Palmerstown, Co. Dublin, to build the lower story of the Old Library (1712-1732), which stands next to the Museum Building on the Trinity College campus. The visible Calp on the Old Library is quite fossiliferous and contains ooids along with tiny cubic crystals of pyrite or “fool’s gold”. The sediment likely accumulated in relatively deep water as turbidites.

Figure 3. Portland stone framed roundels on the exterior of the Museum building with (left) Connemara marble central disc and triangular sections of Cork red limestone and Donegal white marble, and (right) Portland stone framed roundel with Connemara marble central disc & radiating triangular segments of Carlow slate and Scawt Hill marble. (Photographs by Adrian Lantry)

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932 Wyse Jackson, *The Building Stones of Dublin*.

The coloured roundels on the exterior of the building provide modest polychrome decoration on a plain granite backdrop (figure 3). Portland stone frames enclose segments of native marbles, including Connemara green marble, Cork red limestone, black slate, a pale yellow marble and a pure white marble. Though the source of the pure white marble at the Museum Building is undocumented, this variety may be one of the “nearly white” Irish marbles from Donegal, Armagh or Antrim exhibited at the Cork Exhibition in 1852. The *Cork Constitution* described the Armagh stone as greyish-white, Donegal as “almost perfect whiteness”, and the Antrim samples as “rather yellowish”.934 The pure white appearance of the marble in the roundels of the Museum Building, also used internally as triangular insets over the arches, would seem to match the Donegal specimens exhibited. James Russell discovered a vein of white marble on his estate at Dunlewey, near Dunfanaghy, Co. Donegal935 in 1848, which he began working,936 and later a bust column of this white marble was finished for the Dublin Committee and exhibited at the Great Exhibition in London in 1851. Although the marble bust displayed fractures due to improper blasting of the procured block, it demonstrated “the fine polish it is susceptible to’ and resembled ‘the Parian marble in grain and finish”.937

In the Oxford Museum (1855–1860) the architectural firm Deane, Son, and Woodward (comprising Sir Thomas Deane, Thomas Newenham Deane and Benjamin Woodward) used Dunlewey white marble for columns in the upper gallery,938 and William Manderson supplied this stone for both the Oxford Museum and TCD’s Museum Building.939 At the Oxford Museum the Dunlewey columns are noticeably cracked and consist of two drums, in contrast to all the other Irish columns on the upper gallery, which are monoliths. This suggests that sufficiently large blocks of marble could not be raised for solid columns in the Oxford Museum, due to jointing, or the effects of blasting, or a combination of both. As the marble columns in Oxford are significantly shorter and slimmer than those of other stone varieties used in the Museum Building, this flawed and jointed white marble would certainly not have been suitable for use in larger structural columns. Perhaps still wanting to feature Irish white marble in the Museum Building, the architects chose to display the Dunlewey stone in small decorative features of the lunettes and in the decorative archivolt above the internal central arcade.

934 “Cork Exhibition,” *Cork Constitution*, June 24, 1852, 2.
935 See chapter 3 of this thesis for detailed accounts of the white marble quarries in Donegal.
936 “Industrial Resources of Donegal,” *Kings County Chronicle*, August 9, 1848, 2; “Donegal Marble Quarries,” *Armagh Guardian*, July 24, 1848, 3.
938 Oxford University Museum (OUM) archives, The History of the Building of the Museum (hereinafter cited as HBM) 2/7, Documents relating to the shafts by Philips, May 1853.
939 OUM Archives, HBM 1/7, Matters relating to the architects Deane and Woodward, October 3, 1858.
A contemporary newspaper identified a white marble as being from Antrim, but the stone “could not be got in masses sufficiently large for columns”. The travel writers, Anna Maria Hall (1800-81) and her husband Samuel Carter Hall (1800-89), remarked that the white marble (metamorphosed chalk) of Antrim displayed a “striking resemblance to Carrara Marble”, even though in reality they are rather different in colour and texture. The yellowish marble in some of the roundels is similar in colour and texture to metamorphosed chalk from Scawt Hill, Co. Antrim, used in a panel of the entrance hall of the Museum of Irish Industry, and this provenance for the Museum Building stone is likely.

Messrs. P. S. Barff and Co., of Potter’s Alley, Dublin, completed induration of the Portland stone on the exterior of the Museum Building in autumn 1860. The contractor applied Ransom’s patent solutions, deemed “by far the best in use at present” and authorised by the College Board, to preserve the stone while not interfering with its appearance.

940 “Trinity College. The New Museums and Lecture Rooms.,” *Dublin Daily Express*, September 25, 1855, 2.
Figure 4. Central hall of the Museum Building, Trinity College Dublin. (Photograph by Adrian Lantry)
The interior of the Museum Building is a magnificent, didactic gallery of stone. The initial plans and specifications for the building put forward by Deane and Woodward in December 1853 specified ashlar Caen stone interior walls for the ground floor and all arches, while rubble masonry was intended for the upper story. Early in 1855 the architects proposed Caen stone as an alternative for the upper story, to which the Trinity Board agreed, and all of the interior walls were completed in the French limestone. The banded arches above the upper and lower side arcades, together with the large arch dividing the double dome, are alternating Portland stone and a reddish sandstone probably from Mansfield, Nottinghamshire. The domes display mosaics of colourful enamelled hollow brickwork (figure 4).

The polychromatic columns that support the central and side arcades consist of various coloured Irish limestones and serpentinites from Connemara and the Lizard in Cornwall. The polished shafts are of varying circumferences subject to their position in the central hall. The paired columns of the arcade opposite the main entrance and the outer row of columns of the lower side arcades are 46.5 cm in diameter, while the inner columns of the lower side arcades and those of

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943 Trinity College Dublin (TCD) MUN P/2/329.
944 TCD MUN P/2/339, MUN P/2/340, MUN P/2/342, MUN P/2/343 contain letters from Sir Thomas Deane to the Trinity Board regarding the substitution of Caen stone for rubble masonry in the interior walls of the Museum Building and cost estimates from Gilbert Cockburn.
945 TCD MUN P/2/342.
the upper side arcades have diameters of 43.3 cm and 41.7 cm respectively. The carved arches above the central arcade and the capitals and bases of the columns are of Portland stone as were the steps in the original staircase and the balcony floors, which were later replaced with a Portuguese limestone called Sintra Unata. The rest of the staircase consists of Caen stone while the back stairways leading to the basement are in Ballyknockan granite and the walls of the basement are Calp.

A border of purple Welsh Ffestiniog slate surrounds the entire polychrome floor of the inner hallway, originally paved with red Yorkshire flags, Portland stone slabs, and black slate tiles that a contemporary newspaper indicated were from Carlow but may, in fact, have been from Kilkenny. When the floor was relaid in the 1970s the Portland stone was replaced with the Sintra Unata limestone and a portion of black slate tiles were replaced with Kilkenny black limestone. The black slate reappears in some of the external roundels and in the ornamental stone inlay above the inner arches between the entrance hall and the stair hall alongside Connemara marble, Cork red limestone and Donegal white marble (now a yellowish colour but white when cleaned). In 1853, enamel brick was specified for the decoration over the central arcade, but Woodward later altered this to “marble inlaying”. The architects incorporated in their interior and exterior polychrome decoration the same native polished stone, creating a continuity of design throughout the building.

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947 Wyse Jackson, “A Victorian Landmark Trinity College’s Museum Building.”
948 “Trinity College. The New Museum and Lecture Rooms.,” The Daily Express, March 5, 1857, 2.
950 TCD MUN P/2/329; MUN P/2/351/7.
Figure 6. The polished decorative stone of the ground floor of the Museum Building. (Image constructed by Andrew Tierney using laser scans commissioned by Making Victorian Dublin, https://makingvictoriandublin.com/).
Figure 7. The polished decorative stone of the upper floor of the Museum Building. (Image constructed by Andrew Tierney using laser scans commissioned by Making Victorian Dublin, https://makingvictoriandublin.com/).
Native polished stone in the Museum Building

Limestones

In 1853, Joseph Beete Jukes, Local Director of the GSI and author of *Popular Physical Geology*, wrote on the ornamental character of marbles, “All limestone capable of polish would ordinarily come under the denomination of marble”. In the Museum Building several coloured native stones are present, which in terms of commercial stone would be termed “marble” as they are attractive and susceptible to a polish. However, the majority of the coloured stone types are, in fact, polished limestones or pseudo-marbles. See chapter 2 for the geological definition of marble and limestone.

In the Museum Building numerous varieties of coloured limestone were exploited for columns and other decoration (figures 6 and 7). The distinctive, fine-grained, fossiliferous, Sienna-like limestone used in one column was quarried at Clonony in Co. Offaly. A mottled reddish-brown limestone was sourced from Armagh; while the samples of this stone in the Museum Building suggest a consistent red-brown colour, several varieties of colour from light brown to dark red were often found in the same bed. Colouration of this marble is due to the incorporation of the minerals goethite and hematite in assorted quantities and it is patterned with thin red clay seams and contains a rich and varied microfauna and shark teeth. The formation indicates shallow-water open-marine shelf environments. The black ‘reef limestone’ from Brigown, Mitchelstown used in one half column is distinctive with a fine-grained mud lime matrix and flame shaped cavities (stromatactis) filled with sparry white calcite. The grey, crinoidal limestone, which is very similar to a popularly used stone from Clonmacnoise, was obtained from Castle Caldwell. The widely known, valuable, black limestones are from Galway and the Black Quarry in Kilkenny and their black colouration results from the admixture of organic carbon and their fine-grained structure.

The vibrant red limestone originated from Cork, most likely from Little Island and Churchtown and is used predominantly in the Museum Building. The distinctive and decorative “Cork Red Marble”,

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957 Somerville et al.
as many have called it but more correctly termed Cork red limestone herein, is a lime conglomerate, which is a clastic sedimentary rock (composed of fragments, or clasts, of pre-existing minerals and rock). This stone contrasts with the other limestones present in the building, which are purely of organic origin.

*Cork red limestone*

*Figure 8. Cork red limestone columns in the Museum Building. (Photograph by Adrian Lantry)*

The red colouration of the clay matrix is a haematitic stain, the white blotches are calcite pebbles, the dark red wavy lineaments are stylolites formed when calcite was removed by pressure dissolution and insoluble minerals, such as clays and oxides, remained behind, and white cross cutting features are veins of calcite. Its texture reveals a timeline of events from initial deposition of sediment through lithification and some alteration. First, the red clay groundmass incorporated calcite pebbles and pressure dissolution occurred to form the stylolites, then hot fluids, containing abundant calcite in solution, intruded weaknesses in the rock and upon cooling calcite crystallised into veins. Cross-cutting relationships of these with the other fabric of the stone show that vein development occurred later than the stylolite formation. Patterning much of this stone are circular transverse sections of crinoidal stems, as well as longitudinal sections.
Figure 9. Two varieties of Cork red limestone in St Coleman’s Cathedral, Cobh, Co. Cork: The conglomerate (left) and the grey limestone with injections of red sediment (right).

While the red Cork stone in the Museum Building is conglomeratic other varieties of red limestone occur in Cork where “Adjacent to the conglomerate beds a variety of red marble arose by the injection of fine red sediment, from the conglomerate into the cleavages of the grey limestone”. This variety, commonly termed “Midleton Marble”, “Midleton Pink” or “Sunset Pink” in the stone trade, is more accurately a grey limestone with injections of red sediment rather than a red limestone. The conglomerate, which is confined to one broad horizon, is interbedded with grey reef limestone and at points of contact red sediment seeped into the cracks and fissures of the reef limestone, imparting an attractive reddish-pinkish-grey colouration. The latter marble horizon is thin and inconsistent, which its usage accurately reflects; it is rarely found outside of Cork because large enough blocks of this marble could not be raised from quarries to fabricate


960 PKS, Memorial Church at Kylemore, Co. Galway, p. 326.


substantial columns. Columns composed of this stone are used for decoration, are not load bearing, and are consistently of lesser diameter than the large shafts of lime conglomerate seen in the Museum Building and many Victorian churches in Cork, including Cobh Cathedral. The latter conglomerates were used for structural columns in the Museum Building for the first time.

**Connemara marble**

![Figure 10. Connemara marble columns in the Museum Building. (Photographs by Adrian Lantry and Ray Keavney)](image)

The most distinctive stone used in the Museum Building to stunning effect is the celebrated green Connemara marble, which since the third decade of the nineteenth century was often compared to *verde antico*. An early correspondent wrote of its early exploitation and quality: “A quantity of beautiful Green Marble has been just imported from Ireland [to England], where it was discovered a few months since on the estate of John D’Arcy, Esq. of Clifden Castle, in the county of Galway. It is admitted by the scientific men of this country to surpass the ‘Verd Antico’ in shade and colour, and to bear a comparison with any other marble in its being easily worked, and its capability of receiving the finest polish”.  

Of two varieties, the dark, highly laminated, jade green form visible in one column in the Museum Building was sourced from the Streamstown quarry on the estate of John D’Arcy near Clifden, while the light coloured variety used in the other columns and handrails more than likely came...

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966 Personal communication, Ambrose Joyce, current proprietor of the Streamstown Quarry, who states that the dark variety of Connemara marble was only available at Streamstown. The light coloured Connemara marble can be raised at any of the Connemara quarries, including Streamstown.
from the Ballinahinch quarries on Richard Martin’s estate and possibly also from the Streamstown quarry. Connemara marble is a serpentinite primarily composed of hydrated magnesium silicates that may contain little calcium carbonate. All of the commercially significant marbles are concentrated in one stratigraphic horizon, the Connemara Marble Formation, which contains rocks of both calcareous and clastic types; it comprises metamorphosed impure dolomitic limestone, or ophicarbonate, interbedded with Dalradian schists and quartzites. Originally deposited as a dolomitic siliceous limestone interlayered with fine-grained limy muds and quartz rich sands in a shallow marine coastal setting at the end of the Precambrian period, these sediments were metamorphosed late in the Grampian mountain building episode of the Caledonian orogeny approximately 470 million years ago. Subsequent hydrothermal metamorphism and serpentinization caused chemical changes and reactions within the rock that produced the stunning stone now widely appreciated. A detailed account of the formation of Connemara marble is given in chapter 2.

The composition of the marble influences its aesthetic qualities and determines its structural capabilities, both of which influence commercial value. In 1828, Sir Charles Lewis Giesecke wrote: ‘It is impossible to describe the immense variations of delineations and shades and colours of the beautiful rock, the serpent-like [i.e., wavy formation] of some of them must excite particular admiration. Some are bent in a spiral form, others are dotted and spotted with different shades of green, grey, brown and yellow.’ The complex patterns exhibited in the marbles are due to folding of original parallel sedimentary banding, and secondary foliation formed during several phases of deformational events.

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967 Kinahan, “On The Economic Geology of Ireland.”


971 Max, “Connemara Marble and the Industry Based upon It.”
Descriptions of Irish decorative stone types utilised in the Museum Building

Each of the decorative stone types used in the Museum Building is described from both surface features and where viable from thin-sections.\textsuperscript{972} It was not possible to obtain fragments of the decorative stone from the columns and ornamental features, but lithologically and geographically matching samples were obtained during quarry site visits or from the building stone collections at the Geological Museum of Trinity College Dublin, from which thin sections were made. Based on the lithological characterisation, inferences on their original environment of formation are provided where possible, and quarry locations are given where known. The ages of the stone types are expressed either in absolute time in millions of years (Ma) before the present, and/or according to the geological period when they were formed.

\textit{Armagh Limestone}

![Figure 11. Armagh limestone: surface of a column in the Museum Building (left) and thin section under plane polarised light (ppl) (right).](image)

A pale reddish-brown, mottled, compact limestone containing thin red clay seams (fig. 14.3). Fine-grained iron oxides, probably a mixture of haematite and goethite, tint the matrix. This relatively unfossiliferous packstone/grainstone limestone contains dark deep red to brown patches, which are sections through fossil shark teeth which were generally dome-shaped rather than being serrated like in many modern sharks. In thin section this limestone is seen to contain bryozoans, foraminifera, crinoid fragments and algae.

Utilisation: One full column and three half columns on the ground floor.

Locality: Armagh, Co. Armagh.

\textsuperscript{972} For descriptions of the other stone types, besides polished decorative stone, utilised in the Museum Building see https://makingvictoriandublin.com/materials/geology-2/ [accessed 28 August 2021].
Age: Carboniferous, Lower-Middle Mississippian, Viséan (Dinantian, Asbian).

**Clonony Limestone**

![Clonony Limestone Image]

Figure 12. Clonony limestone: surface of a column in the Museum Building (left) and thin section under ppl (right).

A pale brown, Sienna-like limestone composed of micrite and a low percentage of fossil material (wackestone). It contains many fossils including visible crinoids and some cephalopod molluscs. The latter, related to the modern-day *Nautilus*, swam in surface waters and controlled buoyancy through gas-filled chambers in its shell which can be seen in some examples in this stone. In thin section various other small fossil organisms can be identified: bryozoans, crinoid ossicles, ostracods, small brachiopods and molluscs. Original cavities in the lime muds are infilled with white sparry calcite and thin clay seams, veins infilled with grey calcite and stylolites are also visible. The stylolites formed as the rock became subjected to pressure such that some of the lime began to dissolve along these horizons. Stylolites are not strictly linear but have a three-dimensional shape which is highly convoluted and as such they do not reduce the cohesive strength of the limestone.

Utilisation: One column on the ground floor.

Locality: Clonony, Co. Offaly.

Age: Carboniferous, Lower-Middle Mississippian, Tournaisian-lower Viséan (Dinantian).
Galway black limestone

A black, bituminous, fine-grained packstone limestone that is relatively unfossiliferous, and which takes a good matt polish. On the surface colonial corals, solitary corals and brachiopods are visible. In thin section, stone from the classic quarry at Anglingham on the shores of Lough Corrib contains numerous unicellular foraminifera but little shelly fragments, whereas the Merlin Park stone quarried east of Galway city contains algae, corals, bryozoans, a variety of foraminiferan species, and amorphous opaques. The presence of algae indicates that the lime sediment was deposited in very shallow water. This stone was particularly popular from the early nineteenth century, and utilised for chimney pieces, columns, staircases, and even furniture.

Locality: Galway city (either Anglingham, Menlough or Merlin Park), Co. Galway.

Utilisation: One half column on the first floor.

Age: Carboniferous, Middle Mississippian, Viséan (Dinantian, Asbian).

Kilkenny black limestone

Figure 13. Galway black limestone: surface of a column in the Museum Building (left) and thin section under ppl (right).

Figure 14. Kilkenny black limestone: surface of a column in the Museum Building (left) and thin section under ppl (right).
A black, bituminous, fine-grained, calcarenite wackestone/packstone limestone. It is highly fossiliferous, containing fragmentary solitary and colonial corals, crinoids and large productid and other smaller brachiopods visible in hand specimen, as well as bryozoans, foraminifera, calcispheres and opaques seen in thin section. The Kilkenny stone was well known in the 1850s and had been quarried at a number of localities on the River Nore just south of the city by then for over a century. It was exploited and utilised commercially in a large number of Irish and foreign buildings.

Locality: South of Kilkenny, Co. Kilkenny (probably the Black Quarry, Archersgrove).

Utilisation: One half column on first floor, and black to grey fossiliferous floor tiles (small in inner hallway and large in outer hallway).

Age: Carboniferous, Middle Mississippian, Viséan (Dinantian, Asbian).

*Cork red limestone*

![Figure 15. Cork red limestone: surface of a column in the Museum Building (left) and thin section under ppl (right).](image)

This is a lime conglomerate that contains rounded white blotches, representing the original calcite pebbles, surrounded and supported in a red clay-rich matrix. This rock type was deposited during the earliest part of the Carboniferous in a shallow water marine environment quite close to the shoreline. The dominant red colouration results from haematite, an iron-oxide, which was derived from the erosion of the red sandstones that underlie the Carboniferous succession. Following lithification, the rock underwent some slight deformation due to compression resulting from the Hercynian Orogeny towards the end of the Carboniferous. Stylolites were produced by pressure dissolution, resulting in the concentration of wavy red clay bands that cross-cut some of the pebbles. Calcite veins also cut both the stone fabric and the stylolites. This limestone is sparsely fossiliferous with visible circular traverse and longitudinal sections of crinoids stems in both the matrix and the calcite pebbles in hand sample, and fragmentary brachiopods, bryozoans and
foraminiferans in thin section. Cork Red Limestone became particularly popular from the 1850s onwards and was extracted from a number of quarries in Co. Cork, the largest of which were at Midleton and Little Island.

Locality: Co. Cork (probably Churchtown or Little Island).

Utilisation: One full column and three half columns on the ground floor, two full columns on the first floor, seats either side of main staircase, internal stringcourses, balcony rails, triangular insets to panels above the central arcade, and insets in external roundels.

Age: Carboniferous, Lower-Middle Mississippian, Tournaisian-Viséan (Dinantian, Chadian).

Connemara marble

![Connemara marble images]

Figure 16. Connemara marble: surface of a column from Streamstown (top left) and a column from Ballinahinch (top right) in the Museum Building and thin section of Streamstown marble under ppl (bottom left) and under cross polarised light (xpl) (bottom right).

This marble (or strictly an ophicarbonate) occurs as green, white and sepia varieties to pure green varieties with occasional dark bands. The colour is determined by the extent and diversity of the coloured minerals present, varying from white to green with increased serpentine content. The groundmass is typically white-grey calcite and creamy white dolomite in which minerals produced during metamorphism 463-475 Ma ago create decorative bands and blebs of colour. These
minerals include a diverse complex suite such as amphiboles, serpentinised olivine, tremolite, chlorite, talc, mica, diopside, phlogopite and chalcedony. The wavy and lineated serpent-like texture is imparted by folding of original sedimentary banding and secondary foliation.

- Pale green variety shows folded layers of sepia and green minerals.

Locality: Ballinahinch, near Recess, Co. Galway.

Utilisation: Five full columns and four half columns on the ground floor, two full columns and two colonettes on the first floor, two piers supporting the central dome span on the upper portion of the inner hallway walls, handrails, triangular insets to panels above the central arcade, and insets in external roundels.

Age: Lower-Middle Ordovician.

- Dark green variety with alternating folded layers of dark grey, black and green minerals.

Locality: Streamstown, near Clifden, Co. Galway.

Utilisation: One column on the ground floor.

Age: Lower-Middle Ordovician.

Castle Caldwell Limestone

A pale grey fossiliferous packstone/grainstone limestone, rich in disarticulated crinoidal debris. Crinoids are stalked members of the Phylum Echinodermata that also contains sea urchins and starfish, and although they are animals they are often called Sea-Lilies. Crinoid stems comprise stacks of circular or oval-shaped ossicles, and are mainly represented in this stone isolated, as white circular transverse sections, but some longitudinal sections of stems up to 3 cm in length are also visible. This is a grain-supported packstone with a micritic matrix. Similar crinoidal-rich decorative stone is also found in Clerhane, Co. Offaly and in North Wales and Derbyshire. The
latter were known in the 18th century locally as 'screwstones' on account of the crinoid stems. Not seen in thin-section.

Utilisation: One half column on first floor.

Locality: Castle Caldwell, near Belleek, Co. Fermanagh.

Age: Carboniferous, Lower-Middle Mississippian, Tournasian-Viséan, (Dinantian).

**Mitchelstown limestone**

*Figure 18. Mitchelstown limestone: surface of a column in the Museum Building.*

The texture of the stone, which exhibits large (up to 10 cm in length) conjoined white calcite clots (thromboids) in a dark, muddy, fine-grained matrix, is indicative of a thrombolite mound. A thrombolite is a type of microbriolite, a rock-like structure formed by cyanobacteria that precipitate calcium carbonate. Unlike stalagmites, thrombolites are non-layered sedimentary formations. Some thin pale grey veins crosscut the limestone. Not seen in thin section.

Utilisation: One half column on the first floor.

Locality: Mitchelstown (Brigown), Co. Cork.

Age: Carboniferous, Middle Mississippian, Viséan (Dinantian, Asbian).

**Donegal white marble**

See figure 3 for an example of Donegal white marble in a roundel on the exterior of the Museum Building.

This is white, very pure calcitic and crystalline, fine-grained saccaroid marble that first came to prominence when displayed at the Great Exhibition of 1851, at which time it was compared to similar stone from the Greek island of Paros. The extent of the marble outcrop is small and it is surrounded by the Donegal Granite; this body was responsible for metamorphosing pure limestone into this marble. Not seen in thin section.
Locality: Dunlewey, Co. Donegal.

Utilisation: Triangular insets to panels above the central arcade, and insets in external roundels.

Age: Silurian-Devonian.

_Scawt Hill marble_

See figure 3 for an example of Scawt Hill marble in a roundel on the exterior of the Museum Building.

Stylolitic pale yellow to white marble. Originally a pure chalk limestone deposited during the latter part of the Cretaceous geological period 66-77 Ma, this became metamorphosed approximately 50 million years ago when the chalk was altered through contact with a vertical intrusion, or dike, of the igneous rock, Dolerite. This also led to the development of a suite of hydrated calcium-silicate metamorphic minerals including Larnite, Portlandite and Scawtite which were described from this locality for the first time. Not seen in thin section.

Utilisation: Insets to exterior roundels.

Locality: Scawt Hill (or Scaughthill), north of Larne, Co. Antrim.

Age: Paleogene, Eocene, Ypresian.

_Carlow or Kilkenny Slate_

See figure 3 for an example of Scawt Hill marble in a roundel on the exterior of the Museum Building.

A fine-grained black slate. This was originally a mudstone deposited in deepish water, that was subsequently metamorphosed during the Caledonian Orogeny (mountain-building event) that resulted from the closure of the Iapetus Ocean when two continental masses collided approximately 400 Ma ago.

Utilisation: Triangular insets to panels above central arcade, and black floor tiles (small in inner hallway and large in outer hallway).

Locality: West Co. Carlow or eastern Co. Kilkenny.

Age: Probably Ordovician.
The emergence of non-denominational educational institutes, open access to public lectures and industrial museums, and inspiring trade exhibitions of the early 1850s, combined with industry collaborations influenced the geological agenda of the Museum Building. This was the ultimate experiment in native materials and an expression of Irish industry. The willingness of Trinity’s board to allow this tentative building to be imagined and constructed, along with the readiness of the architects, Deane, Son, and Woodward, and building contractor, Gilbert Cockburn and Sons, to engage with native decorative stone, permitted this radical display of native stone.

William Richard Manderson, dual proprietor of the Killaloe and Dublin Marble Works, supplied the polished stone for the Museum Building. The initial Manderson marble enterprise, Messrs. W. & W. Manderson, comprised father, William Manderson (1781-1854), and son, William Richard Manderson (1805-1876), who leased the Killaloe Marble Works from Charles Wye Williams in

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974 See chapter 4 of this thesis for a detailed account of Messrs. Manderson and their establishments at Killaloe and Great Brunswick Street, Dublin.

975 www.ancestry.co.uk [accessed on 01 August 2018].
1840 and resided there fabricating marble, until Sheehan & Crotty commenced a contract of tenancy with Williams for the marble mill and yard in 1855. By this time Mandersons were only occupying a stone yard, also leased from Williams, on the canal bank in the town of Killaloe, which they presumably used as a marble store, and given its close proximity to the waterways enabled easy transport of the stone. In addition to their lease on the Killaloe Marble Works, Messrs. W. & W. Manderson had by 1847 established a workshop and showroom on 172 Great Brunswick Street, Dublin, and it was from this premises that William Richard Manderson dealt with Deane and Woodward and Gilbert Cockburn when supplying the marble for the Museum Building.

![Figure 20. Killaloe Marble Works (courtesy of Clare County Library).](image)

The decoration of the building using Irish marbles was not a faultless process. Disputes between the architects and the board of the college arose during the fitting of multi-drum marble columns on the ground floor which also contained some monolithic columns. On 04 May 1855, in a “report

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977 Joseph Sheehan superintended the Killaloe Marble Works for 8 years before his takeover. “Killaloe Marble Works,” Nenagh Guardian, January 24, 1855; Griffith’s Valuation, November 21, 1855.
978 Griffith’s Valuation, November 21, 1855.
979 The Dublin Almanac and General Register of Ireland (Dublin, 1847), p. 541.
980 William Manderson Senior was living in Surrey in 1851 and he died in Liverpool in 1854. 1851 Census, www.ancestry.co.uk [accessed 01 August 2018].
on the progress of the marble columns now erecting in the hall of the new lecture rooms, Trinity College, Dublin”, Sir Thomas Deane wrote, “My attention having been directed by the committee to the defects that appear in some of the marble columns now erected in the hall of the lecture rooms... I regret to find that it is inevitable that the college must permit in some places small pieces to be inserted in the columns, and broken lengths, where the marble in block did not allow the work to be otherwise performed”. Here, Deane acknowledged geological influence on design. The length and thickness of beds in native marble quarries determined the sizes of raised blocks, which later dictated the sectional configuration of each column. Manderson reported, “the very great difficulty of procuring perfect columns of such large diameter and length”, evidencing the infantile stage of marble production for architecture in mid-nineteenth-century Ireland. Deane continued, “The difficulties that had to be overcome of unopened or partially opened quarries, and the apathy on the part of the proprietors, must be taken into account, but it is to be hoped that the good example now set by the college of largely using native marbles may induce greater facility to be given and exertion made towards the proper development of the resources of the country”.

This communication with the College authorities echoed Kane’s earlier concerns about furnishing the entrance hall of the Museum of Irish Industry as a cabinet of native marbles not yet commercialised. Regardless of the many difficulties involved, Deane accommodated and defended the learning process surrounding Irish marble quarrying and fabrication in return for indigenous polychrome stone columns in the Museum Building. Despite higher costs the patrons chose native polished stone over Italian marble. Deane, in his letter, incorrectly refers to Mr. Manderson as “Mr. Malkinson”, suggesting that he had no relationship with the subcontractor, and this in turn indicates that it was the building contractor, Gilbert Cockburn, who dealt directly with Manderson. On receiving complaints from the Trinity Board, Deane visited Manderson’s workshop to inspect the marble columns then in preparation. Soon afterwards in July 1855 Cockburn entered into an arrangement with Manderson that increased his payment per column on the condition that the order for the lower story was completed within a fortnight and the upper story within two months; failure to do so could incur a penalty.

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981 TCD MUN P/2/341.
982 TCD MUN P/2/341.
983 TCD MUN P/2/341.
984 Bryan Bolger, “A Record of the Contents of a Dublin Stone Yard,” 1801, Appendix X.
985 TCD MUN P/2/341.
986 TCD MUN P/2/344.
In view of the range of Irish stone in the Museum Building the presence of several Cornish serpentine columns for the lower story side arcades is something of an anomaly. This dark reddish-black serpentine from the Lizard Peninsula is the only non-native polished stone in the building, the shafts having been obtained from the London & Penzance Serpentine Company. Correspondence regarding this purchase was conducted between the company agent, Gladwin, and the College bursar, The Revd James Henthorn Todd. Gladwin informed Todd that columns of the Cornish serpentine could be produced in one piece or in two parts, the monolith costing slightly more, and recommended columns in two parts to ensure ‘a better selection of stone’ and to facilitate ‘convenient carriage and erection’. The Board evidently opted for two-part columns of the Lizard stone, which is curious given their strong objections to the multi-drum columns of Irish marble on the ground floor. However, all of the Cornish marble columns comprise two equal height drums, unlike the spolia-like Irish marble columns, which are an assortment of monoliths and shafts comprising two, or in some cases three drums of unequal height.

Numerous factors may have led to the decision to incorporate English serpentine into the display of Irish marbles in the Museum Building. The London & Penzance Serpentine Company exhibited at the London and Dublin industrial exhibitions in 1851 and 1853 and The Illustrated London News praised their presentation at the Dublin Exhibition, reporting ‘The compartment occupied by the Serpentine Company speaks of individual enterprise, and proclaims commercial success’. On the contrary, the same newspaper article highlighted the almost exclusive state contribution of Irish marbles on display at the exhibition; specimens having been supplied primarily by the Dublin Society or the Museum of Irish Industry – “both institutions wholly or in part supported by Government grants”. Upon observing the serpentine at the London Exhibition and during trips to Cornwall in 1846 and 1847, Prince Albert was impressed and promoted its use. The prince’s endorsement, together with the more advanced state of commercialisation of the Lizard stone and its publicised ability to take “a fine lustrous polish, which add much to the brilliancy of the tints”, may well have encouraged its inclusion in the inner hall of the Museum Building. However, the likeliest instigator was Samuel Haughton, Professor of Geology at Trinity, who had

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987 TCD MUN P/2/328.
989 “The Lizard Serpentine Company’s Signal Staff Quarry, near Cadgwith,” The Illustrated London News, September 2, 1854, 199.
990 “Cornish Marbles for Decoration,” The Builder 5 (October 16, 1847): 496.
992 “The Great Industrial Exhibition of Ireland.”
investigated the geology of the Lizard area just prior to the awarding of the building contract and who acquired a suite of serpentinite samples for the College museum.

The distribution of marble columns on the lower story of the Museum Building is enigmatic. There are hints of colour symmetry from the east to the west sides, but subtle disorder prevails suggesting inspiration from spoliated polychromy in European architecture. Indeed, this may have validated the installation of multi-drummed columns and the insertion of pieces into columns where necessary. Nevertheless, the architects heeded the Board’s disapproval of irregularity in the ground floor columns when later fitting the upper level columns. A balanced arrangement of coloured marble is observed, with green and red columns placed between black or grey engaged columns at either end of both upper story arcades (figures 6 and 7). The half column of Kilkenny black limestone is in one piece, while the other three half columns of Galway, Mitchelstown and Castle Caldwell limestone are in three sections: two larger pieces of identical height with a thinner band between, and also the portions of multi-drum half columns match. The two Connemara marble columns and one Cork red limestone column are monoliths, and the remaining Cork red limestone column is in two pieces, perhaps reiterating the unavoidable influence of geological features on the size of blocks available for the building.

Considering decorative stone types for the Museum Building

Many characteristics were undoubtedly considered when choosing the decorative stone contained in the Museum Building. In his paper, ‘On the Marbles of Ireland’, published by the Geological Society of Dublin and The Builder in 1845, Wilkinson noted that “The physical or external character of the marbles constitutes the chief consideration with reference to their use for decoration or ornamental architecture, their colour, and internal structure being the most important... Their chemical character has reference to... their capability of receiving and retaining a certain polish”. Likewise, nearly a decade later, Jukes spoke of “limestones becoming ornamental marble on account of their varied markings produced by the fossils they contain” and others acquiring “their ornamental character from the admixture of other mineral matter colouring the limestones with varied tints, or from the variations in their crystalline character producing pleasing forms and varieties of shade”.

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995 Jukes, Popular Physical Geology, p. 48.
Wilkinson continued, “The more crystalline and least earthy marbles are the least durable. The internal structure determines the durability of the stone and its weight bearing capacity. The compact or finely granular crystalline marbles being superior to those which are largely crystalline or of a slaty texture”.\textsuperscript{996} This must have been an important factor in selecting stone for the Museum Building as the columns are not merely decorative veneers, but an integral part of the engineering of the building. All of the stone types ultimately used are of a compact, fine-grained nature, thus promoting structural stability. It was a risk, but one that vindicated the choice by the architects, to advocate the use of Connemara green, Cork red, Armagh red and Clonony brown for structural columns.

\textbf{Figure 21. The University Church, St Stephen’s Green, Dublin.}

A comparison of the Museum Building with the contemporary University Church on St Stephen’s Green (figure 21) and the slightly earlier foyer to the Museum of Irish Industry\textsuperscript{997} show the latter buildings to contain a wider variety of Irish marbles and decorative limestones. This is easily explained; the varieties are mostly incorporated as thin veneers in wall panels and do not have to act as dimension stones, thus enabling a wider assortment of less structurally durable marbles to be utilised.

\textsuperscript{996} Wilkinson, “On the Marbles of Ireland.”

\textsuperscript{997} See chapter 1 of this thesis for an image of the foyer of the former Museum of Irish Industry.
The allure of native polychromy in Victorian Ireland following the construction of the Museum Building

The Museum Building initiated the use of Irish decorative stone in a structural sense and inspired other architects and marble workers in the latter part of the nineteenth century to utilise native stone. Given the trend towards polychromy during the Victorian period, would architects working in Ireland have included coloured stone in their design regardless of local availability? The Victorian drive for collection of information, which resulted in the understanding of geology, and the extensive availability of indigenous decorative stone no doubt encouraged polychrome architecture in Ireland during this period and perhaps changes in architectural taste were secondary. Contrarily, in a scenario where a large range of high quality, varicoloured decorative stone was not available in Ireland architects may have incorporated imported decorative stone from areas in England, such as Devonshire and Scotland, and the continent regardless. Nonetheless, it is evident in earlier chapters of this thesis that the patriotic momentum of various groups throughout Ireland, including geological bodies, the Board of Works, transport associations, industrial exhibition boards, landlords, quarry owners, craftsmen, and architects, promoted and developed the excavation, fabrication and use of native stone in Victorian Irish architecture and monuments.

As previously discussed there remained a deep-rooted prejudice against Irish produce and manufactory throughout the Victorian period in Ireland and clients continued to request imported decorative stone with the view that it was of superior quality. It was often the task of the architect to convince them otherwise, together with the courage of the marble worker to undertake the challenge of working native stone. Deane and Woodward’s Museum Building motivated several other architects to employ native structural polychromy in their designs, most of which is seen in church building. Some prominent examples include Cork red columns in Pugin and Ashlin’s Church of Saints Peter and Paul, Cork (1859-1862) and Cobh Cathedral (1867), and William Burges’ St Fin Barre’s Cathedral, Cork (1860s);\textsuperscript{998} columns of red Clare limestone flanking the apse in Philip Charles Hardwick’s Redemptorist Church of Mount Saint Alphonsus, Limerick (1858-1862);\textsuperscript{999} nave columns of Cork red and Limerick red limestones in James Joseph McCarthy’s Church of St Mary, Rathkeale (1866-1873) (figure 22);\textsuperscript{1000} square nave shafts of Shantalla granite

\textsuperscript{998} Descriptions and imagery of the stone in these Cork churches are provided in chapter 3 of this thesis.
\textsuperscript{999} Descriptions and imagery of the stone in this church are provided in chapter 3 of this thesis.
\textsuperscript{1000} For architectural detail see https://www.dia.ie/works/view/10579/building/CO.+LIMERICK%2C+RATHKEALE%2C+CHURCH+OF+ST+MARY+%28RC%29 [accessed 24 August 2021].
in William Hague’s Church of St Mary, Galway (1891);1001 external colonnettes of Connemara marble and Kilkenny limestone and internal nave columns of Fermoy red limestone in Pugin and Ashlin’s Church of Saints Augustine and John, Thomas Street, Dublin (1860-1895), completed by William Hague in 1892-1895 (figure 23); and external colonnettes and internal nave shafts of Galway granite (most likely from Shantalla) in Maurice Alphonsus’ Church of the Nativity of Our Lady, Timoleague (1905-1911) (figure 22).1002

![Image of cathedral interior and close-up of column](image)

Figure 22. Cork and Limerick red limestone nave columns in St Mary’s Church, Rathkeale (top); Galway granite external colonnettes and internal nave columns in the Church of the Nativity of Our Lady, Timoleague (bottom)

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1001 Descriptions and imagery of the stone in this church are provided in chapter 4 of this thesis.

1002 For architectural detail see [https://www.dia.ie/works/view/3217/building/CO.+CORK%2C+TIMOLEAGUE%2C+CHURCH+OF+THE+NATIVITY+OF+OUR+LADY+%28RC%29](https://www.dia.ie/works/view/3217/building/CO.+CORK%2C+TIMOLEAGUE%2C+CHURCH+OF+THE+NATIVITY+OF+OUR+LADY+%28RC%29) [accessed 24 August 2021].
Polychrome Cahermoyle House, designed by James Joseph McCarthy in 1870 for Edward O’Brien (1837-1909), demonstrates a loyalty to Irish materials. Given his extensive utilisation of local red limestone in St Mary’s Church in Rathkeale, McCarthy was clearly keen on employing Irish stone in his designs. Edward O’Brien was a son of William Smith O’Brien MP and noted Irish revolutionary who was transported to Tasmania for his role in the Young Ireland uprising on Ballingarry, Co. Tipperary in 1848. William Smith O’Brien inherited Cahermoyle estate from his mother soon after his release, but it was placed in trust for his son who erected the present-day house. Edward may have inherited some of his father’s nationalistic views, which possibly influenced his decision to use primarily Irish stone in Cahermoyle House.

The building is Italian Romanesque in style and constructed of rusticated limestone ashlar (figure 24). The exterior exhibits semi-circular segment arches of alternating finely rubbed Portland stone and Tullamore limestone voussoirs above the windows, which spring from Portland stone carved capitals surmounting blue, finely rubbed, single drum Tullamore limestone shafts. The carved stringcourse and moulded bases are of Portland stone; the sills are of chiselled Tullamore limestone; the polished shafts are of Peterhead granite; and the relieving arches over the window openings are of pink limestone, which are joined by a stringcourse of the same material (most

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1004 For architectural detail see [https://www.dia.ie/works/view/2906/building/CO.+LIMERICK%2C+CAHERMOYLE+%28OR+CAHIRMOYLE%29+HOUSE](https://www.dia.ie/works/view/2906/building/CO.+LIMERICK%2C+CAHERMOYLE+%28OR+CAHIRMOYLE%29+HOUSE) [accessed 25 August 2021].
likely obtained locally). The interior hallway is an impressive display of structural polychromy, akin to the Museum Building, which comprises Caen stone walls, robust columns of polished Cork red limestone, alternate red sandstone and Portland stone floor tiles, carved Portland stone double caps and bases, carved Caen stone caps and bases, and arches of alternating red sandstone (transported by steamer from Liverpool) and Caen stone (figure 25).

Figure 24. Cahermoyle House, 1870. (Photograph by Andrew Tierney)

Tenders for the execution of marble chimneypieces in Cahermoyle House were submitted in October 1873 by Sibthorpe and Son, Hodges and Sons, the Killaloe Marble Works, C.W. Harrison and Neill & Pearse. Hodges and Sons included variations of pricing based on the use of native marbles versus foreign marbles - Belgian black to replace Galway black, Genoa green instead of Connemara marble, Italian red in the place of Cork red, and Italian white; all of the native stone

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1005 TCD MS A035/55, Early & Powell estimate for carving; TCD MS A035/9, Messrs. Ryan’s estimate for west wing, June 1870.
1006 TCD MS A035/9, Messrs. Ryan’s estimate for west wing, June 1870; TCD MS A035/54, Messrs. Good & Sharp estimate for carving, 21 May 1873; TCD MS A035/65, Sibthorpe & Son estimate, 23 October 1873; TCD MS A035/54, letter from Ryan to McCarthy re. carriage of Caen stone and red sandstone, 30 October 1874; TCD MS A035/56 and A035/57, Neill & Pearse Ecclesiastical and Architectural Sculptors estimate for carving; TCD MS A035/52, Joseph O’Reilly Ecclesiastical Sculptor estimate for carving; TCD MS A035/55, Early & Powell estimate for carving.
1007 TCD MS A035, Edward O’Brien of Cahermoyle, County Limerick, papers regarding building, decorating etc. of Cahermoyle House. See chapter 4 of this thesis for information on Victorian marble fabricators and their establishments, including in depth accounts of Sibthorpe and Son’s marble works on Great Brunswick Street, Dublin and the Killaloe Marble Works.
options were more expensive than the imported marbles. The other firms did not disclose stone types in their estimates. Sibthorpe & Son’s tender was accepted by Edward O’Brien shortly after submission in November 1873. The initial costings for the chimneypieces, put forward by Sibthorpes on 03 October 1873, did not specify stone types, but it was noted at the end of the document that “The red marble proposed to be used will be Cork (or Midleton), the green and black will be Galway”. A more detailed estimate was submitted on 24 November 1873, which stipulated only Irish stone for the fabrication of the chimneypieces. Sibthorpes’ tender was not only cheaper than that put forward by Hodges & Sons, but it also included a wider variety of Irish stone. Hodges & Sons proposed green, black and red marbles for the chimneypieces in the hall, dining room, library and office and all of the bedroom and dressing room chimneypieces were to be fabricated of red marble (Irish or Italian).

<table>
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<tr>
<th>Neill &amp; Pearse</th>
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<th>C. W. Harrison</th>
<th>Killaloe Marble Works</th>
<th>Hodges and Sons</th>
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<td>(Unspecified marble source)</td>
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<td>£23. 17. 0</td>
<td>£14. 0. 0</td>
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Table 1. Proposed costs for the execution of marble chimneypieces in a selection of rooms in Cahermoyle House submitted by Neill & Pearse, Sibthorpe and Son, C.W. Harrison, the Killaloe Marble Works and Hodges and Sons to Edward O’Brien in October 1873.

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1008 TCD MS A035/61, Hodges & Sons estimate for chimneypieces, 06 October 1873.  
1009 TCD MS A035/64, Sibthorpe & Son estimate for chimneypieces, 03 October 1873.  
1010 TCD MS A035/70, Sibthorpe & Son estimate for chimneypieces, 24 November 1873.  
1011 TCD MS A035/72, Comparison of estimates for the execution of chimneypieces in Cahermoyle House.
Sibthorpes’ November estimate included the following selection of native stone types: Galway green and black and Cork red marbles in the central hall; Galway green and black in the library; green, black and red veined marbles in the dining room; “Moneen A” marble in the bedroom over the drawing room; Irish Dove in the dressing room over the library; “Moneen B” marble in the dressing room over the drawing room; Cork red marble in the office; “Midleton A” marble in the bedroom over the dining room; “Midleton B” marble in the dressing room over the dining room; Cork red in the bedroom over the vestibule; and Irish Dove in the bedroom over the library (figure 24 shows examples of Midleton and Moneen limestone chimneypieces in Cahermoyle House).  

Sibthorpes also executed and fitted polished limestone fenders in a number of rooms; polished Galway black limestone fenders were manufactured for the library and dining room, a dove marble fender for the drawing room and a Moneen fender for one the bedrooms.  

As discussed in chapter 4, in addition to the marble works on Great Brunswick Street, Dublin, Sibthorpe and Son also leased a number of decorative stone quarries around Ireland in the latter part of the nineteenth century. The firm extracted Cork red limestone from Midleton, Connemara green marble from Ballinahinch and Lissoughter, black limestone from Merlin park in Galway, and a mottled grey limestone from Moneen in Westmeath, all of which were worked as marble at the Great Brunswick Street establishment. The Irish stone proposed in their estimate for the chimneypieces was undoubtedly exclusively sourced from their own quarries. Table 1 shows a price comparison of the tenders provided by the various firms for the chimneypieces in Cahermoyle House. Sibthorpes submitted the lowest price for every chimneypiece, even when executing them in native stone. This was achieved through owning the quarries from which they sourced the stone, thus eliminating the middleman, the quarry owner, and lowering the cost of the raw material. All the other marble works that put forward estimates for the chimneypieces were not associated with quarries and had to source stone in either rough form from the quarry or in a semi-fabricated state from other marble manufactories, such as Sibthorpes.

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1012 TCD MS A035/70, Sibthorpe & Son estimate for chimneypieces, 24 November 1873.
1013 TCD MS A035/71, Sibthorpe & Son estimate for executing and fitting 11 chimneypieces, 31 March 1874.
1014 See chapters 2 and 3 of this thesis for detailed accounts of these quarries.
At the time of erection of Cahermoyle House only three major marble works were also leasing quarries from which they extracted Irish decorative stone - Sibthorpe and Sons, the Kilkenny Marble Works and the Galway Marble and Granite Works. Other manufactories, who were not linked to quarries, no doubt paid a higher price for native raw materials and thus could not compete with these firms. One such marble works was John Robinson and Son of Belfast whose list of prices for chimneypieces in 1877 verifies the high price of Irish decorative stone when compared to imported Italian marble. First quality Sicilian vein marble cost 5% extra, Galway black
marble cost 10% more than Sicilian and 5% more than vein, and Italian dove coloured marble cost the same as Galway black marble. Columns, comprising two or three drums, were more expensive with Cork red limestone costing 15% extra and Connemara green marble costing 30% extra. In the absence of enterprises such as Sibthorpes, who could offer competitive prices for native marbles due to their operation of marble works in conjunction with quarries, one wonders if patrons and architects, such as McCarthy and O’Brien responsible for Cahermoyle House, would have employed native stone. Nonetheless, there were some Irish architects, such as Thomas Newenham Deane, who, regardless of the availability of lower cost imported marbles, remained committed to promoting and using Irish stone, and the Celtic Revival, which emerged at the end of the nineteenth century, also likely had a positive influence on the use of native materials.

Conclusion

The Museum Building of Trinity College Dublin pioneered the use of Irish decorative stone and its erection was a pivotal point in the establishment and growth of the extractive stone industry in Victorian Ireland. It promoted a taste for coloured stone, which spread across Ireland and beyond. The American newspaper, The Pilot, carried a note in January 1859 that the cargo of the Prince Albert, destined for New York, included “one hundred tons of the choicest kinds of black and green marble for the Angliham quarries, specially ordered by an American gentleman who saw it worked up with its fine grain and exquisite polish in the new building at Trinity College, and who intends using it in the decorations of a new mansion now in course of erection by him in New Jersey”.

The building is the earliest known instance of structural columns of Connemara marble and Cork red limestone. While the quarrying of Connemara marble was established and the stone widely used and exported prior to the conception of the Museum Building, the commercial exploitation of the Cork red limestone was only commenced during that period. Its use in the Museum Building provided the opportunity to test and prove the stone in both a decorative and structural sense. William Manderson overcame the difficulties posed in this regard during the construction phase of the building. The combination of robust strength and rich markings promoted the widespread internal use of Cork red limestone in columns, panels, fonts and for other decorative purposes throughout the British Isles during the second half of the century and into the beginning of the

1016 This faithfulness of some Irish architects to native decorative stone contrasts with Ireland’s apostasy of its slate quarries. Cheaper Welsh slate was commonly imported and used instead of high quality, but often more expensive, Irish equivalents, such as that extracted at Killaloe and Valentia Island. The higher price of Irish slate largely resulted from transportation costs. “Building Materials And Marble,” The Dublin Builder, August 1, 1865, 185.
twentieth century. This building demonstrates the crucial relationship between architecture and geology and it is a testament not only to the adventurous architects who conceived its innovative design, but also to the skilled artisans responsible for its creation and the quarry operators who extracted the native decorative stone that imparts its unique palette.
CONCLUSION

This research provides a comprehensive understanding of the decorative stone industry in Victorian Ireland, from its industrial establishment in the eighteenth and early nineteenth centuries through its expansion during the Victorian period to its ultimate collapse at the beginning of the 1900s. Distinct phases of promotion, extraction, fabrication, and application in buildings of diverse Irish decorative stone types were identified and subsequently explored. The crucial role of the Museum Building of Trinity College Dublin (1853-57) in the development of the industry was determined and the inclusion of indigenous polychrome stone in its design and construction was analysed.

The revival of Gothic style architecture, particularly the resurrection of polychromatic design features, in mid-nineteenth century Britain and Ireland saw an explosion in the use of coloured marble, which certainly increased the demand for Irish stone and encouraged the development of extraction and manufactory businesses at that time. Nonetheless, the Irish decorative stone industry would not have flourished were it not for wider societal, economic, industrial and scientific factors. The changing taste in architecture in Victorian Ireland markedly paralleled post-famine industrialism, extensive geological exploration, a rise in the provision of education, expansion of nationwide transport networks and the advent of international trade exhibitions. The work of Sir Robert Kane and the Museum of Irish Industry in the 1840s and 1850s, together with nationwide geological mapping by the Geological Survey of Ireland, was pivotal in the advancement of geological knowledge, inclusive of mineral and stone resource extraction potential. The entrance hall, named the “marble hall”, of the Museum of Irish Industry showcased polished panels of Irish limestones and marbles procured from disparate quarries. Exhibitive of the wide variety of available native decorative stone types and their superior finish when polished, this display unquestionably promoted extraction, fabrication and utilisation. The industrial trade exhibitions of the 1850s and extensions to water and rail transport networks provided further encouragement and opened up domestic and foreign markets for the stone. The ongoing support of prominent architects, such as George Wilkinson and Sir Thomas Deane, for the use of Irish stone was also an important contribution. These various developments arose from a combination of government supported initiatives and the patronage and support of enthusiastic capitalists and architects. In conclusion, the synchronicity of events allied with the eagerness of transdisciplinary groups and individuals drove the evolution of the decorative stone industry throughout the Victorian period.
When referring to “marbles” within this research it is important to note that most designated Irish “marbles” are in fact polished Carboniferous limestones. Ireland contains few true marbles, excepting the green and white varieties in Connemara and Donegal respectively, but diversely coloured and textured limestones abound, extending for half of the island’s land mass. Within the stone trade a marble is considered to be a commercially valuable stone that is attractive and susceptible to a polish; these “marbles” may include limestone, true marble and even granite. Irish coloured “marble” was used locally and exported to England for architectural decoration and monuments as far back as the early seventeenth century, however, excavation appears to have occurred on an ad-hoc basis to meet specific demands. Commercialisation of decorative stone extraction and fabrication initially occurred in Kilkenny in the early 1700s and spread to Galway at the beginning of the 1800s. Superior black limestone was quarried in both localities and the prized green serpentinite marble was extracted in Connemara. Early commercialisation of these specific black and green Irish stone types was most likely driven by architectural taste and resemblance of the stone to other established marbles; the timeless black marbles were continually sought for Georgian architectural and ornamental purposes while the Connemara green marble had the advantage of being frequently likened to the acclaimed verde antico. Much investigation into the viability of white marble extraction in Donegal and Connemara, intended to rival the famous Parian and Carrara statuary marbles of the continent, occurred but impurity of colour and insufficient block size rendered them unsuitable. William Alderman Colles, founder of the Kilkenny Marble Works in 1730, excelled in the marble trade and set a standard to which subsequent quarry owners and marble workers aspired. The Kilkenny Marble Works remained at the forefront of extraction and fabrication throughout its existence until the company was eventually sold in c. 1921. The initiation of decorative stone quarrying in Galway is credited to the investment of speculative landowners, namely Sir Richard Martin, Sir John D’Arcy and Sir Valentine Blake, and the development of the industry throughout the nineteenth century is attributed to the industrious spirits of entrepreneurs.

The long standing marble enterprise in Kilkenny, and the later innovative ventures in Galway, paved the way for widespread quarry development in the latter half of the nineteenth century and the emergence of polychrome architecture created a market for the stone. The principal localities for decorative stone extraction, outside of Kilkenny and Galway, were Armagh, Donegal, Offaly, Westmeath, Limerick, Clare, Cork and Kerry. Although the whereabouts of the quarries was fundamentally controlled by the underlying lithologies, their advancement was largely dependent on the inclination of landowners to explore and exploit the stone on their estates, as well as ongoing investment into modern quarrying equipment and proximity to transport.
networks. In some cases, despite the eagerness of landowners to prospect for decorative stone, the extent of deposits on and around their holdings was too limited for commercial exploitation to occur. This was the case for geology enthusiast Lord Dunraven who constructed and embellished his residence, Adare Manor, using only locally sourced varicoloured limestones, the majority of which were raised fromuviable fragmented deposits. Nevertheless, it was pioneers like Lord Dunraven who exposed the potential of Ireland’s decorative stone resources to others and undoubtedly influenced excavation elsewhere, such as Cork where large scale quarrying of red limestone was established in the mid-1800s and continued into the twentieth century.

The development of decorative stone quarrying corresponded with a growth in native marble fabrication and the expansion of mills. The 1820s was a critical time for marble working in Britain and Ireland when mechanisation of processes allowed for increased accuracy and output; investment in machinery was imperative for success in the industry. During the latter part of the Victorian period proprietors of prominent marble works, including Richard Colles of the Kilkenny Marble Works, Messrs Sibthorpe and Son of the Steam Power Marble Works on Great Brunswick Street, Dublin, John Miller and later Colonel Courtenay of the Galway Marble and Granite Works, and Captain Wyndham Waithman of the Irish Industries Limited Works at Merlin Park, Galway, were also leasing decorative stone quarries across Ireland, from which they sourced cheap native polychrome stone including limestone, marble and granite. Messrs Manderson’s marble works at Killaloe, Co. Clare was unique as a standalone provincial mill that was not linked to any quarries. Mandersons pioneered the use of Irish decorative stone in both ornamentation and structural polychromy during the fifth and sixth decades of the nineteenth century and notably William Richard Manderson was responsible for the fabrication of the indigenous stone in the Museum Building.

The Museum Building was constructed at precisely the moment when Irish decorative stone was becoming available. In addition to exhibiting superb craftsmanship and architectural design its inception critically impacted the decorative stone industry in that it marked the commercial debut of a wide variety of native limestones and marbles. Deane and Woodward designed their building around the incorporation of Irish stone, which contributes both strength and beauty to the structure. Various quarries extracted and provided polychrome stone to Manderson who valiantly embarked on preparing structural columns using the attractive materials for the first time. The building demonstrates the crucial relationship between architecture, craftsmanship and geology. It showcases native structural polychromy and thus confirmed the capability of Irish quarry operators to raise large blocks of decorative stone and the skill of marble workers to fabricate it. The Museum Building certainly promoted a taste for coloured stone amongst Victorian architects.
in Ireland but why did the application of native polychrome limestones and marbles (and later granites) in structural aspects of Irish buildings emerge at this time and was the indigenous provenance of the stone important or would marble from the continent or beyond have been considered interchangeable?

The emergence of native structural polychromy in Victorian Ireland resulted from a combination of aesthetic, scientific and industrial factors. The large cylindrical polychromatic columns that adorn the entrance hall of the Museum Building embody Gothic architectural principles. Preceding the erection of the Museum Building, coloured marbles were incorporated into the design elements of classical buildings, including the Museum of Practical Geology in London, the Museum of Irish Industry in Dublin and Buckingham Palace. However, the marble features in these buildings, such as panelling, pillars and pilasters, were exclusively decorative and not weight bearing. The language of classicism commands tapering structural columns, which, in comparison to cylindrical columns associated with the Gothic aesthetic, are more difficult to produce. Hence, the re-emergence of Gothic style architecture during the nineteenth century likely encouraged the experimental debut of the fabrication of native structural columns; it was more practicable for the marble worker to turn large cylindrical, rather than tapering, columns of unfamiliar material on a lathe. The shift towards Victorian Gothic primarily encouraged the inclusion of coloured marble in Irish buildings, however, the opportunity for the stone to be of Irish origin arose from concurrent scientific and industrial developments.

The Museum of Irish Industry and the Museum Building were both furnished with native marbles not yet commercialised. Much of the stone was sourced from unopened or partially opened quarries. The inability to raise large solid blocks in some of the infantile quarries at this time is evidenced in the multi-drum, and in some cases defective, columns in the Museum Building. Nevertheless Deane defended the decision to use native marbles in the building stating, “it is hoped that the good example now set by the college of largely using native marbles may induce greater facility to be given and exertion made towards the proper development of the resources of the country”.1018 Nationwide geological mapping coupled with private geological prospecting commissioned by wealthy landowners revealed extensive decorative stone deposits. George Wilkinson’s experimental analysis of the structural viability of various native stones, including decorative varieties, critically informed architects of suitable stone types for structural polychromy. Industrial exhibitions, Kane’s Museum of Irish Industry and superior application of native stone in prominent early Victorian buildings, such as Adare Manor and the Museum

1018 TCD MUN P/2/341.
Building, promoted its use. Continued investment in machinery and instatement of skilled workers advanced processes in both quarrying and fabrication throughout the nineteenth century so that large unfractured blocks of native stone could be successfully excavated and transformed into robust columns and other architectural decoration.

Although the procurable assortment of native decorative stone no doubt promoted polychrome architecture, it is not likely to have instigated it. The revival of Gothic design was the primary inspiration for polychromy, specifically structural polychromy. Conversely, the emergence of polychrome architecture did not initiate decorative stone quarrying in Ireland, although it did prompt development and commercialisation of the industry. This shift in architectural taste created a demand for large coloured structural columns and an increase in the volume and diversity of stone needed to fulfil design briefs triggered exploration and expansion. Given the trend towards polychromatic design Victorian architects in Ireland most likely would have included coloured stone in their buildings regardless of local availability; a wide variety of marbles were imported from Italy and France. However, Ireland fortunately had an abundance of superior varicoloured limestones and marbles, and to a lesser extent granites, to serve the growing demand. The deciding factor appears to have been cost.

Deane and Woodward’s Museum Building motivated several other architects to employ native structural polychromy in their designs later in the Victorian period, most of which is seen in church building. Some prominent examples include Pugin and Ashlin’s Church of Saints Peter and Paul, Cork (1859-1862), Cobh Cathedral (1867) and Church of Saint Augustine and John, Thomas Street, Dublin (1860-1895); William Burges’ St Fin Barre’s Cathedral, Cork (1860’s); Philip Charles Hardwick’s Redemptorist Church of Mount Saint Alphonsus, Limerick (1858-1862); and James Joseph Mc Carthy’s Church of St Mary, Rathkeale (1866-1873) and Cahermoyle House, Limerick (1870). For Edward O’Brien’s Cahermoyle House Sibthorpes managed to supply chimneypieces and columns procured from their quarries at a lesser cost than contending marble workers (unlinked to quarries) could offer the same articles fabricated from either imported or Irish stone. The tenders for Cahermoyle House, excluding that submitted by Sibthorpes, consistently showed that Italian stone was cheaper than Irish stone. In the late nineteenth century, like Sibthorpes, Richard Colles’ Irish Marble Company Ltd. also successfully furnished buildings with an array of Irish limestones and marbles at a reasonable price on account of their ownership of native quarries. One such example is the varicoloured pavement in the chancel of St Canice’s Cathedral, Kilkenny (restored between 1864-1870 by Thomas Newenham Deane).

Regrettably, by the late 1860s red Aberdeen granite had mobbed Irish neo-gothic architecture and rapidly replaced large native polished limestone and Connemara marble columns in many
Victorian churches on the basis of its competitive price and monolithic form. The Aberdeen stone lacks the aesthetic variability that Irish limestones and Connemara marble showcase to great effect. There is no need to carry out a 360 degree inspection of an Aberdeen granite column; its colour and crystal configuration remains the same from all aspects. However, when observing an Irish limestone column one cannot anticipate the colour change, textural variation or fossil assemblages that are waiting to be discovered from a different perspective. Connemara marble can transfer from light green to very dark green and display diverse metamorphic textures within the same column. Galway and Donegal pink granites, equivalent in tone and texture to the Aberdeen granite, attempted to compete in the open market at the end of the nineteenth and beginning of the twentieth century, but without major success. Polished Irish structural granite columns are only found in a handful of churches throughout Ireland. Good examples are William Hague’s Church of St Mary, Galway (1891) and Church of St John the Evangelist, Kilkenny (1903-1908), both of which contain nave columns of pink Galway granite. Many of Hague’s other churches, including Church of the Immaculate Conception, Kingscourt (1872), St Mary’s Church, Carrick-on-Shannon (1873-1875) and Cathedral of St Macarthan, Monaghan (1861) are furnished with Aberdeen stone columns. In the absence of marble workers such as Sibthorpes and Colles and later Miller, Colonel Courtenay and Captain Waithman in Galway, who could provide competitive prices for indigenous stone on account of their ownership of quarries, one wonders if patrons and architects would have chosen Irish stone disregarding cost. Nonetheless, there were some patriotic Irish architects, such as Thomas Newenham Deane, who regardless of the availability of lower cost imported marbles, remained committed to promoting and using Irish stone. To repeat Deane’s sentiment about the quality and diversity of Irish marble, “As to Marble, where can you find greater variety in colour or more beautiful stone, than in Ireland? – black, green, red, grey, and every possible shade. I know the Marbles of Italy and, with the exception of those which are very costly, none can be compared to the Irish Marbles.1019

Despite the enthusiasm and momentum of various groups, including geological bodies, the Board of Works, transport associations, industrial exhibition boards, inspired landlords, courageous quarry owners, skilled craftsmen, and devoted architects, in promoting and developing the decorative stone industry in Victorian Ireland, it lamentably never reached its full potential and expansion came to a halt at the beginning of the twentieth century. Several unsuccessful attempts were made to revive the industry but by the 1930s the majority of quarries and marble works had permanently closed. An ongoing deep-rooted prejudice against Irish materials and manufactories,

together with a national lack of support, seems to have been the fundamental reason for the decline. The growth in the popularity of concrete during the twentieth century inevitably furthered the collapse of the industry and the emergence of brutalist architecture in the mid-1900s, involving large-scale use of poured concrete, was probably responsible for its imminent failure. In a lecture in Trinity College Dublin in October 2017 while discussing his design of the Berkeley Library, largely constructed from cast concrete, architect Paul Koralek stated, “Ireland doesn’t have the same relationship with tradition as England. A building doesn’t have to pretend to be old”. Today, decorative stone is commercially extracted in only two regions, Kilkenny and Connemara; the majority of which is exported to the continent. This is in stark contrast to the bustling nineteenth century industry, which displayed ample potential for expansion and longevity. The innovation of Victorian quarry owners and marble workers and their success, albeit short lived, in raising and fabricating native decorative stone to a high standard is largely unknown, however their legacy survives through the buildings and monuments that display their skilful craft. Although architecture and science inhabit diverse schools of thought, it is through the material of stone that these two worlds unite and nurture one another. In Victorian Ireland architecture and geology danced with each other around the same paths. The interweaving of disciplines strengthens the understanding of the Irish decorative stone industry during the nineteenth century and grants us a holistic perspective into its arousal, its expansion, its victories, its challenges and its ultimate demise.

1021 https://www.tcd.ie/library/berkeley/ [accessed 07 September 2021].
Appendix 1: Maps

Marble Quarries of Kilkenny

Threecastles Quarry

Archersgrove Quarry

Clara Quarry

Butlersgrove Quarry

Kilometers

265
Appendix 2: Quarry Data

<table>
<thead>
<tr>
<th>Quarry name</th>
<th>Townland</th>
<th>County</th>
<th>Quarry location: ITM Easting, Northing</th>
<th>Status</th>
<th>Common name of material extracted</th>
<th>Major rock type</th>
<th>Sub rock type</th>
<th>Lithological unit</th>
<th>Rock age (Eon, Era, Period, Series, Stage)</th>
<th>Rock colour</th>
<th>Further information on the quarry and extracted stone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scawt Hill Marble Quarry</td>
<td>Ballygawn / Ballycoos</td>
<td>Antrim</td>
<td>733657.174, 909036.659</td>
<td>Inactive</td>
<td>Scawt Hill Marble</td>
<td>Marble</td>
<td>Chalk limestone</td>
<td>Cresslough Formation</td>
<td>Phanerozoic, Cenozoic, Palaeogene, Eocene, Ypresian.</td>
<td>Pale yellow</td>
<td>Styloitic pale yellow to white marble. Originally a pure chalk, consisting of the remains of coccoliths, deposited during the Upper Cretaceous, this became metamorphosed during the Ypresian when the chalk was altered through contact with a vertical intrusion, or dike, of the igneous rock dolerite. This also led to the development of a suite of hydrated calcium-silicate metamorphic minerals including tamarite, porlandite and scawtite, which were described from this locality for the first time.</td>
</tr>
<tr>
<td>Armagh Marble Quarry</td>
<td>Armagh</td>
<td>Armagh</td>
<td>687094.212, 844024.321</td>
<td>Inactive</td>
<td>Armagh Marble</td>
<td>Limestone</td>
<td>Limestone</td>
<td>Wilson's Bridge Formation</td>
<td>Phanerozoic, Palaeozoic, Carboniferous, Lower-Middle Mississippian, Visean (Dinantian, Asbian).</td>
<td>Reddish-brown</td>
<td>A pale reddish brown, mottled, skeletal, peloidal packstone/grainstone limestone. Stylolites are present. Fine-grained iron oxides, probably a mixture of haematite and goethite, tint the matrix. This relatively unfossiliferous limestone contains dark deep red to brown patches, which are sections through fossil shark teeth which were generally dome-shaped rather than being serrated like in many modern sharks. In thin section this limestone is seen to contain bryozoans, foraminifera, crinoid fragments and algae.</td>
</tr>
<tr>
<td>Cratloe Marble Quarry</td>
<td>Cratloe</td>
<td>Clare</td>
<td>550423.926, 659900.775</td>
<td>Inactive</td>
<td>Cratloe Marble; Clare Red Marble</td>
<td>Limestone</td>
<td>Limestone</td>
<td>Waulsortian Formation</td>
<td>Phanerozoic, Palaeozoic, Carboniferous, Lower-Middle Mississippian, Visean (Dinantian, Lower Visean).</td>
<td>Red</td>
<td>Stone quarried from Cratloe was used for columns in the Library at Adare Manor.</td>
</tr>
<tr>
<td>Rineanna Marble Quarry</td>
<td>Rineanna North</td>
<td>Clare</td>
<td>535102.34, 660957.796</td>
<td>Inactive</td>
<td>Rineanna Marble; Rynana Marble; Clare Red Marble</td>
<td>Limestone</td>
<td>Limestone</td>
<td>Waulsortian Formation</td>
<td>Phanerozoic, Palaeozoic, Carboniferous, Lower-Middle Mississippian, Visean (Dinantian, Lower Visean).</td>
<td>Peach-grey</td>
<td>Fenestella limestone which was worked as marble and for ornamental purposes in Adare Manor. Red, red clouded with grey, and grey clouded with red. Well-shaped blocks could not be directly quarried but good sized stones could be raised which were scabbled (shaped to square) into fair sized blocks.</td>
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</tbody>
</table>

The Cork red marble is a lime conglomerate that contains rounded white blotches representing original calcite pebbles, surrounded and supported in a red clay-rich matrix. Stylolitic, sparsely fossiliferous, cross-cutting calcite veining. Adjacent to the Cork red marble conglomerate beds another variety of reddish/pinkish grey marble arose. This so called “Midleton Red” or “Sunset Pink” marble is a red and pink stained grey micritic wackestone limestone from the overlying Little Island Formation. It was formed by the injection of fine red sediment, from the conglomerate, into the cleavages of the grey limestone. This marble horizon is thin and inconsistent, which its usage accurately reflects; it is rarely found outside of Cork because large enough blocks of this marble could not be raised from quarries to fabricate substantial columns.

Adjacent to the Cork red marble conglomerate beds another variety of red marble arose by the injection of fine red sediment, from the conglomerate into the cleavages of the grey micritic limestone. This marble horizon is thin and inconsistent, which its usage accurately reflects; it is rarely found outside of Cork because large enough blocks of this marble could not be raised from quarries to fabricate substantial columns.

See Little Island Red Marble Quarry for descriptions of the stone extracted.
<table>
<thead>
<tr>
<th>Quarry Name</th>
<th>Location</th>
<th>Coordinates</th>
<th>Status</th>
<th>Marble Type</th>
<th>Formation</th>
<th>Description</th>
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<tbody>
<tr>
<td>Mitchelstown Marble Quarry</td>
<td>Brigown</td>
<td>582281.146, 612771.872</td>
<td>Inactive</td>
<td>Mitchelstown Marble</td>
<td>Limestone</td>
<td>Rathronan Formation: Phanerozoic, Paleozoic, Carboniferous, Middle Mississippian, Visean (Dinantian, Chadian)</td>
</tr>
<tr>
<td>Johnstown East Red Marble Quarries (Fermoy)</td>
<td>Johnstown East</td>
<td>576072.784, 601454.601</td>
<td>Inactive</td>
<td>Cork Red Marble. Midleton Red; Sunset Pink.</td>
<td>Lime conglomerate; Limestone.</td>
<td>Fermoy Red Marble Formation: Phanerozoic, Paleozoic, Carboniferous, Lower-Middle Mississippian, Tournaisian-Visean (Dinantian, Chadian).</td>
</tr>
<tr>
<td>Location</td>
<td>Town</td>
<td>County</td>
<td>Grid Ref.</td>
<td>Grid Ref.</td>
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<td>Type</td>
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</tr>
<tr>
<td>Johnstown West</td>
<td>Cork</td>
<td>Cork</td>
<td>574973.664, 601517.382</td>
<td></td>
<td>Inactive</td>
<td>Cork Red Marble (Fermoy)</td>
</tr>
<tr>
<td>Cork</td>
<td>Cork</td>
<td>Cork</td>
<td>570089.716, 571283.314</td>
<td></td>
<td>450</td>
<td>Cork Red Marble (Rock Farm (West))</td>
</tr>
</tbody>
</table>

**Note:**
- **Inactive:** Quarries that are no longer active.
- **Cork Red Marble:** A lime conglomerate that contains rounded white blottches representing the original calcite pebbles, surrounded and supported in a red clay-rich matrix. Stylolitic, sparsely fossiliferous, cross-cutting calcite veining.
- **Midleton Red:** Adjacent to the Cork red marble conglomerate beds another variety of red marble arose by the injection of fine red sediment, from the conglomerate into the cleavages of the grey micritic limestone. This marble horizon is thin and inconsistent, which its usage accurately reflects; it is rarely found outside of Cork because large enough blocks of this marble could not be raised from quarries to fabricate substantial columns.
- **Little Island Limestone:** A lime conglomerate that contains rounded white blottches representing the original calcite pebbles, surrounded and supported in a red clay-rich matrix. Stylolitic, sparsely fossiliferous, cross-cutting calcite veining.
- **Rock Farm Limestone:** Light to dark grey, close grained, compact, works freely. The limestone in Rock Farm Quarry (West) is of the Little Island Formation – massive, crinoidal, fine, light grey, wackestone limestone. Limestone from the Rock Farm (West) quarry is said to be of better quality, less fractured, lighter in colour and easier to work than the limestone from the Rock Farm Quarry (East), which is partly of the Clashavodig Formation - oolitic, peloidal, cherty, fine, wackestone limestone.

**See Little Island Red Marble Quarry for descriptions of the stone extracted.**
<table>
<thead>
<tr>
<th>Quarry Name</th>
<th>Location</th>
<th>Coordinates</th>
<th>Type</th>
<th>Formation</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>Boreenmanagh Red Marble Quarry</td>
<td>Knockrea</td>
<td>568283.456, 571315.88</td>
<td>Inactive</td>
<td>Cork Red Marble</td>
<td>(Dinantian, Asbian).</td>
</tr>
<tr>
<td></td>
<td>Cork</td>
<td></td>
<td></td>
<td>Midleton Red; Sunset Pink.</td>
<td>Cork Red Marble Formation.</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td>Limestone</td>
<td>Cork Red Marble Formation.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lime conglomerate.</td>
<td>Little Island Formation.</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td>Limestone.</td>
<td>Cork Red Marble Formation.</td>
</tr>
<tr>
<td>Dunlewey Marble Quarry</td>
<td>Dunlewy</td>
<td>593124.79, 919101.675</td>
<td>Inactive</td>
<td>Donegal White Marble</td>
<td>Cresslough Formation</td>
</tr>
<tr>
<td></td>
<td>Near</td>
<td></td>
<td></td>
<td>Marble</td>
<td>Silurian-Devonian</td>
</tr>
<tr>
<td></td>
<td>Donegal</td>
<td></td>
<td></td>
<td>White</td>
<td>A white, very pure calcitic and crystalline, coarse-grained (dolostone) saccaroid marble that first came to prominence when displayed at the Great Exhibition of 1851, at which time it was compared to similar stone from the Greek island of Paros. The extent of the marble outcrop is small and is surrounded by the Donegal Granite – this body was responsible for metamorphosing pure limestone into this marble. The Donegal white marble was not widely used because removal of this stone was costly and its crystalline texture made it unsuitable for fine work.</td>
</tr>
<tr>
<td>Marble Hill Quarries</td>
<td>Marblehill</td>
<td>605996.794, 936107.803</td>
<td>Inactive</td>
<td>Donegal White Marble</td>
<td>Sessiagh-Clonmass Formation</td>
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<td></td>
<td>Donegal</td>
<td></td>
<td></td>
<td>Marble</td>
<td>Silurian-Devonian</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>White or rose-tinted crystalline marble; takes a good polish; slightly schistose.</td>
</tr>
<tr>
<td>Ballymore White Marble Quarry</td>
<td>Ballymore Lower</td>
<td>605560.231, 934960.17</td>
<td>Inactive</td>
<td>Donegal White Marble</td>
<td>Sessiagh-Clonmass Formation</td>
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<tr>
<td></td>
<td>Donegal</td>
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<td></td>
<td>Marble</td>
<td>Silurian-Devonian</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>Creamy brown marble with brown portions in places; takes a good polish; though difficult to work it was used for cut stone purposes.</td>
</tr>
<tr>
<td>Drean Marble Quarry</td>
<td>Drean</td>
<td>625520.135, 913884.081</td>
<td>Inactive</td>
<td>Donegal White Marble</td>
<td>Lough Swilly Succession</td>
</tr>
<tr>
<td></td>
<td>Donegal</td>
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<td></td>
<td>Marble</td>
<td>Silurian-Devonian</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>Possibly the source of white Donegal marble quarried in the 17th century.</td>
</tr>
<tr>
<td>Quarry Name</td>
<td>Location</td>
<td>Number</td>
<td>Status</td>
<td>Type</td>
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</tr>
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<tr>
<td>Castle Caldwell Marble Quarry</td>
<td>Rosbag, Fermanagh</td>
<td>2143</td>
<td>Inactive</td>
<td>Castle Caldwell Marble</td>
<td>Limestone Ballyshannon Limestone Formation</td>
</tr>
<tr>
<td>Menlough Marble Quarry</td>
<td>Galway</td>
<td>Inactive</td>
<td>Galway Black Marble</td>
<td>Limestone Burren Formation</td>
<td>Phanerozoic, Paleozoic, Carboniferous, Middle Mississippian, Visean (Dinantian, Asbian). Black A black, bituminous, fine-grained packstone/wackestone limestone that is relatively unfossiliferous, and which takes a good matt polish. On the surface colonial corals, solitary corals and brachiopods are visible. In thin section the stone from the classic quarry at Anglingham on the shores of Lough Corrib contains numerous unicellular foraminifera but little shelly fragments whereas the Merlin Park stone, quarried east of Galway city, contains algae corals, bryozoans, a variety of foraminiferan species, and amorphous opaques. The presence of algae indicates that the lime sediment was deposited in very shallow water.</td>
</tr>
<tr>
<td>Gortacallow Marble Quarry</td>
<td>Galway</td>
<td>Inactive</td>
<td>Galway Black Marble</td>
<td>Limestone Burren Formation</td>
<td>Phanerozoic, Paleozoic, Carboniferous, Middle Mississippian, Visean (Dinantian, Asbian). Black See Menlough Marble Quarry for description of stone.</td>
</tr>
<tr>
<td>Anglingham Marble Quarry</td>
<td>Galway</td>
<td>Inactive</td>
<td>Galway Black Marble</td>
<td>Limestone Burren Formation</td>
<td>Phanerozoic, Paleozoic, Carboniferous, Middle Mississippian, Visean (Dinantian, Asbian). Black See Menlough Marble Quarry for description of stone.</td>
</tr>
<tr>
<td>Merlin Park Marble Quarry</td>
<td>Galway</td>
<td>Inactive</td>
<td>Galway Black Marble</td>
<td>Limestone Burren Formation</td>
<td>Phanerozoic, Paleozoic, Carboniferous, Middle Mississippian, Visean (Dinantian, Asbian). Black See Menlough Marble Quarry for description of stone.</td>
</tr>
<tr>
<td>Merlin Park (Doughiska) Marble Quarry</td>
<td>Doughiska, Galway</td>
<td>Inactive</td>
<td>Galway Black Marble</td>
<td>Limestone Burren Formation</td>
<td>Phanerozoic, Paleozoic, Carboniferous, Middle Mississippian, Visean (Dinantian, Asbian). Black See Menlough Marble Quarry for description of stone.</td>
</tr>
<tr>
<td>Quarry Name</td>
<td>Location</td>
<td>Coordinates</td>
<td>Active/Inactive</td>
<td>Formation</td>
<td>Description</td>
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</tr>
<tr>
<td>Streamstown Marble Quarry</td>
<td>Galway</td>
<td>465218.761,</td>
<td>Active</td>
<td>Connemara Marble</td>
<td>This marble (or strictly an ophicarbonate) occurs as green, white and sepia varieties to pure green varieties with occasional bands of black or grey. The green variety is principally quarried at this location. The colour is determined by the extent and diversity of the coloured minerals present, varying from white to green with increased serpentine content. The groundmass is typically calcite, which is a white to grey colour (sometimes with traces of pink), and dolomite, which is a creamy white, and in which minerals produced during metamorphism 475-460 Ma ago create decorative bands and blebs of colour. These minerals include a diverse complex suite of minerals including amphiboles, serpentinised olivine, tremolite, chlorite, talc, mica, diopside, phlogopite and thalcanthite. The foliated and serpentinite texture is imparted by folding of original sedimentary banding, and secondary foliation. The pale green variety shows folded layers of sepia and green minerals.</td>
</tr>
<tr>
<td>Ballinahinch Marble Quarries</td>
<td>Galway</td>
<td>475082.447,</td>
<td>345 Active</td>
<td>Connemara Marble</td>
<td>See Streamstown Marble Quarry for stone description.</td>
</tr>
<tr>
<td>Cregg Marble Quarry</td>
<td>Galway</td>
<td>471454.341,</td>
<td>Active</td>
<td>Connemara Marble</td>
<td>See Streamstown Marble Quarry for stone description.</td>
</tr>
<tr>
<td>Lissoughter Marble Quarry</td>
<td>Galway</td>
<td>48555.031,</td>
<td>Active</td>
<td>Connemara Marble</td>
<td>See Streamstown Marble Quarry for stone description.</td>
</tr>
<tr>
<td>Castleisland Red Marble Quarry</td>
<td>Kerry</td>
<td>498238.251,</td>
<td>Inactive</td>
<td>Castlesland Marble; Lisheenbaun Marble; Castlesland Golden Breccia; Sunset Glory; Kerry Red Marble</td>
<td>The red Castleisland conglomeratic limestone is similar in appearance to and at the same stratigraphic level as the Cork reds except it has been exposed to much less contemporaneous and post-contemporaneous deformation on account of being further north of the Variscan front.</td>
</tr>
<tr>
<td>Muckross Marble Quarry</td>
<td>Kerry</td>
<td>495086.417,</td>
<td>Inactive</td>
<td>Muckross Marble; Kerry Red Marble</td>
<td>The quarry was located near the shore of Muckross Peninsula approximately 2km west-south-west of Muckross House. It produced a red to pink conglomeratic marble containing disarticulated crinoids, bands of red to russet clays, calcite pebbles, stylistic and showing evidence of dissolution. Used in Muckross House in walling of kitchen yard and for paving around sunken garden, and paving the Hall in Muckross House.</td>
</tr>
</tbody>
</table>

Limestone: Waulsortian Limestone and overlying Rockfield Limestone Formation. Lateral equivalent of the Cork Red Marble Formation.
<table>
<thead>
<tr>
<th>Quarry Name</th>
<th>Location</th>
<th>Ref.</th>
<th>Status</th>
<th>Marble Type</th>
<th>Formation</th>
<th>Phanerozoic, Paleozoic, Carboniferous, Middle Mississippian, Visean (Dinantian, Chadian-Holkarian?)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Black Quarry</strong></td>
<td>Kilkenny</td>
<td>651832.512, 654900.405</td>
<td>Inactive</td>
<td>Kilkeny Marble</td>
<td>Limestone</td>
<td><strong>Ballyadams Formation</strong></td>
<td><strong>Black</strong> A dark grey, bituminous, calcarenite wackstone/packstone limestone. It is highly fossiliferous, containing fragmentary solitary and colonial corals (Lithostrotoid corals are common), crinoids and large productid and other smaller brachiopods (seashells), as well as bryozoans, foraminifera, calcispheres and oogores seen in thin section. The coral-bearing limestone variety, which in 1810 was not as popular as the brachiopod-bearing variety, was called 'Madrapore limestone' and the fossil itself called 'candle-drop' by the stone-cutters.</td>
</tr>
<tr>
<td><strong>Threecastles Quarry</strong></td>
<td>Killaree</td>
<td>645665.887, 661001.164</td>
<td>Active</td>
<td>Kilkeny Marble</td>
<td>Limestone</td>
<td><strong>Clogrenan Formation</strong></td>
<td><strong>Black</strong> A blush grey crinoidal, cherty, muddy, calcarenitic limestone. Typically medium to coarse grained and may contain fragmentary solitary and colonial corals and large productid and other smaller brachiopods (seashells).</td>
</tr>
<tr>
<td><strong>Butlersgrove Marble Quarry</strong></td>
<td>Butlersgrove</td>
<td>665533.987, 656467.734</td>
<td>Active</td>
<td>Kilkeny Marble</td>
<td>Limestone</td>
<td><strong>Butlersgrove Formation</strong></td>
<td><strong>Black</strong> A very dark grey argillaceous mudstone/wackstone limestone, which is fine-grained and produces a pure black marble when polished.</td>
</tr>
<tr>
<td><strong>Clara Marble Quarry</strong></td>
<td>Clarabricken</td>
<td>657728.849, 657277.808</td>
<td>Inactive</td>
<td>Kilkeny Marble</td>
<td>Limestone</td>
<td><strong>Clogrenan Formation</strong></td>
<td><strong>Black</strong> A blush grey crinoidal, cherty, muddy, calcarenitic limestone. Typically medium to coarse grained.</td>
</tr>
<tr>
<td><strong>Ballysimon Limestone Quarry</strong></td>
<td>Garryglass</td>
<td>360883.062, 655146.786</td>
<td>Inactive</td>
<td>Limerick Marble</td>
<td>Limestone</td>
<td><strong>Visean Limestone (Undifferentiated)</strong></td>
<td><strong>Grey</strong> Close-grained limestone, which when polished presented a variegated colour. This was used as both building stone and polished decorative stone. The marble was easily extracted, of excellent quality and it was extensively exported to London. The beds varied from 7&quot; to 4 ft; and 6 ft in thickness; the premier bed being 12&quot; thick. In the 1840 s a concerted effort was made to persuade Charles Barry to adopt this stone for use for rebuilding the Houses of Parliament in London. Exported and used for St John's Cathedral. Newfoundland.</td>
</tr>
<tr>
<td><strong>Foynes Limestone Quarry</strong></td>
<td>Corrig</td>
<td>525497.025, 650984.564</td>
<td>Inactive</td>
<td>Foynes Marble</td>
<td>Limestone</td>
<td><strong>Shaugolden Formation</strong></td>
<td><strong>Dark grey to black</strong> Dark blue-grey, close-grained wackestone. Black when polished.</td>
</tr>
<tr>
<td><strong>Thomond Gate Quarries North</strong></td>
<td>Prior's Land</td>
<td>556970.264, 658161.19</td>
<td>Inactive</td>
<td>Limerick Black Marble</td>
<td>Limestone</td>
<td><strong>Visean Limestone (Undifferentiated)</strong></td>
<td><strong>Dark grey to black</strong> Greyish-black; fine and close-grained; formerly worked as a superior quality marble.</td>
</tr>
<tr>
<td>Location</td>
<td>Color/Texture</td>
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</tr>
<tr>
<td>Ballingarry Limestone Quarry</td>
<td>Dark greyish purple Fine-grained, packstone, pink blotches, abundant crinoidal debris</td>
<td>Utilised in chimneypieces in Adare Manor.</td>
<td></td>
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<tr>
<td>Clonagh Limestone Quarries</td>
<td>Brownish-red Variegated texture. Utilised in exterior ashlar of Adare Manor.</td>
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<tr>
<td>Clorhane Limestone Quarry</td>
<td>Reddish-brown Weak breccia texture, variegated, wackestone, calcite veinng, crinoidal debris. Utilised in the exterior ashlar and a chimneypiece in Adare Manor.</td>
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<tr>
<td>Dunnaman Limestone Quarry</td>
<td>Grey and orange Variegated texture, wackestone. Utilised in exterior ashlar and chimneypieces in Adare Manor.</td>
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<tr>
<td>Kilbreedy Limestone Quarry</td>
<td>Yellowish-red Utilised in the interior colonnade at Adare Manor.</td>
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<tr>
<td>Rathkeale [Commons] Limestone Quarry</td>
<td>Reddish-grey Stylolitic, crinoidal debris, packstone, well developed breccia texture. Utilised in chimneypieces in Adare Manor.</td>
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</tbody>
</table>

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<tr>
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<tr>
<td>Clorhane Limestone Quarry</td>
<td>Reddish-brown Weak breccia texture, variegated, wackestone, calcite veinng, crinoidal debris. Utilised in the exterior ashlar and a chimneypiece in Adare Manor.</td>
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<tr>
<td>Dunnaman Limestone Quarry</td>
<td>Grey and orange Variegated texture, wackestone. Utilised in exterior ashlar and chimneypieces in Adare Manor.</td>
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<td>Kilbreedy Limestone Quarry</td>
<td>Yellowish-red Utilised in the interior colonnade at Adare Manor.</td>
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<tr>
<td>Location</td>
<td>Town</td>
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<tr>
<td>Rahina Limestone Quarry</td>
<td>Ballycanew</td>
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<td>Tuogh Limestone Quarry</td>
<td>Tuogh</td>
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<tr>
<td>Railway Quarry</td>
<td>Priors-Land</td>
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<tr>
<td>Carey's Road Limestone Quarry</td>
<td>Priors-Land</td>
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<tr>
<td>Hall's Quarries</td>
<td>Ballinacurry (Weston)</td>
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<tr>
<td>Rosbrien &amp; Gough's Quarries</td>
<td>Ballinacurry (Weston)</td>
</tr>
<tr>
<td>Garryowen Limestone Quarry</td>
<td>Killalee</td>
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<tr>
<td>Ballyvogue Limestone Quarries</td>
<td>Ballyvogue</td>
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<tr>
<td>Quarry Name</td>
<td>Location</td>
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<tr>
<td>Pallaskenry Marble Quarry</td>
<td>Pallas</td>
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<tr>
<td>Clonony Marble Quarries</td>
<td>Clonony More</td>
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<td>Egan’s Quarry</td>
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<td>Cuffy’s Quarry</td>
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<td>Moneen Marble Quarry</td>
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<tr>
<td>Tullamore Marble Quarries</td>
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</tbody>
</table>

One mile N.W. of Tullamore at Ballyduff there were very extensive limestone quarries of superior quality where large blocks could be worked. One is located at Ballyduff House, another just east of it, and another at Ballydrohid Bridge where it is bisected by the railway line. Some beds contained an abundance of crinoids (packstones/grainstones) while others exhibited a cloudy texture (wackestones); these beds were preferable for polishing purposes. In 1865 the price of superior rough finish Ballyduff stone delivered in Dublin was 1s. 6d. per cubic foot. Chiselled ashlar was approx. 2s. 6d. per superficial foot, and 4 inch thick tombstones were about 2s. per superficial foot. The weight of Ballyduff limestone per cubic foot is 168 lbs. (Information communicated by Messrs. Fitzpatrick and Molloy to GSI map surveyors in 1865). In 1883 at the Dublin Exhibition it won first prize. There are still active limestone quarries in Ballyduff north of the original Victorian quarries.
Appendix 3: Chronostratigraphic chart