Communities of science: the Queen's Colleges and scientific culture in provincial Ireland, 1845-1875

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List of abbreviations used in the text

Belfast Natural History Society	BNHS
British Association for the Advancement of Science	BAAS
Cork Cuvierian Society	CCS
Cork Scientific and Literary Society	CSLS
Queen's College Belfast	QCB
Queen's College Cork	QCC
Queen's College Galway	QCG
Royal Belfast Academical Institution	BAI
Royal Cork Institution	RCI
Royal Dublin Society	RDS
Royal Galway Institution	RGI
University College London	UCL

List of abbreviations used in the footnotes

Albert College Journal 1870-3
: Journal of the Albert Agricultural College, Glasnevin from 1870-3 (AACI/1) University College Dublin, Archives.

Albert College Journal 1873-6
: Journal of the Albert Agricultural College, Glasnevin from 1873-6 (AACI/2) University College, Dublin, Archives.

Albert College Register
: Register of Pupils in the Albert Agricultural College, Glasnevin (AACI/14) University College, Dublin, Archives.

BNHS Council Minute Book 1840-50
: Belfast Natural History Society Council Minute Book 1840-50 (D/3262/AB/3) Public Records Office of Northern Ireland, Belfast.

BNHS Council Minute Book 1850-67
: Belfast Natural History Society Council Minute Book 1850-67 (D/3262/AB/4) Public Records Office of Northern Ireland, Belfast.

BNHS Out Letter Book
: Belfast Natural History Society Out Letter Book (D/3263/BA/1) Public Records Office of Northern Ireland, Belfast.

BNHS Museum Visitor Book
: Belfast Natural History Society Museum Visitor Book 1843-57 (D/3263/H/3) Public Records Office of Northern Ireland, Belfast.

Boole Letters

Letters of George Boole, professor of mathematics at Queen's College Cork, to his sister Maryanne Boole (U213/BP/1/1-134) University College, Cork, Special Collections.

Cairnes Papers

Correspondence of John Eliot Cairnes (P 8508, microfilm) National Library of Ireland, Dublin.

CCS Minute Book 1835-78

Minutes of the Cork Cuvierian and Archaeological Society from 1835 to 1878 (UCC/U122A) Special Collections, University College, Cork.

CSLS Minute Book 1820-22

Minutes of the Cork Scientific and Literary Society from 1820 to 1822, (UCC/U275) Special Collections, University College, Cork.

CSLS Proceedings 1844-74

Proceedings of the Cork Scientific and Literary Society from 1844 to 1874, (U140/A) Day Collection, Cork Archives Institute, Cork.

Dawson Papers

Papers of John William Dawson, McGill University Archives, Montreal, Canada. For more information see S. Sheets-Pyenson, *Index to the scientific correspondence of John William Dawson* (Stanford in the Vale, 1992).

DNHM Letter Files

Dublin Natural History Museum Letter Files (uncatalogued, filed by last initial of correspondent) National Museum of Ireland, Natural History Division, Dublin.

DNHM Donations

Donation book, n.d., National Museum of Ireland, Natural History Division, Dublin.

DNHM Archive

Dublin Natural History Museum archive of correspondence and internal papers (uncatalogued, boxed by year) National Museum of Ireland, Collins Barracks, Dublin.

Dowden Papers

Papers of Richard Dowden (U140/C) Cork Archives Institute, Cork.

Hamilton Papers

Correspondence and papers of Archdeacon Hamilton (P 1/36) Dublin Diocesan Archives.

Harkness Papers
Papers of Robert Harkness (Add 7652) University Library, manuscripts department, Cambridge University.

Hincks Papers
Letters and miscellaneous papers relating to William Hincks (D2109/3/1) Public Records Office of Northern Ireland, Belfast.

Larcom Papers 7460
Papers of Thomas Larcom relating to the Ulster Provincial College Commission (MS 7460) National Library of Ireland, Dublin.

Larcom Papers 7668
Papers of Thomas Larcom (MS 7668) National Library of Ireland, Dublin.

Monsell Papers
Papers of William Monsell, 3rd Baron Emly (MS 8318, letters from William Kirby Sullivan) National Library of Ireland, Dublin.

Murray Papers
Correspondence and papers of Daniel Murray, Archbishop of Dublin (AB 3/31 and 3/32) Dublin Diocesan Archives.

Newman Letters
Letters of John Henry Newman to Paul Cullen (AB/4/45/10) Dublin Diocesan Archives.

Provincial Colleges Letters
'Provincial Colleges Letters', Office of Public Works (PW I/13/1/1 2D-60-9) National Archives of Ireland, Dublin.

QC Application Letters 1845
Applications, some bundled and others loose, among the Lord Lieutenant's papers for 1845 (OP1845/ box 150) National Archives of Ireland, Dublin.

QC Application Letters 1846
Applications among the Lord Lieutenant's papers for 1846 (OP 1846/67) National Archives of Ireland, Dublin.

QC Application Letters 1848
Applications among the Lord Lieutenant's papers for 1846 (OP1848/304 and 144) National Archives of Ireland, Dublin

QC Application Letters 1849
Applications among the Lord Lieutenant's papers for 1849 (OP 1849/124 and 125) National Archives of Ireland, Dublin.

QCB Applications for Mineralogy and Geology 1854

Belfast College, applications for professorships of mathematics and mineralogy and geology (OP1854/54) National Archives of Ireland, Dublin.

QC Natural History Candidates 1848

'Candidates for Professorships in Natural History, 1848' (OP 1848/305) National Archives of Ireland, Dublin.

QCC Natural History Candidates 1854

Cork College, applications for professorship of natural history (OP1854/59) National Archives of Ireland, Dublin.

QCB Invoices 1849-56

Invoices 1849-56 (QUB/B/2/5/2) University Archives, Queen's University, Belfast.

QCB Cash Book 1855-72

Cash Book 1855-72 (QUB/B/2/5/5)University Archives, Queen's University, Belfast.

QCB Account Book 1849

Account Book of Departmental Expenditure, n.d. [1849] (QUB/B/2/5/1) University Archives, Queen's University, Belfast.

QCB Inventory 1850

Inventory of college property, n.d. [1850] (QUB/B/2/7/2) University Archives, Queen's University, Belfast.

QCC Museum Committee 1852-6

Minutes of the Museum Committee 1852-6 (MB/38) University Archives, University College, Cork.

QCC Museum Committee 20th C

Minutes of the Museum Committee, n.d., 20th century (TC/B1) University Archives, University College, Cork.

QCC Museum Catalogue 1849

Zoological Catalogue n.d. [1849] (MB/4) University Archives, University College, Cork.

QCC Museum Catalogue 1867-8

Museum Catalogue 1867-8 (MB/41) University Archives, University College, Cork.

QCG Museum Catalogue

'Catalogue of Minerals, Rock Specimens, Physical & Mechanical Apparatus, Objects of Art & Antiquity and Miscellanies in the Museum of the Queen's College, Galway' 1849, James Mitchell Museum, National University of Ireland, Galway.

QCG Council Minute Book 1850-6
Council minute book for the Queen's College, Galway, 1850-6, Strong Room, National University of Ireland, Galway.

RCI Minute Book 1826-51
Minute Book of the Cork Institution, 1826-1851 (UC/CI/U28) Special Collections, University College, Cork.

Smith O'Brien Papers
Papers of William Smith O'Brien (MS 434) National Library of Ireland, Dublin.

Thompson Papers
Letters of D'Arcy Wentworth Thompson (MS 46955, 48015 and 48016) originals in University of St. Andrews, photocopies examined in Special Collections, Hardiman Library, National University of Ireland, Galway.

Wyse Letters
Letters of Thomas Wyse (MS 15026) National Library of Ireland, Dublin.

Abstract

The Queen's Colleges in Belfast, Cork and Galway were founded in 1845 as a solution to the education of Ireland's growing middle class, and especially to redress the lack of university education acceptable to Catholics. Chapter One introduces the colleges, as well as placing this dissertation in the context of the literature on history of science and especially history of science in Ireland. Chapter Two presents the Queen's Colleges as part of a larger project to economically improve the country through practical education for the middle classes, especially in science. It revisits the rejection of the Queen's Colleges by the Catholic Church and analyses the lasting effects this had on the cultivation of science in Ireland. Despite the controversy, the colleges opened in 1849 and the rest of the dissertation considers what the colleges were able to achieve in terms of science. Chapter Three focuses on Cork, where the local scientific societies had been integral in the placing of a college in that town. These societies now courted the professors as members, acting as a means of entrée into the social community and altering their activities as a result of the professors' participation.

The agriculture diploma offered in the colleges was expected to have the greatest practical impact on Ireland by encouraging the application of science to farming. Chapter Four examines the unexpected failure of this project due to competition with other similar community initiatives and an inability to balance both practical and scientific concerns. Chapter Five discusses the college museums, which sought, through the collection of objects from across the British empire, to be national (not simply local) institutions for public education and the improvement of Ireland. The final chapter turns to the scientific community itself in an account of the controversy over *Eozoön Canadense*, believed to be the oldest fossil organism. Two Galway professors harnessed an invisible scientific community through letters and publication in an effort to resolve the controversy in their favour. The *Eozoön* controversy demonstrates that peripheral locations should not be disregarded as centres of scientific activity and further shows the links between local communities of science and an international scientific community.

This dissertation argues that the Queen's Colleges were integral to the shaping of science in Ireland in the second half of the nineteenth century. While provincial Ireland had a scientific culture of its own before the colleges arrived, the colleges brought government-appointed experts to local communities. The college professors encouraged the growth of expert science in Cork's scientific societies, presented British-style scientific collections to the Irish public, attempted to alter farming in Belfast to conform with scientific principles and brought an international scientific controversy to remotest Galway. Existing communities of science, and those now created by the presence of the colleges had to negotiate new roles within the scientific culture of Ireland and Britain.

1

Introduction

Communities of science: the Queen's Colleges and scientific culture in nineteenth-century provincial Ireland, 1845-1875

> The world will be a dull world some hundreds of years hence, when Fancy shall be dead, and ruthless Science (that has no more bowels than a steam-engine) has killed her.
>
> William Makepeace Thackeray, 1843[1]

> Here in Ireland we want the rudiments of practical knowledge, and are not yet far enough advanced to gain anything from the amusement of superficial public essayists.
>
> *The Monthly Journal of Progress*, 1854[2]

William Thackeray penned the words above while passing a rainy day in his Galway hotel by reading literature. The fact that Thackeray found himself pondering the march of science in the remotest and least developed portion of Ireland speaks of the degree to which science had infiltrated popular consciousness in the nineteenth-century. Even a town lacking a railway station or significant industrialisation could not prevent Thackeray from seeing the future as one in which science and empiricism would inevitably dominate at the expense of creativity. Others, including many in Ireland, viewed a scientific future with hope, rather than dread. Even in industrially-lagging Ireland, there were vocal supporters of 'science for improvement' who believed that scientific

[1] W. M. Thackeray, *The Irish sketch book* (Belfast, 1985, [1843]).
[2] Anon., 'On country reading rooms and village libraries', *Monthly Journal of Progress*, 1 (1854), pp. 65-70, p. 69.

education and the application of science to agriculture and industry were crucial to the modernisation and economic improvement of the country. The *Monthly Journal of Progress* was one of many products of this movement during the nineteenth century. There was a belief that science would transform society. Nevertheless, it is only recently that science has been seen as an important component of Irish intellectual history, worthy of study in its own right.[3] This dissertation represents a contribution to a growing body of work that considers the role that science has had in Irish society. However, this dissertation also takes a different approach than most of these studies, viewing Ireland's scientific practitioners not simply as isolated individuals but as members of an intellectual community that spread throughout Ireland, into Britain and Europe. The science professors at the Queen's Colleges in Cork, Galway and Belfast were integral parts of a network of scientific men in Ireland and beyond. Yet the professors also became part of local communities through their scientific interests, applying science to local problems or promoting science as a cultural commodity. By examining the interaction between Ireland's scientific culture and the Queen's Colleges, I will present science as an integral component of nineteenth-century Irish political, religious, intellectual and social spheres.

The nineteenth century saw some of the most significant political and cultural developments with lasting effects on modern Ireland. The century began with the dissolution of the Irish Parliament by the formation of the legislative Union with Great Britain and ended with several attempts at passing a Home Rule bill.[4] In the interim, Ireland experienced a massive demographic and economic change

[3] Works on specific topics will be discussed below. For general works covering science in Ireland over relatively long periods see D. Attis (ed.), *Science and Irish culture: volume 1, 2004* (Dublin, 2004); P. J. Bowler and N. Whyte (eds), *Science and society in Ireland: the social context of science and technology in Ireland, 1800-1950* (Belfast, 1997); J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997); N. McMillan (ed.), *Prometheus's fire: a history of scientific and technological education in Ireland* (Kilkenny, 2000); J. R. Nudds, N. McMillan and S. McKenna-Lawlor (eds), *Science in Ireland, 1800-1930: tradition and reform* (Dublin, 1988). N. Whyte, *Science, colonialism and Ireland* (Cork, 1998).

[4] MacDonagh declares the Union to be the most important event in shaping Irish history up to the modern period. O. MacDonagh, *Ireland: the Union and its aftermath* (Dublin, 2003). For general works on nineteenth-century Ireland see W. E. Vaughan (ed.), *A new history of Ireland, 5: Ireland under the Union I, 1801-1870* (10 vols., Oxford, 1989), vol. 5; D. G. Boyce, *Nineteenth-century Ireland: the search for stability* (Dublin, 2005); R. F. Foster, *Modern Ireland, 1600-1972* (London, 1989).

as a result of the Great Famine.[5] While these dramatic events give an indication as to why the study of science in nineteenth-century Ireland has formed a small part of Irish history, they also suggest that the role of science in such a time and place should be of interest. Historians, as well as sociologists of science, have increasingly examined science as both affected by and affecting political, social and cultural developments in human society.[6] Therefore nineteenth-century Irish science promises to be a rich field for exploring the role of science in society.

Much work on Irish science has been biographical and has not substantially examined the role of science in Irish history or related Irish science to the history of science in more researched nations such as Britain.[7] The 1980s and 1990s saw an increasing interest in Irish science, reflected in an output of publications, amongst a mixed group of individuals representing Irish studies, history of science and scientific disciplines.[8] Despite their different disciplinary perspectives, many of these authors shared a fascination with the reasons for the neglect of science in Irish history and sought to address the perception of science

[5] The Famine literature is vast. See for example D. A. Kerr, *A nation of beggars?: priests, people and politics in famine Ireland, 1846-1852* (Oxford, 1994); C. Kinealy, *This great calamity: the Irish Famine 1845-52* (Dublin, 1994); J. Mokyr, *Why Ireland starved: a quantitative and analytical history of the Irish economy, 1800-1850* (London, 1983); M. Turner, *After the famine: Irish agriculture, 1850-1914* (Cambridge, 1996); C. Woodham-Smith, *The great hunger: Ireland 1845-1849* (London, 1980).

[6] On science and politics see for example A. Desmond, 'Artisan resistance and evolution in Britain, 1819-1848', *Osiris*, 3 (1987), pp. 77-110; J. Livesey, 'The Dublin Society in eighteenth-century Irish political thought', *Historical Journal*, 47 (2004), pp. 615-640; A. W. Daum, 'Science, politics, and religion: Humboldtian thinking and the transformations of civil society in Germany, 1830-1870', *Osiris*, 17 (2002), pp. 107-140; P. Elliott, 'The origins of the "creative class": provincial urban society, scientific culture and socio-political marginality in Britain in the eighteenth and nineteenth centuries', *Social History*, 28 (2003), pp. 361-387.

[7] S. McKenna-Lawlor (ed.), *Whatever shines should be observed: quicquid nitet notandum* (Dublin, 1998); C. Mollan, W. Davis and B. Finucane (eds), *Irish innovators in science and technology* (Dublin, 2002); C. Mollan, W. Davis and B. Finucane (eds), *Some people and places in Irish science and technology* (Dublin, 1985); C. Mollan, W. Davis and B. Finucane (eds), *More people and places in Irish science and technology* (Dublin, 1990); W. G. S. Scaife, *From galaxies to turbines: science, technology and the Parsons family* (Bristol, 2000). Interestingly there are few book-length studies of individual Irish scientists, with the exception of Robert Boyle and John Tyndall. See R.-M. Sargent, *The diffident naturalist: Robert Boyle and the philosophy of experiment* (Chicago, 1995); W. H. Brock, N. D. McMillan and C. D. Mollan (eds), *John Tyndall, essays on a natural philosopher* (Dublin, 1981).

[8] In the 1980s see R. Jarrell, 'The Department of Science and Art and control of Irish science, 1853-1905', *Irish Historical Studies*, xxiii (1983), pp. 330-347; R. Johnston, 'Science and technology in Irish national culture', *The Crane Bag*, 7 (1983), pp. 58-65; D. Outram, 'Negating the natural: or why historians deny Irish science', *Irish Review*, 1 (1986), pp. 45-9. In the 1990s see for example Bowler and Whyte (eds), *Science and society in Ireland*; Foster (ed.), *Nature in Ireland*; R. Johnston , 'Science in a post-colonial culture', *Irish Review*, 3 (1990), pp. 70-6; G. Jones, 'Catholicism, nationalism and science', *Irish Review*, 20 (1997), pp. 47-61; S. Lysaght, 'Themes in the Irish history of science', *Irish Review*, 19 (1996), pp. 87-97.

in Ireland as a Protestant and Anglophile activity, rather than a 'native' Catholic one.[9] James Bennett has recently claimed that this inter-disciplinarity in the study of science in Ireland is a strength which ought to be retained.[10] By drawing upon both Irish history and the history of science in this dissertation, I hope to examine science from multiple perspectives. When appropriate, I shall also make comparisons to British and European scientific and cultural developments.

The growing literature on nineteenth-century Irish science has engaged more fully with the larger political and social context.[11] The work which has most successfully integrated science into the historical context has been that on government institutions such as the Department of Science and Art, the Geological Survey, the Museum of Irish Industry and its successor, the Royal

[9] J. Bennett, 'Science and social policy in Ireland in the mid-nineteenth century' in P. J. Bowler and N. Whyte (eds), *Science and society in Ireland: the social context of science and technology in Ireland 1800-1950* (Belfast, 1997), pp. 37-47; Jones, 'Catholicism, nationalism and science'; J. W. Foster, 'Natural history, science and Irish culture', *Irish Review*, 9 (1990), pp. 61-69; J. W. Foster, 'Nature and nation in the nineteenth century' in J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997), pp. 409-439; D. Outram, 'Negating the natural: or why historian deny Irish science', *Irish Review*, 1 (1986), pp. 45-9.

[10] J. Bennett, 'Why the history of science matters in Ireland' in D. Attis and C. Mollan (eds), *Science and Irish culture: volume 1, 2004* (Dublin, 2005), pp. 1-14.

[11] J. Adelman, 'Evolution on display: promoting Irish natural history and Darwinism at the Dublin Natural History Museum', *British Journal for the History of Science*, 38 (2005), pp. 411-436; R. Bayles, 'Understanding local science: the Belfast Natural History Society in the mid-nineteenth century' in D. Attis and C. D. Mollan (eds), *Science and Irish culture: volume 1, 2004* (Dublin, 2004), pp. 139-169; R. Bayles, 'Science in its local context: the Belfast Natural History and Philosophical Society in the mid-nineteenth century' (PhD, Queen's University of Belfast, 2005); Bennett, 'Science and social policy in Ireland'; K. Bright, *The Royal Dublin Society, 1815-1845* (Dublin, 2004); T. Collins, 'Praeger in the west: naturalists and antiquarians in Connemara and the islands, 1894-1914', *Journal of the Galway Archaeological and Historical Society*, 45 (1993), pp. 124-154; T. Collins, *Transatlantic triumph and heroic failure: the story of the Galway Line* (Cork, 2002); T. Duddy, *A history of Irish thought* (London, 2002); Foster, 'Nature and Nation' ; Jarrell, 'The Department of Science and Art'; G. Jones, 'Contested territories: Alfred Cort Haddon, progressive evolutionism and Ireland', *History of European Ideas*, 24 (1998), pp. 195-211; G. Jones, 'Scientists against home rule' in D. G. Boyce and A. O'Day (eds), *Defenders of the Union: a survey of British and Irish unionism since 1801* (London, 2001), pp. 188-208; G. Jones, 'Darwinism in Ireland' in D. Attis and C. Mollan (eds), *Science and Irish culture: volume 1, 2004* (2004), vol. 1, pp. 115-138; B. B. Kelham, 'The Royal College of Science for Ireland (1867-1926)', *Studies*, 56 (1967), pp. 297-309; B. B. Kelham, 'Science education in Scotland and Ireland, 1750 to 1900' (PhD, Victoria University of Manchester, 1968); E. Leaney, 'Missionaries of science: provincial lectures in nineteenth-century Ireland', *Irish Historical Studies*, 34 (2005), pp. 266-288; E. Leaney, '"The property of all": public access to scientific education in nineteenth-century Ireland' (PhD, University of Oxford, 2002); E. Leaney, 'Science and conflict in nineteenth-century Ireland' in N. Garnham and K. Jeffery (eds), *Culture, place and identity* (Dublin, 2005), pp. 66-77; D. Livingstone, 'Darwin in Belfast: the evolution debate' in J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997), pp. 387-408; Lysaght, 'Themes'; S. Lysaght, *Robert Lloyd Praeger: the life of a naturalist* (Dublin, 1998); Whyte, *Science, colonialism and Ireland* ; S. Yearley, 'Colonial science and dependent development: the case of the Irish experience', *Sociological Review*, 37 (1989), pp. 308-331.

College of Science.[12] Institutional histories are currently less dominant in the history of nineteenth-century British science, which has recently developed a wide literature on informal groups of scientific practitioners and popular manifestations of science.[13] Several authors have suggested that Irish science was more 'institutionalised' than British science: and certainly even many of Ireland's scientific societies received government funds and thus could be considered in some way government institutions.[14] Irish scientific societies and other informal scientific activities have only recently begun to attract the attention of historians.[15] This dissertation attempts to integrate institutional with more popular manifestations of science by examining the Queen's Colleges in the context of Ireland's existing scientific culture. This is not an institutional history of science in the Queen's Colleges, but an effort to show the manner in which institutional scientific culture interacted and overlapped with popular scientific culture and local culture.

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[12] Jarrell, 'The Department of Science and Art'; Yearley, 'Colonial science'; Kelham, 'The Royal College of Science'; Whyte, *Science, colonialism and Ireland*; G. L. Herries Davies, *North from the Hook: 150 years of the Geological Survey of Ireland* (Dublin, 1995); C. Cullen, 'Women, the Museum of Irish Industry, and the pursuit of scientific learning in nineteenth-century Dublin' in, *History Mattters II* (Dublin, forthcoming); Leaney, '"The property of all"', pp. 86-120.

[13] See for example S. J. M. M. Alberti, 'Natural history and the philosophical societies of late Victorian Yorkshire', *Archives of Natural History*, 30 (2003), pp. 342-358; D. E. Allen, *The naturalist in Britain: a social history* (Princeton, New Jersey, 1994); L. D. Bregman, '"Snug little coteries": a history of scientific societies in early nineteenth-century Cape Town 1824-1835' (PhD, University College London, 2005); A. Desmond, 'Redefining the X axis: "professionals", "amateurs" and the making of mid-Victorian biology', *Journal of the History of Biology*, 34 (2001), pp. 3-50; L. Miskell, 'The making of a new "Welsh metropolis": science, leisure and industry in early nineteenth-century Swansea', *History*, 88 (2003), pp. 32-52; J. Morrell and A. Thackray, *Gentlemen of science: early years of the British Association for the Advancement of Science* (Oxford, 1981); J. B. Morrell, 'Bourgeois scientific societies and industrial innovation in Britain 1780-1850', *The Journal of European Economic History*, 24 (1995), pp. 311-332; A. Secord, 'Science in the pub: artisan botanists in early nineteenth-century Lancashire', *History of Science*, 32 (1994), pp. 269-315; S. Shapin, 'The Pottery Philosophical Society, 1819-1835: an examination of the cultural uses of provincial science', *Science Studies*, 2 (1972), pp. 311-36; A. Thackray, 'Natural knowledge in cultural context: the Manchester model', *American Historical Review*, (1974), pp. 672-709; C. W. J. Withers and D. A. Finnegan, 'Natural history societies, fieldwork and local knowledge in nineteenth-century Scotland: towards a historical geography of civic science', *Cultural Geographies*, 10 (2003), pp. 334-353.

[14] T. Eagleton, *Scholars and rebels in nineteenth-century Ireland* (Oxford, 1999), Ch. 3; Bennett, 'Science and social policy in Ireland'; Yearley, 'Colonial science'; Jarrell, 'The Department of Science and Art'.

[15] E. Neswald, 'Science and sociability in nineteenth-century provincial Ireland: the Galway Mechanics' Institute', *British Journal for the History of Science*, (expected December 2006); Bayles, 'Science in its local context'; Bayles, 'Understanding local science'; M. E. Daly, *The spirit of earnest inquiry: the Statistical and Social Inquiry Society of Ireland, 1847-1997* (Dublin, 1997); Bright, *The Royal Dublin Society, 1815-1845* ; J. E. Rockley, 'Towards an understanding of the development of antiquarian and archaeological thought and practice in Cork up to 1870' (PhD, University College Cork, 2000); Livesey, 'The Dublin Society' .

The Queen's Colleges

The Colleges (Ireland) Act, introduced by Sir Robert Peel's administration, established the Queen's Colleges in 1845. The colleges, along with many of Peel's other Irish reforms, caused controversy in Britain and Ireland. Historians have included the colleges in a list of Parliamentary efforts intended to solve the problem of Ireland: the industrially lagging, impoverished, rebellious partner in the Union.[16] The colleges were founded specifically to assuage the grievances of a rising Catholic middle class that had no access to higher education acceptable to their religion within Ireland. Instead, the colleges became the centre of divisive religious and political controversy, and one of several causes of the split between followers of the leading Catholic politician Daniel O'Connell and the Young Ireland movement.[17] The colleges were a significant educational development as they were the first example of non-sectarian higher education in Ireland, along the lines of University College London. Although Catholics and Presbyterians were given the opportunity to endow chairs of divinity privately, this was only taken up for a short period by Presbyterians in Belfast.[18] As will be discussed in the next chapter, some politicians saw this secular context as necessary and useful for Ireland, as well as being particularly appropriate for the teaching of scientific subjects. The majority of the Irish Catholic hierarchy, by contrast, mistrusted Peel's intentions and feared the colleges would be used as a vehicle for proselytising or fostering infidelity. Peel's assumption that the Catholic hierarchy would accept the colleges once they were established proved overly optimistic.[19] Partly because Catholic students were discouraged from attending, and partly because of an inadequate secondary education system, enrolment was disappointing throughout the nineteenth century. The colleges,

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[16] D. A. Kerr, *Peel, priests and politics: Sir Robert Peel's administration and the Roman Catholic Church in Ireland, 1841-1846* (Oxford, 1982), Ch. 7; T. W. Moody, 'The Irish university question of the nineteenth century', *History*, 43 (1958), pp. 90-109; T. W. Moody and J. C. Beckett, *Queen's, Belfast, 1845-1949: the history of a university* (2 vols., London, 1959) vol. 1, pp. 1-39; Gearoid O'Tuathaigh, 'The establishment of the Queen's Colleges: ideological and political background', in T. Foley (ed.), *From Queen's College to National University: essays on the academic history of QCG/UCG/NUI, Galway* (Dublin, 1999) pp. 1-15; J. A. Murphy, *The college: a history of Queen's/University College Cork, 1845-1995* (Cork, 1995), Ch. 1.

[17] G. Grogan, 'The colleges bill 1845-49' in M. R. O'Connell (ed.), *O'Connell: education, church and state* (Dublin, 1992), pp. 19-34; Kerr, *Peel, priests and politics*, Ch. 7.

[18] Moody and Beckett, *Queen's Belfast*.

[19] On the Catholic Church and the colleges see Kerr, *Peel, priests and politics* , Ch. 7; C. Barr, *Paul Cullen, John Henry Newman, and the Catholic University of Ireland, 1845-1865*, (Leominster, 2003) Ch. 2; A. Macaulay, *William Crolly, Archbishop of Armagh, 1835-49* (Dublin, 1994), pp. 348-436.

even in their own time, became symbolic of the pitfalls of British solutions to Irish problems. Despite these obstacles, the contribution of the Queen's College professors to the communities of science in Ireland was significant, as this dissertation will demonstrate.

Debates about higher education, such as those surrounding the Queen's Colleges, raised questions about the importance of various intellectual disciplines to Ireland's future. Science was one discipline whose merits for Ireland were urged repeatedly over the course of the century and various programmes of science education were attempted with mixed success. The Queen's Colleges were part of a programme for the scientific improvement of Ireland, yet most of the studies to date have focussed on their role in contemporary political debates.[20] The Queen's Colleges were significant not just for offering an educational panacea to the middle classes, but also for emphasising science as a component of the cure. In nineteenth-century Ireland, exactly what could be achieved by scientific education depended on who was asked: ardent Unionists hoped the Irish would grow peaceful with the prosperity that it must surely deliver; Nationalists anticipated that education would increase both desire for independence and the ability to achieve it.

The two most comprehensive studies of science in the Queen's Colleges to date have been dismissive of their impact. Pointing to the low uptake of science courses, Enda Leaney and Brian Kelham claim that the colleges failed to achieve their goal of science education.[21] Kelham, for example, blames the higher numbers of scientists in Scotland than Ireland in the years 1750 to 1900 on an 'environment which was unfavourable to intellectual pursuits' and Irish education provisions (including the Queen's Colleges) which were often motivated by religious, political or economic goals.[22] In a period when there were virtually no professional scientists, evaluating the contribution of the colleges by counting the number of scientists produced is too limited. Lack of

[20] The following PhD theses each briefly deal with science in the Queen's Colleges: Leaney, '"The property of all"' pp. 125-75; Kelham, 'Science education in Scotland and Ireland' pp. 7.60-7.76.
[21] Leaney, '"The property of all"', pp. 125-75; Kelham, 'Science education in Scotland and Ireland', pp. 7.60-7.76.
[22] Kelham, 'Science education in Scotland and Ireland', p. 8.26.

professional positions for men of science can also explain the low uptake of science courses. In fact, an examination of the Queen's Colleges in the context of the towns in which they were placed reveals substantial scientific activity in nineteenth-century provincial Ireland. While this did not often produce famous men of science, it no doubt contributed to a scientific culture locally and nationally; a culture of which the Queen's Colleges were a part.

By examining science in provincial Ireland this dissertation will also help to redress a bias towards the study of Dublin-based institutions and individuals in the history of Irish science.[23] Some of this bias may be explained by the fact that provincials often migrated to the metropolis in search of opportunities, swelling Dublin's intellectual ranks. The programme of provincial scientific lectures sponsored by the Department of Science and Art has been well-described by Leaney and Frank D'Arcy, but its administrative base was in Dublin and its contemporary proponents assumed the absence of significant scientific expertise in the Irish provinces.[24] The Queen's College professors quickly became listed lecturers, although they often found themselves speaking to the members of a society to which they already belonged. Outside of Dublin, Belfast has attracted the most attention for its acknowledged scientific culture and a recent thesis on the subject contributes greatly to our understanding of science in nineteenth-century provincial Ireland.[25] Cork, too, has received some notice, albeit not for many years.[26] Two recent histories of Galway have touched on the town's scientific societies.[27] In addition, institutional histories of the Queen's Colleges

[23] See note 12 for a list of works on Dublin-based institutions. Some exceptions include M. Mulvihill, *Ingenious Ireland: a county-by-county exploration of the mysteries and marvels of the ingenious Irish* (London, 2003); Foster (ed.), *Nature in Ireland*.
[24] F. D'Arcy, Mandarins and mechanics: the Irish provincial science lecture system 1836-1866 (University of Ulster, 1989), 1-24; Leaney, 'Missionaries of science'.
[25] Bayles, 'Understanding local science'; Bayles, 'Science in its local context'; Livingstone, 'Darwin in Belfast'; J. W. Foster, *Recoveries: neglected episodes in Irish cultural history* (Dublin, 2002).
[26] D. Gwynn, 'Cork Cuvierian Society, 1849-1851', *Cork University Record*, 23 (1951), pp. 27-34; M. MacSweeney and J. Reilly, 'The Royal Cork Institution, part I: 1803-1826', *Journal of the Cork Historical and Archaeological Society*, 62 (1957), pp. 22-36; M. MacSweeney and J. Reilly, 'The Royal Cork Institution, part II: 1826-1849', *Journal of the Cork Historical and Archaeological Society*, 62 (1957), pp. 77-94; S. F. Pettit, 'The Royal Cork Institution: a reflection of the cultural life of a city', *Journal of the Cork Historical and Archaeological Society*, 81 (1976), pp. 70-90.
[27] J. Cunningham, *'A town tormented by the sea': Galway, 1790-1914* (Dublin, 2004), pp. 347-52; K. Woodman, *Tribes to tigers: a history of the Galway Chamber of Commerce and Industry*

have provided biographical material on their scientific professors.[28] Yet none of these studies have given a broader a picture of the scientific community or of the community use of science in nineteenth-century Ireland, especially outside of Dublin. The Queen's Colleges are significant for the simple fact that they sent scientific experts to live in the provinces and become a part of local communities (scientific and social), not just to give a brief course of lectures and return to the safety of the pale. Some of these professors were Irish, members of existing scientific circles, but many were English or Scottish and entering the unfamiliar.

Communities of science

By examining science in provincial Ireland through the lens of the Queen's Colleges, it is possible to gain an understanding of the country's communities of science in the nineteenth century. This is not limited to communities of scientific practitioners, but also includes the communities in which science was used for cultural or social ends and the imagined communities that some hoped would be created in the future by the scientific improvement of Ireland. The colleges are shown to have contributed to and altered the landscape of science in Ireland during their first thirty years through the actions of individual professors as well as through their collective impact.

By not limiting itself to the stories of well-known scientific figures, this dissertation supports the study of science *in* society.[29] Despite the fact that few of the figures discussed in this dissertation will be familiar to historians, or even to historians of science, there is much to be gained in recovering their stories. In fact, historians of science have increasingly eschewed the examination of only

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(Galway, 2000). (Despite the title this book is a history of the Royal Galway Institution and its subsequent incarnations.)

[28] See for example T. Collins, 'Melville, Hart and Anderson: early teachers of natural history, 1849-1914' in T. Foley (ed.), *From Queen's College to National University: essays on the academic history of QCG/UCG/NUI Galway* (Dublin, 1999), pp. 266-302.

[29] See for example Allen, *The naturalist in Britain*; S. Cannon, *Science in culture: the early Victorian period* (New York, 1978); J. Golinski, *Science as public culture: chemistry and enlightenment in Britain, 1760-1820* (Cambridge, 1992); B. Lightman (ed.), *Victorian science in context* (London, 1997); J. A. Secord, *Victorian sensation: the extraordinary publication, reception, and secret authorship of Vestiges of the Natural History of Creation* (Chicago and London, 2000); R. M. Young, *Darwin's metaphor: nature's place in Victorian culture* (Cambridge, 1985).

those figures whose careers have appeared most successful in hindsight as 'Whig' history. Instead, they have looked to popular manifestations of science for a more nuanced picture of the way in which science has been a part of public culture not simply an activity apart. Classic studies such as Steven Shapin's of the Pottery Philosophical Society and Arnold Thackray's of science in Manchester have opened new avenues of historical research by demonstrating the use of science for social and cultural ends.[30] There has been a recent flowering of interest in provincial British scientific societies, especially among historians of the nineteenth century.[31] There has also been much interest in popular print forms of science.[32] Yet neither Ireland's scientific societies nor its numerous scientific publications have attracted the comparable attention of scholars in the past ten years.[33] This dissertation examines popular and informal communities of science such as voluntary societies and considers perspectives on science from religious and political groups as well as from practitioners of science. Scientific communities demonstrate many of the same dynamics as other human spheres, despite the protestations of scientists to be free from political or cultural influence. Likewise, other types of communities have found a variety of uses for

[30] Thackray, 'Natural knowledge'; Shapin, 'The Pottery Philosophical Society'.
[31] In addition to those already mentioned see S. J. M. M. Alberti, 'Amateurs and professionals in one county: biology and natural history in late Victorian Yorkshire', *Journal of the History of Biology*, 34 (2001), pp. 115-147; R. J. Morris, 'Voluntary societies and British urban elites, 1780-1850: an analysis', *Historical Journal*, 26 (1983), pp. 95-118.
[32] R. Barton, 'Just before *Nature*: the purposes of science and the purposes of popularization in some English popular science journals of the 1860s', *Annals of Science*, 55 (1998), pp. 1-33; W. H. Brock and A. J. Meadows, *The lamp of learning: two centuries of publishing at Taylor & Francis* (London, 1998); G. Cantor and S. Shuttleworth (eds), *Science serialized: representations of the sciences in nineteenth-century periodicals* (London and Cambridge, MA, 2004); G. Cantor, S. Shuttleworth and J. R. Topham, 'Representations of science in the nineteenth-century periodical press', *Interdisciplinary Science Reviews*, 28 (2003), pp. 161-168; A. Fyfe, *Science and salvation: evangelicals and popular science publishing in Victorian Britain* (Chicago, 2004); L. Howsam, 'An experiment with science for the nineteenth-century book', *British Journal for the History of Science*, 33 (2000), pp. 187-207; A. J. Meadows, *Science and controversy: a biography of Sir Norman Lockyer* (London, 1972); A. J. Meadows, 'Springer-Verlag, history of a scientific publishing house; part 1, 1842-1945, foundation, maturity, adversity', *Journal of the Society of Archivists*, 19 (1998), pp. 253-254; Secord, *Victorian sensation* ; S. Sheets-Pyenson, 'A measure of success: the publication of natural history journals in early Victorian Britain', *Publishing History*, 9 (1981), pp. 21-36; S. Sheets-Pyenson, 'Popular science periodicals in Paris and London: the emergence of a low scientific culture, 1820-1875', *Annals of Science*, 42 (1985), pp. 549-572; E. C. Spary, 'The world in a box: history of a picture encyclopedia from the eighteenth century', *Studies in History and Philosophy of Science*, 30A (1999), pp. 355-362; J. R. Topham, 'Scientific publishing and the reading of science in nineteenth-century Britain: a historiographical survey and guide to sources', *Studies in History and Philosophy of Science*, 31A (2000), pp. 559-612.
[33] For exceptions see Bayles, 'Science in its local context'; Livesey, 'The Dublin Society'; Rockley, 'Towards an understanding'.

science to meet cultural, social or even political ends. Viewing science in the context of communities links this thesis to a focus on the local that has characterised a group of work in both Irish history and the history of science.[34] However, I think it is important that local perspectives are not examined at the expense of national or international ones.

Historians no longer consider scientific activity to occur in a vacuum which excludes social, political and cultural influences, nor do the stories of many scientific 'discoveries' adhere to the old view of the lone scientist generating knowledge about nature in the absence of interference from the outside world. Historians have also moved beyond the idea that only science which achieves international recognition or which turns out to be 'right' is worthy of historical attention. It is with this in mind that this thesis has been titled 'Communities of science'. The intellectual discipline of science in the nineteenth century had within itself many communities, some overlapping, ranging from groups of casual devotees to scientific professors and serious researchers. Each of these groups has had different uses for science. Each community of science contributed to collective understandings of what science was and what it could achieve. Thus each of the chapters in this thesis explores different aims and uses of science within different types of communities and contexts.

Chapter Two situates the colleges, and their scientific content, in familiar debates surrounding the role of religion in education and the controversy surrounding their establishment. The colleges are seen to have been crucial in sparking and shaping debates about the relative influences that science and religion should

[34] In history of science see for example Alberti, 'Amateurs and professionals in one county: biology and natural history in late Victorian Yorkshire'; C. W. J. Withers and D. A. Finnegan, 'Natural history societies, fieldwork and local knowledge in nineteenth-century Scotland: towards a historical geography of civic science', *Cultural Geographies*, 10 (2003), pp. 334-353; D. A. Finnegan, 'Natural history societies in late-Victorian Scotland and the pursuit of local civic science', *British Journal for the History of Science*, 38 (2005), pp. 53-72; R. H. Kargon, *Science in Victorian Manchester: enterprise and expertise* (Manchester, 1977); C. E. Makepeace, *Science and technology in Manchester: two hundred years of the Lit. and Phil.* (Manchester, 1984); Miskell, 'The making of a new "Welsh Metropolis"'; J. B. Morrell, 'Wissenschaft in Worstedopolis: public science in Bradford, 1800-1850', *British Journal for the History of Science*, 18 (1985), pp. 1-23; Neswald, 'Science and sociability'. In Irish history see; A. Bielenberg, *Cork's industrial revolution, 1780-1880* (Cork, 1991); Cunningham, *'A town tormented by the sea'* ; R. Gillespie and M. Hill (eds), *Doing Irish local history: pursuit and practice* (Belfast, 1998); L. Kennedy and P. Ollerenshaw (eds), *An economic history of Ulster, 1820-1939* (Manchester, 1985); D. Roche, *Local government in Ireland* (Dublin, 1982).

have in Irish life. I argue that the Queen's Colleges were specifically intended to provide scientific education for the middle classes as part of a larger project to economically improve the country through science. The rejection of the Queen's Colleges by the Catholic Church, therefore, had lasting effects on the cultivation of science in Ireland, and especially within the Catholic community.

Despite the controversy surrounding the colleges, professors arrived in Cork, Belfast and Galway in 1849. Chapter Three discusses, through the example of Cork, what kind of a community awaited them. Cork's scientific societies had been integral in the placing of a college in that town, and their roles were changed by the presence of the professors. Some societies were temporarily strengthened by the new members, and the nature of their activities changed. The professors participated in local science popularisation efforts and their presence altered the way in which science was presented and by whom. Their support for the Cuvierian Society, which prioritised the generation of scientific knowledge, led to a temporary fading of the Scientific and Literary Society and its model of scientific socialising.

Aside from participating in scientific societies, the Queen's College professors were also expected to teach. Chapter Four deals with just how science was taught in these new colleges, and how this education compared with alternatives available. Examining the agriculture diploma in Belfast, this chapter shows how the colleges struggled to fulfil expectations of creating an improving class for Ireland. Despite the considerable rhetoric devoted to the potential for scientific advancement, there was disagreement in how education could be harnessed to this aim. The agriculture diploma was forced to compete with other private and governmental initiatives for agricultural education and was eventually sacrificed to conflicting demands for practical instruction and theoretical knowledge.

Another manner in which the science professors educated both students and the inquiring public was through museums, examined in Chapter Five. The colleges' museums were assembled as general collections of objects from across the British Empire and as such presented an image of the museums, and the colleges, as national rather than local institutions. The manner in which the professors

added to their collections reveals links between members of Irish and British scientific communities and demonstrates differences between the scientific infrastructure of the three college towns. Chapter Five demonstrates how the museums, much like the colleges themselves, acted as resources for improving the community and also demonstrated to visitors that intellectual culture had arrived in provincial Ireland.

The final chapter of this dissertation turns to the scientific community itself in an account of the controversy over *Eozoön Canadense*, believed to be the oldest fossil organism. Two Galway professors harnessed an invisible scientific community through letters and publication in an effort to resolve the controversy in their favour. Their location was important to the manner in which they participated in the controversy, necessitating a reliance on communication through periodicals and a correspondence. Despite these disadvantages, they successfully stamped their voice on the controversy. The *Eozoön* controversy demonstrates that peripheral locations should not be discarded as centres of scientific activity.

Throughout this dissertation I will show that provincial Ireland had a diverse scientific culture. Science was an intellectual sphere and a cultural activity as well as a set of practices for studying the natural world. The activities of voluntary societies and agricultural improvers, the displays of museums and the views of religious and political communities are just as vital to our understanding of the role of science in nineteenth-century Ireland as the activities of recognised men of science. By drawing from these different perspectives on science and examining different communities of science, this dissertation will present science as an integral part of life in nineteenth-century provincial Ireland.

2

Science in a divided community: politics, religion and controversy in the founding of the Queen's Colleges

> For, as there is nothing in scientific studies that does not elevate and improve the mind, and as science, when sanctioned by religion, is ever a handmaid for all things good, the nature of our objects cannot but receive the sympathy of every one who loves to see the removal of obstructions which impede the pursuit of knowledge.
>
> Henry Hennessy, 1859[35]

> …science is by no means essential to man's welfare…
>
> Cardinal Nicholas Wiseman, 1858[36]

Introduction

The contrasting opinions of the Catholic man of science Henry Hennessy and Cardinal Nicholas Wiseman given above indicate that men were not of one mind when it came to the importance of science or its relationship with religion. Previous studies have identified the Queen's Colleges as institutions envisioned to deliver science education and have rightly pointed to their failure to produce significant numbers of scientific men for Ireland.[37] This chapter will go beyond these studies by explaining how science and secular education for the middle classes came to be combined in the Queen's Colleges and what effects the failure

[35] H. Hennessy, *A discourse on the study of science in its relations to individuals and to society* (Dublin, 1859), p. 52.
[36] N. Wiseman, *The sermons, lectures, and speeches delivered by His Eminence Cardinal Wiseman, Archbishop of Westminster, during his tour in Ireland in August and September 1858* (Dublin, 1859) p. 247.
[37] E. Leaney, '"The property of all": public access to scientific education in nineteenth-century Ireland' (PhD, University of Oxford, 2002), pp. 197-221; B. B. Kelham, 'Science education in Scotland and Ireland, 1750 to 1900' (PhD, Victoria University of Manchester, 1968), pp. 7.60-7.76.

of this system to gain support from the Catholic hierarchy had on science in Ireland.

I will argue that a concept of 'science for improvement' was popular among liberal politicians in nineteenth-century Ireland, individuals who were also in favour of religiously mixed education as a means of dissolving sectarian strife.[38] The government viewed the combination of science and secular education in the Queen's Colleges as an expedient way to better the country. The Catholic Church, by contrast, viewed this as an efficient system for eradicating its influence over the Irish middle classes. The government chose not to fill the colleges with local men or to prioritise the representation of Catholics in an effort to create what it believed would be neutral, national institutions. The resulting dominance of Protestants among the appointees did not appear neutral to even the most liberal Catholics and seemed to justify the hierarchy's worst fears. The Catholic hierarchy was primarily opposed to the colleges on the basis that they were secular and would have a mixed student body of Catholics and Protestants. However, its efforts to restrain their influence also demonstrate a suspicion of secular science which foreshadows future debates, such as that over evolution. The results of the Catholic Church's ambivalent attitude towards the importance of science is reflected in the personally expedient career choices made by some of Ireland's most promising Catholic men of science. While Robert Kane maintained his support for mixed education, William Sullivan and Henry Hennessy drifted between secular and Catholic institutions. The rejection of the Queen's Colleges by the Catholic hierarchy, combined with the government's hiring strategies, can be said to have prevented the colleges from forming a politically and religiously neutral scientific culture for Ireland.

Although science and religion were considered overlapping spheres of knowledge during much of the past, the nineteenth century saw numerous challenges to this generally harmonious relationship.[39] In the late nineteenth

[38] Education of different religious sects together was referred to by a number of terms in the nineteenth century, including 'mixed' and 'united', the latter being a term preferred by those Irish politicians in favour of the idea.
[39] Two good introductions to the science and religion literature are J. H. Brooke, *Science and religion: some historical perspectives* (Cambridge, 1991) and D. C. Lindberg and R. L. Numbers,

century, for example, certain men of science wished to limit the influence of religion on scientific investigation, especially when science proposed explanations for natural phenomena that were seen to be in conflict with revelation.[40] The majority of work examining the relationship between science and religion in the nineteenth century has focussed on Protestants.[41] The relationship between the Catholic Church and science in the nineteenth century has not been as well studied.[42] Therefore, the controversy surrounding the Queen's Colleges and the teaching of secular science in Ireland should be of particular interest.

Voluntary secular institutions dedicated to science education appeared throughout the United Kingdom in the nineteenth century. These institutions tended to consist of middle-class physicians, surgeons and industrialists who were also politically liberal Protestant Dissenters. Such organisations frequently promoted the idea that science could encourage industrial development and religious toleration.[43] Although much of this literature has focussed on England

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God and nature: historical essays on the encounter between Christianity and science (London, 1986).

[40] See for example R. Barton, '"Huxley, Lubbock, and half a dozen others": professionals and gentlemen in the formation of the X Club, 1851-1864', *Isis*, 89 (1998), pp. 410-444; P. J. Bowler, *Evolution: the history of an idea* (Berkeley, 2003); A. Desmond, 'Redefining the X axis: "professionals", "amateurs" and the making of mid-Victorian biology', *Journal of the History of Biology*, 34 (2001), pp. 3-50; A. Desmond, *Huxley: the devil's disciple to evolution's high priest* (London, 1998); R. M. Young, *Darwin's metaphor: nature's place in Victorian culture* (Cambridge, 1985).

[41] On Protestantism and science see for example J. H. Brooke, 'Science and theology in the Enlightenment' in W. M. Richardson and W. J. Wildman (eds), *Religion and Science: History, Method, Dialogue* (London, 1996), pp. 7-27; A. Fyfe, *Science and salvation: evangelicals and popular science publishing in Victorian Britain* (Chicago, 2004); D. Livingstone, *Darwin's forgotten defenders: the encounter between evangelical theory and evolutionary thought* (Grand Rapids, MI, 1987); J. R. Moore, *The post-Darwinian controversies: a study of the Protestant struggle to come to terms with Darwin in Great Britain and America* (Cambridge, 1979). A notable recent exception is G. Cantor, *Quakers, Jews and science: religious responses to modernity and the sciences, 1650-1900* (Oxford, 2005).

[42] Galileo and the Church, by contrast, is a popular subject, see for example P. Redondi, *Galileo, heretic* (London, 1990). On the Catholic Church and science in the nineteenth century see B. Brundell, 'Catholic Church politics and evolution theory, 1894-1902', *British Journal for the History of Science*, 34 (2001), pp. 81-95. By kind permission of the author I have been able to read advance proofs of a forthcoming survey on the subject by Don O'Leary, *Roman Catholicism and Modern Science*, which will be published in September 2006, by Continuum.

[43] A good summary of current thought on the subject is provided in P. Elliott, 'The origins of the "creative class": provincial urban society, scientific culture and socio-political marginality in Britain in the eighteenth and nineteenth centuries', *Social History*, 28 (2003), pp. 361-387. Two classic studies are S. Shapin, 'The Pottery Philosophical Society, 1819-1835: an examination of the cultural uses of provincial science', *Science Studies*, 2 (1972), pp. 311-36; A. Thackray,

and Scotland, there are examples from Ireland and Wales.[44] Nineteenth-century scientific societies shared many characteristics, and the detailed workings of Cork's societies will be discussed in the next chapter. What I want to focus on in this chapter is the ideal of science as a harbinger of progress and economic development. In this rosy picture, sectarian and political strife, derived from ignorance, dissolved as a result of education and the prosperity it would bring. These are the idealistic images that drove the development of the Queen's Colleges and that led their supporters to believe that a secular, scientific curriculum would be acceptable to representatives of all creeds. As with many ideals, this soon proved naïve: the colleges were condemned by the Catholic Church and Catholic political leaders followed suit. Leaney has shown that science was promoted as neutral, secular territory in nineteenth-century Ireland and linked to educational programmes.[45] However, he has not attempted to explain the failure of those promoting 'secular science' for progress to persuade others or examined the effects of this failure on the perception of science in Ireland, which is what the remainder of this chapter will do.

Science and the liberal agenda

In 1843, William Smith O'Brien[46] began drafting a letter to Queen Victoria, stating the reasons why the Repeal Association demanded the repeal of the 1801 Act of Union. This was largely a list of Irish grievances, suffered under the rule of England since the beginning of the century. If these grievances were not rectified, O'Brien and the Repealers cautioned, political strife might escalate to

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'Natural knowledge in cultural context: the Manchester model', *American Historical Review*, (1974), pp. 672-709.

[44] L. Miskell, 'The making of a new "Welsh metropolis": science, leisure and industry in early nineteenth-century Swansea', *History*, 88 (2003), pp. 32-52; R. Bayles, 'Understanding local science: the Belfast Natural History Society in the mid-nineteenth century' in D. Attis and C. D. Mollan (eds), *Science and Irish culture: volume 1, 2004* (Dublin, 2004), vol. 1, pp. 139-169; J. Livesey, 'The Dublin Society in eighteenth-century Irish political thought', *Historical Journal*, 47 (2004), pp. 615-640; D. Gwynn, 'Cork Cuvierian Society, 1849-1851', *Cork University Record*, 23 (1951), pp. 27-34; J. E. Rockley, 'Towards an understanding of the development of antiquarian and archaeological thought and practice in Cork up to 1870' (PhD, University College Cork, 2000).

[45] Leaney, '"The property of all"'; E. Leaney, 'Science and conflict in nineteenth-century Ireland' in N. Garnham and K. Jeffery (eds), *Culture, place and identity* (Dublin, 2005), pp. 66-77.

[46] O'Brien was a member of the Repeal Association and the liberal MP representing County Limerick at the time. He was later the leader of the failed 1848 rebellion in the south of Ireland and was transported to Australia. See *Oxford dictionary of national biography* (60 vols., London, 2004); R. Sloan, *William Smith O'Brien and the Young Ireland rebellion of 1848* (Dublin, 2000).

violence. (One of the signatories of O'Brien's address was Thomas Wyse, whose role in founding the Queen' Colleges will be explored below.) Among the claims in the letter was the sad state of Ireland's economy:

> Notwithstanding our connection with a nation which boasts to be the wealthiest, the most enlightened, and the most powerful in the world, our commerce, our manufactures, our fisheries, our mines, our agriculture, attest, by their languishing and neglected condition, the baneful effects of your misgovernment.[47]

According to O'Brien, a key result of England's rule of Ireland had been its economic ruin. How, the Repealers asked, was this possible in light of the comparatively advanced state of the English economy? Ireland's resources had been overlooked or mismanaged.

The idea that Ireland was in possession of neglected resources, and that proper exploitation of such would lead to national progress, was a popular fixation in the nineteenth century and one which was fostered by a series of scientific surveys conducted by the government and by private bodies. The Irish Ordnance Survey was begun in 1824 under the direction of Thomas Colby and Thomas Larcom, officers in the British Army. While the survey was really an information gathering exercise, Larcom for one believed that the dissemination of its results would produce change and promote progress through the science of statistics.[48] A contemporary commentator termed it the 'peripatetic university', acknowledging its embrace of many fields of scholarship (from archaeology to zoology) as it moved from one location to the next.[49] The Ordnance Survey also spawned the Geological Survey, one of the largest employers of men of science in Ireland throughout the nineteenth century.[50] Earlier scientific studies included a survey of the peat bogs from 1810 to 1814. Commissioned by Parliament, the bog survey was intended to determine whether several large bogs might be

[47] William Smith O'Brien, draft of address to the Queen, 3 August 1843, Smith O'Brien Papers.
[48] G. Doherty, *The Irish Ordnance Survey: history, memory and culture* (Dublin, 2004).
[49] Ibid., p. 193.
[50] J. H. Andrews, *A paper landscape* (Dublin, 2002, [1975]); G. L. Herries Davies, *North from the Hook: 150 years of the Geological Survey of Ireland* (Dublin, 1995); G. L. Herries Davies, *Sheets of many colours: the mapping of Ireland's rocks, 1750-1890* (Dublin, 1983).

drained for agricultural purposes.[51] Embedded within the purpose of each of these ventures was a firm belief that scientific information would lead to improved exploitation of resources.

Almost one hundred years earlier, the Dublin Society (later the Royal Dublin Society) also attempted a science for improvement scheme in which premiums were awarded for scientific experiments in agriculture and aquaculture as well as success in animal husbandry.[52] Throughout the nineteenth century the Royal Dublin Society (RDS) continued to promote the idea of science for industrial and agricultural progress through its annual exhibitions, at which prizes were awarded for animals and for examples of manufactures.[53] The RDS's annual Parliamentary grant testified to the government's favourable disposition towards science and its expected beneficial effects for Ireland.[54] Parliament also sponsored a lecture scheme in which the RDS's scientific professors were provided to provincial societies for public lectures on science.[55]

Enterprising young chemist and RDS lecturer, Robert Kane, sought to extend the government's commitment to scientific education in Ireland. His book, *The Industrial Resources of Ireland* (1844) caught the national mood and explicitly linked science, education and Irish economic development.[56] Kane was the son of John Kean, a former United Irishman who fled the country after the failed 1798 rebellion and changed his name upon returning. The family owned a successful chemical factory and Robert had been educated at Trinity College, Dublin as well as in the famous chemical laboratory of Justus von Liebig at Giessen. Kane chose a career in science from an early age and through the

[51] P. Foss and C. O'Connell, 'Bogland: study and utilization' in J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997), pp. 184-198.
[52] For the most recent history of the RDS in the nineteenth century see K. Bright, *The Royal Dublin Society, 1815-1845* (Dublin, 2004). See also H. F. Berry, *A history of the Royal Dublin Society* (London, 1915), J. Meenan and D. Clarke (eds), *RDS: the Royal Dublin Society, 1731-1981* (Dublin, 1981); Livesey, 'The Dublin Society'.
[53] Bright, *The Royal Dublin Society, 1815-1845*, pp. 91-9, 209-13.
[54] Ibid. The many disputes between Parliament, Dublin Castle and the RDS over the administration of this grant might also have served as a warning of problems to come in negotiating between conflicting expectations.
[55] E. Leaney, 'Missionaries of science: provincial lectures in nineteenth-century Ireland', *Irish Historical Studies*, 34 (2005), pp. 266-288.
[56] R. Kane, *The industrial resources of Ireland* (Dublin, 1844).

publication of papers, the editorship of the *Dublin Journal of Medical Science* and popular lecturing he quickly gained a substantial reputation.[57]

Kane's reputation, and his commitment to science for the social progress of Ireland, was cemented by the publication of *The Industrial Resources of Ireland*. The book became a standard scientific source and an inspiration to other promoters of scientific progress.[58] In the book Kane argued that progress for Ireland was possible through industrial development. This development was currently impeded not by Ireland's lack of natural resources, but by its lack of appropriate knowledge. 'The fault is not in the country,' Kane wrote, 'but in ourselves; the absence of successful enterprise is owing to the fact, that we do not know how to succeed; we do not want activity, we are not deficient in mental power, but we want special industrial knowledge.'[59] By industrial knowledge Kane meant theoretical and applied science. Kane, ever the politician, also used his book to endorse the Royal Dublin Society as a potential sponsor of a scheme of industrial education. Kane no doubt envisioned himself as leading the enterprise, employed as he was by the RDS as a professor of chemistry. Instead, Kane founded a rival institution, the Museum of Irish Industry, in 1845 to perform the task of industrial education and became its director at a salary of £300 per annum.[60] Also in 1845, he was selected as the president of Queen's College, Cork. Kane's notion of promoting Irish progress through scientific and industrial education had clearly stuck a chord with Sir Robert Peel and had garnered him the support of the Irish administration in Dublin Castle.[61]

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[57] T. S. Wheeler, 'Sir Robert Kane, his life and work' in, *The natural resources of Ireland: a series of discourses delivered before the Royal Dublin Society on April 12th, 13th and 14th, 1944, in commemoration of the centenary of the publication by the Society of Sir Robert Kane's 'The industrial resources of Ireland'* (Dublin, 1944), p. 90.

[58] For example, Thomas Leavitt, an American entrepreneur used Kane's analysis of peat as a fuel to promote a peat-burning industry in Massachussetts. See T. H. Leavitt, *Facts about peat as an article of fuel* (Boston, 1867).

[59] Kane, *The industrial resources of Ireland* , p. 393.

[60] Leaney, 'Science and conflict'; Leaney, '"The property of all"'; *Return of Expenditure for the Museum of Practical Geology in London, and Museum of Irish Industry in Dublin, to Jan. 1851*, H. C. 1851 [639], l, 665.

[61] For the correspondence between Kane and Thomas Larcom, undersecretary for Ireland from 1853 to 1868, see the Larcom Papers 7667 and 7668. On Larcom see T. E. Jordan, *An imaginative empiricist: Thomas Aiskew Larcom (1801-1879) and Victorian Ireland* (Lewiston, 2002).

Kane's book also interested the Catholic clergy, many of whom had only recently become politically active through Daniel O'Connell's campaign for Catholic Emancipation.[62] A favourable review appeared, probably written by Charles Russell of the Maynooth Catholic seminary, in the *Dublin Review*, in which the author claimed that the book's final chapter 'to the literary reader will probably prove the most attractive of all'. The subject of the chapter was 'the necessity of industrial education, as an element of the industrial prosperity of the nation'.[63] The clergy, especially parish priests, were acutely aware of the poverty and lack of education prevalent in rural Ireland. Perhaps they were therefore prepared to embrace the suggestion of expanding industrial education when economic results were promised.

In common with Smith O'Brien, the Repeal politician and author of the list of Irish grievances previously mentioned, Kane was a supporter and member of various scientific societies whose mission statements contained the same promise of economic prosperity to be gained through the application of science to Ireland. For example, the Clonmel Mechanics' Institute, which O'Brien donated to, promised to 'prepare the ground for the coming development of the long neglected industrial resources of the country, and the consequent amelioration and improvement of the unhappy condition of its people.'[64] Unlike the mechanics' institutes of Britain's industrial centres that aimed to educate the labourers in the industrial revolution, the Clonmel institute hoped by education to create the revolution itself. Similar missions might be cited for a number of different scientific bodies throughout Ireland.[65]

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[62] Catholic Emancipation was granted in 1829 and officially lifted restrictions against Catholics holding elected office. Daniel O'Connell was a Catholic landowner who had led the agitation for emancipation, organising mass meetings which threatened civil unrest. The issue came to a head when O'Connell was elected MP for Clare in 1828 and refused to swear the oath necessary to take his seat in Parliament. After emancipation O'Connell led the Catholic movement for repeal of the Union until his death in 1847. See O. MacDonagh, *O'Connell: the life of Daniel O'Connell, 1775-1847* (London, 1991).

[63] 'Kane's *Industrial Resources of Ireland*', *Dublin Review*, 17 (1844), pp. 133-158, p. 156.

[64] Clonmel Mechanics' Institute to William Smith O'Brien, 12 June 1845, Smith O'Brien Papers.

[65] E. Neswald, 'Science and sociability in nineteenth-century provincial Ireland: the Galway Mechanics' Institute', *British Journal for the History of Science*, (expected December 2006); M. E. Daly, *The spirit of earnest inquiry: the Statistical and Social Inquiry Society of Ireland, 1847-1997* (Dublin, 1997).

Beyond the suggested causative link between scientific knowledge and industrial development, the progressive nature of science was also to be seen in its lack of adherence to any religious or political creed. Thus the promoters of 'science for progress' often stressed its special utility to serve as a neutral ground in divided Ireland. Scientific societies also identified themselves as mixed and secular, almost universally banning the discussion of religion or politics from within their walls. Here members of different religions and political persuasions could intermingle and find common ground in their economic class. The government was insistent on this politico-religious neutrality as a prerequisite for financial support of the Royal Dublin Society and even went so far as to demand the cessation of the newspaper room as potentially incendiary.[66]

The idea that religious toleration and thus social progress would spring from secular institutions had been used as an argument in favour of the national schools system, founded in 1831. These schools, backed by liberal MPs such as Thomas Wyse and Thomas Davis[67], were only tentatively supported by the Catholic hierarchy. Knowledge of the secular and, some thought, heretical schools in post-revolutionary France led many to be sceptical.[68] In practice, the national schools had become denominational within two decades of opening because of a system in which the majority religion of the students determined the religion of the teacher.[69] The national schools also took on a substantial science curriculum, seen as importantly contributing to the economic benefits of the schools for Ireland. For example, there was an extensive agricultural education project which included courses in chemistry, natural philosophy and natural

[66] Bright, *The Royal Dublin Society, 1815-1845*, pp. 170-204.
[67] Davis was also a Repeal politician, but a Protestant who later disagreed with Daniel O'Connell over the Queen's Colleges. He died very young in 1845. See *Oxford DNB*. Wyse was MP for Waterford City, of an old Catholic family and unhappily married to Napoleon's niece. He led the 1830s commission to investigate education in Ireland. See J. J. Auchmuty, *Sir Thomas Wyse, 1791-1862: the life and career of an educator and diplomat* (London, 1939).
[68] For a discussion of Catholic clerical opinion on the national schools see D.H. Akenson, 'Pre-university education, 1782-1870', in W. E. Vaughn (ed.), *A new history of Ireland, V: Ireland under the Union 1, 1801-1870* (Oxford, 1989), pp. 523-37; A. Macaulay, *William Crolly, Archbishop of Armagh, 1835-49* (Dublin, 1994), Ch. 5; D. A. Kerr, *Peel, priests and politics: Sir Robert Peel's administration and the Roman Catholic Church in Ireland, 1841-1846* (Oxford, 1982).
[69] Akenson, 'Pre-university education', p. 536.

history.[70] As we will see in Chapter 4, several Queen's College professors wrote texts for the national schools both before and after their appointments to the colleges.[71]

Scientific societies such as the Royal Irish Academy (RIA) attempted to ban political and sectarian discord from their rooms, viewing science as a neutral space in which intellectuals of all creeds could participate. Thus Robert Ball refused a subscription to the RIA from the Repeal Association saying 'a liberal myself in politics, I exert all the influence I possess to prevent political feelings manifesting themselves in the scientific societies I am connected with'.[72] The Clonmel Mechanics' Institute claimed 'to bring Irishmen of all sects and parties into kindly and happy intercourse with each other'.[73] The Royal Cork Institution, the Royal Galway Institution, the Royal Dublin Society and the Cork Scientific and Literary Society all boasted members of every branch of Christianity.[74] Yet, the RDS managed to get itself in a tangle in 1835 when the Catholic Archbishop of Dublin, Daniel Murray, was refused admission to the society. This was seen as a purely sectarian statement and the society was castigated not only by the press, but by the liberal Irish administration and its grant was temporarily withdrawn.[75]

The same Robert Ball who refused the subscription of the Repeal Association had cause to complain to William Smith O'Brien that it was impossible to recruit Catholics for membership in the Zoological Society. O'Brien had evidently noted their under-representation on the society's council; a fact which Ball claimed was the result of their dearth among the members. 'I have done all I can do to interest the Roman Catholics with us,' but, Ball claimed, with a few

[70] D. H. Akenson, *The Irish education experiment: the national system of education in the nineteenth century* (London, 1970), pp. 148-8, 342-3.
[71] E. Murphy, *The agricultural instructor; or young farmer's classbook, being an attempt to indicate the connexion of science with practice in agriculture* (Dublin, 1853); J. F. Hodges, *The first book of lessons in chemistry, in its applications to agriculture: for the use of farmers and teachers* (Belfast, 1873).
[72] Robert Ball to William Smith O'Brien, no. 1228, 20 August 1844, Smith O'Brien Papers.
[73] Clonmel Mechanics' Institute to William Smith O'Brien, 12 June 1845, Smith O'Brien Papers.
[74] RCI Minute Book; CSLS Minute Book; K. Woodman, *Tribes to tigers: a history of the Galway Chamber of Commerce and Industry* (Galway, 2000).
[75] Bright, *The Royal Dublin Society, 1815-1845*, Ch. 5.

exceptions (including Robert Kane), they failed to display sustained interest.[76] Despite the declarations of scientific societies to be open and accepting of Catholic members, the 1861 census showed that of 21 persons who identified their occupation as secretary to a society, only 4 were Catholic (see Figure 2.1). This statistic suggests that Catholics may have been a relative minority among members of scientific societies and this is further borne out by historical studies of these societies (including the Cork societies discussed in the following chapter).[77] If supporters of secular scientific education were expected to emerge from those involved in secular scientific societies, it seems Catholics were under-represented among them. This consideration was largely overlooked by the advocates of the Queen's Colleges.

For many liberals, secularism in public institutions was an important political objective. Thomas Davis, a Protestant Repealer, emphasised the necessity of maintaining the secularity of the political movement and of the future separate Irish state as he imagined it, writing to O'Brien that 'I wd [sic] prefer a military to a theocratic government'.[78] He hoped that O'Brien could temper what he viewed as the excessively religious attitude of O'Connell: 'it behoves [sic] all Protestants to unite on Education, it will be our guarantee against a Browne & McHale government'.[79] In the 1830s, Davis and O'Brien both contributed suggestions to the plans that Thomas Wyse was making for secular provincial colleges. Wyse also requested the opinions of the moderate Archbishop Murray. In his letters to Murray he tried to emphasise the progressive agenda for the colleges, indicating that their scientific focus could be a neutral ground for students of diverse religions. The colleges, Wyse claimed, would educate students in 'the sciences most calculated to promote national industry & knowledge, such as the mathematics, mechanics, natural philosophy, navigation,

[76] Robert Ball to William Smith O'Brien, January 1846, Smith O'Brien Papers.
[77] A significant exception was the first Galway Mechanics' Institute which was dominated by politically conservative Catholics. See Neswald, 'Science and sociability'.
[78] Thomas Davis to William Smith O'Brien, 30 November 1844, Smith O'Brien Papers.
[79] Thomas Davis to William Smith O'Brien, n.d., Smith O'Brien Papers. 'McHale' was Archbishop John MacHale of Tuam, an extreme conservative who was against the national schools and in favour only of religious education. Bishop G. Browne of Galway was a member of MacHale's episcopate and a fellow politicised supporter of Repeal. See O. MacDonagh, 'The politicization of the Irish Catholic bishops, 1800-1850', *Historical Journal*, 18 (1975), pp. 37-53; Kerr, *Peel, priests and politics*, pp. 75-6.

statistics, political economy on a popular plan, agricultural & commercial chemistry &c &c'.[80]

When the recommendations of Wyse's committee on Irish education were published in 1838, the concept of provincial colleges for the promotion of science featured prominently. This idea was seized upon by members of several of Cork's scientific societies who promptly formed the Munster College Committee. In a declaration of their vision of the new colleges, the committee reinforced their need to promote scientific progress: 'In a country like Ireland, whose real wealth is mainly based upon Agriculture, Public Education ought to be so constituted as to diffuse, in the most available form, that practical and scientific information which may best conduce to industrial success and national prosperity.'[81] Yet members of the committee privately worried about the success they would have in maintaining a secular agenda or receiving the support of Catholics for secular colleges. Catholic medical man Denis Bullen wrote to Wyse that several priests had expressed interest in the activities of the committee and that 'We should therefore be early to the field and try to enlist the moderate men of all parties in favour of secular institutions, by putting forward a temperate and well considered exposition of the system.'[82]

The ideas of science, social progress and secularity were intertwined with a liberal political agenda and thus their combination in the plans for the provincial colleges is easily understood. What the promoters of the colleges scheme had not anticipated was the controversy that such colleges would create within Ireland. While it was generally agreed that scientific education was a good thing and that educational advantages needed to be extended to Catholics, secular colleges were not viewed favourably by many public figures outside of a coterie of liberals. While some saw the future colleges simply as an extension and formalisation of existing scientific societies (such as the Royal Cork Institution), others saw them as a new and dangerous way of promoting irreligion. The next section will examine the roots of religious, especially Catholic, rejection of the

[80] Thomas Wyse to Archbishop Daniel Murray, 12 January 1831, Murray Papers.
[81] Letter of the Munster Provincial College Committee, 18 October 1844, Smith O'Brien Papers.
[82] Denis Bullen to Thomas Wyse, 11 August 1844, Wyse Letters.

Queens Colleges as founded in 1845. This was symptomatic not only of a deep political split among Repealers, but also of a growing divide between secular intellectual life and the churches who had formerly controlled education.

Founding of the colleges and religious reaction

During the 1840s Thomas Wyse was in constant correspondence with the government, his peers and several members of the Catholic church in his efforts to create a plan for provincial colleges.[83] The introduction of the colleges bill by the conservative administration of Sir Robert Peel was a significant coup. However, the announcement and even the passing of the Colleges (Ireland) Act in 1845 by no means marked the end of debate and negotiation. Instead, it seemed to spur many into action. Articles appeared in leading periodicals and the daily newspapers and some Catholics and conservative Presbyterians began plans to found alternative universities of their own.

From the debate surrounding the Queen's Colleges there emerged a larger argument regarding the respective places of science and religion in Irish (and British) society. As we have seen, political liberals regarded science as a neutral ground and scientific education as an appropriate basis for mixed education. In the context of voluntary societies for adults this did not trouble either Catholics or conservative Protestants, but backed by the government in the form of the Queen's Colleges many became much more concerned. They believed that the separation of scientific and religious education was a mistake and served to propagate the dangerous notion that scientific knowledge superseded religious knowledge.[84] This was not the first appearance of this disagreement about the roles of religion and science, but it was perhaps the most forcefully voiced

[83] There are disagreements over Wyse's actual influence on the government's plan for the Queen's Colleges, but it is certain that his ideas were presented to Peel and the cabinet and that many were taken up. See Wyse Letters; Auchmuty, *Sir Thomas Wyse*, pp. 145-66; Kerr, *Peel, priests and politics*, p. 301.

[84] See for example Fyfe, *Science and salvation: evangelicals and popular science publishing in Victorian Britain*; J. R. Moore, 'Geologists and interpreters of Genesis in the nineteenth century' in D. C. Lindberg and R. L. Numbers (eds), *God and nature: historical essays on the encounter between science and Christianity* (London, 1986); J. A. Secord, *Victorian sensation: the extraordinary publication, reception, and secret authorship of Vestiges of the Natural History of Creation* (Chicago and London, 2000); Moore, *Post-Darwinian controversies*.

rejection of secular science by the Catholic Church in Ireland before 1850.[85] The themes of this debate reappeared later in the century in the controversy over theories of evolution, the origin of man and expressions of scientific materialism in general.[86] Examining the debate over university education gives us greater insight into these later conflicts.

Consultation with the Catholic Church

The majority of the Catholic bishops in Ireland agreed that the Queen's Colleges must be rejected on the basis that mixed education was dangerous to Catholics. However, there was a reticence among some to reject the style of education the colleges intended to offer, i.e. practical subjects for the lay middle classes. Catholic reaction to the colleges scheme can be seen as trying to demonstrate both the superior importance of faith over science and the goodwill of the Church towards science. At the outset several influential members of the Catholic Church attempted to avert an open break with the government and lay Catholic supporters over the Queen's Colleges. The colleges bill was announced in Parliament on 9 May 1845. On 21 May, the Irish bishops gathered to discuss the proposal and adopted a reply in which they claimed that the colleges as presently planned were dangerous to Catholics. Rather than rejecting them, however, the bishops asked for several amendments that would make the bill acceptable to them including:

- A fair representation of Catholics on the staff of the colleges
- Catholic chairs of logic, metaphysics, moral philosophy, history, geology and anatomy
- Catholic chaplains provided for each of the colleges, selected by the bishops but salaried by the government

[85] Livingstone has noted that the Catholic Church was slow to react to evolutionary ideas. D. Livingstone, 'Darwin in Belfast: the evolution debate' in J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997), pp. 387-408. The idea of a conflict between Catholicism and science was given credence by the publication in 1864 of the *Syllabus of Errors*. See D. O'Leary, *Roman Catholicism and Modern Science* (London, 2006), pp. 23-6.

[86] D. Livingstone, 'Darwin in Belfast: the evolution debate' in J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997), pp. 387-408; G. Jones, 'Catholicism, nationalism and science', *Irish Review*, 20 (1997), pp. 47-61; Brundell, 'Catholic Church politics and evolution theory'; O'Leary, *Roman Catholicism*, Ch. 2.

- A board of trustees created for each college, upon which local bishops would sit, that would be responsible for appointments.[87]

At this point, a split had already emerged between the relatively progressive Archbishops Murray and William Crolly (Armagh) and the conservatives led by Archbishop MacHale and supported by Paul Cullen, the rector of the Irish College in Rome. MacHale wished to suggest that secular colleges would never be acceptable and that the only appropriate education measure for Catholics would be a Catholic university. By contrast, Murray and Crolly hoped to find a way to allow Catholics to take advantage of the colleges. Initially there appeared to be a fairly even division between supporters of Murray and Crolly and those of MacHale and Cullen. However, Murray and Crolly were eventually outnumbered among the bishops by those in favour of abandoning the Queen's Colleges and founding a Catholic university. In the view of these detractors the colleges represented a systematic, formal and lavishly funded attempt to favour science and secularism at the expense of religion.

Those Catholics who were against the colleges were concerned by the filling of specifically sensitive chairs as well as the dangers of the entire project of secular science education to Catholic youths. These concerns were well voiced by an 1845 pamphleteer calling himself 'A Catholic Priest'. The writer acknowledged the importance of introducing more scientific subjects to higher education, but protested against the subjugation of religion to this goal. The pamphlet suggested that the mere mixing of Catholic and Protestant students together was dangerous and inadvisable: 'This very close intimacy weakens the strength of pure Catholic principle, if it shall not tincture the mind of the youth with uncertain notions, as oftentimes happens.'[88] Instead of the Queen's Colleges, the author suggested, the Catholic seminary at Maynooth should also become a lay university with the power to confer degrees (not simply ordinations). The grant should be increased to create a laboratory, museum and observatory and the curriculum expanded to include scientific subjects such as chemistry and

[87] Macaulay, *William Crolly*, p. 355.
[88] A Catholic Priest, *Thoughts on academical education, ecclesiastical and secular, chiefly as regards the interests of the Catholic religious in Ireland* (Dublin, 1845), p. 46.

astronomy. The scheme of the Queen's Colleges to teach science without religion was dangerous folly:

> Where is the use of any science without religion?...The mind of man may climb the loftiest heights of science, number the worlds that roll above and around us, weigh them with accuracy, measure their vast distances, follow them steadily through thousands of years, and millions of miles, into those regions of space whither eye of instrument cannot reach…But what, if after all, the possessor of so much science, wholly intent upon the works of creation, should forget the Creator himself together with his own immortal soul—what then would all this science avail him? Nothing.[89]

The concern of the pamphlet author, and of several bishops, seems to have been firmly focussed on the allure of secular science. The writer implies that knowledge of the workings of the universe could give man false pride in his accomplishments and might tempt him to abandon or ignore religion altogether. The result of educating a generation of men at the Queen's Colleges would be devastating to the Catholic Church: 'vicious education could, in a few generations, do more injury to the Catholic religion than the sword could do in centuries of persecution.'[90] If the pamphleteer is to be believed, some members of the Catholic Church already believed science to represent a challenge to the authority of religion. The Queen's Colleges must have seemed to them not an effort at a religious and political compromise, but a government ploy to undermine the Catholic faith in the name of science and progress.

Yet there were other Catholics who supported the colleges and wished to disregard opinions that they saw as reactionary. Thomas Wyse was not deterred by the increasing opposition to the colleges among the Catholic hierarchy. Smith O'Brien worried that antagonism to the idea was growing among Catholics, but Wyse was more confident, writing: 'From letters received from Cork, I do not think there has been any relaxation of the Catholic feeling in favour of the plan:

[89] Ibid., p.59-60.
[90] Ibid., p. 9.

on the contrary'.[91] Further, Wyse did not see much hope of a different solution more satisfying to the likes of MacHale as he believed that the government would never grant funds for a Catholic university.[92] Later, Murray and Crolly also adopted this line of argument as a reason for ignoring their fellow bishops' suggestions for a Catholic university. Even after the colleges had been condemned by the Irish bishops in 1845, they continued to show their support for the colleges by lobbying Pope Gregory XVI (and then Pius IX, elected in 1846) in an effort to prevent condemnation of the scheme and acting as referees for Catholic candidates applying for posts in the colleges.[93]

The colleges bill was passed in July 1845, but negotiations continued in an attempt to make the colleges acceptable to the Catholic Church. Paul Cullen, rector of the Irish College in Rome, used his powerful Vatican connections to agitate for a wholesale condemnation of the colleges by Propaganda Fide.[94] Meanwhile Crolly was petitioning the Ulster College Commission (responsible for deciding on the location of the Ulster college) indicating his eagerness for a college to be established in his diocese of Armagh.[95] Writing to Thomas Larcom, a Catholic claimed that an Armagh college would be conciliatory towards Catholics as it would be 'under the eye of their Primate' (Crolly).[96] Crolly was praised by liberals and even the largely Presbyterian paper the *Belfast Newsletter* when he made public speeches in favour of the colleges, and in favour of one being located in Armagh. However, this behaviour was viewed less kindly by bishops opposed to the colleges, by Cullen and later by the Pope.

Murray and Crolly also continued their campaign in Rome, in an effort to prevent a total Papal condemnation of the colleges scheme. In this they were supported by the colleges board, made up of the presidents and vice presidents who had been appointed in November of 1845. This selection had been, some believed, very conciliatory to Catholics. Two Catholic presidents had been chosen,

[91] Thomas Wyse to William Smith O'Brien, 18 January 1844, Smith O'Brien Papers.
[92] Thomas Wyse to William Smith O'Brien, 14 February 1845, Smith O'Brien Papers.
[93] Macaulay, *William Crolly*; Murray Papers.
[94] For Cullen's letters on the subject see P. MacSuibhne (ed.), *Paul Cullen and his contemporaries* (5 vols., Naas, 1961), vol. 4, pp. 17-37.
[95] Armagh Committee to Thomas Larcom, 24 September 1845, Larcom Papers 7460.
[96] John Corry to Thomas Larcom, 23 September 1845, Larcom Papers 7460.

including one priest (Father Joseph Kirwan of Galway).[97] The further appointment of Reverend Joseph O'Toole as vice-president of Galway had been supported by Murray and Crolly.[98] The *Belfast Newsletter* claimed that the Galway college would now really be another Catholic seminary.[99] Throughout 1846 and 1847, the board attempted both to scale back Catholic demands and to meet concerns over religious guidance for the future students. For example, Robert Kane suggested a system of religiously segregated boarding houses, overseen by a religious official chosen by their respective hierarchy.[100] However, the issue of granting multiple posts in the disciplines that might be dangerous to Catholics was not pursued. Nor was there any change in the decision to make all professorships crown appointments.

Despite the lack of concessions to Catholic demands, Murray and Crolly continued to advocate the advantages of the scheme to Rome. In a letter to recently-elected Pius IX, they emphasised the practical nature of the education to be offered calling the Queen's Colleges 'the three new colleges for the scientific education of students of every religious persuasion destined for the professions of arts, law, and medicine'.[101] By presenting the colleges as means of professional education, Murray and Crolly hoped Pius IX would be persuaded that they were harmless to Catholics and in no way a challenge to religion.

Opposition among Protestants

While the Catholic Church presented a considerable obstacle to the success of the plan, conservative Protestants also found the colleges objectionable for very different reasons. Rather than seeing the colleges as undermining Catholicism, some Protestants viewed them as too large a concession to Catholics. The *Dublin University Magazine* was an organ of the Established Church and contributed to by many graduates of Trinity College, Dublin.[102] It had been

[97] T. Foley (ed.), *From Queen's College to National University: essays on the academic history of QCG/UCG/NUI, Galway* (Dublin, 1999).
[98] J. P. O'Toole to Archdeacon Hamilton, 4 November 1845, Hamilton Papers.
[99] 'The New Colleges—Appointment of Principles', 7 November 1845, *Belfast Newsletter*, p. 2.
[100] Robert Kane to Archbishop William Crolly, 15 October 1847, Murray Papers.
[101] William Crolly to Pope Pius IX, 28 October 1847, Murray Papers.
[102] See W. E. Hall, *Dialogues in the margin: a study of the Dublin University Magazine* (Buckinghamshire, 2000).

critical of the national schools, claiming they were the work of 'crafty priests and silly ministers'.[103] The schools, in the view of the writer, were not free of religion, but were becoming a medium for *Catholic* proselytising. After the 1838 report of Wyse's commission they sniffed the rising tide of secular education with apprehension. In an article which managed to damn Wyse with faint praise (his Catholicism 'served to give a quaint sort of interest to his character') the magazine struck out against the scheme of provincial colleges. With the current political crisis, in which the Established Church and the government were assailed from all sides, the proposed colleges would do further damage:

> We have said that the recommendation contained in the present report is identical, in principle and in spirit, with the Irish system of national education; and that, as the one has been successful in thrusting aside the church, so the other aims at superseding the university.[104]

The *Dublin University Magazine* clearly felt that the new colleges threatened Trinity's privileged position as Ireland's only university and might even cause its grant to be reduced. This was, the author argued, a totally unreasonable acquiescence to Catholics. Wyse and the Catholic hierarchy appeared to be collaborating on the creation of colleges that would satisfy their needs, but would undermine the proper government of Ireland.

Yet conservative Anglicans actually opposed the Queen's Colleges for similar reasons to the Catholic Church: they disbelieved the central claim of the colleges that the scientific education of the Irish youth would effect national improvement. The *Dublin University Magazine* writer quipped that the colleges were Thomas Wyse's ridiculous solution to the agrarian outrages, believed to be responsible for the recent murder of Lord Norbury: 'An injured and indignant gentry exclaim, how are the rights of property to be maintained? Mr. Wyse and the priests tell them, the people should be instructed in chemistry and natural history!'.[105] This mocked not only the colleges project, but the ideal at its base: that scientific education would improve Ireland. In its support for the landed

[103] 'English Theories and Irish Facts', *Dublin University Magazine* (1835), p. 696.
[104] 'Mr. Wyse's education project', *Dublin University Magazine*, 13 (1839), pp. 115-133, p. 116.
[105] Ibid., p. 117.

gentry, the magazine seemed to object generally to the education of 'the people' as it associated this with dangerous political movements. In this case the false pride acquired through education was explicitly linked to political problems rather than simply religious ones.

Grumblings aside, Irish Anglicans had few objections to the Queen's Colleges as long as no impact would be made on Trinity College. Presbyterians were also generally in favour, although the degree of support varied between the orthodox and reformed sects. Presbyterians of all sects were opposed to the Parliamentary grant to the Maynooth seminary, one pamphlet stating:

> We protest against the proposed endowment of Maynooth College, because it proceeds upon the sceptical or infidel principle that truth and error are equally calculated to promote the best interests of a nation.[106]

The Presbyterians felt that this would amount to the state paying to propagate the errors of the Catholic Church. Although not members of the Established Church, many Presbyterians felt they had more in common with Anglicans than with Catholics. They were thus concerned for the impact on Protestantism in Ireland that a government policy of 'each to his own' might have. If this was the way the government was inclined, they argued, why not endow a seminary for each of Ireland's religious groups rather than secular colleges?

Peel's government and the Irish secretariat did indeed feel they had a debt to pay the Presbyterians and to compensate for the Maynooth grant it was understood that the Ulster college would be made acceptable to the Synod of Ulster for the purposes of educating future Presbyterian ministers.[107] Thus the choice of a moderate Presbyterian clergyman (Pooley Shuldham Henry) as president and the location of the college in Belfast, the most Presbyterian of the Northern cities, were concessions to the Presbyterian body. This was at the expense of the eminent man of science James Thomson, professor of mathematics at the University of Glasgow, who had been led to believe his appointment as president

[106] *The Eastern reformed Presbyterian Synod's protest against the endowment of Maynooth College* (Belfast, n.d., [1845]), p. 3.
[107] Larcom Papers 7460; T. W. Moody and J. C. Beckett, *Queen's, Belfast, 1845-1949: the history of a university* (2 vols., London, 1959), vol. 1, p. 7.

was probable.[108] However, Henry was not the man that orthodox Presbyterians wanted. They had been lobbying for the appointment of Reverend Henry Cooke of Belfast, a conservative minister who was very much opposed to the liberal ideas of the Unitarians and was dissatisfied with the way that education had been conducted in the national schools and the Belfast Academical Institution.[109] Nevertheless, even orthodox Presbyterians were eventually convinced to give the colleges an opportunity, as they were preferable to allowing their sons to travel to Scotland for an education away from the watchful eyes of their ministers. As we shall see in the next section, accusations of sectarianism and party politics that were voiced before the professors had been chosen only began to multiply as the appointments were made.

Applications and appointments

Having passed an act founding secular colleges in Ireland, the government was now faced with the task of choosing appointees and in the process attempting to satisfy all interested religious parties while still appearing neutral. By the specification of the colleges act, all appointments were crown appointments and while advice was taken a large amount of power rested with the Irish secretariat. Initially the government showed a willingness to make conciliatory gestures towards Catholics. The presidents and vice-presidents, to some degree, represented the constituencies of the towns in which the colleges were placed. Kane was a Catholic and a Corkman. Henry was an Ulster Presbyterian. Kirwan was a Catholic priest for County Galway. This provincialism was criticised by the press. For example, the *Irish Unitarian Magazine* claimed that the popular Kane and his vice president John Ryall were 'not so extensively known to be men of general eminence in science, and of academic experience, as might have been desirable in the heads of a seminary about to be organized and put into operation under their auspices'.[110] It was even more scathing on the appointment of Henry and Kirwan saying that Kirwan was 'an indifferent scholar, totally

[108] C. Smith and M. N. Wise, *Energy and empire: a biographical study of Lord Kelvin* (Cambridge, 1989), pp. 111-3.
[109] On Cooke see F. Holmes, *The Presbyterian church in Ireland: a popular history* (Blackrock, 2000), Ch. 4.
[110] 'The new Irish colleges', *The Irish Unitarian Magazine*, 1 (1846), pp. 41-49, p. 46.

unacquainted with the sciences which ought to be taught in the college under his direction' and that Henry was even worse.[111]

There was a change in administration in 1846 when Peel resigned.[112] The liberal Whig Lord John Russell followed Peel as Prime Minister, and Russell seemed less willing to continue with the preferential hiring of Catholics. As a result of this and many other factors, the second wave of appointments ignored the demands of the Catholic hierarchy altogether. When the staff of each college was announced in 1849, the representation of Catholics and Irishmen was lower than expected in many circles. The lowest proportion of Irish appointees was among the sciences, perhaps demonstrating the truth of Kane's assertions that Ireland needed scientific education. However, the choice of professors also demonstrates that a shift in aims for the colleges had already occurred. Rather than creating an Irish institution in order to solve an Irish problem, the government and the college council (of presidents and vice presidents) appeared by their selections to be aiming for an institution with an international, or at least a national, reputation. Ignoring the lobbying of local men and political and religious interests they chose persons with as substantial a British or international profile as possible. The science and medicine appointments are a good example of this process at work.

When Kirwan died in 1849, he was replaced by the Protestant Edward Berwick, rather than promoting the Catholic vice president, John O'Toole. Out of sixty professorial chairs, fewer than ten eventually went to Catholics. This was despite considerable Catholic interest in appointments. Even though a decree from Propaganda Fide in 1847 warned that the colleges were dangerous to the morals of Catholics, Archbishop Murray claimed with some satisfaction that 'Catholic candidates for professorships (including several priests) are crowding in to

[111] Ibid., p. 47.
[112] In fact, the Lord Lieutenant of Ireland changed twice from 1845 to 1849. The first replacement for Baron Heystbury (who had held office under Peel) was John William Ponsonby, 4th Earl of Bessborough. He was replaced in 1847 by George William Frederick Villiers, 4th Earl of Clarendon who lasted until 1852. The Chief Secretaries also changed with the Lord Lieutenants. See W. E. Vaughan (ed.), *A new history of Ireland, 5: Ireland under the Union I, 1801-1870* (10 vols., Oxford, 1989).

present themselves before the Board of selection'.[113] While this was probably an exaggeration, the willingness of priests and lay Catholics to disobey a Papal rescript and associate themselves with the Queen's Colleges illustrates a significant split between lay intellectual culture and the Catholic hierarchy. The representation of local and Catholic candidates among the application pool was more substantial than the eventual selections might have led one to believe. However, the low number of Catholic or simply Irish applicants in the sciences seems to prove the dearth of scientific education available in the country. Finally, the handling of medical appointments, among which there were qualified Catholic applicants, indicates a stubborn refusal to acquiesce to Catholic Church demands which was later regretted by some.

Figure 2.2 shows all applications received in 1845 that are preserved in the Lord Lieutenant's papers. While this is certainly not a full sample, it offers a glimpse of the applicants for the college professorships which may be approximately representative. In 56 of the 117 applications the religion of the applicant was easily determined (either they explicitly referred to it or they were educated somewhere religiously specific such as a Jesuit college). Interestingly, applicants for science, mathematics or medicine were the least likely to identify their religion. This might be explained by the greater number of priests and clergymen, rather than professional men, applying for positions in the arts. Despite Murray's optimism, Catholics were under-represented among applicants. While about 80% of the Irish population was Catholic, their representation among the applicants was only around 50%. This might be blamed on fewer educational opportunities and the small Catholic middle and upper class, rather than their reluctance to disobey the Catholic hierarchy.

The number of applications for scientific posts for all years (1845-9) was quite low. For example, there are only nine preserved applications for the three professorships of natural history.[114] There must have been at least 12 applicants, because the three who received the jobs are not among the preserved applications. Catholic and Irish representation among the small number of

[113] Daniel Murray draft letter to Paul Cullen, 30 December 1848, Murray Papers.
[114] QC Application Letters 1845-1849.

candidates was also lower than among the arts candidates. Only one natural history candidate was Catholic (Thomas Power, of Cork) and he was also one of only two Irish applicants (the other was William Steele, secretary of the Royal Dublin Society). Natural philosophy fared slightly better. In 1845 alone, there were eight applicants and all of these either claimed to be Irish or had been educated at Trinity College, Dublin. These facts simply underscore what is known of the hiring in other scientific endeavours such as the ordnance and geological surveys at the time: there existed a dearth of Irishmen trained in the sciences. The fact that these positions were overwhelmingly given to Scots and Englishmen did not initially concern the newspapers who were otherwise critical of the lack of Irish and Catholic representation among the staff in general. For example, the *Cork Examiner* remarked that 'we cannot but admit that there are some departments of science in which Englishmen and Scotchmen have acquired a higher reputation than Irishmen'.[115]

However, it was a disconsolate Archbishop Murray who clipped the article from the *Freeman's Journal* announcing the professorial appointees and proceeded to tally the Catholics among the staff. Figure 2.3 reproduces Murray's copy of the pages with his handwritten notations and remarks. Among the professors and all staff, Murray was only able to identify two Catholics with certainty and marked another three as questionable. The majority he identified as Protestants, but Raymond de Vericour (modern languages, Cork) was marked with the epithet 'Infidel' and Edward Berwick (President, Galway) as 'materialist'. In fact, Murray had over estimated the Protestant dominance of the appointments, but not by much. Denis Bullen (surgery, Cork), Simon McCoy (materia medica, Galway), Frederick McCoy (geology, Belfast), Henry Hennessy (librarian, Cork) and John O'Donovan (Irish language, Belfast) had all been marked Protestant on Murray's paper, but were in fact Catholics. Edmund Murphy (agriculture, Cork) was also Catholic and marked as unknown by Murray. Of seventy-two total positions (including administrative ones), only nine had gone to Catholics. These are listed in Figure 2.4.

[115] 'The Appointments', 6 August 1849, *Cork Examiner*, p. 2.

While Irish, not to mention Catholic, candidates were difficult to find for some posts, the Catholic hierarchy had cause to complain at the ignoring of their requests for sympathetic appointments in anatomy as there was a fairly large number of Catholic doctors available to choose from. The medical appointments have left a substantial paper trail and give some indication of how posts were given and priorities in selection. Out of 97 medical applicants, the religion of only 18 was determinable from the application materials. Eight of these 18 were Catholic. It therefore seems reasonable to assume that Catholics made up a hefty proportion of applicants. The 1861 census demonstrated that at least 34% of physicians were Catholic and thus a significant number of potential Catholic applicants for chairs existed.[116] However, Kane, Catholic president of the Cork college, appears to have been at least partly responsible for the passing over of some Catholic candidates in favour of what he believed were more qualified individuals.

In 1854 Kane regretted some of his decisions and tried to use his influence, as well as that of Dr Dominic Corrigan, to encourage the hiring of a Catholic replacement for the Protestant Benjamin Alcock (anatomy, Cork).[117] Kane and Corrigan mounted a considerable campaign to ensure that the chair went to Catholic and Corkonian, Daniel Corbett. Although Kane described Corbett as 'beyond doubt one of the first anatomical teachers in Dublin', he admitted that he had favoured Alcock in the 1849 selection. [118] By 1854, however, Kane believed electing a Catholic to the post would be wise. He felt that his own troubled college administration had been damaged by the powerful position of Protestants among the college's staff. There were only four Catholics among a staff of 20 and he complained that 'those Catholics who are here have had to suffer very bad treatment from the dominant majority'.[119] Corrigan wrote to Kane that he was 'very anxious for the sake of the colleges that this Professorship should be

[116] D. H. Akenson, *Small differences: Irish Catholics and Irish Protestants, 1815-1922* (Dublin, 1988).
[117] Corrigan was a prominent Catholic doctor who had been awarded an honorary degree from Trinity College, Dublin in 1849 and became a member of the Queen's University Senate in 1850.
[118] Robert Kane to Thomas Larcom, 28 February 1854, Larcom Papers 7667.
[119] Kane to Larcom, 28 February 1854, Larcom Papers 7667.

conferred on a Catholic'.[120] He reasoned that this might bring the colleges into favour with the Catholic hierarchy as they had requested Catholic chairs of anatomy at the founding of the colleges.

Kane's remarks indicate that despite efforts to retain a secular neutrality, the colleges had already become permeated by suspicions of, if not actual, sectarian strife. It is also ironic that Kane was now complaining of staff whom he had exercised considerable influence over hiring. While Kane had refused to be bullied by the bishops and had attempted to choose staff by scientific reputation alone, he now felt this to have back-fired on him with the 'dominant majority' of Protestants resenting his authority. This discord was no doubt the cause of the departure of several professors from Cork in 1853.[121] William Hincks, natural history, left for Canada. James Nichol, geology, accepted a post in Aberdeen and George Shaw, natural philosophy, returned to Dublin. Mathematics professor George Boole (a Protestant) wrote to his sister that 'I may soon lose nearly all those with whom I have been on terms of the most intimate friendship'.[122]

Dissatisfaction with how the colleges were operating was not limited to the staff. Moderate Catholics who had supported the colleges felt aggrieved at the limited number of Catholic appointees and many continued to lobby for Catholic candidates whenever a position became open. Even in the Presbyterian-dominated Belfast college, some Presbyterians felt they had not gotten a fair representation. When the natural history and geology chairs in Cork and Belfast respectively fell vacant in 1854 several candidates were represented as not only scientifically suitable, but religiously preferable. For example, a testimonial for James McAdam of Belfast claimed that the Presbyterians 'think they have not got their share of the good things going in the college & therefore this might be a good time to smooth them over—and certainly they could not have put forward a

[120] Dominic Corrigan to Robert Kane, 27 February 1854, enclosed in a letter from Kane to Larcom, Larcom Papers 7667.
[121] J. A. Murphy, *The college: a history of Queen's/University College Cork, 1845-1995* (Cork, 1995), pp. 65-70.
[122] George Boole to Maryann Boole, 19 April 1853, Boole Letters.

better man'.[123] McAdam was a local naturalist who had applied unsuccessfully for a position at the opening of the college, and now his cause was being further pressed due to his religious affiliation.[124] Likewise, a Francis Clancy was presented by one letter as the best candidate for the Cork chair because he was the 'brother of a most excellent & unobtrusive Catholic clergyman at Cork' and because the appointment 'would be very popular with the citizens of Cork—with whom he stands very high'.[125] Clancy, however, never submitted an application himself and was therefore not considered. In the end the Lord Lieutenant decided to seek scientific opinion in the Cork appointment, rather than popular opinion, and the eminent geologist Roderick Murchison was requested to give his views on each of the candidates.[126]

In each phase of college appointments the government attempted to tread a path between religious and professional demands in choosing candidates. By presenting the colleges as a means of offering higher education to Catholics and Dissenters, they were open to accusations of sectarianism in attempting to satisfy demands from each community. Indeed it is clear that the applicants themselves, and their supporters, often believed that religion might work in their favour. It mattered not what qualifications the government appointee was claimed to have, there would be those who believed a more suitable candidate had been passed over. Despite claims that science was a neutral discipline, unaffected by religious strife, almost all parties acted as though the religion of a scientific candidate was an important aspect of their qualifications. It was inevitable that the colleges should be unacceptable to those who felt their religious views were not fairly represented. One result was that orthodox Presbyterians eventually founded Magee College in Londonderry and the Catholic hierarchy launched a Catholic university in Dublin. As Magee served as preparation for Presbyterian

[123] Indecipherable author of testimonial for James McAdam, QCB Applications for Mineralogy and Geology 1854.
[124] For more on McAdam see R. Bayles, 'Science in its local context: the Belfast Natural History and Philosophical Society in the mid-nineteenth century' (PhD, Queen's University of Belfast, 2005).
[125] J. Murphy to the Lord Lieutenant, QC Natural History Candidates 1848 (despite the dates this file includes applications from 1854 as well).
[126] Roderick Murchison to Lord St. Germans, 27 October 1854, QCC Natural History Candidates 1854.

ministers, its curriculum was restricted to arts and divinity.[127] The Catholic University, by contrast, initially attempted to address science in a Catholic context.

Founding of the Catholic University

The most concrete result of the rejection of the Queen's Colleges by the Catholic hierarchy was the founding of the Catholic University. The plan originated with a suggestion from Propaganda Fide and was taken up by the conservative wing of the Catholic Church in Ireland, while Murray and Crolly were still trying to increase Catholic support for the Queen's Colleges. When Murray received a petition from the conservative Archbishop of Tuam, John MacHale, in 1849, he drafted a reply claiming that a Catholic University would be unsuccessful because of the lack of available funding.[128] Initially Murray's opposition did not stop MacHale and Cullen, now Primate of Ireland, from pushing forward.[129] As we will see, one of the original aims of the Catholic University Committee was to dispel the association of science with secular education alone and to argue that the education of Catholic students required the guidance of religion.

The Catholic University Committee, formed in 1850, issued separate pamphlets addressing the clergy and lay Catholics and outlining the reasons for founding a Catholic university. To the clergy, the committee emphasised the importance of such an institution for the preservation of the faith. The Church was 'Assailed upon all sides—assailed by numerous and most richly endowed, and well organised bodies' and as a result 'it becomes a most important duty to prepare the rising Catholic generation for the combat that is before them'. [130] The weapon required for this combat was knowledge and thus the proposed university would arm students with 'all the knowledge, all the science, all the intellectual training of which the human mind is capable'.[131] The Queen's

[127] Holmes, *The Presbyterian church in Ireland*, Ch. 4.
[128] Daniel Murray to John MacHale, draft letter, 30 January 1849, Murray Papers.
[129] Barr claims that Murray's opposition was formidable and that the university was unable to proceed beyond tentative plans until his death in 1852. See C. Barr, *Paul Cullen, John Henry Newman, and the Catholic University of Ireland, 1845-1865* (Leominster, 2003), pp. 92-3.
[130] *Address of the Catholic University Committee to the Catholic clergy of Ireland*, (Dublin, 1851), p. 5.
[131] Ibid., p.5.

Colleges, it was felt, threatened the future of Catholic Ireland by potentially turning the leading (middle and upper class) Catholics away from their religion through education. A Catholic university would counter this by offering them an education in keeping with their faith and would thus strengthen rather than weaken the Catholic Church's influence in Irish life: 'Our institution will, in progress of time, create a large body of learned men, exercising an important influence on society; men competent, on the one hand, to vindicate the cause of religion against the insidious attacks of miscalled science'.[132] Thus science, and especially science that challenged religious doctrine, emerged as a key concern in promoting the idea of a Catholic university. While previously the Church had focussed on the education of priests, the rising importance of the Catholic middle class meant that it was no longer practical to believe that priests would remain better educated than laymen. Without a university of their own, young Catholics would undoubtedly use the Queen's Colleges (as many of them had used Trinity College, Dublin) and might lose interest in their religion in the process. Catering to their educational needs was the only solution and these educational needs now included science.

In fact, it was not only Catholics who believed that the government was trying to weaken the influence of the Catholic Church through secular scientific education. The Presbyterian *Belfast Newsletter* accepted that this was the intended effect, but saw it in a more positive light:

> the humbler classes in the National Schools, and the middle classes in the New Colleges, would be trained in literature and science to such a degree of perfection that no priest should dare to insult their improved understandings with the mummeries of Romish falsehood, and no demagogue debauch their minds with the seductions of revolutionary prospects.[133]

Knowledge would create an educated and peaceful Ireland whose citizens would no longer be under the influence of the Catholic hierarchy. However, as the *Newsletter* journalist acknowledged, the priests had easily figured out what Robert Peel was after and had therefore determined to reject the colleges.

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[132] Ibid., p. 7.
[133] 'Ireland and the Government', 8 July 1845, *Belfast Newsletter*, p. 2.

The relationship between science and religion also formed a key component of the Catholic University Committee's address to the people of Ireland. From among the people would come the future students of the university and therefore the committee was at pains to demonstrate that the proposed institution recognised the importance of science to the modern age. They claimed that 'so far from there being any antagonism between religion and science, they are a mutual advantage, each reflecting light upon and facilitating the acquisition of the other.'[134] A scientific education would be had in the Catholic university, and it would be superior to that in the Queen's Colleges as the simultaneous teaching of religion would improve the understanding of science. This would also prevent the spread of evils such as atheism and pantheism which plagued the continent. These were the result, claimed the committee, of teaching science without religion:

> From science without religion has sprung up that spurious philosophy which has overrun to many of the schools, and colleges, and universities of the Continent of Europe; and which the Professors of Atheism, Pantheism, and every form of unbelief, make the ground-work of their impious systems.[135]

The implication was, of course, that the professors of the Queen's Colleges were continuing this work in Ireland and that a Catholic university would combat this by a stronger curriculum combining science and religion.

In 1852 John Henry Newman, an English convert to Catholicism and former Oxford fellow, was chosen to head the Catholic University for which thousands of pounds had been raised by parish priests. Newman was a well-known intellectual and his acceptance of the post was a boon to Cullen's project. Newman, at least initially, also saw the importance of incorporating modern scientific subjects into the curriculum and he immediately suggested a chair of civil engineering. Newman had chosen Terence Flanagan for this chair, whom he described as a very good Catholic from Roscommon and a well-known

[134] *Address of the Catholic University Committee to the people of Ireland*, (Dublin, 1850), p. 7.
[135] Ibid., p. 7.

engineer in England.[136] The Catholic University was officially opened in 1854, with six professorships and 9 lectureships. Civil engineering was elevated to a professorship, but there were no other chairs in the sciences comparable to those in the Queen's Colleges.[137] In 1855, Newman determined to have not just a civil engineering professorship, but a medical school in which the sciences of chemistry and natural philosophy would be represented alongside medical subjects. He proposed William Sullivan and Henry Hennessy for chemistry and natural philosophy respectively.[138] Before his departure in 1858, Newman was able to address the Catholic University's school of science which was intended to include chairs in all the natural as well as medical sciences.

In his opening lectures to the school of medicine and the school of science, Newman suggested that one aim of the science department was to prove that Catholicism was not antagonistic to science and to provide a means of cultivating Catholic science.[139] Newman's view of the means by which disputes between science and revelation might be resolved is an indication of how his vision of a liberal university had already begun to diverge from the priest-driven institution that Cullen desired. Newman claimed that there were three possible reasons why a scientifically proven fact could never contradict revelation. If there is a contradiction, Newman stated, 'that point will eventually turn out, first, *not* to be proved, or secondly, not *contradictory*, or thirdly, not contradictory to any thing *really revealed*, but to something which has been confused with revelation.'[140] Newman advocated freedom of investigation for men of science, on the assumption that they were proceeding in good faith, without the intention to contradict revelation. Unfortunately, as the story of William Sullivan's involvement with the Catholic University (described below) demonstrates, Newman's vision of a harmonious relationship between scientific investigation and Catholicism did not come to fruition in this institution.

[136] Newman to Paul Cullen, 23 June 1854, Newman Letters.
[137] Barr, *The Catholic University of Ireland*, p. 129.
[138] Newman to Cullen, 23 February 1855, Newman Letters.
[139] Later editions of *The idea of a university* included these lectures. See J. H. Newman, *The idea of a university defined and illustrated* (London, 1907), pp. 428-79.
[140] Ibid. , p. 466-7.

The Catholic University encountered a number of obstacles, not least of which was the inability to raise sufficient funds. The relationship between Newman and Cullen also became strained, as Cullen appeared unwilling to concede full control to Newman and Newman became frustrated with the slow progress of the university.[141] The subjects that were of the least priority to Cullen suffered the most, and science quickly found itself without the resources necessary for either teaching or research. As early as 1858 the faculty of science issued a lengthy plea for more funding in the form of a pamphlet addressed to the Catholic bishops. The natural sciences, the faculty claimed,

> constitute, so to speak, the objects in greatest demand in the educational market; and if our university does not supply them in all the abundance, extent, and variety required, our Catholic youth will and must, for they are forced to do so by the exigencies of the day, seek them elsewhere…[142]

The staff suggested that students might be lured to the infidel Queen's Colleges or the Protestant Trinity College simply in an effort to secure the best economic future for themselves. Cullen chose to keep this report private, so as not to attract attention to the Catholic University's problems. However, Thomas Larcom managed to obtain a copy.[143]

The Catholic University had initially attempted to be a Catholic rival to the liberal education offered at Cambridge and Oxford as well as compete with the Queen's Colleges in more practical and scientific subjects. Severe financial restraints, exacerbated by low student numbers and an inability to gain a university charter, resulted in many subjects being neglected. Cullen could not grant the science faculty more funding even if he had wanted to. However, Cullen's university had always been less interested in meeting the needs of the rising middle classes and more interested in educating the elite of British and European Catholicism, and thus the sciences were easily neglected. Despite rhetoric supporting the sciences in education, the subjects of primary concern to

[141] Barr, *The Catholic University of Ireland*, pp. 158-67, 174-6.
[142] *Report of the dean and faculty of science of the Catholic University of Ireland*, (Dublin, 1858), p. 11.
[143] Leaney, '"The property of all"', p. 248; See pamphlets in back of Larcom Papers 7668.

Cullen (and Newman as well) were theological, moral and historical.[144] Thus the rejection of the Queen's Colleges had created a dearth of scientific posts, and science education, available to Ireland's Catholics that was exacerbated by the failure of the Catholic University. In fact it was liberal Catholics such as Robert Kane and Dominic Corrigan who continued to work against the Catholic University's efforts to gain a charter.[145]

The Catholic man of science: pawn or politician?

The combined effect of the Catholic Church's rejection of the Queen's Colleges and the opening of the Catholic University was initially to create new positions for Catholic men of science and to present an alternative to the Queen's Colleges for students. However, the Catholic University was never financially stable and as its position worsened it began to retreat from many things, including science. The impact of this on individual Irish men of science was profound.

Robert Kane's career was initially a success story: he was appointed to the presidency of the Queen's College, Cork and shortly afterwards knighted for work on famine relief. Soon, however, his public profile began a downward trajectory from which it never really recovered during his lifetime.[146] Early on Kane had been identified by the Irish administration in Dublin Castle as a useful, moderate Catholic ally. Kane was a Catholic of whom most Protestants could approve (although members of his own church had increasing doubts). Even the conservative and Presbyterian *Belfast Newsletter* did not object to his appointment to Cork claiming he was 'a man with a Protestant freedom, scope, and exercise of mind'.[147] By 1858 Protestants and Catholics had turned against Kane and his supposed negligence at Cork was one of the main targets of the Royal Commission to investigate the Queen's Colleges in 1856.

In the late 1840s, Kane was a member of a select group of Dublin Catholics who were on good terms with both the local church hierarchy and Dublin Castle.

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[144] Barr, *The Catholic University of Ireland*, pp. 80-9.
[145] William Sullivan to William Monsell, 3 May 1867, Monsell Papers.
[146] Leaney, '"The property of all"', pp. 118-119; B. B. Kelham, 'The Royal College of Science for Ireland (1867-1926)', *Studies*, 56 (1967), pp. 297-309.
[147] 'The new colleges—appointments of principals', 7 November 1845, *Belfast Newsletter*, p. 2.

Archbishop Murray and his secretary, Archdeacon John Hamilton, were dinner guests at Kane's home and Kane regularly corresponded with Hamilton.[148] In the same circle was the prominent medical man Dominic Corrigan, later to also be granted a knighthood and a position on the board of the Queen's University.[149] Hamilton and Murray were considered to have 'castle influence' and were occasionally asked to employ it in favour of candidates for government posts.[150] Murray served as a Commissioner of National Education and was on good terms with his fellow commissioner and Anglican counterpart, Archbishop Richard Whatley. For this select group of Catholics, their Catholicism was advantageous: as long as they appeared loyal to the government they could influence decision making and retain powerful posts for themselves and their friends. Although Dublin Castle was ostensibly responsible for the appointment of Queen's College professors, Kane clearly had considerable influence and specifically hand-picked several candidates. For example, a letter from Thomas O'Meara (a candidate for materia medica or botany) to Kane indicates that Kane had personally offered the position to O'Meara.[151]

In 1853 Kane believed he was poised on the edge of a further promotion and possibly a relocation to his more favoured Dublin. In that year Henry Cole, the director of the Department of Science and Art, sent a proposal regarding the restructuring of 'science and art' education in Ireland to Thomas Larcom, the Irish undersecretary. The proposal, which Larcom forwarded to Kane, suggested that a fourth Queen's College be founded in Dublin with the Royal Dublin Society's museum and the Museum of Irish Industry made subordinate to it. Further links between existing primary and secondary education would be made, with all education targeting a uniform goal of encouraging industrial development. Cole even suggested appointing 'professors of technology' for each college.[152] Kane's comments in a reply to Larcom clearly indicate that he

[148] Robert Kane to Archdeacon Hamilton, 18 October 1847, Hamilton Papers.
[149] See for example Morgan O'Brien to Archdeacon Hamilton, 13 February 1846, and unidentified author to Archdeacon Hamilton, 28 August 1845, Hamilton Papers. On Corrigan see *Oxford DNB*.
[150] For example, Morgan O'Brien to Archdeacon Hamilton, 12 March 1857, Hamilton Papers.
[151] See O'Meara to Robert Kane, 11 February 1849, QC Application Letters 1849.
[152] Mr. Cole's Memorandum on the Promotion of Science and Art in Ireland, objects 40 and 41, Larcom Papers 7668.

saw himself as the head of the new Queen's College, Dublin and with a pivotal role in a more comprehensive and centrally organised, industrial education system for Ireland.[153]

Unfortunately for Kane, his politicking was strongly resented by several members of the Cork college staff, including the vice president, and problems were already beginning to emerge. Kane had been given permission to retain his directorship of the Museum of Irish Industry in Dublin while holding the new post in Cork, but the time spent in Dublin took its toll on staff harmony in Cork. Kane himself attributed these problems to sectarian conflicts, claiming that the Catholic staff suffered as a result of the Protestant majority (see 'Applications and appointments'). In 1853 Kane attempted to have two of his professors removed from office on grounds of neglect of duty: first, Christopher Lane (civil engineering) and then Benjamin Alcock (anatomy).[154] These cases dragged on, and although both were eventually dismissed from duties, it was not without a loss of reputation on Kane's part and an increase in ire on the part of the other Cork professors. The very public newspaper row that ensued contributed to the government's determination to have a commission of inquiry into all three colleges. When the results were published in 1858, Kane was a very discouraged man. Thomas Romney Robinson, astronomer and friend of the under secretary, wrote to Larcom in a state of alarm after having met with Kane: 'He [Kane] thinks the government intend to sacrifice him to the Ultramontaine party, and in course of truckling to Newman's University not merely give up the Queen's Colleges, but even let that respectable society poach on the Industrial Museum.'[155] The potential loss of Kane to the project of mixed education worried Robinson. 'When you have got a Romanist of note who has courage to think for himself, you should pat him on the back,' not betray him, he argued. In Larcom he knew he had a sympathetic audience. Larcom had supported Kane through the numerous controversies.

[153] Kane's reply to Larcom, object 45, Larcom Papers 7668.
[154] Murphy, *The college*, pp. 65-70.
[155] TR Robinson to Thomas Larcom, n.d., Larcom Papers 7667.

Kane clearly believed the causes of science and his career were better served through cooperation with the government scheme of secular education. As a graduate of Trinity College, Dublin he had no objections to mixed education and was considered a very liberal Catholic. However, he eventually lost the support of both Catholics and Protestants and many saw him as nothing more than a 'castle Catholic' and government pawn. Although he managed to retain his post as president of the Queen's College Cork he was forced to give up his post in Dublin, and to reside in Cork for the remainder of his term. The Museum of Irish Industry was subsumed to the Department of Science and Art and became the Royal College of Science for Ireland, a move that William Sullivan claimed was simply 'in order to demolish Sir R. [sic] Kane'.[156] Kane, and along with him Dominic Corrigan, alienated former Catholic allies by using his position on the Queen's University council to prevent the admission of the Catholic University to a unified examination system until 1884. This pitted Kane and Corrigan against Sullivan who was on the staff of the Catholic University, but had been an employee of the Museum of Irish Industry.

William Sullivan was professor of chemistry at Kane's Museum of Irish Industry in the 1840s and although it does not appear that he applied for a post at one of the Queen's Colleges he may have been upset not to have been asked by Kane. Sullivan was, however, selected by Newman for a chemistry chair in the Catholic University's medical school.[157] Ten years later Sullivan was frustrated and bitter over the failure of the university and especially the failure of Cullen to support the science faculty. Sullivan wrote a series of letters between 1866 and 1873 to William Monsell in which he voiced his frustration and asked for advice.[158]

In his letters Sullivan despaired of the Catholic University in which he claimed 'The professors are dropping away, the students are leaving, and the funds are diminishing.'[159] Newman himself had abandoned the project in 1858, as it gradually became clear that the university would struggle to gain a charter and

[156] William Sullivan to William Monsell, 16 June 1873, Monsell Papers.
[157] Newman to Paul Cullen, 23 February 1855, Newman Letters.
[158] William Monsell, Baron Emly, was a Catholic convert, friend of Newman and an MP for Limerick. These letters have also been examined by Leaney; see, '"The property of all"', pp. 248-50.
[159] William Sullivan to William Monsell, 3 May 1867, Monsell Papers.

that Cullen preferred priests to laymen for appointments.[160] The chairs of botany and geology had remained vacant, despite Sullivan's best efforts to persuade Cullen to fill them and the necessity of botany to the medical students.[161] This was a great source of embarrassment to Sullivan and, he claimed, was used by Kane and Corrigan to further prevent the granting of a charter for the Catholic University. Soon, Sullivan feared, all Catholic men of science would have to emigrate to America in order to find employment:

> When the Catholic University shall be shut up, or shall have eliminated the lay element, and the new College of Science shall have completed its staff after the fashion of the Queen's Colleges, it will be time for the few Catholics who have ventured to devote themselves to science to emigrate.[162]

Sullivan even claimed that he had noticed an increase in the number of Irish sounding names among American scientific authors and wondered if the process had already begun. He further suggested that perhaps the Catholic University ought to move to New York.

In 1873, a ray of hope appeared for Sullivan's career. Rumours began that Robert Kane was about to resign his position at the Queen's College in Cork and Sullivan hoped that he would have a chance of gaining the post. Monsell objected to the suggestion that he might apply, noting that Sullivan had been a critic of mixed education and especially of the secular colleges. Sullivan retorted that this was not true, and that he had joined the Catholic University not to support denominational education but

> because I believed and continue to believe that all progress must emanate from within a people and cannot be impressed upon them by external means, and consequently that a great liberal Catholic University could do more for the advancement of learning, and the intellectual and political training of Irish Catholics than any number of government Institutions.[163]

Unfortunately, Sullivan claimed, his hopes were in vain and Cullen and the bishops had perverted Newman's attempts at creating a liberal university in

[160] Barr, *The Catholic University of Ireland*, pp. 168-76.
[161] Sullivan to Monsell, 3 May 1867, Monsell Papers.
[162] Sullivan to Monsell, 1 June 1867, Monsell Papers.
[163] Sullivan to Monsell, 16 June 1873, Monsell Papers.

favour of a sort of lay seminary. The Catholic University, Sullivan believed, no longer represented that hopes of the Catholic people of Ireland, rather it represented the imposition of control by the Catholic hierarchy. Sullivan determined to join the government institution in an effort to save his career. His application was successful: the government was delighted to replace one Catholic president with another, continuing to hope that Catholic approval of the colleges would increase.

The result of the Queen's College controversy was to place Robert Kane in a position of antagonism with his church, while he retained the favour of Dublin Castle. William Sullivan, however was driven from the Catholic University into the Queen's College Cork because of the former's lack of support for science. The effect of this was to weaken the Catholic University, prevent the formation of an Irish Catholic scientific community and lend credence to the accusations that the Catholic Church was opposed to science and progress.

Conclusion

As the two examples above have shown, while there were limited scientific career pathways in nineteenth-century Ireland, there were even fewer available to Catholics. Those Catholics who chose to pursue science also had to embrace politics, possibly brave the disapproval of their church and show a willingness to 'change sides' in any way that would prove most advantageous to them. Far from creating a neutral ground, free from political or religious strife, science became embroiled in these struggles. The growing autonomy of the middle classes threatened the authority of both the government and the Catholic Church. The government attempted to soften this threat by secular scientific education that they believed would reduce religious strife, and even increase the industrial development of Ireland. The Catholic Church, by contrast, feared that the same education might reduce Catholic identity and therefore pursued a Catholic University. Just as the government hoped to create a new generation of productive, happy (and therefore non-rebellious) citizens, the Catholic Church hoped to create a new Catholic intelligentsia who would help to maintain the influence of Catholicism in Irish life. Science was initially important to both

projects as it was, by that point in the century, the discipline symbolic of progress and repeatedly urged as a solution to Ireland's stagnant economy. As the government determined that science was an appropriate subject for study outside of the auspices of religion, some of the Catholic hierarchy became suspicious not only of secular colleges, but of science. Initially they determined to compete with the Queen's Colleges by including science in their new university, but as the hierarchy sought more control and the funds dried up, science seemed less and less important as a part of the curriculum. As a result, eminent men of science such as William Sullivan were forced to give up on the Catholic University.

The failure of the Catholic University to cultivate science and of the Queen's Colleges to provide a good balance of Catholics among their staff had long-term consequences for science in Ireland. The primary institutions for higher education in the sciences in Ireland (the Queen's Colleges and Trinity College Dublin) were now unacceptable to Catholics. As the scientific community in Ireland gained greater professional representation through government posts in the Queen's Colleges and the surveys, there were proportionally fewer Catholics to take on such posts. The Catholic University retreated from science, effectively leaving the field to Protestants and Catholics willing to rebel against their church. Significant numbers of Catholics could still be found among the members of scientific societies and teachers in the science schools. However, Catholics suffered a lack of representation at the highest levels. Much of this can be traced back to the dispute over the Queen's Colleges, which represents a lost opportunity to promote an elite but mixed Irish scientific community.

Despite the fact that the Queen's Colleges failed to create the idealistic utopia of sectarian strife subsumed to science, they can tell us much about scientific culture in Ireland during the nineteenth century. In the chapters that follow I will mostly leave behind the political and religious objections to the Queen's Colleges and examine what actually happened once the colleges opened. As we have already seen, Ireland had a significant community of individuals interested in science before the colleges arrived and the following chapter will examine how this existing community, some of whom had been hopefuls for positions in the colleges, coped with the arrival of the new professors of science.

3

Science in the community: voluntary societies in Cork

> Visions of pomp, and pageantry, and social enjoyment, may have passed through the minds of some, in connection with this movement; but I firmly believe that each and all united in a sincere desire to do some good, by effecting a practical result…
>
> John Francis Maguire, 1853[164]

Introduction

The rejection of the Queen's Colleges by leaders of the Irish Catholic community did not stop the colleges opening nor prevent the towns in which they were placed from celebrating their arrival. However, when the first professors of the Queen's Colleges arrived in Cork, Belfast and Galway in 1849 the devastating effects of the Great Famine were everywhere to be seen. Those from England and Scotland must have found their new surroundings shockingly remote from their former homes. President Edward Berwick of Queen's College Galway noted that the colleges were opened 'under circumstances of a very discouraging nature'.[165] Galway was perhaps the worst stricken of the three towns, but the situation in Cork was hardly more encouraging. Yet despite widespread poverty, none of the three towns was an intellectual vacuum: each could claim at least one voluntary society dedicated to learning. Sustained by the towns' middle classes, most of whom did not depend on farm land for income and were therefore relatively unscathed by the Famine, these societies persisted through the dark years. In the case of Cork and Belfast at least, the existence of these societies and their ability to lobby the government had some impact on the decision to locate a college in these towns.[166]

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[164] J. F. Maguire, *The industrial movement in Ireland, as illustrated by the National Exhibition of 1852* (Cork, 1853), p. 17.

[165] *Report of the president of the Queen's College, Galway for the session 1849-50*.

[166] T. W. Moody and J. C. Beckett, *Queen's, Belfast, 1845-1949: the history of a university* (2 vols., London, 1959), pp. 1-39; J. A. Murphy, *The college: a history of Queen's/University College Cork, 1845-1995* (Cork, 1995), Ch. 1.

Local scientific societies were among the first ways in which the professors interacted with the leading members of their new communities. This chapter will explore the integration of the colleges and their natural science professors into the existing intellectual life of the towns. I will focus on the participation of Cork's professors in local societies, as well as those societies' contributions to the life of the colleges in order to give a rich picture of the scientific culture of a provincial Irish town. The above quotation by John Francis Maguire (editor of the *Cork Examiner*) refers specifically to the 1852 Cork industrial exhibition. It could, however, equally apply to Cork's scientific societies which tried throughout the second half of the nineteenth century to strike a balance between 'social enjoyment' and 'practical results', often defining each of these differently. This chapter will analyse three of these societies in the period immediately after the arrival of the Queen's College in Cork.

* * * *

Mid-nineteenth-century Cork was a town of approximately 85,000 people.[167] Positioned at the River Lee's entrance to the sea, it was in a relatively good location for trade and industry and had seen an industrial boom in the 1840s. However, the Famine had slowed and reversed this growth. The industries of Ulster (cotton and linen manufacture) declined in Cork after the introduction of large-scale mechanisation.[168] Instead, there were breweries (Beamish and Crawford's and Murphy's being the largest), distilleries, flour and corn millers, shipbuilders, a small number of woollen mills and a substantial trade in provisions, principally butter.[169] Cork was also an important shipbuilding centre, although in this too it was overtaken by Belfast once ships were increasingly made of iron rather than wood.[170] The railroad arrived in 1849, allowing for cheap weekend excursions as well as easier passage to Dublin.[171] Overall, Cork remained a minor manufacturing centre compared to Belfast. Even the output of

[167] B. A. Cody, *The River Lee, Cork and the Corkonians* (Dublin, 1859), p. 55.
[168] A. Bielenberg, *Cork's industrial revolution, 1780-1880* (Cork, 1991), Ch. 2 and 3.
[169] Ibid.; C. O'Grada, *Ireland: a new economic history, 1780-1939* (Oxford, 1994), Ch. 12.
[170] O'Grada, *A new economic history*, p. 296.
[171] H. C. Casserley, *Outline of Irish railway history* (London, 1974), Ch. 3.

one of its largest industries, Beamish and Crawford brewers, was consumed almost entirely within Munster.

Despite Cork's apparent failure to advance at the rate of other industrialising towns of Great Britain, the Corkonians' provincial pride was undimmed. Travellers remarked on their gregariousness and love of learning, a reputation which the Corkonians themselves cultivated.[172] Perhaps, then, it was no surprise that Cork gave rise to many philosophical societies and that several of its politicians were actively involved in the pursuit of provincial higher education for Ireland, eventually resulting in the Queen's Colleges. This was a middle-class movement, for Cork had few gentry. Local businessman Denny Lane later recalled that the town's 'few civic knights…had to earn their bread by honest industry instead of by robbery, a degradation unknown to the belted knights of old.'[173] Town life was dominated by the reforming middle classes, a smaller group of whom held multiple civic and literary posts. For example, the Catholic nationalist John Francis Maguire was the editor of the *Cork Examiner* while also on the Industrial Exhibition committee, town mayor and later MP. Richard Dowden, a liberal Unitarian, was an officer in several of the local societies, a promoter of the temperance movement, agent to the local vinegar and mineral water factory, town councillor, mayor and Alderman.[174] United by class values if not by religion, Cork's middling citizens continually sought the improvement of their lot and that of their town. One of the ways in which this was expressed was through local voluntary societies.

As in other industrial cities in Britain, Cork's middle class grew in wealth and political influence during the nineteenth century, and their enthusiasm for voluntary societies, from those distributing charity to scientific societies, arose from their desire both to fill their increased leisure time and to forge a

[172] Cody, *Cork and the Corkonians*, Ch. 8; D. Lane, *Then and now; being the inaugural address delivered at the opening of the 52nd session of the Cork Literary and Scientific Society* (Dublin, 1885), p. 5; W. M. Thackeray, *The Irish sketch book* (Belfast, 1985 [1843]), p. 84; J. Windele, *Historical and descriptive notices of Cork* (Cork, 1843).
[173] Lane, *Then and now*, p. 5.
[174] See T. Cadogan and J. Falvey, *A biographical dictionary of Cork* (Dublin, 2006); 'Cork worthies of the last century, I. Richard Dowden', *Journal of the Cork Historical and Archaeological Society*, 22 (1916), pp. 20-24.

respectable identity.[175] Scientific societies routinely proclaimed their dedication to the cultivation of useful knowledge, though sociability and social mobility were often as important. There is a large and growing literature specifically on scientific societies and mechanics' institutes.[176] Historians have demonstrated that provincial scientific societies are an important means of understanding local uses of science and also give an insight into the social dynamics of town life. While early literature viewed the societies as contributing positively to industrial innovation and change, key papers by Jack Morrell, Steven Shapin and Arnold Thackray among others have demonstrated that social and cultural aims were often more important.[177] Mechanics' institutes in particular have been associated with liberal reform movements which sought appropriate scientific education for the working classes as a means of encouraging economic growth and middle class values as well as discouraging attempts to overthrow the social order.[178] Cork's mechanics' institute failed to prosper, but its scientific societies flourished throughout the nineteenth century. Although scientific societies have

[175] R. J. Morris, 'Voluntary societies and British urban elites, 1780-1850: an analysis', *Historical Journal*, 26 (1983), pp. 95-118.
[176] S. J. M. M. Alberti, 'Natural history and the philosophical societies of late Victorian Yorkshire', *Archives of Natural History*, 30 (2003), pp. 342-358; P. Elliott, 'The origins of the "creative class": provincial urban society, scientific culture and socio-political marginality in Britain in the eighteenth and nineteenth centuries', *Social History*, 28 (2003), pp. 361-387; D. A. Finnegan, 'Natural history societies in late-Victorian Scotland and the pursuit of local civic science', *British Journal for the History of Science*, 38 (2005), pp. 53-72; J. Laurent, 'Science, society and politics in late nineteenth-century England: a further look at mechanics institutes', *Social Studies of Science*, 14 (1984), pp. 585-619; L. Miskell, 'The making of a new "Welsh metropolis": science, leisure and industry in early nineteenth-century Swansea', *History*, 88 (2003), pp. 32-52; J. B. Morrell, 'Bourgeois scientific societies and industrial innovation in Britain 1780-1850', *The Journal of European Economic History*, 24 (1995), pp. 311-332; Morris, 'Voluntary societies'; S. Naylor, 'The field, the museum and the lecture hall: the spaces of natural history in Victorian Cornwall', *Transactions of the Institute of British Geographers*, 27 (2002), pp. 494-513; E. Neswald, 'Science and sociability in nineteenth-century provincial Ireland: the Galway Mechanics' Institute', *British Journal for the History of Science*, (expected December 2006); A. Thackray, 'Natural knowledge in cultural context: the Manchester model', *American Historical Review*, (1974), pp. 672-709; C. W. J. Withers and D. A. Finnegan, 'Natural history societies, fieldwork and local knowledge in nineteenth-century Scotland: towards a historical geography of civic science', *Cultural Geographies*, 10 (2003), pp. 334-353.
[177] J. B. Morrell, 'Wissenschaft in Worstedopolis: public science in Bradford, 1800-1850', *British Journal for the History of Science*, 18 (1985), pp. 1-23; Morrell, 'Bourgeois scientific societies'; S. Shapin and B. Barnes, 'Science, nature and control: interpreting mechanics' institutes', *Social Studies of Science*, 7 (1977), pp. 31-74; S. Shapin, 'The Pottery Philosophical Society, 1819-1835: an examination of the cultural uses of provincial science', *Science Studies*, 2 (1972), pp. 311-36; Thackray, 'Natural knowledge'.
[178] I. Inkster, 'The social context of an educational movement: a revisionist approach to the English mechanics' institutes, 1820-1850', *Oxford Review of Education*, 2 (1976), pp. 277-307; I. Inkster, 'The public lecture as an instrument of science education for adults: the case of Great Britain c.1750-1850', *Pedagogica historica*, 20 (1980), pp. 80-107; Shapin and Barnes, 'Science, nature and control'; Thackray, 'Natural knowledge'.

been of interest in the history of Irish science, recent efforts have tended to focus on Dublin.[179] Cork's scientific societies have remained largely out of the historical frame since the 1970s.[180] The only exception is a brief discussion of their relationship to antiquarian activity in two recent theses.[181] Therefore there is still much to be learned from an examination of the scientific culture of Cork, especially in the years leading up to and following the establishment of the Queen's Colleges.

* * * *

This chapter will demonstrate that scientific societies played an important cultural role for Cork's middle-class community. They provided a space for socialising across religious boundaries and reinforced intellectual links between Cork and the rest of Britain. As such, their members formed an appropriate group to welcome the Queen's College that they had worked to have placed in Cork. However, the local scientific community now had to adjust to an influx of 'professional', or professorial, men of science. This led to a process of differentiation among the societies. The Royal Cork Institution, whose aims overlapped most substantially with those of the new college, ceased to be a scientific society and became largely a lobbying group, a design school and a meeting place for Cork's other societies. The Cuvierian Society, already a

[179] K. Bright, *The Royal Dublin Society, 1815-1845* (Dublin, 2004); M. E. Daly, *The spirit of earnest inquiry: the Statistical and Social Inquiry Society of Ireland, 1847-1997* (Dublin, 1997); P. S. W. Jackson, C. Moriarty and J. R. Akeroyd (eds), *In the field of the naturalists: proceedings of a seminar held on 27 September 1986 in celebration of 100 years of the Dublin Naturalists' Field Club* (Dublin, 1989); T. O'Rafeartaigh (ed.), *The Royal Irish Academy: a bicentennial history, 1785-1985* (Dublin, 1985). Exceptions include R. Bayles, 'Understanding local science: the Belfast Natural History Society in the mid-nineteenth century' in D. Attis and C. D. Mollan (eds), *Science and Irish culture: volume 1, 2004* (Dublin, 2004), pp. 139-169; R. Bayles, 'Science in its local context: the Belfast Natural History and Philosophical Society in the mid-nineteenth century' (PhD, Queen's University of Belfast, 2005).

[180] D. Gwynn, 'Cork Cuvierian Society, 1849-1851', *Cork University Record*, 23 (1951), pp. 27-34; M. MacSweeney and J. Reilly, 'The Royal Cork Institution, part I: 1803-1826', *Journal of the Cork Historical and Archaeological Society*, 62 (1957), pp. 22-36; M. MacSweeney and J. Reilly, 'The Royal Cork Institution, part II: 1826-1849', *Journal of the Cork Historical and Archaeological Society*, 62 (1957), pp. 77-94; S. F. Pettit, 'The Royal Cork Institution: a reflection of the cultural life of a city', *Journal of the Cork Historical and Archaeological Society*, 81 (1976), pp. 70-90.

[181] J. E. Rockley, 'Antiquarian activity in Cork, 1803-1881' (MPhil, National University of Ireland, 1995); J. E. Rockley, 'Towards an understanding of the development of antiquarian and archaeological thought and practice in Cork up to 1870' (PhD, University College Cork, 2000), Ch. 3.

specialist group devoted to scientific research, attempted to become more specialised and more scientific to attract the professors as members. The Scientific and Literary Society, by contrast, focussed on a popular debating format and continued as a primarily social venue. I will also suggest that a central aim of the Cuvierian and the Scientific was to help their members to participate not only in local civic culture but in a wider British intellectual community.

The different approaches to science taken by Cork's scientific societies reveal two different and yet compatible roles for science within the nineteenth-century provincial town: science as rational recreation and science as gentlemanly knowledge. The second function, served by the Cuvierian Society, was initially most suited to the Queen's College professors who made their contributions almost exclusively to this society. The period from 1849 to 1875 in Cork was characterised by a rise in activity for the Cuvierian Society and a decline in the Scientific and Literary. Even science cultivated outside the college walls was treated as expert knowledge, practiced by few. Science as rational recreation appeared infrequently in activities such as the 1852 exhibition and the occasional conversazione. However, by the 1870s, William Sullivan held the presidency of Queen's College Cork and of the Cork Scientific and Literary Society, while the Cuvierian Society had virtually disappeared. These alterations in fortune indicate the increasing role of the professors as scientific experts, initially complementing, and later replacing, local experts. The Scientific did not purport to be an organisation of experts, but a disseminating and debating body. The professors appeared as lecturers to a lay audience rather than peers. Thus the resurgence of the Scientific, with the college's president at its head, indicates a shift to expert-led popularisation of science towards the end of the nineteenth century. A move towards popular science that disseminated rather than encouraged participation has also been observed in the periodical literature of this time.[182] Institutions devoted to science education for the middle classes,

[182] R. Barton, 'Just before *Nature*: the purposes of science and the purposes of popularization in some English popular science journals of the 1860s', *Annals of Science*, 55 (1998), pp. 1-33; S. Sheets-Pyenson, 'Popular science periodicals in Paris and London: the emergence of a low scientific culture, 1820-1875', *Annals of Science*, 42 (1985), pp. 549-572.

such as the RCI, disappeared completely, relegating this to self-study or the Queen's Colleges.

The Royal Cork Institution

The Cork Institution was founded in 1803 by a few eminent Cork men including the Reverend Thomas Dix Hincks, a Unitarian minister and amateur man of science.[183] Hincks had given a series of lectures on science, funded by subscription, which proved so popular that a group of citizens decided to found an institution to deliver such lectures on a regular basis. By 1807 the Cork Institution became the Royal Cork Institution with an annual government grant of £2000. The council chose a number of professors each year to deliver a series of scientific lectures in exchange for a salary. Scientific notables such as Edmund Davy (brother of Sir Humphry Davy), local doctors and amateurs held the professorships.[184] In the early years, therefore, the Institution's role was clear: it provided educational lectures on practical subjects, such as chemistry and agriculture, which were open to a certain segment of the public for a fee. The Institution was housed in the 'Old Custom House' built in the eighteenth century and situated by the river, a short distance out of town. (Brian Cody, visiting in 1852, called it an 'antiquated fabric of dingy red brick' located in 'an unfrequented part of the city'.)[185] There, in addition to providing lectures, the RCI built up a collection of books, periodicals, art and natural history objects.

In 1830 the government grant was withdrawn and the Institution had to scale back and eventually terminate its professorships as its repeated appeals for fresh funding went unheeded. The government claimed the grant had not been renewed because of the limited scope of the RCI's activities.[186] However, it did agree to grant the RCI the ownership of the Custom House, and later, a small

[183] Hincks later moved to Belfast where he lectured in the Belfast Academical Institution. His son was the first professor of natural history in Cork. For more on the Hincks family see *Oxford Dictionary of National Biography* (60 vols., London, 2004) and Hincks Papers.
[184] R. Day, 'The account of the proprietors of the Cork Institution', *Journal of the Cork Historical and Archaeological Society*, 12 (1906), pp. 44-47; Pettit, 'The Royal Cork Institution'; Windele, *Notices of Cork*, pp. 125-9.
[185] Cody, *Cork and the Corkonians*, p. 77.
[186] Day, 'The account of the proprietors of the Cork Institution'; MacSweeney and Reilly, 'The Royal Cork Institution (I)'.

building attached to the Custom House. The Institution persevered even without government support, and its members found new ways to appeal for funding. The involvement of Munster politicians in lobbying for the Queen's Colleges has been mentioned in the previous chapter, but it is worth elaborating on the role of the Royal Cork Institution in this movement here. As early as 1831, the Institution's managers wrote to the governor general of Ireland suggesting that

> …the want of a Collegiate Establishment has long been felt in the South of Ireland, in which the middle classes may obtain, on cheap and easy terms, a scientific and practical education, intermediate between the elementary system of the grammar school and the more expensive and higher instruction of the University.[187]

The Institution, its managers felt, formed the perfect base upon which to establish this new college: it had a history of providing education for the town and its members and proprietors represented a harmonious mixture of religions.[188] The Munster Provincial College Committee, headed by the prominent Catholic chemist, Robert Kane, was fostered by members of the Institution.[189] It is interesting to note that, much like Thomas Wyse, the members of the RCI initially envisioned their college more as a secondary school than as a university. This type of education was deemed appropriate for the middle classes, while the university was primarily for gentlemen. The courses which the RCI had proposed would have been easily paid for by an annual subsidy coupled with relatively low fees for classes, a formula which was now in operation at the Belfast Academical Institution.[190] The RCI was arguing for a reinstatement of its grant (which had essentially been conferred upon the Belfast Academical Institution) on the grounds of a planned expansion of its activities.[191]

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[187] RCI Minute Book, 29 August 1831.
[188] This harmonious mixture is according to the RCI, see RCI Minute Book, 29 August 1831. Others were less convinced, see Cody, *Cork and the Corkonians*, p. 79.
[189] See for example D. Gwynn, 'The Munster college petitions in 1838', *Cork University Record*, 11 (1947); D. Gwynn, 'The origins of Queen's College, Cork', *Cork University Record*, 10 (1947), p. 30; Murphy, *The college*, Ch. 1.
[190] J. Jamieson, *The history of the Royal Belfast Academical Institution 1810-1960* (Belfast, 1959); *A view of the system of education in the college department of the Royal Belfast Academical Institution* (Belfast, 1832).
[191] MacSweeney and Reilly, 'The Royal Cork Institution (II)'; Pettit, 'The Royal Cork Institution',

When it was eventually decided in 1845 to establish the Queen's Colleges and to place one of them in Cork, the Royal Cork Institution attempted once again to become the site for the college. At this point, the RCI's activities had been reduced to hosting the meetings of other scientific societies and maintaining a library and museum (although the reports of visitors indicate that this maintenance was minimal). The proprietors of the RCI therefore offered the building as a site for the new college. As the inspector sent by the Office of Public Works put it, the RCI's building

> …was formerly the Custom House, and is now used as an institution for the encouragement of the arts and sciences it contains a library, a museum and statue gallery, with lecture rooms. The building is not at all in a good state, and the mayor & committee with whom communication was held stated that probably there would be no objection to its being given up to the Government if required.[192]

Fortunately for Cork's scientific societies, the building was deemed unsuitable as was the site, which was too small and potentially too marshy to hold the size of buildings necessary for the new college. Even an architectural drawing of the RCI from 1877 indicates a state of disrepair, illustrating several of the bricks and some of the ornamental façade as crumbled and worn (see Figure 3.1). At this point perhaps it began to become clear to the members of the Munster Provincial College Committee and the RCI that the institution was to have little or no influence over the form of the college for which they had successfully lobbied. While a few individuals involved in the RCI did receive professorships, Cork's manufacturers and businessmen did not receive powerful positions on the college council, as those in Manchester and Birmingham would when civic colleges were opened in their towns.[193] Although the example of the Cork Institution and the political clout of its members influenced the decision to locate a college in Cork, the elite of Cork were not able to dictate its terms. When the colleges opened, the RCI even lost its steward, who defected to the new establishment with glowing testimonials from his former employer.[194]

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[192] Henry Paine to Sir Thomas Freemantle, 30 August 1845, Provincial Colleges Letters.
[193] D. S. L. Cardwell, *The organisation of science in England* (London, 1972); D. R. Jones, *The origins of civic universities: Manchester, Leeds and Liverpool* (London, 1988), Ch. 6.
[194] RCI Minute Book, 2 October 1849.

By the time the Queen's College opened, the Institution was simply a formal name for a loose affiliation of politicians, doctors and men about town. It was a channel through which committees could be organised and appeals to the government made. In an analysis of the RCI, MacSweeney and Reilly concluded that 'Its activities were always culturally serious though they became progressively less scientific as science became a field for professionals rather than for enthusiastic amateurs.'[195] While the Institution certainly lost its primary scientific functions with its funding, it is less clear that the professionalisation of science had much to do with this change. Quite simply, the Institution had established itself as an educational body and with the loss of its grant and the introduction of the Queen's College, it was no longer able to function as such. In addition, the amenities of the RCI enabled various other forms of amateur science to persist in Cork. Instead of regular science courses, the RCI looked for other means of funding itself in order to pay for the upkeep of its building and perhaps return to the glory of past days. This was done by creating a design school, supporting the National Exhibition of 1852, building a large hall to host public lectures, renting space to other societies, offering subscriptions to the newspaper room and writing to government ministers in an effort to receive funding for various schemes. Thus, the RCI continued to play an important role in the intellectual and scientific life of Cork long after its grant had ceased and well after the arrival of the Queen's College.

One of the most important amenities which the RCI had was its building. Figure 3.1 shows plans of the RCI building and Figure 3.2 shows the 'Athenaeum' or public hall, added in 1855. The RCI's building consisted of three floors. The ground floor housed a large lecture hall (used by the Scientific and Literary Society), with a platform stage and a laboratory attached, as well as a residence which may have been occupied by the librarian and care taker, John Humphreys. On the first floor was the library, divided into a series of smaller rooms one of which is also labelled 'committee room' and may have been the location in which the Cuvierian Society met. As of 1877, however, the school of design occupied the committee room. Windele, in 1843, estimated that the library

[195] MacSweeney and Reilly, 'The Royal Cork Institution (I)', p. 23.

contained between 5000 and 6000 volumes, the majority being scientific in nature.[196] By 1859, Cody estimated (probably incorrectly) the library contained of the order of 13,000 volumes.[197] The second floor held the cast gallery as well as the classrooms of the design school and a lecture room. There is no precise indication of where the museum was located, but either the library rooms or the gallery are possibilities. Though the Office of Public Works and many visitors remarked on the poor state of the Institution, Corkonians such as John Windele were more sanguine. Writing in 1843 Windele claimed of the RCI that

> it is evident that its utility is capable of being greatly extended, and that it may be converted into a highly valuable means of diffusing knowledge far more widely than at present. Its adaptation is complete as a nucleus to draw together the scattered science and talent of a most extensive district, and to serve as a depository of its natural and artificial productions.[198]

Indeed, the building did serve as a nucleus and a depository, hosting not only the scientific societies but benevolent organisations as well. In addition, various objects found their way to the RCI's museum by donation.[199] These objects played an important role in events such as conversaziones which will be discussed below. The extension of utility of which Windele spoke was the proposal to convert the RCI into a new college, a dream which never did become reality.

Having failed to secure a new grant as a provincial college the RCI was in hibernation from about 1843 to 1848, when meetings and minutes were very scarce indeed.[200] However, the opening of the Queen's College seemed to encourage a relative spurt of activity, albeit mostly related to reducing the Institution's debt. In an effort to squeeze money out of the new college, the RCI proposed to sell its natural philosophy instruments to the science department. Sir Robert Kane was unwilling to pay for antiquated materials, but offered to take them on long-term loan and house them appropriately, to which the RCI could do

[196] Windele, *Notices of Cork*, p. 125.
[197] Cody, *Cork and the Corkonians*, p. 79.
[198] Windele, *Notices of Cork*, p. 129.
[199] See for example RCI Minute Book, 1 April 1850, when 'some curiosities' were donated to the museum by a James Wood, Esq. of London.
[200] RCI Minute Book.

nothing but agree.[201] The RCI also directed its attention to raising interest in their newspaper room, through which the Institution could keep Cork in contact with the rest of the United Kingdom (especially London and Dublin). In January of 1849, before the college opened, the RCI began a campaign to recruit new library subscribers at one guinea per annum. In December, after the opening of college, the proprietors determined to begin a newspaper room as an additional enticement. It was initially proposed to take six London newspapers, three Cork papers and one each from Dublin and Limerick. In the end the Cork papers were dropped and instead seven London papers (the *Times*, *Morning Chronicle*, *Express*, *Sun*, *Examiner*, *Spectator* and *Observer*) were taken along with the *Dublin Evening Post* and the *Limerick Chronicle*. The new amenity was advertised and new subscribers followed. Among the new subscribers were Queen's College professors George Boole, Alexander Flemming, John Ryall and Benjamin Alcock.[202] The papers quickly proved too expensive, and were reduced to the *Dublin Evening Post* and four London papers, indicating a preference for metropolitan news.

Getting new library subscribers and selling off equipment proved insufficient to restore the RCI's finances. However, the occurrence of the National Exhibition of 1852, held in Cork, inspired the RCI to change directions and seek a new audience in an effort to become a centre for Cork's intellectual and social life again. The exhibition committee, formed in 1851, had many overlaps with the RCI's proprietors and managers.[203] The presence of the Lord Lieutenant at the opening of the exhibition allowed the RCI another opportunity to point out its role in the establishment of the Queen's College Cork and to appeal for the support of the government.[204] After the exhibition closed, not only did the RCI attempt to gain the exhibited natural history specimens for its collection, but it proposed the removal of the exhibition hall to its own grounds to be re-erected as a public hall for:

[201] RCI Minute Book, 9 January and 4 February 1850.
[202] RCI Minute Book, 4 March 1850.
[203] See *Handbook to the harbour and city of Cork, with map and appendix* (Cork, 1852), pp. 6-7 and RCI Minute Book, List of Proprietors (in back of volume).
[204] RCI Minute Book, 7 June 1852.

> Religious Meetings—Scientific Lectures, Lectures upon special subjects—panoramas—exhibitions—The Young Man's Association—The Ancient concerts and musical societies concerts—balls—promenades—charity bazaars—Soirees.[205]

The RCI did acquire some specimens, but most importantly also got the building. A loan from the town council was arranged, an architect was hired and by 1855 the new hall, 'one of the noblest in the United Kingdom, being 113 feet in length and 53 in width', was erected near the Institution.[206] The plan of the Athenaeum can be seen in Figure 3.2. The RCI hoped to make a profit by renting out the building to various groups and it also hoped that it might serve as a means of becoming a new style of educational body, fulfilling the needs of those not served by the Queen's College.

As young middle-class men were now accommodated by the Queen's College, the Institution saw a new role for itself as the educator of the working classes and of women. In a fresh appeal for a reinstatement of their grant, the proprietors of the institution suggested to the Lord Lieutenant that:

> the advancing state of knowledge requires to place, within reach of all classes in society, the means of mental cultivation. Literature, science and the fine arts are every day becoming more essential requirements of the domestic circle and the Atheneum, the Royal Cork Institution with the School of Design, combine the elements for promoting popular instruction in its widest form, and giving expansion to the system of industrial and art teaching, which government is [sic] gradually bringing into operation in this country.[207]

If the RCI had received the funding it desired it would have effected a reversal of the transformation which most mechanics' institutes underwent in this same period. Although founded for the education of working-class artisans and mechanics, the mechanics institutes soon had an almost exclusively middle-class audience.[208] Instead, the RCI had proposed to move from a middle-class audience (now served by the Queen's College) to a wider one which included the

[205] RCI Minute Book, 15 September 1852.
[206] Cody, *Cork and the Corkonians*, p. 88.
[207] RCI Minute Book, 11 May 1855.
[208] Cardwell, *The organisation of science in England*, Chs 3 and 4.

working classes and women (implied by mention of the 'domestic circle'). The Lord Lieutenant may have sympathised with the RCI's intentions, but the funds were not forthcoming. Instead, his reply encouraged the RCI to accept that its role had been usurped by the college and to enter into cooperation or 'spirited emulation.'[209]

With its buildings and collections, the RCI offered societies which rented its premises more than they could ever hope to own, given the low membership rates they charged. Thus it managed to sustain the societies over lean periods and the long life of many of them may be partly attributed to the RCI. Rather than being driven out of scientific activities by the process of professionalisation, the RCI in fact fostered amateur scientific activity by providing it with a home and with the appropriate trappings. Dr Charles Yelverton Haines, a member of both the Cuvierian and the Scientific, acknowledged the contribution of the RCI to Cork's scientific culture in his opening lecture in the new Atheneum saying that:

> Around our old and oft unfairly abused Instititution is now growing up in spite of all vituperation, her brood of young children, though like other offspring—they may not always acknowledge the direct parentage:--She did retain her foster nest-egg of Science in her valuable library and in her former courses of lectures—…[210]

One wonders who had been flinging the abuse and vituperation. However, several hints indicate that perhaps the RCI had a reputation for exclusivity. MacSweeney and Reilly have noted their lack of enthusiasm for cooperation with the town's Mechanic's Institute.[211] When mayor in 1852 John Francis Maguire and several other town councillors objected to the town's £200 contribution to the RCI's school of design on the basis of its lack of public spirit.[212]

The library, lecture hall and museum of the RCI were the sole meeting spaces for the Cuvierian and the Scientific societies and the repeated backdrop to their

[209] RCI Minute Book, 4 June 1855.
[210] C. Y. Haines, *Introductory lecture delivered in the rotunda of the Atheneum for the Cork Young Men's Christian Association* (Cork, 1855), p. 8.
[211] MacSweeney and Reilly, 'The Royal Cork Institution (II)', p.77.
[212] 'Town Council—Yesterday', *Cork Examiner,* 2 February 1852, p. 3.

conversaziones. As I have already suggested, the bulk of Cork's scientific activity passed from the RCI to these organisations after its grant was withdrawn. Both societies were founded in the 1830s (although an early Scientific had appeared and disappeared in the 1820s), and a substantial number of their active members had been involved with the Institution. While the proprietors and supporters of the Institution had contained a significant number of Cork's elite (even if they were only 'civic knights'), the societies were clearly middle class. The Institution had offered educational lectures by paid experts, but the societies offered an open exchange of learning among members. The result was occasionally frivolous rhetoric, but serious investigation persisted. The following section will describe the membership and approaches of the Cuvierian and the Scientific and how these were altered with the arrival of the Queen's College.

The Cuvierian and the Scientific and Literary Societies

The primary 'offspring' of the RCI were the Cuvierian Society for the Cultivation of the Sciences (CCS), founded in 1835, and the Scientific and Literary Society (CSLS), founded in 1834. The Scientific was the most recent incarnation of a failed Philosophical Society and an earlier failed Scientific and Literary Society founded in 1820.[213] Historians have moved away from the expectation that scientific societies had intended, and were able, to affect industrialisation by introducing their members to scientific principles. Jack Morrell has argued that the social turbulence created by industrialisation in some towns was in fact a deterrent to the creation of a lasting scientific culture, rather than a stimulus to useful knowledge.[214] Instead, scientific societies have been seen as means of social legitimisation by marginalised groups (dissenters, newly wealthy manufacturers, doctors), of forming class identity and of controlling the lower orders through education.[215] While the Royal Cork Institution clearly served some of these purposes when it was actively providing scientific lectures, the responsibility of fostering science firmly moved on to the Cuvierian and the

[213] Windele, *Notices of Cork*, p. 130.
[214] Morrell, 'Wissenschaft in Worstedopolis'; Morrell, 'Bourgeois scientific societies',
[215] See for example Elliott, 'The origins of the "creative class"'; Morris, 'Voluntary societies'; Shapin, 'The Pottery Philosophical Society'; Shapin and Barnes, 'Science, nature and control'; Thackray, 'Natural knowledge'.

Scientific from the late 1830s. These societies, while conforming to many well-described British scientific societies in some of their particulars, present a new perspective on the uses of science in a provincial town.

The arrival of professorial science in the form of the Queen's College in Cork had the immediate effect of strengthening, rather than weakening, local scientific societies. This has been argued in the case of Yorkshire as well as in Glasgow.[216] However, the Queen's College initially strengthened one particular version of science, that of a gentlemanly pursuit of knowledge best expressed in the Cuvierian. The dominance of the Cuvierian as Cork's most active scientific society from about 1849 to 1869 can be said to have contributed to a separation between scientific expert and audience which characterised the Cuvierian's 1855 conversazione and the later resurgence of the Scientific. The presence of the Queen's College professors as members of the Cuvierian Society cemented differences between it and the Scientific and permanently altered the manner in which science was approached by each society. The Cuvierian was inspired to new efforts in scientific research with the college professors helping to stabilise membership. Conversely, this relatively reclusive society also attracted public attention through several conversaziones. The Scientific, however, went into a temporary decline, ceasing their conversaziones, and was generally ignored by the professors unless they were invited to deliver lecturers. It would seem that science for rational recreation was provided elsewhere (the 1852 exhibition and the 1855 conversaziones, for example) and that the more serious tones of the Cuvierian were preferred by local scientific devotees. However, the pendulum eventually swung back in favour of the Scientific as the interest and membership in the Cuvierian began to dwindle and as experts such as the president of the college joined the Scientific.

Figures 3.3 and 3.4 list the officers, in 1844, of the Literary and Scientific Society and the Cuvierian Society respectively. While there was certainly a mix of Christian denominations, in 1844 the Established Church accounted for at

[216] S. J. M. M. Alberti, 'Amateurs and professionals in one county: biology and natural history in late Victorian Yorkshire', *Journal of the History of Biology*, 34 (2001), pp. 115-147; J. B. Morrell, 'Reflections on the history of Scottish science', *History of Science*, 12 (1974), pp. 81-94.

least five out of twelve officers of the Scientific and at least three out of twelve for the Cuvierian. With two Unitarians and three Quakers, the Cuvierian had a larger selection of known dissenters in 1844 than the Scientific, though Unitarians and Quakers were proportionately over-represented in both societies, as we might expect. Each society had at least two Catholics among the officers, but this is still quite low given that Catholics accounted for 80% of Ireland's population in 1861.[217] The occupations of these same officers were, however, extremely close to that predicted by the British provincial societies. Each society represented a mixture of the professions (lawyer, minister, physician) as well as a few manufacturers and merchants. Medical men were in much greater abundance at the Cuvierian, making up three of the twelve officers. Interestingly, three of the twelve officers of the Scientific were religious officials (two ministers of the Established Church and one Catholic priest). This may indicate that expertise was already concentrated in the Cuvierian, as medical men would have had formal training in science.

What is also illustrated by the tables in Figures 3.3 and 3.4 is the amount of overlap in the leadership of Cork's societies. In 1844 they shared five officers. There were many similarities between the Cuvierian and the Scientific aside from their members. Both societies made use of the facilities of their 'parent' organisation, the RCI, holding meetings, soirees and conversaziones in its building. The societies each had relatively small annual subscription fees (10*s*, although the Scientific later reduced theirs to 5*s*) and the evening meetings were taken up with papers read by members. Both societies controlled access to membership by a proposal and balloting process and neither society permitted ladies to become members. However, there were also differences. Ten years later, and once the college had been open for five years, the Cuvierian and the Scientific shared only a single officer (John Humphreys, see Figures 3.5 and 3.6). Moreover, the Cuvierian had three professors on its council, one of whom was the president, while the Scientific had none. It is hardly surprising that Cork could not support two identical scientific societies and therefore that the goals of the Cuvierian and the Scientific diverged further over time. The Cuvierian

[217] D. H. Akenson, *Small differences: Irish Catholics and Irish Protestants, 1815-1922* (Dublin, 1988).

regarded itself as a learned body producing original research and thus saw the professors as natural additions. The Scientific, on the other hand, was more of a 'popularising' body, providing education and entertainment for middle-class citizens.

This difference reflected a divergence of their goals and activities that grew stronger over time. The Cuvierian's stated goal was:

> the promotion of a friendly intercourse between those persons who feel a pleasure in the cultivation of science and literature and the fine arts, and by personal communications, and occasionally, by courses of lectures on particular branches, to diffuse more generally the advantages of intellectual and scientific pursuits.[218]

In contrast, the Scientific and Literary Society was more simply a 'society for promoting knowledge in Science, Literature, Arts and Antiquities'.[219] The small differences in mission statements actually reveal greater differences in activities. The Cuvierians were meant to be 'cultivators' or practitioners of their arts whereas the members of the Scientific simply promoted. John Windele, an antiquarian and one of the Cuvierians, classed the Scientific as one of many short-lived 'debating societies' in his *Historical and Descriptive Notices of Cork*.[220] While the Cuvierian's papers often contained original research (albeit of an eclectic nature), members of the Scientific propounded rhetoric on topics which they had studied. The style of meetings was thus very different. The Cuvierians met on the first Wednesday of every month from October to June at 7:30 or 8 p. m. seated around a table in the library of the RCI (see Figure 3.7 for an invitation to a meeting).[221] Papers were often illustrated by items which the members brought with them and placed on the table for examination. For example, at one meeting the following items were on display: leaves from some trees in Cork, a portion of the trunk of a palm tree washed ashore on Valentia, tombstone rubbings, a newspaper from New Zealand and a collection of calculi and gall stones.[222] The Scientific met every Thursday at 7:30 p. m. in the lecture

[218] CCS Minute Book, 10 September 1850.
[219] CSLS Minute Book, 16 November 1820.
[220] Windele, *Notices of Cork*, p. 130.
[221] CCS Minute Book.
[222] CCS Minute Book, 6 February 1850.

hall of the RCI from September to May. (The different meeting days ensured that it was possible to participate in both societies, as at least a few individuals did.) In its heyday, the Scientific's meetings were attended by a larger audience than the Cuvierian's and consisted of a paper followed by a discussion. Unlike the Cuvierian, ladies were permitted to watch from the gallery. Papers were read once in full, and then in parts for discussion at a series of subsequent meetings. Thus each meeting consisted of a fresh paper and a portion of an earlier paper, each of which might be followed by discussion.[223] As we have seen in the plans of the RCI (Figures 3.1 and 3.2), meeting in the library meant a gathering of equals in an intimate atmosphere, surrounded by the products of knowledge in the form of books and possibly museums specimens. Meeting in the lecture hall, by contrast, involved viewing a speaker on a raised platform as one might view an actor in a play or a political orator. However, the Scientific did not allow this hierarchical format to preclude discussion, but rather encouraged discussion through a system of re-reading papers in pieces.

By 1854, the leadership of the two societies had diverged almost completely, as the Cuvierian embraced the college professors first as members and then as leaders. The Scientific, by contrast had engaged the Queen's College professors in a series of monthly lectures on science, designed to attract numbers to the meetings of the struggling society.[224] Professors George Shaw (natural philosophy) and William Hincks (natural history) as well as President Kane gave lectures.[225] The attendance at these lectures was reported to have been more numerous than usual.[226] The formula of the Scientific depended on the presence of a larger group of members than the Cuvierian, which could properly function with no more regular attendees than its officers. The continued and active role played by Richard Dowden in both societies indicates that to one intimately involved in their affairs the societies appeared to serve distinct purposes. These distinct purposes were not defined by the class of the members, which distinguished mechanics' institutes from bourgeois scientific societies, but were the result of different views of the use of science. The Cuvierian saw science

[223] CSLS Proceedings.
[224] CSLS Proceedings, 31 October 1850.
[225] CSLS Proceedings, 21 November and 12 December 1850 and 2 January 1851.
[226] *Cork Examiner*, 25 November 1850, p. 2.

largely as specialist, expert knowledge, the cultivation of which was a mark of distinction. As we shall see, the Cuvierians wished to be in communication with other specialist societies and to be viewed as a part of a larger scientific culture. The Scientific, by contrast, saw science as a component of middle-class social life and self-improvement. Expert knowledge could be provided by occasional visiting lecturers, the members themselves were not necessarily intended to become experts. Discussion was an important component of meetings as an extension of polite parlour conversation. These contrasts, demonstrated to some degree in their memberships, mission statements and style of meeting can be further seen in their approaches to conversaziones.

Science and sociability: the conversazione

An important component of most nineteenth-century voluntary societies was socialising. While the meetings themselves were undeniably social, most societies saw the need for more lavish events on occasion. These events, usually called conversaziones or soireés, were opportunities for infusing the members with fresh enthusiasm as well as attracting new members. The conversazione was an evening of music, food, lectures, scientific and artistic displays, promenading, seeing and being seen. Fine art, industry and science bled into one another as paintings were displayed alongside specimens and machinery, demonstrating the cultural value of scientific knowledge to the middle-class audiences present.[227]

The conversaziones of the Cork Scientific and Literary Society and those of the Cuvierian Society further emphasise the differences between the two societies. The CSLS hosted conversaziones in 1844, 1845, 1846 and 1866. The CCS held them in 1849, 1850 and 1855. All the conversaziones, except the two in 1855, were held in the rooms of the Royal Cork Institution and attracted hundreds of visitors. The 1855 conversaziones were held in the Athenaeum and each was attended by nearly 2,000 people. The Scientific had adopted the conversazione as a regular feature of their annual season until finances no longer permitted the

[227] S. J. M. M. Alberti, 'Conversaziones and the experience of science in Victorian England', *Victorian Culture* (2003), pp. 208-230.

extravagance. These conversaziones were limited to the friends and family of the society and showed science to be an important part of middle-class social life. The Cuvierian, by contrast, initiated its first conversazione in an effort to attract the Queen's College professors for membership. While the early conversaziones (1849, 1850) bore striking resemblance to the Scientific's events of the 1840s, the final conversaziones (1855) consolidated the image of the Cuvierians as purveyors of expert knowledge as they became demonstrators and lecturers to several thousand working-class guests.

The format of these conversaziones was remarkably consistent, and also bore similarities to the ones which Samuel Alberti has described in England.[228] Admission was controlled by ticketing which usually required one to be a member or invited guest of a member. Wives and daughters were conspicuously present at conversaziones, even if they were not invited to regular meetings of the host society. For example, the Scientific's 1844 conversazione was open to the 'members, subscribers, and usual visitors', and tickets were to be had from the RCI or the Cork Library. Members could introduce two visitors who 'may be either two ladies, or a lady and a gentleman, as the member requiring the tickets may prefer.'[229] The fashionably dressed crowd would arrive at the designated hall around 7 or 8 p.m. and would proceed to perambulate the building examining natural history specimens, machinery, paintings, and sculpture and sometime participating in experiments. A band was often playing. Later, there would be refreshments followed by a speech given by the society's president or an invited guest. While Alberti reports drinking and revelry at some conversaziones in England, the presence of many temperance campaigners among the officers of the Cork societies ensured that tea and coffee were the only available beverages.

The CSLS conversaziones resembled its meetings, but on a larger scale: more women, more objects, more food. The two conversaziones which it sponsored during the 1844/5 session were the celebrations of a thriving society. The first, on 3 October, opened the new session with a flourish, as the rooms of the RCI

[228] Ibid.
[229] 'Scientific and Literary Society', *Cork Examiner*, 2 October 1844, p. 1.

were 'flooded by a galaxy of fashion and beauty, as well as every man in Cork remarkable for taste, literary and scientific'.[230] Neither the committee for refreshments nor the apparatus committee had disappointed as 220 people were treated to tea, coffee, cakes and an array of scientific objects and experiments. Most of the items were borrowed from the RCI, which allowed the use of its microscope, electromagnetic apparatus, air pump and orrery.[231] A second conversazione was held at the end of the session, and this time 300 people attended, perhaps an indication of the excitement which the first created. This time, while the usual RCI apparatus were again made use of, the most exciting display was a demonstration of the electric telegraph, performed by Mr Nott.[232] For his efforts, Mr Nott was elected an honorary member of the society. From the detailed newspaper accounts it is clear that the conversaziones attracted public attention which the society required to further build its membership. The conversaziones were immediately followed by the proposal and acceptance of new members, lured by the possibility of further exciting events.[233]

During the 1845/6 session the CSLS's funds were insufficient for two conversaziones, but one did open the session in October. Mr Nott appeared again with his telegraph and an improved electromagnetic device. Dr Charles Yelverton Haines, a member as well as lecturer at the Cork Recognised School of Medicine, also presented a galvanic battery.[234] The final Scientific and Literary conversazione of the 1840s occurred on 1 October 1846. The numbers attending had declined to below 200 people and given the concurrent appearance of the potato blight the spirit of celebration must have been difficult to muster.[235] In fact, the force behind the conversaziones, Richard Dowden, had now to direct his determination and spirit to the society's survival. An obituary of this Unitarian temperance worker remarked that

[230] 'Cork Literary and Scientific Society—Opening of the Winter Session', *Cork Examiner*, 4 October 1844, p. 2.
[231] CSLS Proceedings, 3 October 1844.
[232] CSLS Proceedings, 1 May 1844.
[233] CSLS Proceedings, 3 October 1844, 2 October 1845 and 1 October 1846.
[234] R. O'Rahilly, *A history of the Cork medical school, 1849-1949* (Cork, 1949); CSLS Proceedings, 2 October 1844.
[235] CSLS Proceedings, 1 October 1846.

> During those years which followed upon the famine, and when gloom and depression hung over everything Irish, this Society felt the prevailing influence; and but for the courage, the perseverance, and the versatility of Richard Dowden, it had proved to be one of the many victims of the great national tribulation.[236]

Before the Famine, as the conversaziones indicated, the society had been flourishing. Indeed it was the Cuvierian Society which had asked for assistance from the Scientific, requesting aid in paying the cost of publishing its *Flora and Fauna of the County Cork* which it had printed in 1845.

The format of the conversaziones was indicative of a successful formula which the Scientific had struck upon. The paper topics at regular meetings were eclectic, representing the broad range of tastes among the audience. Weightier subjects such as 'The chemical nature of gas' (delivered by William Sullivan) were mixed with papers like 'Popular fallacies' (delivered by Revd Dominick Murphy). The taste for weird and wonderful objects was not neglected. For example, appearing in the 1844/5 session were the following:

10 October:	diagrams and specimens illustrating the circulation of the blood
7 November:	a live rattlesnake from New York
28 November:	various gas meters
12 December:	timber for use in railways
9 January:	greenhouse plants introduced from the tropics, a large assortment of mummies including human, cat and crocodile
20 February:	specimens (dead) of the flying phalanger and other members of the genus opossum from New South Wales
27 March:	a live racoon from New Foundland[237]

Thus scientific content was mixed with spectacle and polite conversation.

As indicated by the obituary remarks about Dowden, the Scientific was struggling by the time the Queen's College opened in 1849. In September of

[236] 'Death of Richard Dowden (Richard)', *Cork Examiner*, 5 August 1861, p. 2.
[237] CSLS Proceedings, 10 October 1844 to 27 March 1845.

1850 the members voted to reduce the membership fees to 5*s* and ask the RCI for a reduction in room rental as 'the reduction has been made from a desire to extend the usefulness of the society'.[238] Nevertheless, the 1850s were a period of relative inactivity and disappointing levels of participation. In 1853 a meeting was summoned to discuss the 'further prospects [of the society], after many of the members had expressed their anxiety for its welfare and continuance.'[239] However, few members appeared for the meeting and it had to be postponed for another week.[240] Thus the return of the conversazione in 1866 was heralded as a sign of the increased strength of the society. The *Cork Examiner* remarked that

> It is gratifying to see this Society, which has been so long identified with the progress of intellectual cultivation in Cork, is still capable of displaying the energy it possessed when the list of its members comprised names of more than national importance.[241]

Indeed the conversazione marked the increasing importance of the Scientific Society, which would rise in importance in the final quarter of the nineteenth century. In the 1870s the Scientific once again attracted 'names of more than national importance' in the form of the Queen's College president, William Sullivan.[242]

For the Cuvierian, the conversaziones were not simply about middle-class socialising. Instead, in 1849 and 1850 they acted to specifically welcome and recruit the professors as members. In 1849 the Cuvierian was struggling, at least financially. Little had been accomplished since the *Flora and Fauna* (1845). The Cuvierian saw the new professors as potential members and the saving of the society. To entice them to join, they hosted a conversazione. The conversazione was far more of a departure from usual affairs for the Cuvierians than it was for the members of the Scientific. While objects were certainly components of Cuvierian meetings, the meetings were generally smaller and more intimate than those of the Scientific. The subjects discussed were almost exclusively scientific

[238] CSLS Proceedings, 17 September 1850.
[239] CSLS Proceedings, 28 April 1853. The meeting was scheduled for the first Thursday in September.
[240] CSLS Proceedings, 8 September 1853.
[241] 'The Cork Scientific Society', *Cork Examiner*, 3 October 1866 , p. 3.
[242] R. Day, 'Cork Scientific Society 1813, notes and queries', *Journal of the Cork Historical and Archaeological Society*, 12 (1906), p. 48.

or antiquarian. Nevertheless, on 27 November 1849 the Cuvierians hosted their first conversazione. Once again, the rooms of the RCI were used. Unlike the Scientific's conversaziones, the guest list was not simply members and their appointed visitors. The professors were specifically invited, although, as several Cuvierian and Scientific members had been appointed to professorships, there was some overlap.[243] The conversazione proceeded in almost identical manner to those hosted by the Scientific in the past. However, the Cuvierians, seeing the uniqueness of the occasion, ranged farther and wider for their displays. The objects for inspection included a 'self-generating light', a collection of natural history specimens including Dr Joshua Harvey's birds, paintings of native birds by a Mr R. D. Parker and specimens of electrotype.[244] The president, A. F. Roche, distributed copies of the *Flora and Fauna*, a publication which had been inspired by the 1843 visit of the British Association.[245] A series of addresses were given by officers of the Cuvierian Society which explained the work and an additional account of the geology of Cork was given by Dr Haines. Colonel Joseph Portlock, Cuvierian vice president and an officer of the Ordnance Survey, delivered the feature address.

The conversazione succeeded in exactly the way the CCS had hoped. New interest in the society was aroused, and 15 new members were admitted at the next meeting.[246] However, it seemed to take a bit longer to entice the professors. Only one joined during the 1849-50 session. Nevertheless, the Cuvierians were flushed with the success of their foray into scientific socialising and a motion was made to plan a further event for the close of the session. Perhaps having learned from his experience with the Scientific, Richard Dowden suggested postponing the second event until the beginning of the following session. So once again, the beginning of the fall term was marked by a conversazione. Over

[243] These were all medical men who had been lecturers in medicine at the local medical colleges and now became lecturers at the Queen's College, usually in the identical subject.
[244] 'Cuvierian Society: Soiree for the President, Vice President and Professors of the College', *Cork Examiner*, 28 November 1849, p. 3. Dr Joshua Reubens Harvey was an instructor at the Cork Recognised School of Medicine. He became professor of midwifery at QCC. See J. P. Cullinane, 'Joshua Reubens Harvey', *The Irish Naturalists' Journal*, 17 (1972), pp. 223-225; R. Desmond, *Dictionary of British and Irish botanists and horticulturists including plant collectors and botanical artists* (London, 1977); O'Rahilly, *The Cork medical school*.
[245] J. R. Harvey, J. D. Humphreys and D. Power, *Contributions towards a flora and fauna of the county of Cork* (1845).
[246] CCS Minute Book, 2 December 1849.

the next year, the professors began to trickle in. On 6 March 1850, Francis Jennings, owner of a chemical factory, proposed Christopher Lane, professor of civil engineering.[247] On 2 October Edmund Murphy, professor of agriculture was proposed. He was followed by George Boole of mathematics and George Shaw of natural philosophy on 6 November.[248] In December, after the second conversazione, three professors of arts were admitted, along with James Nicol, the professor of geology. [249] The second Cuvierian conversazione seemed determined not to fall into the rut of repetition which had plagued the Scientific's events. Larger and more lavish than the last, the display included a portable gas factory; working models and sections of locomotives, hydraulic machines, and marine engines; three microscopes; 'an electrifying machine which formed an object of practical amusement to laughing groups'; insect collections; Mediteranean fishes; large botanical drawings; a sun fish; a drawing of the Mylodon; handicrafts; and illustrations of native birds.[250]

While the format and style was the same as that of the Scientific's conversaziones, there were also differences. Catering to a more prestigious audience (described as the 'elite' of Cork by the *Cork Examiner*), the Cuvierians attempted to out do past events.[251] Displays included more items and were more interactive. Significantly, many of the items exhibited had been borrowed from outside of Cork. Prestigious men of science had contributed: Robert Ball, the director of the Dublin Zoological Gardens and professor at Trinity College, had drawn the life-size Mylodon himself; William Henry Harvey, another Trinity man, had loaned his botanical drawings; the Queen's College had lent many of their apparatuses.[252] Thus both the 1849 and 1850 conversaziones served not only to prove to the professors that the society was enjoyably social, but also that they were scientifically serious and well-connected. The Cuvierians sought to further reinforce this image by printing the proceedings of the sessions as well as the conversaziones.

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[247] CCS Minute Book, 6 March 1850.
[248] CCS Minute Book, 2 October and 6 November 1850.
[249] CCS Minute Book, 4 December 1850.
[250] 'The Cuvierian Society Soiree', *Cork Examiner*, 25 November 1850, p. 2.
[251] Ibid., p. 2.
[252] *Reports of the Cork Cuvierian Society for the Cultivation of the Sciences for the sessions 1849-50 and 1850-51* (Cork, 1851).

While the scientific content of conversaziones was significant for demonstrating the seriousness and value of the societies, it is fair to say that education was not their primary goal. However, the addition of several professors to the Cuvierian's members and officers and the occurrence of the 1852 National Exhibition in Cork changed the CCS's approach to its 1855 conversaziones. These two conversaziones were more like mini-exhibitions and the overtone was distinctly one of social progress and harmony rather than the local pursuit of knowledge. They were even located in the Athenaeum, the 'recycled' exhibition hall. In addition, the 1855 conversaziones made a clear division between the scientific experts and their audience as the displays were operated and explained by men of science, rather than being left for individual exploration by the audience. For example, microscopes were demonstrated by Professors Edmund Murphy and William Smith while the natural philosophy apparatus (including engine models and a galvanic battery) were operated by Professor Shaw.[253]

The 1855 conversaziones broke with tradition: the audiences were much larger and one conversazione was specifically for the working classes.[254] The president of the Cuvierian in 1855 was George Boole, professor of mathematics at the college. In the 1830s, Boole had been involved in the mechanics institute in Lincoln, where he taught many science and mathematics courses for free.[255] Thus his interest in the working-class conversazione must have been significant. George Shaw, professor of natural philosophy, had been involved in a multitude of civic projects since his arrival in Cork, including the Exhibition.[256] Both Shaw and Boole spoke at the working-class conversazione and made clear that it was not simply about sociability but socialisation. The displays elevated the audience, inspired good behaviour and demonstrated the bond between humans. Shaw commented that although some scientific men might view the evening as a degradation of science, 'as for the Cuvierian Society, we think that the man who invents a cheap popular amusement, of an innocent and elevating character, does

[253] *Report of the Cork Cuvierian Society, for the Cultivation of the Sciences, for the session 1854-55; with an account of the conversaziones held at the Athenaeum on the 29th and 31st of May*, (Cork, 1855).
[254] Ibid.
[255] D. MacHale, *George Boole: his life and work* (Dun Laoghaire, 1985), Ch. 3.
[256] *Handbook to Cork*, p. 7; Maguire, *The industrial movement in Ireland*, p. 23.

a great deal of good, and is a benefactor to his kind.'[257] He was careful to notice the orderliness and attention of the 1800 artisans and their families as they perused the scientific and artistic exhibits on display. Boole claimed that the exhibits spoke of more than simply facts or beauty, rather 'the central bond of the arts and sciences must to us at least consist in the idea of humanity, in their connexion on the one hand, with the general progress of the race, on the other, with the development of the nature of the individual.'[258] The massive working-class conversazione had been a sort of one-day mechanics' institute, familiar to Boole from England and Shaw from Dublin. Its appearance in Cork said more about the efforts of the Cuvierians to imitate metropolitan examples than to cater to the needs of the local working classes. Tellingly, the working classes had to be drawn from outlying towns as there was limited local industry and local employers had 'encouraged and enabled' their employees and families to attend, probably by providing transportation.[259] Such encouragement could hardly have been resisted in a time when employers had nearly absolute control over workers.

The directors of the RCI were impressed with with event and sent a memorandum to the Cuvierians expressing their pleasure at the working-class conversazione, an event for which they were 'entitled to the thanks of every lover of progress'.[260] An event which had previously been a celebration of the accomplishments of a middle-class society had now been explicitly harnessed for the indoctrination of all classes into a narrative of social progress. The introduction of a working-class audience further distanced the scientific experts from the attendees. Previous conversaziones had been socially exclusive—they were limited to friends of the society or to the middle and upper-middle classes. While this new conversazione was inclusive in one sense, it clearly distinguished between knowledge-makers and knowledge-receivers. Interestingly, the Cuvierians never hosted another conversazione despite their success in 1855. Perhaps their finances did not allow for such regular expenditure or maybe the departure of members such as Dowden (who died in 1861) and Shaw (who left for Dublin in 1856) diminished the stock of conversazione enthusiasts. The

[257] *Report of the Cork Cuvieran Society 1854-5,* p. 17.
[258] *Ibid.,* p. 34.
[259] CCS Minute Book, 1 June 1855.
[260] RCI Minute Book, 4 June 1855.

event only returned to Cork in 1866 when the Scientific Society hosted one, resuming the traditional format of members and guests congregating at the RCI. The conversazione was considered a regular component of CSLS activities, when they could afford it. These events reflected the Scientific's view of science as a means of facilitating middle-class socialising. The CCS, by contrast, made use of the conversazione for two specific purposes: first, to attract the attention of the professors and second, to offer working-class education

Science and expertise: the decline of the Cuvierian Society

The conversaziones demonstrate that the Cuvierian and the Scientific were different in their approaches to 'public' displays of science. In their private activities too, the Cuvierians' more intimate meetings suggest a small circle of experts very different from the oratory and debate format of the Scientific. Many of these differences were in place before the Queen's College arrived, but the Cuvierians attempted to cement them in several ways which aimed at (and succeeded in) encouraging professorial participation in their activities. First, they divided the society into departments, similar to the academic divisions of the college or the sections of the British Association for the Advancement of Science. Second, they began to print transactions (albeit irregularly). Third, they focussed on developing local expertise by collecting data on local natural history and antiquities.

Although the RCI and its staff had been rejected as the foundation of the new college, when the professorial appointments were made, some local men were represented: Henry Hennessy became librarian, Sir Robert Kane became president, and several local medical men including Dr Denis O'Connor, Dr Joshua Harvey and Dr Thomas Shinkwin took up posts in the Queen's College medical school.[261] The first scientific professors in Cork were George Shaw (natural philosophy), William Hincks (natural history), James Nicol (geology), Christopher Lane (civil engineering) and Edmund Murphy (agriculture), though only Murphy and Shaw lasted past 1853. In the mean-time, Shaw, as we have seen, was deeply involved in civic scientific culture in Cork. Hincks, despite his

[261] Murphy, *The college*; see appendix for a list of professors.

father having established the RCI, made very few appearances at society meetings. His replacement, Joseph Reay Green, was involved in the Cuvierian Society from 1858. Nicol was replaced by Robert Harkness, who was a steady contributor to the Cuvierian for the duration of his life (he died in 1878). Murphy was vice president of the CCS in 1856 and president in 1858. The most striking thing about the professors' involvement in local scientific culture is that, with the exception of the local medical men, their contributions were made exclusively to the Cuvierian Society. The Cuvierians, through their early conversaziones, had actively sought the professors and then attempted to change the society's format to suit these new members.

As Professor Lane was being proposed for membership in March 1850, the able secretary, Richard Dowden also proposed 'That the Society be specially summoned to consider the propriety of modifying its arrangement, for the purpose of making it more practically useful.'[262] Dowden's idea for improvement consisted of dividing the society into committees according to specialisation and revising the society's regulations and mission statement. He also wished to change the name of the society to the 'Cork Cuvierian Society and Atheneum'. (This was before the building of the Cork Athenaeum and was a popular name for intellectual societies in the nineteenth century.) The society adopted new regulations which appear identical to the old regulations as described by Windele but once again emphasised that the Cuvierians were to 'feel a pleasure in the cultivation of science and literature and the fine arts'.[263]

However, Dowden's alterations did result in a new structure of specialised committees. These committees were to have separate meetings and to agree on how to best further the pursuit of their subject area. In addition they would be required to 'conduct any inquiries directed by the society or the council, and to obtain papers or reports to be read before the society.'[264] The four committees created were natural history, physical and experimental science, statistics and political economy, and agriculture and arts, reflecting a distinctly scientific

[262] CCS Minute Book, 6 March 1850.
[263] Ibid., 11 March 1850; Windele, *Notices of Cork*
[264] CCS Minute Book, 4 September 1850.

weighting of the society's activities. Despite the fact that several antiquarians were active in its membership, antiquities was included with industry as a second half of the 'agriculture and arts' committee. The society had effectively split itself into academic departments mimicking the arrangement of the college.

In his opening address for the 1849-50 session, given at the soiree for the professors, president Charles Yelverton Haines outlined the alterations which were taking place in the society, emphasising how they would make the CCS more useful and appealing. Through the division into subject area committees, Haines said:

> it is hoped that our Society may act up more practically to the principles of progress, seeking active cooperation by the admission of new members, and demanding that aid externally which may be rendered in so many ways by our friends.[265]

The Cuvierian saw itself as a learned body, but realised that without the trappings of other such societies it might have trouble attracting the interest of persons familiar with more prestigious organisations. To compensate, it set about acquiring what the members saw as the proper components of a society: published transactions, designated committees and a presence in public social life (provided by the conversaziones).

The results of the organisational changes and the new spirit which they infused into the society became immediately obvious in the natural history section. By the end of 1850, the natural history committee had decided its mission. In reporting back to the society as a whole it promised an ambitious programme: to complete the flora and fauna of the county and 'by correspondence with naturalists in other parts of the provinces, to extend their inquiries.'[266] The section seemed to take to its new mandate and its members reported on new species of flora and fauna at each monthly meeting. Heading up this section was Dr Harvey, who had previously had charge of the work on the *Flora and Fauna* (1845).[267] Harvey was clearly an enthusiastic naturalist and collector: he had

[265] *Reports of the Cork Cuvieran Society 1849-51*, p. 8.
[266] CCS Minute Book, 20 December 1850.
[267] Harvey, Humphreys and Power, *Flora and fauna of Cork*.

illustrated his talk on local fauna to the British Association in 1843 with his own stuffed specimens.[268] Using the published pamphlet as a starting point, the other members of committee, Isaac Carroll and Robert Olden, began to add to the species lists. Carroll's additions, at least, were recorded by the secretary of the society, John Humphreys on the pamphlet itself.[269]

At the start of 1851 there were monthly additions: Harvey contributed a paper on additions to the fauna, Carroll added several plants and Joseph Wright and Humphreys contributed lists of marine and freshwater molluscs.[270] Wright even proposed a detailed study of the behaviour of molluscs which he had begun by observing several of his specimens in captivity.[271] During this period, although several of the professors were regularly contributing to the society, the natural history section was dominated by local amateurs. However, the new committee for 1851-2 included James Nicol, professor of geology. The accumulation of information continued, with Carroll reporting on the first sighting of a species of algae in Ireland which he had made in Cork. Carroll had added to the authority of his finding by sending it to Dr William Henry Harvey of Trinity College, Dublin for confirmation. Over the next several months, Carroll and newly-admitted Samuel Wright made additions to the county's marine fauna, based on the results of their summer dredging expeditions in Cork Harbour.[272]

This accumulation of facts seemed to press upon the CCS the need to publish. While brief accounts of the meetings were consistently provided in the press, the Cuvierians were now seeking a larger audience. Speaking in January of 1851, after Dr Harvey had presented an array of additions to Cork's fauna, Colonel Portlock 'hoped that the society would adopt some method for preserving such valuable papers as this, as the monthly abstract published in the newspapers was not sufficient, and it was most important to study natural history locally, as it was the best way of arriving at the geographical distribution of species'.[273] Thus the Cuvierians decided to print a summary of the year's transactions, along with the

[268] H. Biggs, *Annals of the county and city of Cork* (Cork, 1843), p. 42.
[269] Harvey, Humphreys and Power, *Flora and fauna of Cork* , see copy in the NLI.
[270] CCS Minute Book, 3 January, 5 February, 5 March 1851.
[271] Ibid., 5 March 1851.
[272] See for example CCS Minute Book, 13 January and 4 November 1852.
[273] *Cork Examiner*, 3 February 1851, p. 4.

president's incoming and outgoing speeches. Copies were sent to other learned bodies in Ireland, including the Royal Dublin Society and the Royal Irish Academy. In addition, this pamphlet was added to the extra copies of the *Flora and Fauna* as an item to be used as a gift or to be exchanged for transactions of other societies. When the *Natural History Review* was begun in 1854, it called itself an organ of Ireland's scientific societies and listed the Cork Cuvierian among them.[274]

Other writers have claimed that the Cuvierian disappeared sometime in the 1860s. In 1859, Brian Cody's guide to Cork claimed the Cuvierian Society was scarcely heard of, defeated by squabbling among sections (the antiquarians versus the scientific men).[275] By 1949 any memory of the Cuvierian Society had vanished among the Irish scientific community: Robert Lloyd Praeger listed the society in *Some Irish Naturalists* but claimed he could find no information on it aside from the 1845 *Flora and Fauna*.[276] Other writers have dismissed the final years of the society as a period of inactivity and decline.[277] In fact, while the 1850s were to be the peak of the Cuvierian's public image, with its several opulent soirees to science, the 1860s were a period of steady scientific activity on the part of its members. Instead of bitter infighting between the antiquarian and scientifically minded members, there was cooperation in a wave of enthusiasm for cave exploration. Perhaps the zoologists and botanists had been alienated, but the geologists had found their niche. Joseph Wright and Professor Robert Harkness actively collected fossils, samples of geological strata, stone tools and bits of fossilised animal bone alongside their antiquarian friends John Windele and the Richards Sainthill and Caulfield.[278] While the Cuvierian had no publication of its own, and a lazy secretary had ceased recording minutes aside from pasting in newspaper summaries, Wright and Harkness were busily publishing in geological and other scientific journals. The cave exploration was

[274] *The Natural History Review* (Dublin, 1853-54), vol. 1.
[275] Cody, *Cork and the Corkonians*, p. 98.
[276] R. L. Praeger, *Some Irish naturalists* (Dundalk, 1949), p. 186.
[277] Gwynn, 'Cork Cuvierian Society'; MacHale, *George Boole*, Ch. 8; Rockley, 'Towards an understanding', Ch. 3.
[278] See for example letters from Harkness to Alexander Carte, 28 October and 1 November 1865, DNHM Letter Files.

exciting enough to detain Colonel Lane Fox, later Pitt-Rivers, for a spell in Cork where he participated in the expeditions and the Cuvierian's meetings.[279]

Yet as a major contributor towards Cork's public intellectual life, the Cuvierian Society had definitely declined. It no longer seemed interested in quenching the public's thirst for knowledge and instead was content with producing esoteric knowledge intended for the eyes and approbation of other specialists. Interestingly, this period also saw the revival of the sectional committees: this time limited to Geology and Antiquities. The Cuvierian had become, in some ways, a legitimate scientific body, boasting a Fellow of the Geological Society (Wright) and one of the Royal Society (Harkness) among its members. However, these individuals had become the life blood of the society and as they died or left town there were none to replace them. Young enthusiasts did not need the expertise of the Cuvierians, they had access to the professors at the college. The technical nature of the research presented at meetings meant that those in search of rational recreation migrated to the Scientific and Literary Society. Others, such as Isaac Carroll, had been helped into a scientific network partly by the society, but found that they no longer needed it once connections were established. Carroll continued his botanical research until his death in 1880, but he ceased participating in the Cuvierian before 1870. He did, however, contribute to Alexander Goodman More's *Cybele Hibernica* (1866) and continue to correspond with numerous Irish and British naturalists.[280] Carroll was not forgotten by Praeger and his publications and notes were treasured as particularly accurate.[281]

Despite much rhetoric on the importance of publishing, the Cuvierian only occasionally appeared in print. Its two pamphlets appeared in 1852 and 1855, but it never published a revised flora and fauna nor did it print annual transactions. The *Natural History Review* was short-lived and thus did not provid a consistent outlet. As we shall see in the final chapter of this dissertation, print communication was a vital means of engaging with the broader

[279] Rockley, 'Towards an understanding', Ch. 7.
[280] D. Moore and A. G. More, *Cybele Hibernica* (Dublin, 1866).
[281] Praeger, *Some Irish naturalists*.

scientific community as well as the public at large. As a private club which did not publish regular transactions, the Cuvierian was doomed to fade away, at least in historical memory. Without developing the necessary means of establishing itself among an international group of specialist scientific societies, the Cuvierian could not incorporate itself successfully into this 'public' either. Without regular social events such as the conversazione, it failed to attract substantial numbers of new members. The Cuvierian slowly faded from public life and memory and eventually ceased meeting. Its prominent members presented their work to metropolitan societies such as the Royal Irish Academy and the Geological Society of London. The demise of the Cuvierian is in contrast to the rise of the CSLS which still exists to this day.

Conclusion

At the opening of the Queen's College in 1849 Cork boasted three scientific institutions although one (the RCI) was virtually inactive. By the 1870s, only the Scientific and Literary Society was still active and in 1892 the Cork Naturalists' Field Club was founded at one of its meetings.[282] This was despite the relatively greater activity of the Cuvierian Society through the 1860s. The field club could be seen as a resurgence of the role of the Cuvierian's natural history committee: it focussed on collecting data about local natural history. At an 1896 meeting of the field club, the Cuvierian Society was referred to as being 'as extinct as the Irish Elk', which raised a response from a surviving member in the audience who replied that although the society had not met in almost twenty years he 'objected to be [sic] relegated to the Pleistocene period'![283]

The transitions in the style of science which dominated Cork's intellectual and public spheres after the arrival of the college were directly influenced by the presence of the professors. In Cork, after the arrival of the Queen's College, the idea of science as knowledge available to, and useful to, the middle class as a form of entertainment became temporarily less fashionable and Corkonians

[282] R. L. Praeger, 'The Irish field clubs III: The Cork and Limerick Field Clubs', *The Irish Naturalist*, 3 (1894), pp. 247-52.
[283] 'Field club news', *The Irish Naturalist*, 5 (1896), pp. 26-27.

inside and out of the college attempted to establish the Cuvierian as a learned scientific body, on par with other such organisations in Britain. This is comparable to the influence that the 1843 Cork meeting of the British Association for the Advancement of Science had: its eminent arrival led to increased activity by the Cuvierians and a concerted effort to collect natural history data. The meeting was followed by the printing of the results, in the *Flora and Fauna*, that had been encouraged by members of the BAAS.[284] The type of science that the Cuvierians favoured had a limited audience and was eventually unable to sustain itself as members moved on or passed away. The fading of the Cuvierian seemed to allow the resurgence of the Scientific, and its endorsement by the president of the Queen's College ensured its stability for a number of years. 'Scientific and Literary' societies were also founded as student organisations in each of the other Queen's Colleges and functioned very much as debating societies, where the priority was on rhetorical ability rather than expertise in subject matter.[285]

Cork's scientific culture during the nineteenth century is perhaps most comparable to Belfast.[286] As we shall see in the next chapter, there was a substantial local scientific community in Belfast before the arrival of the college. One of its longest-standing societies, the Belfast Natural History Society (BNHS), was also strengthened to a degree by adding professors as new members, but it never developed any dependence on their interest. The BNHS's involvement in large-scale civic projects (such as the museum and botanic garden) made it a significant independent presence.[287] Galway, by contrast, had a very limited scientific culture before the arrival of the college. This may be partly attributed to the lack of a middle class who, as we have seen, were mostly responsible for these organisations in Cork. The most significant extant scientific society in Galway in the 1840s was the Royal Galway Institution,

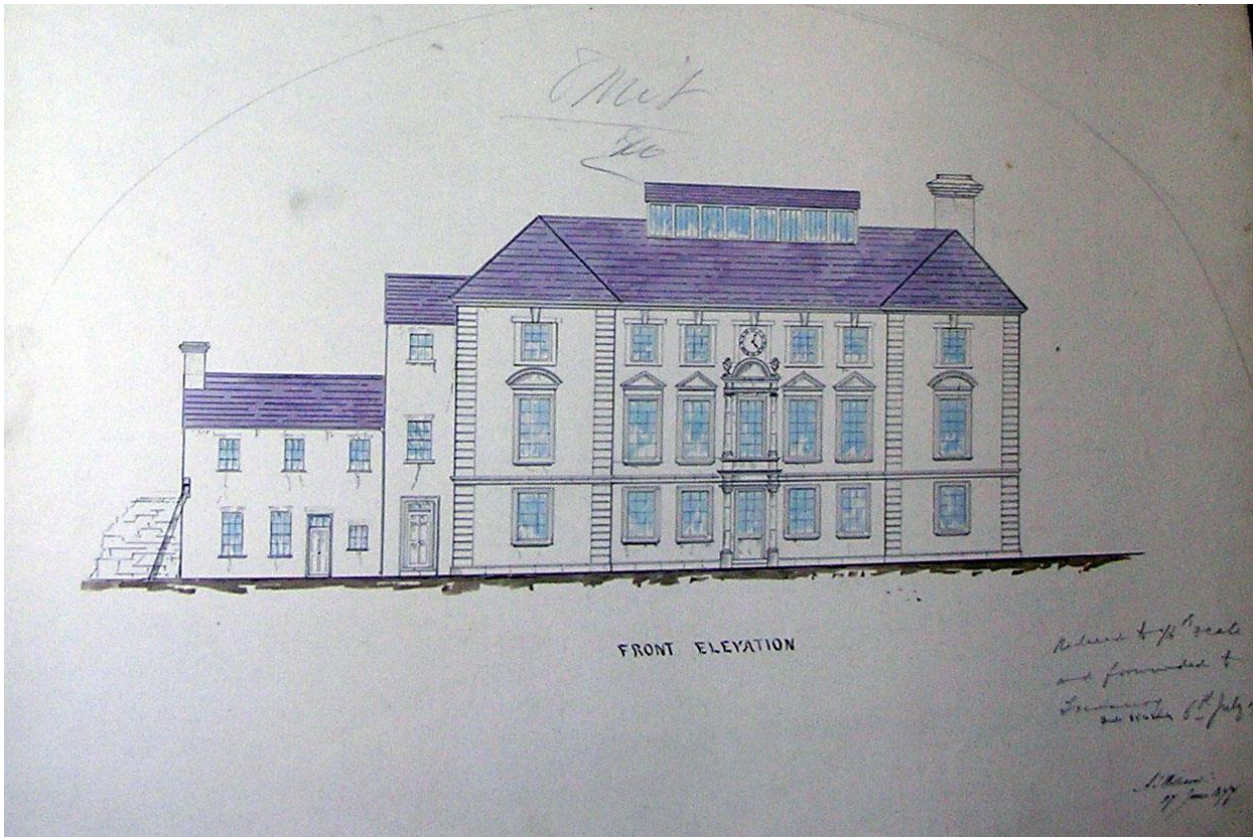
[284] Harvey, Humphreys and Power, *Flora and fauna of Cork*, see introduction.
[285] 'Some Reflections of an Old Student' (1902); K. Woodman, *Tribes to tigers: a history of the Galway Chamber of Commerce and Industry* (Galway, 2000).
[286] This has also been proposed by Rockley, who claimed that Cork and Belfast were more similar to one another than to Dublin. See J. E. Rockley, 'Towards an understanding of the development of antiquarian and archaeological thought and practice in Cork up to 1870' (PhD, University College Cork, 2000), p. 83.
[287] Bayles, 'Understanding local science'; Bayles, 'Science in its local context'.

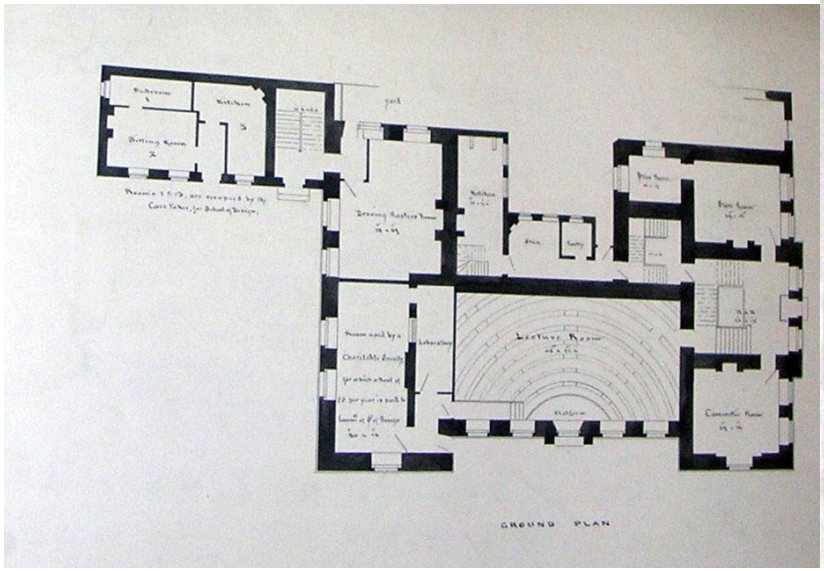
which also attracted some of the college professors as members. In this it was similar to the Cuvierian, but it actually functioned much like the RCI: the RGI met irregularly and conducted little if any scientific work itself, but occasionally hosted scientific lectures. These lectures were often delivered by professors or were applied for through the government's Committee of Lectures scheme.[288]

Unlike some of Belfast's societies, Cork's societies did not focus on improving local industry or farming and were more concerned with science as an intellectual discipline than its practical applications. There were occasional campaigns, supported by members of the RCI, Cuvierian and the Scientific, such as that for the 1852 industrial exhibition and the Munster Model Farm. However, the running of the Model Farm was then left to the government and the Queen's College, without direct involvement from the societies. In Belfast, which will be discussed in the next chapter, local institutions were directly involved in attempting to institute changes to agricultural and industrial practice.

[288] Woodman, *Tribes to tigers*.

Figure 3.1: Architectural drawings of the Royal Cork Institution, including front façade and three floor plans. Note the indication by the architect of wear on the front of the building. On the next page, note the ground floor lecture room (the meeting place of the Cork Scientific and Literary Society) and the library (meeting place of the Cork Cuvierian Society). Author's own photographs, originals at OPW 5HC/4/900, National Archives of Ireland, Dublin.




GROUND PLAN

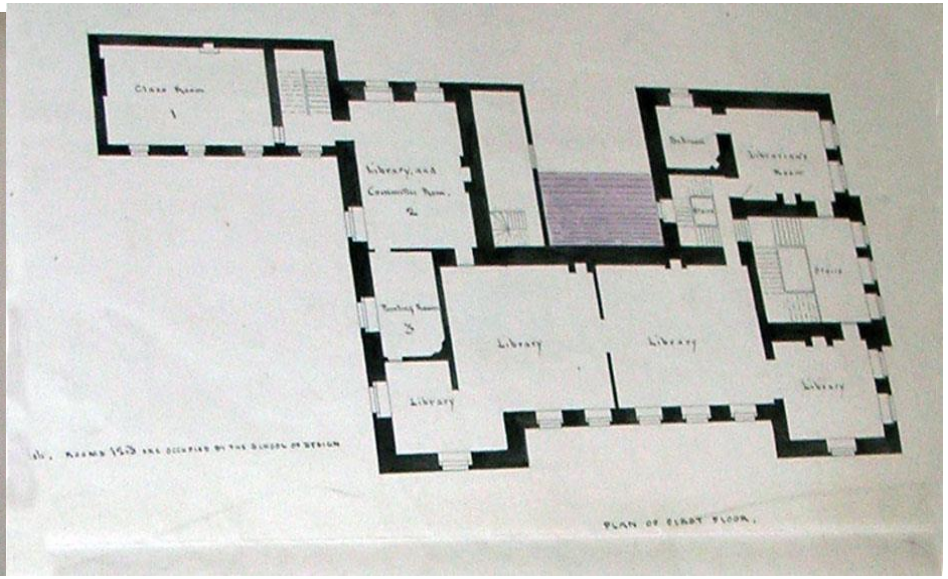

Class Room
1
Library and
Committee Room.
2
Library
Library
Library
Library
PLAN OF FIRST FLOOR.

Figure 3.2: Floor plan of the Cork Athenaeum. Author's own photograph, original at OPW 5HC/4/935, National Archives, Dublin.

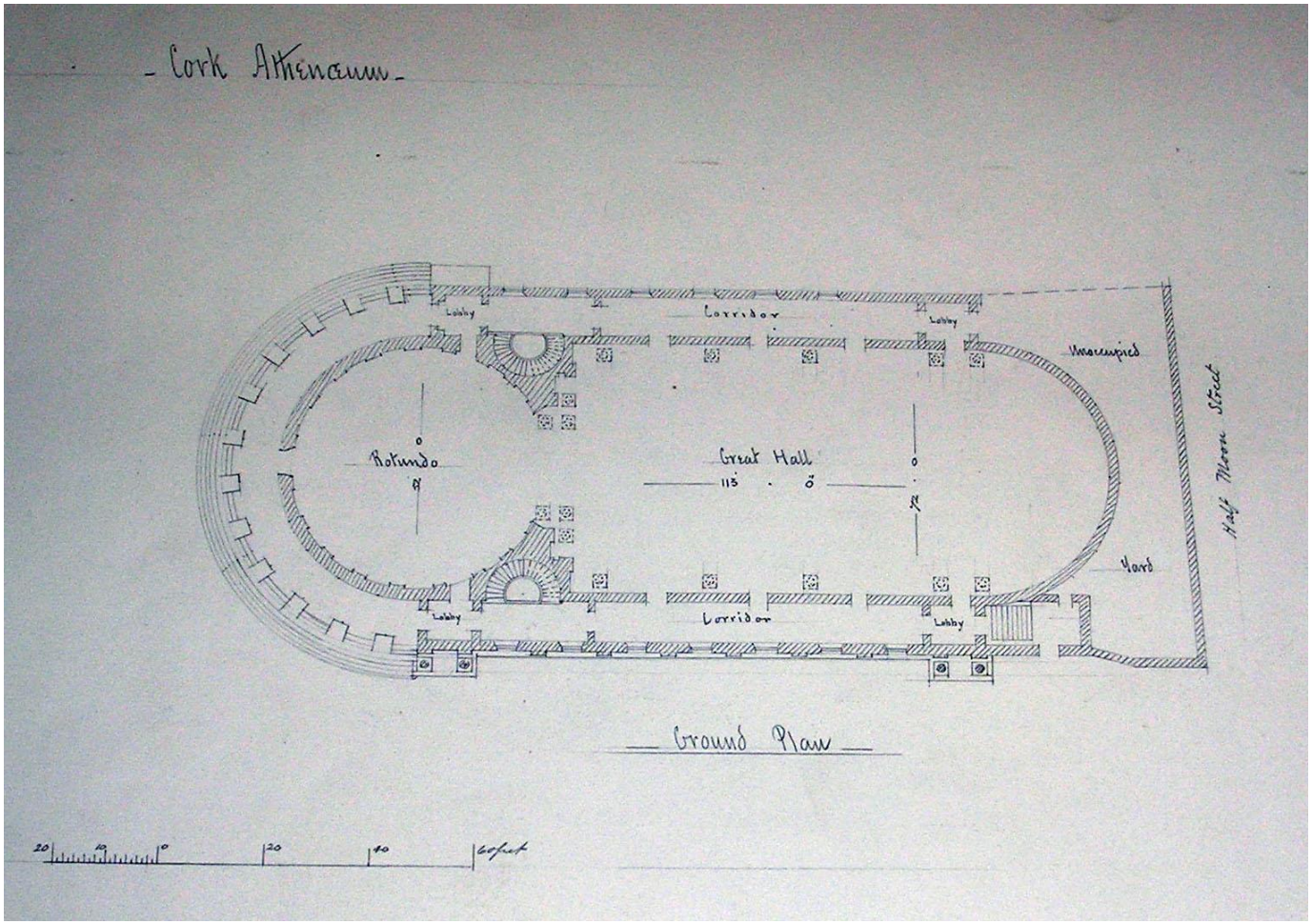


Figure 3.3: Table showing the council of the **Cork Scientific and Literary Society** in 1844. Information on occupations and religion taken from the following sources: T. Cadogan and J. Falvey, *A biographical dictionary of Cork* (Dublin, 2006); *Henry and Coghlan's general directory of Cork for 1867* (Cork, 1867); *Finny's Royal Cork Almanac*, (Cork, 1844); R. O'Rahilly, *A history of the Cork medical school, 1849-1949* (Cork, 1949) and R. Harrison, *A biographical dictionary of Irish Quakers* (Dublin, 1997).

Officer	**Occupation**	**Religion**
President: Francis Walsh	Lawyer, temperance campaigner	--
Vice Pres.: Thomas Jennings	Soda water manufacturer	Church of Ireland
Treasurer: William Kelleher	Gentleman	--
Secretary: Rev. Dominick Murphy	Priest	Catholic
Assistant Sec.: John Humphreys	Librarian to RCI, schoolmaster	Quaker
Censor: Richard Dowden	Secretary to Jennings' factory	Unitarian
Censor: Henry Biggs	--	--
Council: Francis Jennings	Soda water manufacturer	Church of Ireland
Council: Revd A. King	Minister	Church of Ireland
Council: Revd W. Whitelegge	Minister	Church of Ireland
Council: Dr Denis O'Connor	Professor of medicine at the Cork School of Anatomy, Medicine, and Surgery	Catholic
Council: J. S. Varian	--	Church of Ireland

Figure 3.4: Table showing the officers of the **Cork Cuvierian Society** in 1844. For sources see Figure 3.3. Note the dominance in the Cuvierian of professors at the Cork Recognised School of Medicine.

Officers	**Occupation**	**Religion**
President: Dr Joshua R. Harvey	Professor of medicine at Cork Recognised School of Medicine	Quaker
Vice Pres.: Thomas Jennings	Soda water manufacturer	Church of Ireland
Vice Pres.: Richard Sainthill	Wine merchant	--
Secretary: Francis Jennings	Soda water manufacturer	Church of Ireland
Assistant Sec.: John Humphreys	Librarian at RCI, schoolmaster	Quaker
Treasurer: William Clear	--	Unitarian
Council: Dr Power	Professor of botany at Cork Recognised School of Medicine	Catholic
Council: Richard Dowden	Secretary to Jennings' factory	Unitarian
Council: Abraham Abell	Merchant	Quaker
Council: Revd A. King	Minister	Church of Ireland
Council: Henry Hennessy	Self-taught physicist	Catholic
Council: Dr Charles Y Haines	Professor of natural history and medicine at Cork Recognised School of Medicine	Protestant (unknown denomination)

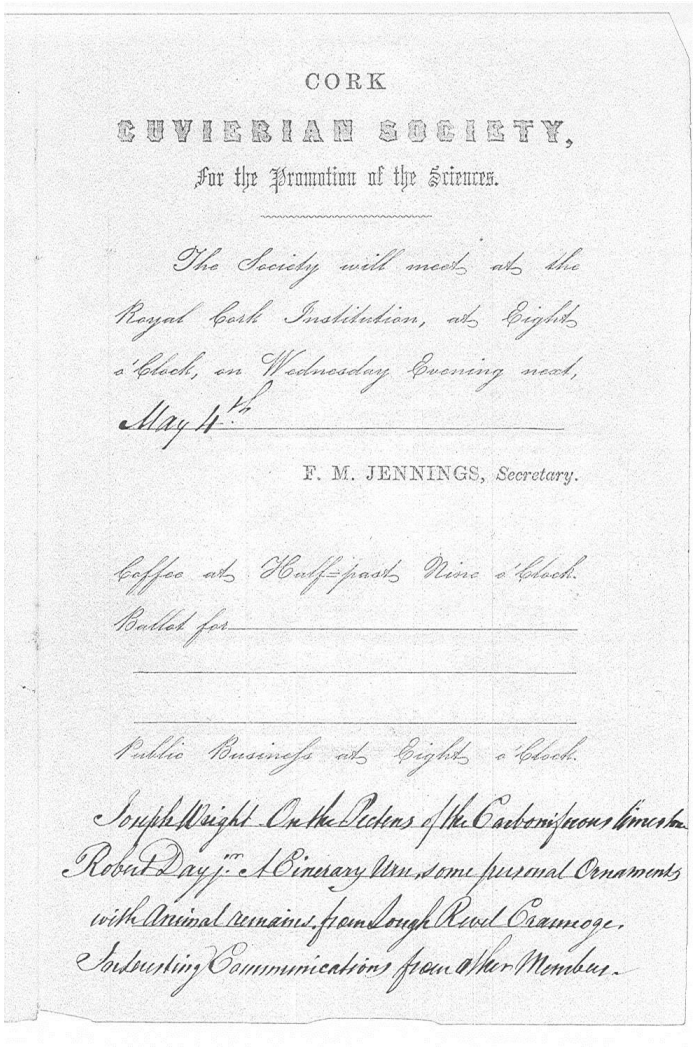
Figure 3.5: Table showing the council of the **Cork Scientific and Literary Society** in 1854. For sources see Figure 3.3.

Officers	**Occupation**	**Religion**
President: Michael Joseph Barry	Editor of local newspaper	Catholic
Vice Pres.: William Dowden	--	Unitarian
Treasurer: James E. White	--	--
Secretary: M. O'Bergin	--	--
Assistant Sec.: John Humphreys	Librarian to RCI, schoolmaster	Quaker
Censor: Richard Dowden	Secretary to Jennings' factory	Unitarian
Censor: B Hennessy		Catholic
Council: Dr Shinkwin	Professor of natural history, Cork Recognised School of Medicine	--
Council: James Casey	--	--
Council: James Colhurst	--	--
Council: Thomas Dunscombe	--	--
Council: Thomas Crosbie	Reporter and partner in local newspaper	Catholic
Council: Dr S H Hobart	Professor of surgery, Cork Recognised School of Medicine	--

Figure 3.6: Table showing the council of the **Cork Cuvierian Society** in 1854. For sources see Figure 3.3.

Officer	**Occupation**	**Religion**
President: Prof. George Boole	QCC professor of mathematics	Protestant
Vice Pres.: Robert Olden	--	--
Vice Pres.: Dr Hewitt	--	--
Secretary: Francis Jennings	Soda water manufacturer	Church of Ireland
Assistant Sec.: John Humphreys	Librarian at RCI, schoolmaster	Quaker
Treasurer: Francis Jennings	Soda water manufacturer	Church of Ireland
Council: Sir John Benson	architect	Church of Ireland
Council: Prof. Robert Harkness	QCC professor of geology	Protestant
Council: Prof. Edmund Murphy	QCC professor of agriculture	Catholic
Council: Dr Charles Y Haines	Professor of medicine at the Cork Recognised School of Medicine	Protestant

Figure 3.7: Invitation to a meeting of the Cork Cuvierian Society, from the uncatalogued letter files in the Dublin Natural History Museum. Note the advertisement of a paper by Joseph Wright.



CORK

CUVIERIAN SOCIETY,

For the Promotion of the Sciences.

The Society will meet at the Royal Cork Institution, at Eight o'Clock, on Wednesday Evening next, May 4th

F. M. JENNINGS, *Secretary.*

Coffee at Half-past Nine o'Clock.

Ballot for

Public Business at Eight o'Clock.

Joseph Wright On the Pectens of the Carboniferous Limestone

Robert Day jr. A Cinerary Urn, some personal Ornaments with Animal remains from Lough Revel Cranmoge.

Forwarding Communications from other Members.

4

'Practical' in practice: the agriculture diploma in Belfast

> …it is principally by giving a practical and industrial character to the higher departments of education that those new colleges can prove themselves truly useful or earn the permanent approbation of the country.

Robert Kane, 1845[289]

Introduction

One of Robert Kane's great desires for the Queen's Colleges was that they would provide education in areas of science that he believed would improve the country. The previous chapter has shown that science could be used as a way to create and expand a social community. This chapter will examine the hopes that science in the Queen's Colleges would transform a community, specifically the farming community, and thus Ireland. The Great Famine broke out just as the board of presidents and vice presidents was beginning the task of deciding the subjects to be included in the colleges. The need for agricultural education, already recognised by Commissioners for National Education and in Kane's *Industrial Resources of Ireland*, must have seemed even more pressing in the face of such widespread crop failure. Nevertheless, the agriculture diploma was the aspect of the colleges' programme that failed most spectacularly: each college attracted no more than five agriculture students per year and even fewer chose to take the examinations leading to a diploma. In 1858 the Parliamentary commission set up to investigate the progress of the colleges recommended that the chairs of agriculture be abolished upon the death of their holders. Yet in the 1840s there had been reason to believe that the programme in agriculture would be a great success and reap substantial benefits for the country. The number of farms associated with national schools and special model farm schools had been growing every year from the first establishment in 1832 and their success was touted by the Commissioners of National Education.[290] A network of agriculturalists was employed in the schools, in farming societies, by landlords and as adjuncts to public institutions such as workhouses and lunatic asylums. The Royal Agricultural Improvement Society of Ireland was generally experiencing widespread support and success in its annual exhibitions and the list of subscribing farming societies continued to grow. Thus an atmosphere

[289] [R. Kane], *On the importance of agricultural and industrial education* (Dublin, n. d., [1845]), p. 16. Although the author is not named on this pamphlet, it is inscribed by Kane.
[290] D. H. Akenson, *The Irish education experiment: the national system of education in the nineteenth century* (London, 1970), pp. 148-9.

receptive to agricultural improvement and education existed in Ireland at the time when the Queen's Colleges were founded

The agriculture diploma was not predestined to fail, although fail it did. Its failure demonstrates that subjects considered to be integral to voluntary scientific societies and intellectual discourse in the nineteenth century were not necessarily suitable as university subjects. The direct link between theoretical science and its application to industry and improvement was consistently urged by scientific men and their supporters, but in practice this link was tenuous at best. In addition, students could not be forced to enter into degree programmes for which they saw no use and it was their lack of demand for the diploma in agriculture that sealed its fate. I will argue that the diploma was in keeping with a movement for applying science to agriculture in Britain and Europe from the 1840s. Improvement in agriculture was seen as a partner to industrial improvement, making the subject suitable even in Belfast, the most industrial of Irish cities. However, as I will show, the diploma fell victim to conflicting interests between making agriculture scientific and teaching the practice of farming to those who were not farmers.

Members of the Irish scientific community saw the Queen's Colleges as an opportunity for reinforcing the importance of science to national development. In this, they were supported by a portion of the farming community who had shown their commitment to scientific agriculture through the support of farming societies. Yet scientific culture and practice could not easily be imposed upon traditional farming methods nor upon traditional ideas of the purpose of university education. In exploring these themes I will focus on the agriculture diploma in Belfast. Run by the chemist John Frederick Hodges, this was probably the most scientific and least practical programme in the three colleges, and as such it amply demonstrates the rift between science and its applications, a rift generally ignored by (or invisible to) proponents of science for improvement.

Agriculture in education

Well before the Queen's Colleges were founded there was support for agricultural education in Ireland. In many cases this was informally conducted by agricultural societies through lectures or the printing of pamphlets containing farming advice. However, in 1832 the British government funded two Irish agricultural schools as an experiment. This was followed in 1833 by the establishment of Glasnevin Model Farm for training teachers in agricultural education and a small number of pupils. By 1846 there were five model agricultural schools (national schools that had both teacher training and primary school classes conducted by the trainees) in operation and a further eleven under way. Some ordinary national schools also had small farms attached to them. The number of model agricultural schools continued to increase throughout the 1840s and early 1850s.[291] Agricultural education at these schools was conducted by 'agriculturalists' or by ordinary teachers with some agricultural training.[292] Subjects included chemistry, geology and natural history as applied to farming and students were also involved in the cultivation of the school farm. The resident agriculturalist was motivated to improve the farm because he was permitted to keep a portion of the profits. The inspector of the agricultural schools argued that a good balance between science and practice was maintained, telling the Commissioners of National Education that:

> The object that is aimed at, and which will be steadily kept in view, is not to fill the heads of the pupils with a technical jargon which they cannot understand, or reduce to practical application, but to make them familiar with those scientific principles which are of daily application in their profession…[293]

The inspector made two different arguments for the importance of agriculture education: first that agriculture could be improved by scientific principles, and second that it was a profession, comparable to more widely-recognised professions such as law and medicine. The inspector felt the need to assuage any

[291] Ibid., p. 149.
[292] *The 17th report of the Commmissioners of National Education in Ireland (for the year 1850)*, (Dublin, 1851), pp. 253-266. The meaning of 'agriculturalist' is somewhat difficult to pin down, but generally seems to have referred to an individual who taught methods of improving agriculture.
[293] Ibid., p.266.

doubts as to whether science was in fact needed for agriculture. He claimed that science was not simply useless 'technical jargon', but information specifically applicable to the practice of farming. This could be reinforced through farm work and the example the of agriculturalists, who cultivated the school farm along scientific principles.

The Glasnevin Model Farm (later Albert Model Farm and then Albert Agricultural College) was a model national school and perhaps also the model institution for agricultural instruction in Ireland before the Queen's Colleges were even proposed. Minimal records exist of the farm before 1870 (when a daily journal was begun), but it is possible to reconstruct some aspects of the teaching which occurred there. As late as the 1870s the school had not abandoned traditional means of teaching agriculture through a minimum of classroom instruction and regular bouts of farm labour. Little classroom time was specifically devoted to agriculture or science in general: while the students received an average of three to four hours of agricultural instruction per week, they also received nearly four times that in 'literary' instruction.[294] Even the entrance exam was heavily weighted (almost 2:1) in favour of literary subjects.[295] Nevertheless, records of their classroom teaching indicate that geology, botany and surveying were regular subjects as well as agricultural topics such as animal husbandry. Approximately one full day per week was devoted to working the farm itself.[296]

Ireland was an example of a trend for agricultural improvement and education that existed elsewhere in the United Kingdom as well. In the 1840s, institutions promoting agricultural chemistry were also being founded in England, including the Royal Agricultural College and the Royal College of Chemistry, both sources of jobs for the former pupils of agricultural chemist Justus von Liebig.[297] Throughout these institutions there was a tension between the demands of teaching agriculture as a science and as a practice, one of the problems that

[294] Albert College Journal 1870-3. See for example the schedule for the week of 30 October 1870.
[295] Albert College Journal 1873-6. See exam results for August 1873. What the literary subjects were is not specified.
[296] Albert College Journal 1870-3.
[297] R. Sayce, *The Royal Agricultural College, Cirencester* (London, 1992).

would later plague the Queen's College agriculture diploma. The national schools attained some balance between science and art by supplementing class instruction with farm labour, a model also followed in the Royal Agricultural College.

The Royal Agricultural College had first been suggested in 1842, at a meeting of a farming society. The institution was intended to educate the sons of larger tenant farmers at a fairly low cost. Nearly 500 acres of land were leased in Cirencester, college buildings were erected in a style imitative of Oxford and in 1845 the college was opened to 25 students between the ages of 14 and 18. The diploma offered was two years long and each day was divided equally between classroom lectures (in chemistry, geology, natural history, veterinary surgery and civil engineering) and farm labour. Students initially paid £50 per year as boarders, but in 1848 this was raised to £80. The high fees effectively limited the student body to the sons of wealthy landowners, rather than tenant farmers.[298] In addition, the college was plagued by administrative problems, resulting in an inability to retain scientific staff. Although the college was intended to be for higher education, it was initially more like a secondary school. This changed in the 1860s, when a new principal initiated a higher standard of theoretical, scientific education.[299]

Post-revolutionary France also had a fairly extensive system of agricultural education, although its failure to effect large-scale change in farming practice should perhaps have served as a warning to Ireland's agricultural improvers. The leading Scottish agriculturalist, Professor James Johnston, claimed that France 'presents another striking instance of the small connection which may exist between the existence of extensive means of agricultural instruction, provided by the central government, and the practical skill of the rural population.'[300] France had, in 1849, established a national agricultural university which added to the existing farm schools and abundant agricultural societies. Johnston (not surprisingly) blamed the failure of the system on the revolutionary government.

[298] Ibid.
[299] Ibid.
[300] J. F. W. Johnston, 'The state of agriculture in Europe', *Farmer's Gazette and Journal of Practical Horticulture*, 9 (1850), pp. 206-207, p. 207.

A much more recent historical analysis has claimed that the farm schools mixed success and failure and, rather than being ruined by government, were very much dependent on the unique vision of the agriculturalist in charge.[301]

The British education efforts discussed thus far were not offered as a component of university education. However, agriculture in the university did have a precedent in the chair of agriculture at the University of Edinburgh. The Edinburgh chair was created and privately endowed by a local Member of Parliament in 1790 and its first holder, Dr Andrew Coventry, experienced the contradictory demands of justifying agriculture as a scientific subject and providing education that was sufficiently practical to attract students.[302] One historian's assessment of the chair concluded that contemporary agriculturalists felt 'No agricultural faculty or department *per se* was desirable, for agriculture was a practical art, not a theoretical science, and as such could never lend itself appropriately to study at the university.'[303] Coventry's falling student numbers seem to support this belief. The foundation of the chair in Edinburgh coincided with a rising interest in improving agriculture as a means of uplifting Scotland, evinced by societies such as the Highland and Agricultural Society, and new ideas about the application of chemistry and other sciences to agriculture. Some agricultural improvements, such as enclosure, reaped huge and immediate economic benefits.[304] The return to a concept of scientific agriculture in nineteenth-century Britain was precipitated by many of the same factors involved in the eighteenth-century Scottish Enlightenment including relative economic prosperity, advances in the sciences, and an overlap between intellectual and landowning communities with a shared desire to promote ideas of improvement.[305] Despite the support of Scottish landowners and nearly 60 years

[301] A. R. H. Baker, 'Farm schools in nineteenth-century France and the case of La Charmoise, 1847-1865', *Agricultural History Review*, 44 (1996), pp. 47-62.
[302] S. Richards, 'Agricultural science in higher education: problems of identity in Britain's first chair of agriculture, Edinburgh, 1790-1831', *Agricultural History Review*, 33 (1985), pp. 59-65.
[303] Ibid., p. 64.
[304] C. W. J. Withers, 'A neglected Scottish agriculturalist: the 'georgical lectures' and agricultural writings of the Revd Dr John Walker (1731-1803)', *The Agricultural History Review*, 33 (1985), pp. 132-146.
[305] S. Wilmot, *"The business of improvement": agriculture and scientific culture in Britain, c.1770-c.1870* (1990), pp. 19-26.

of history by the opening of the Queen's Colleges, Edinburgh's agriculture chair was also plagued by difficulties and relatively limited student interest.

The addition of the school of agriculture to the programme of the Queen's Colleges was greeted positively by most. Even the *Dublin University Magazine*, which had been highly critical of the colleges, printed a letter to the editor that claimed:

> the most important innovation of all, considering the peculiar circumstances of the country, consists in the establishment of the Chair of Agriculture. There is now some prospect of having our country gentlemen properly taught that business by which they are to live, and having a most important branch of science restored to its due dignity, by being admitted to its place with the more elegant, but less practical studies of a University education.[306]

The establishment of chairs of agriculture in the colleges was seen as a particularly suitable for Ireland, especially in the aftermath of the Famine. However, the difficulties that would contribute to low student numbers can already be seen in this positive endorsement of the programme. First, the audience for the agriculture diploma, despite the middle-class remit of the colleges, was assumed to be 'country gentlemen', most of whom were in the habit of sending their sons to Trinity College Dublin or to one of the English universities for classical studies. Second, the writer declares that placing agriculture on the university curriculum establishes it as a science among 'less practical' subjects. As we shall see, the agriculture diploma was unable to retain both the 'dignity' of a science and the essence of its practicality.

The agriculture diploma in the Queen's Colleges

The agriculture diploma offered in the Queen's Colleges was clearly influenced by the Royal Agricultural College in Cirencester. The diploma was also to be two years and to cover scientific subjects as applied to agriculture. However, unlike most of the models mentioned above, there was no insistence on practical instruction in the Queen's Colleges and in fact none of the colleges was initially

[306] A. B., 'The Queen's Colleges', *Dublin University Magazine*, 39 (1852), pp. 707-721, p. 721.

provided with a model farm. In this sense, the agriculture chairs at the Queen's Colleges mimicked the chair at the University of Edinburgh, where it was assumed that the subject was a theoretical science in its own right.[307] While the Queen's students shared coursework with other students who took scientific subjects such as geology, chemistry and natural history, the examinations for the agriculture diploma were tailored for agriculture students.

The agriculture diploma in the Queen's Colleges was one of only two courses offered at the colleges in which students took solely science courses. In the first year, students took physics, chemistry, zoology, botany and the theory of agriculture. In the second and final year, they took courses in mineralogy and geology, surveying and mapping, 'history and diseases of farm animals' and the practice of agriculture.[308] It was a diploma, not a degree, and therefore the language and classics requirements for a bachelor of arts were not applied. Students had to pass entrance exams in basic mathematics and English, but there were no requirements for classics or other scientific background. In this respect it was similar to the other diploma offered in a practical subject, that in civil engineering. Engineering had similarly broad scientific requirements in its two-year course, with drawing, surveying and one specific civil engineering course reflecting the students' future focus.

Although relatively wide-ranging in scientific subject matter, the specific instruction in agriculture for the diploma was fairly limited. Theory and practice were separated, but in the absence of a farm to work it seems that 'practice' was mostly theoretical rather than practical. While agriculture students were required to take broad scientific subjects, they were examined far less rigorously on these topics. The exam questions reveal a focus on agricultural aspects of the subjects, rather than simply the principles of chemistry or geology. For example, the chemistry exam for 1852 included questions on Liebig's insights into chemical

[307] Richards, 'Agricultural science'.
[308] *Report on the condition and progress of the Queen's University in Ireland; from June 19, 1852 to September 1, 1853*, pp. 51-8 H. C. 1854 [1707], xx, 83.

fertilisers and the geology exam asked about the origins of Ireland's soils. The zoology exam asked about the phases of the turnip fly.[309]

The requirements for the agriculture diploma at the Queen's Colleges were only slightly greater than those for a student of agriculture in one of the national model schools. In these schools students also took basic chemistry, geology, natural history and physics and were introduced to specific agricultural topics. The examination had similar questions on the geological origins of Irish soils and the chemical constituents of animals and plants. However, each school with a course in agriculture did have a farm on which the students could practice tilling the soil, managing animals and raising crops.[310] At the Dublin model school (Glasnevin Model Farm) eminent men of science such as William Sullivan were employed to teach geology and chemistry.[311]

The Queen's University had a single examination system, but the three Queen's Colleges differed in their execution of the agriculture diploma. The agriculture professors each had different areas of expertise, which shaped their approach to the degrees. The Cork and Galway professors, Edmund Murphy and Thomas Skilling respectively, both had experience of the model farm/national school system.[312] John Frederick Hodges, the Belfast professor of agriculture, was a chemist by training and his approach to agricultural education was substantially different and perhaps more classically scientific than the education offered in the other two colleges. Hodges claimed that his version of agricultural education was preferable to the Cork and Galway colleges and had therefore attracted students from outside of Ulster to the Belfast college.[313] In contrast to Belfast, the Cork programme was more focussed on farming practice rather than theoretical science.

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[309] Ibid., pp. 51-8.
[310] *19th annual report of the Commissioners of National Education* (Dublin, 1853), p. 427.
[311] See for example Albert College Journal 1870-3, 27 October 1870.
[312] Skilling had been the manager of Eglington Model Farm in County Derry. See 'Our Commissioner', 'Rambles by road and by rail; or, where we went, and what we saw. no. XXXI', *Farmer's Gazette and Journal of Practical Horticulture*, 17 (1858), pp. 703-704. Murphy, by his own account, had been involved in founding a model farm outside of Dublin: E. Murphy, *The agricultural instructor; or young farmer's classbook, being an attempt to indicate the connexion of science with practice in agriculture* (Dublin, 1853).
[313] *Report of Her Majesty's Commissioners appointed to inquire into the progress and condition of the Queen's Colleges at Belfast, Cork and Galway*, H.C. 1857-8 [2413], xxi, 53.

When Edmund Murphy arrived at the Queen's College in Cork there was no farm available for the teaching of agriculture and he was thus not equipped as he might have expected. However, Murphy immediately joined the Cork Cuvierian Society. Influential members of this society, such as Richard Dowden and Francis Jennings, had already begun to petition the government for a model farm and Murphy's presence seemed to further galvanise their efforts.[314] In fact it was Dowden who proposed the committee at a meeting of the Scientific and Literary Society, suggesting that they write to the Lord Lieutenant in pursuit of a £4400 grant previously promised for agricultural education in Munster.[315] The establishment of the Munster Agricultural School and Model Farm was finally complete in 1853, when a building had been erected and the farmland had begun cultivation under Dr Kirkpatrick, representative of the Board of National Education.[316] The school straddled several age groups and while it was used to a certain extent in the teaching of agriculture at the Queen's College, it was also used as a component of the national schools system.

The focus of the Munster Agricultural School was quite different from that of Hodges's work in Ulster. Its support by two keen botanists (Dowden and Murphy) ensured that the focus was on the cultivation of plants, rather than agricultural chemistry. While experiments were to be a part of its remit, Dowden also seemed to hope that the farm might replace Cork's defunct botanic garden of the 1820s. Cork was, Dowden claimed,

> the natural situation for a scientific agricultural and arboricultural garden, where students from the rural district can have ready access, and probably the aid of Botanical and agricultural demonstrations, assisted by the manifest advantages of the growing vegetable illustrations.[317]

Murphy and Dowden seemed to see farming as horticulture writ large. Murphy's regular contributions to Cork's scientific societies consisted of papers on the diseases of farm crops, insect pests, invasive plant species and the cultivation of

[314] See for example, *Cork Examiner*, 20 April 1853, p. 3.
[315] CSLS Minute Book, 5 October 1848.
[316] *Cork Examiner*, 20 April 1853, p. 3.
[317] MS speech of Richard Dowden, n.d., Dowden Papers.

new food plants.[318] Prior to his appointment in Cork he had been advocating the establishment of a farm school in Leopardstown (near Dublin) and had edited the *Irish Farmer's and Gardener's Magazine*.[319] The magazine was sponsored by the Royal Horticultural Society, the Royal Dublin Society and the Royal Agricultural Society of Ireland and provided articles on botanical subjects as well as traditional farming advice in the style of a farmer's almanac. The differences between the Munster Model Farm and the agriculture diploma at the Queen's College in Belfast are further demonstrated by the fact that the Model Farm became the basis for a national school which continued long after the agriculture diploma at the Cork college had ceased. In the interim it was sparingly used for agriculture students and Murphy seems to have supplemented his absent lecture fees by accommodating national school students.[320]

Murphy's treatise on agricultural education, *The Agricultural Instructor* (originally published 1849, before his appointment began) further reinforces the notion that his teaching emphasised agricultural practice over science. While the first half of his book is devoted to what Murphy calls the 'science' of agriculture including the chemical composition of plants, the second and larger portion covers the 'practice' of agriculture, with suggestions for more traditional improvements including methods of crop rotation and improved farm implements. Murphy argued that agriculture is a balance between science and art: 'Science consists in the knowledge of the relation of bodies to, and their action on each other, and art is the application of this knowledge for the purpose of effecting the proposed object.'[321] It was in pursuit of the 'art' of agriculture that Murphy joined the local campaign to found a model farm in association with the Queen's College.

In Belfast, by contrast, there was no farm, nor evidence of a campaign to found one, and the chemical training of Hodges led to a focus on agricultural chemistry. The remainder of this chapter will focus on the programme in Belfast and the

[318] See for example CCS Minute Book, 5 March 1851, 5 October 1853 and 6 December 1854.
[319] See preface to Murphy, *The agricultural instructor*.
[320] J. A. Murphy, *The college: a history of Queen's/University College Cork, 1845-1995* (Cork, 1995).
[321] Murphy, *The agricultural instructor*, p. viii.

substantial efforts by Hodges, inside the classroom and out, to establish agriculture as a science. Hodges has also left significant records of his teaching practice in the form of lecture notes, pamphlets and textbooks which enable me to draw a more detailed picture of the agriculture diploma in practice.

Scientific agriculture in industrial Belfast

Agriculture may seem a strange subject for a college in a city that prided itself on manufacture. However, scientific agriculture actually was well-suited to the improving ethos of Belfast and the predominant local industry of linen manufacture. As we shall see, Belfast already boasted several agricultural societies and Ulster had more than one agricultural school. Belfast's middle-class voluntary societies, and their support by local gentry, created an environment in which agricultural science could flourish. In addition, links to Scotland encouraged imitation of agricultural developments there.

Belfast was, from its opening, the most successful of the three Queen's Colleges in attracting students. Nineteenth-century Belfast was a growing city, while Galway had been in decline for many years and Cork was beginning an economic downturn.[322] One guide to Ireland remarked with approval that 'Few towns have progressed in importance so rapidly as Belfast.'[323] The 'Northern Athens' had a middle class gaining in numbers and wealth and boasted a variety of educational and cultural institutions. In addition, concessions had been made to the Presbyterian community in the staffing and location of the college and therefore the largest religious denomination in Belfast was prepared to accept (at least initially) the education offered there.

Economically, Belfast was more similar to other expanding, industrial cities of nineteenth-century Britain than any other city in Ireland. In 1821, Ulster had a higher concentration of individuals (55%) employed in the trades than any of the other provinces.[324] The incumbent editor of the *Northern Whig* on his approach

[322] A. Bielenberg, *Cork's industrial revolution, 1780-1880* (Cork, 1991), Ch. 1; J. Cunningham, *'A town tormented by the sea': Galway, 1790-1914* (Dublin, 2004), pp. 16-39.
[323] *Black's picturesque tourist of Ireland* (Edinburgh, 1879), p. 323.
[324] C. O'Grada, *Ireland: A New Economic History, 1780-1939* (Oxford, 1994), Ch. 12.

to Belfast by train in 1866 wrote that 'as the train sped northward the landscape gradually improved. It began to show signs of energetic industry, of busy and prosperous life such as are painfully wanting amid the much more romantic scenery of the South and West'.[325] Belfast's architecture today is testament to its boom in the nineteenth century: red brick terraces that also filled Manchester, Birmingham and Leeds are still dominant. Each of these three cities was to develop a civic college in the latter half of the nineteenth century, influenced partly by the example of the Queen's Colleges.[326] Nineteenth-century Belfast had the highest concentration of Presbyterians in Ulster, and Ulster Presbyterians of all classes had links to coreligionists throughout the British Isles and especially Scotland.[327] In the absence of an acceptable alternative, the Scottish universities had been used as preparatory training for future orthodox Presbyterian ministers. Educating these students closer to their parents was an important reason for placing the new college in Belfast rather than Armagh or Londonderry.[328] With its educated, dissenting middle class engaged in trade and manufacture, Belfast had closer affinity to Northern British cities than to Dublin. This fact was repeatedly noted by travel writers, who referred to Belfast as 'a clean Manchester' and claimed that it was so similar to Glasgow that visiting Glaswegians believed they had never left home.[329]

Belfast also had all the cultural accoutrements of a Victorian city. It boasted a museum, botanic garden and library among numerous buildings devoted to trade and commerce; it had an active port and a railway station connecting Belfast to Portadown. At the time the station was erected in 1843, the only other railway line in Ireland connected Dublin and Kingstown.[330] In addition, Belfast had a number of educational and scientific institutions prior to the arrival of the Queen's College and the majority of these continued to flourish throughout the nineteenth century. The college itself had a precedent in the Belfast Academical

[325] T. MacKnight, *Ulster as it is; or twenty-eight years' experience as an Irish editor* (2 vols., London, 1896), vol. 1, p. 6.
[326] D. R. Jones, *The origins of civic universities: Manchester, Leeds and Liverpool* (London, 1988)
[327] F. Holmes, *The Presbyterian church in Ireland: a popular history* (Blackrock, 2000), Ch. 4.
[328] Larcom Papers 7460.
[329] *Picturesque tourist*, p. 323; MacKnight, *Ulster as it is*, p. 13.
[330] O. Doyle and S. Hirsch, *Railways in Ireland, 1834-1984* (Dublin, 1983), pp. 14-16.

Institution's (BAI) collegiate department. The BAI had taught the sciences since its foundation and hoped to become the basis for the new college, but its liberal Unitarian taint proved too much of an obstacle for conservative Presbyterians and it was ruled out.[331] Instead, many of its professors were re-hired by the Queen's College.[332] The predominance of local men among the staff made the Belfast college unique among the three Queen's Colleges in which there was a majority of English, Scottish and Dublin-born professors. Both the president, Pooley Shuldham Henry and the vice president, Thomas Andrews were Ulster men. Thomas Andrews had been the professor of chemistry at the BAI, while Henry was a moderate Presbyterian minister. Among the scientific and medical staff there were four former professors at the BAI, including the new professor of agriculture John Frederick Hodges.[333]

Aside from the BAI there were substantial numbers of voluntary societies devoted to learning. The Belfast Natural History and Philosophical Society's members had been responsible for the erection of the Belfast Museum in 1831 and the creation of the Botanic Gardens in 1828.[334] The Linen Hall library had been founded by the members of the Belfast Reading Society and had once contained a museum as well.[335] Numerous smaller societies were devoted to the promotion and improvement of a range of subjects including the Clinical and Pathological Society, the Chemico-Agricultural Society and the Flax Improvement Society.[336] English visitors, such as Harriet Martineau, who found much to criticise in other towns, found Belfast and its intellectual, industrial community praiseworthy.[337] This environment of learning and industry was

[331] J. Jamieson, *The history of the Royal Belfast Academical Institution 1810-1960* (Belfast, 1959).
[332] T. W. Moody and J. C. Beckett, *Queen's, Belfast, 1845-1949: the history of a university* (2 vols., London, 1959).
[333] Ibid., p. 119.
[334] For more on this society see R. Bayles, 'Science in its local context: the Belfast Natural History and Philosophical Society in the mid-nineteenth century' (PhD, Queen's University of Belfast, 2005).
[335] *Belfast Literary Society, 1801-1901; historical sketch with memoirs of some distinguished members*, (Belfast, 1902).
[336] See *Transactions of the Belfast Clinical and Pathological Society, for the session 1854-55*, (Belfast, 1855), N. Nesbitt, *A museum in Belfast: a history of the Ulster Museum and its predecessors* (Belfast, 1979); *Belfast Literary Society*.
[337] H. Martineau, *Letters from Ireland* (London, 1852), letter V.

among the chief reasons mentioned by the Ulster College Commission in choosing Belfast as the site for a Queen's College.[338]

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When it was decided that three chairs of agriculture would be created in the new Queen's Colleges, John Frederick Hodges must have been an instantly appealing choice. A native of Ulster whose scientific credentials were impeccable, he had, in fact, applied for a professorship in either chemistry or materia medica as early as 1845 (when no professorship in agriculture had yet been announced).[339] After the diploma ceased to exist (1863) he taught medical jurisprudence until his death.[340] Before beginning his job at the college, Hodges had been active in the field of scientific agriculture, especially agricultural chemistry. Born in Downpatrick, Co. Down and educated for some time in the laboratory of Justus von Liebig at the University of Giessen in Hessen-Darsmtadt, Hodges was among the chief proponents of scientific agriculture in nineteenth-century Ireland.[341] His work at the college was directly informed by his study with Liebig and his involvement in the agricultural improving societies of Belfast.

Hodges had long been part of a community promulgating the idea of agricultural improvement in Ulster. Inspired by Liebig, Ulster's agricultural improvers sought to make the farm as efficient as a factory. Prior to the opening of the Queen's College, Belfast already hosted two active societies devoted the scientific improvement of agriculture. To understand the role of agriculture at the Queen's College, Belfast it is important to understand the activities of the Flax Improvement Society and the Chemico-Agricultural Society of Ulster which had both advocated agricultural education prior to the opening of the college. These societies were the result of a movement for improving agriculture in the relatively prosperous early 1840s and mirrored a similar movement that had

[338] Larcom Papers 7460.
[339] QC Application Letters 1849. This file contains come applications from 1845, including Hodges's.
[340] *Report of the Commission to inquire into well-being and efficiency of the Queen's Colleges in Ireland*, H. C. 1884-5 [4313], xxv, 1.
[341] K. Newman, *Dictionary of Ulster biography* (Belfast, 1993).

occurred at the close of the eighteenth century.[342] The interest in improving agriculture through science in nineteenth-century Ireland was inspired by European examples. Ulster's two voluntary societies devoted to agricultural science (the Flax Improvement Society and the Chemico-Agricultural Society) had been founded in order to make use of European expertise. In the case of the flax society, this was the superior linen produced in Belgium and France. The Chemico-Agricultural Society was inspired by Liebig, with whom some of its members had studied. Each of these institutions attempted schemes of agricultural education and each were supportive of the effort to place agriculture on university standing.

The Flax Improvement Society and the Chemico-Agricultural Society were founded in 1842 and 1845 respectively.[343] Each society was supported by an almost identical list of local landed gentry and Hodges was a member of both.[344] In fact, it is difficult to distinguish between their memberships by either class or occupation. The Flax Improvement Society was specifically aimed at increasing the production of quality flax within Ireland as a raw material for the production of linen, while the Chemico-Agricultural Society was interested in the use of chemical analysis to improve agricultural practice. The societies were similar in their claims that science, and especially controlled experimentation, ought to be applied to agriculture. They actively sought advice and information from European and British sources and attempted to spread this advice to farmers at all levels in an effort to change agricultural practice. Their members believed that they were participating in a patriotic project whose result would be increased prosperity for Ulster and for Ireland in general.

The Flax Improvement Society focussed its attentions on the most significant Ulster crop, the raw material for linen manufacture. Flax is a grass; the fibre obtained from the stalk of the grass is used in weaving linen. The longer, finer and stronger the fibre extracted, the more valuable it was at market. Despite the

[342] Wilmot, *"The business of improvement"*, p. 19.
[343] *Report of the proceedings at the first general meeting, and council dinner, of the Chemico-Agricultural Society of Ulster* (Belfast, 1846).
[344] *The annual report of the Chemico-Agricultural Society of Ulster, and proceedings of the meeting; also, report of Doctor Hodges* (Belfast, 1847).

capacity for growing flax in Ireland, Ulster imported much of its flax fibre for spinning from Europe.[345] Thus local manufacturers and landlords were motivated to encourage the local production of flax fibre in order to make the Irish linen trade more competitive. The aim of the Flax Improvement Society was to

> *practically demonstrate what can be done*, by bringing over foreigners to instruct *in the careful system of Belgium and Holland*, and by sending some of our most intelligent young farmers abroad to witness and learn the treatment of the crops, *as practised in those countries* [emphasis in original].[346]

The society operated an exchange programme in which Irish tenant farmers, selected by their landlords as particularly industrious individuals, took up residence in parts of the Continent for weeks at a time in order to observe the farming of flax in those areas. The farmers did not necessarily speak the language of the area to which they travelled, but through watching and recording they would return to Ireland with new knowledge of farming and harvesting techniques. They then passed this information on to fellow farmers, encouraging others to grow flax and to grow the best possible crop by the new techniques. The Irish farmers also stopped in London to take lessons in chemistry at the Royal Polytechnic Institute.[347] In addition, several Belgian agriculturalists were selected to come to Ireland in order to assist in teaching Irish farmers their skills. These activities were subsidised by the subscriptions of the largely upper-class membership. Farming societies in smaller Ulster towns (although the society later spread throughout Ireland) could subscribe £15 to £25 per annum in exchange for the services of an agriculturalist for three to five weeks, prize money to award for successful flax products and copies of the society's publications.[348] Each of the society's publications included a section at the back of 'directions to farmers' giving the latest information on how to grow flax, when and how to pull it and how best to harvest the fibre. This was, in essence, an itinerant agricultural school for the transfer of both tacit and explicit knowledge.

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[345] J. F. Hodges, *The raw material of the linen trade: flax* (Belfast, 1865).
[346] *Proceedings of the first annual general meeting of the Society for the Promotion and Improvement of the Growth of Flax in Ireland* (Belfast, 1842), p. 6.
[347] Ibid.
[348] *The fourth annual report and transactions of the Society for the Promotion and Improvement of the Growth of Flax in Ireland* (Belfast, 1844).

The Flax Improvement Society was intensely practical. While it disseminated the results of experiments related explicitly to the growth of flax, it was primarily concerned with mechanical practice and with techniques that had the immediate effect of increasing yields or quality. Its audience was primarily tenant farmers and perhaps labourers as well, whose techniques of flax sowing, pulling and steeping could be improved directly by following continental examples. Therefore, *witnessing* European agricultural practice was an integral component of its educational programme. The Chemico-Agricultural Society, by contrast, was experimental in its remit, despite the large overlap in membership. It was inspired not by continental farmers, but by Liebig, who had a profound effect on Hodges and on many British chemists trained in his laboratory. (The effect was personal as well as professional: Hodges named his son George Liebig.)[349] He can be almost exclusively credited with the rise of agricultural chemistry in the 1840s in Britain. Liebig himself was symbolic of the rise of the middle classes: son of a successful shopkeeper who made paints and other household chemicals, he was apprenticed to one of his father's clients (the chemist William Kastner). Through the support of Kastner and Alexander von Humboldt, Liebig was eventually appointed professor of chemistry at the University of Giessen.[350] At Giessen, Liebig developed a research programme based on a technique for analysing organic compounds. In the 1840s he published a series of books on the application of chemistry to various aspects of industry and agriculture, almost all of which were translated into English.

Liebig's example quickly inspired imitation in Britain and Ireland. Between 1838 and 1845 the Agricultural Chemistry Association of Scotland and the Chemico-Agricultural Society of Ulster were founded, Kane published the *Industrial Resources of Ireland*, the Royal College of Chemistry was opened in London and the Irish Museum of Economic Geology (later the Museum of Irish Industry) was opened in Dublin. Robert Kane, another former pupil of Liebig's, was of key importance in spreading Liebig's methods and views in Ireland

[349] W. H. Brock, *Justus von Liebig: the chemical gatekeeper* (Cambridge, 1997), see appendix 2, pp. 342-52.
[350] W. H. Brock, *The Fontana history of chemistry* (London, 1992).

through the work of his laboratory and his lectures. His equivalent in Ulster was Hodges who also tried to extend the influence of a scientific approach to agriculture through the Ulster society, public lectures and laboratory chemical analysis. It is possible that Kane was influential in Hodges's appointment, recognising a fellow Liebig enthusiast.[351]

In 1840, Liebig's *Chemistry in Its Applications to Agriculture* appeared in both English and German. One of Liebig's primary observations was that plants require a variety of trace minerals in addition to the basic organic building blocks of carbon, hydrogen, oxygen and nitrogen. When these minerals are exhausted in the soil, the field decreases rapidly in fertility. He proposed that an artificial fertiliser could be produced to replace exactly the minerals taken out. Liebig believed that this could supplant the practice of crop rotation and produce higher yields for less labour. Once the farmer understood exactly what elements were taken from his soil by each crop, he

> will be able to keep an exact record, of the produce of his fields in harvest, like the account-book of a well-regulated manufactory; and then by a simple calculation he can determine precisely the substances he must supply to each field, according to the crops he has reaped, and the quantity of these, in order to restore their original fertility.[352]

The analogy of the manufactory symbolised efficiency and was particularly apt for Belfast whose farming fed directly into industry. Agriculture and industry were seen by Liebig and his disciples to be related enterprises. Through the application of industrial principles and the manufacture of suitable chemicals, agriculture could be turned into an efficient industry in its own right. Liebig made six trips to the British Isles and on at least two of these occasions he toured Ireland, visiting several of his former students. The influence of Liebig in the Queen's Colleges cannot be overstated: six men associated with the colleges in their first 25 years had been trained in his laboratory.[353] Kane has already been

[351] Hodges was also at Giessen at the same time as William Kirby Sullivan. See Brock, *Justus von Liebig*; list of pupils in appendix 2, pp. 342-52.
[352] J. von Liebig, *Familiar letters on chemistry, in its relations to physiology, dietetics, agriculture, commerce, and political economy* (London, 1859), p. 512.
[353] Aside from Kane and Hodges there were John Blyth, first professor of chemistry at QCC, Edmund Ronalds, first professor of chemistry at QCG, his replacement, Thomas Rowney, and William Kirby Sullivan, second president of QCC.

mentioned, but other Liebig pupils included William Kirby Sullivan (later president of the Queen's College, Cork) and Thomas Rowney, the second professor of chemistry at the Queen's College, Galway, who will be discussed further in Chapter Six.

According to William Brock, Hodges completed a PhD at Giessen in 1843 and performed further laboratory work in 1845.[354] Hodges also received an MD from Giessen in 1853.[355] In 1844, Hodges was back in his home town in Ireland, preaching the word of agricultural chemistry to the Seaford and Hollymount Farming Society. His speech was later published as a pamphlet, reprinted from the *Downpatrick Recorder*.[356] Hodges advocated Liebig's ideas, saying that 'It is Agricultural Chemistry alone which can show the farmer what the plant has taken away from his fields, the substances required to prevent their exhaustion, and the true composition of artificial soils or manures.'[357] Hodges described how simple experiments could show what minerals their crops contained, and therefore what minerals had been taken from the soil in the process of growth. For example, he encouraged farmers to try burning a bit of wheat or heating their soil in a teaspoon and examining the material left behind. Mechanical improvements had gone as far as they could in improving agriculture, now farmers needed to know more than how to 'make their fields smooth as the floors of their parlours'. Instead, 'It is to chemistry that the Irish farmer must look forward for any great improvement in the produce of his fields.'[358] Foremost among Hodges's claims was that the education of farmers was necessary for the advancement of farming: 'There is one great obstacle to the advancement of agriculture in this kingdom which I cannot pass over without notice—that is, the want of agricultural education among our farmers.'[359]

[354] Brock, *Justus von Liebig*, see appendix.
[355] Newman, *Dictionary of Ulster biography*; Hodges Papers.
[356] J. F. Hodges, *What science can do for the Irish farmer: being an introductory lecture on agricultural chemistry, delivered before the members of the Seaforde and Hollymount Farming Society* (Dublin, 1844).
[357] Ibid., p. 19.
[358] Ibid., p. 25.
[359] Hodges, *What science can do for the Irish farmer*, p. 25.

Hodges therefore saw the government's decision to found an agricultural chair in the new Queen's Colleges as an endorsement of Liebig's programme for scientific agriculture. This was a programme which he had personally been forwarding through work for the Chemico-Agricultural Society of Ulster who elected him its chemist in 1847.[360] The programme of the Chemico-Agricultural Society was strikingly similar to that adopted by Kane's Museum of Irish Industry: the members set up a laboratory in which chemical analyses of the composition of soils and fertilisers were conducted, as well as various experiments aimed at specifically improving crop yields.[361] In its first year the laboratory attracted ten students and conducted experiments into the following:

- The composition of lime used for agricultural purposes
- The use of human sewage for agricultural purposes
- The composition of imported guanos
- The composition of kelp and its suitability for fertiliser
- The qualities of water suited to flax steeping.

These were all overseen by Hodges, at an annual salary of £100.[362] Hodges had in fact been induced to leave his home in Downpatrick and move to Belfast in order to become the society's chemist.[363]

Each of these areas of research addressed specific local dilemmas. Guano was becoming a popular, if expensive, fertiliser and was imported into Belfast in large quantities from Latin America. However, results were extremely variable owing to the differing contents of the guano and the different mineral balance of the fields upon which it was applied. The expense of the product made the ability to predict its efficacy very desirable indeed. This had been the subject of Hodges's research at Giessen.[364] The disposal of sewage was also a topic with much contemporary urgency, especially in growing cities such as Belfast. Throughout the century there were numerous proposals for its recycling into productive matter. Edmund Davy, brother of Humphry Davy, proposed the addition of peat charcoal to lavatories and chamber pots in order to subdue the

[360] *Chemico-Agricultural Society, 1847 report*.
[361] Ibid. On the Museum of Irish Industry see E. Leaney, '"The property of all": public access to scientific education in nineteenth-century Ireland' (PhD, University of Oxford, 2002), pp. 86-98.
[362] *Chemico-Agricultural Society, 1847 report*.
[363] *Chemico-Agricultural Society, 1846 report*.
[364] Brock, *Justus von Liebig*, p.346.

smell and then the reuse of this material directly onto fields.[365] The use of kelp as fertiliser was a folk tradition of coastal farmers and Hodges's examination of it demonstrated what farmers already knew: that it was almost as good a fertiliser as animal manure. The processing of flax, vital to the linen trade of Belfast, required steeping the harvested material in water for several days. In Ulster farmers dug out 'ponds' and filled them with water. In parts of Europe, rivers were often used for steeping of flax and linen production associated with these areas was viewed as superior to that produced in Ulster. Therefore, Hodges and others sought to determine if there was some quality to Belgian river water that produced superior flax fibre. In fact, there was no important difference between an Ulster puddle and the River Lys except the skill of those labourers employed in extracting the fibre.[366]

The Chemico-Agricultural Society also propounded the improving rhetoric now familiar from Chapter Two of this dissertation. For example, the guest at the society's 1846 meeting was Professor Johnston of the Agricultural Chemistry Association of Scotland. Addressing the Ulster society was, he claimed, a pleasure:

> because I have been invited to meet a Society of improvers; of men who have the desire, and are exerting themselves, to bring science to bear on agriculture, who wish to make science instrumental in furthering the development of the resources—the unknown, I may almost say, the unimagined resources which Irish, as well as British, soil possesses.[367]

In the same language of Kane's book, Johnston referred to the undeveloped, possibly even unknown, resources of Ireland which simply awaited proper exploitation. The members of the society were referred to as 'improvers', that is those who wished to apply science to human endeavours for the purposes of improvement. (One cannot help but think that Jonathan Swift would feel his 'projectors' had come to life in these men, especially in reference to their attempts to put human sewage to useful ends.) In this same speech, Johnston referred to the absence of any 'school for the middle and higher classes, where

[365] E. Davy, *An essay on the use of peat or turf, as a means of promoting the public health, and the agriculture of the United Kingdom* (Dublin, 1850).
[366] Hodges, *Flax*.
[367] *Chemico-Agricultural Society, 1846 report*, p. 5.

they might receive a sound practical, agricultural education'.[368] Just as Kane had referred to the deficiency of industrial education as a reason for the neglected resources of Ireland, so too did the advocates of scientific agriculture pose education as necessary to increased agricultural productivity. If only farmers, land agents and even labourers understood the chemistry behind properly cultivated soil, they would be persuaded to try new techniques rather than relying on ineffective old ones.

As we have seen, the Queen's College agriculture diploma was partly the result of a movement for agricultural improvement in Ireland that began before the Famine, but whose resolve was no doubt strengthened by it. As such, its results were anticipated by members of the Chemico-Agricultural Society of Ulster. Their journal, edited by Hodges himself, advertised the new agriculture diploma in glowing terms saying

> We look forward with confidence to the most beneficial results from the arrangements which have been adopted, and anticipate that the Queen's Colleges will do much to remove from our country the reproach which travellers have, with too much foundation, cast upon our land-agents, and farmers of possessing less agricultural knowledge than any similar class in Europe.[369]

Thus the diploma would, in the minds of its supporters, not only improve agriculture in Ireland but also improve the view of Ireland within Europe. The extensive post-Famine travel literature did not make comfortable reading for the Irish farmer. The agriculture diploma, it was hoped, would extend the agricultural education available in the national schools, place agriculture on par with the other sciences and place Ireland on par with other nations.

Professor Hodges and the agriculture diploma

All was optimism at the start and perhaps the example of engineering, another applied science recently promoted to a university subject, contributed to that

[368] Ibid., p. 12.
[369] 'School of agriculture, Queen's College, Belfast', *Farmer's Gazette and Journal of Practical Horticulture*, 9 (1850), p. 208.

optimism. Trinity College Dublin had created a chair of civil engineering in 1841 (one of the earliest in the United Kingdom).[370] While the Queen's College engineering diploma continued throughout the nineteenth century, the parliamentary commission set up to investigate the progress of the colleges in 1857 suggested the termination of the agriculture diploma. This section examines the contents of that diploma, in the context of other courses available at the Queen's Colleges, including the engineering diploma. In this I am fortunate to have not only the thorough records of examination papers given in annual reports to parliament, but also the text of some of Hodges' lectures as well as fairly detailed information about the agriculture students. All of this information leads to the conclusion that the agriculture diploma failed at least partly because of a lack of agreement as to what it should contain and who it was for. This is closely tied to the question of whether agriculture itself was a science or an art, and whether theoretical scientific information was as important (or more important) than practical experience of tilling the soil and managing farm animals. This question is not simply relevant to agriculture, but goes to the heart of the question of 'science for improvement'. Despite an obvious professional path for the agriculturalist, and widespread support among landlords and larger tenant farmers, there were still limited numbers of students willing to embrace the idea that science was necessary for the improvement of agriculture. Hodges's approach to the agriculture diploma was distinct from the approaches in Cork and Galway in its focus on agricultural chemistry and in Hodges's own lack of experience with practical farming.

Hodges's educational materials indicate that he lacked confidence in the acceptance of agriculture as a scientific discipline at an academic level. This is despite the fact that it was clearly more directly relevant to Irish society than other scientific disciplines such as geology and natural history, which also struggled to maintain student numbers throughout the century. The teaching of agriculture illustrates the rift between theory and practice (or science and art) that plagued many scientific subjects. On the one hand, their importance to university education was justified on the basis of their application to the

[370] *The School of Engineering, Trinity College, Dublin: a record of graduates* (Dublin, *c*.1981).

improvement of the human condition. On the other hand, the transition from theory to application was neither direct nor smooth. As I have already pointed out, there were several existing interpretations of 'agricultural education' or even of 'agricultural science' in the middle of the nineteenth century. Efforts at the improvement of farming practice could be divided roughly into those which were practical and those which were theoretical. Practical involved hands-on instruction, and usually required the use of a model farm. Theoretical instruction included the sciences relevant to agriculture such as botany, zoology and chemistry.

The proper balance between these two types of knowledge was debated in the context of other educational programmes as well. An apt comparison is engineering as the Queen's Colleges also offered a diploma programme in this subject as well. As in agriculture, the training of engineers inspired debates over the value of apprenticeship versus book-learning.[371] Professorships in engineering began to appear in the early part of the nineteenth century, but the railway boom of the 1840s inspired a growth in the foundation of various engineering education programmes These theoretically-trained engineers were not rapidly accepted into the fold.[372] Nevertheless, Trinity College Dublin was among the first universities to found a chair in civil engineering and it was not alone among the older universities to recognise the importance of engineering as an emerging discipline.[373] Engineering, unlike agriculture, most certainly became a profession by the close of the century. This was not entirely due to the growth of university education in the subject, but the result of the specific cultivation of a professional image by organised groups of engineers.[374] The status of engineering as a science was a separate issue which did not impede its

[371] See for example R. A. Buchanan, 'Gentlemen engineers: the making of a profession', *Victorian Studies*, 26 (1983), pp. 407-29; R. MacLeod, 'Instructed men and mining engineers: the associates of the Royal School of Mines and British Imperial Science, 1851-1920', *Minerva*, 32 (1994), pp. 422-439; B. Marsden, 'Engineering science in Glasgow: economy, efficiency and measurement as prime movers in the differentiation of an academic discipline', *British Journal for the History of Science*, 25 (1992), pp. 319-346; B. Marsden and C. Smith, *Engineering empires: a cultural history of technology in nineteenth-century Britain* (Houndmills, 2005), pp. 160-2, 235-42; P. L. Robertson, 'Technical education in the British shipbuilding and marine engineering industries, 1863-1914', *Economic History Review*, 27 (1974), pp. 222-235.
[372] Buchanan, 'Gentlemen engineers: the making of a profession'.
[373] R. B. McDowell and D. A. Webb, *Trinity College, Dublin, 1592-1952: an academic history* (Cambridge, 1982), pp. 237.
[374] Buchanan, 'Gentlemen engineers: the making of a profession'.

progress at becoming a profession. Perhaps this was due to its increasing importance in every day life through the development of communication and transportation networks and its undoubted significance to the development of the Empire.[375] Agriculture, by contrast, appeared as a declining industry from which many farmers' sons were happy to flee for new professional careers. The establishment of agriculture as a profession seemed to depend on its establishment as a theoretical science within the university.

That the board of presidents and vice presidents had envisioned a theoretical bent to the agriculture teaching at the colleges is demonstrated by their selection of professors. The three professors had backgrounds in a culture of agricultural improvement that advocated the application of scientific principles. Thomas Skilling's (Galway) treatise on agriculture of 1846, prepared in his capacity as the director of Glasnevin Model Farm, attempted to strike a balance between scientific information and farming advice.[376] Edmund Murphy (Cork) had previously edited the *Irish Farmer's and Gardener's Magazine* which contained practical advice on planting, but also reviews of scientific treatises. His instructional book on agriculture, also written with the National Schools in mind, gave information on the scientific basis of agriculture before discussing the manner in which it was practiced on crops and livestock.[377] However, of the three, Hodges was probably the most scientific and the most theoretical in his approach to agricultural education. His teachings relied heavily on agricultural chemistry and the teachings of Liebig, who was admittedly not a farmer. The difference in their skills was recognised by others. For example, when a member of the Royal Dublin Society proposed in 1858 to remove the chairs of agriculture from the colleges and relocate the professors to a central institution in Dublin he claimed that one could assume a chair in the practice of agriculture, one in botany and one in chemistry.[378]

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[375] Marsden and Smith, *Engineering empires*.
[376] T. Skilling, *The science and practice of agriculture* (Dublin, 1846). On Skilling see J. Mitchell, 'Thomas Skilling (1793-1865) professor of agriculture, Queen's College, Galway, part 1: his career to 1849', *Journal of the Galway Archaeological and Historical Society*, 57 (2005), pp. 65-89.
[377] Murphy, *The agricultural instructor*.
[378] J. Fisher, 'Royal Dublin Society; agricultural education', *Farmer's Gazette and Journal of Practical Horticulture*, 17 (1858), pp. 441-443.

Hodges's emphasis on theory was later criticised by the Commission of Inquiry and cited as a reason for the lack of interest in the agriculture diploma at the colleges. While the colleges board, and probably largely Kane, had been visionary in establishing the chairs, there did not seem to be a fully formed idea as to who the agriculture students would be or what they would do with their education. Were they to become better farmers themselves or agriculturalists, encouraging others to change their farming practices? The former seemed to indicate an emphasis on practice and the latter an emphasis on theory. Although Hodges would later claim that his classes were indeed practical, the evidence of his writings and his lectures indicates a focus on the theoretical aspects of agriculture. This appeared to Hodges to justify agriculture as a science, worthy of inclusion in a university. However, a theoretical approach was not necessarily valued by students as the low enrolment numbers in the diploma seem to suggest.

Hodges was not a farmer and therefore must have had much to learn himself about the practice of farming. He admitted in an early lecture to a local farming society that 'I do not profess to have any practical acquaintance with the mechanical operations of agriculture'.[379] Yet he felt that his knowledge of chemistry allowed him to impart critical information to future farmers that they would not have readily acquired on their own. Hodges encouraged pupils to experiment in order to prove to themselves the truth of his statements. Many of his lectures and texts describe simple kitchen experiments using ingredients readily found on the farm or at a grocer's. Hodges seems to have been a conscientious educator with a knowledge of the limitations of his audience. His lectures were explicitly structured and even the simplest of chemical terms were defined.

A manuscript that appears to be Hodges's introductory lecture for the Queen's College indicates that he still felt the need to argue for the significance of agricultural education, even to an audience who had voluntarily submitted to it. Other authors have claimed that by the 1840s, the 'special pleading' for science's

[379] Hodges, *What science can do for the Irish farmer*, p. 4.

ability to contribute to the reform of agriculture had ceased, indicating that science had become accepted by agriculturalists.[380] Yet Hodges did not reflect this confidence. Agricultural education, 'the paramount importance of which, is so evident, that it might be supposed that very few words would be required to enforce its claims', actually required an entire lecture to justify its value for collegiate education. He declared the agriculture diploma to be 'the first public recognition by the state of the importance of securing a proper professional education for those who are in future years to become the proprietors or managers of the landed property of the country'.[381] While several agricultural model schools had already been founded in Ireland, the endowing of a university chair in agriculture was indeed a significant endorsement of the discipline as scientific. Hodges's first lecture, like those of the other professors, was announced in the local papers and the public were permitted to attend.[382] It was therefore not solely addressed to the existing students, but also to those members of the farming (and even manufacturing) community who might wish to send their sons for agricultural education at the college. Hodges was arguing for the importance of his discipline to a large audience of potential patrons.

Aside from convincing the students of the importance of their subject matter, Hodges also gave lectures on the classification of soils, water and 'the feeding of animals'.[383] Hodges dwelled, unsurprisingly, on his superior expertise in chemistry rather than the practicalities of farming for the substance of many of his lectures. 'The feeding of animals' lecture relied heavily on Liebig's *Animal Chemistry* (1843) and was primarily a discussion of the chemical physiology of animals and their diet. In essence, it was organic analysis applied to animals, rather than plants.[384] Much of this discussion was very theoretical: it was unlikely that a farmer would burn and chemically analyse the components of one of his animals. Hodges's interpretation of 'practical' was 'laboratory-based'. Without a model farm of any kind, he was unable (and possibly unqualified) to give instruction in methods of tillage or the improvement of mechanical farming

[380] Wilmot, *"The business of improvement"*, p. 17.
[381] MS introductory lecture, Hodges Papers.
[382] 2 November 1849, *Belfast Newsletter*, p. 3.
[383] Lecture notes, Hodges Papers.
[384] J. von Liebig, *Animal chemistry, or chemistry in its applications to physiology and pathology* (London, 1843).

devices. He was, however, keen to encourage chemical experimentation or at least knowledge of chemical principles.

Although Hodges's *First book of lessons in chemistry, and its applications to agriculture* (1849) was adopted as a textbook for the National Schools, indicating its appropriateness for a younger audience, the book gives some insight into his teaching priorities. Three copies of the book were available in the Belfast college library and could have been consulted by agriculture students.[385] The book was intended to guide teachers in the national schools as much as students, with descriptions of experiments that could be performed for the class. The focus of the nine chapters of this book was the chemical composition of plants and soils, and the improvement of such by the application of different types of fertilisers. The appendix to the book contained Hodges's own analysis of the quantities of carbon and nitrogen in plants, the chemical composition of different waters and the classification and nomenclature of soils. The author also suggested a minimum of apparatus and chemicals need to perform a series of basic experiments that he believed would demonstrate the principles described. Once again, the focus of each of these lessons was chemistry and it is easy to see why Hodges later came in for criticism for being too 'theoretical'. Hodges believed that chemistry *was* practical because it had a useful application. The descriptions of chemical analyses and even the basic experiments to be performed for demonstration were not intended to become a part of the farmer's land management repertoire. Instead, the farmer would become convinced of the need for such activities and hire a chemist, such as Hodges, to perform them. In fact, this was precisely the service that Hodges provided to the Chemico-Agricultural Society of Ulster and that Kane and Sullivan provided at the Museum of Irish Industry.[386]

The collections of the Queen's College library also give an indication of what agricultural works were seen by Hodges to be of most importance. There is no surprise that over twenty books by Liebig, many in multiple copies were found in

[385] W. A. Sanford, *Catalogue of books in the library of Queen's College, Belfast* (Belfast, 1897).
[386] R. Kane, *General descriptive notice of the Industrial Museum of Ireland and Government School of Science* (Dublin, 1866); J. F. Hodges, *The Chemico-Agricultural Society of Ulster: report on the composition and agricultural value of kelp* (Belfast, 1846).

the library. In addition, Hodges's own papers and those of Robert Kane also feature prominently. The proceedings of agriculture and farming societies throughout the British Isles were well represented, including journals from Dublin, London, Bath and Edinburgh. While no German or French periodicals were present there was one journal from the United States (Albany, New York) and another from Canada (Toronto).[387]

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The agriculture diploma, as well as the civil engineering diploma, were experimental curricula in an experimental university. As such, they allow us to examine different views of the work of a university. As this dissertation has already highlighted, there were a variety of expectations for what the Queen's Colleges could achieve in provincial Ireland including the submergence of religious strife and the scientific improvement of the country. The agriculture diploma was designed with precisely this second goal in mind. However, it rapidly became clear that no matter the aims of the colleges' founders and staff, the students would determine the future of the university and any outcomes of its education for Ireland. It was expected by many that students would favour the improving subjects so popular in the public courses offered by scientific societies across the country, including science applied to industry and agriculture.

In reality, as the vice-president of the Belfast college revealed in his testimony to the 1858 Commission of Inquiry, students attended the colleges for other reasons. Thomas Andrews was also professor of chemistry and the commissioners were particularly interested to know if the sons of industrialists attended his courses for the purpose of acquiring chemical knowledge related to industry. Andrews claimed that these students were very few indeed, and that the example of Owens College in Manchester and the University College London had demonstrated there was little demand for this type of education by industrialists in other British cities either. Further, Andrews believed that students did not attend university for the education, but for the prestige of

[387] Sanford, *Catalogue of books.*

obtaining a university degree. 'The demand for mere knowledge, for its own sake,' claimed Andrews, 'is not sufficient to induce a young man to pass through a fixed course of education'.[388] It was the desire for a degree, rather than a desire to learn subjects applicable to business that drove students to complete the course of study at Queen's College, Belfast. If this was true, there was an additional lack of incentive for students to embark on the course for an agriculture diploma as this certificate carried no weight nor any prestige, yet required submission to a strenuous course and rigorous examinations. In essence, students could use the university as a many had used casual scientific lectures and only the most serious of them attempted to complete the requirements for a degree.

What Andrews revealed in his testimony was essentially a question of audience: the imagined audience of students for the Queen's Colleges was not the same as the actual audience. As we saw in Chapter Two, the colleges and their schedule of courses bore striking resemblance to existing voluntary educational institutions such as scientific societies. Subjects like agricultural chemistry proved widely popular as public lectures. The self-improving middle classes saw the possibility of formalising and extending the attention paid to these subjects through university courses. Yet they failed to overcome the traditional view of the university as a place for training either gentlemen or professionals in law and medicine. The fact that Hodges had any students at all, and that some of these even went on to be farmers, illustrates the level of support he claimed within the farming community.

Hodges's introductory lecture, discussed above, gives some indication of the intended audience for the agriculture diploma. The expected students would be 'proprietors or managers of the landed property of the country.' Sometime during his career, possibly after the1858 report of the Commission of Inquiry put the agriculture chair in doubt, Hodges compiled a list of students whom he had educated at the Queen's College. The list also included the occupations of the students' fathers and their own employment where known. This list, combined with the records of the Albert Model Farm can give us some indication of the

[388] *Report of the Commission to inquire into the progress and condition of the Queen's Colleges at Belfast, Cork and Galway*, p. 4, H. C. 1857-8 [2413], xxi, 53.

audience for agricultural education in nineteenth-century Ireland (See Figure 4.1).

As was true of many courses at the Queen's Colleges, more students attended agriculture courses than matriculated as students and competed for examinations. The annual reports of the colleges indicate dismal student numbers. In the first year that diplomas in agriculture were granted (1852), only three were given. Of these, two were in Cork and one in Belfast. One of the graduates in Cork appears to have been the son of the professor of agriculture.[389] Only one diploma in agriculture was granted in 1853 (at Galway) and in 1857 none were given.[390] For comparison, Glasnevin Model Farm enrolled 44 students in 1850, although numbers declined thereafter.[391] Further, the Queen's College civil engineering diploma registered no graduates in either 1852 or 1857 and continued to have abysmally low graduation rates. Yet the abolition of the engineering diploma was not suggested, partly because enrolment rates were significantly higher than diploma rates.[392]

A comparison with the engineering diploma is appropriate because both were two-year programmes in subjects new to university education and neither conferred honours that were necessary for entrée into their professions. While the economy of nineteenth-century Ireland would suggest greater employment in agricultural fields, engineers were in relatively high demand for the development of infrastructure throughout Ireland, Britain and the Empire. In Belfast between 1849 and 1860 there were 31 matriculated agriculture students and 68 in civil engineering. Agriculture had an additional 17 non-matriculated students (students who took courses but not in preparation for a diploma), while engineering had only seven. On average there were between three and five agriculture students per year, and seven or eight in civil engineering. Still, these

[389] Brady, *Rep. Queen's U. Ireland 1853*, p. 59.
[390] M. Brady, *Report on the condition and progress of the Queen's University in Ireland; from September 1, 1853 to August 31, 1854* (Dublin, 1854); M. Brady, *Report on the condition and progress of the Queen's University in Ireland; from 1st September, 1856 to 1st September 1857* (Dublin, 1858).
[391] Albert College Register, students for 1850.
[392] Brady, *Rep. Queen's U. Ireland 1853*; Brady, *Rep. Queen's U. Ireland 1857*; *Queen's College (Ireland); return of the names of the matriculated students who entered in the Queen's Colleges in Ireland since 1849*, (1860).

were relatively low numbers compared to the 349 students in the faculty of arts for the same 11 year period. In Galway, where overall students numbers were lowest, there were 39 agriculture students and 44 engineering students. In Cork, by contrast, the difference was much greater. There were 35 agriculture students as compared to 139 engineering students.[393]

As Hodges himself acknowledged, the Queen's Colleges were in competition with the model schools for prospective agriculture students. Glasnevin was a model national school which, like other model schools, was intended to train national school teachers as well as students.[394] The lack of a consistent system of education from primary through to university meant that the ages and educational experience of students in both the Queen's College and the model schools varied widely. Thus the average age of a model school teacher in training was roughly 22. The minimum age for entrance into the Queen's Colleges was 16. While teachers in training were required to pass examinations to enter the model school, no university degree was required and thus the potential student population for the model schools and the Queen's Colleges overlapped significantly. Indeed graduates of the agriculture programme at Glasnevin followed similar career paths as the agriculture students of the Queen's Colleges.

Hodges's own list of agriculture students survives and although it is not dated, it cannot cover past 1863, when teaching in agriculture ceased (see Figure 4.1).[395] Hodges's list includes many more students than those that appeared in the official Parliamentary return and may take account of further casual students than were counted by the college registrar. For the majority of the 72 students that he listed, Hodges had information about their father's occupation and for many he also knew their occupation after leaving the college. While the Queen's University administration did attempt to keep track of the later careers of the Queen's College students, this information is relatively patchy and never includes information about the father's occupation. Thus, Hodges's list

[393] *Queen's College return of students*.
[394] For more on the organisation of the national schools see Akenson, *The Irish education experiment* ; T. Mangione, 'The establishment of the model school system in Ireland, 1834-1854', *New Hibernian Review/Iris Eireannach Nua*, 7 (2003), pp. 103-122.
[395] *Rep. Comm. Queen's U., 1884*, minutes of evidence.

represents an unusual and valuable historical source that enables me to discuss the audience for the diploma in much more detail than would otherwise be possible.

The dominance of farmers indicates that despite the small numbers of matriculated students, there was support for the diploma among the local farming community and some of them were willing to send their sons to the Queen's Colleges. Even eight of the local gentry (proprietors) were willing to send their sons to a college supposedly for the middle classes to take courses from Hodges. The students' occupations were often the same as their fathers. For example, all the merchants' sons who had finished their degree and whose occupation was known had continued to be merchants. However, some individuals did seemingly become farmers as result of the agriculture diploma. While six farmers' sons continued the family business, five other individuals also became farmers despite the lack of paternal example or (presumably) inherited farms. Three of these left the country (two to New Zealand and one to America), but the other two may have acquired farms through the encumbered estates courts or by renting land. Three of the students also became 'agriculturalists' which Hodges distinguished from 'farmers'. Many public institutions at this time had small farms (national schools, workhouses, lunatic asylums) and the individual who oversaw the farm, led inmates and students in farm labour and sometimes gave instruction in agriculture was designated as an agriculturalist.[396] At the Glasnevin Model Farm a majority of students went on to become agriculturists, many through arrangements made by the staff of the model farm on their behalf.[397] Six of Hodges's students became land agents or land stewards, indicating the continuing employment possibilities engendered by absentee landlordism. Other student occupations varied widely, including one civil servant and one geological museum employee in India, a member of the 'Spanish Survey', a banker and three bleachers.

The agriculture diploma cannot be credited with the creation of large numbers of scientific farmers. However, the information about students' occupations is

[396] On agriculture in the national schools see Akenson, *The Irish education experiment*, pp. 148-9.
[397] Albert College Register.

revealing nonetheless. It is striking that a large minority of the students who took agriculture courses were not the sons of farmers, proprietors or land agents. This indicates that Hodges did manage to arouse some interest in agricultural science among Belfast's middle-class professionals. The three students who became manufacturers actually went into businesses not unrelated to agricultural chemistry: one became the manager of his father's chemical works and the other two became managers of manure works. From the limited information available on the agriculture students, there are also indications that at least some of them were sons of those involved in the local agricultural societies. For example, one active member of both the Flax Improvement Society and the Chemico-Agricultural Society was James Campbell and two Campbells (J. C. and Robert) were listed among Hodges's students. Likewise, Richard Niven was also an officer in the Chemico-Agricultural Society and an R. Niven is listed among the students. The younger Niven also appears to have become a member of the Chemico-Agricultural Society, performing laboratory analyses with Hodges.[398]

The occupations of the Queen's College, Belfast students are quite similar to those of the Glasnevin Model Farm, although the model farm tended to produce a large quantity of 'agriculturalists' as previously noted. A few of the Model Farm students continued on to the Queen's Colleges. Reflecting national trends, many emigrated to America, Canada and Australia. In addition, around the 1860s there was a growth in numbers who became overseers on Jamaican plantations.[399] Despite the low numbers of students (much lower in the Queen's Colleges), both the Glasnevin Model farm and the collegiate agriculture programme created a number of farmers and agricultural advisers for Ireland. Unfortunately none of these individuals has left behind publications or personal papers and I am therefore unable to assess the impact of their studies on the prosecution of their trades. The economic reality of the times was such that employment opportunities did not necessarily match with trends in education. The creation of the posts of 'agriculturalist' in the national schools and other institutions was no doubt a boon to agriculture students, but many still found it necessary to emigrate for work.

[398] *Journal of the Chemico-Agricultural Society*, 11 (1852), p. 3.
[399] Albert College Register.

Conclusion: reasons for the failure

Perhaps the most important reason for the withdrawal of the diploma in agriculture was the condemning report of the Commission of Inquiry into the Queen's Colleges, published in 1858. In 1857, partly as a result of management problems that had lead to embarrassingly public disputes between members of staff at the Queen's College, Cork, the British Parliament decided that a commission of inquiry into the colleges was necessary.[400] The Commission questioned all members of staff and the complete minutes of evidence survive in the Parliamentary Papers. The Commission took responsibility for discovering what was and was not working in the programme of the new colleges. One of the most firm conclusions that it came to, and which was later acted upon by Parliament, was that the agriculture diploma had been a failure and should be abolished. The Commission cited the low student numbers and claimed the lack of a farm in which to teach practical farming was an impediment to attracting them. Rather than suggesting the introduction of a farm, the Commissioners claimed that agriculture was an unsuitable university subject in the first place, saying 'From its nature it is questionable whether Agriculture should have a place in the Course of Studies at the Colleges of a University.'[401] A prospective agriculturalist, the Commissioners remarked, could learn all that was necessary at the scientific courses relevant to their discipline by taking an arts degree, the civil engineering diploma or simply attending a limited number of classes of his choosing. Thus the Commissioners claimed that the foundation of the chair in agriculture in a university had been a mistake and that low enrolment was the expected outcome. The Commissioners found no cause to criticise engineering, despite low diploma rates, never questioning its status as an appropriate university discipline. Perhaps the example of engineering programmes in the more prestigious ancient universities, the availability of engineering jobs in the civil service and the relatively high enrolment rates marked engineering out as a success.

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[400] For more on the dispute see Murphy, *The college*, pp. 65-70. On the Commission see Leaney, '"The property of all"', pp. 206-11.
[401] *Rep. Comm. Queen's Colleges, 1858*, p. 22.

Hodges expressed his optimism that the agriculture course was increasing in interest, but the Commissioners dashed any hope of reforming the agriculture diploma to lure more students:

> We doubt, moreover, if the farmers of Ireland, generally, are in a condition to defray the expense of maintaining their sons at Belfast, Cork, or Galway, merely that they may receive a theoretical education in Agriculture; and that it will be hopeless, therefore, to expect that the School of Agriculture in the Queen's Colleges will ever be successful. The agriculturist is formed in the field of the farm not in the hall of the College.[402]

The Commissioners confirmed that farming was not a profession and claimed that the poor financial position of most Irish farmers was not a justification for agricultural education, but a reason for abandoning the project. The education offered in the colleges was referred to as 'merely' theoretical, as opposed to practical and therefore dubious preparation for a farming life. During questioning Hodges attempted to answer the Commissioners' criticisms, but evidently failed to convince them that what he was doing was of real value or potentially capable of improving agriculture in Ireland.

Hodges cited four reasons for the low students numbers. First, there was no prestige attached to the diploma to induce students to complete such a course. Second, the students were often young and under-educated so that the programme of study was too difficult, causing them to drop out or to become non-matriculated students. Third, there was no farm attached to the college in which the students could put their learning to use. Fourth, other schools existed offering a similar course of studies which competed with the Queen's Colleges.[403] In essence, the agriculture diploma was not significantly distinguishable from the agricultural instruction offered in the model farm schools and was, in practical farming instruction, possibly inferior. While the diploma sought a higher-class audience than the model schools, it did not have significant enough prestige to attract this audience in large numbers. Hodges

[402] Ibid., p. 23.
[403] Ibid., minutes of evidence, pp. 26-8.

himself was uncertain of whether his audience should be the middle or upper classes. As we have seen, he had pupils from both classes (sons of proprietors as well as manufacturers and farmers).

Hodges, as is clear from his evidence to the Commission of Inquiry, had believed that the sons of local landowning gentry might send their sons to learn from him. This hope was based on the membership of the Chemico-Agricultural Society which boasted among its officers many local gentry.[404] While many societies had gentlemen as sponsoring officers, those of the Chemico-Agricultural Society did appear to attend meetings regularly, subscribe to the services of the chemist and generally participate actively. Yet very few of these gentlemen sent their sons to the Queen's Colleges. One critic of the Queen's College agriculture diploma claimed it would have been more appropriately placed in Trinity College Dublin, saying that agricultural education was for the upper classes. He noted the incongruity of it appearing in the Queen's Colleges, saying:

> Some may think that I am hardly correct in placing the education of the Queen's Colleges as that which is adapted for the upper classes in Ireland, and they may regard it as only intended for those who look to be stewards or farm bailiffs, and I admit the force of this remark, but it is the highest agricultural education which we have.[405]

He distinguished education in agriculture as a science, appropriate for gentlemen, from the practical education of middle-class land stewards and bailiffs. Thus the failure of the agriculture diploma to attract students was partly due to the intended audience of the Queen's Colleges and a perception that their education would only be useful training for middle-class careers in agriculture.

The agriculture diploma failed to cultivate the appropriate audience, but this audience also failed to recognise the value of the diploma in significant numbers. The proponents of scientific agriculture were attempting to advocate not a single subject but an array of subjects with different audiences and different content, increasing the difficulty of their task. Still, the failure of the diploma must be kept in perspective. Only in Cork were the agriculture students overwhelmingly

[404] *Chemico-Agricultural Society, 1847 report*.
[405] Fisher, 'Royal Dublin Society; agricultural education', p. 442.

outnumbered by the engineering students (about five to one). In Belfast, there were almost the same number of students matriculated in law, but there was no suggestion to abolish the law degree.[406] Instead, the commissioners questioned the appropriateness of the degree for a university, thereby claiming that agriculture was neither a science nor a profession.

The dour tones of the 1858 Commission contrast sharply with the 1840s optimism for agricultural education evinced by Hodges, Kane, Liebig, Johnston and the agricultural improvers. So what had changed that made the agriculture diploma seem like a bad idea? As Wilmot has argued, despite two waves of sustained interest in scientifically improving agriculture, precious few results were achieved by the end of the nineteenth century.[407] Perhaps some were beginning to lose faith in the promise of science. Liebig himself had been embarrassed by the failure of his chemically manufactured fertiliser, which he later admitted had not even been tested on a field.[408] Ireland had additional circumstances: while the devastation wrought by the Famine made agricultural education seem even more necessary, it also made it more difficult to apply. The structure of farms had changed and those who could afford to improve their farms often moved from tillage to grazing.[409]

The Queen's Colleges were an attempt to offer a different type of higher education than had been previously available in Ireland. Catering for a progressive notion of middle-class needs, the colleges offered degrees and diplomas in improving and practical scientific subjects. The agriculture diploma was an expression of the great wish for the colleges to alter the face of Ireland by the production of a new educated class of scientific men who would improve Ireland's economy. However, reality did not meet expectations and it became clear that while there was community support for agricultural education this was adequately supplied by local institutions. The scientific community was not fully

[406] *Queen's College return of students*.
[407] Wilmot, *"The business of improvement"*, p. 68.
[408] Brock, *Justus von Liebig*, p. 128.
[409] E. R. R. Green, 'Agriculture' in *The Great Famine; studies in Irish history* (Dublin, 1994), pp. 89-91.

agreed on the nature of agricultural education and therefore the colleges could not put into practice a consistent plan.

The failure of the agriculture diploma also demonstrates that occasionally voluntary organisations were more successful promoters of science than government institutions in Ireland. In the case of the scientific societies discussed in Chapter Three, and the museums that will be discussed in the next chapter, the Queen's Colleges did manage to take on some of the functions that had previously been the role of voluntary organisations. However, they were unable to supplant either the government's own model farm system or the voluntary agricultural societies in the provision of agricultural education. The Flax Improvement Society grew during the second half of the nineteenth century to include chapters throughout Ireland and Hodges continued his work as chemist to the Chemico-Agricultural Society of Ulster. The colleges board had thought that they could take a community effort and improve it by putting it on more formal footing. This proved impossible, however, and probably also ignored the social realities of land cultivation and ownership in post-Famine Ireland.

5

Improving museums: showcases of the natural world in provincial Ireland

> A museum of natural objects appears, for a variety of reasons, best fitted to interest, instruct, and elevate the middle and lower classes, and the young. It is more in accordance with their tastes and sympathies, as is shown by the universal fondness for flowers and birds, and the great interest excited by new or strange animals.
>
> Alfred Russel Wallace, 1869[410]

[410] A. R. Wallace, 'Museums for the People', *Macmillan's Magazine*, 19 (1869), pp. 244-250, p.245. Alfred Wallace was an English naturalist best known for his concurrent 'discovery' of natural selection with Charles Darwin. See H. C. G. Matthew and B. Harrison (eds), *Oxford dictionary of national biography* (60 vols., London, 2004).

Introduction

The agriculture diploma had obvious practical application. Perhaps more surprisingly, the Queen's College museums were also touted by science professors as a means of improving Ireland. This aim was not unique to college museums. In 1831, after years of collecting subscriptions, James Drummond opened the new museum of the Belfast Natural History Society. His launching speech listed a number of lofty expectations for the institution:

> I hope it will give a new, and powerful impulse to the study of nature and physical science, that it will create and foster a taste for knowledge among all classes in our community, and that it will materially serve to raise the character of our town still higher, as a place favourable to the culture of literature and scientific pursuits.[411]

As well as advancing science, the museum was to interest the public, educate all classes and prove that Belfast was a learned city. The idea that a museum represented more than just an assemblage of objects and was capable, in itself, of engendering improvement and education was not unique to Belfast. All over the United Kingdom advocates claimed that the museum was no longer simply for men of science and wealthy dilettantes, rather it should become a place of public education. Museum specimens were not just objects but ideas, the museum a store of knowledge much like a book. Unlike a book, the mere existence of a museum was thought capable of affecting change by raising the character of a town. In this chapter I will examine the role of the Queen's College museums in fostering Drummond's goals of science, education and civic pride. In many ways, these were goals also voiced for the Queen's Colleges themselves, as discussed in Chapter Two. The college museums were an unusual blend of public and private and the expectations for their impact extended beyond the colleges' own students to the entire community.

Chapters Three and Four have demonstrated that the Queen's Colleges had to integrate into an existing intellectual community with its own goals and ideas for science. In the case of Cork, this integration was relatively smooth and the

[411] Quoted in: N. McNeilly (ed.), *Belfast Natural History and Philosophical Society: selection from 150 Years of proceedings, 1831-1981* (Belfast, 1981), p. 5.

professors soon gained a prominent role in deciding the manner in which science in Cork's voluntary societies was conducted. In the case of Belfast, by contrast, the college attempted to replace local applied science initiatives without success. This chapter will explain how the college museums became a space in which the Queen's Colleges attempted to merge the specific goal of educating students in the sciences with a general aim of the colleges to improve Ireland.

Much like the Belfast Museum, the college museums were intended to teach science and aid scientific research, but also to raise the status of the colleges and to educate a 'public' beyond students. The previous chapters have demonstrated that science in Ireland could have both social as well as practical roles. In the context of voluntary societies, science could be a source of entertainment and a means of bridging social, political and religious divides. The idea of science in the provincial Irish town was also inextricably linked to civic pride and economic progress. After the Great Famine, visitor and Irishman alike continued to look about for signs of recovery and future health. Evidence of scientific taste and activity were welcomed as portents of better days to come. One location which could embody both scientific and social progress was the museum. Examining the Queen's Colleges' museums can tell us much about science (especially natural history) as a university discipline and about the scientific community in Ireland. Slight differences in collecting practices by the curators also show the relative strength and importance of local natural history within the three communities of Cork, Galway and Belfast. Finally, the manner in which the collections were acquired begins to reveal links between provincial scientific communities in Ireland while also differentiating the three college towns in terms of access to resources.

* * * *

The nineteenth century has been called the golden age of the museum. There was a significant rise in the number of museums of all kinds and many formerly private collections became part of developing civic institutions open to the public. The importance of museums in the nineteenth century was frequently expressed by contemporaries. The quote from English naturalist Alfred Wallace

at the opening of this chapter indicates that even men of science, who used museums for research, saw the museum as a space for public education. By the end of the nineteenth century, David Murray's *Museums: Their History and Their Use* (1904) described the museum as 'an instrument of culture and education'.[412] Emphasising the museums' uses for science, Murray stated that 'Its collections are a fair index of what has been ascertained on any particular subject, and give him [the man of science] a definite basis from which to work'.[413] Thus museums were important to both a general audience and a special scientific one; for the first they provided education, for the second a means of research.

The increase in public museums can be seen as one result of a movement, largely supported by the politically liberal, for increasing access to education for all classes in the nineteenth century. As we have already seen, this movement contributed to the foundation of the Queen's Colleges. In 1845, the same year as the Queen's Colleges were founded, the Free Museums Act was passed, enabling towns of over 10,000 inhabitants to vote a rate (1/2*d* in the pound) to support a public museum.[414] Libraries were later added as another provision. In Ireland, Sir Robert Kane gained government support in the form of an annual grant for his Museum of Irish Industry, an institution which combined collections with scientific teaching and was modelled on the Museum of Economic Geology in London.[415] Museums were becoming synonymous with education and although touted as an antidote to labour agitation and drunkenness by liberal reformers they also became symbols of the rising importance and self-improving ethos of the middle classes.[416] In outlining his plans to reform Irish education in 1835,

[412] D. Murray, *Museums, their history and their use; with a bibliography and list of museums in the United Kingdom* (2 vols., Staten Island, 2000, [1904]), p. 270.
[413] Ibid., p. 270.
[414] K. Hill, *Culture and class in English public museums, 1850-1914* (Aldershot, 2005), Ch. 3, esp. pp. 42-44.
[415] The London institution's full title was the 'Museum of Economic Geology and Government School of Mines'. For more about the Museum of Irish Industry see C. Cullen, 'Women, the Museum of Irish Industry, and the pursuit of scientific learning in nineteenth-century Dublin' in, *History Mattters II* (Dublin, forthcoming); B. B. Kelham, 'The Royal College of Science for Ireland (1867-1926)', *Studies*, 56 (1967), pp. 297-309; E. Leaney, 'Science and conflict in nineteenth-century Ireland' in N. Garnham and K. Jeffery (eds), *Culture, place and identity* (Dublin, 2005), pp. 66-77; E. Leaney, '"The property of all": public access to scientific education in nineteenth-century Ireland' (PhD, University of Oxford, 2002), pp. 86-98.
[416] Hill, *Culture and class*.

Thomas Wyse included museums as a form of 'subsidiary' education which would 'continue or improve education already acquired' and should be sponsored by government through an initial outlay providing for a building.[417] Scientific societies and institutions invariably included museums within their walls, and many a society bankrupted itself in the effort to amass an important collection.[418] The majority of these were private organisations and would not have been considered educational institutions, but many did offer public opening hours and often suggested (however falsely) that they served as a public resource.[419]

Historians have increasingly chosen to examine the role of museums in nineteenth-century science, education and even social governance. For example, the architecture of museums devoted to natural sciences has been interpreted as revealing differing attitudes towards science.[420] Museums have also been viewed as vital components of nineteenth-century civic life, offering public education as well as communicating social norms.[421] University and college museums have been less frequently examined than civic museums or those created by scientific societies.[422] Therefore, most relevant to the Queen's College museums may be

[417] T. Wyse, *Education (Ireland). Speech of Thomas Wyse, Esq., M. P., in the House of Commons* (Dublin, 1835), p.27.
[418] For some examples see S. J. M. M. Alberti, 'Placing nature: natural history collections and their owners in nineteenth-century provincial England', *British Journal for the History of Science*, 35 (2002), pp. 291-311; S. Naylor, 'The field, the museum and the lecture hall: the spaces of natural history in Victorian Cornwall', *Transactions of the Institute of British Geographers*, 27 (2002), pp. 494-513.
[419] See for example R. Bayles, 'Science in its local context: the Belfast Natural History and Philosophical Society in the mid-nineteenth century' (PhD, Queen's University of Belfast, 2005), Ch. 5.
[420] J. Beckman, 'Nature's palace: constructing the Swedish Museum of Natural History', *History of Science*, 92 (2004), pp. 85-111; S. Forgan, 'The architecture of display: museums, universities and objects in nineteenth-century Britain', *History of Science*, 32 (1994), pp. 139-162; S. Forgan, 'Building the museum: knowledge, conflict, and the power of place', *Isis*, 96 (2005), pp. 572-585; C. Yanni, *Nature's museums: Victorian science and the architecture of display* (London and Baltimore, 1999)
[421] See for example T. Bennett, *The birth of the museum: history, theory, politics* (London, 1995); T. Bennett, *Pasts beyond memory: evolution, museums, colonialism* (London, 2004); S. Conn, *Museums and American intellectual life, 1876-1926* (Chicago, 1998); Hill, *Culture and class*; K. Hudson, *A social history of museums: what the visitors thought* (London, 1975); E. Hooper-Greenhill, *Museums and the shaping of knowledge* (London, 1992); S. MacDonald, 'Exhibitions of power and powers of exhibition: an introduction to the politics of display' in S. MacDonald (ed.), *The politics of display: museums, science, culture* (London, 1998), pp. 1-24.
[422] Exceptions include K. C. Davies and J. Hull, *The zoological collections of the Oxford University museum: a historical review and general account, with comprehensive donor index to the year 1975* (Oxford, 1976); A. V. Simcock, *The Ashmolean Museum and Oxford science 1683-1983* (Oxford, 1984); S. G. Kohlstedt, 'Curiosities and cabinets: natural history museums and education on the antebellum campus', *Isis*, 79 (1988), pp. 405-426; S. G. Kohlstedt,

studies of other provincial collections. Many of these collections included or were dominated by natural objects.[423]

Despite a growing interest in the study of Irish scientific societies, natural science collections in Ireland have rarely been the subject of historical study.[424] Even the oft-studied RDS has inspired only one history specifically devoted to its museum.[425] Irish museums in general have been overlooked by historians. The only major study to date examined the founding of the National Museum of Ireland by looking at the history of its antiquities collections.[426] Several studies have examined Irish industrial exhibitions and Irish participation in the Great Exhibition of 1851, although the focus has not usually been on objects, and if it has, they have been objects of art.[427] The lack of historical interest in Irish natural science collections cannot be the result of a dearth of potential museums

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'Museums on campus: a tradition of inquiry and teaching' in R. Rainger, K. R. Benson and J. Maienschein (eds), *The American Development of Biology* (Philadelphia, PA, 1988), pp. 15-47; Yanni, *Nature's museums*.

[423]For studies of society museums see: Naylor, 'The field, the museum and the lecture hall', ; S. J. M. M. Alberti, 'Natural history and the philosophical societies of late Victorian Yorkshire', *Archives of Natural History*, 30 (2003), pp. 342-358; D. E. Allen, *The naturalist in Britain: a social history* (Princeton, New Jersey, 1994); R. Bayles, 'Understanding local science: the Belfast Natural History Society in the mid-nineteenth century' in D. Attis and C. D. Mollan (eds), *Science and Irish culture: volume 1, 2004* (Dublin, 2004), vol. 1, pp. 139-169; P. Brears, 'Temples of the muses: the Yorkshire philosophical museums', *Museums Journal*, 84 (1984), pp. 3-19; E. F. Greenwood, 'A history of Liverpool natural history collection', *Journal of the Society for the Bibliography of Natural History*, 9 (1980), pp. 375-382.

[424] For exceptions see N. Nesbitt, *A museum in Belfast: a history of the Ulster Museum and its predecessors* (Belfast, 1979); J. Adelman, 'Evolution on display: promoting Irish natural history and Darwinism at the Dublin Natural History Museum', *British Journal for the History of Science*, 38 (2005), pp. 411-436; Bayles, 'Science in its local context', Ch. 5; Leaney, '"The property of all"', Ch. 2.

[425] For histories of the Royal Dublin Society see: H. F. Berry, *A history of the Royal Dublin Society* (London, 1915); H. B. White, 'History of the science and art institutions, Dublin', *Museum Bulletin: National Museum of Science and Art, Dublin*, 1 (1911), pp. 7-34, K. Bright, *The Royal Dublin Society, 1815-1845* (Dublin, 2004). On its museum see C. E. O'Riordan, *The Dublin Natural History Museum* (Dublin, *c.*1983) and N. Whyte, *Science, colonialism and Ireland* (Cork, 1998), Ch. 16.

[426] E. Crooke, *Politics, archaeology and the creation of a National Museum of Ireland: an expression of national life* (Dublin, 2000).

[427] See S. F. Pettit, *This city of Cork* (Cork, 1977), L. Litvack, 'Exhibiting Ireland, 1851-3: colonial mimicry in London, Cork and Dublin' in L. Litvack and G. Hooper (eds), *Ireland in the nineteenth century: regional identity* (Dublin, 2000), pp. 15-57; N. O'Cleirigh, 'Dublin International Exhibition, 1865', *Dublin Historical Record*, XLVII (1994), pp. 169-182; J. Turpin, 'Exhibitions of arts and industries in Victorian Ireland', *Dublin Historical Record*, xxv (1981-2), pp. 2-13, 42-51; A. J. Saris, 'Imagining Ireland in the Great Exhibition of 1853' in L. Litvack and G. Hooper (eds), *Ireland in the nineteenth century: regional identity* (Dublin, 2000), pp. 66-86, N. Netzer, 'Picturing an exhibition: James Mahony's watercolors of the Irish industrial exhibition of 1853' in A. M. Dalsimer (ed.), *Visualizing Ireland: national identity and the pictorial tradition* (London, 1993), pp. 89-98.

for examination. Although very few Irish towns adopted the Free Museums and Libraries Act, there was a healthy number of museums in provincial Ireland.[428] Leaving collections housed in private homes aside, there were the collections of the Royal Cork Institution, the Royal Galway Institution, the Belfast Natural History and Philosophical Society, the Belfast Library Society, the Armagh Natural History Society, the Kilkenny Archaeological and Historical Society and the Waterford Archaeological Society. Some of these later became part of college or other local museums and many of them have also left paper records, and represent excellent opportunities for historical study.[429]

Despite the museum's growing role in education over the nineteenth century, it had not always been seen as a necessary component of university education. The Queen's Colleges represent a turning point in British thinking about education for a number of reasons. As the second experiment in 'mixed' education, and without religious instruction, they were an endorsement of secular higher education, which would become the norm in the twentieth century. With numerous changes to the classical curriculum, including generous provision for science, the colleges also represent an attempt to cater for a perceived demand for 'practical' and scientific education among the middle classes. Museums had not been traditionally provided for in universities. However, the Queen's Colleges were a new type of higher education and as an extension of the efforts to make them practical and to embrace scientific subjects they included museums as an integral component of their buildings.

Prior to the Queen's Colleges, university museums had usually come about through the efforts of individual professors, often indulging an interest which was not the primary subject of their teaching. Natural history in particular was simply a component of the medical curriculum and not a subject in its own right.

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[428] *Public Libraries Acts: Return showing the names of all places in England, in Scotland and in Ireland, that have adopted the Public Libraries Acts*, H. C. 1885.

[429] Of the institutions listed the author can name the following extant records: the Royal Galway Institution at the Galway County Library, the Royal Cork Institution at University College Cork and the Cork Archives Institute, the Belfast Natural History and Philosophical Society at the Public Records Office of Northern Ireland and the Belfast Central Library, the Armagh Natural History and Philosophical Society at the Armagh Museum and the old library. In addition, correspondence between individuals associated with these societies appears among the correspondence of other institutions (Dublin Natural History Museum) and persons (Thomas Larcom, NLI; Alexander Goodman More, Charles Bethune Moffett and John Windele, RIA).

The Ashmolean Museum, bequeathed to Oxford University in 1683, contained a library, laboratory and lecture room in addition to the collections.[430] In the nineteenth century, this museum was used by the geologist William Buckland for teaching courses in natural history, and was the inspiration for the formation of the Ashmolean Society, a group of natural history devotees. A small museum was a component of many Oxford and Cambridge colleges, the result of bequests by particularly keen former students or professors.[431] The University of Edinburgh's natural history museum was built up almost entirely by Robert Jameson in the first half of the nineteenth century. Upon his death the museum was made public and became the basis for the National Museum of Scotland.[432] While museums or at least collections were prevalent in universities, they were slow to be recognised by administration as worthy of financial support. Oxford men of science campaigned vigorously to be granted a purpose-built college museum in 1860. A similar campaign was conducted at Cambridge, but the museum was never completed as planned and housed only the mineralogy and geology collections.[433] Trinity College, Dublin began a museum in 1777 as some curiosities from a voyage of Captain Cook had been bequeathed to them. The museum was initially given quarters above the entry arch and was without a designated curator (apart from professors responsible to specific parts of the collection) until 1844.[434] The incorporation of museums into the Queen's Colleges can be seen as part of the increasing emphasis on science as a subject in university education and was accompanied by the creation of laboratory space. The Queen's College museums represent a triumph for the promoters of practical university education and perhaps reflect the perceived benefits of science for the industrially backward Ireland.

The second half of the nineteenth century saw a growth in university science chairs, accompanied by the building of museums and laboratory space. For

[430] Simcock, *The Ashmolean Museum* ; R. F. Ovenell, *The Ashmolean Museum 1683-1894* (Oxford, 1986), Ch. 13.
[431] Davies and Hull, *The zoological collections of the Oxford University museum*; Simcock, *The Ashmolean Museum*.
[432] R. M. Birse, *Science at the University of Edinburgh, 1583-1993: an illustrated history to mark the centenary of the faculty of science and engineering, 1893-1993* (Edinburgh, 1994).
[433] Yanni, *Nature's museums*.
[434] R. B. McDowell and D. A. Webb, *Trinity College, Dublin, 1592-1952: an academic history* (Cambridge, 1982), pp. 194-8.

example, the Oxford museum building housed the natural history and geology collections as well as offices, lecture rooms and laboratories for all the sciences including chemistry and anatomy.[435] The Trinity museum building (completed by the same architects as Oxford in 1858) was created partly to house collections but also to give space to the new school of civil engineering.[436] These developments were linked to the movement for university reform which included a series of commissions of inquiry into the practice of Britain's older universities. An increasingly vocal and politically powerful middle class criticised the exclusivity and impracticality of the education being offered at the ancient universities and demanded something more suited to their own needs.[437] Middle-class education was nearly universally seen as 'practical' education and practical education seemed to necessitate a museum.

The aims of the Queen's College museums

The University College London (UCL) was a model for the Queen's Colleges not only because of its secularity, but also for some of its specific educational provisions. The first university to offer a BSc, UCL had placed an emphasis on science from its inception, a fact reflected in the 1828 building plans: separate accommodation was planned for natural history, botany, materia medica and anatomy museums.[438] Although the natural history museum never materialised and all the zoological collections ended up amalgamated into a zoology and comparative anatomy museum, science had been given significant space.[439] On the limited budgets allotted to building the Queen's Colleges, making provision for a museum and a chemistry laboratory was a statement in favour of scientific education.

Before professors had been hired a board of the presidents and vice-presidents of the future colleges was assembled. These individuals had a large part in

[435] Yanni, *Nature's museums*.
[436] McDowell and Webb, *Trinity College, Dublin*, pp. 236-7.
[437] D. S. L. Cardwell, *The organisation of science in England* (London, 1972), pp. 43-58.
[438] *Description of the building for the University of London from the report of the council to the proprietors* (London, 1828).
[439] K. Arnold-Forster, *The collections of the University of London: a report and survey of the museums, teaching and research collections administered by the University of London* (London, 1989).

determining the shape of the colleges (within the designated budget) as well as choosing sites. Aside from lecture rooms and an examining hall, one of the first items which the board voted to include in the colleges was a museum, to 'be erected on an upper floor & be lighted from the top and sides'.[440] Not only did the college board recognise the importance of the museum, but they specified its placement and arrangement to maximise the use of natural light. In fact, the museum, laboratory and four lecture rooms devoted to sciences indicated the dominant position of science in the minds of the board members. The literary department, by comparison, was given just two lecture rooms.[441] Sir Robert Kane's chairmanship of this board is significant. As founder and director of the Museum of Irish Industry, Kane had a demonstrated belief in museum-based education. Kane saw the purpose of the mainly Irish collections of his museum as

> the diffusion of sound scientific instruction as to the means by which the resources of the country could be most usefully applied, and the popular mind directed to subjects of permanent utility, and practical value.[442]

No doubt he envisioned the college museums as providing the same possibilities.

The museums were built, as per instructions, on the upper floors of each of the colleges, designating them as relatively private spaces. Each college museum was of a similar size and was given an almost identical location in the building, on the upper floor to the left of the main entrance (see Figures 5.1-5.3). Figure 5.1 shows the Belfast college museum as it was planned, in a small single room of less than 40 by 40 feet. This was immediately determined to be much too small and before the college was opened, the library was moved into the examination hall and the museum expanded into a two-room space of almost 80 by 40 feet.[443] Slight differences in lighting arrangements reflected the architects' taste, understanding of museum needs, and the demands of their building designs. The Galway and Belfast museums received only window light, but the Cork museum had dormers in the roof for further illumination. The Cork college

[440] 24 January 1846, Provincial Colleges Letters, p. 24.
[441] Provincial Colleges Letters, pp. 26-7.
[442] R. Kane, *General descriptive notice of the Industrial Museum of Ireland and Government School of Science* (Dublin, 1866), p. 5.
[443] T. W. Moody and J. C. Beckett, *Queen's, Belfast, 1845-1949: the history of a university* (2 vols., London, 1959), pp. 109-114.

had been designed by Sir Thomas Deane, a prominent Cork architect who would later, along with Benjamin Woodward, design museum buildings for Trinity College, Dublin and Oxford. However, Deane had much to learn yet and Professor Robert Harkness (in charge of Cork's museum) complained bitterly of damp, roof leaks and the gloominess of the exposed ceiling beams.[444]

The arrangements of the Queen's Colleges resembled both the colleges of Oxford or Cambridge, and the middle-class scientific institutions they had replaced. Gothic architecture predominated and complimentary reviews of the buildings claimed that they would be suited to grace the campus of either of the English universities. Each building was arranged as a full (Galway) or partial (Cork and Belfast) quadrangle, with cloisters lining the sides. However, like the Royal Cork Institution, a single building housed lecture rooms, museum, laboratory and library. Of course, the building budget was relatively modest (£20,000 for each college, including the cost of purchasing the site) and creating separate buildings would have been unrealistic. Serious consideration had been given to simply appropriating existing scientific institutions in the case of Cork and Belfast. In the end this was rejected in Cork because of the poor state of the building and the relatively small plot of land on which it rested and in Belfast so as to leave the school teaching functions of the Belfast Academical Institution intact.[445] However, the Queen's Colleges bear striking resemblance to the layout of the University of London (see Figure 5.4). The basic plan of central entrance hall with two wings extending off this is similar to each of the colleges and almost identical to Belfast. Also striking is the choice of locating the museum of natural history on the upper floor of the left wing, a practice copied in each of the Queen's Colleges.

The colleges' board and the government had allocated space for the museums indicating dedication to science education but they had not provided significant funds for filling the museums. While an initial grant was provided for equipping the colleges, this was soon spent. The lack of funding for the museums was

[444] 6 December 1853, QCC Museum Committee; *Report of the president of Queen's College, Cork for the year 1855-6*, p. 45, H. C. 1857 Session 1 [2170], xv, 455.
[445] 30 August 1845, Provincial Colleges Letters, pp. 2-3; Larcom Papers 7460.

seized upon by college staff almost immediately. Each annual report contained pleas arguing for greater expenditure on the museums. Examining these pleas gives a picture of what the college staff believed the museums were to be used for as well as an understanding of what arguments they believed government ministers would find compelling.

The professors and the college presidents began demanding fresh funds to purchase for the museums in 1852. A grant of £4000 had been given to each college in 1849 to facilitate purchasing books for all subjects, as well as specimens for natural history and medical courses, laboratory equipment for chemistry courses and apparatus for natural philosophy.[446] This money was quickly used up as it had to be divided between library, collections, laboratory equipment, stationery and general building upkeep. This left little for the museums. The limited collections, the college presidents claimed, reflected badly on the colleges and prevented the professors from teaching effectively. The presidents of the three colleges seem to have agreed to issue a similar statement in each of their reports to Parliament. Reverend Pooley Henry, president of Queen's College, Belfast, claimed that:

> the efforts of these eminent men [the professors] are more or less paralyzed, and their zeal in a great degree disheartened by the inefficient means placed at their disposal for illustrating those subjects which they are so well qualified to teach; and the colleges cannot, without obtaining that assistance which the Presidents now solicit from the Government, continue to afford that high Education which they were instituted to impart, and which the rapid progress of science, and the increasing wants of the age, so imperatively demand.[447]

Henry focussed on the detrimental effect on scientific progress the lack of funding for collections was having. The professors were unable to lecture effectively because they lacked specimens for illustration. In turn, the quality of education at the colleges was suffering, and 'the rapid progress of science' would leave students and professors behind. If the colleges were to serve the aims for

[446] *Report of the president of Queen's College, Belfast for the year 1851-2*, p. 10, H. C. 1852-3 [1618], xliii, 435.
[447] Ibid., p. 11.

which they had been founded the museums must be given more money. This plea was based almost entirely on promoting scientific education within the colleges: the teaching of scientific subjects had been an important provision of the colleges, but now the professors were left lacking the materials to perform this teaching.

Henry's plea was echoed in the reports of the presidents of the Cork and Galway colleges. President Berwick of Galway issued exactly the same statement. President Kane expanded on the arguments saying that museums were:

> auxiliary to professorial teaching and original research, in order that the Professors and the Senior Students may be enabled to keep pace with the progress of literary and scientific investigation, and to occupy themselves with those advanced branches of learning, on the successful study of which must in future so materially depend the progress of superior education in Ireland, and the success of the new University System founded by your Most Gracious Majesty.[448]

Kane deplored the hindrance to both scientific and educational progress that the budgetary constraints were effecting. Without appropriate museum collections scientific investigation was speeding ahead of both professors and students of the colleges. The result of this might be the total failure of the government's experiment in Irish university education. The professors also added to their presidents' cries for more funding. For example, George Dickie (natural history, Belfast) complained in his report to the president (included in the report given to Parliament) of his inadequate means of illustrating lectures, saying that 'It is to be regretted, however, that at present there is a deficiency of both the means of illustration [specimens and drawing] alluded to'.[449]

Pleas on the basis of scientific progress and the requirements of pedagogy proved insufficient and in 1853 the presidents of the colleges addressed a letter to both the Lord Lieutenant and Parliament making even broader claims for the importance of the college museums. President Henry wrote that:

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[448] *Report of the president of Queen's College, Cork for the year 1851-2*, p. 3, H. C. 1852-3 [1585], xliii, 451.
[449] *Report of the president of Queen's College, Belfast for the year 1852-3*, p. 9, H. C. 1854 [1804], xx, 31.

> Beyond the strictly collegiate instruction, the *reflection* of benefit from a great governmental institution on the surrounding province ought not to be overlooked. I have the happiness of sanctioning the Professors of this College to lecture, in times of recess, all through the leading towns of the surrounding counties, in which they meet not only with the uninstructed, but with gentlemen of different churches, and of educational positions. A Queen's College, therefore, becomes, both directly and indirectly, a *centre* of enlightenment, and as such ought to be furnished with the proper appliances for radiating light. A national institution ought to possess all that is necessary to be effective, and to command the respect of educated men.[450]

Henry was arguing that the colleges were not simply institutions for educating the students who were enrolled, but were also part of a greater effort to improve the areas in which they were placed, and by implication to participate in the rejuvenation of Ireland in general. Henry cited the public lecturing activities of the professors to demonstrate the impact that the colleges might have on the wider Ulster community across religious, political and class divides. He also argued that the museums were a key component to this project for social progress and enlightenment.

Henry's arguments resemble the hopes of James Drummond for the future of the Belfast Museum and may have been influenced by the recent visit of the British Association for the Advancement of Science. The desire for the college, for Belfast and for Ireland, to put on a good face for the visiting men of science was great. In the previous year's report Henry had cited the success of the meeting, noting that the college's rooms had been used by the Association and that 'The reception it received, was, in all respects, worthy of the intelligent and enterprising community of which Belfast is the centre'.[451] The college professors had taken a large part in hosting the event and Dickie had also participated in

[450] Ibid., p. 18
[451] *Report of the president of Queen's College, Belfast for the year 1851-2*, p. 9, H. C. 1852-3 [1618], xliii, 435.

rearranging the Belfast Museum with the scientific visitors in mind.[452] Perhaps this merely helped to emphasise the paltry state of the college's museum.

Uses and audiences

As we have already seen, the college museums were addressed to a wider audience than simply the college staff and students. This made them similar to other civic buildings, which travellers used as a means of assessing the nature of the towns they visited. The abundance and status of repair of places such as banks, lunatic asylums, poorhouses and factories were seen as indications of the intellectual health and financial prosperity of the town. Harriet Martineau's assessment of Galway was based as much on the appearance of its buildings as on the ragged beggars. The college, railway station and clean hotel indicated the potential for progress and improvement, while the ramshackle Claddagh showed 'barbarism'.[453] Thackeray, while noting the book-loving nature of the Corkonians, saw evidence of their lack of practical industry in the shabby state of the Royal Cork Institution.[454] Belfast, by contrast, was noted by travel writers for its cleanliness and for the obvious evidence of 'improvement' occurring around the town.

In Belfast, the local museum was a recommended stop on a tour which was sure to demonstrate to the visitor that:

> The high tone which literature and science have given to its people, have, as it were, created a somewhat peculiar class; for the knowledge elevates while it improves; and a large proportion of the merchants and manufacturers of Belfast are "gentry" in the most emphatic sense of the term; education, and a thirst for learning, having, in a remarkable degree, prevented the sordid habits too frequently engendered by trade.[455]

Cork, by contrast, had not been quite so elevated:

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[452] 28 April 1852, BNHS Council Minute Book 2
[453] H. Martineau, *Letters from Ireland* (London, 1852), pp. 82-90.
[454] W. M. Thackeray, *The Irish sketch book* (Belfast, 1985, [1843]), pp. 83-5.
[455] Mr and Mrs S. C. Hall, *Hand-books for Ireland: the North and Giant's Causeway* (London, 1853), p. 41.

> The appearance and habits of the citizens of Cork are exclusively mercantile. The attempts that have been made to elevate the city in the scale of literature and science, have not had the success which their more sanguine promoters anticipated…[456]

A visit to the decaying Royal Cork Institution with its miscellaneous museum and shabby library merely confirmed for most visitors the presumed failure of scientific advance in the city. As we saw in Chapter Three, the RCI was perhaps not a fair measure of the intellectual life of Cork. Nonetheless, those responsible for nineteenth-century civic museums were aware that their collections made a statement about the town. Drummond noted that while the Belfast Museum was yet incomplete in 1831, he could already 'point to the productions of more countries and places than a man could visit in a long life'.[457] Thus the museum demonstrated that Belfast was an important city of the British Empire with wide-ranging international connections provided by the city's businessmen, civil servants and military personnel. The Cork Institution's prized items included a collection of Ogham-inscribed stones and a series of casts of Classical statues, in this case proclaiming both Irish identity and cultural understanding.[458] As Hill has demonstrated for English civic museums, displays more often represented the collecting practices of donors rather than a systematic approach to the museum. But those responsible for arranging the museums tried to present the best possible face. Events such as the hosting of the British Association for the Advancement of Science inspired bouts of reorganisation in the hope of impressing visitors.[459]

So how did the college museums fit into this picture? The Queen's Colleges, much like local museums and societies, became new locations in which to promote science, education and civic pride. They too became stops on tours of Ireland. For example, *Black's Guide to Killarney and the South of Ireland*

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[456] J. Tillotson, *Ireland and its scenery; illustrated by thirty-three engravings on steel, by various artists.* (London, [n.d., c.1863]), p. 37.
[457] Quoted in: McNeilly (ed.), *Belfast Natural History and Philosophical Society* , p. 5.
[458] J. Windele, *Historical and descriptive notices of Cork* (Cork, 1843), pp. 125-9; B. A. Cody, *The River Lee, Cork and the Corkonians* (Dublin, 1859), pp. 77-9.
[459] See for example, BNHS Council Minute Book 1850-67, 19 May 1852; W. R. Wilde, *A descriptive catalogue of the antiquities of stone, earthen, and vegetable materials, in the museum of the Royal Irish Academy* (Dublin, 1857).

recommended a stop at the Queen's College in Cork, claiming that 'the examination hall, the museum, the lecture rooms, and the library, are worthy of a visit.'[460] Nassau Senior and Harriet Martineau were among the more famous visitor-writers to examine the colleges.[461] The colleges became places where the character of a town, and its future prospects, could be read, as well as education and research institutions. Their supporters hoped they would contribute to the improvement of Ireland.

Opening to the public was a practice of many college museums. For example, Trinity College's museum was open to the public and was often noted by travel guides as of greater interest than that of the Royal Dublin Society (which would later become the civic museum for Dublin).[462] The museum of the Royal College of Surgeons in Dublin was also open to the public, as were the museums of the Universities of Edinburgh and Oxford.[463] However, all of these museums except the College of Surgeons charged admission fees which represented an obstacle to many sectors of the public. The Belfast Museum asked for fees as a means of subsidising itself. At various points in time these fees were prohibitively high, thus restricting 'public' access to a select group of the middle classes.[464] However, there were often special opening days for the working classes, including the annual Easter Monday holiday when admission prices were severely reduced and thousands flooded the museum.

The Queen's College museums, perhaps because they were 'great governmental institutions', did not charge. The college museums in Cork and Galway claimed to be free and open to the public, with Galway having the most liberal policy. The Cork Museum Committee decided to open the museum to the public every day from 12 to 4, except during times when the museum was used for lectures.

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[460] *Black's guide to Killarney and the south of Ireland* (Edinburgh, 1864), p. 70.
[461] N. Senior, *Journals, conversations and essays relating to Ireland*, (London, 1868); Martineau, *Letters from Ireland*, see her accounts of Galway in letter XI and Belfast in letter V.
[462] *Black's picturesque tourist of Ireland* (Edinburgh, 1879), p. 339.
[463] *Returns relating to Medical Museums from the Colleges of Physicians of London, Edinburgh, and Ireland; the Colleges of Surgeons of England, Edinburgh, and Ireland; the Faculty of Physicians and Surgeons of Glasgow; the Societies of Apothecaries of London and Dublin; and the Universities in England, Scotland and Ireland*, 1856, p. 54; Birse, *Science at the University of Edinburgh* ; Ovenell, *The Ashmolean Museum*, p. 196.
[464] Nesbitt, *A museum in Belfast* ; Bayles, 'Science in its local context'.

In addition, the hours of 9 to 12 were reserved for private study by the professors or students. Making opening hours during the working day insured that visitors would be of a certain class, but the audience was cleary assumed to be beyond the college alone. In Galway, William King claimed that

> Although the primary object of the collection is to illustrate the lectures on natural history, it has, nevertheless, become a source of great interest to many in this remote locality—otherwise excluded from all acquaintance with the wondrous forms of animal life.[465]

King even claimed to have an aquarium displaying live specimens from the local bay. The Galway museum overcame the cloistered nature of its position in the building by slowly colonising the stairwell which led to the museum entrance with further specimens.[466]

It was not stipulated in the act creating the colleges that the museums were to be open to the public; rather, the professors chose to do so. Reporting to the Royal Commission investigating the Queen's Colleges in 1857, Alexander Melville (natural history, Galway), recommended the funding of a full-time curator, in order to better provide public access to the museum. His suggestion was seconded by William King (geology, Galway).[467] After significant agitation, Cork succeeded in getting a curator who allowed the museum to be open beyond the hours that the professors had managed. It is likely that their reasons for wanting to open the museums to the public were similar to those cited by President Henry in his appeals for further funding.

That the public took advantage of the open policy of the college museums is confirmed by the observations of Thomas Romney Robinson, who wrote to Irish Under Secretary, Thomas Larcom in 1863 to say that in Galway he observed

> A very fair Zoological Museum, rather cramped in space, but full of country folk, who are admitted freely and some of whom seemed to be

[465] *Report of the president of Queen's College, Galway for the year 1855-6*, p. 10, H. C. 1857 Session 1 [2374], xxi, 673.
[466] R. J. Anderson, 'The natural history museum, Queen's College, Galway', *The Irish Naturalist*, 8 (1899), pp. 124-131.
[467] *Report of Her Majesty's Commissioners appointed to inquire into the progress and condition of the Queen's Colleges at Belfast, Cork and Galway*, (Dublin, 1858), minutes of evidence, pp. 275-6.

> getting new ideas very fast… I trust it will do good; and certainly Galway of any spot in the world, requires some infusion of motive power. All seems dead in it except beggary and jobbing.[468]

Robinson's letter echoes many of the hopes for the exhibitions of industry that had graced Cork and Dublin in 1852 and 1853, but never the West.[469] Viewing order and the wonders of nature was expected to have some beneficial effect on the viewer. Just what 'new ideas' these visitors were getting one can only guess, but it seems unlikely that they were complex understandings of zoology. Perhaps the visitors were simply imbibing the grandeur of an empire which could bring an elephant to Galway.

In Galway and Cork, the college museums seem to have entirely replaced the museums of local scientific institutions as repositories for local collections. For example, Dr Joshua Ruebens Harvey was a long-standing member of the Cuvierian Society but also a professor of midwifery at the Queen's College in Cork. Upon his death he donated his extensive local fauna collection to the college museum (where it remains) rather than to the Royal Cork Institution, the museum and building used by the Cuvierians.[470] The nearly defunct Royal Galway Institution donated its geological collection to the Galway college's museum.[471] Various authors have suggested that the collections of the Royal Cork Institution ended up in the Queen's College Cork.[472] The college museums were viewed by the Irish scientific community as public natural history resources. At the end of the nineteenth century, the editor of the *Irish Naturalist* (George Carpenter) was also assistant curator of the Dublin Natural History Museum. A keen interest developed in supporting and promoting local museums, to whom the Dublin museum would send duplicates or loan collections. Among the local museums highlighted in the *Irish Naturalist* was

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[468] Thomas Romney Robinson to Thomas Larcom, September 1863, Larcom Papers 7668.
[469] Saris, 'Imagining Ireland'.
[470] M. H. [M. Hartog], 'The zoological museum', *Univeristy College, Cork Official Gazette*, 3 (1913), pp. 69-71.
[471] D. A. T. Harper, 'Professor William King and the establishment of the geological sciences in Queen's College Galway' in T. Foley (ed.), *From Queen's College to National University: essays on the academic history of QCG/UCG/NUI, Galway* (Dublin, 1999), pp. 242-265; QCG Museum Catalogue.
[472] H., 'The zoological museum', , S. F. Pettit, 'The Royal Cork Institution: a reflection of the cultural life of a city', *Journal of the Cork Historical and Archaeological Society*, 81 (1976), pp. 70-90. I am unable to confirm this assertion.

that of Queen's College, Galway, described over several pages and a photograph.[473]

As both public and educational collections, the same objects were employed for pedagogy as for the amusement or improvement of visitors. Thus college museums were in fact less static collections than might be expected. Items were frequently removed for teaching or used for research and the arrangements were considered of interest to visitors. Even living animals occasionally formed a part of the displays. The forming of college museum displays took into account both the needs of classroom teaching and the use of the public. This was expressed through labelling and arrangement as well as the selection of furniture and objects themselves.

The manner in which a collection was displayed could make specific statements to a visitor. Edward Forbes, professor at the Museum of Economic Geology in London, argued that it was not the individual items, but rather their arrangement which was of educational use to the museum visitor: 'it is not the objects themselves that he sees there and wonders at, that makes his impression, so much as the order and evident science which he cannot but recognize in the manner in which they are grouped and arranged.'[474] Henry Cole, director of the Science and Art Department, added his voice to the chorus calling for systematic labelling and arrangement in museums.[475] Traditionally, even well-endowed and gigantic museums such as the British Museum were relatively poorly labelled and often incomprehensible to the casual visitor, and not much more useful to the man of science. As the directors of teaching museums, the Queen's College professors did not neglect the need for an easily 'readable' display. In 1852, for example, Dickie ordered 4,200 blank labels for the museum in Belfast. In Galway, William King devised a display of fossils which allowed systematic groups to be removed *en masse* for closer examination, but prevented his careful classification scheme from being disrupted by student use.[476] King, who had experience in museum management in Newcastle, took special note of the

[473] Anderson, 'The natural history museum'.
[474] E. Forbes, *On the educational uses of museums* (London, 1853), p. 9.
[475] H. Cole, *The functions of the Science and Art Department* (London, 1857).
[476] Anderson, 'The natural history museum'.

museum's arrangement, reporting in 1857 that 'The specimens are, for the most part, mounted and arranged according to the latest systems; and every attention has been paid to labelling them as fully as possible.'[477] Robert Harkness of Cork, less certain of how to approach museum curation, visited the Royal Dublin Society's museum and corresponded with its director for guidance.[478] Harkness and Joseph Reay Greene, the natural history professor, were keen to imitate some of the more successful display techniques which they saw there and to find a taxidermist whose ability was sanctioned by the metropolitan museum.

As we shall see in the next section, the college museums often acquired specimens singly or in small groups. However, choosing (or accepting as donations) individual specimens was not particularly conducive to creating a systematic display. Highly prized were collections which had been arranged according to a useful classification system by trustworthy and scientific owners. These collections often sold for comparatively large amounts. For example, in 1855 Dickie purchased a systematic collection of shells of the British Isles for over £23. A series of minerals 'arranged according to Dana' had been purchased for £80 in 1849.[479] In addition, the professors occasionally developed systematic collections of their own. Alexander Melville, professor of natural history, received a £10 subsidy from the Galway college council in order to make a collection of local ocean fauna on a summer dredging expedition.[480] The college also purchased geology professor William King's collection of the Permian fossils of England, which had formed the basis for his monograph on the subject.[481]

The Queen's College professors' choice of furniture also reflects the dual use of the museums. Surviving photographs showing crowded rooms demonstrate a conflict between an interest in acquiring an impressive array of specimens and attempting to give space to scientific work for students and faculty. Display possibilities were hindered by the large number of recessed windows needed for

[477] *Report of the president of Queen's College, Galway for the year 1855-6*, p. 11, H. C. 1857 Session 1 [2374], xxi, 673.
[478] R. H. Mills to Alexander Carte, 19 February and 16 March 1869, DNHM Letter Files.
[479] QCB Account Book.
[480] QCG Council, 15 May 1852.
[481] QCG Council, 15 May 1852.

lighting which took up a great deal of wall space. A photograph of the Cork zoology museum indicates a veritable maze of tall glass cases in the zoology museum (see Figure 5.5). The photograph of Galway's museum indicates little room for walking, much less working (see Figure 5.6). However, only a portion of the museum is visible and there appears to be a bench in the lower left corner of the frame. Cork and Galway had specifically scheduled hours for student and professorial study (9 am to 12 pm) and so there must have been some space provided if this time was to be used. As these photographs were taken at the turn of the century, it is possible that at one time there had been more room to work. However, a visitor to the Galway museum in 1863 remarked that it was already 'cramped' and the records of the Queen's College Cork museum indicate that Harkness ordered a large number of cabinets in 1855 and 1857. It therefore seems likely that the museums were always rather crowded. In addition, there was no storage space outside of the museum, so every one of the thousands of items had to find a home in display cabinets, on walls, on ceilings or in drawers.

The Galway college's museum committee did not see the museum furniture as merely storage space for specimens, but also as presenting to the public an image of the museum and the college. In 1852 the committee complained that 'The number of cases already supplied to the museum falls considerably short of the number considered requisite by the curator and several of the cases which have been furnished are not adapted to the requirements of a public museum, and moreover do not correspond with the designs drawn up by the curator'.[482] The cases were not complained of for their lack of suitability for a teaching collection, but because they did not meet the needs of a public museum. Prior to this the committee had written to the Board of Works stating that (cheap) pine deal was not an appropriate material for furnishing the museum and that they wished to be certain that the other colleges had not received superior furniture. The museum committee did 'not wish that Galway should be placed in a more inferior position to Belfast and Cork'.[483] The image which the museums presented to the public was clearly very important to the curator and to the other science professors who formed the museum committee.

[482] QCG Council, 15 May 1852.
[483] QCG Council, 10 January 1852.

A list of furniture from the Belfast college allows us to be fairly specific about the arrangement and use of that museum, despite the absence of photographs. In addition to cases, Belfast had a table and bench, presumably to allow students or professors to examine the specimens in detail. However, in Belfast the microscopes were kept in the classroom, indicating that detailed examinations often went on outside of the museums.[484] Professors were allowed to borrow specimens from the museum for a number of days in order to use them for teaching. In fact, the classroom and lecture rooms had pedestals, presumably for the display of larger items as well as glass cabinets. One Belfast student recalled frequent use of objects in the classroom by Professor Wyville Thompson.[485]

> The table of his classroom was invariably covered with a profusion of specimens carefully selected from the Museum, or fresh plants collected by himself or his porter, and of these he made incessant use, handling them with great dexterity and carefully pointing out their characteristics.

Thus the museums may be envisioned as very large storage areas. Specimens were removed for teaching and then replaced, serving the same purpose as diagrams. No mention is made by this student of actually handling the specimens themselves, rather observing their handling by the professor. The Irish naturalist Robert Lloyd Praeger recalled with less fondness his scientific training at Queen's College, Belfast claiming that it was boring and not at all practical.[486]

Mazes of cabinets in each museum allowed for almost every item (aside from those in drawers) to appear on display. Throughout the second half of the nineteenth century debates over the best arrangement of museums raged. Strategies such as separating scientific and public collections, thinning displays of duplicates and increasing the number of labels were all advocated as preferable to an over-crowded one-of-everything approach. The college museums blithely ignored such advice, as did many other provincial museums. Such a display might have represented scientific progress or even have been

[484] QCB Inventory.
[485] *Belfast Literary Society, 1801-1901; historical sketch with memoirs of some distinguished members*, (Belfast, 1902), p. 125.
[486] R. L. Praeger, *The way that I went: an Irishman in Ireland* (Dublin, 1969), pp. 7-9.

educationally progressive. However, it did not necessarily deliver the message that dominated the college museums. The colleges seemed to be determined to signal their inclusion in British scientific networks by the selection of specimens and their displays. The museums' vast miscellanies claimed Cork and Galway as no different to Liverpool and Manchester. The fact that Cork and Galway seem to have spent more money on their museums indicates how much more they had to prove than Belfast.

Selecting specimens

The varied ideas of audience and use of the museums affected not only arguments for funding and decisions about furnishing them, but also collection practices. We can distinguish several types of collections common in the nineteenth century which included natural objects. First, there was the systematic collection exemplified by the British Museum which aimed for a specimen of each known organism. Second, there were local collections which represented the flora, fauna and geology of a geographic area surrounding the museum. These collections were increasingly advocated as appropriate for provincial museums in the second half of the nineteenth century. Third, there were collections which focussed on the curious and exotic, or miscellaneous collections as they were called by contemporaries. These collections could be found in provincial museums, but were also formed for the purposes of entertainment in a fee-paying museum or itinerant exhibition. It is important to note that these are not three discrete categories, but often overlapped within one museum. Each of type of collection had some influence on the college museums.

The natural science professors of the Queen's Colleges had been handed empty museums and therefore an opportunity to fit them out to serve their own educational or research goals. No stipulation was made as to what should be purchased for the museums, the Colleges (Ireland) Act simply stating that they were to house collections for the teaching of natural history, geology and medicine. Filling the museums became a more onerous task for the professors than they might have hoped because of limited money. Specimens quickly ate away at the portion of the initial grant not consumed by books, furniture and

other equipment. A single kiwi bird, purchased by the Belfast college museum in 1850 cost £7 7*s*. The average vertebrate specimen cost between 10 and 15*s*, and almost the same expense to stuff and mount.[487] Mundane items such as storage boxes and paper also incurred significant cost: an unidentified quantity of boxes cost £3 15*s* in 1857 and paper £1 11*s* 10*d*.[488] Nevertheless, resourceful professors did manage to fill the museums: by the end of the century there was hardly room to move (see Figures 5.5 and 5.6). Cork and Galway retain substantial collections to this day, despite losses both intentional and accidental. Each of the colleges built relatively similar 'general' collections, reflecting as wide a variety of animals, vegetables and minerals as budgets allowed.

The type of miscellany assembled by each of the Queen's Colleges was repeatedly criticised by contemporary men of science as lacking educational merit. In provincial museums, which have been much better studied than college museums, this miscellany was often the result of the museum's heterogeneous pedigree. Assembled from private collections, donations, auction houses, dealers and the collecting efforts of museum patrons, it is no surprise that such museums were not exactly systematic.[489] Edward Forbes, in a speech opening the 1853 session at the Museum of Economic Geology mockingly claimed that provincial museums invariably contained the following:

> Curiosities from the South Seas, relics worthless in themselves, deriving their interest from association with persons or localities, a few badly stuffed quadrupeds, rather more birds, a stuffed snake, a skinned alligator, part of an Egyptian mummy, Indian gods, a case or two of shells, the bivalves usually single and the univalves decorticated, a sea urchin without its spines, a few common corals, the fruit of a double cocoa-nut, some mixed antiquities, partly local, partly Etruscan, partly Roman and Egyptian, and a case of minerals and miscellaneous fossils.[490]

Forbes's description was more astute than perhaps even he knew and indeed would bear striking resemblance to the catalogue of many a small nineteenth-

[487] QCB Invoices 1849-56, 6 June 1851.
[488] QCB Cash Book 1855-72, 2 November 1857.
[489] For an excellent account of the 'pedigree' of such museums see Alberti, 'Placing nature: natural history collections and their owners in nineteenth-century provincial England',
[490] Forbes, *On the educational uses of museums* , p.14.

century museum. Forbes, speaking as a representative of an explicitly practical educational institution, claimed that only a museum which was narrowly focussed and free from 'curiosities' could serve the purposes of science education.[491] As we shall see, the above list would not be a wholly unfitting description of the Queen's College museums. However, I will argue that the Queen's College museums were aiming not for a miscellany, but for as complete a systematic collection as they could muster. This they viewed as appropriate to the needs of pedagogy and the public.

In the beginning, financial constraints certainly contributed to a collecting approach that was far from systematic. In Cork, up until 1854, less than £200 was spent on natural history and botany as compared to £387 on natural philosophical apparatus and £442 on medical specimens.[492] The museum originally contained a very limited selection of objects purchased inexpensively, brought by the professors or donated to the college. For example, the class mammalia was represented by the following specimens in the Cork museum around 1849:

- Ouran Otan (skeleton)
- Seal
- Stomach of sheep
- A diagram showing digestion
- Marsupiata (unknown number, stuffed)
- Kangaroo (skeleton)
- Edentate, manis [This is an Asian or African animal, covered in scales commonly known as a pangolin.]
- Horse (skeleton)
- Denoceral? [indecipherable]
- Feet of teryssodactyli [This should be spelled 'perissodactyli' and refers to the group of quadrupeds with an odd number of toes (e.g. horses, rhinoceroses).]
- Dissection of a rabbit

It appears from this very short list that these were not specimens selected for their desirability, rather items that had been donated by professors or supporters of the college. Less expensive items were better represented: there were larger

[491] Ibid. , p. 14. Forbes donated two copies of this address to the Queen's College, Belfast library in 1853. See QCB Library Donations.
492 *Returns relating to Medical Museums*, p. 60.

numbers of molluscs and insects for example.[493] By 1867 (the date of the next available catalogue), however, there were 11 pages of mammalian entries, including at least 22 specimens of primates.[494] Once a regular grant was received, spending on the museum increased dramatically, as is shown in Figure 5.7. In fact, the levels of money given to the Cork college's natural history collection in the nineteenth century were much larger than the annual sum of £10 given for natural history specimens in the twentieth century.[495]

Spending in Galway seems to have mirrored that of Cork, although there are no precise records of the amount spent per year. William King, professor of geology and curator of the museum, reported large increases in numbers of specimens after the introduction of the annual grant. Before the grant the museum committee reported a collection which was largely the result of donations from staff, local enthusiasts and three very altruistic students who spent their prize money on a dredging expedition in Galway Bay to collect specimens.[496] The largest systematic collections were that of King's English Permian fossils, the shells obtained by the students and a donated collection of foreign shells. Aside from these, the remainder of the collection was fossils and a few skins. By 1857, however, King reported that the museum represented 115 genera of foreign mammals and 152 genera of exotic birds (as a genus contains many species there were likely many times this number of specimens).[497] This sudden glut of specimens was due largely to the serendipitous auction of the Zoological Society of London's collection, which occurred soon after the annual grant was introduced and from which both Cork and Galway benefited.

In Belfast, George Dickie (natural history) spent much of his initial budget on items for teaching, paying £19 for three microscopes and more than £100 for diagrams from prominent illustrators such as Tuffen West.[498] An additional £80 was spent by Frederick McCoy (geology and mineralogy) on a collection of 2000

[493] QCC Museum Catalogue 1849.
[494] 'Primates', QCC Museum Catalogue 1867.
[495] QCC Museum Committee 20th C.
[496] 15 May 1852, QCG Council Minute Book 1850-6.
[497] *Rep. Queen's College, Galway, 1855-6*, p. 10.
[498] QCB Account Book 1849.

mineral species.[499] From the invoice book, Dickie and McCoy seem to have spent at least £344 in the first four years on illustrations, instruments and specimens for the museum.[500] Dickie had access to a relatively substantial community of naturalists in Belfast and Ulster; it is clear from Figure 5.8 that by 1851 he was able to make use of this to procure natural history specimens for the museum. In this year William Darragh, taxidermist and curator of the Belfast Museum, provided and stuffed for Dickie a selection of birds and other specimens.[501] From 1849 onwards Dickie was involved in the Belfast Natural History Society and certainly would have known Darragh.[502] Dickie's choice of specimens indicates an effort to purchase a variety of both foreign and local items and to cover as many different genera as possible. He paid high prices for some especially interesting or rare foreign items such a single Indian porcupine for £1, but other foreign items such as a crocodile and a gavial (10*s* 6*d* each) were much less expensive.[503] Dickie also purchased a variety of British birds and was willing to put £20 towards a less glamorous, but systematic collection of shells.[504] Birds and shells, as is clear from the table, rapidly formed a substantial portion of the collection.

Eventually the government capitulated and granted an annual £1600 to each of the colleges for maintenance in 1854. By 1856, Cork's collection had grown tremendously and contained thousands of specimens (Figure 5.9). Figure 5.7 compares spending on museum collections with that on books in mineralogy, geology and natural history. The table clearly shows that after the introduction of the grant in Cork, spending on specimens increased dramatically and quickly outpaced spending on books. In Belfast the case is not so clear, with spending on both specimens and books for the natural sciences remaining at a relatively low level. Several possible reasons for this difference might be named. First, Dickie was able to spend a substantial sum in the first several years, before the grant had been introduced. Second, the presence of the Belfast Museum possibly

[499] Ibid.
[500] QCB Invoices 1849-56. I simply added the cost of those items clearly designated for the museum or for teaching in the invoice book, up until 1853.
[501] QCB Invoices 1849-56, 6 June 1851 and 15 June 1852.
[502] BNHS Council Minute Book 1840-50, 8 November 1849.
[503] QCB Invoices 1849-56, 12 June 1850 and 15 June 1852.
[504] QCB Invoices 1849-56, 5 April 1851.

decreased the need for the college to develop a comprehensive museum. Finally, the presence in Belfast of significant numbers of enthusiasts with collections to donate may have decreased the need to purchase specimens.

Shortly after the grant was introduced, the museums had the opportunity of purchasing specimens from the Zoological Society of London which had begun dispersing its museum collection in order to concentrate on the menagerie. The knowledge of this sale may have originated with Alexander Melville (natural history, Galway) or perhaps William King (geology, Galway) as the Galway college was the first to tender a request to purchase specimens in early September of 1855.[505] In October of 1855 Sir Robert Kane (president, Cork) alerted the museum committee to the opportunity and volunteered to accompany the curator (Robert Harkness, professor of geology) to London to assist in selecting specimens.[506] Kane and Harkness must have been successful as the expenditure for the zoology and botany collections for the year 1855-56 was over £350 and Harkness reported the addition of several hundred vertebrate specimens and skeletons which had not yet been accounted for in the acknowledged 469 vertebrates in the museum catalogue.[507] Instead of complaining of want of specimens, Harkness was now complaining of want of space and proper cabinetry to house them. Galway also received hundreds of specimens from the same auction; only Belfast did not purchase anything.

The purchasing of specimens from the Zoological Society was significant for a number of reasons. Firstly, Cork and Galway took between them more than half of the society's collections. Cork spent almost £400 and Galway £300, purchasing hundreds of specimens at bargain prices: the bulk of their vertebrate collections were items obtained at the sale. The British Museum was the only other major repository, receiving an array of type specimens at no charge as well as purchasing £500 worth of items to fill up spaces in their systematic collection. Several provincial museums (Liverpool and Norwich) purchased smaller

[505] A. Wheeler, 'Zoological collections in the early British Museum: the Zoological Society's museum', *Archives of Natural History*, 24 (1997), pp. 89-126.
[506] QCC Museum Committee 1852-6.
[507] *Report of the president of Queen's College, Cork for the year 1856-7*, p. 45, H. C. 1857-8 [2354], xxi, 613.

numbers of specimens.[508] The Zoological Society museum contained not only the stuffed remains of animals that had perished in the menagerie, but also items collected by some of the nineteenth century's most important naturalists including Charles Darwin. At least two of Darwin's specimens remain in the Cork museum, and several in Galway's collection are attributed to Darwin.[509] Even before the writing of the *Origin of Species*, Darwin was well known and respected and thus purchasing his specimens would have given prestige to the museum collections as well as providing novelty. Purchasing the Zoological Society's collections was akin to buying an ideal British museum which had both the exotic appeal of foreign animals and the stamp of British science. As the specimens had been intended for both scientific research and the entertainment and education of the public they were ideal purchases for Cork and Galway, aspiring to become new provincial museums for Ireland. One of the reasons that the society claimed it was selling the contents of its museum was the belief that the improvement of national and provincial collections would provide a better service to the public than the society could hope to provide with cramped accommodation and limited funds.[510]

The manner in which the professors gathered items for their museums also reveals something of the scientific networks existing in nineteenth-century Ireland. In particular, the acquisition of foreign specimens reveals networks of trade in the British Isles and marks distinctions between Cork, Galway and Belfast. Belfast was often deemed the closest thing in Ireland to an English or Scottish city.[511] The amenities and trade networks of Belfast somewhat justify the view that Ulster was more British than the other Irish provinces. Ireland was not particularly well-provided with natural history dealers. Ulster, however, was an exception and Dickie was able to purchase foreign specimens via Darragh and British and foreign fossils through Patrick Doran who was based in County

[508] Wheeler, 'Zoological collections'.
[509] These are all South American mammals and are thus quite likely to have been collected by Darwin on the voyage of the *Beagle*. Confirmation of this claim would require proper identification of the specimens and their comparison to the list of Darwin's specimens in the catalogues of the Zoological Society museum.
[510] Wheeler, 'Zoological collections'.
[511] T. MacKnight, *Ulster as it is; or twenty-eight years' experience as an Irish editor* (2 vols., London, 1896), vol. 1, pp. 12-13.

Down.[512] A business directory also listed two 'bird-stuffers' in 1852, while neither Cork nor Galway had any.[513] Ulster-Scottish connections were also reflected in the collecting practices of the Belfast college museum. Dickie and Wyville Thomson, both Scottish and educated in Scotland, used Edinburgh dealers and illustrators to acquire teaching materials. Dickie commissioned 68 drawings from artist Neil Stewart in Edinburgh in 1859.[514] Dickie also used well-known English dealers such as John Warwick of London and Robert Damon of Weymouth. Cork and Galway acquired all their foreign material through British dealers or local donors as neither Munster nor Connaught had dealers. For example, King received foreign rocks and minerals from the Royal Galway Institution.[515] Galway's status as a port also allowed King to receive the occasional donation from a passing ship captain, colonial administrator or missionary. A Revd William Moffat, missionary, donated some iron from South Africa.[516] Melville appears to have had links to the East India Company and brokered a few donations.[517]

Specimens also flowed within Ireland. The exchange of objects between the college museums, Irish scientific societies and other members of Ireland's scientific community occurred with some regularity. These individuals may not have formed a cohesive group but they were clearly known to one another. King, for example, made use of Dublin-based botanist Alexander Goodman More to pick up specimens for him in London.[518] He also received specimens from Harkness in Cork and sent rocks to David Moore at the Botanic Gardens.[519] The Galway museum also received a case illustrating the manufacture of flax fibre from James MacAdam of the Royal Flax Improvement Society, based in

[512] QCB Invoices 1849-56; Patrick Doran to Alexander Carte, 25 July 1868, DNHM Letter Files.
[513] See 'gun & pistol-makers' in *The Belfast and province of Ulster directory for 1852* (Belfast, 1852).
[514] QCB Invoices 1849-56.
[515] QCG Museum Catalogue.
[516] Mineral no. 394, QCG Museum Catalogue.
[517] T. Collins, 'Melville, Hart and Anderson: early teachers of natural history 1849-1914' in T. Foley (ed.), *From Queen's College to National University: essays on the academic history of QCG/UCG/NUI Galway* (Dublin, 1999), pp. 266-302.
[518] C. B. Moffat, *Life and letters of Alexander Goodman More* (Dublin, 1898), p. 227.
[519] Mineral no. 1211, QCG Museum Catalogue; E. C. Nelson and E. M. McCracken, *The brightest jewel: a history of the National Botanic Gardens Glasnevin, Dublin* (Kilkenny, 1987).

Belfast.[520] A cursory glance at the donations register of the Dublin Natural History Museum indicates that professors often sent specimens there as well. Some, like George Dickie, continued to do so after their departure from Ireland.[521] Robert Day, member of the Cork Cuvierian Society, sold the expensive kiwi bird to the Belfast college museum. Dickie also purchased unidentified specimens from William Henry Harvey, botanist of Trinity College Dublin, in 1857 and lichens from the Cork botanist, Isaac Carroll in 1859. Both Harvey and Carroll were in Dickie's own field of expertise (botany) and thus may have been known to him through publication or prior acquaintance. The Irish meetings of the British Association for the Advancement of Science in 1843 (Cork), 1852 (Belfast) and 1857 (Dublin) may have helped to consolidate the sense of an Irish scientific community. Movement between Cork and Belfast, both with strong Dissenting communities, was fairly regular. Joseph Wright (amateur palaeontologist, discussed in Chapter Three) moved his business and his scientific interests from Cork to Belfast in 1867.[522] Thomas Dix Hincks, founder of the Royal Cork Institution, went on to teach at the Belfast Academical Institution.[523] When his son, William Hincks, became the professor of natural history at the Cork college he would certainly have been able to access Ulster's scientific community through his father. Indeed William visited the Belfast Museum twice in 1851 where he was introduced by his father.[524]

The presence of an active community of naturalists in Belfast meant that local natural history specimens should have been easiest for Dickie to procure. However, he does not appear to have made an effort to acquire them. The Belfast Museum, especially after the death of William Thompson and the donation of his collection, was seen as the natural home for local collections.[525] This arrangement was also later advocated by William Benjamin Carpenter, on a visit to Belfast in 1869 (Carpenter was a biologist and registrar at University College London, he will be further discussed in the next chapter). In his address to the Belfast Natural History Society, Carpenter claimed that the college

[520] QCG Council, 19 March 1855.
[521] DNHM Donations Book.
[522] R. L. Praeger, 'Joseph Wright', *The Irish Naturalist*, 32 (1923), pp. 53-55.
[523] See *Oxford DNB*.
[524] BNHS Museum Visitor Book 1843-57, 22 September 1851.
[525] 24 November 1852, BNHS Council Minute Book.

museum already provided an adequate general series of the animal kingdom, thus allowing the Belfast Museum to concentrate on local specimens.[526] The Belfast college museum thus differs materially from either Cork or Galway which, despite a paucity of collectors and a total absence of dealers sought local collections. For example, the Galway college museum spent a very substantial £500 on acquiring a series of local fauna and the Cork college advertised for collectors via the local newspaper in order to obtain local specimens.[527]

The significance of the scientific staff's own collecting practices towards the development of the museums should not be overlooked. In fact, a valuable collection could be a bargaining tool in attempting to garner an academic position. For example, the contract between Thomas Coulter (curator of the herbarium) and Trinity College Dublin stipulated as a condition of his employment that Coulter was to turn over his herbarium to the college upon his death.[528] At least one candidate for the professorship of natural history in the Queen's Colleges, Robert J. Montgomery, emphasised the extent of his personal collection saying that he 'would be willing, if elected, to hand [it] over to the College, as a nucleus, whereon to commence the establishment of their own Museum of Natural History'.[529] As it was, staff did contribute (or sell) personal collections to the college museums. Galway gained King's priceless collection of English Permian fossils, brought with him from the Hancock Museum, much to that museum's dismay.[530] Professor William Smith of Cork augmented the Cork college's herbarium by his collections.[531] Melville also procured local specimens for the Galway museum.[532] For slightly less altruistic staff members, this was also a way to make a little money. As Figure 5.8 shows, Dickie sold a number of specimens to the college in Belfast. Wyville Thomson (professor of

[526] Nesbitt, *A museum in Belfast*
[527] QCC Museum Committee 1852-6; *Rep. Queen's College, Galway, 1856-7*, p. 10.
[528] McDowell and Webb, *Trinity College, Dublin*, p. 196.
[529] Robert J. Montgomery to the Lord Lieutenant, 1848, QC Natural History Candidates 1848.
[530] Collins, 'Melville, Hart and Anderson: early teachers of natural history 1849-1914' in, (It is my suspicion that King's priceless collection played no small part in his hiring, as he had no university education and was relatively under-qualified. However, I have not yet been able to confirm this.)
[531] *Rep. Queen's College, Cork, 1855-6*, p. 45.
[532] Harper, 'Professor William King'.

geology and natural history after 1853) also sold fossils to the Belfast college museum.[533]

The college museums offer us a contrast to the miscellaneous provincial museums which are presumed to have been assembled primarily by chance. The professors, for the most part, explicitly chose how to spend their money and what to place in the museums. Several reasons might be suggested for their approach to the museums. Natural history, although an option for the arts degree, was still primarily taken by medical students. There were generally no careers for naturalists, unless they became college professors. Natural history, therefore, was primarily seen as a hobby particularly appropriate to medical men. Most of the nineteenth-century's prominent naturalists had studied medicine, including Thomas Henry Huxley and most of the Queen's College natural history professors.[534] Geologists, by contrast, might make civil service careers in the surveys at home or abroad. Thus, for the purposes of teaching, a variety of foreign animals were most useful for imparting anatomy lessons. Systematic collections of shells offered insight into how to form a collection, perhaps a useful hobby in a foreign posting. In fact, a large portion of Queen's College graduates seem to have taken up civil service positions. In 1858, assistant surgeon in the Royal Navy was the most frequently cited career after an education at the Queen's Colleges, followed closely by service to the East India Company.[535] As one commentator put it: 'The Queen's College graduate is not a visionary: the education he receives stimulates him to make his way in the world, and especially in the services of our Colonial and Indian Empire.'[536] Colonial specimens could serve as a means of familiarising oneself with a strange territory before beginning service abroad, one of the reasons that Forbes gave for expanding the colonial collections at the Museum of Economic Geology.[537] Thus the natural products of Empire were a suitable area of study, and could perhaps encourage a future hobby or at the very least contributions to the museums of Britain and Ireland.

[533] QCB Cash Book 1855-72, 26 November 1857 and 1 November 1859.
[534] A. Desmond, *Huxley: the devil's disciple to evolution's high priest* (London, 1998).
[535] 'The Queen's University in Ireland', proof of pamphlet in the Larcom Papers 7668.
[536] MacKnight, *Ulster as it is*, pp. 47-48.
[537] Forbes, *On the educational uses of museums*.

As we have seen in a previous section, the college presidents had argued for greater funds for the museums as a means of both 'enlightening' the local area and impressing educated men. Both these goals may have been served better by broad generalist collections rather than provincial ones. The Queen's Colleges were national institutions, funded by Parliament. They were intended to educate those in the area, but it was also hoped that they would become colleges of a university with good academic standing. For this goal, a collection which focussed merely on local specimens would not do. The college museums must resemble the collections of other university colleges and be representative of an idea of a British museum in which the products of the Empire were well represented. Further reinforcing the cultural and public role of the museums was an increasing interest in collecting antiquities as well as scientific specimens. In 1857, for example, the Queen's College Cork president reported that 'arrangements have been made to form, on a moderate scale, such a collection as should be especially illustrative of Classical Archaeology and History'.[538] By 1909, a £10 annual budget (out of the now much-reduced £100 museum budget) was given over to purchasing archaeological specimens.[539] Galway's incomplete catalogue indicates at least an intention of assembling art and antiquities.[540] Thus the Queen's College museums became much more than teaching collections, they were also archives, research collections and displays for the interest of the local public.

Conclusions

The Queen's College museums encourage us to rethink both the role of the colleges within the local community as well as the role of the museum in science and education. The museums demonstrate one way in which the colleges became civic spaces, open for access by the local public as well as examination by visitors. This role was immediately recognised by professors and college presidents, who attempted to persuade Parliament to increase their grant on the

[538] *Rep. Queen's College, Cork, 1855-6*, p. 7.
[539] QCC Museum Committee 20th C, 18 November 1909.
[540] QCG Museum Catalogue.

basis of making the colleges a location for 'radiating light' to the local community. In Cork and Galway the college museums soon came to replace earlier museums of scientific societies, attracting the collections of some of their members and serving local visitors on a regular basis. Despite the complaints of the professors, the Queen's College museums were better funded than most local museums could ever hope to be. This role for the museums as civic spaces further differentiates Cork and Galway from Belfast, in which there was an extant natural history museum. However, even in Belfast it was suggested that the college museum be viewed as complementary to the museum of the Belfast Natural History Society and that the Belfast Museum ought to focus on local specimens, leaving the general collection to the college. Although the Free Museums and Libraries Act of 1845 (extended to Ireland in 1850) allowed the voting of a rate to fund municipal museums, almost no Irish towns adopted the act. In a survey taken by Parliament in 1884, only seven cities in Ireland had adopted the act and of these only Dundalk, Sligo, Dublin and Belfast had actually begun the work on buildings. Each of these was a library rather than a museum.[541] Most likely it was not viewed as a financially viable measure, given the high cost of museums and the low numbers of rate payers available for the tax. In a sense the college museums in Cork and Galway replaced the need for a municipal museum by opening their doors to the public. The Queen's College museums were eminently suited to the task of public education which it was hoped that nineteenth-century museums would perform: as teaching collections they housed a miscellany fascinating to the average visitor.

The museum was advocated throughout the nineteenth century as a location appropriate for the education of all classes, yet universities were slow to provide funding for museums within their walls and most university museums were built up as private collections. The Queen's College museums therefore demonstrate a significant acceptance on the part of the government that museums were a necessary component of university education and represent a further affirmation of the importance of science to the educational programme of the colleges. However, the college museums also encourage a re-examination of the manner in

[541] *Public Libraries Acts: Return showing the names of all places in England, in Scotland and in Ireland, that have adopted the Public Libraries Acts, 1885*.

which museums were actually used. Collections are generally viewed as static, their assemblages occasionally changed in light of scientific principles or to make room for more objects. In fact, the college museums had to provide illustrative material for lecturers (a function still served by many of the same specimens to this day). As such the collections were dynamic, with objects constantly removed and replaced. The museum galleries themselves acted as large storage spaces.

Museums and spaces devoted to science also served as places for the interaction of scientific men in Ireland and scientific visitors to the island. Professors travelled between the museums, including those in Dublin, and specimens were passed from provincial society members to college museums in other provinces. The collections of the college museums leave a trail, however faint, of the network of scientific men active in nineteenth-century Ireland. A more comprehensive study than the space of this chapter has allowed would enrich our understanding of this network by the inclusion of museums in the study of Irish scientific societies.

Finally, the eclectic choice of objects in the college museums cannot be dismissed as accidental or the result of poor finances as has been the case for other provincial museums. Instead, the selection of objects was a compromise which attempted to encompass many roles for the museums. The presence of a wide array of foreign specimens might have seemed strange or irrelevant to local natural history and would most certainly have been dismissed by Forbes as 'uneducational'. However, the selection placed the college museums on a footing with other British museums and claimed them as a part of British intellectual culture. The Queen's College professors and students, as well as members of the local public, now had access to scientific amenities available in other British cities and of comparable standard to other British universities. As we shall see in the next chapter, this was an important statement. The scientific community of Britain hesitated to accept that scientific work emerging from Ireland was on par with that 'on the mainland', despite the increasing ease with which ideas could be shared through print and research conducted with identical materials in multiple locations.

6

An invisible scientific community: the 'Galway professors' and the *Eozoön* controversy

> Considering how rapturously its advent into paleontology [sic] was greeted by latter-day biologists, and others who were content to accept on mere authority a plausible yet one-sided explanation of a difficult problem…the constructors of the "creature of dawn" have certainly no grounds for exultation at its present position as a "received doctrine" in exact science.
>
> William King and Thomas Rowney, 1871[542]

Introduction

Previous chapters have focussed on science *in* the community, whether that community was academic, religious, political or civic. This chapter will focus on the scientific community itself, seen through the mediation of a controversy. The controversy over the *Eozoön canadense*, supposed by some to be fossil evidence of the first life on earth, lasted over twenty years. One of the most interesting aspects of the controversy was the ability of two men in Galway to participate in it without leaving their location on the scientific periphery. The 'Galway professors', as William King and Thomas Rowney came to be called by their opponents, had chosen their controversy well. They exploited the difficulties involved in developing and defending scientific authority in the second half of the nineteenth century, especially for a discovery such as *Eozoön*, which was reliant on microscopical observation. The periodical and the microscope, both widely available at this time, increased the audience for science and were not fully under the control of scientific elites. Peripheral figures, such as King and

[542] W. King and T. H. Rowney, 'On the mineral origin of the so-called "*Eozoön* canadense" ', *Proceedings of the Royal Irish Academy*, 1, 2nd series (1871-74), pp. 140-153, p. 152.

Rowney, could access the same instruments as their London-based opponents and use the audience of the periodical to garner support for their scientific conclusions.

Throughout this dissertation I have demonstrated the importance of science to the project of improving Ireland and shaping local communities. This chapter returns to the substance of scientific research itself in highlighting a scientific controversy. However, many of the same themes that appeared in previous chapters remain relevant. Scientific communities function similarly to other types of communities, with leaders and competing factions, each trying to influence what becomes 'official' science. This chapter shows how it was possible in the second half of the nineteenth century to be part of a scientific community from afar and how a position on the periphery of elite scientific culture could confer advantages as well as disadvantages.

Galway in 1849 had little industry, a population decimated by famine and a bleak economic future. Nevertheless, as Neswald has remarked the town's 'keen sense of its own importance' inspired the foundation of intellectual societies, a 'season' of entertainments and a faith that the college was the beginning of the town's revival.[543] The Royal Galway Institution (RGI), the most elite and self-important of the town's societies, had lain dormant for many years. Upon the opening of the college, the Institution was resurrected with great hopes for the future. Expecting to draw new members and new vigour from the Galway college, the Institution organised meetings and invited the professors for membership. The newly inducted Professor William Hearn read a paper at the opening of the 1850-51 session in which he declared that 'Upon Galway the eyes of the whole empire are turned; upon Galway, at once the capital and the representative of the West, the fate of all Connacht mostly depends.'[544] The Institution and the college in Galway could provide 'a rallying point to the scattered intellectual power of the west' and 'bring the mind of Connacht into direct communication with the

[543] E. Neswald, 'Science and sociability in nineteenth-century provincial Ireland: the Galway Mechanics' Institute', *British Journal for the History of Science*, (expected Dec. 2006).
[544] *Galway Vindicator*, 6 November 1850.

noblest minds of Britain'.[545] The elite of Galway welcomed the professors as peers in the process of civilising and raising up the West after the Famine years.

The Galway professors seemed amenable to the project of breathing new life into the city. Many of them, including William King, became members of the Royal Galway Institution. Some delivered public lectures, either at the request of the RGI, the Mechanics' Institute or through the provincial lecture scheme.[546] Unlike Cork's societies, however, the Royal Galway Institution did not develop a kernel of loyal followers. Over the latter half of the nineteenth century it met irregularly, sometimes only for the annual dinner.[547] Class distribution was probably partly responsible for this. While Cork boasted a large mercantile class, the middle class of Galway was conspicuously small, a fact which Harriet Martineau considered responsible for its lack of industry.[548] Even the Mechanics' Institute became the venue of the upper and upper-middle classes.[549] The town's population had swelled with the impoverished during the Famine and these remained a majority. Nevertheless, the leaders of the town remained optimistic about Galway's future as a 'rallying point' through which 'direct communication with the noblest minds of Britain' might be enacted.

Aside from the rhetoric of the members of intellectual societies, more concrete attempts to draw Galway out of the dark days of the Famine and into the industrial age included the arrival of the railway and the trans-Atlantic packet station.[550] From 1851 a direct rail link with Dublin was established, shortening journey times and providing a further cause for optimism. By the 1860s, Galway was relatively well-connected to the rest of Britain. Three daily trains linked it to Dublin (a journey of about five to six hours). Two daily trains provided service

[545] Ibid.
[546] E. Leaney, 'Missionaries of science: provincial lectures in nineteenth-century Ireland', *Irish Historical Studies*, 34 (2005), pp. 266-288.
[547] K. Woodman, *Tribes to tigers: a history of the Galway Chamber of Commerce and Industry* (Galway, 2000).
[548] H. Martineau, *Letters from Ireland* (London, 1852), pp. 89-90.
[549] Neswald, 'Science and sociability'.
[550] T. Collins, 'The Galway Line in context: a contribution to Galway maritime history (Part 1)', *Journal of the Galway Archaeological and Historical Society*, 46 (1994), pp. 1-42; T. Collins, 'The Galway Line in context: a contribution of Galway maritime history (concluded)', *Journal of the Galway Archaeological and Historical Society*, 47 (1995), pp. 36-86; J. Cunningham, *'A town tormented by the sea': Galway, 1790-1914* (Dublin, 2004), pp. 165-7.

to Belfast (nine to ten hours).[551] From both Dublin and Belfast, regular sea crossings were available. From 1860 steam ships brought post from London via Holyhead to Kingstown (now Dun Laoghaire) and then by train to Dublin and on to Galway. These ships made two deliveries per day with the mail being fully sorted on board. A letter mailed in Galway could conceivably reach London within 24 hours. [552] The letter which King and Rowney wrote to the editor of the *Reader* in 1865 was penned on 3 June and was in print seven days later on 10 June.[553]

The trans-Atlantic packet station had a short, but hopeful, life. The 'Galway Line' was inaugurated in 1858, establishing direct mail links between Galway and America and leading the *Galway Vindicator* to claim to be the first paper to print American news in the British Isles. This link was the direct inspiration for founding the *Galway American*, a nationalist paper which looked to America for the future of Ireland.[554] The line failed when, due to bad luck and bad weather, its ships were unable to meet the journey speeds set by the Royal Mail.[555] Also in the 1860s, Galway had a brief flirtation with becoming the terminus for the transatlantic telegraph line. Among the supporters of this idea was William King, who provided geological evidence of Galway's suitability.[556] The line had always been intended to leave from Valentia in County Kerry as this allowed for the shortest length of cable to Newfoundland. In 1861 soundings were performed by the HMS *Porcupine* off the west coast of Ireland in order to determine the best route for the cable. Asked to examine both samples and sounding reports, King reached the perhaps surprising verdict that Galway, not Valentia was the best terminus for the cable. His conclusions, originally printed in the *Mechanic's Magazine* and the *Nautical Magazine*, were reprinted with

[551] *Galway Express*, 6 June 1865.
[552] See E. Watson, *The Royal Mail to Ireland* (London, 1917), p. 163.
[553] W. King and T. H. Rowney, 'The *Eozoön Canadense*', *The Reader*, (1865), p. 660.
[554] M.-L. Legg, *Newspapers and nationalism: the Irish provincial press, 1850-1892* (Dublin, 1999), p. 45.
[555] T. Collins, *Transatlantic triumph and heroic failure: the story of the Galway Line* (Cork, 2002).
[556] W. King, 'Observations on the proposed telegraph communication between Ireland and Newfoundland', *The Nautical Magazine and Naval Chronicle*, (1862), pp. 650-655.

approval in the *Galway Express*.[557] However, King's claim angered the Knight of Kerry, who struck back with the claims of Valentia as the appropriate terminus. The failure of Galway to secure either a packet station or a telegraph station was felt keenly by the local press, as each seemed to represent dashed hopes for Galway's future as a true city of Empire.

While ostensibly connected to the rest of the British Isles by rail, canals and sea, Galway remained an outpost. Galway and Connemara were offered as destinations for the more adventurous British traveller who was willing to part with some of the comforts he or she had come to expect at home. After the Famine, visitors sought not only sublime scenery and an opportunity to view 'Paddy' in his native environment, but the chance of moralising and speculating on the future of Ireland.[558] Martineau seemed to echo the belief of the Royal Galway Institution's proprietors that the whole of the Empire was watching the future of Galway as a gauge of the health of Ireland. In 1852, Martineau found the city prepared for an imminent awakening:

> Here is the railway, with, as yet, very little traffic. Here is the canal, with, as yet, no trade. Here is a nobly situated port, with, at present, no article of export. Here is a great hotel, built apparently in some prophetic anticipation of custom in future years. Here is the very handsome Queen's College, with its staff of twenty professors, and its forty-two scholarships, while its halls echo to the tread of seventy-five students.[559]

Despite its lack of development, Galway held a certain appeal. D'Arcy Wentworth Thompson, professor of Classics, was smitten with the city and remained for the duration of his life. Thompson's description of Galway, contributed to *Macmillan's Magazine* in 1865, was an affectionate, if patronising, picture of a lively, ramshackle place full of quaint, good-hearted

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[557] W. King, 'Preliminary notice of the organic and inorganic objects obtained from the soundings of H. M. S. "Porcupine" off the west coast of Ireland', *The Nautical Magazine and Naval Chronicle*, (1862), pp. 600-602; King, 'Observations'; *Galway Express*, 29 November 1862; *Galway Express*, 17 January 1863.

[558] Martineau, *Letters from Ireland* ; An Oxonian, *A little tour in Ireland; being a visit to Dublin, Galway, Connemara, Ahtlone, Limerick, Killarney, Glengariff, Cork, etc., etc., etc.* (London, 1859); R. S. G. Osborne, *Gleanings in the west of Ireland* (London, 1850); H. Coulter, *The west of Ireland: its existing condition, and prospects* (Dublin, 1862).

[559] Martineau, *Letters from Ireland* , p. 87.

citizens who had been neglected by their government.[560] Taking this sympathy too far in 1867, Thompson created a furore by publicly supporting clemency for Fenian prisoners sentenced to death and suggesting that harsh treatment by English landlords was the cause of Ireland's rebelliousness.[561]

King, too spent his life in Galway, sending both of his sons to the Queen's College and choosing to die there, rather than making a post-retirement pilgrimage back to England. This may not have been the result of choice, as King competed unsuccessfully in 1873 for the chair of geology at Cambridge.[562] However, the isolation of Galway and the security of his post afforded him a certain freedom of action which was useful for challenging London's geological authorities. In the minds of his opponents, King's position in Galway was a severe disadvantage: his association with a backwater of the Empire surely reflected on the character of his science. The elite of London did not look particularly kindly on Ireland and its scientific culture, especially that outside of Dublin and Belfast. Gordon Herries Davies has noted the disregard British geologists felt for Irish geology. After Roderick Murchison became the director of the Geological Survey of the United Kingdom in 1855, he took a trip to Ireland to investigate the work there. At the end of his stay he had little or nothing positive to say about the country, complaining of weather, social conditions and the dullness of the Irish geological landscape. His subordinate and the leader of the Irish survey, Joseph Beete Jukes, can hardly have helped matters by continuously bemoaning the incompetence of his Irish staff.[563] Attempts were made in the 1870s to end the Geological Survey of Ireland earlier than that of Britain and without completing a drift survey. This was met by protest on the part of the survey staff and eventual capitulation by the government.[564] In this undesirable of geological territories, King had received

[560] D. A. W. Thompson, 'Galway; or, the city of the tribes (edited, with an introduction by T. Foley)', *Journal of the Galway Archaeological and Historical Society*, pp. 90-102.
[561] T. P. Foley, 'D'Arcy Wentworth Thompson: classical scholar and Fenian sympathiser', *Journal of the Galway Archaeological and Historical Society*, 45 (1993), pp. 90-123.
[562] A. O'Connor, 'The competition for the Woodwardian Chair of Geology: Cambridge, 1873', *British Journal for the History of Science*, 38 (2005), pp. 437-461.
[563] G. L. Herries Davies, *North from the Hook: 150 years of the Geological Survey of Ireland* (Dublin, 1995), pp. 54-61.
[564] R. Jarrell, 'The Department of Science and Art and control of Irish science, 1853-1905', *Irish Historical Studies*, xxiii (1983), pp. 330-347.

perhaps the least desirable professorial post. While the British Association visited Dublin, Cork and Belfast in the nineteenth century, Galway was never entertained. Even Cork was viewed as a sleepy village with no scientific culture, and important men of science expressed their reluctance to travel to the meeting.[565] What geological community Ireland had in the form of the survey, the Dublin Geological Society, and (for a time) the Museum of Irish Industry, was located in Dublin. In actuality, the economic and geographical situation of Galway offered no impediment to research and the arrival of the railway in 1851 and the penny post in 1840 ensured that postal communication was rapid and inexpensive. The contrast between the 'uncivilised' character of Galway and the high British intellectual circles within which its professors moved merely demonstrates how effective print and post were in uniting distant scholars. However, accessibility of communication did not guarantee unity of thought, as the *Eozoön* controversy demonstrates.

As we have seen, Galway's elite expended much energy in the second half of the nineteenth century on trying to draw Galway more closely into the communication network of the British Empire. This process was not always successful. Likewise the scientific community was developing new means of communicating among specialists and with the public. The ubiquity of scientific literature and instruments such as the microscope challenged those wishing to develop a clear authority structure. Both the magazine and the microscope were common, affordable objects accessible to a large portion of the middle classes. Neither microscopy nor scientific writing had a rigid authority structure to enforce a hierarchy of experts and both lacked disciplinary boundaries for their use. These ambiguities allowed them to be suitable vehicles for a controversy between a relatively unknown geologist isolated in the West of Ireland and an elite man of science with a prominent position in London. Both the microscope and the periodical created new challenges for the scientific community, challenges which are highlighted by their function in the *Eozoön* controversy

[565] J. Morrell and A. Thackray (eds), *Gentlemen of science: early correspondence of the British Association for the Advancement of Science* (London, 1984), pp. 352-6.

The controversy arises

In September of 1864, the professor of geology at Queen's College, Galway attended the annual meeting of the British Association for the Advancement of Science (BAAS) in Bath. This was not unusual: despite the travel involved, William King had attended, and presented at, several other British Association meetings since his appointment in 1849.[566] King was accompanied by the professor of chemistry (since 1856), Thomas Rowney.[567] Together they listened with interest to the reports by John Dawson, William Logan and Sterry Hunt of a new fossil that had been discovered in Canada among some of the oldest sedimentary rocks. The discovery of *Eozoön canadense*, or 'the dawn animal of Canada', relied on Dawson's microscopic examination of specimens which the Geological Survey of Canada had uncovered in Grenville limestone of the Laurentian age. The fossil resembled the shelly cast of a vast foraminifera, which might have covered the floor of the ancient seas like a coral. The discovery was significant for two reasons.[568] First, as the Laurentian limestone was among the oldest known sedimentary strata, the fossils were supposed to be the earliest signs of life on earth. This would have extended the time which men of science believed the earth to have been inhabited by hundreds of thousands, if not millions, of years. Second, *Eozoön* conformed to what many (especially believers in Darwinian evolution) had been expecting as the dawn animal: a very simple, sea-dwelling organism. The discovery seized the imagination of London's elite geologists: Charles Lyell mentioned *Eozoön* in his presidential address to the BAAS and Dawson, Logan and Hunt's papers were much discussed in section C (the geology section).[569] William Carpenter, a physiologist and self-proclaimed expert microscopist who had published a respected study of foraminifera, applied his expertise to *Eozoön* and confirmed it

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[566] See King's own account of attending the meeting in W. King and T. H. Rowney, *An old chapter of the geological record with a new Iinterpretation: or, rock-metamorphism (especially the methylosed kind) and its resultant imitations of organisms; with an introduction giving an annotated history of the controversy on the so-called "Eozoön canadense," and an appendix.* (London, 1881).

[567] As stated in Chapter 3, Rowney was another of Justus von Liebig's chemical pupils who came to teach in the Queen's Colleges. See W. H. Brock, *Justus von Liebig: the chemical gatekeeper* (Cambridge, 1997).

[568] Foraminifera are single-celled marine organisms which excrete a shell or cast. In the nineteenth century their casts had been discovered to make up a large proportion of mud dredged from the bottom of the sea.

[569] *The Times*, 15 September 1864, p. 7.

as a fossil.[570] For an illustration of *Eozoön* as Dawson, Logan and Carpenter saw it, see Figures 6.1 and 6.2.

While Thomas Rowney was named as a second author on most of the Galway publications dealing with *Eozoön*, it appears that King was the primary protagonist and thus my account will focus on him. William King was fairly unusual among the scientific professors of the Queen's Colleges because he came from a modest background and had no formal training in geology. A native of Sunderland, England, he had once owned a bookshop and after developing an interest in natural history became involved in the local Literary and Philosophical society. Eventually he became the curator of the Newcastle Museum (later re-named the Hancock Museum) before moving to Galway in 1849.[571] When King left, he took his palaeontological collections with him, much to the annoyance of his previous employers who believed them to be the property of the Newcastle Museum.[572] These specimens became the basis of the Galway college's museum while the monograph describing them (*The Permian Fossils of England*, 1850) led King into a conflict over priority with another geologist, Richard Howse.[573]

In the early 1860s King was involved in another argument over scientific priority when he published preliminary thoughts on the findings of the H. M. S. *Porcupine* voyage.[574] Dr George Wallich then accused King of 'wholesale plagiarism' of his work.[575] King replied that most of what he had stated in his 'Preliminary Notice' was attributable not to Wallich, but rather belonged to the domain of established knowledge and had not been claimed as original research. He cited a course of lectures he had given in Bandon a year prior in which much

[570] B. J. Harrington, *Life of Sir William E. Logan* (Montreal, 1883); W. B. Carpenter, 'On the structure, affinities, and geological position of *Eozoön Canadense*', *The Intellectual Observer*, 7 (1865), pp. 278-302.
[571] D. A. T. Harper, 'King, William (1809-1886)' in H. C. G. Matthew (ed.), *Oxford Dictionary of National Biography* (Oxford, 2005).
[572] D. A. T. Harper (ed.), *William King, D. Sc.: a paleontological tribute* (Galway, 1988) pp. 1-24.
[573] David A. T. Harper, 'The Geological Sciences', in Tadhg Foley (ed.), *From Queen's College to National University* (Dublin, 1999).
[574] King, 'Preliminary notice'.
[575] G. C. Wallich, 'Professor King's "Preliminary Notice of the Porcupine's Soundings" Considered by Dr. Wallich', *The Nautical Magazine and Naval Chronicle* (1863), pp. 26-31.

of the same material had appeared and his claims were supported by the editors of the *Galway Express*.[576] Wallich tried to undermine King's credibility by giving ample evidence of King's involvement in a variety of other controversies, including a dispute with William Carpenter over the microscopic surface structure of a fossil brachiopod.[577]

Despite the aversion of the scientific, and particularly geological, community to public controversies, King's opponents in the dispute over *Eozoön* seemed to relish controversy as much as he did.[578] The eminent geologists Charles Lyell and Roderick Impey Murchison had both supported *Eozoön* vocally in the early years of its discovery, but it was William Carpenter who became the most important ally of *Eozoön*'s first describer and last supporter, John William Dawson. Dawson was a Canadian geologist and protégé of Lyell's who had once competed for the chair of natural history in Edinburgh. He had, however, been unsuccessful and remained in Canada as the principal of McGill College.[579] This administrative post gave him sufficient freedom to pursue his geological interests. Over his life he published several books on Canadian geology, on his own interpretation of Creation and on *Eozoön*. Dawson's biographer claims that he enjoyed engaging in controversy, a statement born out by his efforts to counter Darwinian evolution throughout his life.[580] Dawson was also involved in a heated dispute over the proper classification of a fossil with William Carruthers in the 1870s.[581]

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[576] W. King, 'The "Porcupine's soundings", or Professor William King's reply to Dr. Wallich's statements', *The Nautical Magazine and Naval Chronicle* (1863), pp. 132-137; *Galway Express*, 27 December 1862.
[577] W. King, 'Remarks on the histology of two specimens of *Rhynchopora geinitziana*, De Verneuil, from near the River Oukhta, province of Archangel, and belonging to the collection of the Corps des Mines of St Petersburg', *Annals and Magazine of Natural History*, 16, 3rd series (1865), pp. 124-128; W. B. Carpenter, 'On the microscopic structure of the shell of *Rhynconella Geinitziana*', *Annals and Magazine of Natural History*, 16, 3rd series (1865), pp. 305-307.
[578] J. G. Thackray, *To see the fellows fight* (Stanford on the Vale, 2003); M. J. S. Rudwick, *The Great Devonian Controversy: the shaping of scientific knowledge among gentlemanly specialists* (London, 1985).
[579] S. Sheets-Pyenson, 'Horse race: John William Dawson, Charles Lyell, and the competition over the Edinburgh natural history chair in 1854-1855', *Annals of Science*, 49 (1992), pp. 461-477.
[580] S. Sheets-Pyenson, *John William Dawson: faith, hope and science* (Montreal, 1996).
[581] D. Lindsay, '*Prototaxites* Dawson, 1859 or *Nematophycus* Carruthers, 1872: geologists v. botanists in the formative period of the science of paleobotany', *Earth Sciences History*, 24 (2005), pp. 35-61.

William Carpenter may seem an unlikely ally for Dawson: he had trained in medicine and was perhaps best known for the publication of *The Principles of Human Physiology* (1842), a controversial text which some viewed as being irreligious.[582] Carpenter was on the periphery of the self-selected group of politically liberal men of science designated as the X Club, which supported the evolutionary views of Darwin and sought to increase the public profile of science.[583] By 1865, Carpenter was well-established in the elite scientific circles of London: he was the registrar at the University College London, a fellow of the Royal Society and a regular contributor to the scientific societies. His interest in *Eozoön* no doubt derived from his comprehensive study of the foraminifera, published in 1862, as well as his devotion to the microscope as a scientific tool, a popular guide to which he wrote in 1856.[584] Carpenter was also, in the 1860s and 70s, involved in several dredging projects funded by the Royal Society and executed off the coasts of Ireland and Britain in collaboration with Wyville Thompson, professor of natural history at Queen's College, Belfast.[585] Dawson, Carpenter and King were the primary disputants over *Eozoön*, although, as we will see, many other men of science contributed to the debate.

After the successful announcement of *Eozoön* at the BAAS, Dawson and Logan travelled to London where their discovery was presented to the Geological Society of London, the Royal Society (by William Carpenter) and the Royal Institution (by Andrew Ramsay).[586] Logan placed a specimen in the Museum of Practical Geology on Jermyn Street, thus depositing *Eozoön* at the centre of London, both physically and metaphorically.[587] While Dawson and Logan were being feted in London, King and Rowney returned to Galway. The *Geological Magazine*, the journals of the Geological Society and the Royal Society, the

[582] J. A. Secord, *Victorian sensation: the extraordinary publication, reception, and secret authorship of Vestiges of the Natural History of Creation* (Chicago and London, 2000), p. 66.
[583] R. Barton, '"Huxley, Lubbock, and half a dozen others": professionals and gentlemen in the formation of the X Club, 1851-1864', *Isis*, 89 (1998), pp. 410-444; A. Desmond, *Huxley: the devil's disciple to evolution's high priest* (London, 1998).
[584] See R. Smith, 'Carpenter, William Benjamin (1813-1885)' in H. C. G. Matthew (ed.), *Oxford Dictionary of National Biography* (Oxford, 2005); W. B. Carpenter, *The microscope and its revelations* (London, 1881).
[585] A. L. Rice, *British oceanographic vessels, 1800-1950* (London, 1986), see entry under H. M. S. *Discovery*.
[586] Harrington, *Life of Sir William E. Logan* , p. 376.
[587] Ibid. , p. 370.

Intellectual Observer and other magazines were available in the library of the college, and King and Rowney could have easily followed the sensation *Eozoön* was creating in the scientific community.[588] King and Rowney were already conducting examinations of their own when, in January of 1865, the *Geological Magazine* announced that *Eozoön* had been discovered in the Connemara marble.[589] Seated at Rowney's microscope with specimens collected from a trip to the local marble dealer, King and Rowney found no evidence of organic structure or foraminiferal character in this local stone.[590] In July of 1865, they announced their belief that *Eozoön* was simply a rock in the pages of the *Reader*, a recently inaugurated London weekly.[591] In 1866, the scientific basis for their rejection of the fossil was read at the Geological Society of London and later printed in its *Quarterly Journal*.[592] Carpenter became the primary defender of *Eozoön*, replying to King and Rowney's paper at the Geological Society and to each of their notes in the *Reader*. Meanwhile King and Rowney began an extensive microscopic and chemical study of limestone similar to the Connemara marble and the Canadian Laurentian formation and published numerous refutations of *Eozoön*'s organic origin.[593] King and Rowney refused to see *Eozoön* as Dawson and Carpenter did and the argument reached a stand still. (For an illustration of how King and Rowney saw *Eozoön*, see Figure 6.3.)

Previous analyses of the *Eozoön* controversy have suggested several reasons for its duration. O'Brien has claimed that the massive geological surveys of the nineteenth century and the improvement in techniques such as microscopy generated data with which men of science could not cope: 'nineteenth-century

[588] D. A. W. Thompson, *A series of alphabetical catalogues of books contained in the library of Queen's College, Galway; arranged according to departments* (Galway, 1877).
[589] W. A. Sanford and T. R. Jones, 'Correspondence: *Eozoön Canadense* in Connemara marble from the Binabola mountains', *The Geological Magazine*, 2 (1865), pp. 87-89.
[590] W. King and T. H. Rowney, 'On the so-called "Eoozonal rock"', *Quarterly Journal of the Geological Society*, 22 (1866), pp. 185-217. I assume the microscope was Rowney's as King thanks him for its use in his earlier papers on *Rhynchonella*. See W. King, 'On the tubulation of the valves of *Rhyncopora Geinitziana*, De Verneuil', *Annals and Magazine of Natural History*, 17 (1866), pp. 230-233.
[591] King and Rowney, 'The *Eozoön Canadense*'. On the *Reader* see A. J. Meadows, *Science and controversy: a biography of Sir Norman Lockyer* (London, 1972) and R. Barton, 'Just before *Nature*: the purposes of science and the purposes of popularization in some English popular science journals of the 1860s', *Annals of Science*, 55 (1998), pp. 1-33.
[592] King and Rowney, 'The "*Eozoön*al rock" '.
[593] A good summary of the literature on *Eozoön* is provided in C. F. O'Brien, '*Eozoön Canadense* "the dawn animal of Canada"', *Isis*, 61 (1970), pp. 206-223.

science was sufficiently advanced to raise such questions, but insufficiently developed to settle them'.[594] Gould, by contrast, has noted that scientific naturalists, especially those who believed in Darwinian evolution, had been expecting to discover something like *Eozoön*: a simple, sea-dwelling animal that might be a logical starting point for more complex life. Thus, *Eozoön* was not thoroughly interrogated because it conformed to preconceived notions.[595] While both of these explanations have merit, neither of them serves to explain why King and Rowney exerted such an effort to prove that *Eozoön* was inorganic, or why their efforts were so consistently rebuffed. Nor do they address the role of Galway in the controversy. Galway's distance from the centre of scientific circles demonstrates the ability of men of science in peripheral locations to participate actively in scientific discourse (and the importance of periodicals to this participation) and highlights some of the advantages of pursuing controversy from such a remote location.

King and Rowney's campaign against *Eozoön* demonstrates that arriving at an agreed 'truth' among a heterogeneous and scattered scientific community was nearly impossible. The weaknesses of the *Eozoön*ists' claims, exploited by King and Rowney, lay in their disregard for the opinions of men of science outside a select circle and their reliance on the microscope for proof of *Eozoön*'s organic nature. Print culture presented a forum which leading men of science could not always control and through which peripheral men could challenge authority and raise support for dissident opinions among a wider community. Likewise, the proliferation of the microscope as a device for hobbyists made its use in the establishment of scientific claims fraught with potential problems of interpretation. Thus King and Rowney in Galway, armed with pens and a decent microscope, were able to present themselves as equally authoritative members of the scientific community.

Print media and the microscope were both necessary and useful devices for the expert man of science, but they were also readily available to any person with sufficient income to purchase them. While publishing was a well-established

[594] Ibid., p. 223
[595] S. J. Gould, 'Bathybius and *Eozoön*' in S. J. Gould (ed.), *The panda's thumb: more reflections in natural history* (New York and London, 1980), pp. 343.

means of procuring necessary income as well as establishing scientific authority, men of science were not always able to control publishers and editors. Likewise, writers of manuals on the microscope, and science educators, attempted to control the way in which their pupils used the instrument in order to confine microscopical practice to a set of norms defined by scientific hegemony.[596] Both the microscope and the periodical, by the very nature of their availability, allowed for challenges to scientific authority. This is very well-demonstrated by the case of *Eozoön*. King and Rowney, although outside the metropolitan circles of London science, were permitted by editors to publish challenges to the authority of that elite in a variety of forums. Their arguments were strengthened by the difficulty of definitively establishing any finding with the use of the microscope.[597] In the following sections I will argue that periodicals allowed peripheral figures such as King and Rowney to be active participants in the scientific community, against the wishes of a metropolitan elite. Arguments over the microscopical identification of *Eozoön* as a fossil demonstrate the difficulty of creating consensus among a heterogeneous and widely spread scientific community and reveal tactics used by men of science for establishing their own authority.

A periodical debate

Historians of science have recently taken great interest in the publishing industry and the effect of mass-market publications on the dissemination, popularisation and practice of science in the nineteenth century.[598] The demand for scientific

[596] G. Gooday, 'Nature in the laboratory: domestication and discipline with the microscope in Victorian life-science', *British Journal for the History of Science*, 24 (1991), pp. 307-341.
[597] On other microscopical controversies see G. J. N. Gooday, 'Instrumentation and interpretation: managing and representing the working environments of Victorian experimental science' in B. Lightman (ed.), *Victorian science in context* (Chicago, 1997), pp. 409-437.
[598] M. Frasca-Spada and N. Jardine (eds), *Books and the sciences in history* (Cambridge, 2000); A. Fyfe, 'Conscientious workmen or booksellers' hacks? The professional identities of science writers in the mid-nineteenth century', *Isis*, 96 (2005), pp. 192-223; A. Fyfe, 'Publishing and the classics: Paley's *Natural Theology* and the nineteenth-century scientific canon', *Studies in History and Philosophy of Science*, 33A (2002), pp. 729-751; Secord, *Victorian sensation*; Barton, 'Just before *Nature*'; S. Sheets-Pyenson, 'A measure of success: the publication of natural history journals in early Victorian Britain', *Publishing History*, 9 (1981), pp. 21-36; S. Sheets-Pyenson, 'Popular science periodicals in Paris and London: the emergence of a low scientific culture, 1820-1875', *Annals of Science*, 42 (1985), pp. 549-572; J. R. Topham, 'Scientific publishing and the reading of science in nineteenth-century Britain: a historiographical survey and guide to sources', *Studies in History and Philosophy of Science*, 31A (2000), pp. 559-612; G. Cantor, G. Dawson, G. Gooday, R. Noakes, S. Shuttleworth and J. R. Topham, *Science in*

publishing even allowed several houses to specialise in it.[599] Historians have noted the impact on science of the expansion of periodical literature in the nineteenth century.[600] This literature was hugely diverse, varying in the audience(s) addressed, the schedule of publication, editorial style and price. As we shall see, the *Eozoön* controversy appeared in a range of periodicals: some scientific, some popular, some for a wide audience and others for a narrower one. The 1860s has been seen as a crucial period in which popular science journals shifted from a tone of encouraging participation to one of seeking support for science.[601] The *Eozoön* controversy shows that certain members of the scientific community sought to exclude or limit contributions not only from the lay public, but also from outlying members of that community. My analysis of *Eozoön* also supports the suggestion that periodicals provided a space for controversy and for unorthodox views in science which was not necessarily available in societies.[602] All of the participants in the *Eozoön* controversy demonstrate an understanding of the effective use of print media for promoting their views and establishing their own credibility. The *Eozoön*ists in particular voiced anxiety over their inability to control the print coverage of anti-*Eozoön* views. Thus the periodical is seen as a vital, but volatile, tool in establishing a fact among the scientific community.

Nineteenth-century periodicals were crucial to constructing scientific credibility by introducing, spreading and reinforcing scientific claims. The variety of audiences addressed and publication schedules meant that scientific information could be reconfigured in almost infinite ways. For example, James Mussel has

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the nineteenth-century periodical: reading the magazine of nature (Cambridge, 2004); G. Cantor and S. Shuttleworth (eds), *Science serialized: representations of the sciences in nineteenth-century periodicals* (London and Cambridge, MA, 2004); G. Cantor, S. Shuttleworth and J. R. Topham, 'Representations of science in the nineteenth-century periodical press', *Interdisciplinary Science Reviews*, 28 (2003), pp. 161-168.

[599] See W. H. Brock and A. J. Meadows, *The lamp of learning: two centuries of publishing at Taylor & Francis* (London, 1998).

[600] Sheets-Pyenson, 'A measure of success'; Sheets-Pyenson, 'Popular science periodicals'; Barton, 'Just before *Nature*'; Brock and Meadows, *The lamp of learning*; Meadows, *Science and controversy*; Cantor, Dawson, Gooday, Noakes, Shuttleworth and Topham, *Science in the nineteenth-century periodical: reading the magazine of nature*; Cantor and Shuttleworth (eds), *Science serialized*; Cantor, Shuttleworth and Topham, 'Representations of science'; D. E. Allen, 'The struggle for specialist journals: natural history in the British periodicals market in the first half of the nineteenth century', *Archives of Natural History*, 23 (1996), pp. 107-123.

[601] Barton, 'Just before *Nature*'; Sheets-Pyenson, 'Popular science periodicals'.

[602] Brock and Meadows, *The lamp of learning.*

shown how the wide coverage of scientific meetings in the chemical press varied in speed and depth depending on the needs of the magazine.[603] This was because many periodicals were not simply a rehashing of society proceedings, but rather a separate intellectual sphere in which original scientific contributions were made and scientific news was reconfigured for a specific audience. Scientific men understood the power of publishing and the uses of different types of publications. It was a scientific *weekly* that the X Club desired as a venue for their ideas, offering both speed and space for the development of reflective discussion.[604] The diversity of publications and printing schedules meant that strategy could be employed in order to circulate one's views among the desired audience within the desired time frame. Both the *Eozoön*ists and King and Rowney were aware of this, as is demonstrated by their approach to the presentation of their views on *Eozoön*.

Dawson and his primary London-based support, Carpenter, proceeded through the established scientific channels: they first sought scientific approval by presenting their ideas to respected scientific societies and prominent men of science. Only after articles appeared in learned periodicals did the *Eozoön*ists provide a popular representation of *Eozoön* in the *Intellectual Observer*. The announcement of *Eozoön* to various publics was accompanied by the endorsement of formidable scientific figures such as Charles Lyell and Roderick Murchison. By contrast, King and Rowney made an announcement of their intention to disprove the organic origin of *Eozoön* through the popular outlet of the weekly *Reader*. This was not followed by a scientific paper for a number of months, but immediately sparked a heated debate in the pages of the *Reader* which was then noticed in a wide variety of other media. King and Rowney were therefore able to create anticipation for their paper and be certain that it would make an impact.

When Dawson and Logan began their *Eozoön* campaign they did so with an announcement at the British Association for the Advancement of Science

[603] J. Mussell, 'Taking Time: Late Nineteenth-Century Chemistry and the Rhythm of the Periodical Press', presented at *BSHS 2004*.
[604] Barton, '"Huxley, Lubbock, and half a dozen others"'.

(BAAS) meeting in Bath on 15 September 1864.[605] Although their results had already been reported in the *Canadian Naturalist*, the BAAS meeting ensured that they were introduced to the British geological elite. These annual events received wide press coverage and notices of their paper appeared in many periodicals, scientific and popular, as well as the newspapers.[606] Aiding their cause were the remarks in favour of *Eozoön* made by Lyell in his presidential speech, as this was often the only part of the meeting reproduced in full.[607] After communicating their results to the British Association in September, the *Eozoön*ists moved to London where they recruited further scientific support from William Carpenter (to whom Lyell had sent specimens) and presented a barrage of proofs of *Eozoön* to the Geological Society in November.[608] These papers appeared in February of 1865 in the *Quarterly Journal of the Geological Society*. The time delay was perhaps unfortunate, but the prestige of the journal and the implied acceptance of *Eozoön* by the Geological Society was significant for establishing *Eozoön* as a fossil and an important discovery.

Dawson remained in England until at least December, and Logan stayed until May of 1865.[609] While there, they made excellent use of their time to garner as much coverage for *Eozoön* among the metropolitan scientific community as possible: they moved from one London scientific body to the next. Soon after *Eozoön*'s appearance in the Geological Society, Carpenter read a paper on the subject to the Royal Society which he accompanied with a microscope and slides for the viewing of the members.[610] In his paper Carpenter remarked 'I cannot

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[605] *Report of the 34th meeting of the British Association for the Advancement of Science; held at Bath in September 1864* (London, 1865).
[606] Coverage of the BAAS and specifically Dawson and Logan's paper appeared, for example, in 'Reports of proceedings', *The Geological Magazine*, 1 (1864); 'Meeting of the British Association in Bath', *The Intellectual Observer*, 6 (1864), pp. 219-24.
[607] See for example 'Microscopical soiree by the Bath and Bristol societies, assembly rooms, Bath-September 20, 1864', *Quarterly Journal of Microscopical Science*, 5, new series (1865), p. 73.
[608] J. W. Dawson, 'On the structure of certain organic remains in the Laurentian limestones of Canada', *Quarterly Journal of the Geological Society*, 21 (1865), pp. 51-9; W. B. Carpenter, 'An additional note on the structure and affinities of *Eozoön Canadense*', *Quarterly Journal of the Geological Society*, 21 (1865), pp. 59-66; W. E. Logan, *Quarterly Journal of the Geological Society*, 21 (1865), pp. 45-51; S. Hunt, *Quarterly Journal of the Geological Society*, 21 (1865), pp. 67-71.
[609] See Harrington, *Life of Sir William E. Logan*, pp. 365-79.
[610] Ibid., p. 374; W. B. Carpenter, 'On the struture and affinities of *Eozoön Canadense*' *Proceedings of the Royal Society*, 13 (1863-4), pp. 545-9.

doubt that your attention has been drawn to the discovery announced by Sir Charles Lyell in his presidential address at the late meeting of the British Association…', indicating the significance of this speech to spreading interest and knowledge of *Eozoön* among the scientific community.[611] Popularisations for an even broader audience followed. In March of 1865, Andrew Ramsay presented both a working-class and middle-class lecture at the Royal Institution, for which he specially prepared a poster-sized reconstruction of *Eozoön* and brought along specimens for examination.[612] Popular lectures were accompanied by popular articles: geologist T. Rupert Jones announced the discovery of *Eozoön* in the *Popular Science Review* in April, accompanied by ten illustrations, and Carpenter provided an article for the *Intellectual Observer* in May which included one colour and numerous black and white illustrations.[613] In his article Carpenter gave a history of the discovery as well as a reconstruction, visual and verbal, of a living *Eozoön*. Carpenter presented *Eozoön* as an established creature, claiming that he and Dawson were 'able to *reconstruct* our *Eozoön* with at least as much certainty as the comparative anatomist can restore an Iguanadon or a Plesiosaurus.'[614]

Dawson and Carpenter's approach to publishing articles demonstrates a concern for scientific prestige, but also an understanding of how to gain significant attention for a discovery through the use of print and personal presentation. Lyell's speech to the BAAS gave *Eozoön* a highly public platform, but his credentials insured that it was also an approved scientific one. 'Popularisation' of *Eozoön* only occurred after its scientific credibility seemed to be established by a slew of supporting papers (published or presented to societies). King and Rowney took an almost opposite approach, opting to first publicly declare their disbelief of *Eozoön* in a popular print forum and then publish a scientific paper.

King and Rowney's strategy was affected by their location: unable to represent themselves at meetings of societies they relied on the printed word both to

[611] Carpenter, 'On the struture and affinities of *Eozoön Canadense*', p. 545.
[612] Harrington, *Life of Sir William E. Logan*, p. 376; A. C. Ramsay, 'On the *Eozoön* and the Laurentian rocks of Canada', *Proceedings of the Royal Institution*, (1865), pp. 374-7.
[613] Carpenter, 'On the structure'.
[614] Ibid., p. 291.

receive news of *Eozoön* and to present their own views. We have already seen how throughout the nineteenth-century the Galwegians strove for further connections with the British Empire, achieving success with the railway but not with the telegraph or packet station. Print, however, was a readily available medium for keeping in touch with affairs outside of Connaught and Ireland. The major attraction of a mechanic's institute or local society was often the contents of its newspaper room, allowing the members to obtain the latest information from all parts of the British Empire, but especially London. Galway's learned bodies were no different. The Queen's College, the Royal Galway Institution and the Galway Mechanic's Institute all had subscriptions to major London papers, literary magazines and some scientific periodicals.[615] Individuals occasionally had their own subscriptions which were usually shared among friends. A professor summering in England might pass a favourite publication on to a friend who had remained in Galway.[616] King seems to have been particularly fond of magazines. In his old age he was the victim of a stroke and when his colleague, D'Arcy Wentworth Thompson, visited him 'He was sitting in his arm-chair with a lot of weekly magazines on a table by him'.[617] Perhaps later in life they served merely as a means of passing the time, but during his active scientific career, periodicals were King's link with the rest of the scientific community. His relative poverty, compared to Dawson, meant that extensive sojourns in England were not always possible. Instead King used the savvy placement of his views in a range of periodicals to ensure that he stamped his name on the *Eozoön* controversy.

The *Reader* was the first location in which King and Rowney voiced their opinion on *Eozoön* (see Figure 6.4 for their letter to the editor). I will focus on the development of the controversy in this periodical for two reasons: it is revealing of the manner in which material circulated between journals, societies and individuals and it has not been the focus of previous analyses of the

[615] Neswald, 'Science and sociability'; Thompson, *A series of alphabetical catalogues of books contained in the library of Queen's College, Galway; arranged according to departments* ; *Catalogue of books and periodicals in the library of the Royal Galway Institution* (Galway, 1856).
[616] For example, John Cairnes sent London magazines back to William Nesbitt while in England. Cairnes Papers.
[617] D'Arcy Thompson Sr to D'Arcy Thompson Jr, 20 May 1883?, Thompson Papers.

controversy. The liberal London weekly had been the pet project of the 'X Club', an elite group of men of science which included John Tyndall, Thomas Huxley, John Lubbock, George Busk and Joseph Hooker.[618] The paper targeted a middle-class audience, able to afford a 4*d* weekly issue.[619] Each issue noticed books published during the week, with reviews of those the editors felt were worthy of extra attention. In addition there were editorials on politics, proceedings of London societies and articles on scientific subjects.[620] The *Reader* had been in existence for about two-and-a-half years by the time King placed his refutation of *Eozoön* in it. In his letter, King emphasised the fact that the *Reader* was 'widely-circulated' as a reason for placing the notice there and stated that 'We purpose [sic] at an early opportunity to lay before the public all the evidences and considerations which bear us out in our present opinion.'[621] Thus the notice, which contained no scientific data, was simply a place holder, a declaration of intent. King had chosen the space for his declaration wisely, and the letter to the editor was subsequently reprinted in full in the *Popular Science Review*, *Hardwicke's Science Gossip*, the *Galway Vindicator*, the *Quarterly Journal of Microscopical Science* and the *American Journal of Science*.[622]

King's appeal to 'the public' as the audience for the determination of a scientific debate was not necessarily standard. After all, Dawson and Carpenter had not attempted to bring *Eozoön* to the notice of 'the public'. Instead, they had presented it to the British Association, the Geological Society and the Royal Society. The fact that it became of interest to the public was the result of its approval by elite men of science, not by a direct appeal to the public by Dawson or Carpenter. Only *after* scientific papers had been presented did Carpenter prepare a 'popular' version of the work for the *Intellectual Observer*. This was not the first time that King had, in the minds of his peers, inappropriately

[618] Barton, '"Huxley, Lubbock, and half a dozen others" '.
[619] *Hardwicke's Science Gossip* was just 4*d* for a larger monthly issue.
[620] 'Front matter', *The Reader*, 1 (1863), p. i.
[621] King and Rowney, 'The *Eozoön Canadense*'.
[622] '*Eozoön Canadense* not a fossil', *Popular Science Review*, 4 (1865), p. 514; 'The *Eozoön* Canadense', *Hardwicke's Science Gossip*, 10 (1865), p. 164; 'On the history of *Eozoön* Canadense', *Americal Journal of Science*, 40 (1865), pp. 344-362; 'Miscellaneous: *Eozoön Canadense*', *Quarterly Journal of Microscopical Science*, 5, new series (1865), p. 224; *Galway Vindicator*, 17 June 1865.

addressed the public. In his encounter with King over the H. M. S. *Porcupine* soundings, Wallich had complained to the editors of the *Nautical Magazine* that

> Already your widely circulating journal will have afforded Professor King's "Preliminary Notice", in your issues for November and December, a publicity far beyond that I can command for those writings of mine from which he has so largely, and without the slightest acknowledgement, borrowed.[623]

Men of science acknowledged the potential power of presenting one's views before a wide audience and were wary of those whom they believed to have abused this power. In the ensuing exchange between King and Carpenter in the *Reader*, Carpenter felt compelled to continue the debate on the grounds that 'the confidence with which Professor King reiterates his denial of the organic structure of that fossil may not improbably have some weight with such of your readers as are unacquainted with the following piece of scientific history' and proceeded to bring a previous encounter with King to the attention of the 'public'.[624]

The role of the audience in deciding the 'winner' in the *Eozoön* controversy was unclear. While articles discussing the subject appeared in journals, such as the *Reader*, which were not limited to a scientific audience, Carpenter claimed that he would 'leave the decision [on the origin of *Eozoön*] altogether with the *scientific* public'.[625] King also deferred to the judgement of the public, but without the requirement that it be scientific. In ending the exchange in the *Reader*, Carpenter declared that 'This question will, of course, have to be decided by the scientific world upon its own merits, when all the materials for such decision shall have been made public.'[626] Yet Carpenter wished the decision on the question of *Eozoön* to be decided not just on the scientific material itself, but 'whether Professor King or myself is more likely to be a competent interpreter'.[627]

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[623]Wallich, 'Professor King's "Preliminary Notice of the Porcupine's Soundings" Considered by Dr. Wallich', p. 26.
[624] W. B. Carpenter, 'The *Eozoön Canadense*', *The Reader*, (1865), p. 45.
[625] Ibid. Emphasis mine.
[626] Ibid., pp. 325-326, p. 325.
[627] Ibid., p. 45.

The *Reader*'s frequency of publication also made it a good choice for King and Rowney's first announcement on *Eozoön*. Societies such as the Geological Society printed their transactions at a leisurely pace, so getting the latest scientific news quickly relied on meeting reports appearing in other publications. For example, Dawson and Carpenter read papers to the Geological Society on 23 November 1864. The issue of the *Quarterly Journal of the Geological Society* which contained the paper did not appear until 1 February 1865. A report of the meeting and summaries of the papers, however, appeared in the *Geological Magazine* on 7 January, 1865. The meeting also appeared in the *Reader*, a mere 10 days after its occurrence. The weekly publication of the *Reader* insured that a number of less frequent periodicals picked up content from its pages: for example the *Popular Science Review* appeared quarterly and *Hardwicke's Science Gossip* monthly. Yet weekly news was not so stale that it was not of interest to more frequent publications such as the thrice weekly *Vindicator*. Just as the full coverage of *Eozoön*'s announcement at the BAAS generated interest among the scientific community, the wide coverage of King and Rowney's refutation generated interest in their forthcoming paper. Reporting on the controversy in the *Reader*, the *Popular Science Review* remarked sarcastically that 'We await Professor Rowney and King's "evidences" in extreme anxiety'.[628]

The *Reader*, probably due to editorial guidance, became a choice location for conducting controversies. King's colleague in Galway, the political economist John Eliot Cairnes, used it to voice his opinions about the American Civil War and university education in Ireland from 1863 to 1865.[629] A believer in mixed education, Cairnes actively supported the Queen's Colleges and was against their incorporation into an examining university with the Catholic University. However, by October of 1865 he feared there was no paper in London that would print his views bar the *Reader*.[630] Also in 1865, a controversy over Alpine geology erupted between John Ruskin and Professor Joseph Beete Jukes in the *Reader*.[631] Finally, a dispute between Murchison and his former protégé, James

[628] '*Eozoön Canadense* not a fossil'.
[629] Cairnes Papers.
[630] Cairnes to William Nesbitt, 2 October 1865, Cairnes Papers.
[631] 'The controversy upon English and alpine geology', *Popular Science Review*, 4 (1865), p. 245.

Nicol, was also aired in the pages of the periodical. Nicol, having received a professorship in Aberdeen through Murchison's assistance, showed himself ungrateful by failing to sufficiently reference his benefactor's work.[632]

As the *Reader* was not a strictly scientific journal and the notice presented by King and Rowney took the informal format of a letter to the editor, this paved the way for an exchange of vituperative remarks. While there is no evidence to suggest that King wanted to incite Carpenter to ungentlemanly language and insult, he might have easily anticipated the response from their earlier dispute. Where other scientific journals eschewed a dispute in which 'personalities' rather than sober judgement might prevail, the *Reader* embraced them. This is demonstrated by the *Eozoön* debate: remarks of a personal nature were often limited to communications in the *Reader* and were kept out of articles in other periodicals. Carpenter's reply to King and Rowney's letter paraded his disdain for King, claiming that he awaited not proof of the inorganic nature of *Eozoön*, but 'proof of his competence to estimate the value of the evidence in this branch of scientific inquiry'.[633] Carpenter further impuned King's character, saying he 'must rank him in the same category with those sagacious persons who still maintain that the flint implements were shaped out by a fortuitous succession of accidental blows, and not by human handiwork.'[634]

The more specialist *Annals and Magazine of Natural History* also welcomed controversy.[635] This journal had harboured King and Carpenter's previous dispute over the perforation/pitting of *Rhynchonella*. The editors were induced to allow the disputants a second airing of their conclusions, as the *Eozoön* debate spilled over into a question of prior scientific credibility. In this context, King encouraged Carpenter to confine remarks of a personal nature to the *Reader* and to comment only on the scientific question at hand, saying 'I wish it to be understood that I have no desire to enter on a controversy with Dr. Carpenter in your pages' and admonishing Carpenter that he would 'have ample opportunity of adding any other matters in the "Reader," in which he has already introduced a

[632] Murchison to Harkness, 8 March and 10 April 1866, Harkness Papers.
[633] Carpenter, 'The *Eozoön Canadense*'.
[634] Ibid.
[635] Brock and Meadows, *The lamp of learning*, p. 106.

"personal discussion"'.[636] Carpenter's attacks allowed King to present himself as the sober gentleman by contrast. In replying to Carpenter in the *Reader*, King called him 'undignified and intemperate' and objected strongly to Carpenter's insults directed at his colleague (Rowney).[637] Carpenter clearly did not regard letters in the *Reader* as the proper venue for establishing scientific authority. However, his angry letters probably served to erode his own authority further than he imagined. The *Quarterly Journal of Microscopical Science* noted that King had 'exacted Dr Carpenter's ire by daring to doubt that *Eozoön canadense* is an organic phenomenon'. King was judged to have replied 'very amply' to Carpenter's accusations.[638] Not surprisingly, the *Galway Vindicator* sided with the local men:

> We do not see why Professors King and Rowney, if they feel the conviction of being in the right, should be abused for having published an opinion opposite to that entertained by other scientific men. It would appear that Dr Carpenter lays claim to being an infallible authority…[639]

Indeed, each side's assertion of their own authority to pronounce on *Eozoön*, as opposed to the scientific merits of the question, quickly became the focus of the controversy. Carpenter felt that King and Rowney lacked such authority. King claimed that authority alone could not decide a scientific question.

In their printed papers the *Eozoön*ists attempted to undermine the credibility of King and Rowney by referring to King and Rowney's isolated location in Galway. Thus Carpenter used the format which kept the 'Galway professors' informed of scientific developments to dispute whether science from such a remote provincial source could be trusted at all. In his first repudiation of King in the *Reader*, Carpenter claimed support from 'the many accomplished naturalists of this metropolis'.[640] In his final letter in the series of exchanges Carpenter declared that *Eozoön* was 'denied only by a Galway professor', indicating that King's location introduced some doubt into his reliability as a source of scientific information. Carpenter was not the only one to make such a

[636] King, 'Two specimens of *Rhynchopora Geinitziana*', p. 124.
[637] W. King, '*Eozoön* Canadense', *The Reader*, (1865), p. 715.
[638] 'Quarterly chronicle', *Quarterly Journal of Microscopical Science*, 5, new series (1865), pp. 280-284, p. 280.
[639] *Galway Vindicator*, 25 June 1865.
[640] Carpenter, 'The *Eozoön Canadense*'.

claim. The *Popular Science Review*'s notice (probably written by geologist T. Rupert Jones) referred to King and Rowney sarcastically as a 'light from the far West', ridiculing the notion that anything scientific could issue forth from such a remote region.[641] No doubt King and Rowney found this irksome, as they certainly needed no reminder of their distance from home.

While the *Reader* was significant for breaking the news of the *Eozoön* controversy and for the highly publicised and angry exchange between King and Carpenter on the subject, the question of *Eozoön* was discussed in more detail in other publications. Although King and Rowney had attracted significant attention for their views, the *Eozoön*ists managed, for several years, to limit the impact of their contributions in a variety of other periodicals. The Geological Society allowed King and Rowney to present their views (although they could not read their paper in person) and even printed them in the *Quarterly Journal*, but Carpenter was given access to the paper in advance. He was therefore able to prepare and present counter claims, in person and in print, to each of their arguments.[642] The *Geological Magazine* and the *Popular Science Review* came out clearly in favour of *Eozoön* and, despite naming King on their covers as a contributor, never printed (or re-printed) an article of his on the subject.[643] Dawson even chastised the editor of the *American Journal of Science* for overly-publicising King and Rowney's views in his journal and requested better coverage of his own. The editor replied that he 'had published scarcely any thing in the journal on *Eozoön* excepting your views and Hunt's'.[644]

King and Rowney turned to the Royal Irish Academy for a full presentation of their views on *Eozoön*. Perhaps they felt that in this venue they would be shown more support than they had been in the Geological Society, or perhaps the paper had been rejected by other possible outlets. None of the *Eozoön*ists seem to have

[641] '*Eozoön Canadense* not a fossil'.
[642] King and Rowney, 'The "*Eozoön*al rock" '; W. B. Carpenter, 'Supplemental notes on the structure and affinities of *Eozoön* Canadense', *Quarterly Journal of the Geological Society*, 22 (1866), pp. 219-228.
[643] See for example the cover pages to the *Popular Science Review* volume 4 (1865) and the *Geological Magazine* volume 1 (1865).
[644] James D. Dana to Dawson, 10 March 1872, Dawson Papers. 'Hunt' is T. Sterry Hunt, another employee of the Canadian Geological Survey.

initially felt that a reply to the paper in the *Proceedings of the Royal Irish Academy* was necessary.[645] However, King and Rowney published two other papers (in 1870 and 1871). This sudden domination of a journal by the anti-*Eozoön*ists attracted a response from Dawson and from Hunt. Dawson claimed that 'I think it necessary, in the interest of truth, to ask permission to place on the record, in the "Proceedings" of the Society which has published Professors King and Rowney's paper, some of my reasons for dissenting from their conclusions'.[646] Yet Dawson and Hunt were not satisfied that coverage in this journal was sufficient and they sought to further publicise their replies to King and Rowney in other publications.[647]

Both King and Rowney and the *Eozoön*ists used the periodical literature to present their case in front of a variety of audiences. The *Eozoön*ists not only presented scientific information but repeatedly appealed to their own (or their supporters') authority. Carpenter, for example, presented Dawson to the readers of the *Intellectual Observer* as 'the accomplished principal of McGill University'. Just as Lyell promoted *Eozoön* in his address to the BAAS, so did the presidents of the Geological Society each year endorse *Eozoön* in their annual introductory lecture, reprinted in the *Quarterly Journal*.[648] Carpenter even resorted to listing the Irish colleagues of King's whom he had persuaded over to his point of view.[649] King and Rowney were not above scientific 'name-dropping': they considered it a major coup when a posthumous letter (reproduced in the *Annals*) from the German zoologist Maz Schultze seemed to confirm that he had changed his position on *Eozoön* to that of a disbeliever, thus stripping Carpenter of a supporter.[650] Aside from brandishing names of supporters, both

[645] King and Rowney's first paper appeared in 1869. See W. King and T. H. Rowney, 'On "*Eozoön* Candense"', *Proceedings of the Royal Irish Academy*, 10 (1866-69), pp. 506-551. It was not until they published a second paper in 1871 that a reply appeared from the *Eozoön*ists. See King and Rowney, 'On the mineral origin'.
[646] J. W. Dawson, 'Note on eozoön (in reply to Professors King and Rowney)', *Proceedings of the Royal Irish Academy*, 1 (2nd ser.) (1871), pp. 117-121, p. 117.
[647] Hunt to Dawson, n.d. [ref. 2211/37], Dawson Papers.
[648] W. Hamilton, 'Anniversary address of the president', *Quarterly Journal of the Geological Society*, 21 (1865), pp. xxx-cxvi; W. Hamilton, 'Anniversary address of the president', *Quarterly Journal of the Geological Society*, (1866).
[649] W. B. Carpenter, 'Final note on *Eozoön Canadense*', *Annals and Magazine of Natural History*, 14, 4th series (1874), pp. 371-372.
[650] M. Schultze, 'Latest observations on *Eozoön Canadense*', *Annals and Magazine of Natural History*, 13 (1874), pp. 379-80.

sides of the *Eozoön* controversy also made the use of the microscope as an important element in determining scientific credibility. Proper microscopical technique for seeing *Eozoön* was urged in articles by the *Eozoön*ists, and they attempted to undermine the technique of King and Rowney. King and Rowney, by contrast, tried to undermine the authority of the instrument itself.

Under the microscope

At the same time as the print arena for science was expanding, some scientific tools such as the microscope were beginning to be produced cheaply and spread widely.[651] The role of the microscope in the *Eozoön* controversy is especially interesting in the context of the wide periodical coverage which the controversy received. The microscope, like the periodical, crossed boundaries between specialist and lay scientific audiences. It was frequently the subject of discussion in popular science periodicals which actively advocated its use by the amateur or hobbyist.[652] Just as cheaper paper and new printing techniques made print media available to a wider audience, the repeal of the glass tax and improvements in construction made the microscope available to many in the nineteenth century.[653] The reduced cost of reproducing illustrations and increased interest in the instrument contributed to a rise in publications which featured microscopical work.[654] Despite the presentation of images as 'true' reproductions of what was seen under the microscope, disputes continued to arise. The microscope was used in a wide range of disciplines, therefore questions arose as to whether a microscopist should comment on any subject that involved the reliable use of their favourite instrument or only on subjects in their field of scientific knowledge. Debates over microscopical authority were argued in the 'public' forums of scientific and popular journals and furnished with conflicting illustrations of revealed 'truth'. Thus the use of the microscope to identify

[651] Gooday, 'Nature in the laboratory', ; D. E. Allen, *The naturalist in Britain: a social history* (Princeton, New Jersey, 1994); L. Barber, *The heyday of natural history 1820-1870* (London, 1980).
[652] Gooday, 'Nature in the laboratory'.
[653] G. L. E. Turner, *The great age of the microscope: the collection of the Royal Microscopical Society through 150 years* (Bristol, 1989); G. L. E. Turner, *Essays on the history of the microscope* (Oxford, 1980), pp. 159-83.
[654] W. H. Brock, 'Patronage and publishing: journals of microscopy 1839-1989', *Journal of Microscopy*, 155 (1989), pp. 249-266; Turner, *History of the microscope*, pp. 215-32.

Eozoön canadense as a fossil foraminifera was problematic. The excitement generated by the discovery, and the wide availability of the microscope, meant that examples of *Eozoön* could and would be examined by many others. Some of these individuals, such as King and Rowney, did not agree with the conclusions of the *Eozoön*ists.

Despite the efforts of the *Eozoön*ists, the nature of the microscope and its use contributed to the difficulty of reaching a consensus on the organic origin of *Eozoön*. Dawson and Carpenter had little more than their reputations to use as proof of the superior accuracy of their microscopical observations to that of their opponents. While they could appeal to the authority of the geological community, there was no similar authority for the microscopical community. King and Rowney exploited this fact to enter and perpetuate the controversy. However, the *Eozoön*ists, and Carpenter in particular, focussed attention on what they perceived to be King's lack of skill with the microscope. In their defence, King and Rowney argued that matters of magnification and resolution were immaterial and that the *Eozoön*ists continued to see only what they wanted to see. The *Eozoön*ists were persuasive not by visual evidence, but by force of their reputations, King and Rowney claimed.

In their early descriptions of *Eozoön*, the *Eozoön*ists claimed that seeing *Eozoön* required skill, precision and the correct tools. For example, in his paper to the Geological Society of London, Dawson noted that the specimens of *Eozoön* of which he spoke

> were prepared by the lapidary of the Survey, and were carefully examined under ordinary and polarized light, with objectives made by Ross and Smith & Beck, and also with good French objectives.[655]

Dawson's paper described in detail the microscopic structure of *Eozoön,* which he had determined after Logan sent him the samples in 1864. Logan claimed that Dawson had been consulted because of his known skill with the microscope. Dawson acknowledged the difficulty of seeing such structures, saying that they could 'be made out only by the careful study of numerous slices, and in some

[655] Dawson, 'On the structure', p. 51.

instances only with polarized light'.[656] The accompanying plates served as a guide for those seeking to examine the structure of *Eozoön* for themselves. To further ensure that other microscopists were able to see *Eozoön* as they did, Dawson and Logan had arrived in London equipped with prepared slides and samples. These samples were presented alongside their paper for Section C of the British Association meeting in Bath.[657] Members of the section could use the microscopes available (possibly on loan from the societies who had hosted the microscopical soiree) to see *Eozoön* for themselves, under the watchful guidance of Dawson and Logan.

In a further acknowledgement of the potentially difficult nature of microscopical discoveries, the *Eozoön*ists attempted to establish credibility with a mountain of scientific authority. Dawson and Logan had sought the support and expertise of the Canadian Geological Survey's chemist, Sterry Hunt, as well as the renowned microscopist and physiologist, William Carpenter. Carpenter and Hunt also contributed papers to the Geological Society on their observations of *Eozoön*. The verification of *Eozoön* represented the interdisciplinary nature of microscopy: two geologists, a chemist and a physiologist gave the first authoritative accounts of its structure. Ambiguities in the microscope and the visibility of *Eozoön* were to be overcome by trust in the *Eozoön*ists' reputations and methods, as well as guided observation of specimens.

Throughout the controversy, supporters of *Eozoön* emphasised the authority and observational skills of the primary *Eozoön*ists and denigrated those of their opponents. The microscope was declared to unambiguously reveal the organic structures that Dawson and Carpenter saw. Carpenter, as the author of *The Microscope and Its Revelations*, a popular manual of microscopy that went into many editions, believed his authority on microscopy to be unimpeachable. The *Eozoön*ists, but especially Carpenter, went to great lengths to undermine King and Rowney's authority to pronounce on *Eozoön*. Thus Carpenter immediately brought forward a previous dispute with King over the microscopic structure of a fossil brachiopod in the *Rhynconella* genus. In this dispute, Carpenter claimed

[656] Ibid., p. 55.
[657] Harrington, *Life of Sir William E. Logan* , p. 365.

that King, despite all evidence to the contrary, insisted on maintaining that the shells of these fossils were perforated rather than simply pitted. Carpenter was outraged at this 'audacity', as his claim was supported by thirteen illustrations of thin sections 'drawn by that very accurate microscopic draughtsman, Mr. S. M. Leonard' and his 'observations [were] made with every advantage of first-rate instruments and careful preparation of specimens'.[658] King, by contrast, had confined himself to 'glances with a hand-magnifier'.[659] Carpenter extrapolated to the *Eozoön* controversy, claiming King to be incompetent to pronounce on this matter as well. Having undermined King's ability to prepare and examine specimens, he claimed that the fact that King's preparations did not show foraminiferal structures was simply a fault of the preparations. Carpenter offered King the free examination of his specimens and comparison with his figures and descriptions, so long as they remained in Carpenter's possession. Thus Carpenter could supervise King's examination of *Eozoön* in order to be certain that King accorded with his own idea of good microscopical practice.

Perhaps taking their cue from Carpenter, others declaimed King and Rowney's ability to pronounce on the microscopic structure of *Eozoön*. The *Popular Science Review* stated that 'no one who is capable of using a microscope or is familiar with animal history should doubt' the animal characteristics of *Eozoön*.[660] Dawson, Logan, Carpenter and Hunt's observations were greeted with enthusiasm at the Geological Society. King and Rowney's counter claims, however, were unconvincing.

> They will have it, despite the opinion of those who are experienced in microscopic observation, that *Eozoön* is the result of something which they term mineral segregation. However, they have not found any supporters, and the able paper which was read by Dr. Carpenter immediately after theirs has served to convince us more than ever that *Eozoön* is a foraminiferous fossil.[661]

[658] William B. Carpenter, 'The *Eozoön* Canadense', *The Reader*, 8 July 1865, p. 45.
[659] Ibid.
[660] '*Eozoön Canadense* not a fossil'.
[661] 'The structure and affinities of *Eozoön*', *Popular Science Review*, 5 (1866), pp. 237-238.

Thus King and Rowney's authority to comment on a microscopical matter was directly undermined by the fact that their opponents were viewed as more experienced or capable with the microscope.

Carpenter, Dawson and Logan, despite the claims above, were not content to leave confirmation of their results idly in the hands of any person 'experienced in microscopic observation'. Instead, they systematically recruited supporters by the strategic dispersal of specimens which they had specially prepared. In 1865 Carpenter donated eight slides of *Eozoön* to the Microscopical Society of London.[662] Geologist and editor of the *Geological Magazine,* T. Rupert Jones compared Connemara samples to Canadian ones given by Carpenter and Logan.[663] As already mentioned, Logan and Dawson were accompanied to England in 1864 by numerous *Eozoön* specimens, some of which were displayed at the British Association meeting in Section C. One was deposited by Logan in the Jermyn Street geology museum.[664] Carpenter showed numerous slides under the microscope during his paper to the Royal Society in 1864.[665] Lyell passed selected specimens on to the head of the Geological Survey of Bavaria, Dr Gumbel. With this aid, Gumbel was able to supply Lyell with examples of *Eozoön* from Bavaria.[666] As late as the 1870s, members of the Canadian Geological Survey were given samples to distribute upon trips to England.[667] Not only supporters were given such generosity. In their 1869 paper to the Royal Irish Academy, King and Rowney acknowledged specimens given to them by Carpenter.[668] Through distribution of specimens prepared by themselves, the *Eozoön*ists were confident that scientific men would support their views. Logan remarked at the close of his 1864-65 visit to England that 'There is now no one that I know who has seen the specimens and does not believe them to be fossils, so I think that *Eozoön* is pretty well established.'[669] Carpenter even included a description of *Eozoön* in his 1868 edition of *The Microscope and its*

[662] 'Proceedings of societies', *Quarterly Journal of the Microscopical Society*, 5 (1865), p. 289.
[663] Sanford and Jones, 'Correspondence'.
[664] Harrington, Bernard James, *The Life of Sir William E. Logan: chiefly compiled from his letters, journal and reports* (Montreal, 1883).
[665] Ibid.
[666] Lyell to Dawson, 15 December 1865, Dawson Papers.
[667] T. C. Weston to Dawson, 10 November 1876, Dawson Papers.
[668] King and Rowney, 'On "*Eozoön* Candense" '.
[669] Harrington, *Life of Sir William E. Logan* , p. 374.

Revelations.[670] The *Eozoön*ists knew that generating a consensus on a microscopical discovery was not thoroughly straightforward and required intervention to be achieved. King knew that even what consensus there was could be challenged.

The *Eozoön*ists gave the impression of placing great faith in the microscopical skills of their camp. However, the Connemara limestone presented them with problems. One of the staunch supporters of *Eozoön*, T. Rupert Jones, had examined this rock and declared it to contain *Eozoön*. Jones described to the readers of *The Geological Magazine* how to see *Eozoön* in the Connemara marble:

> the peculiar structure, at first sight merely granular (where the mass is more green than white), but showing to the practiced eye green stony matter replacing tiers of many-segmented 'Sarcode', together with delicate greenish-white threads for 'pseudopodial filaments' and for 'stolons', of the different sizes and in the different positions peculiar to the structure of *Foraminifera*, can readily be detected.[671]

Jones's 'practiced eye' had generated an aberrant result, as some of the geological supporters of *Eozoön* were quite uncomfortable with the idea of its appearance in Connemara marble. These rocks were not supposed to be of the same age as the Laurentian group in Canadian and were acknowledged to be highly metamorphosed, leaving little possibility for the preservation of fossils.[672] Thus the geological and microscopical evidence for *Eozoön* seemed to now be in contradiction. King claimed that the discovery of *Eozoön* in Connemara marble had induced him to enter the controversy. In fact, King and Rowney were joined by Lyell, Robert Harkness (professor of geology in Cork) and even Dawson (for a period) in doubting that *Eozoön* was contained in Connemara marble.[673] Lyell, however, kept his disapproval relatively quiet. King rightly saw the Connemara marble as a weakness for the *Eozoön*ists: if their reliable and practiced eyes were

[670] O. Hahn and W. S. t. Dallas, 'Is there such a thing as *Eozoön Candense*? a microgeological investigation', *Annals and Magazine of Natural History*, 17, 4th series (1876), pp. 265-282.
[671] Sanford and Jones, 'Correspondence', p. 89.
[672] Lyell to Dawson, 15 December 1865, Dawson Papers.
[673] Lyell to Dawson, 6 December 1865, Dawson Papers. See also R. Harkness, 'Reports and proceedings of the British Association for the Advancement of Science, Birmingham', *Geological Magazine*, 2 (1865), pp. 456-71, p. 471.

seeing *Eozoön*al structures in impossible places, perhaps they were neither reliable nor practiced.

Initially, King and Rowney also set out to prove that their use of the microscope was trustworthy. They claimed that the possession of a 'first-class binocular microscope' was an inducement to their interest in studying *Eozoön*.[674] This microscope was likely to have been Rowney's own, as King refers to borrowing it in order to examine specimens for a different dispute with Carpenter. King emphasised the care with which his observations had been taken, and gave a picture of himself and Rowney as the conscientious observers 'settled quietly before one of Smith and Beck's first-class binocular microscopes, and furnished with the best object-glasses and eye-pieces'.[675] King did not argue, however, as Carpenter did, that the best lenses were necessary to the best observation. By contrast, in the case of *Rhynchonella*, the 'first-class' microscope simply confirmed what King had seen with his simple hand lens.[676] King began by demonstrating his own microscopical ability. However, just as the *Eozoön*ists eventually reverted to criticising King's skill, King began to argue that Carpenter and the *Eozoön*ists had placed too much weight on microscopic observations and on their own authority.

King argued that Carpenter and Dawson were attempting to establish the fossil origin of *Eozoön* not on the basis of careful examination, but on the basis of their own, and their friends' authority. Authority, he claimed, could be mistaken. King 'could not regard him (Carpenter) otherwise than as a fallible being—like every one else'.[677] He had engaged in a previous microscopical dispute with Carpenter, as mentioned above, and felt that Carpenter had unjustly declared himself the victor. In response to Carpenter's accusations that he had observed carelessly with an unsuitable instrument, King claimed that Carpenter had repeatedly attempted to attack him simply by 'personalities'. In addition, King presented Carpenter as consistently trying to 'rig' the results by prejudicing outside judges. In the case of *Rhynconella*, King had nominated Mr Quekett (of

[674] King and Rowney, 'On "*Eozoön* Candense"', p. 507.
[675] King and Rowney, 'The "*Eozoön*al rock" '.
[676] King, 'Two specimens of *Rhynchopora Geinitziana*'.
[677] W. King, 'On the histology of *Rhynchopora geinitziana*', *The Reader*, (1865), pp. 211-212.

the Microscopical Society of London) and Mr Salter as independent authorities to examine his and Carpenter's specimens and determine the nature of the shell. Instead, King claimed, Carpenter presented only his own specimens to the men who duly concluded as Carpenter had argued, that the shells were simply pitted (rather than perforated, as King believed).[678]

Aside from trying to prove that Carpenter and the *Eozoön*ists were fallible, King also claimed that the microscope was only one means of examining the specimens. 'Besides "Microscopic Palaeontology," the subject involves Lithology, Mineralogy, and Chemistry' he argued.[679] The eye could be deceived, and a variety of scientific techniques were necessary to determine the origin of *Eozoön*. He demoted Carpenter's precious microscope to simply one tool of analysis among many. King, with the assistance of the chemist Rowney, claimed to have examined *Eozoön* from a number of perspectives. They found by comparison that the '*Eozoön*al structures' (tubular canals in-filled with calcium) occurred in many other minerals. They suggested a chemical explanation for this, claiming that a process of 'chemical segregation' which occurred during rock metamorphosis was responsible.

King consistently argued that the microscope could lead to false conclusions. This seemed to be confirmed by the debunking of Thomas Huxley's *Bathybius Haeckeli*. This supposed organism, dredged from the depths of the Atlantic, was also discovered by microscopic examination and later determined by chemical analysis to be simply a reaction between a mixture of animal remains, sea water and the alcohol they were preserved in.[680] *Bathybius* had been suggested by Carpenter as a potential relation of *Eozoön*, and King revelled in its exposure as an error.[681] 'It is a sad reflection', King wrote in the *Annals and Magazine of Natural History*, that *Bathybius* 'should have turned out to be no more than a mineral substance.' Further, he asked, 'Is it not significant that those who

[678] Ibid.
[679] King, '*Eozoön* Canadense'.
[680] P. F. Rehbock, 'Huxley, Haeckel, and the oceanographers: the case of *Bathybius haeckelii*', *Isis*, 66 (1975), pp. 504-533; Gould, 'Bathybius and *Eozoön*'.
[681] W. King and T. H. Rowney, 'Remarks on "The Dawn of Life", by Dr. Dawson; to which is added a supplementary note', *Annals and Magazine of Natural History*, 17, 4th series (1876), pp. 360-76.

accepted *Bathybius* are for the most part no-surrender champions of Eozoonism?'[682]

When King and Rowney announced their dissent from the views of Dawson, Carpenter and the *Eozoön*ists, they claimed to have looked in vain for the evidence of organic foraminiferal structure:

> It would have given us unalloyed pleasure, had we been able to state that our investigations have confirmed those of the eminent authorities to whom reference has been made, as it was purely in this spirit that we commenced our labours.[683]

The *Eozoön*ists by contrast, were not such careful observers.

> They tested their "creature of the dawn" with no independent testimony; contenting themselves, with a few trifling exceptions, by examining it from a *single point of view; even forgetting, in their excusable enthusiasm, to notice certain grave difficulties* they cannot but have observed, and which *notwithstanding our having pointed them out,* have been left unexplained, and still remain *an insurmountable obstacle* to the *thoughtful* acceptance of the "received doctrine".[684]

King and Rowney's papers deliberately appealed to the humble observer and declaimed the foundation of scientific truths based on 'mere authority'. In representing Carpenter and the *Eozoön*ists as microscopical 'bullies', King and Rowney received some support, albeit tepid, from the Microscopical Society's journal. Reporting on the continued controversy, the editor remarked that they had recently 'exacted Dr. Carpenter's ire by daring to doubt that *Eozoön Canadense* is an organic phenomenon'. King was judged to have replied 'very amply' to Carpenter's accusations over *Rhynchonella* and the journal referred to the brachiopod in question by King's species name rather than Carpenter's.[685]

King and Carpenter disagreed as to the status of the microscope as a tool for scientific discovery. For Carpenter, some microscopes and magnifiers were appropriate for the use of hobbyists and students while others were necessary for

[682] Ibid., p. 361.
[683]King and Rowney, 'The *Eozoön Canadense*', p. 660.
[684] King and Rowney, 'On "*Eozoön Candense*"', p. 545, emphasis in original.
[685] 'Quarterly chronicle'.

scientific investigation. Thus he selected the same Smith and Beck's top-of-the-line binocular microscope (for £20) for the use of William Logan and the Canadian Geological Survey as he himself used.[686] Discoveries could not be made and authorities could not be challenged without the use of high-end instruments. For King, the microscope was one tool among many and was susceptible to the fancies of its user. A man of science was not defined by the expense of his instruments and the prestige of his friends, but by the honest pursuit of truth. To King, the continued support for *Eozoön* among the geological community represented not a success, but a failure of the scientific method. King claimed in the quote introducing this chapter that 'mere authority' was a dubious basis upon which to establish scientific facts.[687]

A resolution and conclusions

Dawson's publication of *The Dawn of Life* in 1875 sparked another round of controversy, but it seems clear that by this time the *Eozoön*ists were losing ground. Between December 1875 and June 1876 the *Annals and Magazine of Natural History* published two scathing reviews of Dawson's book and a treatise against *Eozoön* by German naturalist Otto Hahn.[688] One of these reviews was by King and in it he accused Dawson not only of poor science in his unending support for *Eozoön*, but also of promoting a 'sensational' version of natural theology 'suggesting Olympian Thaumaturgy rather than Teleogony, and irreverently familiar in its utterances with a subject which Science and Religion alike relegate to the mysterious, incomprehensible, and unresolvable [sic] "ways" and "thoughts" of Providence.'[689] Thus Dawson's claim to know that *Eozoön* was the primordial organism from which all life had sprung was not only unscientific, it was also insulting to a Christian God. Karl von Zittel's definitive *Textbook of Palaeontology* (1900) claimed that for most palaeontologists, the controversy finally ended with Karl Möbius's paper in 1879 which denied that

[686] Harrington, *Life of Sir William E. Logan* , p. 378.
[687] King and Rowney, 'On the mineral origin', p. 152.
[688] H. J. Carter, *Annals and Magazine of Natural History*, (1875); King and Rowney, 'Remarks on "The Dawn of Life" '; Hahn and Dallas, 'Is there such a thing'.
[689] King and Rowney, 'Remarks on "The Dawn of Life"', p. 376.

Eozoön was a fossil.[690] However, contributions to the debate continued after this. King and Rowney published a pamphlet in 1881 which detailed the lengthy controversy and presented new arguments.[691] Carpenter had been preparing a monograph on *Eozoön* before he perished in a vapour-bath accident in 1885. Dawson continued to use *Eozoön* as the basis for his theory of the origin of life which he presented in several books, the last of which was printed in 1897. As O'Brien has stated, when Dawson died in 1899, *Eozoön* died with him.[692]

King was extraordinarily persistent in his determination to overturn the notion of *Eozoön* as a fossil. Although a dearth of preserved letters written by King makes motivations very difficult to guess at, his communication in journals indicates that he had a particular dislike of scientific authority figures whom he perceived as able to establish 'facts' by the force of their authority alone. His particular target in the *Eozoön* controversy was the somewhat unfortunate William Carpenter, who seemed unable to understand just what King had against him. Perhaps King's isolation in Galway encouraged him to make himself heard amongst the geological elite in London, in any manner possible. He certainly seems to have had motivations beyond an altruistic quest for truth. In fact, King's position in Galway played no small role in his conduct of the controversy. His inability to travel to meetings of the Geological Society or even to regularly attend the British Association meetings meant that he had to participate in the scientific community by way of the periodical press. His success at doing so indicates that, despite his opponents' misgivings about science emerging from backwaters such as Galway, one could be an active member of the scientific community without ever defending one's opinions in person. Although he failed in his bid to be appointed as professor of geology in Cambridge, King's quarrels with the geological community had no effect on his position in Galway. He seems to have been appreciated by colleagues as well as by the Queen's University, which recognised him with one of its first honorary doctorates in

[690] While this account has focussed on Irish involvement in the *Eozoön* controversy, the German involvement also merits consideration. It is my impression that German authorities on foraminifera, palaeontology and geology were deemed neutral and conclusive experts in the eyes of British men of science. This deserves to be further investigated.
[691] King and Rowney, *An old chapter.*
[692] O'Brien, '*Eozoön Canadense*'.

science.[693] His acceptance of a post that, to other British geologists, seemed highly undesirable allowed King the freedom to attack his opponents. They might ridicule his position on the periphery, but King chose to build authority on his own terms, without deferring to the centre.

7

Conclusion

> May we all feel, and may we now be encouraged by the thought, that there is a fair field before us, and that we are fellow-travellers in the march of scientific progress, able and willing to help ourselves and to help each other.
>
> Robert Lloyd Praeger, 1894[694]

When, at the close of the nineteenth century, the Irish naturalist Robert Lloyd Praeger spoke of his 'fellow-travellers in the march of scientific progress' he referred largely to the field clubs of Dublin, Cork, Limerick, Galway and Belfast. The field clubs had emerged from previous scientific societies, many of which had lain fallow for years before 1890. The field clubs have usually been considered a revival of amateur, provincial Irish science and their increasing activity in the decades surrounding the turn of the century has been commented on by previous scholars.[695] However, members of the field clubs included professors at the Queen's Colleges, of which Praeger himself was a graduate. The president of the Cork club was also the president of the Cork college.[696] The years following the opening of the colleges were years of change for the Ireland's communities of science, supplemented as they now were with

[693] See Harper (ed.), *William King.*
[694] R. L. Praeger, 'The Irish field clubs II: the Dublin Field Club', *The Irish Naturalist*, 3 (1894), pp. 211-215, p. 215.
[695]See for example S. Lysaght, *Robert Lloyd Praeger: the life of a naturalist* (Dublin, 1998).
[696] R. L. Praeger, 'The Irish field clubs III: The Cork and Limerick Field Clubs', *The Irish Naturalist*, 3 (1894), pp. 247-52.

'professional' men of science found in the university and hailing from all over the United Kingdom. This dissertation has shown that the Queen's Colleges must be viewed not only as a failed attempt to placate middle-class Irish Catholics and diminish the power of Daniel O'Connell, but also as substantial developments for science in Ireland. The colleges should be seen as a component of the 'science for improvement' movement within Ireland, which also manifested itself in scientific societies (such as the field clubs and their precursors), museums and informal educational programmes. As new centres for science the Queen's Colleges created, added to and altered networks of scientific men and demonstrate that science in provincial Ireland was international as well as local and national. Yet science concerned not only scientific and university men, but interacted with civic, religious and political spheres.

Very few studies have attempted to give a broad picture of the scientific community in Ireland. While we know who the significant players might have been at a given time, we are not often told how they interacted with one another or indeed whether they could be considered to have constituted a 'community'. Previous accounts have often focussed on single societies in a single location or on a single disciplinary group.[697] For example, Gordon Herries Davies's studies of the Irish geological community have shown the links between the Geological Survey, the geological societies and the university geology chairs.[698] Other work has begun to reveal a natural history network around the close of the nineteenth century, with Robert Lloyd Praeger as a key figure.[699] My dissertation has consistently demonstrated that Ireland's many communities of science, including the supporters of provincial scientific societies, the staff of the Queen's Colleges

[697] R. Bayles, 'Science in its local context: the Belfast Natural History and Philosophical Society in the mid-nineteenth century' (PhD, Queen's University of Belfast, 2005); S. F. Pettit, 'The Royal Cork Institution: a reflection of the cultural life of a city', *Journal of the Cork Historical and Archaeological Society*, 81 (1976), pp. 70-90; D. Gwynn, 'Cork Cuvierian Society, 1849-1851', *Cork University Record*, 23 (1951), pp. 27-34; B. B. Kelham, 'The Royal College of Science for Ireland (1867-1926)', *Studies*, 56 (1967), pp. 297-309.
[698] G. L. Herries Davies, *North from the Hook: 150 years of the Geological Survey of Ireland* (Dublin, 1995); G. L. Herries Davies, *Sheets of many colours: the mapping of Ireland's rocks, 1750-1890* (Dublin, 1983).
[699] T. Collins, 'Praeger in the west: naturalists and antiquarians in Connemara and the islands, 1894-1914', *Journal of the Galway Archaeological and Historical Society*, 45 (1993), pp. 124-154; Lysaght, *Robert Lloyd Praeger*; J. Adelman, 'Evolution on display: promoting Irish natural history and Darwinism at the Dublin Natural History Museum', *British Journal for the History of Science*, 38 (2005), pp. 411-436.

and Trinity College and the members of elite metropolitan organisations can be said to have constituted a network of scientific men. These individuals were aware of one another, corresponded with one another and made use of each others' expertise. What emerges from my discussion of the Queen's Colleges is a broadly-defined network of men devoted to science of any kind. Ireland did, of course, have her several scientific giants of international standing. However, many more people, usually unknown to history, were also involved in science in Ireland.

Irish scientific networks existed before the founding of the Queen's Colleges, but the presence of the colleges strengthened them. College professors became recognised local and national resources of scientific expertise, thereby elevating the importance of towns such as Galway in scientific circles. During the *Eozoön* controversy the 'Galway professors' made use of Irish networks, but also brought their locales into contact with international science. The *Eozoön* controversy demonstrates that geographical barriers to participation in science, as were often imagined to exist in parts of provincial Ireland, were easily overcome as techniques of communication expanded. William King and Thomas Rowney were able to take advantage of print, post, widely available instruments and the circulation of specimens to challenge men of science hundreds, even thousands, of miles away. Galway's distance from London meant that King and Rowney could not directly debate their adversaries at scientific meetings, and influenced their decision to use periodical literature to present their views. The local community also took an interest in the controversy and the Galway newspapers leant support for King's views in their pages. Thus the case of *Eozoön* demonstrates the manner in which the local context of participants in an international controversy could affect the manner in which the controversy was conducted.

College museums strengthened scientific networks by becoming new scientific spaces, especially in Cork and Galway which had limited access to such collections before the colleges' arrival. The manner in which specimens were collected for the museums confirms the existence of interlocking Irish communities of science in the nineteenth century. Specimens passed between the

colleges, local societies and individual collectors with ease. Although the professors responsible for the museum collections were most often not Irishmen, they were quickly able to identify the most significant naturalists from whom to procure specimens. The museums became recognised repositories for local collectors, in some cases replacing previous collections which had been under the auspices of scientific societies. These museums were not simply local, but as governmental institutions were peers to museums throughout the United Kingdom.

Although focussing on the Queen's Colleges, this dissertation has highlighted the importance of informal groups dedicated to science and science education. These societies were dominated by middle-class professionals and included a large representation of dissenters, as was true for comparable societies in Britain. Religiously diverse, these groups generally shared some liberal values such as an interest in popular education and a commitment to self-improvement. They also, of course, shared an interest in science. The societies and the Queen's Colleges exerted influence on one another and this interaction affected the role of science within the towns. Members of Cork's scientific societies had been actively involved in advocating the establishment of the colleges. After the colleges opened, the societies performed an important role as social communities, introducing the college professors to their socioeconomic peers within their new home towns. Through Cork's societies, the professors also affected the role of science in the local community by favouring certain societies with their membership. The different fates of Cork's scientific societies were not simply the result of the professionalisation of science. Rather than weakening local communities of science, the professors strengthened them through their active participation in local scientific culture.

Demonstrating the importance of local factors, the relationship between the Queen's College in Belfast and local societies differed from that seen in Cork. In Belfast, the format of the agricultural societies was not altered by the influx of new members from the college. Rather, the college took its lead from the Chemico-Agricultural Society by hiring its chemist as the first professor of agriculture. John Hodges was able to continue and extend the educational

programme which he had begun at the society in the context of the new university. Unfortunately, this programme filled neither the students' nor the Queen's College Commission's expectations for university education. However, the direct influence of Belfast's scientific societies on the format of the Queen's Colleges demonstrates that even the Irish administration in Dublin recognised the importance of informal, provincial scientific activities.

This dissertation has shown that the Queen's Colleges should be seen as a manifestation of the movement for the scientific improvement of Ireland, and thus comparable to agricultural improvement societies, scientific societies and mechanics' institutes. The promotion of science as a means for self-development and national development is a dominant theme in the nineteenth century. The scientific societies can be seen as particular examples of this sentiment, but the Queen's Colleges are an even further extension of it. Two examples highlighted in this dissertation prove this point: the agriculture diploma and the development of college museums. The agriculture diploma was an effort to make the Queen's Colleges as practically applicable to the improvement of Ireland as possible. Promoters of agricultural improvement believed that science held the answer to Ireland's development and saw the foundation of the agriculture diploma as recognition of their cause by the government. The subsequent failure of the diploma was a blow. The government and its advisors, seeing the existing support for agricultural education and perhaps also the results of the Great Famine, believed that they could raise agriculture to a science in the Queen's Colleges. In fact, the new system proved an unsuccessful competitor with the extant agricultural education programmes. The colleges were passed over by potential students in favour of the national schools or the informal courses of the agricultural societies.

'Improvement' was more successfully manifested in symbolic ways, such as in the development of public museums of natural history in each of the colleges. These museums accumulated huge varieties of specimens, demonstrating the intellectual and cultural resources of colleges and towns. The lack of immediate practical application for the museums to the Irish economy by no means diminishes their importance as an attempt to bring science to the public through the Queen's Colleges. Museums were clearly useful educational tools within the

colleges, but the professors did not stop at this and extended the museums to the local community. In the case of Belfast, the college museum provided a complementary function to a flourishing local society with its own collections. In the case of Cork and Galway, the college museums were among few places in which to see natural history specimens and were a significant local attraction. The building up of these museums stemmed from a desire not just to educate students, but also to educate the local population and to prove that learning was flourishing in provincial Ireland. The museums served as attractions for tourists and as such contributed to civic pride.

In the context of Ireland, the effect of the Catholic Church on culture, politics and even science cannot be ignored. Catholic support for the idea of 'science for improvement' was not insubstantial, yet the Church's rejection of the Queen's Colleges was a major blow for Irish Catholic participation in the highest levels of science. The Catholic middle classes continued to play a part in informal scientific activities, but they were severely under-represented in higher education. Cork's scientific societies, for example, included active Catholic members, some of whom were instrumental in establishing the Queen's Colleges. However, between 1849 and 1880, the only locations for formal education in science in Ireland were the Queen's Colleges, Trinity College Dublin and the Royal College of Science. All of these were either 'mixed' and secular or Protestant in ethos and therefore unacceptable to the Catholic Church. The Catholic University was unable to sustain a substantial science department until its inclusion in the Royal University in 1880 ensured a supply of students and funding. As a result, Ireland's few Catholic men of science were almost universally employed by the government's secular institutions and thus at odds with their Church. Much of the history of science literature in Ireland has grappled with the question of low Catholic representation among prominent men of science. Several theories to explain this have been proposed including economic and educational disadvantage, cultural aversion and the hostility of the Catholic Church to science. This dissertation lends support to the idea that educational disadvantage, and specifically lack of Catholic participation in the Queen's Colleges, was a significant factor. As the voluntary societies

demonstrate, cultural aversion to science did not exist among Catholics at informal levels.

Nineteenth-century men of science commonly cited the Catholic Church as an enemy of progress and, by implication, anti-scientific. One of the Church's most vocal critics was the Irish physicist, John Tyndall (although Tyndall was critical of organised religion in general).[700] The conflict between the Catholic Church and the government over the Queen's Colleges illustrates the failure of the liberal movement to extend a notion of secular science education from the voluntary sphere to a formalised system of higher education. Of course the Catholic Church rejected the colleges not on the basis of their scientific content, but in opposition to mixed education. However, what is significant for the question of science in Ireland was the failure of the Church to accept the arguments of some liberal Catholics that science was a safe, neutral subject and therefore a good basis for mixed education. The linking of science with both secularity and appropriate education for the middle classes demonstrates Ireland's participation in British trends. In supporting what they surely knew was bound to be controversial legislation for nondenominational colleges without religious teaching, liberals such as Thomas Wyse attempted to push the notion that science was neutral and suitably taught to a mixed audience. I would argue that Catholic hostility was actually directed at liberalism, and it was science's promotion by liberals as a means of softening religious difference that aroused suspicion and resulted in the decisive condemnation of the colleges by the Catholic Church.

Studies of science in Ireland have rarely made comparisons to the situation in Britain or engaged with existing history of science literature.[701] Viewing Ireland in a vacuum does not allow us to determine what, if anything, was unique about the Irish situation. This dissertation demonstrates the value of placing Ireland in a comparative context when examining the history of science. For example, by comparing Cork's scientific societies to those in Britain, we can see the societies

[700] One of Tyndall's most inflammatory statements on the subject was delivered in his address to the BAAS in Belfast in 1874. See D. Livingstone, 'Darwin in Belfast: the evolution debate' in J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997), pp. 387-408.
[701] One example is J. W. Foster (ed.), *Nature in Ireland* (Dublin, 1997). While representing significant scholarship, most essays in this volume make little effort to compare Ireland to the substantial literature on natural history in Britain.

as conscious efforts by the Corkonians to include themselves in British intellectual circles. The conversaziones, and especially the large ones for the working classes, emulated events in England and Scotland and their format was no doubt informed by members' direct and indirect knowledge of such events. The similarity of Irish scientific societies to British counterparts was not the result of a lack of creativity, but rather a shared cultural understanding of what a scientific society should be and do and an interest in using them as a means of proving intellectual parity with metropolitan counterparts. The same observation has been made of Irish industrial exhibitions after the Great Exhibition of 1851.[702] This emulation of British models was strengthened by the arrival of the Queen's College professors, many of whom came from England or Scotland and brought experiences of scientific institutions there. In the scientific societies and in the college museums, science could serve symbolic functions—demonstrating inclusion or parity with Britain and a shared intellectual culture. This does not diminish the fact that the content and form of the societies' activities was also profoundly influenced by local developments. Likewise, examining the Queen's College agriculture diploma in the light of developments in England demonstrates that it was indeed an innovative and important project. Thus parallel developments in Irish and British science can be mutually informative, demonstrating widespread trends as well as highlighting important locally-driven differences.

One of the most striking differences between Ireland and Britain may be the reversal of the relationship between industrialisation and an increasing interest in science education. In Britain, industrialisation seems to have preceded and inspired science education movements. In Ireland the reverse was true—the lack of significant industrialisation was blamed on the lack of science education. Perhaps the most influential example of this thinking was Robert Kane's *Industrial Resources of Ireland*. Institutions such as the Queen's Colleges were

[702] L. Litvack, 'Exhibiting Ireland, 1851-3: colonial mimicry in London, Cork and Dublin' in L. Litvack and G. Hooper (eds), *Ireland in the Nineteenth Century: Regional Identity* (Dublin, 2000), pp. 15-57; J. Turpin, 'Exhibitions of arts and industries in Victorian Ireland', *Dublin Historical Record*, xxv (1981-2), pp. 2-13, 42-51; N. O'Cleirigh, 'Dublin International Exhibition, 1865', *Dublin Historical Record*, XLVII (1994), pp. 169-182; A. J. Saris, 'Imagining Ireland in the Great Exhibition of 1853' in L. Litvack and G. Hooper (eds), *Ireland in the Nineteenth Century: Regional Identity* (Dublin, 2000), pp. 66-86.

seen as potential solutions to the dearth of scientific education and industrial development. Although science education in Britain was also intended to promote further development, it was not charged with creating an industrial economy in and of itself. In several of the chapters of this dissertation we have seen how in Ireland, the educational or scientific initiative came first, and economic development was expected to follow. While initiatives like the agriculture diploma failed to achieve the expected results, Galway, Cork and Belfast did experience some economic development as an indirect result of the Queen's Colleges establishment. Railways connecting each of the towns with Dublin were planned before the colleges were founded, but the subsequent linking of the cities to one another (on now defunct lines) may have been influenced by the towns' new importance.[703] Some professors in Galway despaired at the slow rate of growth in that city and advocated that the college be moved to Dublin, but there can be no doubt that the presence of the college increased the town's importance in the eyes of visitors and its own citizens. Some of the Queen's College professors, including William King were actively engaged in promoting the profile of Galway.

What Ireland lacked that Britain had was an organisation like the British Association for the Advancement of Science, which served to consolidate a scientific community by its peripatetic meetings.[704] The BAAS facilitated communication between a large variety of scientific disciplines, across a wide geographical area, thus leading to the sense of a shared, if intangible, purpose. While the BAAS visited Ireland several times during the nineteenth century (and returned to Dublin in 2005), there was only one meeting outside of Dublin or Belfast, that in Cork in 1843.[705] This was considered a failure and the experiment never repeated. While some Irish men of science frequently travelled to Britain for the meetings, other techniques of communication within Ireland had to be used to bring Ireland's communities of science into contact with one

[703] O. Doyle and S. Hirsch, *Railways in Ireland, 1834-1984* (Dublin, 1983), pp. 14-28, 46.
[704] J. Morrell and A. Thackray (eds), *Gentlemen of science: early correspondence of the British Association for the Advancement of Science* (London, 1984), vol. 30 J. Morrell and A. Thackray, *Gentlemen of science: early years of the British Association for the Advancement of Science* (Oxford, 1981).
[705] R. Johnston, 'Science and technology in Irish national culture', *The Crane Bag*, 7 (1983), pp. 58-65; Morrell and Thackray (eds), *Gentlemen of science (correspondence).*

another.[706] In the late nineteenth century, natural history field clubs instigated joint days out in an effort to strengthen the sense of an Irish natural history. These meetings were not dissimilar to the BAAS in that they moved locations.[707] The Queen's Colleges could be considered a static version of the BAAS: by creating government positions in various scientific disciplines they identified three provincial experts in any given field who were now accessible to communities in Belfast, Cork, Galway or adjoining areas. The BAAS's inner council of prominent scientific men circumscribed the participation of those outside recognised scientific circles. Similarly, the Queen's Colleges' scientific professors were elevated above their local peers by their professorial status, a status which they were able to use to shape science locally and nationally.

The college's museums and nearly identical curricula could be seen as a successful use of the Queen's Colleges as a sort of static BAAS. The museums, for example, presented a nearly uniform version of a scientific collection to visitors and students. The pursuit of collections also put naturalists across Ireland and Britain into contact with the Queen's College professors and redistributed specimens such that no museum could be considered to represent simply a single local group (in contrast to the museums of provincial societies). Likewise, the central examination system for the Queen's University guaranteed that its graduates shared a common base of scientific knowledge, agreed by the professors.

However, we should not take the analogy to the BAAS too far. As the case of the agriculture diploma in Belfast and the *Eozoön* controversy in Galway demonstrate, neither the local communities nor the Queen's Colleges themselves could be easily incorporated into a common British scientific culture. What might work locally did not necessarily translate into a national scheme. Hodges succeeded in making some progress with local landlords, but agricultural chemistry did not prove an attraction to students nor effect dramatic changes in farming practice during his lifetime. The Queen's College professors also could

[706] For an account of attending the BAAS by an Irish man of science see W. V. Ball, *Reminiscences and letters of Sir Robert Stawell Ball* (London, 1915), ch. 7.
[707] Lysaght, *Robert Lloyd Praeger* ; Collins, 'Praeger in the west'.

not be expected to accept their designated role in a scientific hierarchy which prioritised London-based institutions. King, for example, wished to see himself as on par with London peers, rather than inferior to them. Finally, the BAAS was a voluntary group, not a government-imposed educational system.

This dissertation challenges the current focus on Dublin as the centre of scientific activity in nineteenth-century Ireland and demands that further studies examine provincial scientific activity. I have also shown that informal or popular manifestations of science can play an important role in our understanding of science in Ireland, just as they have increasingly become a central part of the history of science in Britain. Scientific societies, museums and politico-religious debates about the role of science can no longer be considered peripheral to our understanding of the history of science in Ireland. Neither can they be considered developments completely separate from the spheres of scientific institutions sanctioned by government. As I have previously stated, science in Ireland has often been viewed as more 'institutionalised' than that in Britain. However, as this dissertation demonstrates, even institutions such as the Queen's Colleges, imposed and directed by government, could not act without negotiating their role within local and national communities. These communities were not just affected by the institutions, but had a lasting effect on them.

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