



NUI MAYNOOTH
Ollscoil na hÉirann Má Nuad

The Darwin debate in Dublin, 1859-1908.

by

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1. Introduction: Climate for controversy

This thesis intends to analyse both the course and the effects of the Darwin debate in Dublin during the first fifty years after the landmark publication of Charles Darwin's *Origin of species* in 1859. Darwin's hypothesis that species evolved gradually over time by a process of natural selection was so vastly contrary to the popular belief in a static order of life that controversy was perhaps inevitable. The period in question was an extremely interesting phase in Irish history which saw much intellectual and ideological change. Dublin, at the centre of this, saw many important developments such as the rise of the Republican, Home Rule and Unionist movements. It also saw the Gaelic revival take place and experienced great vibrancy in Irish academic life, particularly in literature with fine work produced by Dublin born men such as Yeats, Synge and Wilde. Important debates were taking place over the land question, the university question, the disestablishment of the Church of Ireland and the rising influence of Rome. It comes as no surprise that the study of Darwinism in this environment of change would deliver a number of interesting outcomes.

Any study of Darwinism can become overwhelmed in an effort to define the concept itself. This investigation of the Darwin debate in Dublin will interpret Darwinism in a very broad sense, encapsulating the various intellectual concerns that can be considered to be related developments. The *Origin* laid out Darwin's hypothesis on the evolution of species through a process of natural selection. Evolutionary theory or development theory

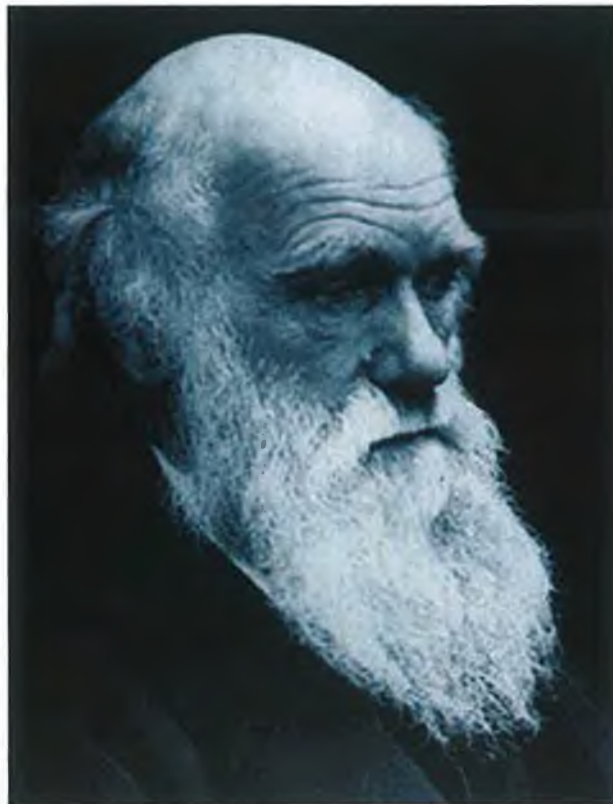
was not original to Darwin's publication; he was preceded by other theorists, most famously Jean-Baptiste Lamarck a French biologist who had written on the subject half a century earlier. Robert Chambers in his *Vestiges of the natural history of creation* written in 1844 had put forward a developmental theory of creation which was written in anonymity as he had anticipated the controversy his work might create.¹ Herbert Spencer, an early supporter of Darwin, advocated what later became known as Social Darwinism, the application of the survival of the fittest concept to society. Spencer had written on the subject as early as 1851 with *Social statics* and another work *Progress: its law and cause* published two years before the *Origin*.² What was different about Darwin's work was his vehicle for evolution, the process of natural selection which later became popularly known as the survival of the fittest. Another Englishman, Alfred Russell Wallace, had simultaneously formulated a theory of natural selection but by publishing his work first Darwin's name was branded on the concept. Darwin's name became synonymous with the term 'evolution' over the coming decades.

If Darwin was not the originator of the concept of evolution then why did his work arouse such a controversy? On one level Darwin's hypothesis removed the necessity for a divine creator which was extremely offensive in any Christian society. Darwin's theory also offended many men of science and in particular those naturalists whose work had been based around the idea of fixity of species. Essentially, to accept the concept of evolution

¹ Robert Chambers, *Vestiges of the natural history of creation* (London, 1884).

² Herbert Spencer, *Social statics* (Michigan, 1865) and 'Progress: Its law and causes' in *The Westminster Review*, lxvii (Apr, 1857) pp 445-65.

involved what is now known as a paradigm shift or a complete change in a universally accepted worldview. Darwin's idea of natural selection was the difference between his theory of evolution and those of men like Lamarck, it was the idea of the survival of the fittest in a struggle for life. The very idea of this system of existence was not in any way compatible with the Christian belief in a benevolent deity. The strength and depth of Darwin's research was another major factor. Darwin was already well established in scientific circles, particularly as a result of his published journal *The voyage of the Beagle* in 1839 which documented his natural discoveries on that expedition in great detail and won him international acclaim. Darwin used this vast array of knowledge of the natural world to add a mass of supporting evidence to his claims.



Charles Robert Darwin, 1809-1882.³

³ Image available at <http://fisher.berkeley.edu/cteg/images/photos/darwin.jpg> (12 Jan. 2009).

Despite Darwin's admirable ability, the formulation of the natural selection theory should not be viewed solely as a work of a genius independent from history but also as a product of his social context. How else could the simultaneous formulation of the theory by Darwin and Wallace be explained, or its clear associations towards the Malthusian theory of population?⁴ It must also be remembered that while the idea of evolution made considerable gains in the late nineteenth century, natural selection was not entirely dominant as the accepted process. It wasn't until its synthesis with Mendel's work on heredity in the twentieth century that natural selection gained predominance. The reliance of Darwin's work on the then yet unproven theory of heredity left his own work open to much greater criticism. An alternative perspective on the pre-Mendel phase of evolutionism is laid out by Peter Bowler in his *Non-Darwinian revolution* which argues that parts of Darwin's work had comparatively little impact on nineteenth century thought.⁵

Perhaps the most influential factor in arousing controversy was Darwin's early group of supporters. The men of science who began to rally behind this new theory were by and large atheistic or agnostic materialists. Darwin may not have formulated natural selection to promote materialistic atheism, but given the implications of such a theory it is not

⁴ For a full discussion on this subject see Gregory Radick 'Is the theory of natural selection independent of its history?' in Jonathan Hodge and Gregory Radick (eds) *The Cambridge companion to Darwin* (Cambridge, 2003) pp143-167.

⁵ Peter J. Bowler, *The Non-Darwinian revolution* (London, 1988)

surprising that its earliest proponents were of this persuasion.⁶ These men were generally more steadfast in their defence of Darwinian theory than the man who actually formulated the ideas. They were determined to use the concept as a flagship for an armada of secularisation and intellectual change aimed at overthrowing the established order. This belligerence towards the current social order, in particular the role of the churches, necessarily created a conflict, and a vociferous debate between science and religion ensued.

Peter Bowler, in his very comprehensive work *Evolution*, points out that understanding how Darwinism achieved its first success cannot be attained by looking at the scientific debate alone, but by understanding the changes taking place in the scientific community and in the social environment.⁷ He identifies that to understand its early successes in England we need to look at how Darwin's supporters gained control of the scientific establishment and promoted their position.⁸ Darwin's support from this group of influential scientific heavyweights was solidified with the formation of the X Club in London in 1864, an informal dining group of nine men which promoted Darwin's theory and generally sought to liberate and secularise academia. These men included Thomas Huxley, Herbert Spencer and Irish born physicist John Tyndall. The first clash of this new scientific movement is classically considered to be the debate between Huxley and Bishop Wilberforce at the British Association meeting at Oxford in 1860. Here Bishop

⁶ David L. Hull, 'Darwinism and historiography' in Thomas F. Glick (ed.), *The comparative reception of Darwinism* (Austin, 1972) p. 391.

⁷ Peter J. Bowler, *Evolution: The history of an idea* (London, 1984) p. 22.

⁸ *Ibid.*

Wilberforce mockingly inquired as to whether Huxley was related to an ape on his mother's or father's side. Huxley famously responded that he would rather have an ape as a grandfather than a man 'possessed of great means of influence & yet who employs ... that influence for the mere purpose of introducing ridicule into a grave scientific discussion.'⁹ Thus the scene was set for Huxley, who became known as 'Darwin's bulldog', and the other X Clubbers to campaign for a reassignment of intellectual authority. The role of these men in the controversy essentially made Darwin's hypothesis much more offensive than it would have been otherwise.

The three primary environments for the examination of the Darwin debate in Dublin are academic, religious and cultural, with significant intersection between these three occurring in a number of instances. The changes taking place in the scientific community in Dublin exhibit some similarities to that seen in England during the same period. However, the social environment differs substantially over this fifty year time span. As a result, the early phase of the Darwin debate takes a much different course to its neighbour. England serves as the main subject of comparison in this study due to its great influence on all aspects of Irish society. There was a great growth in a middle-class based amateur scientific community in Dublin throughout the middle of the century similar to that of London and Belfast. Numerous clubs were formed with the study of the natural sciences

⁹ *Oxford dictionary of national biography*,

<http://www.oxforddnb.com.jproxy.nuim.ie/view/articleHL/14320?docPos=6&anchor=match> (16

September 2008).

as their *raison d'être*. In Dublin we see the formation of the Dublin Natural History Society, the Dublin Geological Society, Dublin University's Zoological and Botanical Association, Entomological Society and the Royal Zoological Society. These societies supplemented the already well established Royal Irish Academy and Royal Dublin Society. The membership of these clubs seemed to have considerable overlap with the same names appearing at meetings of several different societies. This community was amateur in nature but the societies were typically headed by professors of educational institutions like Trinity College and later the Royal College of Science.

The vibrancy of the scientific community is evident from the publication of journals containing their papers and proceedings, namely the *Natural History Review*, a quarterly journal published in Dublin between 1854 and 1865 before merging into a more global version of the periodical of the same name with its base in London. The *Dublin Quarterly Journal of Science* also ran during this period with a similar base of contributors. From the study of these two periodicals in conjunction with the published proceedings of both the Royal Irish Academy and the Royal Dublin Society we get a very comprehensive picture of the scientific work carried out in Dublin during this period. Sean Lysaght identifies this group as an almost exclusively Protestant community and connects the popularity of natural history with a colonial project aimed at exploiting commercial opportunities in natural raw materials throughout the empire.¹⁰ He also highlights the temptation to equate the spread of science in Ireland with Anglicisation.¹¹ However, in reality, science was not

¹⁰ Sean Lysaght, 'Themes in the Irish history of science' in *The Irish Review*, xix (1996) p.91

¹¹ *Ibid* p.94

entirely limited to the Protestant community. This study will analyse a number of Catholic scientific works that deal with Darwinian ideas. Furthermore, as Greta Jones has pointed out, there was a clear demand for a Catholic university and for scientific instruction at the Catholic University of Ireland among the Catholic middle classes.¹² However, the stance of the Catholic Church against much of modern science became a barrier to its advance in Ireland. Jones also highlights that the link between nationalism and the Church and nationalist desires for a unique cultural vision also jeopardised Ireland's link with the wider intellectual community of the British Isles.¹³

The reception of Darwinism in Dublin in the scientific community significantly overlaps with reactions of an ecclesiastical nature. Trinity College and St. Patrick's College Maynooth become focal points for the study of Darwinism over the entire course of this thesis. Maynooth, although slightly outside the borders of County Dublin, has been included in this study due to its importance as a Roman Catholic ecclesiastical centre and the significance of some of the college staff's contributions to the Darwin debate at this time. The majority of scientific discussion of Darwinism at Maynooth and Trinity came from college professors who were also ordained clergymen in their respective faiths. This obviously leads to a certain amount of religious bias in their scientific opinions. Unlike in England, Dublin could not boast secular men of the calibre of Huxley dedicated to the advancement of science. As a result of this, the Darwin debate in Dublin was much slower to rise to boiling point. While there are direct responses to Darwin's work and a general

¹² Greta Jones, 'Catholicism, nationalism and science' in *The Irish Review*, xx (1997) p47.

¹³ Ibid p.52.

awareness of his theories in religious and scientific circles, it wasn't until after Carlown born physicist John Tyndall's aggressive address to the British Association for the Advancement of Science in Belfast in 1874 that we see a level of debate comparable to that of England.

Dublin in the late 1870s, as a result of Tyndall's lecture, experienced a wave of written publications and a chorus of sermons was heard addressing the advancement of modern scientific concepts, with Darwinism heading the pack. Tyndall's address was an intentional affront to the authority of established religion in intellectual matters and helped cement opinions against modern scientific thought, held among representatives of the Catholic Church in Ireland. These included the Archbishop of Dublin, Paul Cullen, an extreme ultramontanist, who was vigorously opposing the idea of mixed and secular forms of university education for Catholics and the inclusion of modern scientific ideas on any potential science curriculum. The recent disestablishment of the Church of Ireland did not hinder the Anglican clergy from participating in the discussion in the 1870s with large numbers of sermons on the matter making it into print. Religious discussions of Darwinism were not limited to attempts by clergymen to reject new ideas but also included many attempts to reconcile biblical accounts of creation with new science. Such attempted reconciliations became increasingly difficult for Catholics to engage in as the period progressed as a result of Rome tightening its grip on intellectual authority. Later in the century we see much broader effects of Darwinism which extend beyond science and religion and into the cultural sphere. Darwinian gradualism had seeped into the consciousness of the population and we see new issues emerging relating to race and

national identity that are intertwined with questions raised by Darwin's work.

Darwinism was the figurehead symbol of modern thought in the late nineteenth century and in much the same way it has dominated the history of science to a great extent. While the Darwin industry has produced an immeasurable number of studies worldwide it has been relatively neglected in Ireland. Greta Jones is the foremost scholar on the subject and she has produced some very perceptive and insightful scholarly articles on Darwinism in Ireland. David Livingstone has carried out some excellent research on the impact of Darwinism in Belfast, particularly in relation to responses to Tyndall's address. Thomas Duddy published a collection of reprinted primary source publications on the subject in *The Irish response to Darwinism* which the author has made available for analysis by other scholars. Five of the sources in this collection are relevant to this Dublin based study and are utilised here. No major investigation of Darwinism in Ireland has been published to date. Jones's and Livingstone's work on the subject consists only of a few short articles within scholarly books and journals. This work endeavours to be the first in-depth investigation of its kind. Dublin and Belfast were the two main centres of discussion of Darwinism in Ireland during this period and as a result this Dublin based study covers a large segment of the study of Darwinism in the country as a whole. A great number of sources used in this study have not been utilised in any of the articles written on the subject of Darwin and Ireland including contemporary journals, newspapers, correspondence, private papers and published books and sermons. This is the first study to recognise the importance of Maynooth in the debate. It is also the first to

consider the great number of sermons that were published on the conflict of science and religion in an Irish context and the first to consider Darwinism in Ireland in light of the movement against modernism in the Catholic Church.

The study draws on a varied range of published primary sources. Contemporary academic and scientific periodicals are examined including the aforementioned *Natural History Review* and the *Dublin Quarterly Journal of Science*. The proceedings of societies such as the Royal Irish Academy and the Royal Dublin Society are also very important sources in the examination of Darwinism. Much is drawn from church publications such as the *Catholic Irish Ecclesiastical Record* and the Church of Ireland's *Irish Ecclesiastical Gazette*. Other less discipline specific contemporary journals also feature including the *Dublin Review* and the *Dublin University Magazine*. The controversy aroused by Tyndall in the 1870's resulted in the publication of many of the sermons preached from the pulpits in pamphlet form, these are also greatly utilised. Newspapers, particularly the *Irish Times*, and the *Freeman's Journal* featured various useful articles relating to the Darwin debate. Two web based databases were the primary tool used to search for relevant newspaper articles on the subject of Darwinism in Dublin; these were the Irish Times Digital Archive and the Irish Newspaper Archives¹⁴. The greater body of primary sources utilised are published materials. Unfortunately very little relevant material has survived in the private papers of those involved in the study. In some instances large bodies of private papers survive but without relevant material regarding Darwin and for

¹⁴ Irish Times Digital Archive, <http://www.irishtimes.com/search/archive.html> and Irish Newspaper Archives <http://www.irishnewsarchive.com>.

many of the individuals no private material survives at all. There are three exceptions in this matter. The first and foremost is Gerald Molloy, Maynooth theologian and geologist who has a sizeable collection of private papers held at Maynooth College's Russell Library. A considerable focus has been awarded to Molloy in 'Chapter 2' which draws heavily on this body of material. The private scientific papers of Trinity College's Samuel Haughton are also utilised, as are the post-humously published private memoirs of Maynooth's Walter McDonald. The web-based Darwin correspondence project based at Cambridge University Library has been utilised to great effect particularly in the early part of the thesis as Darwin had corresponded personally with some Trinity College academics and wrote about these men and their work in other correspondence with his friends and associates.¹⁵

The body of this thesis is broken into three distinct chapters which represent three distinct periods in the course of the Darwin debate in Dublin during this first fifty years after the publication of the *Origin*. This does not divide the fifty year period into three equal parts but rather reflects the course of the debate in Dublin. The first main chapter entitled 'Early Reactions' deals firstly with the direct impact of Darwin's publication of the *Origin* from 1859. The ideas that this book presented were discussed and debated to a great extent among Dublin's scientific community, some of whom corresponded with Darwin himself on the matter. This chapter then also addresses some of the discussions of the theory in popular periodicals. As we move to the 1870s, more than a decade after the publication, Darwinism began to be recognised as a movement or way of thinking that

¹⁵ See Darwin Correspondence Project, <http://www.darwinproject.ac.uk/>.

reached far beyond the ideals of the *Origin*. At this stage the Catholic Church begins to voice opinions on the subject as part of a wider movement of modern thought.

In 1874 a watershed moment occurs when Irish scientist John Tyndall delivers an address to the British Association for the Advancement of Science where he pits science against religious authority and shows his support for Darwinian ideals. This provoked a massive debate in which the religious authorities sought to defend themselves from this attack. This address and its effects are the subject matter of the second of these three chapters entitled 'the Tyndall catalyst'. Darwinism was considered to be a fundamental part of this argument and as a result the topic was discussed extensively in Dublin within the wave of publications, articles and lectures given in Dublin during the 1870s. The third section of this work then seeks to analyse the longer term impact of Darwinism on Dublin society in the chapter entitled 'Darwinism develops'. This impact could be seen in various areas including changes within the churches, in education and the development of a range of new academic interests.

Dublin as Ireland's capital offers an interesting social context for a focused study. It also represents a substantial portion of the study of Darwinism in Ireland as a whole because Dublin and Belfast were the two primary hubs of discussion on the subject. Dublin is the focus of the investigation but some flexibility is required to make this study well rounded. Some attention must be paid to developments outside of Dublin such as in Belfast and England as they have a major impact on the study. Periodicals and newspapers that had a nationwide circulation are also included as many were published in

Dublin and had a wide readership there. As mentioned already St. Patrick's College Maynooth has been included. Its proximity to the capital city and the importance of Maynooth as a seminary and ecclesiastic centre make it impossible not to include it here and we shall see that it makes many contributions in this area. The Darwin debate in Dublin may be a slightly misleading title for this paper because since Darwinism grew beyond what Charles Darwin had ever conceived, so has this investigation of the concept in Dublin with quite a wide range of related issues regarding modern thought and science coming under analysis.

2. Early Reactions

In Great Britain there was an immediate response to the publication of Darwin's *Origin* in 1859 and major debates and controversy ensued. This was largely due to men like Thomas Huxley who immediately began to defend and disseminate Darwin's work in learned circles. The confrontation between science and religion in England as a result of Darwinism can be seen as early as 1860 with Huxley and Bishop Wilberforce trading blows. In Dublin however, we see a very different story. In the early years after the publication, the opinions expressed were rather limited to the scientific and academic community, with little in the form of theological reactions until several years later. Why this comparatively lacklustre response to what was the most heated debate of the day in England? Some of this can be attributed to the fact that there were no men of the stature of Huxley or Hooker to stimulate the debate to the level it took place across the water. Another reason stems from the blinkered vision of the Catholic Church, most of whom saw this as yet another controversy based around a speculative theory that would eventually blow over and be forgotten as with many others in the past. However, it must also be considered that this publication appeared during a period in Ireland in which a battle was taking place between the Protestant churches and those who looked to Rome. The direct influence of Rome was rising with ultramontanist Paul Cullen as Archbishop of Dublin; disestablishment was only a decade away and there was a great debate taking place regarding the role of religion in third level education. Another factor was the rising level of nationalism best seen perhaps through the foundation of the Irish Republican Brotherhood in the previous year, 1858. Given this context it is easy to agree with the

idea that most Irish intellectuals would have been somewhat preoccupied with other types of ideological matters as suggested by McDowell and Webb in their history of Trinity College.¹⁶

Despite the array of other concerns for Irish intellectuals there were still some vociferous responses to Darwin's publication among Dublin's academic community. At Trinity College Darwin found two major antagonists holding chairs in the college's departments, these were Samuel Haughton the professor of geology and the professor of botany, William Henry Harvey. Both of these men were heavily involved in the scientific clubs and their related publications in Dublin. Harvey was the first to speak out prolifically against Darwin's hypothesis of natural selection. Harvey was one of the foremost botanists of his day. He had been a correspondent of Darwin on botanical matters prior to the publication of the *Origin*. He was a fellow of the Royal Society, the Linnaean Society and a member of the Royal Irish Academy. He was very close friends with both other leading botanists J.D Hooker and Asa Gray but with regard to opinions of Darwin he widely differed from these men. Harvey was also a very religious man, raised as a Quaker who had converted to the Church of Ireland in 1846.¹⁷

Shortly after Darwin's publication of the *Origin* Harvey put into print a pamphlet berating the work of the Englishman under the title *An inquiry into the probable origin of*

¹⁶ R.B. McDowell and D.A. Webb, *Trinity College, Dublin, 1592-1952: An academic history* (Cambridge, 1982) p.240.

¹⁷ *Oxford dictionary of national biography*, <http://www.oxforddnb.com.iproxy.nuim.ie/view/article/12533> (26 September 2008).

the human animal on the principles of Mr. Darwin's theory of natural selection and in opposition to the Lamarckian notion of a monkey parentage. In this publication Harvey was very much concerned with the question of monkey parentage, a notion which he credits as being originally from Lamarck. Harvey didn't believe that it was possible to prove a line of descent or evolution for various animals as he didn't consider there to be a substantial enough body of evidence. He expressed his disappointment that such an able man as Darwin would subscribe to such a concept.¹⁸ It is probable that the publication of this pamphlet stems from a combination of Harvey's personal religious views and also the challenges that Darwin's hypothesis would pose towards the botanist's own studies. However, Harvey let his sense of humour run a bit wild in the publication and was too openly derisive of Darwin. Harvey later in life came to accept Darwin's theory and greatly regretted the publication.



William Henry Harvey, 1811-1866.¹⁹

¹⁸ William H. Harvey, *An inquiry into the probable origin of the human animal, on the principles of Mr. Darwin's theory of natural selection and in opposition to the Lamarckian notion of monkey parentage* (Dublin, 1860).

¹⁹ Image available at <http://www.capeorchids.co.za/images/harvey.jpg> (12 Jan. 2009).

This pamphlet, was written before Harvey had actually completely read Darwin's book and was therefore somewhat ignorant of the strength of the Englishman's research and evidence used in putting forward his theory. In a letter written by Darwin to Joseph Hooker in May 1860 Darwin discussed this publication and explained that he was glad that Harvey was late in finding the time to read the *Origin* because of his lecturing commitments as he had feared it might have been as a result of bigotry. We see from this letter also that Harvey showed some acceptance of the natural selection theory as he was glad to see: 'that he goes a little way (much further than I expected) with us on natural selection.'²⁰ However, Darwin also expresses his dismay at Harvey turning the subject into ridicule when he said that it was not a 'proceeding which I deserved or worthy of him.'²¹ The two surviving printed copies of what was originally a spoken address that are in the National Library of Ireland can be found with inscriptions from Harvey himself on the inside saying 'This is rubbish—merely got up to amuse an evening meeting of a private society. W. H. H.'²² A copy of the pamphlet is also in the Darwin pamphlet collection at Cambridge University library as Harvey had later sent Darwin a copy of the paper with the writer's repentance. The private society was the Dublin University Zoological and Botanical Association. Although Harvey did eventually come around to Darwin's concept of evolution his initial reaction shows the effect that the publication of

²⁰ C.R. Darwin to J.D. Hooker, 30 May 1860, *Letter 2818*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2818.html> (2 Dec. 2008).

²¹ Ibid

²² William H. Harvey, *An inquiry into the probable origin of the human animal, on the principles of Mr. Darwin's theory of natural selection and in opposition to the Lamarckian notion of monkey parentage* (Dublin, 1860) p.i.

the *Origin* had on a scientific and religious man whose life work was based around a pre-Darwinian concept of the fixity of species and was therefore understandably defensive of the old order. Fortunately no ill feeling was retained between the two men regarding differences in opinion and they remained correspondents for a number of years.

In correspondence exchanged between Harvey and Darwin in the latter half of 1860 Harvey portrays his true opinions on natural selection. After Harvey had finally completed reading the *Origin* (which was some months after he had published his ridiculing pamphlet) he admitted that his: 'opinions have been, at least modified. It is true that I cannot as yet (probably never shall) receive the theory of natural selection as a satisfying explanation of the origin of species - but I am willing to admit that it explains several facts which are not otherwise easily to be accounted for. Until however something more is known of the inciting causes of the variation & correlation of organs, which in nature ever go hand in hand, I can only regard natural selection as one agent out of several; a handmaid or wetnurse, so to say, but neither the housekeeper, nor the mistress of the house.'²³ In this letter Harvey laid out his own opinions on natural selection and variability in nature and put forth a number of criticisms of the evidence used and conjectures made by Darwin in the *Origin*. Harvey for the most part was willing to accept that natural selection is a powerful and important agent of modification in nature. However, he believed that Darwin's emphasis on the importance of natural selection goes too far especially given the evidence in nature to its contrary.

²³ W.H. Harvey to C.R. Darwin, 24 Aug. 1860, *Letter 2898*,

<http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2898.html> (3 Dec. 2008).

Darwin in his response to the letter expressed his disappointment at Harvey's interpretation of what is meant by natural selection: 'You speak in early part of your letter & at p. 9. as if I had said that natural selection was the sole agency of modification; whereas I have over & over again, ad nauseam, directly said & by order of precedence implied (what seems to me obvious) that selection can do nothing without previous variability. see p. 80, 108, 127, 468, 469 &c "Nothing can be effected unless favourable variations occur". I consider Natural Selection as of such high importance, because it accumulates successive variations in any profitable direction; & thus adapts each new being to its complex conditions of life'.²⁴ Darwin also defended the various illustrations he employed in his book which were questioned by Harvey and admitted that 'they are all necessarily conjectural, and may be all false; but they were the best that I could give'.²⁵ He mentions that men such as Lyell, Hooker, Asa Gray and Huxley had no problems comprehending his work and were quite favourable towards it and therefore asks Harvey to perhaps reflect a little more on the matter.

Harvey in his letter had dedicated a considerable amount of energy to discussion of the geological difficulties with the theory and also towards the possibility and importance of a divine creator. Interestingly, Darwin's response to both of these matters was extremely limited. Regarding the geological evidence, Harvey had put forth examples of molluscs

²⁴ C.R. Darwin to W.H. Harvey, 24 Sept. 1860, *Letter 2922*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2922.html> (2 Dec. 2008).

²⁵ Ibid.

which had existed in diverse forms in early geological strata and many which had remained unchanged over huge lapses of time, which made it difficult to accept natural selections tenets of variability over time and the idea of numerous modern forms developing from one or few earlier forms.²⁶ However, Darwin's reaction to this was: ' I agree to every word about antiquity of the world; and never saw the case put by any one more strongly or more ably. It makes, however, no more impression on me, as an objection; than does an astronomer when he puts on a few hundred-million miles to the distance of the fixed stars'.²⁷ Darwin was clearly confident enough in his own knowledge of geology that his belief in the theory of natural selection would be unaffected by examples of difficulties highlighted by critics.

There were numerous references in Harvey's letter to a divine creator. Harvey is aware that Darwin accepted the possibility that a divine being may have created a primordial form of life from which all forms have descended. Harvey's own opinions seemed to be similar and says that there are evidences for one great design beginning with a simple form and culminating in man.²⁸ He also mentions that Darwin in the *Origin* objects to the idea of a creator working through intelligent powers in much the same way as a man. He highlights various signs of intelligence in the world which cannot be accounted for

²⁶ W.H. Harvey to C.R. Darwin, 24 Aug. 1860, *Letter 2898*,

<http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2898.html> (3 Dec. 2008).

²⁷ C.R. Darwin to W.H. Harvey, 24 Sept. 1860, *Letter 2922*, Darwin correspondence project,

<http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2922.html> (2 Dec. 2008).

²⁸ W.H. Harvey to C.R. Darwin, 24 Aug. 1860, *Letter 2898*,

<http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2898.html> (3 Dec. 2008).

without giving greater credit to the idea of a divine power such as the bees and ants whose instincts are transmitted through communities of neuters rather than through inheritance as suggested by natural selection.²⁹ Despite Harvey's emphasis on notions of the divine, Darwin characteristically refused to be drawn into a theological discourse. He rather directs Harvey towards a forthcoming theological article on natural selection by Asa Gray in the *American Journal of Science* which he believed would be of interest to him on theological matters.³⁰

Harvey wrote a further letter in response to Darwin on 8 October 1860 which addressed and readdressed some of the scientific points of contention between the Englishman's views and his own. There was little referring to the divine except for one point where he declared that: 'variations arising from altered conditions &c, being impersonal, may fairly be referred to secondary causes;—but the other & infinitely the larger class of unresolved variations, including correlation of organs or modelling after a preconceived pattern, imply personality, & therefore (to avoid pantheism), I ascribe them to the creator'.³¹ This letter seems to be the last in this correspondence as Darwin appears not to have responded on this occasion. Harvey for the most part seemed willing to accept the possibility of natural selection as a cause of variability over time but found that he could not agree with Darwin on all grounds. He was perhaps at his greatest variance to Darwin

²⁹ Ibid.

³⁰ C.R. Darwin to W.H. Harvey, 24 Sept. 1860, *Letter 2922*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2922.html> (2 Dec. 2008).

³¹ W.H. Harvey to C.R. Darwin, 8 Oct. 1860, *Letter 2943*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2943.html> (2 Dec. 2008).

regarding the role of the divine in nature, although this did not become a controversial topic between the two men due to Darwin's reluctance to be drawn into such discussions. Analysing Harvey's views in this fashion gives us greater insight into what might have been the opinion of many leading Irish academics, many of whom would have also been religious men.

Harvey's associate in the department of geology at Trinity College, Samuel Haughton remained a lifelong opponent of Darwin's work. Haughton was another deeply religious man and an ordained minister of the Church of Ireland. David Spearman writing on Haughton illustrates that the geology professor challenged Darwin on scientific rather than religious grounds, as he claims that Haughton was a man who would not hold religious views that were contrary to reason. His own estimate of the geological age of the earth in his *Manual of geology* first published in 1865 was that the earth was far older than Ussher's estimate calculated from the biblical record of less than 6,000 years.³² Here Spearman implies that Haughton must have in some way accepted the metaphorical rather than factual interpretation of Genesis and therefore his opposition to Darwin's hypothesis must have been based strictly on scientific opinion.³³ However, in reality, it is hard to escape the possibility of religious bias on the part of Haughton, even if science was his chosen field in the defence of the old order. In the preface of his second edition of the *Manual of geology* he declared that his view that there was a creator who set out

³² Samuel Haughton, *Manual of geology* (London, 1866).

³³ T.D. Spearman, *Samuel Haughton: Victorian polymath. A lecture delivered to the National Committee for the history and philosophy of science of the Royal Irish Academy, 4 December 2001* (Dublin, 2001) p.2.

the formation of the world in much the same way as an intelligent shoemaker would make a pair of shoes. He also stated that 'I can no more imagine an abstract creator *à la* Lamarck, or *à la* Darwin, than Martinus Scriblerus could imagine a universal lord mayor without his horse, gown and gold chain.'³⁴ Haughton, too, was a scientific heavyweight during this period and alongside holding the chair of geology at Trinity College he was heavily involved in studies of physiology. He was greatly concerned with the study of comparative anatomy and the fruit of this work came in the publication of his *Principles of animal mechanics* in 1873, a topic which he had also lectured on for many years at that point.³⁵

Haughton was quick to come out in opposition to Darwin's hypothesis. In 1859, after the joint presentation of Darwin's and Wallace's papers to the Linnaean Society, but before the publication of the *Origin* Haughton had already openly dismissed the concept during an address to the Geological Society of Dublin.³⁶ By 1860 he had begun publishing articles arguing against Darwin. The first we see is an anonymously written article which appeared in the *Natural History Review* which at that time was the main organ of communication for the large and active naturalist community in Dublin. In this article entitled 'Biogenesis' Haughton says that 'to establish a character for subtlety and skill, in drawing large conclusions on this subject from slender premises, the first requisite is, ignorance of what other speculators have attempted before us in the same field: and the

³⁴ Samuel Haughton, *Manual of geology* (London, 1866) pp vi-vii.

³⁵ Idem, *Principles of animal mechanics* (London, 1873).

³⁶ *Annual address to the Geological Society of Dublin 8 February 1859* (Dublin, 1859) pp16-18.

second is, a firm confidence in our own special theory. Neither of these requisites can be considered wanting in those who are engaged in the task of reproducing Lamarck's theory of organic life, either as altogether new, or with but a tattered threadbare cloak, thrown over its original nakedness.'³⁷ This was a response common to many academics worldwide that were unfavourable to Darwin's ideas. His contention was that not only was Darwin's theory founded almost entirely upon speculation, but also, that this speculative theory belonged originally to Lamarck and the differences between the two men's work was negligible. After discussing Lamarck's theory of development he points out that the natural selection theory was the only addition Darwin made to the Frenchman's work, and that even this was an argument borrowed from Malthus' theory of population.³⁸ Part of Lamarck's theory was the law of imitation where, for example, a monkey progresses through the imitation of man. Darwin's theory was based rather on natural selection. Houghton mockingly attributes the difference in the two theories to a difference in nationality: 'the Frenchman with the vivacity and perception of the ridiculous belonging to his nation, seizes upon the quality most likely to elevate a monkey into a man, selects the faculty of imitation.....The Englishman on the other hand, firmly believes his theory, and, with a confident faith in the power of food and comfort, equally characteristic of his country, elevates the desire to supply the stomach into a law of sufficient force to convert an eel into an elephant or an oyster into an orang-utan'.³⁹

³⁷ *Natural History Review*, ii (Dublin, 1860) p.23.

³⁸ *Ibid* p.27

³⁹ *Ibid* p.28.

Haughton claimed that all theories of biogenesis were based on three unwarrantable assumptions that bring down the whole house of cards. Firstly, that there is an indefinite variation of species in one direction. He believed that all things in nature are in motion but balance around a centre or equilibrium which does not change. He says that Darwin's theory does not account for the consistency of the ass, ostrich or cat over 3,000 years.⁴⁰ Secondly, that the causes of variation assigned, through cross breeding with Buffon, imitation with Lamarck and natural selection with Darwin, were not sufficient to account for the effects to be produced. In arguing against this he launches into a lengthy discussion on the economy of wax production with bees, an example which we see below from Darwin's correspondence had greatly angered him.⁴¹ The third assumption which Haughton took issue with was the idea that succession implied causation. This assumption he considered to be the greatest logical blunder by the theorists. Here Haughton gives an example from mineralogy saying that if a chemist put forward the idea that lime had developed from potash he would be considered to be a lunatic.⁴² Haughton then continues on with an attempt to dismantle all such theories of 'biogenesis' and attacks the many naturalists of the day who he declares must be 'untrained in the logical faculties' to subscribe to such theories of speculation.⁴³ While this is an anonymous article it is quite straightforward to establish Haughton as its author since there is a section dedicated to the study of bee cells in relation to the origin of species. It is exactly the same as a paper he read before the Natural History Society of Dublin in 1862 and also very similar to an

⁴⁰ Ibid p.29.

⁴¹ Ibid p.30

⁴² Ibid p.31.

⁴³ Ibid

article in the *Annals and Magazine of Natural History* in 1863.⁴⁴ Darwin and his supporters were also aware of this as Hooker wrote to Darwin in 1862 to confirm that Haughton was the author of the review and described him as being of 'large capacity' but without any 'faculties of imagination or discovery'.⁴⁵ By 1862 Haughton had lost whatever apprehension he may have had in 1860 and gained enough confidence in his resistance to Darwinian theory to publish articles in his own name.

Darwin portrays his anger at Haughton's article in the *Natural History Review* in a letter to Joseph Hooker in June 1860 asking: 'have you seen Haughton's coarsely-abusive article of me in Dublin Mag. of Nat. History. It outdoes even N. British & Edinburgh in misapprehension & misrepresentation. I never knew anything so unfair as in discussing cells of bees, his ignoring the case of melipona which builds combs almost exactly intermediate between hive and humble-bee. What has Haughton done that he feels so immeasurably superior to all us wretched naturalists & to all political economists, including the great philosopher Malthus.'⁴⁶ In 1860 this first year after the publication Darwin met a huge amount of opposition to his paper and spent much time defending himself against attacks such as those of Haughton and Harvey. He continued in this letter

⁴⁴ See Samuel Haughton, *On the form of the cells made by various wasps and by the honey bee with an appendix on the origin of species* (Dublin, 1863) and Alvar Ellegard, *Darwin and the general reader: the reception of Darwin's theory of evolution in the British periodical press 1859-1872* (Goteborg, 1958) p.46.

⁴⁵ J.D. Hooker to C.R. Darwin, 12 Nov. 1862, *Letter 3802*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-3802.html> (15 Oct. 2008).

⁴⁶ C.R. Darwin to J.D. Hooker, 5 Jun. 1860, *Letter 2821*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2821.html> (3 Dec. 2008).

that: 'this review (Haughton's), however, & Harvey's letter have convinced me that I must be a very bad explainer. Neither really understand what I mean by natural selection. I am inclined to give up the attempt as hopeless. Those who do not understand, it seems, cannot be made to understand.'⁴⁷ The letter by Harvey to which Darwin was referring was one forwarded to him by Hooker, who was a mutual friend of both men. Harvey had corresponded with Hooker in May and June 1860 regarding the theological implications of the natural selection theory.⁴⁸ Hooker had forwarded one of these letters to Darwin and Darwin hoped to reply to Harvey directly with the intention of explaining the role of the natural selection theory. Haughton's criticism of the natural selection theory and his work on wax production in bee cell's clearly struck a chord with Darwin and he seemed to find it to be a terribly unfair review. He had corresponded with Joseph Hooker, Charles Lyell and Asa Gray expressing his anger and defending himself against Haughton's ideas on bees. In one of these letters to Lyell he writes of Haughton that: 'He is more coarsely contemptuous than even Mr. Dunns in N. British and overdoes everyone else in misrepresentation. I never knew anything so unfair as his ignoring in his remarks on bee's cells the almost exactly intermediate comb of melipona; and so in many other cases. It consoles me that he sneers at Malthus, for that clearly shows, mathematician though he may be, he cannot understand common reasoning'.⁴⁹

⁴⁷ Ibid.

⁴⁸ C.R. Darwin to J.D. Hooker, 29 May. 1860, *Letter 2816*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2816.html> (3 Dec. 2008).

⁴⁹ C.R. Darwin to Charles Lyell, 6 Jun. 1860, *Letter 2822*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2822.html> (3 Dec. 2008).

In Houghton's *Principles of animal mechanics* he lays down his findings regarding the organization of limbs and muscles in animals. One of the conclusions of this work is that as far as bones, muscles and joints are concerned the permanence of species is secured. Therefore, there can be no common ancestor for different species, a conclusion which could not support Darwinian theory in any way.⁵⁰ Houghton circulated his work through the relevant streams of the academic community, as was customary, and received a number of interesting responses. These are collected in his private scientific papers available at Trinity College Library. Fellow Carlow-man John Tyndall, at the Royal Institution wrote: 'accept my very best thanks for the gift of your important work. I see that it embodies the substance of your admirable lectures in this place, which I ranked at the time among the most remarkable that I ever heard.'⁵¹ Greta Jones quite rightly points out that Houghton, who gave lectures on Darwin's theory to his students at Trinity College, could be seen to have inadvertently stimulated interest in evolution by natural selection even if he was deeply against it.⁵² The bishop of Meath, Charles Parsons Reichel, stated that it was rare to find a study which scientist and theologian could agree on and suggested that this was one of those rare few.⁵³ The Catholic front took a similar appreciative line when Charles William Russell, President of St. Patrick's College Maynooth, described it as 'the most original and ablest exposition of the great doctrine of

⁵⁰ *Oxford dictionary of national biography*,

<http://www.oxforddnb.com.ioproxy.nuim.ie/view/article/12616?docPos=2> (26 September 2008).

⁵¹ Samuel Houghton, *Scientific papers* (1873) p.3.

⁵² Greta Jones, 'Darwinism and Ireland' in David Attis (ed.), *Science and Irish Culture*, i (Dublin, 2004) p.119

⁵³ Samuel Houghton, *Scientific papers* p.5

design, which our age has produced.’⁵⁴ However, Darwin himself was clearly disappointed by the conclusions of the book when he wrote to Haughton from his home in Kent in April, 1873: ‘I am much obliged for your kindness in having sent me your *Animal mechanics*. Although the subject is beyond my reach, I have read enough about your researches to be able to appreciate a certain extent, their very high value. I grieve that our theoretical views about the organic world differ so widely.’⁵⁵ Interestingly, Richard Owen, a well noted outspoken opponent of Darwin’s theory responded to Haughton’s work with great praise. Haughton may have been defensive of the old order of science based on the fixity of species as so much of his studies and teaching had been based around that principle and he observed that Darwin appealed to the ‘young, the enthusiastic and the inexperienced’.⁵⁶

Haughton was one of the few men in Dublin who mounted a substantial scientifically based challenge to Darwinian theory and alongside Harvey was one of the few whose work triggered a direct response or received recognition from Darwin himself. It would be incorrect to give the impression that there were no academic voices in favour of the new hypothesis nor that the discussion was limited to the academic community at this early stage. The two most prestigious academic societies in Dublin, the Royal Irish Academy and the Royal Dublin Society both exhibited early signs of support for Darwin’s work. Conversely, in England there was a ‘conspiracy of silence’ whereby the

⁵⁴ Ibid

⁵⁵ Ibid p.4

⁵⁶ Alvar Ellegard, *Darwin and the general reader: the reception of Darwin in the British periodical press 1859-1972* (Goteborg, 1958) p.55.

older and more prestigious a society the less they were willing to address the issue of Darwin.⁵⁷ The Royal Society in London never discussed Darwinism between 1859 and 1870. Ireland's most prestigious societies were more willing to risk discussing the volatile subject. In a series of 12 lectures given at the Royal Dublin Society in 1860 and 1861 by John Robert Kinahan, the Professor of Zoology, there was one lecture devoted to: 'Life in its fossil aspect'. In this lecture he addressed the various notions of evolution and discussed the 'falsehood and absurdity' of previous progressive and degradation theories and then goes on to discuss the 'Natural selection theory: its extreme probability'.⁵⁸ Unfortunately there seems to be no surviving copy of this lecture in full but merely a record of the syllabus in the *Proceedings of the Royal Dublin Society*. Interestingly William Harvey delivered a series of lectures on the subject of botany at the RDS in 1861 which one can be certain gave less credit to Darwin's recent work. RDS scientific lectures were typically open to all and therefore Kinahan's lectures may have reached a broader audience than lectures delivered at higher education institutions or scientific clubs and societies.

In 1866 the Royal Irish Academy elected Charles Darwin as an honorary member and interestingly there were other Darwinians short listed for the distinction, Joseph Hooker, Thomas Huxley and John Tyndall.⁵⁹ John Locke delivered an address before the Royal Irish Academy in 1865 which was published as a pamphlet and also appears in the

⁵⁷ David L. Hull, 'Darwinism and historiography' in Thomas F. Glick, *The comparative reception of Darwinism* (Austin, 1974) p.399

⁵⁸ *Proceedings of the Royal Dublin Society: 1860-61* (Dublin, 1861) p.45

⁵⁹ *Royal Irish Academy minutes of the committee of science* (9 February 1866) p.17

Proceedings of the Royal Irish Academy in which he argued against the Darwinian notion of society's progression from savagery to a civilised state. He argued rather that both have always existed alongside each other.⁶⁰ The idea of applying the concept of the evolution of society from a barbaric to a civilised state first came from Herbert Spencer in his work *Progress: its law and cause* from 1857, which predated Darwin's work but later became known as Social Darwinism. Gradualism was becoming an increasingly accepted universal truth throughout the second half of the nineteenth century and this paper is one of the earliest discussions of the evolution concept applied to society that we find coming from Dublin. Locke who seems to have been a religious man based on this paper argued that mankind's primitive form was in fact civilised in what he calls the Adamic era and barbarism was the result of war and invasion which plunged once civilised societies into decay. He also refutes the idea of mankind evolving from more primitive forms. Rather Locke believed that by: 'applying the observed numerical statistics of succession and increase to the antiquity of man, the solution will be found to confirm the mosaical period of 6,000 years since the creation of Adam. Exceed that period by even a small proportion of the hundreds of millenniums assigned by some to the past duration of our race, and then making the amplest allowances for all the checks to fecundity, inevitable, or fortuitous.....man must have multiplied up to this date to such an extent as to render collective existence impossible within his present circumscribed domain, except the cumulative pressure of population was stemmed by a universal cannibalism, or a wholesale exodus at stated periods to some other planet was found practicable. To such monstrous and absurd conclusions are those driven, who reject

⁶⁰ John Locke, *Antiquity of man: an essay* (Dublin, 1865).

the evidence of revelation, history and experience, for the wild inventions of unchastened imaginations'.⁶¹ Clearly Locke believed Ussher's calculation of the age of mankind and was opposed to all modern theories that required extending this age by many thousands of years.

Locke attempts to prove his opinion on mankind's independence from any kind of evolutionary process using the aboriginal people of Australia as an example. He considers the missing link in mankind's evolution and says that while Australia's aboriginals are the most 'debased form of the human organism' it so happens that there is no trace of the Simians that would link man to primates in living or fossil form and declares his shock that modern anthropologists propound such a strange theory.⁶² Locke concludes his paper by outlining his three main points which: 'both sacred and secular history accord with human experience in authenticating, first the mosaical limit of 6,000 years since the creation of man; secondly, that civilisation, not savagery was his primitive condition; and thirdly, his utter incapability of self renovation from moral and physical decadence, apart from extern aid and instruction. From the days of Adam even to the ascendant enlightenment of this nineteenth century of dispensation, civilisation and savagery have dwelt together upon the earth, associated although in contrasted aspects; and their continuance, without coalescing, awaits the solution of the providential, not geologic future'.⁶³ This lecture delivered by Locke is very interesting, not just because of

⁶¹ John Locke, 'On the antiquity of man' in *Proceedings of the Royal Irish Academy*, ix (1864-6) p.201.

⁶² Ibid p.206.

⁶³ Ibid p.208-9.

his attempts to defend the old order and biblical history of the world but also because it is one of the first to address the idea of the evolution of society. Furthermore, because it was a lecture grounded in biblical belief delivered before an institution that elected Darwin an honorary member only one year later.

The famous English zoologist Edward Blyth came to Dublin and gave addresses in 1863 and 1864. Blyth had recently retired after a long career as a naturalist. He was a great correspondent of Darwin and was responsible for providing him with much of the information he used in his work regarding domestication and sexual differences in birds and animals. He was considered to have been an enthusiastic Darwinist after the publication of the *Origin*.⁶⁴ At a meeting of the Natural History Society of Dublin in January 1863 Blyth was asked to give some remarks as Houghton could not attend. Here he discoursed on breeding and hybridity in pigeons. He discussed the impossibility of rigorously defining species and explained in detail the views held by Darwin and ‘the large and increasing body of naturalists of superior qualifications who participate in his opinions’.⁶⁵ Blyth had also addressed the Royal Irish Academy a year earlier ‘On the animal inhabitants of ancient Ireland.’⁶⁶ In the same volume of the *Dublin Quarterly Journal of Science* we see another article relating to the subject of species read before the Geological Society of Dublin by Alexander Carte on the former existence of the polar

⁶⁴ *Oxford dictionary of national biography*, <http://www.oxforddnb.com.iproxy.nuim.ie/view/article/2725> (30 September 2008).

⁶⁵ *Dublin Quarterly Journal of Science*, v (1865) p.34.

⁶⁶ *Ibid*, iv (1864) pp 149-52.

bear in Ireland. In this address Carte indulges us with a discussion on the remains of polar bears found to date in Ireland. He also mentions the recent increased interest in the remains of man and is interested to know how far down into the earth's crust such remains will be found before they become undistinguishable from lower forms of life. Carte considers the gradualist model of change in forms of life as the ordinary rule but seems to regard the abrupt appearance of certain fossils as unaccountable in that system and that man would not be included in this gradualist process based on findings so far.⁶⁷ This concern with the existence of sudden abrupt changes in nature was a concern of many of the opponents of Darwinian gradualism and was something which we can see was also mentioned by Harvey in his correspondence with Darwin in 1860.⁶⁸

It is clear that the subject of Darwinism was greatly discussed among the academic community during this early period and that opinions were certainly mixed on the subject, even from a purely scientific point of view. Outside of the world of academia there was some discussion of Darwinism in some more popular periodicals. The *Dublin Review* was a Catholic periodical available in Dublin at this time, it was founded in 1836 and Daniel O'Connell and Cardinal Wiseman were among its founders. Although the *Dublin Review* dealt with a large amount of Irish topics and there were a great deal of Irish contributors it was actually published in London. In 1860 the periodical printed a review of the *Origin* which was very much written from a religious point of view but was in no way ignorant of

⁶⁷ Ibid p.143

⁶⁸ W.H. Harvey to C.R. Darwin, 24 Aug. 1860, *Letter 2898*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2898.html> (2 Dec. 2008).

the scientific weight of Darwin's work. The article displays the confidence of the author in his faith. It declares that faith is not at the mercy of every fresh theorist on the mysteries of creation. He believed if one were to remain tranquil such enemies would either devour each other or new theories in science would eventually cancel one another out.⁶⁹ Despite this the author describes Darwin's work as 'so valuable, and approves itself to us individually as so genuinely scientific, the basis of the facts is so unusually broad and comprehensive, the reasoning is so dispassionate, and the writer shows himself throughout so keen-sighted to every objection, that we cannot say how grieved we are that the book should be marred by the introduction of so gratuitous and repulsive an idea, or that the theory should be carried to such unreasonable lengths.'⁷⁰ The article goes into a thirty page discussion on the topic, disagreeing with Darwin on several points. Firstly, that there cannot be a classification or genealogy of all species as he negates the difference between species and varieties. The author was at odds with Darwin for dismissing the biblical concept of the deluge. He also says that he has failed to prove the necessity for the enormous periods of time involved in the production of significant variation in species while changes in domestic animals can be made over extremely short periods.⁷¹ He claimed that Darwin could not account for the non-appearance of forms throughout all stages of the world's history nor for the vast diversity of forms found in earliest fossils in the earliest geological strata.⁷² As regards Darwin's book, it had convinced him of the great variability of plants and animals and that variations which give an advantage would

⁶⁹ *Dublin Review* (1860) p.51.

⁷⁰ *Ibid* p.52.

⁷¹ *Ibid* p.78.

⁷² *Ibid* p.79.

probably be perpetuated and other forms would become extinct. However, the author failed to believe given the evidence that 'all existing species of the same group have descended from one progenitor.'⁷³ The points raised in this article may seem slightly arbitrary but the arguments used by this author in defence of biblical creation against Darwin's concept of the origin of species are ones which we see recurring in the religious reactions throughout the period.

In the *Dublin University Magazine* in 1860 two articles were printed relating to Darwin and both of these responded favourably to the work. This periodical had no official connection to the university but contributors were typically Trinity educated men and generally covered political and literary topics. Isaac Butt was amongst its founding members and contributors to the periodical included Joseph Sheridan Le Fanu, Samuel Ferguson and William Wilde. In the February issue Christopher Grim wrote an article 'My club table' in which he laid out some of the ideas of Darwin's work in relatively straightforward terms and he recommended it 'earnestly to all readers, and deprecating the use of the theological tomahawk in the discussion of a matter in which science alone has a right to speak'.⁷⁴ He explains that the theory sought to prove that the view which most naturalists held and Darwin once held that each species has been created independently is erroneous.⁷⁵ The author also mentions that he is glad that the *Edinburgh Review* had not yet offered a critique on the book as he believed that the work was

⁷³ Charles Darwin, *The origin of species by means of natural selection* (London, 1985) p.306

⁷⁴ Christopher Grim, 'My club table' in *Dublin University Magazine*, lv (1860) p.235

⁷⁵ Ibid

worthy of people offering their own opinions. Grim was also aware of the situation with Wallace and explains to the reader that Darwin's work was rather hastily published and believed that the *Origin* would eventually form one part of a much larger work.

Later on that year the other article which was printed on the subject in the *Dublin University Magazine* appeared under the simple title of 'Palaeontology'. The anonymous author offers his interpretation of Darwin's work and tells the reader that 'without accepting all the conclusions of the author and without entering upon those questions that have been and will continue to be disputed, there is an abundance of matter in this volume which all naturalists must value, and which even for the general reader is as interesting as it is novel'.⁷⁶ While explaining how Darwin's theory works the author clearly shows that he finds no problem holding Darwin's theory alongside the acceptance of the existence of a divine creator. 'There is nothing in this view of the method of creation that can be regarded as derogatory to the power and dignity of the great creator; for, the gradual derivation of species from varieties, under the action of a law imposed on organization, is as great an exhibition of power as the occasional infraction of a law, or the constant recurrence of special acts of creation.'⁷⁷ The author continues that Darwin believed that the objections to his work lay in the imperfection of the geological record which if to be seen as a history of the world, then, they had yet seen a minute part to date. The author, who seems to have been in the department of palaeontology at Trinity, believed that their studies of geology would in due time be rewarded by the 'development

⁷⁶ D.T.A., 'Palaeontology' in *Dublin University Magazine*, lv (1860) p.716.

⁷⁷ Ibid p.718.

of the real law of progress, whatever law that may be'.⁷⁸ However, in the second part of the article the author makes reference to fellow palaeontologist Richard Owen who actually became an outspoken opponent of Darwin. Despite this the author communicates that Owen's work on the unity of creation remains one of the most important results of the study of natural science.⁷⁹ This article is remarkably open-minded and the author clearly does not see any of his religious or scientific principles threatened by Darwin's findings.

Trinity College had conveyed a full array of opinions on Darwin's work from Haughton's scientific opposition down to the attempts to reconcile the idea of a creator with the new theory in the *Dublin University Magazine*. In Trinity's Catholic counterpart, St. Patrick's College Maynooth, there was less evidence of discussion of Darwinism during the 1860s. Walter McDonald (who becomes important to this study later on) was training for the priesthood at Maynooth in the 1870s. McDonald in his *Reminiscences* described being taught philosophy of a very bald nature by a Mr. Hackett during his student years. He exclaimed that 'Darwin was then revolutionizing thought; but we overturned him in two or three brief sentences'.⁸⁰ He further explained that the materialistic and agnostic schools of thought that arose in England in the wake of Darwin with men such as Spencer

⁷⁸ Ibid p.722.

⁷⁹ Ibid lvi 'Palaeontology II' (1860) p.34.

⁸⁰ Walter McDonald, *Reminiscences of a Maynooth professor* (London, 1925) p.66

and Huxley were almost completely overlooked and that in Maynooth they were educated in an outdated fool's paradise as if it were the eighteenth or sixteenth century.⁸¹

There is little else to be found in the way of references to Darwin's work coming from Maynooth during this early period, although we have already seen the president of the college Charles William Russell responding favourably to the non-Darwinian findings of Houghton's *Animal mechanics*. One major exception to this rule was Gerald Molloy the Dublin born Professor of Theology at Maynooth from 1857 to 1874 prior to moving on to the Catholic University in Dublin. Molloy, although a theologian, had a great interest and ability in the sciences, particularly in the field of geology. He published a book *Geology and revelation* in 1870 which had originally been run as a series of articles in the Catholic periodical the *Irish Ecclesiastical Record*. This work deals primarily with the origins of the earth rather than the origins of species but displays sympathies with Darwin's work and is also important as an example of a theologian dealing with scientific modern thought during this period. Fortunately a large body of Molloy's private papers has survived and are held at the Russell Library at Maynooth. This largely untapped resource is a collection of private notebooks, publications and lecture series, written by Molloy who helped popularise science in his time through various popular lectures. Much of these notebooks contain his thoughts on theological and scientific matters. There is a good body of notes on this matter of geology and revelation from his days at Maynooth. The papers also include a large number of notes and lectures on the topic of electricity

⁸¹ Ibid.

which seems to have been his main preoccupation during his time at the Catholic University in Dublin.

Molloy believed that it was possible to reconcile the *Genesis* account of creation with the geological evidence of the age of the earth and this is evident also from his private papers. He believed that recent discoveries in the field of geology were not a threat to the place of God in the story of creation but rather allowed for God using secondary causes over long periods of time as opposed to direct divine intervention. Molloy thought that *Genesis* and the newly established lengthy geological eras could fit together if there was a reconsideration of the time frame of the book's account of creation. This can be seen clearly from his private papers held at Maynooth. In a private journal dated from 1863 he attempts to defend the bible's story of creation by looking at it from different perspectives. Geological evidence had rid the world of the notion that only 7,000 years had passed since creation, to counter this Molloy suggests that perhaps 7,000 years had passed since the creation of Adam instead. Molloy suggests that the six days of creation may have not been consecutive or alternatively that we should take a different interpretation of 'one day' which could really be an entire age.⁸² This type of defence of *Genesis* was becoming quite common among theologians at this time and later in the century metaphorical interpretations of the story of creation were becoming more common.

⁸² Gerald Molloy, Notebook 1863 (Russell Library, Maynooth, Molloy Papers, MS 1, i).

Like Darwin himself, Molloy looked to Charles Lyell as the great authority in the field of geology. In his private papers Molloy discusses Lyell's work, the *Antiquity of man*.⁸³ This was a book written by Lyell later in his career which took into account the recent findings in the fossil record of humankind dating them back to prehistoric times and also gave a favourable review to Darwin's 1859 publication of the *Origin*.⁸⁴ Lyell in his earlier work had not given his approval to evolution as a concept but did so after Darwin's work. He allowed the idea that humans could be included in this system in a physical sense but making exception for the mental and moral aspects of mankind since he himself was a religious man.⁸⁵ Molloy in his private notes referred to Lyell rather than Darwin as he considered him to be the most eminent writer on the matter of antiquity of the earth at that time. Molloy believed that the theories of modern geology did not require more than 7,000 years of history for their account of mankind. He said no remains of man had been found in the earliest strata of the earth but some traces had been found in later strata and declared that these discoveries have recently led to very extravagant and unfounded conclusions.⁸⁶ Molloy was generally quite open-minded regarding scientific matters and also seemed willing to have a reconciliatory approach to the interpretation of the bible. Despite this, he clearly had difficulty accepting the inclusion of man as part of the framework of beings that had developed from simpler forms of life. Lyell himself was at this point slowly coming to accept Darwin's hypothesis. In other parts of these private

⁸³ Charles Lyell, *Antiquity of man* (1863)

⁸⁴ *Oxford dictionary of national biography*

<http://www.oxforddnb.com.idroxy.nuim.ie/view/article/17243?docPos=2> (3 September 2008)

⁸⁵ *Ibid*

⁸⁶ Gerald Molloy, Notebook 1863 (Russell Library, Maynooth, Molloy Papers, MS 1, i).

notes we see him trying to confirm that man had not existed in the earlier periods and making defences against some of the ideas involved in evolution. He discusses ethnography and argued that science did not yet fully understand the impact of climate on race and that it would be quite possible for such skin colour differences that exist today to have occurred over only 200 generations.⁸⁷

Molloy displays his awareness of Darwin's work in his 1873 book *Geology and revelations*. Although he does not discuss in detail the antiquity of man in this case he does discuss other parts of Darwin's work such as his theories on the subsidence of the ocean bed as one example.⁸⁸ He also addressed the age of mankind briefly in a chapter dealing with geological chronology and the succession of organic life in which he clearly emphasises that man was the last work of creation: 'No bone of man, no trace of human intelligence is to be found in any bed of rock that belongs to the primary, secondary or tertiary formations. It is only when we have passed all these, and come to the latest formation of the whole series, nay, it is only in the uppermost beds of this formation, that we meet, for the first time, with human bones, and the works of human art. Thus it appears pretty plain, even from the testimony of geology, that man was the last work of creation; and that, if the world is old, the human race is comparatively young.'⁸⁹ Here Molloy clearly displays his opinion that despite the recent discoveries of geology and the evidence for a much greater antiquity of the earth, that the age of mankind is

⁸⁷ Ibid

⁸⁸ Gerald Molloy, *Geology and revelations* (London, 1873) p.155

⁸⁹ Ibid p.260.

comparatively young and therefore the biblical interpretation of mankind could still be upheld.

Molloy also touches on the subject of evolution of species although there is no mention of the word 'evolution' or reference to the work of Darwin directly but he rather once again refers to Lyell as his authority on the matter. He quotes directly from Lyell's *Principles of geology* to demonstrate that there has been through the ages a gradual transitional pattern of living organisms: In passing from the older to the newer members of the tertiary system we meet with many chasms, but none which separate entirely, by a broad line of demarcation, one state of the organic world from another. There are no signs of an abrupt termination of one fauna and flora, and the starting into life of new and wholly distinct forms. Although we are far from being able to demonstrate geologically an insensible transition from the Eocene to the Miocene, or even from the latter to the recent fauna, yet the more we enlarge and perfect our general survey, the more nearly do we approximate to such a continuous series, and the more gradually are we conducted from times when many of the genera and nearly all the species were extinct, to those in which scarcely a single species flourished which we do not know to exist at present'.⁹⁰ His conclusion then is that: 'the extinction and creation of new species has been the result of a slow and gradual change in the organic world'.⁹¹

⁹⁰ Ibid p.263

⁹¹ Ibid.

Molloy also takes a step towards discussion of the natural selection theory when he writes that: 'we find a gradual advance in the types of animal organisation....from the humbler and more simple forms of structure to those of a higher and more perfect character. That form of organisation is regarded among zoologists as the more perfect in which there is a greater number of organs specifically devoted to particular functions'.⁹² This idea of a transition of forms through species carrying forward the organs that are suited to ensure their survival is the basis of the natural selection theory. Molloy divides all forms of animal life into two basic divisions, vertebrate and invertebrate, and then charts the appearance of the progressive forms of vertebrates including man on this scale. 'The vertebrate animals do not all make their appearance at once, but come in successively according to the same scale of organic perfection, - the fish appearing first, then the reptiles, then the birds, and lastly the mammalian. Even among the mammalian, a well defined order of progressive succession has been observed, which finally culminates in the appearance of man, the last created and most perfect of animals'.⁹³ This can be seen in a table of geological formations, included here below, made by Molloy which shows the first appearance of the various forms of animal life with man at the top of the scale.


⁹⁴Even though the very intention of Molloy's book was to uphold the veracity of scripture through accounting for modern scientific discoveries, this inclusion of man on an ascending scale of animal life was an extremely outlandish move for a Catholic theologian.

⁹² Ibid p.267.

⁹³ Ibid p.268.

⁹⁴ Ibid p.269.

TABLE OF GEOLOGICAL FORMATIONS,
SHOWING THE FIRST APPEARANCE ON THE EARTH OF THE VARIOUS
FORMS OF ANIMAL LIFE.

	RECENT.				
	POST-PLIO-CENE.	GLACIAL DRIFT			
TERTIARY.	PLIOCENE.				
	MIOCENE.				
	EOCENE.	U U U U U U U U U U U U U U			
		O O O O O O O O O O O O O O			
SECONDARY.	CRETACEOUS.	CHALK			
		WEALD			
	JURASSIC.	OOLITE			
		LIAS			
	TRIASSIC.	NEW RED SANDSTONE			
PRIMARY.	PERMIAN.				
	CARBONIFEROUS.	COAL			
		MOUNTAIN LIMESTONE			
	DEVONIAN.	OLD RED SANDSTONE			
	SILURIAN.				
	CAMBRIAN.				
	LAURENTIAN.				
			INVERTEBRATE.		
			VERTERATE:—FISH.		
			VERTERATE:—REPTILES.		
			VERTERATE:—BIRDS.		
			VERTERATE:—MAMMALS;		
			NON-PLACENTAL.		
			MAMMALS; PLACENTAL.		
					MAN. Human bones and works of human art.
					Gigantic Mammalian quadrupeds, now extinct.
					Shells of minute animalcules composing the White Chalk.
					Extraordinary development of marine Reptiles.
					Oldest Fossil Mammal.
					Earliest trace of Birds.
					First appearance of Reptiles; Archegosaurus; discovered in the Coal Measures near Strasburg, 1847.
					Fossil Fish in great abundance.
					Most ancient Fossil Fish; found near Ludlow, on the borders of Herefordshire.
					Eozoon Canadense; oldest known Fossil.

Gerald Molloy's 'Table of geological formations' in *Geology and revelation*, 1873.

The second part of this book is dedicated to the reconciliation of the *Genesis* account of creation with modern geology, a theme we have seen already in his private notes. In this he explains that he accepts the geological theory and extreme antiquity of the earth but attempts to maintain the *Genesis* story by re-interpreting its words. He examined two hypotheses which may allow *Genesis* and geology to stand in agreement. The first is the idea of an indefinite period of time between the creation of the world and the first mosaic day and the second is the idea that the days of creation could be long periods of time instead of days in their literal sense. Molloy is also aware that readers may consider these hypotheses to have ventured into dangerous ground and so he offers a number of similar opinions held by eminent men to help reassure them. These eminent men included Cardinal Wiseman who Molloy claimed had inclined to such opinions in lectures he had delivered thirty years earlier on the connection between science and religion.⁹⁵ Molloy then declares that there is: 'nothing in the mosaic narrative, when carefully examined, at variance with the hypothesis of an indefinite interval between the creation of the world and the work of the six days. And, in the second place, we contend that it is quite consistent with the usage of sacred scripture to explain these days of creation as long periods of time'.⁹⁶ Having examined both hypotheses, and offering a chart of readjustment of geologic time and the mosaic days, Molloy comes to the conclusion that either could be legitimate explanations for the findings of modern geology and a successful reconciliation with revelation. Molloy's conclusion shows that he felt he had

⁹⁵ Ibid p.357.

⁹⁶ Ibid.

defended scripture against any question regarding its veracity that had arisen from modern geology.

Molloy's conclusion in *Geology and revelation* mentions that he had hoped to return in future to the second branch of the investigation, in reference to the teaching of the bible as regards the antiquity of the human race.⁹⁷ In Molloy's private notes we see that he was still concerned with this topic in the 1880s. At this point in his career he had left Maynooth and had been a professor at the Catholic University until it eventually dissolved whereupon Molloy became involved with the Royal University.⁹⁸ In these private notes we see him preparing something on the *Geological evidence of the antiquity of man* in 1887.⁹⁹ He discussed the various remains of man from neanderthals down to modern man. He claimed that man had already occupied all the earth's continents as early as the quaternary period (the period in which the continents assumed their modern configuration) and that they already existed in the form of several clearly distinct races.¹⁰⁰ He makes one significant allusion to Darwinian theory here when he states that because of the evidence of man from this early period that there is 'great reason to believe that all races came from one common stock'.¹⁰¹ Even in his later career we still find among his notes attempts to reconcile scripture with science. For example, he tries to maintain the

⁹⁷ Ibid p.432.

⁹⁸ *Oxford dictionary of national biography* <http://www.oxforddnb.com.jproxy.nuim.ie/view/article/35056>
(6 September 2008)

⁹⁹ Gerald Molloy, Notebook 1887 (Russell Library, Maynooth, Molloy Papers, MS 7, i).

¹⁰⁰ Ibid p.3.

¹⁰¹ Ibid.

story of Noah and the deluge by introducing a number of assumptions to account for the geological records of modern times.¹⁰²

It is interesting to see how this man of science who was also a theologian dedicated so much time and effort to trying to maintain the position of religion in an age of rapid scientific discovery. Walter McDonald when discussing Molloy in his *Reminiscences* mentions how the professor had been preparing this second volume on the antiquity of man and explains that Molloy had chosen to keep his opinions to himself as 'he had no taste for martyrdom'.¹⁰³ The climate of discussion had become more hostile in this later period and any publication on this subject was much more likely to arouse a controversy. Thomas Duddy has included Molloy's *Geology and revelation* in his collection of contemporary works entitled *The Irish response to Darwinism*. In his introduction to the collection he describes this work quite accurately as a milestone in the Irish reception of evolutionary ideas owing to Molloy's attempt to consider and reconcile both the scientific and the theological points of view equally and dispassionately.¹⁰⁴ Such attempts at a reconciliation of faith and science became much more difficult for Catholics later in the century as we will see later with Walter McDonald during his tenure as professor in Maynooth.

¹⁰² Idem, Notebook 1888 (Russell Library, Maynooth, Molloy Papers, MS 7, ii)

¹⁰³ Walter McDonald, *Reminiscences of a Maynooth professor* (London, 1925) p.54.

¹⁰⁴ Thomas Duddy (ed.), *The Irish response to Darwinism*, i (Bristol, 2004). p xxiv.

The first period of this fifty year study, which this chapter covers, ends at 1874. However, it is important to remember that in 1871 Darwin published his next important work the *Descent of man* in which he applied the theory of evolution to mankind and aroused more controversy on the subject. By the 1870s Darwinism as a movement of its own far surpassed the boundaries of Darwin's original work. Darwinism began to have implications on all of society as the concept of evolution was applied to it by certain academics, namely Herbert Spencer, who we have seen was the father of Social Darwinism and introduced the idea of the survival of the fittest in human society. There was great concern among religious and conservative quarters over this growing wave of modern thought and this can be seen clearly by the 1870s. We see a series of responses to Darwinism and its related forms of modern thought in the monthly Catholic periodical the *Irish Ecclesiastical Record*, which had been founded by the Archbishop of Dublin Paul Cullen to be a link between Ireland and Rome in 1864. In May 1873 the *Record* published an article simply entitled 'Darwinism' which was reprinted from a popular lecture delivered to a mixed audience in America and was clearly triggered by Darwin's publication of the *Descent of man* three years earlier.¹⁰⁵ The anonymous author under the pseudonym, J.G.C, unsurprisingly comes down against Darwin in relation to both the story of creation and the descent of man and does his best to dismantle Darwin's theory of natural selection and in his work on the descent of man from the apes by picking holes in his work and pointing out its moral deficiencies.

¹⁰⁵ Patrick J. Hamell, *Index to the Irish ecclesiastical record, 1864-1917* (Dublin, 1959) and Charles Darwin, *The descent of man* (London, 1871).

This article for the most part is quite mocking of Darwin's ideas and the author displays that he was a deeply religious man as one would expect from this periodical. The author tells us that man's 'pedigree is the question of the hour. If on this question we consult the naturalist's college of heraldry, we shall be puzzled to determine – so much pursuivants differ – whether we descend from a chimpanzee or a gorilla, from a jelly or from a seaweed, or derive from a collection of gases electro-chemically combined. For my part I am content to accept my pedigree under the hand and seal of the oldest king-at-arms that we know. He had his tabard from God. He wrote about thirty four centuries ago; the duty having been placed on his shoulders, and the authority furnished by the creator himself, he has recorded our pedigree in the book of Genesis. If anyone is not content with a genealogy that runs back six thousand years, let him take Darwin for his guide, and let him be assured that under such guidance he may "travel further and speed worse"'.¹⁰⁶

This statement makes clear his preference towards a scriptural history of the world ahead of Darwin's efforts. The author claims that Darwin cannot account for the 'countless millions of transitional forms (that) are unnoticed in the broad volume of nature's annals'.¹⁰⁷ He also continues on with an attempt to disprove the possible transition from apes and baboons to man's current physical and mental state. In his conclusion J.G.C. shows his opinion on Darwin's attempts to explain the beginnings of religion among mankind whereby 'religious devotion consists of love, complete submission to an exalted and mysterious superior, a strong sense of dependence, fear, gratitude and hope for the future, and then maintaining that all this in the germ may be witnessed in "the deep love

¹⁰⁶ J.G.C., 'Darwinism' in *The Irish Ecclesiastical Record*, ix (1873) p.337-8.

¹⁰⁷ Ibid p.350

of a dog for his master””.¹⁰⁸ As a result of this the author claims that the ‘tendency of his doctrines is – if not to eliminate creative action altogether out of the universe of mind and matter, and to reduce the order of harmony of nature to the results of blind fortuitous forces, which would be to obliterate God altogether – at least to place the creator at such a distance from his works that his supervision, providence and justice may be safely ignored’.¹⁰⁹ Darwin’s affront on the position of God was clearly the authors greatest concern. He then rounds this off with a quote from Agassiz that the ‘transmutation theory is a scientific mistake, untrue in its facts, unscientific in its methods, and mischievous in its tendency’.¹¹⁰

J.G.C is also quite aware of the nature of Darwinism as a movement or concept itself at this point. He explains that the word (Darwinism) is popularly associated with man’s descent from the apes but that is also covers a much ‘wider area of scientific significance, embracing a complex of opinions involved and unfixed, undergoing modification, and losing coherence to that degree that Darwin is no longer the best exponent of Darwinism or its most formidable champion.’¹¹¹ This is an extremely apt and accurate understanding of how Darwinism had developed by the 1870s and it is interesting to see this kind of awareness in Ireland at that time. Darwin’s name and work had become the flagship for the armada of modern thought which was bombarding contemporary society and its morals and traditions.

¹⁰⁸ Ibid p.361

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

¹¹¹ Ibid p.141.

The *Irish Ecclesiastical Record* also ran a series of five articles over the years 1873 and 1874 on the subject of 'The Church and modern thought', the author of which not being disclosed in the periodical. This series aimed to deal with all branches of modern thought and displays some considerable arrogance as it declares in the first article that it is 'only from the Catholic Church that the infidel element of modern thought can meet with any forcible answer, or any effectual opposition'.¹¹² Although these articles do not deal directly with Darwin's work they do show the Catholic Church's standpoint in Ireland on the various forms of modern thought including those strains which would fall under the heading of Darwinism. In the first two articles it is made quite clear that intellectual authority is a primary concern and that the Church is the only one that can offer effective authority when it comes to the progress of the human mind. The origin of modern thought is said to be Protestantism as it explains that the intellectual basis of that religion is the rejection of intellectual authority.¹¹³ This was an argument seen quite frequently among Irish Catholic circles and we see later on how discussions of modern thought simply became another battleground for the conflict between Catholicism and Protestantism.

Early in the first article the author lays out the Catholic Church's interpretation of the aims and implications of modern thought in relatively straightforward terms: 'The origin of this "modern thought" is to be found in Protestantism as a system – and its tendency is a tendency which, indeed, is no longer a mere tendency, but a full development into pure

¹¹² 'The Church and modern thought' in *The Irish Ecclesiastical Record*, ix (1873) p.494.

¹¹³ Ibid p.498.

naturalism. Some of its leading assumptions are – and they are assumptions which, beyond all others, should be branded as “unscientific” – that there is no such thing as “the supernatural” – or at least, that if there be, it cannot be brought within the scope of human knowledge; that physical experiment is the sole test of scientific truth, and that, consequently, any proposition not capable of submitting itself to that test, thereby forfeits any claim to the attention, not to say the adherence, of the human mind; that there is, in the domain of matter, such a “reign of law”, that God himself cannot interfere in its working, and in the domain of morals such a “law of evolution” that the human will counts for nothing in the production of history; that consequently miracles are myths, the sediment, as it were, of unscientific ages past, and that responsibility is a bugbear, which having served its purpose with the intellectual children of a pre-scientific period, may now be relegated to the domain of exploded superstitions, and be substituted by the infallible dogma, that even if a man does wrong, he is only fulfilling a certain law that works in spite of him to the progress of the species’.¹¹⁴ Although the author admits that the statements of modern scientific men within their own field are worthy of credence he states that: ‘it has become more than ever necessary to distinguish between the statements of scientific men on the proper subject matter of their science, and their arbitrary assumptions and crude theories by which they make unwarrantable incursions into the sciences in which.... they are complete beginners – more in need of teaching than competent to teach’.¹¹⁵

¹¹⁴ Ibid pp496-7.

¹¹⁵ Ibid p.500.

The articles then embark on a discussion of views on the formation of modern thought as originating from Descartes' model of philosophy and then through Spinoza, a disciple of Descartes, who popularised pantheism, with naturalism singled out as the main root of error in all modern thought (these systems of philosophy will be discussed in detail in the next chapter). The author discusses the noted Darwinists Huxley and Tyndall and their attempts to disprove religious beliefs such as the efficacy of prayer. He believes that although physical science regards itself as the only true science that the reality is that the human intellect is too limited to ever attain comprehension of the absolute truth, 'it may apprehend the existence of absolute truth, it cannot comprehend it'.¹¹⁶ For the church the main problem lay in the rejection of the supernatural by modern science and philosophy, this was simply unacceptable.

The church was already fighting the rise of positivism, a school of philosophical thought led by Auguste Comte until his death in 1857. Positivism espoused the denial of all non-sense based knowledge and therefore anything supernatural. Darwinism had now taken the mantle as the main ideological challenger coming from 'atheistic' quarters as it took on its role as the symbolic mainstay of all modern thought. This early period in Dublin and Ireland does not compare to England in the intensity of the debate over Darwinism that was taking place. Despite this, there was a clear awareness of his work in scientific quarters at least, with a wide range of opinions coming from this community and men of science such as Harvey and Haughton making their mark on the debate internationally. It is also clear that by the early 1870s Darwinism had by then become recognised as a

¹¹⁶ Ibid, x (1874) p. 238

movement as seen clearly from the 'Darwinism' article in the *Irish Ecclesiastical Record*. However, the threat it posed to the order of society was not fully realised or acknowledged until John Tyndall's Belfast address in 1874 in response to which the religious community took a defensive stance against science.

3. The Tyndall Catalyst

In 1874 Irish born scientist John Tyndall stood before the annual meeting of the British Association for the Advancement of Science gathered in Belfast to give his presidential address and boldly declared the independence of the scientific world from the intellectual authority of religion. ‘The impregnable position of science may be described in a few words. We claim, and we shall wrest, from theology the entire domain of cosmological theory. All schemes and systems, which thus infringe upon the domain of science, must in so far as they do this, submit to its control and relinquish all thought of controlling it’.¹¹⁷

Tyndall’s belligerent words were very much intended to arouse controversy among religious and scientific communities and in this they succeeded. This controversial address was a catalyst which increased debate regarding Darwinism and related forms of modern thought to an unprecedented level. This single address defines and shapes an entire period in the study of the Darwin debate in Dublin and indeed in Ireland as a whole. We saw in the previous chapter that the debate in Dublin regarding modern thought was beginning to heat up in the years immediately prior to 1874 and given that context it is not surprising that one man seeking controversy could cause the whole situation to erupt.

¹¹⁷ John Tyndall, *Address delivered before The British Association assembled at Belfast with additions* (London, 1874) p.61.

Given that this period and indeed this chapter is shaped so significantly by the words of one man it seems important to give a description of John Tyndall's background. John Tyndall was born in Leighlinbridge, Co. Carlow in 1820. He was born into a Protestant family which had settled in Ireland in the seventeenth century and his father was in fact an Orangeman. His father seemed to have instilled in him his great interest in theological debate which was characteristic of his entire career.¹¹⁸ Although he was not from a particularly wealthy background he still received schooling until the age of seventeen. He spent a period working in the Ordnance Survey in both Ireland and England and later working as a rail engineer in England during the railway boom. Tyndall then went on to Marburg in Germany where he completed his doctorate in science under the famous chemist Robert Bunsen. After this he began to focus on physics in particular and it was in this field which he became a renowned scientist.

In 1851 Tyndall went to Berlin to carry out research in diamagnetism and his work here brought him to the attention of the Royal Institution in London where he was invited to give a lecture in 1853. The Royal Institution was a great centre of scientific research and boasted some of the most renowned scientists of the day including Michael Faraday. This was a golden opportunity for Tyndall, who was struggling to find a professorship at a university. He had already developed an outstanding ability in public oratory and intended to utilise this to its fullest at his Royal Institution lecture. Fortunately he made

¹¹⁸ Burchfield, Joe D., *John Tyndall – A biographical sketch* in Brock, W.H., McMillan, N.D. and Mollan, R.C. (eds) *John Tyndall: essays on a natural philosopher* (Dublin, 1981) p.1

such an impression that three months after this lecture he was offered the position of professor of natural philosophy at the Royal Institution itself. Offers of positions at various institutions came pouring in but the opportunity to work at the Royal Institute was one which he could not refuse. In fact he went on to spend the rest of his professional life there. Here he perfected his lecturing techniques and became particularly renowned for his popular public lectures attracting large audiences due to his ability to make difficult concepts understandable. He is considered to be one of the great popularisers of science in his time.



John Tyndall lecturing at the Royal Institution, London.¹¹⁹

One crucial difference in the climate for discussion before and after Tyndall's historic address was Darwinism becoming a central tenet of a movement known as scientific naturalism. Earlier in the nineteenth century right down into the 1860s it was quite often believed that there was no necessary conflict between scientific and religious truths, science could in fact help re-enforce religious views and we have seen this already with men in Dublin such as Haughton and Molloy. However, this changed significantly in the third quarter of the century as a result of this scientific naturalism movement and the

¹¹⁹ Image available at http://understandingscience.ucc.ie/img/sc_John_Tyndall.jpg (12 Jan. 2009).

opinions of the men leading it into battle. The most influential group of scientists that pushed for this change were the group of nine prominent scientists in London which came to be known as the X Club. John Tyndall was one of these nine alongside other scientific heavyweights like Thomas Huxley and Herbert Spencer. It began as an informal dining club of friends in 1864 who met monthly to discuss issues of science. Between them they dominated scientific circles for almost thirty years. Their shared value was a devotion to 'science, pure and free, untrammelled by religious dogmas'.¹²⁰ To quote Frank Turner scientific naturalism as a movement likewise sought to 'create a secular climate of opinion that would permit the theories and practitioners of modern science to penetrate the institutions of education, industry, and government for the material progress and social amelioration of the nation'.¹²¹ Scientific naturalism wanted to establish laws of development in all things without any necessary reference to spiritual or theological considerations. Darwinism and its defence was a central part of this movement. These naturalists believed that society could only progress through the pursuit of science. The advocates of scientific naturalism believed that the scientific method was the only way to investigate reality. They did not necessarily deny the possibility of the supernatural in an atheistic fashion. Some such as Huxley would describe themselves as agnostic and John Tyndall as we shall see later would certainly not have described himself as an atheist. The liberation of science from the imposition of any creed's intellectual authority was far more important than any individual scientist's views on life and the existence of God.

¹²⁰ *Oxford dictionary of national biography* <http://www.oxforddnb.com.jproxy.nuim.ie/templates/theme-print.jsp?articleid=92539> (31 March 2008).

¹²¹ Frank Turner, 'Victorian scientific naturalism and Thomas Carlyle' in *Victorian Studies* xviii (1975) p.325

In the years leading up to the Belfast address he wrote on a number of issues which aroused debate back in Dublin. As part of Tyndall's great quest to bring science to ordinary people he published a series of detached lectures and essays in 1871 under the title *Fragments of science; for unscientific people*.¹²² Among these articles he presented arguments against both the possibility of miracles and the effectiveness of prayer. Here he tried to rid ordinary people of what he believed to be nonsensical notions and indeed barriers to progress in society. These discourses on prayer and miracles instigated quite a discussion in Dublin among Catholic theologians. We also see that although Tyndall was based permanently in London his work was followed with a keen eye in Ireland as he was this country's most prominent scientist.

In the series of articles on 'The Church and modern thought' in the *Irish Ecclesiastical Record* which was touched on in the last chapter we see responses to Tyndall's earlier work on miracles and prayer. Here the Catholic Church laid out its position in relation to modern thought and by this they were referring broadly to naturalism and allowing various philosophical notions to fall under that heading. The articles upheld that Protestantism was the origin of modern thought as it denied any external authority and allowed for private judgment on matters of religion.¹²³ For them the intellectual authority of the church was absolutely necessary for the progress of the human mind and the Catholic Church represented the only effective opposition to the rising tide of modern

¹²² John Tyndall, *Fragments of science; for unscientific people*, ii (London, 1879).

¹²³ 'The Church and modern thought' in *The Irish Ecclesiastical Record*, ix (1873), p.498

thought. This was in sync with Pope Pius IX's *Syllabus of errors* from 1864 which condemned naturalism alongside the concepts of rationalism and pantheism.

In one of the articles in the *Irish Ecclesiastical Record* Tyndall's opinions on miracles and prayer are dealt with directly. In their opinion he clearly saw miracles as utterly impossible citing Tyndall's opinions on God stopping the rotation of the earth or appearing as a burning bush.¹²⁴ In relation to prayer Tyndall is quoted from his *Fragments of science* publication as saying that 'Granting the power of free will in man... and assuming the efficacy of free prayer to produce changes in external nature, it necessarily follows that natural laws are more or less at the mercy of man's volition, and no conclusion founded on the assumed permanence of these laws would be worthy of confidence'.¹²⁵ Effectively Tyndall considered the ordinary Christian doctrine on the subject of prayer to be untenable.¹²⁶ The article further claims that this concept of naturalism not only attempts to strip man of his religion but completely remodel society based on its hollow template leaving us with; 'reason without revelation, intellect without faith, will without grace, society without the church, humanity without the incarnation, the world without God'.¹²⁷ This is clearly not the kind of society in which a devout Catholic would wish to live. The article then continues on in an attempt to disprove the naturalists and claiming that the fundamental flaw with the philosophy is found in its concept of the origin of the world, that a creator acts directly only at the origin of the creation and after

¹²⁴ Ibid, x (1873) p.104.

¹²⁵ John Tyndall, *Fragments of science*, ii (London, 1879) p.36.

¹²⁶ 'The Church and modern thought' in *The Irish Ecclesiastical Record*, x (1873), p.106.

¹²⁷ Ibid p.107.

that can only act through secondary causes. Denial of the existence of the supernatural to them is absurd since they believed that the very idea of the existence of the supernatural has influenced the evolution of human history more than any other factor.¹²⁸

Overall this discourse between the Catholic Church in Ireland and Tyndall is fairly typical of the dispute between men of science and religion at that time. However, this seems quite tame in comparison to the controversy which followed Tyndall's famous address to the British Association. So why did Tyndall's address manage to inflame this debate to such a degree? The content of the address was a very important factor but other factors including the context and location of the event were crucial in making Tyndall's address one of the most notorious events in the clash of science and religion in the nineteenth century English speaking world.

As mentioned earlier the event was the annual meeting of the British Association for the Advancement of Science. The mission of this society was 'to give a stronger impulse and a more systematic direction to scientific inquiry; to promote the intercourse of those who cultivate science in different parts of the British Empire with one another and with foreign philosophers; to obtain more general attention for the objects of science and the removal of any disadvantages of a public kind that may impede its progress'.¹²⁹ This was certainly a motto to which John Tyndall and the movement of scientific naturalism could relate.

¹²⁸ Ibid p.109.

¹²⁹ *The History of the British Association*, available at The British Association <http://www.the-ba.net/the-ba/AbouttheBA/HistoryoftheBA/index.htm> (2 April 2008).

The British Association's annual meeting was a standard feature in an X Club member's diary. Each year this annual meeting took place in a different city and each year a president was nominated to chair the proceedings. Part of the tradition of the presidential position was an inaugural address. In earlier years this address was merely a summary of the year gone by but throughout the 1860s the addresses had become more and more animated with presidents taking the opportunity to express their opinions on the place of science.

Tyndall's address would not be the first one to cause controversy. As we have seen an earlier famous debate had taken place between Thomas Huxley and Archbishop Wilberforce in 1860 over Darwin's hypothesis in the *Origin of species* published less than a year earlier. Tyndall would not be the first Irish voice heard at the meeting either. Richard Whately Anglican Archbishop of Dublin had given an address in the 1867 meeting in Dundee arguing against X-Clubber John Lubbock over the Darwinian notion of man's advance towards civilisation from a state of barbarism.¹³⁰ This viewpoint was similar to that presented by John Locke in his paper delivered at the RIA in 1865 which was mentioned in the previous chapter. Tyndall had himself also given a lecture to the British Association in 1870 at its meeting in Liverpool, but unlike Belfast no controversy was provoked.

The meeting took place in the Ulster Hall in Belfast in August 1874 and a convocation of

¹³⁰ Alvar Ellegard, *Darwin and the general reader: the reception of Darwin's theory of evolution in the British periodical press 1859-1872* (Goteborg, 1958), p.81

members of the X-Club were in attendance. Huxley himself also gave a lecture at the same meeting. In Tyndall's address he first presented a history of the great scientific thinkers down through the ages from Democritus and Lucretius through Newton and Copernicus down to Darwin and Spencer. Much weight is obviously given to Darwin and his contemporary exponents. This is aimed to be an alternative history of thought with Tyndall overlooking the medieval Christian contributors. He then moves on to discuss the position of science in contemporary society and throws down the proverbial gauntlet that was mentioned at the beginning of this chapter: 'the impregnable position of science may be described in a few words. We claim, and we shall wrest, from theology the entire domain of cosmological theory. All schemes and systems, which thus infringe upon the domain of science, must in so far as they do this, submit to its control and relinquish all thought of controlling it'.¹³¹ Tyndall was not only protesting the notion of church interference in scientific matters but also going so far as to demand theologians' submission to a new intellectual world order. Such a strong declaration would not go unnoticed anywhere but especially so in 1870's Belfast.

Alongside his attack on the authority of the church, Tyndall also laid out his position on materialism and displayed his pantheistic views of the universe, neither of which were acceptable dogmas to organised religion. Tyndall was unusual even among his peers for openly using the term materialist in relation to himself as the term carried quite a considerable stigma. It was the notion that the only thing that can be proven to exist is

¹³¹ John Tyndall, *Address delivered before The British Association assembled at Belfast with additions* (London, 1874) p.61.

physical matter. His views on pantheism are not clearly expressed but it is clear from reading his work that he believed in the pantheistic notion that everything in the universe is part of God and at the same time all things are God. Essentially it says that God and all things in the universe are equivalent, this God is an impersonal one who does not act directly in things, quite the opposite to a theistic personal God believed in by Christian creeds. Tyndall's spiritual sentiments in this regard owe much to his respect and friendship with Thomas Carlyle. Many believed that these concepts of materialism and pantheism could only lead to immoral behaviour in society. Towards the end of Tyndall's address he attempted to soften the blow of his words allowing some space for the concept of a divine mystery and recognising the importance of religious sentiment to mankind but the damage had been done already and it evoked even more controversy than he perhaps intended.

Belfast, like Dublin, was a hotspot for amateur scientific activity at the time, very much orientated around the Protestant middle classes with societies like the Belfast Naturalist Field Club extremely active during the period. However, it was also the centre of a very strong evangelical movement. David Livingstone puts it well when he says what better place for the X-clubbers, who wished to free science of its shackles, than Calvinist Belfast.¹³² To put the address further into context it came just three years after two other important events in the history of science and religion both in 1871. The first was Darwin's second large publication, the *Descent of man* which outlined the evolution of

132 David N. Livingstone, 'Darwin in Belfast: The evolution debate' in John Wilson Foster (ed.), *Nature in Ireland: a scientific and cultural history* (Dublin, 1997) p.395.

man and which sparked further controversy in intellectual circles. The second major event of that year which is important to keep this discussion in context was the finalization of the disestablishment of the Church of Ireland. This blow to the authority of the once established church must have been a delight for Tyndall as he pursued the establishment of the scientific faith in its stead.

In Tyndall's BAAS lecture in Liverpool four years earlier he had put forward the opinion that evolution as a hypothesis was quite compatible with 'the existence of all those virtues to which the term Christian applies'¹³³ In fact Tyndall quite typically saw religion as being compatible with scientific theory such as evolution. So once again what was the difference with the Belfast address? Matthew Brown in answering this question believes the reasons were a combination of: the religious atmosphere of Belfast in the 1870s, the particular structure of the views expressed on scientific and religious faith and also his critique of religious conversion.¹³⁴ Conversions were a major topic of discussion during the 1870s particularly among the evangelical circles for whom it was extremely important. Brown goes so far as to say that Tyndall's discussion of the concept of spontaneous generation in the address (the notion that non-living matter could spontaneously convert into living matter) was part of a wider secular reaction to religious conversion in the latter half of the nineteenth century, explaining also that instantaneous religious conversion was

¹³³ Brown, Matthew, "Darwin at church: John Tyndall's Belfast address" in Murphy, James H. (ed.), *Evangelicals and Catholics in nineteenth century Ireland* (Dublin, 2005) p.239.

¹³⁴ Ibid.

one of the final challenges to the ideology of Darwinian gradualism.¹³⁵



Cardinal Paul Cullen, 1803-1878.¹³⁶

Leaving Tyndall's issue with spontaneous generation aside, there was another more substantial reason for Tyndall's anti-clerical stance in the Belfast address. This reason was quite simply his great mission to liberate science from the grasp of the Irish Catholic hierarchy and in particular in the area of scientific education. Here we find that the motives behind Tyndall's address are tied closely with the university question in Ireland. There was an ongoing debate about the inclusion of sciences in the curriculum of the Catholic University in Dublin. Tyndall in the prefaces to the published version of his address makes his opinions quite clear. He considered Cardinal Cullen Archbishop of Dublin and chief campaigner for the establishment of a recognised Catholic university to

¹³⁵ Ibid p.235.

¹³⁶ Image available at <http://multitext.ucc.ie/images/thumbnails/420.jpg> (12 Jan. 2009).

be 'erecting spiritual barriers' against the intrusion of 'infidelity into Ireland'.¹³⁷ He also mentions a memorial written by the students and ex-students of the Catholic University to the episcopal board of the university expressing their dissatisfaction with the curriculum in relation to science.¹³⁸ By the time of Tyndall's address this document he claimed had vanished from public view. He further quotes them as stating that if 'scientific training be unattainable at our University, they will seek it at Trinity, or at the Queen's Colleges, in not one of which there is a Catholic professor of science'.¹³⁹ The memorialists also complained that there were no Catholic names known in connection with the physical and natural sciences to which Tyndall responds that this was the complaint of any free minds where a priesthood exercises dominant power.¹⁴⁰ Later government enquiries into the university question were caught up with the question of whether the Catholic bishops would allow the teaching of Darwinism and a very hostile and evasive approach to answering this question was taken by the bishops.¹⁴¹ Tyndall saw the Catholic hierarchy as perhaps the greatest barrier to his push for scientific naturalism in Ireland. For Tyndall education and particularly scientific education was the most important vehicle for the modernisation of society and it is no wonder he felt the need to address it so strongly in his native country.

¹³⁷ John Tyndall, *Address delivered before the British Association assembled at Belfast with additions* (London, 1874) p.xxxv.

¹³⁸ *Ibid* p.xvii

¹³⁹ *Ibid* p.xviii.

¹⁴⁰ *Ibid* p.xix.

¹⁴¹ Greta Jones, 'Scientists against home rule' in George Boyce and Alan O'Day (eds), *Defenders of the union* (London, 2001) p.193.

This next part will focus specifically on the reactions to the Belfast address in Dublin and discuss the impact of Tyndall on the place of science and religion in the capital city. In Dublin there was a great debate aroused by the Belfast address, so much so that Tyndall becomes quite a household name in the periodical press in the years which followed. Neither Catholic nor Protestant responses were positive towards Tyndall's address in general but there were considerable differences in the arguments which they voiced. One striking feature is a general displeasure with the nature of Tyndall's address, that it was given in a place where there was no opportunity for debate and discussion. Tyndall no doubt was well aware of this and it was part of the reason why it generated so much controversy in the weeks, months and years which followed.

The meeting itself was publicised in the media quite well. The *Irish Times* dedicated considerable page space towards reporting the whole affair. This paper was founded in 1859, coincidentally the same year as Darwin's publication of the *Origin* and was a Protestant owned and edited publication which was printed in Dublin. One year earlier in 1873 it had been acquired by the Arnott family who brought the politics of the paper towards a very unionist orientation. The paper gives considerably more attention to the Protestant reactions to the Tyndall controversy as we shall see below, particularly with its coverage of various Protestant church sermons. It reported on the Association's proceedings as they happened, in fact a large tract of Tyndall's address was reprinted for all to read. The reporter must have been a man of science as he was very favourable towards the address describing it as being full of passages of great beauty and emphasising

that Tyndall's great point was the attainment of the freedom to discuss the science of Lucretius, Bruno, Darwin and Spencer.¹⁴² The following day the paper printed a somewhat biographical article on Professor Tyndall, probably aimed at relatively ordinary people who were unfamiliar with his background. It declares that Tyndall's great aim was to 'break down the barriers that have too long existed between men of science and the world at large'.¹⁴³ It describes Tyndall's work as an exponent of scientific learning through his great skill at popular lecturing. It hails a change that is taking place led by him to move science forward in the public domain and the removal of any disadvantages to its progress. These positive responses which appeared early on in the *Irish Times* would actually prove to be the exception rather than the rule.

Numerous written articles appeared in the churches organs of communication. The Church of Ireland newspaper the *Irish Ecclesiastical Gazette* ran an article only a few days after the address dealing with it specifically. The first edition of this newspaper was printed in 1856 in Suffolk Street, Dublin and it is still in existence today under the name of *Church of Ireland Gazette* which it changed to in 1900. The newspaper generally contained a number of reprinted Irish sermons and reviews of the latest publications. With the recent disestablishment of the Church of Ireland it is not surprising that the *Gazette* took an interest in Tyndall's address as this would have been viewed as another debasement of the authority of that church. This article from September 1874 scorns Tyndall for his

¹⁴² *Irish Times*, 20 Aug. 1874, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1874/0820/Pg002.html#Ar00201 (15 Nov. 2007).

¹⁴³ *Ibid*, 21 Aug. 1874, www.ireland.com/newspaper/archive/1874/0821/Pg006.html#Ar00602 (15 Mar. 2008).

aggressiveness towards religion and claims that there is no need to believe there are any serious attempts to restrain the progress of science among the Protestant denominations. Tyndall had been looking for the freedom to discuss the questions of science. However, this article responds by asking: 'Who forbids the discussion? Who denies the right of search? In our opinion, science would be more dignified if it ceased to pretend that anyone seriously restrains or interferes with it. Professor Tyndall was elected President of the British Association, although no person mistook him for a Christian. The British Association was welcomed to Belfast by men of all Protestant denominations, who never dreamed that the slightest reticence would be imposed upon its members by respect for the dearest convictions of the living or the last hope of the dying.'¹⁴⁴ It is interesting to see that the author shows just as much anger on this point regarding the right to discuss science as it shows regarding the theological implications of Tyndall's scientific opinions. Perhaps Tyndall's affront on this matter was truly directed at the Catholic church and the science curriculum at the Catholic University in Dublin. Responses such as this from the reformed churches may have been what induced Tyndall to explain his position on Catholicism and scientific education in the preface to the published version of his Belfast address.

The writer in the *Gazette* was clearly of the opinion that the scientific discoveries of the day could be reconciled with faith. One concession to science in this reconciliation is the admission of the great age of the earth saying that theologians had: 'surrendered any notion that the world was non-existent a few thousand years ago, or that within a week after it bounded ready made out of the void Adam and Eve were cultivating the soil of

¹⁴⁴ *Irish Ecclesiastical Gazette* 23 Sept. 1874.

Eden. Science has reminded them that the scripture represents the seventh day as lasting still, and that all believe as entering into its rest; and taught by this experience they are quite ready to accept as much as science has shown to stake her credit upon'.¹⁴⁵ Despite his reconciliatory opinions it did not override the author's anger at Tyndall's address. The writer is unhappy that Tyndall's history of science does not distinguish between the reformed church and those beyond the Alps. He argued that the great reformation of thought and philosophy owed itself to the great reformation of religion. He believed that Tyndall whom he describes as the greatest living experimentalist had wasted a great opportunity to teach people in his own province by instead choosing to hurl abuse at their faith.¹⁴⁶

The article admits that there are two main theories of existence now evident. For him, the theological theory is the clear winner over its modern scientific rival: 'One(theology) teaches that a personal God made the world by repeated modifications of matter which he in the beginning created. Grant its premises of a personal God, and its conclusion presents no difficulty for his perfection and accounts for the orderly and methodical progress of creation as exactly as development can do. Nor is this theory embarrassed, as its rival is, by the impossibility of leaping over certain vast chasms, from death to life, to the mammalia, to consciousness, to reason, to adoration'.¹⁴⁷ Furthermore, despite the author's alleged open mindedness to scientific work he does not subscribe to the Darwinian theory

¹⁴⁵ Ibid.

¹⁴⁶ Ibid.

¹⁴⁷ Ibid.

of evolution which Tyndall puts forward in his address or indeed Spencer's application of evolutionary theory to society. He believed evolution as a hypothesis had not yet sufficient evidence to be considered a proven theory also vouching that any society built upon such a theory would 'rend itself to pieces within twelve months'.¹⁴⁸ Tyndall had admitted in his address that such theories were not yet proven and would likely undergo much modification. The author highlights this weakness and states that: 'when we grant the postulate of atoms impelled by some attraction or affinity, you still need a "mysterious power", an "insoluble mystery"; you are still unable to produce any "experimental demonstration"; you are still dependent upon theories which "may be wrong", and are certain to be "modified"'.¹⁴⁹ The article denounces the notion of society moving forward through the survival of the fittest, as if this were true he asks how society could have progressed from the Roman arena in earlier times to hospitals, almshouses and poorhouses in modern times. Needless to say he credits Christianity as the great moral influence which denounces this concept of the survival of the fittest and the driving force towards civilisation. The article also highlights that Tyndall left the existence of religious sentiment in mankind utterly unconsidered. The conclusion states that when Tyndall and Spencer have settled the difficulties of their own theories then they shall discuss with them the difficulties and evidences of theism. This newspaper article is quite a comprehensive and confident riposte to Tyndall's address and given the then recent history of the Church of Ireland may be seen to show its ability and familiarity with defending its own existence.

A month later in the *Irish Ecclesiastical Gazette* we find another article which makes

¹⁴⁸ Ibid.

¹⁴⁹ Ibid.

direct reference to Tyndall and also to the evolution theory. This comes under the title of 'Science and revelation' and is printed under the 'topics of the day' section of the *Gazette* written by F.F. Carmichael.¹⁵⁰ Carmichael seeks to quell the fear of recent startling scientific theories endangering the realms of revelation and theism. He claims that these theories are based upon great amounts of speculation and are therefore not scientific fact. He warns that: 'the infallibility denied to theologians is not to be hastily predicated of men of science.....private interpretations are no more allowable in science than in prophecy.'¹⁵¹ He makes reference to Tyndall and Henry Charlton Bastian who was famous for arousing controversy regarding the concept of spontaneous generation. Carmichael claims that these two men refuse to enter controversy with other men who were less scientifically qualified than themselves regarding their so called facts. He writes that the 'infinite azure of the past' is pretty but by no means scientific' which is a direct reference to the ambiguous closing remarks of Tyndall's address.

Unlike the article on Tyndall's address a month earlier in this paper, Carmichael did not believe that it was yet possible to reconcile theology and science in any way. 'Science from the very nature of the case cannot boast finality. The time has not yet arrived when the question of reconciling science with revelation, supposing that they require to be reconciled, can be fairly agitated. The question lies just now, not between revelation and the fully and finally ascertained facts of science, but between revelation, as fixed, and

¹⁵⁰ *Irish Ecclesiastical Gazette*, 22 Oct. 1874.

¹⁵¹ *Ibid.*

science as in a state of progress. Geology, ethnology, biology, philology, anthropology, have all sprung up in the last century, and every year is adding to the facts on which they rest, and not unfrequently witnessing a complete change of opinion as to the value of phenomena hitherto regarded as unquestionable'.¹⁵² The author contends that much of the fault with scientific theory is the tendency to use inductive reasoning from the particular to the general and he includes theories of evolution under this heading: 'The same fallacy vitiates all the absolute conclusions of the several forms of the evolution theory. It is quite possible that "the manifold wisdom of God" may not be restricted to one invariable method of communicating life. Evolution may be true of many orders of God's creatures, and yet not true of all'.¹⁵³ His strong conclusion exudes his confidence in the established order of things: there has been nothing established as undoubted scientific fact, irreconcilably hostile to theistic or revealed beliefs. Our position as Christians remains... unaffected, andis likely to remain so.'¹⁵⁴ Carmichael's article as a whole is far more conservative in nature than the coverage of Tyndall's address in the *Gazette* which attempted to address the issues of modern scientific theory on sciences terms and acknowledging a necessary amount of reconciliation between the two disciplines.

Tyndall's address sparked an utter tidal wave of sermons preached in Dublin, particularly in relation to materialism and pantheism. The Protestant sermons in particular were very rigorous in their analyses and responses to the Carlowman. A great number of these

¹⁵² Ibid.

¹⁵³ Ibid.

¹⁵⁴ Ibid.

sermons found their way into print through reports or direct reproduction in newspapers such as the *Irish Times* and the *Irish Ecclesiastical Gazette* and large numbers of them found publication in pamphlet form. The publication of so many of these sermons highlights the popularity of discussion of this controversial topic at the time. Much of the initial energy of the Catholic responses to Tyndall went towards the discussion of the university and scientific education question. However, in the *Irish Times* we find mention of a pastoral letter from the Catholic bishops of Ireland intended as a reply to Tyndall and Huxley's materialism which was circulated in the various Catholic Churches of the diocese of Dublin on the first Sunday of November 1874. This came under the heading of 'The Roman Catholic bishops on materialism' and read in full as: 'A pastoral letter from the Catholic archbishops and bishops of Ireland, intended as a reply to the recent addresses of Professors Tyndall and Huxley and others, was read yesterday in the various Catholic Churches of the diocese of Dublin. Their lordships declare that the theory which recognizes in matter the promise of every form of life is of pagan origin, and was that which was taught by the pagan philosophes who flourished 600 years before Christ and whose condemnation was pronounced by Plato and Aristotle'.¹⁵⁵ There are far less published sermons regarding these topics from the Catholic church compared to Protestant sermons in Dublin. This probably reflects the usage of the print media rather than the actual number of sermons that addressed the issue as we can see from the numerous articles in the *Irish Ecclesiastical Record* that the threat of modern thought was also a major preoccupation in the Catholic church in Ireland. Perhaps the usage of a common

¹⁵⁵ *Irish Times*, 2 Nov. 1874, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1874/1102/Pg002.html#Ar00214 (15 Mar. 2008).

pastoral letter to address the issue reflects the more centralised working of the Catholic church as opposed to the separate and very individual sermons preached from Protestant pulpits.

One of the most important figures in Dublin to preach a sermon on the matter was George Salmon, not only head of Trinity's divinity school but also an established mathematician and man of science, he was a fellow of the Royal Society and had received many awards for his academic work. He was in a unique position as a preacher to be able to give a critique of Tyndall with a scientific understanding. He preached two sermons in the chapel of Trinity College in late 1874 on topic of *Theism and modern science* in which he discussed Tyndall and also the concept of evolution. These were published in pamphlet form in the same year by the publishers to the university Hodges, Foster and Co. on Grafton Street. Salmon, discussing the evolution hypothesis states that: 'we have been told, however, that modern science can refer all the wonders of teleology to natural causes. The key is supposed to be found in the doctrine of evolution, which Mr. Darwin has done so much to popularise.....I can imagine the possibility that hereafter some theory of evolution may be so established (as fact) but I am far from thinking that this stage has been at present approached. In the progress of scientific discovery guesses ever precede proofs. The imagination of the enquirer hurries on to a generalisation long before it can be arrived at by any process of demonstration'.¹⁵⁶ While he understood that this theory was not yet proven, he was open to it as a possibility but also didn't think that 'theological

¹⁵⁶ George Salmon, *Theism and modern science: two sermons preached in the chapel of Trinity College Dublin in Michaelmas term, 1874*, (Dublin, 1874) p.9.

systems should see the possibility of the theory as a threat'.¹⁵⁷



George Salmon, 1819-1904.¹⁵⁸

For Salmon the progress and discoveries of evolution should not make one 'feel that the evidence of a creator had been lost, but rather that a higher conception had been obtained of the majesty of his works'.¹⁵⁹ Salmon believed that the question raised by the idea of evolution was not: 'what power exerted itself in ages past but what we are to think of that power which rules the universe now'.¹⁶⁰ For Salmon the force of evolution was not a threat to theism but allowed for the existence of a creator and the evolution of animals could be viewed as the creation process at work every day. In the second of these two sermons he refers directly to Tyndall with regard to his opinions on the immovable

¹⁵⁷Ibid p.11.

¹⁵⁸ Image available at http://www.tcd.ie/provost/images/g_salmon_lrg.jpg (12 Jan. 2009).

¹⁵⁹ Ibid p.16

¹⁶⁰ Ibid p.18

religious sentiment in mankind. Salmon argues against Tyndall's notion that religion should only have free sway within its own sphere and the idea that emotions should be banished from the sphere of knowledge. To this Salmon retorts that our emotions refuse to arise if there is not a basis of knowledge to justify them, people cannot love a God whom science has proved to be a non-entity.¹⁶¹ So while Salmon was quite open to the scientific theories, such as evolution, supported by Tyndall he was very much against the separation of the spiritual and academic spheres. This is understandable given his own position in both spheres and one could infer that many of Ireland's academics could have felt likewise given that so many of them were also members of the clergy.

The Church of Ireland bishop of Meath, Charles Parsons Reichel, was very outspoken and resolute in his opposition to Tyndall's address and the philosophy it tried to advance.

Reichel preached several sermons on this subject in Dublin over the next few years and these were extensively reported in the press. In a sermon preached in the Concert Hall in September 1874 he condemned Tyndall for attempting to reduce religion to something mechanical, because by doing so it would remove its spiritual and moral influence.

Reichel accuses Tyndall of assuming the non-existence of a creator and challenges him on this point. He claimed that Tyndall was undisciplined by mathematics and that his opinions were not representative of the majority of scientific men and even rejected by many of the highest intellectuals of the British Association.¹⁶² To prove the existence of a

¹⁶¹ Ibid p.34.

¹⁶² *Irish Times*, 21 Sept. 1874, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1874/0921/Pg005.html#Ar00501 (15 Mar. 2008).

creator Reichel used the example of planetary motion and the inevitable end of the planetary system. Reichel declared that: 'if matter would have an end it must have had a beginning; if this universe would have an end in time, it must have had a beginning in time. The universe was known to be similar to a watch or a clock that was wound up, and as it was impossible to deny the power that wound up the latter so it was impossible to question the power that kept the former in motion. Now that power they called God'.¹⁶³ In this response to Tyndall Reichel focused greatly on the assumed threat to the existence of God posed by Tyndall's address and did not tackle the main issue that Tyndall actually brought to the table, which was, the idea of scientific liberation and separation from theology. This slightly misguided riposte by Reichel helps exhibit the clergy's instinctive fear of the threat of modern scientific thought and also a measure of difficulty challenging scientists on scientific terms.

This was an address of a moderate nature in comparison to the one given by Reichel a month later at the annual visitation of his diocese held in Dublin at the Metropolitan Hall. Here he discussed Tyndall's defence of materialism and pantheism and furthermore attempted to dismantle his views on evolution and the origin of life. This address tackled Tyndall in a much more thorough fashion than that of a month earlier and actually discusses the issue of Tyndall's conflict between science and religion. He showed his contempt for Tyndall's opinions on the religious sentiment in mankind in much the same way as Salmon did by denouncing the notion that: 'all these feelings and emotions like the human intellect itself are nothing more than "the result of the play of organisms and

¹⁶³ Ibid.

environment through cosmic ranges of time”¹⁶⁴ Reichel believed that there was no need to create this antagonism between science and religion claiming Tyndall ‘seems all through his address to be haunted by the idea that there is some hereditary and irreconcilable antagonism between science and religion.....between religion, as such, and true science, there neither is, nor can be, any real opposition..... science is the instrument or medium through which God’s manifestation of himself in nature is intelligibly apprehended. And as he is essentially one and unchangeable so there can be no real diversity or want of harmony between the laws of nature and the utterances of revelation. Any apparent difference between them must be due to error inseparable from man’s finite capacity, either in the interpretation of nature or the interpretation of revealed truth, or in both’.¹⁶⁵ This address by Reichel was later published on behalf of the clergy of his diocese so that they would have a full and satisfactory reply to Tyndall.

The notion of pantheism which Tyndall is seen to have propounded is something which we see Reichel take further issue with a few years later in a sermon delivered at St. Patrick’s Cathedral in Dublin in June 1877, and also published as a pamphlet. This system of thought he credits to Spinoza and having been recently revived holds it in great contempt as the basis of almost all modern unbelief.¹⁶⁶ He also states that: ‘theism may be difficult, but pantheism is impossible. The God of Spinoza is no God at all. The gulf of

¹⁶⁴ *Irish Times*, 15 Oct. 1874, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1874/1015/Pg006.html#Ar00605 (15 Mar. 2008).

¹⁶⁵ *Ibid.*

¹⁶⁶ Charles Parsons Reichel, *A sermon preached in St. Patrick’s Cathedral, June 28, 1877* (Dublin, 1877) p.5.

atheism yawns before his believers'.¹⁶⁷ The strength of Reichel's conviction shows the growing threat of modern philosophical thought to established organised Christianity in the years immediately after the Tyndall controversy.

Keeping on the subject of Protestant reactions to Tyndall's address there are two other significant contributors from this domain. Firstly, there was the newly formed Dublin Clerical Association which was founded in the wake of disestablishment. At the inaugural meeting of this society in late 1874 two essays were read and later published on the subject of materialism and were well publicized in the notices of books section of the *Irish Ecclesiastical Gazette*. One by Rev. W Sherlock entitled 'Recent materialism' and the other by Rev. Arthur Gore Ryder 'Materialism and the incarnation' which was also delivered as a sermon in Donnybrook.¹⁶⁸ Both of these were discussed in detail in the *Gazette*. Gore Ryder's essay still survives in pamphlet form in the National Library of Ireland which had been published together with a sermon he delivered in Donnybrook the day before the Dublin Clerical Association meeting.¹⁶⁹ Both essays are perhaps less scientific than the criticisms offered by the likes of Salmon but both men were credited by the *Gazette* as very competent critics who they believed, when put alongside Reichel's sermons and essays, gave the Church of Ireland the right of claiming the scalp of the President of the British Association. It is also interesting to see that the reviewer acknowledges the fact that the labour of reconstructing the church since disestablishment

¹⁶⁷ Ibid p.7

¹⁶⁸ *Irish Ecclesiastical Gazette*, 23 Dec. 1874.

¹⁶⁹ Arthur Gore Ryder, *Materialism and the incarnation* (Dublin, 1874).

had distracted many away from such questions and that they were proud to have more than one competent reply to Tyndall's 'materialistic speculations'.¹⁷⁰

The review immediately lays out its position on the evolutionary theory: 'Supposing for a moment that the theory were true, recognising the existence of the great evolutionist, who at first stamped the order by which the process was to be carried on to its completion, we do not see what fact of revelation would be thereby contradicted. . . . It makes all the difference, however, when the existence of the great evolutionist is ignored, as Professor Tyndall ignores it, and matter by itself, by inherent of its own "potentialities", is made to account for the varied phenomena of nature'.¹⁷¹ So once again we see an example of the Church of Ireland taking a reconciliatory approach to the idea of evolution, providing there is the acceptance of a divine originator to the whole process, which is referred to here as a great evolutionist. We also see here a clear concern coming from theistic quarters regarding Tyndall's pantheistic views on nature whereby matter and the divine are somehow synonymous. The article continues on with its discussion of evolution and seeks to at least ensure that its readers are sure that man could have no part of this process. It highlights that the theory is not proven and that it is rejected by Mivart and also by Wallace regarding mankind. It concludes by declaring that 'Christians guided by the light of revelation know that man was created in the image and likeness of God (not of a monkey), and that nothing can be higher than that'.¹⁷² Gore Ryder in his essay highlights

¹⁷⁰ *Irish Ecclesiastical Gazette*, 23 Dec. 1874.

¹⁷¹ *Ibid.*

¹⁷² *Ibid.*

the danger with Tyndall's pantheistic view of man and nature as homogenous both in origin and evolution, then, things like free will, morality and piety would become just 'baseless phantoms'.¹⁷³ For those men at the Dublin Clerical Association and at the *Gazette* there was a possibility of somewhat accepting modern evolutionary theories but the anger was aroused instead by the difference between their theistic, and Tyndall's pantheistic, views of the divine.

Alongside the Dublin Clerical Association and *Gazette* the other great contributor to Protestant discussion on Tyndall seems to have been the evangelical movement in Dublin. Robert Watts, head of the Assembly's College in Belfast, had become a notorious opponent of Tyndall immediately after his address by condemning him from the pulpits in Belfast. Watts came to preach at the Metropolitan Hall, the centre of Dublin's evangelical movement on Abbey Street. His refutation of Tyndall in Belfast was already in print. In this lecture to the Young Men's Christian Association which was reported on in the *Irish Times* he tackled the issue again and also went to great efforts in his attack on Huxley's address at the same meeting. For Watt's so called atheism could find no common ground or fellowship with theism in the field of scientific investigation. He contended that Huxley and Tyndall had abused their position in entering the field of theology and that a crisis had come when Christian men could no longer submit to the ignorance of the existence of God by scientific men.¹⁷⁴ Watts although seemingly out of his depth in scientific understanding

¹⁷³ Arthur Gore Ryder, *Materialism and the incarnation* (Dublin, 1874).

¹⁷⁴ *Irish Times*, 16 Sept. 1874, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1874/0916/Pg002.html#Ar00205 (15 Mar.2008)

tried to argue that an apparent difference in scientific conclusions between Huxley and Tyndall somehow proved the existence of God. The report tells us that: 'he asserted that the two professors, starting with the same stock of atoms, had arrived at totally different conclusions. Huxley asserted that our impressions of everything around us were liable to be deceived; Tyndall, that nothing could be true of which we could not present a distinct picture to our imagination. The one was a materialist, the other an idealist. By their differences they afforded another proof that there was a God above the atoms, who fashioned all things to his own wise ends'.¹⁷⁵

While much of the Catholic reactions to Tyndall seem to have focused on the place of science in education, his work still became a regular point of discussion in Catholic circles. In a series of two articles run in the *Irish Ecclesiastical Record* on the subject of 'Revelation, geology and the antiquity of man' there are constant references to him and his supposed profane observations made at the meeting of the British Association in Belfast.¹⁷⁶ This is an anonymously written piece which was signed simply H.E.D. at the end of the second article. It is tempting to speculate that Gerald Molloy may have been the author given its subject matter and the periodical in which it appears but this would be too hard to substantiate. It may at least be seen as a sign that this had become increasingly perilous subject matter for Catholic clergy to openly sign their name to. The author charges many modern scientists such as Tyndall and Darwin with responsibility for the rise of unbelief in modern times and questions the strength of their conscience. These

¹⁷⁵ Ibid.

¹⁷⁶ 'Revelation, geology and the antiquity of man' in *The Irish Ecclesiastical Record*, i (1880) p.263.

moral implications were then becoming increasingly evident in Ireland: ‘even in our own country, whose faith is a proverb, young men educated under liberal scientific professors show tendency to free themselves from moral and intellectual restraints’.¹⁷⁷ For the remainder of this first article the author discusses modern geological discovery. Having satisfied himself that there was no discrepancy between the facts of geology and the words of revelation the author moves on to discuss the more controversial topic of the antiquity of man in the second article.

In this second article, which discussed the antiquity of man, the author claims that no evidence of an ancient pre-historic man had been found and nothing can be found of man deeper than the most recent strata of the earth’s surface. The theories of prehistoric man were said to be based on false assumptions and: ‘when we find such assumptions as these regarded as established facts, we are prepared from flippant, if not profane, observations, such as that made by Mr. Tyndall at the last meeting of the British Association in Belfast; “there can be no doubt as to the fact that man existed before all history”’.¹⁷⁸ Prehistoric man is said to be a myth and a fiction and the author argues that man has existed only for a few thousand years with his proof in the authority of the bible. He also claims that there is scientific evidence to back the account of Noah’s deluge. The article tries to create an appearance of a major difference of opinion between Tyndall and Darwin which is predominantly untrue in that: ‘Tyndall will have us to believe that man has been upon the earth for ten thousand years, or twice that period, but all through as man. Darwin tells us

¹⁷⁷ Ibid p.187.

¹⁷⁸ Ibid p.262

that man has been on the earth myriads of years, but not as man all through, but as an ape or a monkey. The human skulls and flint instruments of Tyndall are against the theory of Darwin's gradual development; and Darwin's animate leaves and intellectual shell-fish and talking baboons have no place in the caves of the extinct animals or the stalagmite beds of Tyndall and his followers'.¹⁷⁹ In reality, Tyndall gave great weight to Darwin's hypothesis regardless of what date either of them considered man to first exist in his modern form. The writer then continues with an intention to disprove Darwinian theory. Man, he argues, had not evolved from the gorilla and the dividing line between the two was said to be the line that divides instinct from reason. He also opposes the Darwinian notion of society's progress from barbarism to civilisation referencing a number of great ancient civilisations. His conclusion is that Darwin's theory needs to be abandoned as it fails to stand the tests of experience and hard facts. This discussion of Darwin and Tyndall's work coming from Catholic quarters is a well written and methodical piece of prose but seems somewhat outdated in its arguments and certainly slightly neglectful of a lot of evidence that had appeared on the side of science. It appeared as though the Catholic Church had not come up with any original way to defend itself and its teachings against the tide of modern scientific thought. It would be slightly later in the century that we see more powerful radicalised defences coming from this domain.

Regular references to Tyndall can also be found in, the nationalist newspaper, the *Freeman's Journal* in relation to Catholic meetings which discussed the subject of modern thought. One such example was a meeting of the St. Kevin's branch of the Catholic Union

¹⁷⁹ Ibid.

at Camden Street in November 1877 at which a speech was delivered regarding their general dissatisfaction with the encroachment of immoral materialism on to Irish shores. Here the speaker discusses Tyndall in relation to modern thought: 'one of the chief high priests of the new school was Professor Tyndall, and on any subject connected with natural science there was no higher authority, but we failed to see the connection between the dissecting room and the sanctuary, and into the higher sphere we declined to follow him. Professor Tyndall's doctrine degraded humanity, subverted moral law, obliterated the division between right and wrong, and reduced society to chaos (applause)'.¹⁸⁰

The British Association brought its annual meeting to Irish shores again in 1878, this time to Dublin. This received a great amount of media coverage in Dublin ever since it had been chosen as the host city a year earlier at the BAAS meeting in Plymouth. Clearly the controversies of 1874 were making many curious about the outcomes of this next meeting in Ireland. Tyndall, very much at the height of his career decided against addressing the meeting. English mathematician, William Spottiswoode delivered the presidential address on a purely mathematical matter which aroused no controversy whatsoever. One interesting matter that did arise was that Samuel Haughton had expected to have been elected to the presidential chair for Dublin, being the most eminent scientist based in the city. The *Freeman's Journal* reported that this had been blocked due to Haughton's recent

¹⁸⁰ *Freeman's Journal*, 14 Nov. 1877, Irish Newspaper Archives

<http://www.irishnewsarchive.com/Default/Skins/INA/Client.asp?Skin=INA&enter=true&AppName=2&AW=1234120371846> (25 Jan. 2008).

outspoken views as a nationalist and Home Ruler.¹⁸¹ This is quite likely given the imperialistic nature of British science and the British Association. Tyndall was quite likely part of this conspiracy against his fellow Carlow-man. He had become an avid anti-Home Rule campaigner believing that the state would be dominated by the Catholic Church and that Irish science would suffer death if cut off from the empire.

It is clear from all the examples examined so far that there was a enormous expression of discontent with Tyndall and the principles he purported. The dissenting voices were always more likely to speak louder. However, we can see from some other examples that he was not completely demonised. We have already seen that the original report in the *Irish Times* on the Belfast address had shown no signs of discomfort with the speech that had been delivered. The *Freeman's* had even defended Tyndall in 1878 against a reviewer in London's *Quarterly Review* who berated him in relation to a lecture which he had given in Birmingham on science and man who they claimed had scolded Tyndall like a class student. Perhaps Tyndall's Irish nationality was more important to the writers at the *Freeman's* than his scientific philosophy. They make it clear that they are not apologists for his views but declare that his 'opinions should not disentitle him to rational treatment, as if he were an Irish political prisoner'.¹⁸² Trinity College's Historical Society, in a

¹⁸¹ *Freeman's Journal*, 16 Aug. 1877, Irish Newspaper Archives

<http://www.irishnewsarchive.com/Default/Skins/INA/Client.asp?Skin=INA&enter=true&AppName=2&AW=1234120371846> (25 Jan. 2008).

¹⁸² *Freeman's Journal*, 23 Jan. 1878, Irish Newspaper Archives

<http://www.irishnewsarchive.com/Default/Skins/INA/Client.asp?Skin=INA&enter=true&AppName=2&AW=1234120371846> (25 Jan. 2008).

meeting in November 1875, expressed what they considered to be the general opinion of the Irish regarding Tyndall, when its auditor in the course of his address: ‘mentioned the names of eminent Irishmen – amongst others that of Professor Tyndall, and said that while rejecting his theology and philosophy, Ireland rejoiced in his scientific discoveries and felt justly proud of her brilliant son.’¹⁸³

We have seen that most of the religious reactions are not just responses to Tyndall’s denouncement of theology’s authority on science alone but also flat rejections by the theologians of Tyndall’s own spiritual world views, materialism and pantheism. However, it also becomes clear that the discussion of science and modern thought in relation to religion had at the same time become an arena in which Protestant and Catholic thinkers could battle it out against each other regardless of their position on the scientific subject matter. Catholics claimed that materialism was a product of Protestantism and its personal interpretative view of the bible. Materialism then eventually leads on to atheism and thus atheism was the ultimate end product of the Protestant faith. Protestants on the other hand generally tried to take pride in their open minded and progressive view towards science and most still believed that it could be reconciled with the bible somehow. They instead accused the Roman Catholic faith of being a barrier to science and progress in society through its ignorance and condemnation of advances in the discipline.

Another striking feature of these theological responses was the difference in the approach

¹⁸³ *Irish Times*, 11 Nov. 1875, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1875/1111/Pg005.html#Ar00500 (15 Mar. 2008).

of Catholic respondents compared to those of the reformed faiths. Protestant discussion on the whole utilised scientific reasoning in discussions regarding Tyndall to a far greater extent. There are a number of reasons why this may have been the case. Firstly, many of these Protestant clergymen would have received a far higher level of scientific education and as we have seen some of these were in fact leading academics in the field of science. Another factor is the nature of the religion. Reformed faiths were in the position to use their own interpretation of the bible in these discussions while among Catholics the intellectual authority on scripture remained in Rome. Catholics may have also felt less impetus to defend their position against Tyndall's attack given that Pius IX had already officially condemned materialist ideology ten years earlier. More obviously Archbishop Cullen's drive against the teaching of modern scientific thought to Catholics in third level institutions also played a major role in creating this environment.

Among the more serious discussions of Tyndall's address and the ideology it upheld there were also some satirical and humorous reactions in the press also and it seems irresistible to include some examples here. Both of these were published in the *Irish Times* as re-prints from *Punch* magazine. The first one 'Democritus in Belfast' was printed only a few days after the address. This is its closing verse;

*If Tyndall's last word be indeed the last
Of Hope and Faith hence with each rag and tatter
A black cloud shrouds our future as our past
Matter, the wise man's God: the Crowd's- no Matter*

Here we see a mocking critique of Tyndall's concept of materialism and indeed pantheism whereby God is material and the religious sentiment of the people pushed into insignificance. Then we see a different viewpoint put forward from *Punch* again a few months later. This shows a much more conciliatory view of the questions of science and religion.

'MATTER'

Portly Old Swell (on reading Professor Tyndall's Speech)

"Dear me! Is it possible! Most Extraordinary!

(throws down the Review) That I should have been

Originally a 'Primordial Atomic Globule'.....

Satisfactory Solution

Facts in Geology and Egyptology,

Very momentous as touching chronology,

Seem to run counter to facts of Theology,

Very well, never mind. What if they do?

These facts and those facts as well may be true,

Truth and Truth ne'er can at variance be:

All truths will some day be proved to agree,

Seemingly different truths let us say,

Are equally true in a different way.¹⁸⁴

¹⁸⁴ *Irish Times*, 1 Oct. 1874, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1874/1001/Pg003.html#Ar00303 (15 Mar. 2008).

Ruth Barton in her study of Tyndall's pantheism argues that it is too simple to put Tyndall strictly on the side of science in this great debate as he had displayed concerns for both sides of the divide. But leaving aside Tyndall's own philosophy it seems impossible to apply this to Dublin. Tyndall comes out quite clearly on the side of science.¹⁸⁵ Tyndall may have seen his role in the scientific liberation of his native country as some sort of noble crusade which he felt obliged to undertake given that there was no real movement for scientific naturalism in Irish society. His aggressive Belfast address as we have seen seemed to have the effect of infuriating all creeds in Dublin. Liberating scientific education from the grasp the Catholic hierarchy was vital in his mission and Tyndall would later on become an avid anti-Home Rule campaigner believing that science in Ireland would only suffer under such a system where the state was likely to be dominated by the Catholic Church. The measure of his success in evangelising Irish society in the scientific faith is a matter of opinion but it is impossible to deny the impact of John Tyndall on the great intellectual debate of Darwinism in the nineteenth century in Dublin and Ireland as a whole.

¹⁸⁵ Ruth Barton, 'John Tyndall, pantheist: a rereading of the Belfast address' in *Osiris*, iii (1987) p.134.

4. Darwinism develops.

The Darwin debate in Dublin had been engulfed in the controversy of the Tyndall address in the second half of the 1870s and this period saw a level of debate that remained unequalled at any other stage of this study. By the following decade the concepts and ideas that had been promoted earlier on had truly seeped into the consciousness of academics and the everyday man. People began to view their own existence in a different way regardless of whether or not this had been a conscious decision. Essentially the concept of Darwinian gradualism had gained much acceptance even if issues such as human evolution were still a very volatile subject. Such a change in mindset is not unique to Ireland but quite in tune with the change that had taken place across the western world. However, the unique cultural context of Ireland results in a number of independent outcomes to this change. Within theological circles we observe many examples of the same style of attempts to reconcile these new world views with long held scripture based beliefs but we also see attempts by some to draw a line in the sand between scientific and religious beliefs. Outside of these circles we see a number of interesting new developments in the reception and impact of Darwinism and other related concepts.

Firstly, let us examine theological discussions of Darwinism and modern thought in Dublin during this period. We see two major responses coming from this quarter, one from each of the main Christian faiths. James Houghton Kennedy delivered a series of lectures at Trinity College over the years 1888 and 1889 on the subject of *Natural*

theology and modern thought. This series was known as the Donnellan lectures and were run periodically since the end of the eighteenth century on theological topics. In the third part of this series he delivered a lecture on 'Design and natural selection'. The author put forth his argument in favour of design showing its evidence throughout nature and then later went on to discuss the concept of natural selection. His understanding of these concepts seems quite basic and very black and white as he sets them up as straight substitutes for one another. His belief was that any development theory could not be consistent with the mechanical view of the world and therefore would only further the argument in favour for design; he believed that many so called materialists were therefore contradicting themselves on this point. He continues on to assess the natural selection theory put forward as the sole agent of development. He attempted to display poor logic underpinning natural selection: 'in inquiring whether the doctrine of natural selection can be an adequate substitute for the doctrine of design, we must first of all bear in mind that the law of natural selection can act only by destroying the unfit, not by producing the fit. Those who oppose it for design, must contend that order is produced out of an infinite or at least an immense number of chance combinations by the elimination of the unfit. It can produce nothing, and can develop nothing further than by letting it alone. Therefore, to regard it as a positive cause would show great confusion of thought.'¹⁸⁶ The logic was that natural selection could not possibly be an origin of existence since all things which have died out in the struggle for life must have come into existence and to perfection before natural selection could test them, reaching this perfection therefore is evidence of

¹⁸⁶ Ibid

design.¹⁸⁷ His belief was quite clear that, although there is plenty of evidence in nature for the struggle for life and the concept of adaptation, development theories and particularly the natural selection theory offered little in terms of proof of origins compared to the principle of teleological design.

This argument put forward by Kennedy does not exhibit much strength in scientific terms but it may have been simplified for the purpose of lecturing. Kennedy's lecture is also much more typical of the theological defences used in the earlier period of this study and in this regard occurs too late to have any major impact on the Darwin debate in Dublin. This argument which appears to be quite outdated may also be an indicator of some loss of cohesion in the Anglican Church in Dublin. It was the last major Church of Ireland defence against modern thought that we see coming from Dublin in the nineteenth century and is a remarkably limp one. In the period of this study marked by the Tyndall debate Church of Ireland clergymen had acted as the frontline against modern thought. This may be because they were initially enlivened by their recent disestablishment but after almost twenty years this vitality seems to have been spent, at least in Dublin. This was a contrast to what took place in Belfast during the same period where men such as Robert Watts remained steadfast in their opposition to Darwinism. Watts even republished his original response to Tyndall's address again in 1888.¹⁸⁸

¹⁸⁷ Ibid p.128.

¹⁸⁸ Robert Watts, 'Atomism – An examination of Professor Tyndall's opening address before the British Association 1874' in *The reign of causality* (Edinburgh, 1888).

In the Catholic Church we also see that some of the defences against Darwinism and modern thought remain quite similar to before. However, the crucial difference in this period for the Catholic Church is the uncompromising approach now taken. There was a line drawn in the sand between science and faith. The only major exception to this was Walter McDonald the Maynooth theologian and scientist who will be discussed in detail later in this chapter. The perfect example of this new hard-line approach to modern thought was Jeremiah Murphy. Murphy was the most vigorous Catholic opponent to Darwinism in Ireland at the end of the nineteenth century in Ireland. Although a Canon from Cork, Murphy is included here because of his contributions to the *Irish Ecclesiastical Record*. Murphy rose to prominence in the Darwin debate due to his engagement and disagreement with the work of English biologist St. George Mivart. Mivart's attempt to reconcile evolution with the Catholic faith was a controversial topic in the greater Roman Catholic world and also in Darwinian circles. Murphy, a very conservative and traditional Catholic pitched himself against the idea of such reconciliation and directly engaged with Mivart in a literary debate in the 1870s and 1880s in various periodicals including the *Irish Ecclesiastical Record*.

He published an article on 'Evolution and Genesis'¹⁸⁹ and another article 'Darwinism' in 1884.¹⁹⁰ In the former article Murphy puts forward his argument against Mivart and his attempts to embrace the evolutionary concept alongside revealed faith. The strength of Murphy's opposition caused Mivart to respond directly to a number of his points in an

¹⁸⁹ Jeremiah Murphy 'Evolution and genesis' in *The Irish Ecclesiastical Record*, v (1884) pp756-67

¹⁹⁰ Jeremiah Murphy, 'Darwinism' in *The Irish Ecclesiastical Record*, v (1884) pp584-94

article 'Modern Catholics and scientific freedom' in 1885 in the July edition of *Nineteenth Century*.¹⁹¹ Murphy's other article in the *Irish Ecclesiastical Record*, entitled 'Darwinism' is a straightforward display of his rejection of the theory of evolution and an assault on modern scientific thinkers. Murphy acknowledges that theories of evolution existed before Darwin, but that he was responsible for its popularisation. For Murphy the conclusions of Darwin's work were unscientific, illogical and degrading. He viewed the Darwinian movement as the newest and most dangerous of heresies. He was greatly angered by modern scientists completely ignoring the established revelation on the origin of mankind and contends that: 'our scientists must then remember that on them lies the burthen of proof. Logically they are bound: 1. to disprove, utterly, the arguments in favour of revelation; and 2. to establish their own theories by conclusive arguments. The former they have not seriously attempted; the latter, they have utterly and ignominiously failed to do. It would then be unreasonable, illogical, to displace such a revelation for an unproven – a doubtful hypothesis'.¹⁹² Murphy does acknowledge the fact that Darwin was actually more cautious in his assertions than his 'disciples' and declares that none of these disciples had succeeded in disproving the arguments in favour of revelation or succeeded in proving their own theories by conclusive arguments.¹⁹³ He uses some arguments seen many times before, such as the lack of geological and paleontological evidence for the evolution of man claiming that we only find man in the most recent formations of the earth's crust and that transition between man and ape cannot be traced.

¹⁹¹ St. George Mivart, 'Modern Catholicism and scientific freedom' in *Nineteenth Century*, xviii (1885) pp30-47.

¹⁹² Jeremiah Murphy, 'Darwinism' in *The Irish Ecclesiastical Record*, v (1884) p.589.

¹⁹³ *Ibid.*

Darwin could also not account for the transition from instinct to reason which separates man from animal.¹⁹⁴

He shows his opinion of Darwin and other modern scientists when he quotes a quip by Carlyle that Darwin had 'by no means satisfied me that men were descended from monkeys, but had gone far towards persuading me that he and his so-called scientific brethren had brought the present generation of Englishmen very near to monkeys. A good sort of man is this Darwin, and well meaning, but of very little intellect.....And that is what we have got: All things from frog spawn. The gospel of dirt, the order of the day'.¹⁹⁵

Murphy is clearly trying to belittle Darwin as part of his effort to create an impassable gulf between faith and modern scientific conjectures. In his quest to create this black and white division Murphy displays his conservative Catholic views by defending a literal interpretation of scripture at least in relation to the creation of man during a period when it was becoming more acceptable to adopt a metaphorical interpretation. For Murphy the revealed account of the creation of man was straightforward and literal therefore evolution was completely untenable.¹⁹⁶ While there was certainly a move towards ultra-conservatism in the Catholic Church during this period as exhibited by Murphy's writings, we shall now see that it was not shared right across the board in Catholic Ireland in relation to modern thought.

¹⁹⁴ Ibid p.591

¹⁹⁵ Ibid p. 592.

¹⁹⁶ Mariano Artigas, Thomas F. Glick and Rafael A. Martinez, *Negotiating Darwin: the Vatican confronts evolution 1877-1902* (Baltimore, 2006), p. 246

Don O'Leary in his insightful book *Roman Catholicism and modern science* points out that the *Irish Ecclesiastical Record* had also allowed the expression of the opposite opinion, coming from another priest John S. Vaughan who published articles challenging Murphy's views on human evolution in the periodical.¹⁹⁷ Vaughan held a view that evolution could be applied to man in a physical sense but not to his moral and spiritual development.¹⁹⁸ O'Leary further points out that for this to happen there must have been a significant minority of the clergy in favour of reconciling human evolution and Catholic doctrine.¹⁹⁹ This is certainly true and one such individual in Ireland was Maynooth professor Walter McDonald. McDonald gained notoriety as a radical thinker in Catholic circles. A former student of Gerald Molloy, McDonald also wished to harmonise modern scientific fact and religious doctrine. A polar opposite to Murphy in most regards, McDonald was absolutely fascinated by Mivart's work. McDonald was handed a primer on Mivart's philosophy as a joke in 1884 but ironically it triggered his mind to such an extent that he decided to dedicate the rest of his life to the study of the sciences as a theologian. He credits Mivart with making him understand that all metaphysics including natural theology is based on the physical sciences. And that if the understanding of nature has progressed so much since the time of Copernicus then the system of metaphysics needs to be reformed on parallel lines, which would then react at once in theology.²⁰⁰ Regarding the concept of evolution McDonald acclaimed Mivart's work over Darwin's when he mentioned his study of Mivart's work on *The Genesis of Species* which he said

¹⁹⁷ Don O'Leary, *Roman Catholicism and modern science: a history* (London, 2006), p.86

¹⁹⁸ John S. Vaughan, 'Faith and evolution' in *Irish Ecclesiastical Record*, vi (1885) pp481-96, pp723-36.

¹⁹⁹ Don O'Leary, *Roman Catholicism and modern science: a history* (London, 2006) p.86

²⁰⁰ Walter McDonald, *Reminiscences of a Maynooth professor* (London, 1925) p. 89.

was: 'now, of course is behind in many details, sets forth clearly the principles of evolution. This, no doubt is largely due to Darwin's unsuccessful effort; but that it should be done so soon, and in the face of the consensus of approval with which Darwin's work was then received is proof sufficient, and even abundant, of Mivart's genius'²⁰¹.

In 1898 McDonald published his work on kinetic energy *Motion: its origin and conservation: an essay*. He declares that his purpose in this book is to vindicate for Catholic professors the right to teach in accordance with the kinetic theory of activity in relation to any science physics, metaphysics, theology etc.²⁰² The essential concept behind McDonald's work was that God was the original source of all kinetic energy in nature. If the physical law that energy could neither be created nor destroyed was to be upheld then, for McDonald, there was space for God to be that energy's original source. Taking this kinetic view of nature McDonald believed that the controversy between scientist and theologian would be greatly reduced since the material universe is incapable of producing any new substance so therefore there must be a superior being who generates them.²⁰³ 'Thus God reveals himself in nature as the conservator or continual creator of every substance faculty, motion and shade of reality.'²⁰⁴ McDonald also seems favourable to the concept of evolution as he gives a number of example of how lower forms can produce higher ones such as frogs from tadpoles and embryos from sperm cells

²⁰¹ Ibid.

²⁰² Walter McDonald, *Motion: its origin and conservation: an essay* (Dublin, 1898) p.vii.

²⁰³ Ibid p.416.

²⁰⁴ Ibid p.418.

and attempts to disprove a number of arguments against evolution.²⁰⁵ He says that there is no denying that there is a significant amount of error with modern science but admits that there is a proportionate error in metaphysics and theology. McDonald saw it as a mistaken view of theologians to think that when they read the work of modern thinkers that he should be prepared to 'propound in the face of modern physical science whatever he may find to have received commonly two or three hundred years ago.'²⁰⁶ If they did this the Ptolemaic system of astronomy would still be followed. Metaphysics and theology are rather connected with and in part derived from these portions of physical science and need to develop alongside.²⁰⁷

While some of McDonald's understanding of science may have been flawed in this work it was a massive effort by an Irish theologian to embrace modern science. It was also very daring to suggest that theology had significant flaws and revisions were now necessary because of advances in modern science. McDonald had already met with opposition to some of his work earlier at Maynooth as a result of his rival professor Daniel Cohalan taking action against him with the college authorities. *Motion* too met with opposition and in this case directly from Rome. William Walsh the Archbishop of Dublin brought McDonald to the attention of Cardinal Logue and in 1899 the publication was banned and McDonald forbidden from teaching his ideas to his students. McDonald sought

²⁰⁵ Ibid p.401.

²⁰⁶ Ibid p. ix

²⁰⁷ Ibid

clarification on what was unorthodox in his book but was never given an answer.²⁰⁸

McDonald published another work in 1903, *The principles of moral science*, which was a work in moral theology (the Church would describe theology as a science). In a discussion of the importance of responsibility he says that Spencer claimed that the notion of responsibility or duty is diminishing as society moves forward and moralization increases. McDonald admits that: 'evolutionists appeal to the progress already made in European morals, hospitals built.....better treatment of the poorer classes....'.²⁰⁹ He doesn't doubt that this is true but he does not believe that we necessarily have a greater respect for virtue than our forefathers simply because we are better educated in the sciences and arts.²¹⁰ This is another interesting reference to the concept of Darwinian progression whereby society moves from barbarism to a state of civilisation which was becoming more deeply imbedded in the minds of society. While he indirectly shows an acceptance of the basic principles of evolution and the idea of the survival of the fittest he maintains that God has an important role in maintaining morals. McDonald received an *imprimatur* from the Archbishop of Dublin for this book but despite his success in publishing this work he was regularly at odds with authority again in the years that followed.

During the period in which McDonald met with opposition from Rome for his work *Motion* there was what might be considered to be a movement growing within

²⁰⁸ *Oxford dictionary of national biography* <http://www.oxforddnb.com.iproxy.nuim.ie/view/article/52704> (3 September 2008).

²⁰⁹ Walter McDonald, *The principles of moral science: an essay* (Dublin, 1910) p.168.

²¹⁰ *Ibid*

Catholicism known as modernism. The idea of modernism was, in its most basic sense, a viewpoint that Catholicism needed to develop and modernise in line with the modern world. It was not a unified movement and the men who propounded these new concepts generally would not label themselves as 'modernists'. It concerned itself with matters relating to science, psychology, critical history and the human sciences.²¹¹ The two men at the front of this school of thought were Alfred Loisy and George Tyrrell. Loisy was a French priest and professor at the Institut Catholique du Paris until his dismissal in 1893. In Loisy's biblical criticism the *Five thesis* he essentially denied the strength of scripture and the literal interpretation of parts of the bible, including Genesis. This along with a number of works written between 1901 and 1908 were condemned by the Church.

Tyrrell was born in Dublin and raised as a member of the Anglican faith in Ireland. After failing to get accepted to Trinity College Dublin, Tyrrell departed for London at 18 years of age and shortly after converted to Catholicism. He joined the Jesuits and was ordained a priest in 1891. Tyrrell like Loisy challenged the interpretation of scripture declaring that 'God has revealed himself ... not to the theologian or the philosopher, but to babes, to fishermen, to peasants ... and therefore he has spoken their language, leaving it to the others to translate it (at their own risk) into forms more acceptable to their taste.'²¹² Tyrrell wanted to address what he considered to be burning intellectual problems in the Church and to do this he had to publish his work under pseudonyms. He published a

²¹¹ Patrick J. Corish, *Maynooth College, 1795-1995* (Dublin, 1995) p.249.

²¹² *Oxford dictionary of national biography*

<http://www.oxforddnb.com.jproxv.nuim.ie/view/article/36606?docPos=1> (3 Sept 2008).

number of works from 1902 to 1909 which challenged Roman Catholicism's teachings and the role and position of the very institution itself.

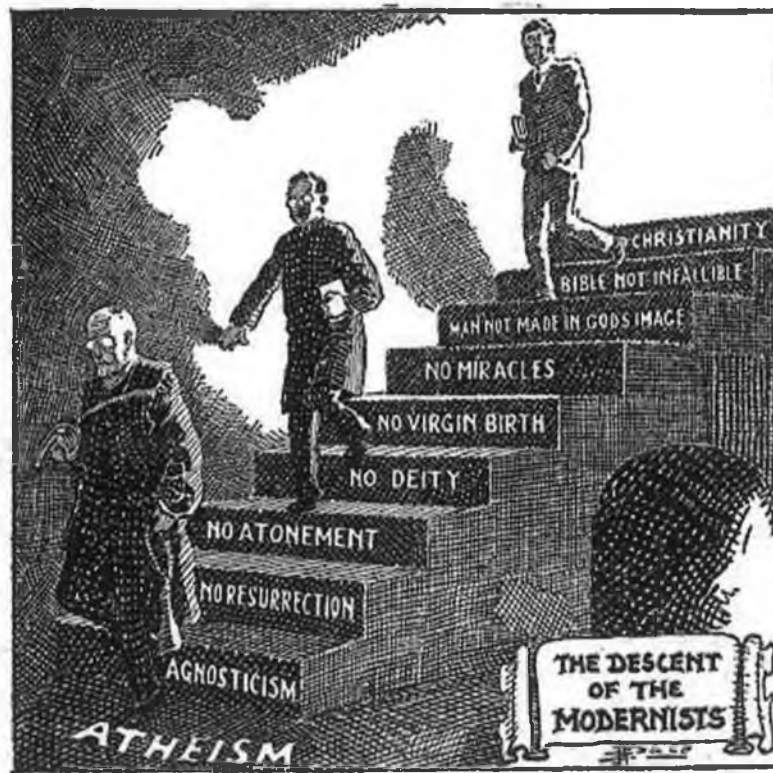


Pope Pius X, 1836-1914.²¹³

Pius X who became Pope in 1903 is often considered to have invented the idea of modernism as a movement. This is a credible theory since so many different concepts were included under this umbrella term, many having little or no association with any of the others. In July 1907 Pius X published a decree the *Lamentabili Sane* which condemned 65 different propositions that he considered to be heretical all labelled under term modernism. This was cemented later that year by another encyclical the *Pascendi Dominici Gregis* which included an oath to be taken by priests and teachers against so called modernism. Patrick Corish summarises the main points denounced by the

²¹³ Image available at <http://www.havelshouseofhistory.com/Pius%20X.jpg> (12 Jan. 2009).

encyclicals as the following: a denial that certain knowledge of the supernatural was possible; an assertion that God was immanent in the individual soul to the extent that the Church was no more than the social organisation of those who believe; and a strict compartmentalisation of Church teaching and 'scientific' theological research.²¹⁴ These encyclicals formalised the Catholic Church's move against modern thought which had then been taking place for quite a number of years in a more covert fashion where there



'Descent of the modernists' by E.J. Pace, 1922.²¹⁵

²¹⁴ Patrick J. Corish, *Maynooth College, 1795-1995* (Dublin, 1995) p.249

²¹⁵ Image available at <http://www.imagefree.org/freeimage/ViewImage.aspx?imageId=220670> (12 Jan. 2009).

had already been a number of denunciations and excommunications for many Catholics including Mivart. McDonald did not consider himself to be a modernist, although that was a label which was often applied to him. At the college in Maynooth McDonald was trying to drive forward reforms in education particularly by making a wider array of knowledge available to the students. During an effort to have a greater range of periodicals and newspapers made available in the library McDonald had some measured success and noted that 'the modest reform continued, till the authorities in Rome got frightened over modernism, and we were thrown back, practically to the old order of things.'²¹⁶ The education of seminarians in Maynooth and across the Catholic world had become even more limited and out of date than it had been when McDonald was a student years earlier.

McDonald was also at the head of an effort to establish a new ecclesiastical periodical in Ireland. He did this with the *Irish Theological Quarterly* set up in 1906 whose purpose it claimed was not to compete with the *Irish Ecclesiastical Record* but rather focus more on philosophy, science, history and literature. However, the foundation of this periodical had rather unfortunate timing just one year before Pius X's encyclical. As a result McDonald ended up severing his connection with the periodical since it was so greatly enfeebled to properly discuss those matters for which its creation was intended. McDonald wrote in his *Reminiscences* of the affair that: 'we were unfortunate in the time at which our project was commenced, as the modernists not only lamed but killed us. They aimed at progress, so did we, therefore we were modernists. It was of no avail to claim modernistic views:

²¹⁶ Walter McDonald, *Reminiscences of a Maynooth professor* (London, 1925) p.194.

were not our whole aims modernistic? If we were not modernists, should we not be content with the *IE Record*? Is it not a strange, sad thing that I, who not only hate modernism, but feel contempt for it, should be classed as a modernist by so many, even high-placed ecclesiastics as I know I am? The modernists have set back the hands of progress in the Church, dear knows how many years – far beyond my time, I expect. Were it not for them we might have been able to struggle on: is it any wonder that I dislike them? Though indeed it is not for any harm they have done to me that I dislike them primarily, but for what they teach, as well as for what they have done. It was hypocritical and mean of Loisy and Tyrrell to pretend to remain in the Church.²¹⁷

Clearly McDonald was enraged by this great setback to his attempts towards progress and it wasn't until 1967 at the Second Vatican Council that the hangman's noose connected to modernism was removed. McDonald may not have considered himself a modernist but his espousal of Mivart's philosophical ideas and his work on *Motion* certainly would have put him in that category for many in the Church. This supports the idea that modernism was not actually a coherent movement but was simply an invented label used by the church as part of an effort to quell those members seeking unorthodox changes from within. McDonald considered his main dedication to be the 'truth' whether that brought him into conflict with the teaching of the Church or not. He believed that any Church teaching that could not deal with a scientific conclusion could be deemed as a non-definitive teaching and many could therefore be rejected without disloyalty to the Church. He thought that a choice between a scientific conclusion and a definite teaching

²¹⁷ Walter McDonald, *Reminiscences of a Maynooth professor* (London, 1925) pp 328-9.

of the church should be straightforward duty of a Catholic theologian. He genuinely believed that that the traditional teachings could be modified to suit the new scientific conclusion and in fact draw strength from it. McDonald, however, was swimming against the tide and his reconciliatory approach was doomed to failure as a result of the Roman authority above him. In many ways he was lucky not to have suffered the same fate as Mivart, Loisy and Tyrrell by being excommunicated from the Church. There may have been a significant number of Catholics in Dublin who wished to embrace both science and faith together. However, McDonald stands out as an unusual example of a Catholic theologian that was stubborn enough in his attempts to do so facing the ever growing tide of conservatism in the Catholic Church.

Moving back outside the inner sanctum of the Roman Catholic Church we encounter a direct reaction to Darwinism from the quarter of the literati. This came from Dublin polymath George Sigerson who wrote 'Genesis and evolution' in the *New Ireland Review* in 1894. Sigerson was deeply immersed in Irish literary and political life. A qualified doctor by profession and practising neurologist, Sigerson was just as well known as a litterateur as he was a man of science. Having presented scientific papers at institutions such as the Royal Irish Academy he was also a great contributor to Irish culture with major works on Irish history and the Irish language.²¹⁸ His name is immortalised through to today from the Sigerson university Gaelic football trophy which he founded in 1911. Sigerson had corresponded with Darwin regarding botanical matters and told the Englishman in a letter from 1863 that he had read the *Origin of species* 'with so much

²¹⁸ 'George Sigerson: Obituary' in the *British Medical Journal* (March, 1925) p.428.

pleasure.’²¹⁹ Darwin was also said to have recommended Sigerson for membership to the Linnaean Society. The *New Ireland Review* was a purely literary periodical (although it was certainly considered to be a Catholic organ)²²⁰ and likewise Sigerson’s article ‘Genesis and evolution’ was written in a literary rather than scientific fashion. Duddy who has included Sigerson’s article in his collection of responses to Darwinism is quite apt in his introduction to the work as being ‘unusual in that it praises evolution on ethical grounds, specifically for undermining racialist theories of mankind and replacing them with a far more commendable idea of a common human ancestry.’²²¹

Sigerson, as a Christian, sought to disprove that belief in a divine being was something which developed slowly over the course of history. Instead he believed that ‘on man’s first appearance on earth the knowledge of the existence of the supreme father was imparted to the created immortal soul.’²²² Sigerson hence needed to counter the argument put forward from what he calls the Voltairian school in which each race of man developed in its own separate centre or ‘Eden’, because if the races of man had developed separately his belief could not stand.²²³ So in an unusual interpretation of science he claimed that the evolution theory had abolished this great scientific objection of mankind

²¹⁹ George Sigerson to Charles Darwin, 8 July 1863, *Letter 4236*, Darwin correspondence project <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-4236.html> (15 Sept 2008).

²²⁰ *Catholic Encyclopaedia* available at New Advent: <http://www.newadvent.org/cathen/11681a.htm> (15 Sept 2008).

²²¹ Thomas Duddy (ed.), *The Irish response to Darwinism*, i (Bristol, 2004) p.xxii.

²²² George Sigerson, ‘Genesis and evolution’ in *The New Ireland Review* (1894) p20

²²³ *Ibid* p.24.

developing in different places. This he claimed had since the previous century been an 'insurmountable obstacle to the acceptance of the Christian belief in the unity of the human race, and the brotherhood of man'.²²⁴ But now 'this impregnable obstacle, however, has vanished like an ice-berg, under a tropic sun, and wherefore? Because the evolution theory, whose very name sounds hostile, has destroyed it, and proved at least this much, that all races of mankind may, as holy writ declares, have sprung from common parents'.²²⁵ He also says that although evolutionary theory abolished what he claimed was the greatest objection to Christian belief that this fact was not yet well known.

He furthermore discussed the story of the deluge which we have seen was a great concern of many theologians analysing the veracity of biblical history. He explains that 'the continent of Lemuria, upon which the first of the human family are said to have appeared, and from which they migrated in many directions, was submerged beneath the Indian Ocean, and the memory of this submergence may(perhaps) be correlated with the account of the deluge contained in the bible, and the traditions of a great flood preserved by so many scattered fragments of the human race'.²²⁶ Effectively the Darwinian proof of mankind originating in one centre of creation helped prove the unity of the human race and even contributed to the proof of a biblical account that had been a major subject of inquiry among theologians for decades. He did also mention the obvious fact that many

²²⁴ Ibid.

²²⁵ Ibid p.25.

²²⁶ Ibid p.26.

of those 'materialist' advocates of evolutionary theory did not believe in a divine creator or an immortal soul. To this he asserts that 'the position which they uphold is self-contradictory and self-destructive. For if it were true that this belief in a divine being and an undying soul were false, then the progress of the human race would have resulted in reducing us mentally far beneath our animal ancestors.....the hypothesis of the materialists cannot stand. There has been either no progress or progress corroborates faith'. Sigerson did not tackle the question of whether or not man evolved from lower forms but still found no problem using one particular aspect of Darwinian theory as proof for his argument. Sigerson may not have entirely embraced evolution but this is certainly an interesting case if only for its unusual use of Darwinian science to help uphold the concept of a divine creator.

Questions regarding the nature of race, as addressed by Sigerson, were to some extent an academic preoccupation of this period and are important to the study of the development of Darwinism. Much of this interest in race in Ireland was connected to a myth that arose regarding the belief that the Irish people and the Irish language had descended directly from an Aryan Celtic origin. This idea of the Irish as Celts was pushed to prominence in the early nineteenth century with much work of significance appearing in the period of this study during the Irish revival. Darwinian science sought to trace the origin of man and had triggered a number of related questions. Sigerson was concerned with proving that all races of man had a common origin while we see that many others were instead trying to define and differentiate their race. A fascination with the Aryan Celt existed in other European countries but in Ireland it was fabricated to develop a sense of national

identity and as a tool to de-Anglicise the country. Discussions of the Aryan idea littered the pages of periodicals like the *Dublin University Magazine* and the *Dublin Review* for a number of years. The social sciences of anthropology and ethnography were in their infancy at this stage and there was no shortage of study and discussion on the subject of race. An array of race theory developed and was generally centred on differentiation in physical appearances and in language. John Beddoe may have been important in stimulating the discussion in Ireland when he attempted to apply his 'Index of negrescence' to the Irish nation in a paper entitled *The Kelts of Ireland* read before the Anthropological Society of London in 1870.²²⁷ His idea was to chart the racial differences through studying large samples of hair colours. Beddoe had difficulty discerning any real pattern to race in Ireland and believed that the original Aryan Celtic people had intermixed with so many other races in Ireland over the centuries that there was no racial purity on the island. However, with studies of language this situation is reversed because in Ireland the native language was considered to be much closer to purity in terms of its Celticism. R.V. Comerford in his survey of contemporary ideas of Irish racial origins tells us that: 'from a linguistic point of view Gaelic was the prime exhibit in the Celtic display, and the interest shown by continental scholars was a source of considerable pride for the small number of Irish people paying attention to such matters'.²²⁸

²²⁷ Chris Morash, 'Celticism: Between race and nation' in Tadhg Foley and Sean Ryder (eds), *Ideology and Ireland in the nineteenth century* (Dublin, 1998) p.210.

²²⁸ R.V. Comerford, *Ireland: Inventing the nation*, (New York, 2003) p.71

A publication which most likely stimulated interest in this subject in Ireland was the work by Ulick T. Bourke, Canon of Tuam Cathedral, *The Aryan origin of the Gaelic race and language* in 1875.²²⁹ A review of this work in the *Irish Times* tells us that the ‘Aryan Kelts, who had crowded into Europe long before the time of Homer, brought with them thousands of years ago that language which it has been the policy of our rulers for centuries to stamp out’ and attributing the destruction of Irish manuscripts to the Danes and hostile acts of the English nation.²³⁰ The book also challenges the Darwinians alleged views on the diversity of languages: ‘we have much that will assist them who reverence the holy scriptures and hold in abhorrence the fanciful theories of such men as Huxley and Tyndall- for we have it proved to demonstration that there once existed on earth a unity of language, a unity which is over and over again spoken of in the books of Moses’.²³¹

Beddoe also had a method of measuring intelligence based on facial angles in which the Irish scored poorly due to their broad jaw-line compared to that of the Anglo-Saxons. We can see this displayed in caricatures in publications like *Punch* where the Irish are portrayed in an ape-like fashion. James H. Murphy while writing on the Fenians mentions that ‘hostile British attitudes to Ireland drew heavily... both on a racism that was derived from a Celtic-Anglo-Saxon debate going on in intellectual circles and from a parody of

²²⁹ Ulick T. Bourke *The Aryan origin of the Gaelic race and language* (London, 1875)

²³⁰ *Irish Times*, 30 Oct. 1875, Irish Times Digital Archive

www.ireland.com/newspaper/archive/1875/1030/Pg006.html#Ar00600 (15 Mar. 2008)

²³¹ *Ibid.*

Darwinism'.²³² Comerford's work on the subject also highlights that on one hand the racial character of the Celt had been favourably depicted by men such as Oxford's Matthew Arnold as a source of great creativity in literature while on the other hand a belief was held by some that the Celts lacked the required qualities for self-government.²³³ This question of the 'Celts' ability to govern themselves became increasingly significant with the Home Rule movement in the late nineteenth century. Edward Hagan discusses the use of the Aryan myth by the Anglo-Irish ascendancy during a period in history when they were beginning to lose their grip on power in Ireland. Here he mentions Dublin's men of letters James Joyce and William Butler Yeats in connection with this Aryan movement. He asserts that the 'Catholic view of the Church as being for everyone fits quite well with James Joyce's pluralism. Given the prevalence of the Aryan myth it is not surprising that a Catholic Joyce would create a polygenetic hero of *Ulysses* with a bit of everything in him – Irish, Semite, Hungarian, Catholic, Jew, Protestant.'²³⁴ Hagan also shows the influence of the Aryan discussion on Yeats' 1894 play *The land of heart's desire* in which a woman abandons Catholicism and modern society and instead chooses life with the faeries and Ireland's ancient religious traditions. Yeats portrays the Aryan obsession as the return to the ancient traditions. His Ireland has a triumph over the death of the ascendancy but his victory is ironic as 'Aryan improvement results not in dominance, but in the restoration of ambiguity'.²³⁵

²³² James H. Murphy, *Ireland a social cultural and literary history 1791-1891* (Dublin 2003) p120

²³³ R.V. Comerford, *Ireland: Inventing the nation*, (New York, 2003) p71.

²³⁴ Edward A. Hagan, 'The Aryan myth: A nineteenth century Anglo-Irish will to power' in Tadhg Foley and Sean Ryder (eds), *Ideology and Ireland in the nineteenth century* (Dublin, 1998) p.204

²³⁵ Ibid p.205.

A more scientific side to the racial discourse during this period in Dublin can be seen with Alfred Cort Haddon. Haddon, an Englishman, was a driving force behind the future professionalisation of anthropology and had come to Dublin as a professor of zoology in the Royal College of Science in 1880.²³⁶ As was the case with almost all anthropologists of the time Haddon was a strong Darwinist in his views and this is evident in his work. Haddon made a major contribution to scientific discourse during his time in Dublin. He carried out numerous ethnographical studies and founded the Dublin Anthropometric Laboratory at Trinity College with Daniel Cunningham from which they carried out a major survey of the people of the Aran Islands over 1891 and 1892.²³⁷ The Aran Islands were regarded by anthropologists to represent the most uncontaminated region of Irish people in an ethnological sense. The islands had already been a subject of interest before Haddon with Beddoe visiting on his study of Ireland and also Dublin surgeon and naturalist William Wilde who brought a party from the British Association there on a study in 1857.

Greta Jones in her study of Haddon discusses the Irish pre-occupation in the 1890's with the idea of an ancient civilisation. She found that there was a contested territory in the interpretation of Ireland's primitive past. For those involved in the Gaelic revival the study of the 'primitive' was to be used to forge a distinct Irish concept of nationality but

²³⁶ *Oxford dictionary of national biography* <http://www.oxforddnb.com.jproxy.nuim.ie/view/article/33626> (15 Sept 2008).

²³⁷ A.C. Haddon and C.R. Browne, 'The ethnography of the Aran Islands, County Galway' in *Proceedings of the Royal Irish Academy*, ii (Dublin, 1893).

for Haddon the study of the 'primitive' was necessary as it was soon to be overwhelmed by modern society and lose its distinctiveness through external economic and technological development.²³⁸ We see the interest in the former interpretation of the primitive coming from the non-scientific investigation of the islands by Dublin writers like Yeats and also John Millington Synge who published a journal of his stay there in 1907 which helped win him international acclaim.²³⁹ In Ireland the interest in race which was aroused by Darwinism is clearly important in the context of the cultural revival. Interestingly the same interest in race produces very different results elsewhere owing to different cultural settings. For example, in Prussia the notion of racial superiority was a key part in the drive towards German unification which culminated in their victory in the Franco-Prussian war in 1871 thus confirming for them the idea of racial progress.²⁴⁰

Another concept which was related to Darwinism was the idea of eugenics. Darwin's cousin Francis Galton inspired by the *Origin of species* had dedicated many years to the investigation of the nature of human heredity. He was led further into coining the term 'eugenics' which was the improvement of human heredity through intervention. The basic idea was that to improve the biological standards of the race you needed to ensure that those with high abilities were encouraged to have large numbers of children and inversely those who were perhaps insane or weak minded should be prevented from

²³⁸ Greta Jones, 'Contested territories: Alfred Cort Haddon, progressive evolutionism and Ireland' in *History of European Ideas*, xxiv (1998), p. 205.

²³⁹ J.M. Synge, *The Aran Islands* (Dublin, 1907).

²⁴⁰ David L. Hull, 'Darwinism and historiography' in Thomas F. Glick, *The comparative reception of Darwinism* (Austin, 1974) p.396.

procreating. The first form which could be called positive eugenics could be promoted through tax incentives and the latter which was negative eugenics could be achieved through things like state implementation of sterilisation of unfit people for example.²⁴¹

Many who took up the eugenics cause were more concerned with the negative eugenics concept. It was taken to extremes by the Nazi movement giving the term 'eugenics' much more negative connotations today. The basis of the eugenics movement was that it was the duty of the state to limit the multiplication of the least fit citizens. Darwin himself had left the door open for the movement when he pointed out the problem with the relaxation of natural selection in modern society whereby the less fit now survive.²⁴² The eugenics movement came a little late to Ireland, leaving it slightly outside of the scope of this particular study. However, it is worth noting that a National Public Health Congress was held in Dublin in 1911. At this meeting eugenics were discussed and further promotion was agreed. This resulted in the foundation of eugenics societies in Belfast and an effort was made to establish one in Dublin which met once but never again subsequently.²⁴³ A national eugenics society existed later with many prominent members including Yeats and the Guinness family.²⁴⁴

²⁴¹ *Oxford dictionary of national biography* <http://www.oxforddnb.com.iproxy.nuim.ie/view/article/33315>
(18 Sept 2008)

²⁴² Peter Bowler, *Evolution: the history of an idea* (London, 1984) p. 274.

²⁴³ Greta Jones, Jones, Greta, 'Eugenics in Ireland: the Belfast Eugenics Society, 1911-15' in *Irish Historical Studies*, xxviii (1992), p. 83.

²⁴⁴ *Ibid*

By the close of the nineteenth century we see a major success for Darwinism in an educational context. The Dublin Natural History Museum in 1890 began a rearrangement of their collection. Their 'History of animals' exhibit was displayed in a format which followed the progression of reasoning in Darwin's *Origin of species* and a study on this has been carried out by Juliana Adelman.²⁴⁵ The museums curators George Scharff and Robert Carpenter were outright Darwinians. They believed not only in evolution but in the process of natural selection and this is clear from the layout of their museum display.²⁴⁶ At this juncture this opinion seems to have been shared by a number of Ireland's scientific luminaries. They avoided any potential controversy involved with the display by the omission of two key things. They never mentioned the name Darwin in the display (although natural selection was used) and they did not include 'man' or human evolution in the display. Adelman accurately observes that this caution exhibited by the museums curators confirms that in late Victorian Ireland evolution had become an acceptable term and field of study but 'Darwinism' still aroused fear and carried many negative connotations.²⁴⁷ Another interesting aspect of this was Carpenter's belief that the study of Darwin's work and natural history might put some perspective on the Anglo-Irish political struggle, whereby in the great expanse of geological time the 'duration of the struggle of Teuton and Celt had been but as a day.'²⁴⁸ This may have been a bit too

²⁴⁵ Juliana Adelman, 'Evolution on display: promoting Irish natural history and Darwinism at the Dublin Science and Art Museum' in the *British Journal for the History of Science*, xxxviii (2005) pp 411-36.

²⁴⁶ Ibid p.427.

²⁴⁷ Ibid p.428.

²⁴⁸ G.H. Carpenter, 'Mingling of the north and south' in *Irish Naturalist*, v (1893) p.68.

ambitious for a natural history display but there is no doubt that this museum popularised the Darwinian view of development as it reached almost half a million visitors per year.

Discussion of Darwinism in an educational context is appropriate since this study ends in 1908. One of the significant factors of this date to the discussion of Darwinism was the conclusion to the debate over the education system which culminated in 1908 with the passing of the Irish Universities Act. This established the National University of Ireland with three constituent colleges Cork, Dublin and Galway, Maynooth as a recognised college and Trinity College opting to remain a separate entity. The format for the instruction of science, and modern concepts with Darwinian evolution as their flagship, in universities had now been a major topic at government enquiries into education for decades. The Act passed in 1908 finally put to rest the question of format for Irish universities and although these colleges were secular by nature the Catholic hierarchy maintained considerable influence on the boundaries of education. The encyclicals of 1907 had formally laid down the Catholic position against all aspects of what it called 'modernism' and we see far less in the way of open discussion of Darwinism in this context, with the notable exception of Bertram Windle, President of the Queen's College Cork, who embraced a form of derivative creationism. The British Association also visited Dublin again in 1908 and celebrated the 50th anniversary of the *Origin* with Darwin's son Francis Darwin holding the presidents chair and delivering a speech on natural selection. The *Irish Independent* reported on the event and referred back to a prediction made by Huxley in Dublin thirty years earlier. This prediction was that, by the time of this meeting in 1908: 'conclusions that are now thought to be going to shake the

foundation of the world will have become part of every-day knowledge, and nobody will be one whit the worse.²⁴⁹ Given that Huxley also falsely prophesied thirty years earlier that he himself would not be at that meeting, it is not surprising that the world's acceptance of these controversial ideas by 1908 was not as universal or clearly defined as his prophecy had foreseen.

²⁴⁹ *Irish Independent* 2 Jun. 1908, Irish Newspaper Archives

<http://www.irishnewsarchive.com/Default/Skins/INA/Client.asp?Skin=INA&enter=true&AppName=2&AW=1234120371846> (15 Mar. 2008).

5. Conclusion: Darwin 200.

Studies of Darwinism typically focus on the question of the controversy which it aroused. This is understandable given its course of history and this thesis for the most part is no real exception. The existence of controversy is perhaps not an adequate reason alone to justify historical research. However, Darwinism's iconic position at the head of a wave of modern thought in the late nineteenth century which had far reaching affects throughout society creates a far greater justification for such an examination. This study of the Darwin debate in Dublin, 1859 -1908, produces a number of distinctive results in the history of Darwinism and also offers a unique perspective on that period of Irish history. In the early phase of this thesis we get an insight into the structure and work of a significantly large and active scientific community in Dublin. Although this was a very vibrant community it had only a few men of great stature in the international scientific community. Scientific discussion of Darwinism in Dublin we have seen was almost inextricably linked to the ecclesiastical world as so many scientists in the city were ordained clergymen.

This investigation also sheds new light on some of the inner workings of the universities and the issue of scientific instruction in higher educational reform. The question of intellectual authority is important throughout the study in both clerical and secular domains. The struggle for this authority gave shape to the educational ethos at higher institutions for years to come. The clash of science and religion highlights the strengths

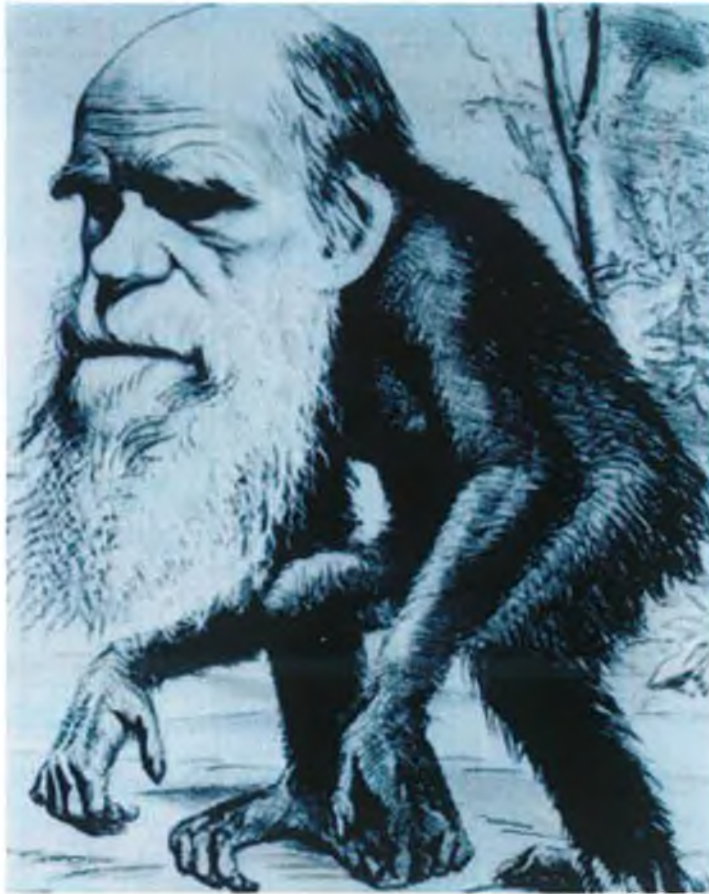
and weaknesses of the two main churches in Ireland and in many ways displays the nature of the relationship between the two. Generally, the Church of Ireland was much more open to discussion of Darwinism from a reconciliatory perspective from the offset, while the Catholic Church showed a certain amount of complacency in this initial period. Tyndall's Belfast address invigorated both faiths into discussions of man's origins, biblical veracity and the role of the churches in society but both within different contexts. The Church of Ireland had suffered disestablishment only a few years earlier and any further threat to the authority which they held over their flock was assured to prompt a powerful response. The Catholic Church was experiencing a rise in influence from Rome as a result of Cullen's ultramontane views and over the remainder of the period Rome tightened its grip on intellectual authority. While Darwinism was slower to arouse major controversy in Dublin than it was in London, Tyndall's address truly acted as the catalyst which brought the furore in Dublin to an unanticipated level in the mid-1870s. This short period in Dublin is perhaps an example of the most intense clash of Darwinian science and religion that took place anywhere in the world in the nineteenth century.

Darwinism created space for reconsiderations of man's place in the world and as a result a number of new questions were raised, particularly regarding race. This new interest in race affected both the scientific and cultural spheres in Dublin from the ethnographical studies conducted from Trinity College to the question of national identity in the context of a cultural revival. When Darwin sought to find the origin of species he never would have considered that Darwinism might have had an impact on Ireland when it sought to reclaim a sense of 'Irishness' by looking towards its own origins. The paradigm shift

caused by Darwinism becomes increasingly difficult to measure as a study moves further away from science but Darwinism's influence on the cultural climate in late nineteenth century Dublin is quite tangible. As we saw with the Dublin Natural History Museum, Darwinian evolution had gained a great deal of acceptance by the turn of the century but the name still carried a great stigma from the many of years of clashes and debates throughout society. People's fears of displaying sympathies with such modern thought as Darwinian science were even further augmented by the conservatism of the Catholic Church and its increasing radicalisation against such ideals.

The position and importance of both Darwin's name and his scientific work have constantly developed over the last century and a half. The *Origin* initially shocked both scientific and religious circles firstly for its intrinsic content. Soon afterwards the great intellectual movement of Darwinism began to take full stride with broad ranging effects across society far beyond the original aims of Darwin's book. In the twentieth century the synthesis of Darwin's work with Mendelian genetics finally gave his work the scientific credibility he never enjoyed during his own lifetime. In our lifetime the current debate between creationists and evolutionists exhibits great similarities in the nature of the conflict and the arguments used when compared to what took place over one hundred years ago. Now in the 21 century we have arrived at the Darwin 200 celebration, which is the bicentenary of the man's birth and the 150 anniversary of the publication of the *Origin*. Dublin plays host once again to much discussion of questions of Darwinism at these celebratory lectures and events and the newspapers articles and television documentaries that are constantly highlighting the significance and importance of

Darwin's work. The numerous conferences and publications on the topic today, show that Darwinism has perhaps now further developed into its very own exciting field of historical research.



Satirical image of Darwin in *The Hornet*, 1871.²⁵⁰

²⁵⁰ Image available at http://www.iupui.edu/~mstd/a103/darwin_ape.jpg (12 Jan. 2008).

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Appendices

Three appendices have been included to allow the reader the benefit of viewing some of the primary source material used in researching this work. None of these three sets of sources have been included in Thomas Duddy's 2004 collection of primary materials, *The Irish response to Darwinism*. These sources have not been used in any previous writings on the topic of Darwinism in Ireland and offer a sample of some of the scientific discussion which took place and also the views of the Catholic Church and the Church of Ireland on the matter of modern scientific thought.

Appendix A is the correspondence between William Henry Harvey and Charles Darwin in 1860 consisting of three letters in total. The transcripts are directly taken from the Darwin Correspondence Project online at Cambridge University and cited in the bibliography.¹ This is worth including here, not just to sample some of the scientific discussion taking place, but also because Darwin's Irish correspondence is relatively scarce. Appendix B is from the Protestant newspaper the *Irish Ecclesiastical Gazette*. This is an article regarding John Tyndall's 1874 British Association address.² Appendix C is the article on 'Revelation, geology and the antiquity of man' from the Catholic monthly periodical the *Irish Ecclesiastical Record* in 1880.³ Both Appendix B and C contain images scanned directly from the primary sources held at Trinity and Maynooth.

¹ W.H. Harvey to C.R. Darwin, 24 Aug. 1860, *Letter 2898*, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2898.html>, C.R. Darwin to W.H. Harvey, 24 Sept. 1860, *Letter 2922*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2922.html> and W.H. Harvey to C.R. Darwin, 8 Oct. 1860, *Letter 2943*, Darwin correspondence project, <http://www.darwinproject.ac.uk/darwinletters/calendar/entry-2943.html> (2 Dec. 2008)

² *Irish Ecclesiastical Gazette* 23 Sept. 1874.

³ 'Revelation, Geology and the Antiquity of Man' in *The Irish ecclesiastical record*, i (1880) pp 185-93; *ibid* ii (1880) pp260-72.

Appendix A:

Correspondence of William Henry Harvey and Charles Darwin

Harvey, W. H. to Darwin, C. R., 24 Aug 1860.

Trin. Coll. Dublin—

Aug. 24. 1860

My dear Sir

I have taken advantage of the summer vacation to finish the reading of your book, & considering what has already passed between us on the subject, I feel bound to tell you that my opinions have been, at least modified. It is true that I cannot as yet (probably never shall) receive the theory of Natural Selection as a satisfying explanation of the Origin of species—but I am willing to admit that it explains several facts which are not otherwise easily to be accounted for. Until however something more is known of the inciting causes of the *Variation & Correlation of Organs*, which in Nature ever go hand in hand, I can only regard Natural Selection as one Agent out of several;—a handmaid or wetnurse—so to say—but neither the *housekeeper*, nor the mistress of the house.

So long as you deal in generalities I can usually follow your arguments assentingly. Many of the facts brought forward illustrate your general principles & fit well into the place assigned them. But unhappily, my assent is most ready in cases where your data are *fewest!* and I find that particular instances, intended to illustrate how Natural Selection has acted or might be supposed to act in certain cases, almost always incline me to withdraw my assent to the previous argument.

Thus, when—following your argument—I am half inclined to admit the successive development of species from species, I come to your *Illustrations*, instead of my faith in my teacher being confirmed, I am absolutely repelled, & forced to suspect some undetected flaw in his line of reasoning. For instance, the speculation on the bear & the whale, of which I dare say you have heard enough, simply made me laugh. But that on the Ostrich & a bustardlike-bird (p. 134), though less improbable, is almost as *fanciful*; for, if your previous statement of the reason why ground feeding birds have imperfect wings be a *vera causa*, it is just as likely that the Ostrich may be a decreasingly corpulent *Dinornis* *acquiring* wings in its efforts to escape from a recently selected Lion. The modern Ostrich assuredly does use its wings constantly, both in running, & in flapping its sides in hot weather.— Again, the imagined adaptation of the tube of the red-clover to the proboscis of an improved domestic bee (p. 95) seems to me referable to the times of the "may-bees" only;—and lastly (for it is useless to say more, since the result on my mind has been *uniform*), what you say (p. 392) of insular trees belonging to orders which elsewhere include only herbaceous species, seems to me to be unsupported by sufficient evidence. You cite no particular trees, & I may therefore be wrong in *guessing* that the Orders you allude to are *Scrophularineæ* & *Compositæ*; & the insular trees the Antarctic *Veronicas* & the arborescent *Compositæ* of S. Helena, Tasmania &c. But—in S. Africa, *Halleria* (a *Scrophularinea*) is often as large & woody as an apple tree; & there are several S. African arborescent *Compositæ* (*Senecio* & *Oldenburghia*). Besides, in Tasmania at least, the arborescent *Composites* are not found "competing with herbaceous plants *alone*, & growing taller & taller by overtopping them" & so being converted "first into bushes & ultimately into trees"; for the most *arborescent of them all* (*Eurybia argophylla*, the Musk-tree) grows, not among bushes & herbaceous plants but in *Eucalyptus* forests, where it forms an undergrowth to trees so hopelessly taller than itself that competition is impossible. And so of the S. African *Halleria*, which is a tree, among trees. What the conditions of the arborescent *Gerania* of the Sandwich Islands may be I am unable to say, or whether you allude to them. I cannot remember any other instances; nor can I accept your *explanation* in any of the cases I have cited.

The Chapters of your Essay that weigh most with me are the latter ones.— The fact of an orderly succession of forms throughout geological eras suggests the notion of an orderly transmutation of species successively from epoch to epoch.— The facts of geographical distribution, making allowance for residua, seem to me *favourable* on the whole to a theory of successive mutation; particularly as regards the biology of outlying, small islands.— The facts of Embryology & of morphology are favourable to belief in an intimate relationship of organism to organism throughout nature; & this relationship is explicable on the hypothesis of a community of descent: & though these facts are not contrary to a notion of separate creation they are unexplained by it.— But if Creation be the finished work of a single Divine Author a *common-plan* may be anticipated throughout; there will be a "wheel within a wheel", the same idea endlessly repeated & endlessly diversified; the same results arrived at by innumerable different contrivances. There will thus arise, between the different organisms, graduated similarities & diversities, & these will suggest relationship; but the *real* blood-relationship may be no more than that between different patent contrivances for accomplishing the same end. Watt's steam-engine is not necessarily the *parent* of all steamengines.— The major facts of classification therefore, the subordination of group to group, appear to me to be perfectly consonant with a theory of separate creation.

But there are other facts of classification which certainly favour the view of *mutation*, & these are what you have most enlarged on in the early chapters. The tendency of forms to vary; the impossibility of distinguishing between species & variety; in many cases the difficulty of drawing a clear line between genus & genus, order & order, class & class, & even between the vegetable & animal kingdoms;—these are difficulties to the believer in separate acts of creation & are perhaps the strongest evidence in favour of a doctrine of *mutation*. But it does not therefore necessarily follow that the mutation has been effected through "natural selection" *alone*.

For some years back I have contented myself in believing in the *absolute* creation of "natural species" as distinguished from "book-species"; allowing "book-species" to have originated by variation within limits. But I must freely confess that my "natural species"

are purely *ideal*, & never can be absolutely made plain to the senses. It is for such species as these that M^r. Hopkins contends in Frazers Magazine.

At p. 484. you state your belief "that animals have descended from at most only 4 or 5 progenitors, & plants from an equal or lesser number";—and you admit that analogy suggests that "all organic beings may have descended from some one primordial form, into which life was first breathed by the Creator". Now, if you admit 4 or 5, or even but one, primal organisms, you admit so many "natural species", in the same ideal sense that I have been accustomed to do. The difference between us at starting is merely as to the *number* of originally created forms; a difference in *degree* & not one in *kind*. We both believe that Life was first given by the Creator. Hitherto I have believed in thousands of "natural species"; nor do I yet see any absurdity in so believing. I may yet be driven back, by evidence, step by step, as you have been, into the narrows, & back even to one primordial form; but so long as we hold that form to have been "*created*", we cannot be said to be infidels. To my mind there is no more difficulty in believing in 50, or 500 or 5000 absolute acts of creation, than in believing in one solitary creative act;—nor do I see greater difficulty in believing in many successive acts than in few or many simultaneous acts; but you seem to feel a difficulty in both these cases. What has *once* occurred, may occur more than once.

Again, at p. 483, you ask, "Were all the infinitely numerous kinds of animals & plants created as eggs or seed, or as full grown"? To this it is sufficient to reply; was your primordial organism, or were your 4 or 5 progenitors created as egg, seed or full grown? Neither theory attempts to solve this riddle, nor yet the riddle of the Omphalos.

In a former letter I troubled you with a few remarks on the *geological* difficulties of the Theory, & I have still something to say under this head.

Granting the highly developed condition of Silurian fossils we are driven to seek for the "primordial form" in some much earlier bed, "long before the first bed of the Silurian was deposited". At p. 285, you calculate the denudation of the Weald at 306,662,400 years, or at the lowest 150 to 100 millions of years. We shall not trouble ourselves to

compute thereby the enormous length of the *post-silurian* epoch (from the present year, back to the date of the first silurian bed);—but let us endeavour to conceive, guided by palæontological evidence, the probable length of the *pre-silurian*-organic period, from the lowest bed, back to the bed of the Primordial Form. Little as we know of Silurian Animals we know at least that they were greatly diversified, many of them highly organised, and probably very far removed from a "primordial form", & if we could fully unveil the buried world of that era, it would probably compel us to push back our "primordial" some millions of centuries further than the known evidence now obliges us to do.

But how is palæontological evidence to be applied so as to compute a probable lapse of time? Granting that species & genera divaricate in the manner explained by your diagram of divarication, we may observe the number of fossiliferous beds through which *well marked & nearly allied* genera extend; remaining mutually distinct below, and undivariated above. Taking the group of Mollusca, I find, among the fragmentary evidence collected by the palæontologist, that between 20 & 30 molluscan genera which have numerous living species, are represented by fossil species in Silurian strata, & considering our very small acquaintance with Silurian fossils I think this a *large* number. I cannot doubt that many other genera which at present seem to fail a little above the Silurian will yet be traced down into it. Every fresh discovery will add to the lapse of time, required to gather in the divarications to a primordial.

But let us take *Patella* & *Chiton*, two well-marked & nearly allied Silurian genera, having numerous modern as well as ancient species. The fossil Chitons have the same number of valves, similarly arranged & sculptured as their modern congeners, & except the subgenera *Chitonellus* & *Cryptochiton*, neither very different from the type, I know of no generic divarication. Now if *Chiton* & *Patella*, littoral shells, living side by side on the same rocks, have continued with the same habits, the same organization, generically undivariated since the first bed of the silurian was deposited; may not these same two genera go down through lower strata with the same habits, the same organization & generically disunited to some indefinitely distant primal sea, before a tendency to coalesce exhibit itself; & may they not then go down through an equally indefinite but

probably much longer period before an animal half-patella & half-chiton, the common progenitor of both will be found? But suppose us to have reached this *Chitona-patella*: can we believe it to be the common progenitor of all Mollusca? Certainly not, for *Chiton* & *Patella* are far removed from the lowest of the Molluscan series.— But to hunt back for a common progenitor of Molluscs through supposed forks of an imaginary family-tree would be a very hopeless task, and when at length, after fresh myriads of centuries we had traced this parent of Mollusca, we should have to go still further down, & probably to an equally remote era before the common progenitor of Mollusca & Articulata were found;—& this low organism might still be myriads of centuries removed from your ultimate *Protozoon*.

By your theory, the changes from generation to generation are infinitesimal; & to the continued accumulation of such changes through vast periods is due the present diversified condition of the organic world. But till I began this conjectural calculation I had no conception of the smallness of an infinitesimal generic difference. Judging now by the *differences* which may have modified the organization of *Chiton* & other molluscan genera during the whole post-silurian epoch, I can only liken each small *cyclical* divergence to the distance between two of the striæ on some microscopic test-object! Well may those naturalists who believe in the *cyclical fixity* of a *variable type* be forgiven when they see so large, so ancient & so widely diffused a genus as *Chiton* is so persistently slow in its progressive development. I am tempted to think that "*festina lente*" ought still to be our motto, in receiving a theory of *unlimited* divarication.

Moreover, we must bear in mind, that as, in imagination, we descend through pre-silurian beds toward our first organism, many circumstances conspire to render every successive step slower & slower. For you tell us that higher & more improved forms *alter quicker*, but low, unimproved forms *endure longest & alter most slowly*. We know how long *Chiton* & other molluscan genera have endured & flourished, & how slowly they have altered, *if altered at all*, in organization. In every step below them therefore we must allow still longer periods of stability, still slower cycles of change.— Besides, at every step downwards, we encounter fewer & fewer forms; hence, there will be less & less "*struggle for life*" in a continually thinner & thinner population. "*Natural Selection*"

consequently will become feebler & feebler, as the "Struggle for life" diminishes; & this latter, it seems to me, must cease altogether long before the era of your Protozoon be arrived at.

But granting that we are at length arrived at the bottom of the well & have secured our "primordial form", just as it was "created". What was it like?— It is plain that it must have belonged to the *Protozoa*; for it is the original *protozoon* itself. Besides, as it united in itself the *undeveloped Animal & Vegetable ideas*, it could not be higher in organization than the simplest animal & vegetable soldered together. A pair of nucleated cells, combined into an atom of sarcode, would answer to this description. But the *size* of each cell might be as large as you please. The largest cells known in the Vegetable Kingdom occur among the Algæ; those of *Valonia Forbesii* are sometimes as big as a pigeon's egg. But remembering the enormous bulk of the animals of the early world, & that the *earliest* types of each group are the *most gigantic*, I think we may (if necessary) make the cells of our primal organism as big as plum-puddings—or as balloons. There is nothing necessarily to limit the size but the tenacity of cellulose & sarcode, & that might vary almost indefinitely.

But probably the enormous size suggested may be objected to, & there is nothing compelling us to any size. The organization *must* have been simple, but the size is an open question. Whatever was the size, large or small, the production of the first organism was a stupendous miracle. The "flashing up of elemental atoms into living tissue" (p. 483) which then occurred is doubtless as wonderful as the creation of a new world. For, however brought about, this is what took place. Certain atoms of carbon, oxygen, hydrogen & azote, changing into cellulose & protoplasm, became a living body, endowed with growth; capable, by feeding, of changing mineral atoms into more cellulose & protoplasm; having *an instinct* to turn to the light & perhaps the germs of indefinitely progressive instincts; and above all, possessing a procreative power, enabling it to transmit from generation to generation of similar organisms, throughout all time, similar powers & capacities. This first organism in fact possessed distinct *personality*; hence (my reason assures me) the Power that called it into being & endowed it with secondary powers must be a **Personality**, & not merely "a law or laws acting around us." And as

every organism in Nature has its *personality*, so, whether every one were separately created, or the higher derived through the lower, we require a *personal*, creative or moulding Power alike in all cases. Secondary (or physical) laws suffice for all the phenomena of the inorganic world, but life is made up of contingencies which physical laws, unmodified by personal Agency, will not always meet.

And here I must observe that if we allow a Self-originated, Supernatural Power to have *once* acted as above described, we cannot presume to limit the further working of that Power. If the derived generative force of animal or plant may act an indefinite number of times, must not the primary Generating Force be held capable of acting an indefinite number of times? Hence I see no theoretical reason for limiting the number of originally *created* forms, either as to their variety among themselves or as to the number of individuals of each kind that may have been simultaneously or successively called into being. Neither is it of any theoretical consequence whether they were created as eggs or as adults; for the Power that could call *a living tissue* from the dust, must be held capable of, at will, calling up an egg or an adult.

To return to our primordial form; let us see what becomes of him on the theory of natural selection. By theory we have made him the simplest in structure; the feeblest in divaricating tendency (because "unimproved") & there is a probability in favour of his being of small size. By theory also he is alone in the world, because every species starts from a solitary individual or pair. Now granting a high rate of increase to such a being we may safely allow myriads of years or perhaps of centuries to roll by before the world could have been so fully stocked with undivariicated protozoa that there should have arisen any "struggle for life". Millions of ordinary protozoa may congregate without crowding in a cubic foot of water; how many million millions would it require to overstock a primæval, universally extended Ocean?—"Variability" if solely depending on "conditions of life" could effect but little, for protozoic forms flourish equally well on arctic-snows, in temperate & tropical rivers & seas & in thermal springs. They are the *simplest* of organisms, & the simpler an organism is, the less is it affected by "conditions of life". Any attempt therefore to set "natural selection" in action under such circumstances appears to me to be impossible.

I have endeavoured, by theory, to overcome this difficulty; but granting that "Growth", & "Reproduction" are ordinarily in each animal or plant fixed-average quantities; and considering that "Variability" arising from conditions of life, from use & disuse, is feeble or wholly inoperative in a being placed and constituted as our protozoon; and that a "Struggle for life" is all but impossible to conceive; I have exhausted your Productive "Laws" (p. 490) & have no resource left but to call up the *Unknown Laws of Variation*, those namely which cause an Organism "to sport" or diversify itself *unexpectedly*.— Natural Selection, no doubt, is ready to take advantage of such *contingent variations*, but cannot be said either to *explain*, or to *originate* them. If therefore these are *necessary*, at starting, to set natural selection in motion, we are surely calling up a wholly different Agency to any set forth in your theory.

For once that we call in *Unknown Laws of Variation*, "Growth" will no longer be a fixed-average quantity, but may be supposed to vary indefinitely either in the same being or in its immediate progeny, as we see illustrated by sponges & the lower algæ. The Protozoon may be supposed as plastic as an *Amoeba*. Hence divarication from the original Protozoon may immediately commence, & even be rapid, but would be disorderly or monstrous but for another *unexplained Law*, "the correlation of Organs".

By the help of Divarication & Correlation acting together we arrive at the symmetrical diversity of organisms, so obvious in all around us; and with "Reproduction" ever multiplying individuals, & "Inheritance" seizing on & perpetuating new variations, we may conceive the Earth to be rapidly peopled with diversified & diversifying forms. And these may have been *originated*, & have gone on divaricating for long ages before a "Struggle for Life" shall have brought Natural Selection into being. Whilst we have Instruments at command so powerful as "Unknown Laws" (of Variation & Correlation) we no longer feel hopelessly crushed by the weight of 50 or 500 post-silurian epochs, for we see that, time being allowed, we shall at length emerge from the abyss. But without calling in these Unknown & Unexplained laws, organic nature, if it originated in a single "primordial form" appears to me to be doomed to perennial sameness. The primordial form, like the *Protococcus nivalis*, would have reproduced its own likeness from the dawn of life to the present day. Mere lapse of time can effect no change whatever.

But what are these "Unknown Laws of Variation"; what this "Correlation of Organs"? My reason tells me that they are probably fresh revelations of the same Supernatural Power which *originated* our "primordial form", and endowed it with its reproductive, & all its other *powers*. Organic nature, from beginning to end, is a continued miracle, & this is true on both theories; whether each species has been separately created, or whether the past & present conditions of the organic world have arisen by successive divarications of a primæval germ. Every living atom bears its witness to an Everliving, Superintending, Upholding, & Contriving Intelligence. In every variation from type, in every correlation of parts, there are evidences of Creative Power, such as no secondary agency, like that of Natural selection accounts for; and I think also there are evidences of *one* Great Design, beginning at the simplest elementary form, & culminating in the "fearfully & wonderfully made" framework of man.

Once or twice in your essay you object to our attributing to the Creator a way of working similar to that of intelligent man. At p. 188, speaking of the structure of the eye, you say,— "Have we any right to assume that the Creator works by intelligent powers like those of man"?— We have at least some reason for "assuming" that He possesses such powers; for how has man acquired them but through His gift? Nor do I think it presumption to believe that the Infinite Intelligence is ever acting, everywhere throughout creation. And if not, whence arise those wondrous correlations, beginning with the balanced movements of the spheres, & penetrating every particle of matter? Are they merely coincidences? Or, do they come through natural-selection?—

Do not suppose me to mean that I consider you to deny a Superintending Providence. Your admission of a *created* germ of life, & the quotation from Bishop Butler, explanatory of the word *natural* ("what is natural requires & presupposes an intelligent agent to render it so") show that you admit a Supernatural Agency. But it seems to me that in developing the theory of natural selection & referring *every* operation in nature to it, the underworking Power is too generally lost sight of as an element in the problem, & that the continual mention of "usefulness" is the only evidence of theism that the work supplies;—because, an appreciation & perpetuation (or *selection*) of the "useful" presupposes a *vigilant & intelligent* agent. I do not suppose you to say, for instance,

(p. 235) that "nature" is no more conscious than the reforming bees of the saving of wax effected by "sweeping equal spheres at a given distance from each other in a double layer" &c. There is abundant evidence of *intelligence* somewhere; either among the bees (which we do not think) or *Above* & around the bees. But it is surely no *explanation* to say, as you often do: "If so & so were *useful* to any animal in its struggle for life, *it would be easy for natural selection*, by slow degrees, more & more perfectly, to fit the creature to its peculiar habits, & endow it with such & such instincts;"—as in the case of the Ant & the Bee, whose instincts, supposed to be acquired *through inheritance*, are *transmitted* through successive communities of *neuters*! You seem to me to be merely asserting this trueism; Nature or the Author of Nature, can easily effect any preconceived design, & form & endow any creature, as He pleases. Nothing is really *explained* by saying "it would be easy" "if it were useful". And when we strike off such "explanations" as these, with which the book abounds, the facts of organisation *explained* by natural selection will be very seriously diminished.—

If there be any part of the theory of natural selection more firmly established than another, it is what we may call *the law of the strongest*. Dominant races throughout nature will gradually drive out feeble races; "the weakest will go to the wall". In applying this universally recognised principle you strongly insist that *improved* races will continually supplant *unimproved*, & hence you deduce the gradual progress of organic nature from the simple primordial forms up to man. We know what an "improved" race among domestic animals means; we know how it is manufactured, how disseminated & how preserved from degenerating; but we also know that it is feebler in constitution & less fitted to conquer in the struggle for life than its *unimproved* progenitor. Artificially "improved" races could never become dominant, if neglected by man. It is of importance to your theory therefore to determine whether, in Nature, the most *dominant* races are also the **organically improved** races? Unless I mistake your meaning you seem very generally, so to argue, & many of your readers understand you to contend for *one continued progress* onward, from the monad to the man, accomplished by the continual extinction of *less improved* forms, by dominant *improved* varieties.

Such appears to me to be the *general* drift of your argument; but the chapters on "use & disuse" allow for occasional retrogression. They teach us, that if an animal, through profitable use of its limbs has risen, in successive generations, from a very low to a very high organization; its degenerating descendants, subjected to changed conditions of life, which would cause them gradually, in successive generations, to lose the formerly acquired *habit*, & the *organs* fitted to those habits, may descend in the scale of being to the state of the unimproved original from which the race ascended. The blind animals, vertebrate & invertebrate of the Kentucky caverns illustrate such retrogressions. You suppose these animals to have "slowly migrated, by successive generations, from the outer world into the deeper & deeper recesses of the caves" (p. 138); and we see that they have already gone so far back as to have *lost* the eyes which their progenitors had *acquired* (through natural selection, as *all* eyes have arisen (p. 136)), and to have had their bodies considerably correlated with their new habitats. Now, they have only to go still further back, and after successive migrations & generations their descendants may lose every *acquired* organ, one by one, till they revert to a protozoic form. But how can we certainly tell that they are migrating inwards, deeper & deeper into the caves? May they not, on the contrary, be migrating *outwards*, *seeking* the light, as almost all known organisms instinctively do;—and if so, they are animals in progress, *acquiring*, not losing organs. Their imperfect eyes are *nascent*, not obliterated eyes. And in the case of the blind-rat, with its well formed though sightless eyeballs we have an animal almost ready for emergence?

But to return to the dominant races: are these the *improved* or the unimproved in *organization*? Viewing organic nature in its widest aspect I think it is unquestionable that the truly dominant races are not those of high, but those of low organization. The simpler any animal's structure is, the less is it dependent on outward conditions; hence, the better is it fitted to conquer in the struggle for life, & to perpetuate its kind to a remote posterity. Cryptogamic plants & invertebrate animals, nature's scavengers, are the most dominant and persistent races of the world. The *Protococcus nivalis* is probably one of the oldest inhabitants of the world, younger only than the snow; and the *P. pluviialis*, which scarcely differs, is equally persistent wherever rain water habitually rests, & these two may be

called dominant. But as they are harmlessly dominant, we do not heed them. Other animals & plants of low organization by the ravages they cause, teach man himself that his domination over nature is by sufferance of a Higher Power. The *Botrytis* which so nearly destroyed the potatoe; the *Oidium* which has ruined the vinegrowers throughout the world; these, and the locust & the caterpillar, the tapeworm & its kindred, with the innumerable army of intestinal worms & of animal & vegetable parasites, these are the true *dominant* races; the Lords of creation that never struggle for life and that fear no evil. They have nothing to lose by any chance, short of the annihilation of the world, & if the theory of natural selection be true, they have every thing to win.

The law of the strongest therefore most forcibly applies to the wholly unimproved races; in a less degree to those higher in the scale; and gradually diminishes upwards as organization, & sensibility to outward conditions encrease. I object therefore to its being made a *vera causa* of the *evolution* of organization. It only applies where a peculiar organization, combined with *strength of constitution & adaptability to circumstances*, gives an animal an advantage over its fellows: but in this case I think the dominancy will depend more on the strength of constitution & power of adaptation than on the organization. For we see improved & unimproved races (like the humble & domestic bees) flourishing together without one supplanting the other; & if the humble bee, notwithstanding its wasteful habits, have greater strength of constitution & less susceptibility to varying climate than the domestic bee, it will eventually win.

I have already far transgressed the proper bounds of a letter, & yet have a few more words to say.

When you suppose one species to pass, by insensible degrees into another, so many facts of variation support your view that it does not seem very improbable; but where a generic limit has to be passed, bearing in mind how *persistent* generic differences are, I think we require a *saltus* (it may be a small one) or real break in the chain, namely, a *sudden* divarication. I know you account for genera by the dropping out of supposed intermediate infinitessimals. But we know also that *sudden* divarications do sometimes occur in nature; and it is *possible* that they may be even necessary consequences of repeated &

long-continued infinitesimal changes. The tower of Pisa may be infinitesimally receding from its perpendicular for centuries, & may at last, the point of balance being passed, come down bodily with a crash. I have sometimes amused myself, when looking through a kaleidoscope, by turning it so as to make it indicate *genera & species*. Starting with any pattern of figure, by very slow turning of the tube you may get successively a great many *modifications* of the figure, without any radical change in the pattern, thus illustrating several species of one genus. But when you have turned the tube so far as to cause such a displacement of the fragments of glass as makes them topple over, a perfectly new pattern will *suddenly* start up & may then by further slow turning be modified, till it in turn shall topple over. Of course this is merely a possible illustration of the gradual succession of species & genera, if they arise by *smaller & greater* divarications.

You object, I know, very strongly to *abrupt* changes. But as there are volcanoes & sudden displacements in the mineral world, there may also be abrupt divarications in the organic. Some of the facts of metamorphosis, particularly that of the Cirrhipedes (p. 441) which for a special purpose suddenly acquire & as suddenly lose their compound eyes & natatory legs; and every similar fact that indicates a *special* interference of Creative intelligence implies at least a *break* in the series of changes. Nor can I divest myself of the belief that there is a real *break* between every established species (however originated), & that that break implies the interference of a First Cause. The line of unfertile hybridity offers us some evidence of such breaks; anatomical structure, in cases where the plan of organization is reversed, will probably furnish more exact evidence. The change from hairs to feathers seems a sudden one, inexplicable on the hypothesis that intermediate links have dropped out. The change from coniferous wood-tissue & no ducts to ordinary wood-tissue with ducts, seems also sudden. And so do other changes that imply contrariety or polarity.

I am therefore still strongly of the opinion that, whether all organisms *originated* in but a few primæval types or in a definite, but considerable, number of "natural species"—a question that at present must be left open—that the present aspect of nature is due, not to a succession of minute differences accumulated through inheritance & preserved by

``natural selection'', but to renewed *interferences* with ordinary generation, which may be attributed either to ``Variation & Correlation of Organs'', or to a superintending & moulding Intelligence:—& that these interferences may have caused either *sudden* or *gradual* changes in the previously moulded organisms. By admitting the possibility of *sudden* divarication we get rid of those perfectly innumerable forms of life which your hypothesis requires us to believe in, but of whose existence there is so little evidence either in existing nature or among fossils. But the whole subject is at present obscured by difficulties that no proposed hypothesis fully gets rid of. By directing attention to one set of phenomena your theory of natural selection finds favour, but turning to another set I am driven back nearly to my old ground; and then ``natural selection'' is to me but a new phrase signifying ``the order of nature'', which may be further translated into ``the will of God'', & then the theory dissolves into thin air.

As yet therefore I cannot subscribe myself your disciple, but I remain as heretofore | My dear Sir | very faithfully yours | W. H. Harvey

Darwin, C. R. to Harvey, W. H., 24 Sept 1860.

My dear Sir

I have read your long letter with much interest & I thank you sincerely for your great liberality in sending it me.— But on reflexion I do not wish to attempt answering any part, except to you privately: anything said by myself in defence would have no weight; it is best to be defended by others or not at all.

Parts of your letter seem to me, if I may be permitted to say so, very acute & original; & I feel it a great compliment your giving up so much time to my book. But on the whole I am disappointed; not from your not concurring with me, for I never expected that; & indeed in your remarks on Ch. XII & XIII you go so much further with me, (though a little way) than I ever anticipated & am much pleased at the result. But on the whole I am disappointed, because it seems to me that you do not understand what I mean by Natural Selection, as shown at p. 11 of your letter & by several of your remarks.— As my book

has failed to explain my meaning it would be hopeless to attempt it in a letter. You speak in early part of your letter & at p. 9. as if I had said that Natural Selection was the sole agency of modification; whereas I have over & over again, ad nauseam, directly said & by order of precedence implied (what seems to me obvious) that selection can do nothing without previous variability. see p. 80, 108, 127, 468, 469 &c ``Nothing can be effected unless favourable variations occur". I consider Natural Selection as of such high importance, because it accumulates successive variations in any profitable direction; & thus adapts each new being to its complex conditions of life.— The term ``Selection" I see deceives many persons; though I see no more reason why it should than *elective* affinity, as used by the old chemists. If I had to rewrite my book, I would use ``natural preservation" or ``naturally preserved". I sh^d. think you would as soon take an emetic as reread any part of my Book, but if you did & were to erase selection & selected & insert preservation & preserved, possibly the subject would be clearer.

As you are not singular in misunderstanding my Book, I should long before this have concluded that my brains were in a haze, had I not found by published reviews & especially by correspondence that Lyell, Hooker, Asa Gray, H. C. Watson, Huxley & Carpenter & many others *perfectly* comprehend what I mean.

The upshot of your remarks at p. 11 is that my explanations &c & the whole doctrine of natural selection are mere empty words signifying the ``order of nature"; as the above named clear-headed men, who do comprehend my views, all go a certain length with me & certainly do not think it all moonshine, I should venture to suggest a little further reflexion on your part. I do not mean by this to imply that the opinion of these men is worth much as showing that I am right, but merely as some evidence that I have clearer ideas, than you think; otherwise these same men must be even more muddled headed than I am; for they have no temptation to deceive themselves. In the forthcoming September no^r of the American Journal of Science there is an interesting & short Theological Article (by Asa Gray), which gives incidentally with admirable clearness the theory of Natural Selection, & therefore might be worth your reading: I think that the theological part would interest you.)

You object to all my illustrations: they are all necessarily conjectural, & may be all false; but they were the best I could give. The Bear case has been well laughed at, & disingenuously distorted by some into my saying that a bear could be converted into a whale; as it offended persons I struck it out in 2^d. Edition; but I still maintain that there is no especial difficulty in a Bear's mouth being enlarged to any degree useful to its changing habits,—no more difficulty than man has found in increasing the crop of the pigeon, by continued selection, until it is literally as big as whole rest of body. If this had not been known, how absurd it would have appeared to say that the crop of a bird might be increased till it became like a balloon.

(With respect to the ostrich, I believe that the wings have been reduced & are not in course of development, because the whole structure of a Bird is essentially formed for flight; & the Ostrich is essentially a bird. You will see at p. 182 of "Origin" a somewhat analogous discussion. At p. 450 of 2^d Edit. I have pointed out the essential distinction between a nascent & rudimentary organ.— If you prefer the more complex view that the progenitor of the Ostrich lost its wings, & that the present ostrich is regaining them, I have nothing to say in opposition.—)

(With respect to Trees on islands: I collected some cases, but took the main facts from Alph. De Candolle, & thought they might be trusted. My explanation may be grossly wrong; but I am not convinced it is so; & I do not see the full force of your argument of certain herbaceous orders having been developed into trees in certain rare cases on continent. The case seems to me to turn altogether on the question whether generally herbaceous orders more frequently afford trees & bushes on islands, than on continents, relatively to these areas.—)

(In p. 4. of your letter you say you give up many Book-species as separate creations; I give up all, & you infer that our difference is only in degree & not in kind. I dissent from this; for I give a distinct reason how far I go in giving up species; I look at all forms, which resemble each other homologically or embryologically as certainly descended from the same parents.)

(You hit me hard & fairly about my question (p. 483 Origin) about creation of eggs or young &c—(but not about mammals with mark of umbilical chord). Yet I still have an *illogical* sort of feeling that there is less difficulty in imagining the creation of an asexual cell, increasing by simple division.)

(Page 5 of your letter,— I agree to every word about antiquity of World; & never saw the case put by any one more strongly or more ably. It makes, however, no more impression on me, as an objection; than does the astronomer when he puts on a few hundred-million miles to the distance of the fixed stars. To compare very small things with great,— Lingula &c remaining nearly unaltered from Silurian epoch to present day is like the dovecot pigeons still being identical with wild rock-pigeons, whereas its ``fancy" offspring have been immensely modified & are still being modified by means of artificial Selection.)—)

(You put the difficulty of the first modification of the first protozoon *admirably*: I assure you that immediately after 1st. Edit. was published this occurred to me; & I thought of inserting it in 2^d. Edit. I did not, because we know not in the least what the first germ of life was; nor have we any fact at all to guide us in our speculations on the kind of change which its offspring underwent. I dissent quite from what you say of myriads of years it would take to people world with such imagined protozoon.— In how very short a time Ehrenberg calculated that a single infusorium might make a cube of rock— A single cube on geometrical progression would make the solid globe in (I suppose) under a century. From what *little* I know I, cannot help thinking that you underrate the effect of the physical conditions of life on these low organisms. But I fully admit that I can give no sort of answer to your objection; yet I must add that it would be marvellous if any man ever could, assuming for the moment that my theory is true.— You beg the question, I think, in saying that Protococcus would be doomed to eternal similarity:—nor can you know that the first germ resembled a Protococcus or any other now living form.—)

(Page 12 of your letter. There is nothing in my theory necessitating in each case progression of organisation; though natural selection tends in this line, & has generally thus acted. An animal if it became fitted by selection to live the life, for instance, of a

parasite, will generally become degraded. I have much regretted that I did not make this part of the subject clearer; I left out this & many other subjects, which I now see ought to have been introduced. I have inserted a discussion on this subject in the foreign Editions. In no case will any organic being tend to retrograde unless such retrogradation be an advantage to its varying offspring; & it is difficult to see how going back to the structure of the unknown *supposed* original protozoon would ever be an advantage.)

(Page 13 of your letter. I have been more glad to read your discussion on "dominant" forms than any part of your letter: I can now see that I have not been cautious enough in confining my definition & meaning. I cannot say that you have altered my views. If Botrytis had exterminated the wild Potatoe, a low form would have conquered a high; but I cannot remember that I have ever said (I am sure I never thought) that a low form would *never* conquer a high. I have expressly alluded to parasites half exterminating game-animals: & to the struggle for life being sometimes between forms as different as possible, for instance between grasshoppers & herbivorous quadrupeds. Under the many conditions of life which this world affords, any group which is numerous in individuals & species & is widely distributed may properly be called dominant. I never dreamed of considering that any one group, under all conditions & throughout the world, could be *pre* dominant. How could Vertebrata be predominant, under the conditions of life to which parasitic worms live? What good would their perfected senses & their intellect serve under such conditions? When I have spoken of dominant forms, it has been in relation to the multiplication of new specific forms, & the dominance of any one species has been relative generally to other members of the same group, or at least to beings exposed to similar conditions & coming into competition. But I daresay that I have not in the Origin made myself clear, & space has rendered it impossible. But I thank you most sincerely for your valuable remarks, though I do not agree with them.)

(About sudden jumps; I have no objection to them: they would aid me in some cases: all I can say is, that I went into the subject, & found no evidence to make me believe in jumps; & a good deal pointing in the other direction.— You will find it difficult (p. 14 of your letter) to make a marked line of separation between fertile & infertile crosses. I do not see how the *apparently* sudden change (for the suddenness of change in chrysalis is of course

largely only apparent) in larvæ during their development throws any light on this subject.—)

I wish I could have made this letter better worth sending to you: I have had it copied to save you at least the intolerable trouble of reading my bad hand-writing. Again I thank you for your liberality & kindness in sending me your criticisms; & I heartily wish we were a little nearer in accord, but we must remain content to be as wide asunder as the poles; but without, thank God, any malice or other ill feeling.—

My dear Sir | Yours very sincerely, Charles Darwin.

Harvey, W. H. to Darwin, C. R., 8 Oct 1860.

40 Trin. Coll. Dublin

Oct. 8. 1860

My dear Sir

I have to thank you for the patience & good nature with which you have listened to my crudities, & the trouble you have taken to meet several of the points I ventured to bring to your notice— I do not want to lead you into a controversial correspondence, or to be drawn into one myself, but yet there are a few matters in your letter that I would like to reply to.—

1st. — I never supposed you to say that Natural Selection could act without previous Variability. On the contrary, throughout your book Natural Selection is represented as dependent on ``favourable" variations & conditions, ready to take advantage of, to perpetuate & accumulate any profitable item of differentiation;—but, in strict language, to originate nothing. Hence in my letter I have called her a Wetnurse, rather than a Mistress, & hence I can see how we may accept her as the manufacturer of multitudes of ``species" (so called), such as they exist in our arrangements; and yet reject her as explaining unlimited divarications. The first impression of your book on my mind was

that it too boldly assumed *unlimited* variability as the cornerstone of the argument; and this was the first stumbling block in my way, for I am strongly impressed with the notion (perhaps wholly wrong) that there is no law of organic or inorganic nature *unlimited* in its operation. And so, however widely species may vary, I suspect an oscillation in every case. In the case of your divaricating pigeons for instance, I should anticipate, after endless variations from type, either a return to type or extinction; but not the passage into a new type.

Among plants, I can believe in very wide limits of *transmutation*; but not equally among all plants. Orchids, Amaryllideæ, Irideæ, & perhaps most Endogens, & all Cryptogamic plants, are *centrifugal* in a very high degree:—so much so that whole genera or even suborders or Orders of our arrangement may be really no more than Natural Species. Thus, for instance granting Natural Selection to be *partially* true, I can see how all *Gramineæ* may have sprung from one common parentage, one aboriginal grass (a *veritable* *Aira præcox*),—and how all *Cyperaceæ*, in like manner, may have sprung from one original Sedge. But here I stop, perhaps illogically, because between *Gramineæ* & *Cyperaceæ* I think there is a ``*saltus*”, or vacant space in which it is difficult to conceive a *strictly* intermediate type. The difference in structure of the seed—the relation of embryo to albumen—implies *opposition* (or *polarity*) to that degree that a half & half structure must be proved to exist before I can believe in it. Now *Gramineæ* & *Cyperaceæ* are unquestionably very ancient types, if the widest distribution & great diversity of specific form be proofs of antiquity; both also must have been dominant in a high degree for myriads of years or ages,—and yet, in embryological structure, in floral arrangement, in foliation & in stem,—we have no reason for supposing that the earliest *grasses* or *sedges* respectively, were materially different from those of today. Both Orders differ from each other by an exact, definite character of seed; and in neither Order do the *genera* rise in organization one above the other, but in both orders the genera, so to say, stand on a dead-level or common platform of organisation. This case (and several similar might be cited) appears to me to support the *notion*, that natural variability has *strict limits*; & to bear, so far as it goes, against the notion of *unlimited* derivation from a Protozoon.

2^d. — You regret having used the term *Natural Selection*, as tending to mislead, & propose *Nat. Preservation* as a better phrase. If you will not think it impertinent (understanding your theory so imperfectly as I do), I would suggest the term "Natural *Evolution*" as expressing still more exactly the *idea* conveyed to my mind by your theory. Do you not teach us that all organisms, past & present, have been *evolved*, through the action of secondary or *natural* laws, from one *created* or primæval form? If so, Natural Evolution would well express the combination of all the powers of nature in the production of species. 3^d. A word or two respecting the Ostrich's wings.— You suppose he has lost wings, "because the whole structure of a Bird is essentially formed for flight, & the Ostrich is essentially a Bird". But—if all *organs* (*wings* included) have been *gradually* formed, through *Nat. Sel.* accumulating useful variations in successive generations;—unless the *primal organism* had wings & was essentially a flying animal;—then the *earliest* essential bird, or his remote non-bird ancestor, may have had only rudimentary wings. Now the Ostrich may be a *slightly modified* descendent of one of the earlier types, for his affinity to the *Dinornis* & other wingless birds suggests it.— If indeed the *primal-bird* were formed "per saltum" or by an act of creation, the case would be different;—we should then suppose his organisation to be perfectly adapted for flight, completely furnished as a *typical* bird should be. But if the *primal-bird ascended* from a lower non-bird form, it is not at all probable that the earlier types would have been so fully furnished either with wings or with feathers as those more recently evolved. Hence, I do not see that it is "more complex" to suppose in this case an *evolution*, than a *suppression*;— when, according to your theory, the evolution *must* have once occurred, whereas the suppression, at best, only *may* have occurred. The only complexity I am guilty of is in supposing the Ostrich to represent an *early* type of bird, not a *late* one. Quere, what degree of carination of the sternum is requisite to constitute an "essential" or *typical* bird?— After all, I only alluded to the Ostrich to show that the *facts* of nature may be interpreted, by the help of your theory, in *opposite* ways;—that if you take *one* explanation, another may take the *opposite*, and both be *equally* plausible. It is a matter to me of indifference, whether the Ostrich be going up the hill or down again.

4th. — You say that I beg the question of "Protococcus being doomed to perennial similarity".— I own to the *begging*;—but pray let me state how little I here beg. Truly we know nothing of the imaginary *Protozoon*; but as you say *you* "have less difficulty in imagining the creation of an asexual cell, encreasing by simple division" than an animal of higher organisation, I hope I am not incorrect in inferring that you suppose the *Protozoon* to have been such a cell, so encreasing.— Now, *Protococcus nivalis* is simply a spherical cell, asexual, encreasing by simple division. The sphere is also the simplest & most self-balanced form of a cell. Grant it to vary in *outline* however, & in *size*; for it does grow & has an average size when mature.— But however variable in such minor points, the *structure* is essentially the same in all individuals;—it is *a simple, nucleated cell & no more*. The question to be solved then is, *how long has it remained in this condition?*— Of course, the epoch at which it was called into being is wholly undiscoverable, but for the following (theoretical) reasons I think it probable that *Protococcus* is very ancient indeed.— If, as you suppose, *all* organisms were successively evolved from one primordial germ or *Protozoon*, by accumulations of useful variations from generation to generation, then it is reasonable to infer that organisms which depart least from the type of the Primordial are its nearest "blood relations". There was an age of Protozoa before the world contained anything else, & it was probably a long period, because it must (by theory) have continued till Variability, the Struggle for Life &c &c had evolved something better. There was time for protozoic forms to *diversify* indefinitely, if not to exhaust all possible differentiations to which unicellular bodies could be stretched. In our times the world teems with such forms; their genera & species may be counted by thousands & tens of thousands,—& yet, these are only remnants of the innumerable lost protozoic races that preceded them. Few, comparatively, are capable of fossilisation;—but the Diatomes are, and several of the fossil Diatomes are said to be *specifically* identical with forms now living.— Now, it does not matter, for my argument, whether the Pre-silurian *Protococcus* were *spherical*, or *oval*, or *square*, or *stellæform*; or whether it were *red*, *green* or *brown*; it may have gone through indefinite variations of this kind, and yet I should say it was doomed to perennial similarity, if, through all changes, it remained *a simple, asexual cell*.— Now, as it could not have been *less* complex than a cell & have retained organisation;—and as, at

the present day, it is not *more* complex than a cell,—all I can say is that, since it was called into being, it has not materially improved in organisation. So far it has inherited ``perennial similarity"; & I see no reason why it should not inherit the same to the end of the world.— But, you may say, why should *Protococcus* & similar organisms, be regarded as relics of a Protozoic, pre-silurian world & not *modern organisations*?— I reply:—either they must have come down to us as undivarcated protozoa, from your Protozoon by uninterrupted succession of generation;—or, they must represent higher animals & plants which once flourished, but which through gradual loss of organs from disuse, & a continual struggle with adverse circumstances, have dwindled down to a monadic condition;—or, they must have been *spontaneously generated*, from age to age, that is to say, the creative act of calling a living cell from the dust, must have been *repeated* an infinite number of times from the dawn of life to the present day.— I can find no other way of accounting for their existence; & I suppose your theory would prefer the *first* supposition, as the simplest—that they have lived, as Protozoa, from the dawn of life to the present day.—

And here I would observe, that if you maintain that Protozoic organisms now living are lineal descendents of the aboriginal Protozoon;—and if you also maintain that all higher animals & plants have descended (or rather *ascended*) from the same aboriginal Protozoon, through the agency of natural laws alone, without the personal interference of an Intelligent First Cause,—you are bound to show theoretically how such widely different results have been arrived at. At starting we have similar elementary organisms, under similar conditions of life, all exposed to the same struggle, all subjected to similar ``laws acting round them". Why have some remained Protozoa to the present day, while others have developed into Whales or into Man?— Have the ``perennially similar" races had no struggle for life? I suppose not, for they have remained perennially similar. But what kept them out of the struggle while all around them, of their own kind & in their own condition as respects outward circumstances were wriggling upward into higher beings? And what set these latter in motion? A struggle for life. Side by side, in the same sea, with the same water to swim in, the same food to eat, the same sun above them; one Protozoon remained in statu quo *unexterminated*, another *advanced* in organisation &

developed nerves, sinews & bones; one perhaps was drawn into an *eddy* & so swam round & round forever; the other floated on a *current* & gradually drifted into a new phase of being.—

5th— You dissent from my requiring myriads of years to overstock the Earth with the imaginary Protozoon & refer to Ehrenberg's calculation of the time it would take for an infusorium to make a cube of rock. The *time required* will depend on the nature of the protozoon. If it secreted *lime*, like one of the Foraminifera, or *silex*, like a Diatome, its dead shells would rapidly form strata; but if it were like a Protococcus or an Amoeba no such result could follow for infinite ages. But my argument had reference to something more than a question of *time*;—I wished to show the difficulty of eliminating *a struggle for life*, of inducing *variation*, & leading, through Nat. Selection, to the evolution of higher animals from a protozoon, so placed in a universal sea.—

Granting however that it secreted lime, like a Foraminifer, & rapidly propagated itself: what would result?— I see nothing at first but a thin film of chalk spread out over the bottom of the ocean, & gradually increasing in thickness till the sea became shallower & shallower, until (supposing *lime* enough) it was filled up at last;—all which filling up must have occurred before the struggle for life commenced, for so long as clear water & available lime remained the Protozoon (if analogous to his modern kindred) had all he required. And, as the available lime diminished, though the newer generations might have thinner & thinner shells, & might at last come to be membrane coated or gelatinous, they need not have made a single *onward* step;—& the fact of their contriving to do without lime would still further retard the *struggle for life*, for they would have fewer wants to supply, their debris would more slowly accumulate & the clear water would be less rapidly filled up. Suppose however that the lime diminished unequally, & that, in some favoured localities the lime-secreting species continued to propagate;—though you might then have *two* species "naturally selected" where but one had been before, yet the *newer* might be the *lower & feebler type*, for the power of secreting lime would be lost, *by disuse*, & with it whatever apparatus was fitted to that purpose. We may indeed suppose that the power of secreting might remain & be diverted to the secretion of silex or any other earth; and so we should get a third, or more species.— To this I have nothing to

object;—all these & similar "specific" changes are compassable by Natural Selection. But it is yet to be shown whether all such *adaptations* to circumstances have not, in every case, their natural limits. We can conceive a Protozoic world so originating & becoming greatly varied in "species" without one of them rising sensibly in organisation above another. Like snow-crystals their *patterns* may be innumerable, but their organisation all of a piece. The modern Protococcus may be very unlike the imaginary Protozoon in outward form & in habits of life, and yet, in simplicity of organisation, it may be identical;—each a nucleated, asexual, spontaneously dividing cell.

The arguments above applied to an imaginary protozoon appear to me to fit as well in the case of a reefbuilding coral;—and if Agassiz observations on the reefs of Florida may be depended upon, namely, that there is no difference in species between the bottom & top of a long persisting reef, it further illustrates the "perennial similarity" of low forms for indefinite periods.

6th. — A word or two more about *Variability*. I fear, by your referring me back to passages in the Origin where Variability is insisted on, you have misunderstood what I meant, when, in my letter, speaking of *Unknown* Laws of Variation, I say:—"If therefore these are necessary, at starting, to set Natural Selection in motion, we are surely calling up a wholly different Agency to any set forth in your Theory" &c. I did not mean that you had *ignored* such Laws, for at the opening of Chap. 5, in speaking of them, you pointedly say that they are not due to *chance*, but to an unknown cause. What I meant was that, to variation from this *Unknown* Cause, & not to "Variability from the indirect & direct action of the external conditions of life, from use & disuse" (p 490) we must, in the present state of science, attribute all the *Major* divarications of the organic world, even on the theory of evolution from a primordial. We must, I think, draw a broad line between Variations arising from allied conditions of life, from use & disuse, and those Variations that introduce *new stages* of being, molding an animal body with symmetry of limbs & definite position of internal organs; that, early in the history of life, introduced a *definite* number of typical formulæ (radiate, articulate, molluscoid, vertebrate, &c), & have *retained* these same types, through *every change* of outward circumstances, to the present day.— Variations arising from altered conditions &c, being *impersonal*, may fairly be

referred to secondary causes;—but the other & infinitely the larger class of unresolved Variations, including Correlation of Organs or modelling after a preconceived pattern, imply *personality*, & therefore (to avoid pantheism), I ascribe them to the Creator. Natural Evolution, no doubt, takes advantage of every such organic change & commences a new set of modifications upon it, but (as I think) is insufficient to explain or *originate* it. These *steps* (however originated), and however small in amount each may be, are the *saltations* for which I have all along been contending,—the non-recognition of which, in the theory of Natural Selection, appears to me like leaving out the keystone of the arch.

But it is useless to carry on the discussion. I must again apologise for my prolixity, & remain,

My dear Sir | very truly yours | W. H. Harvey

Appendix B

Irish Ecclesiastical Gazette, 23 Sep 1874.

PROFESSOR TYNDALL'S ADDRESS.

PROFESSOR TYNDALL is a timid man if he thinks free speech to be in any danger. Yet he assures us that his whole address was intended, not to inform scientific men of any new discovery, nor to tell the world how high the tide of human knowledge has now risen, but merely to assert the right of philosophers to make assertions which they cannot prove. "I have touched on debatable questions, and led you over dangerous ground - and this partly with the view of telling you, and through you the world, that on these questions science claims unrestricted right of march. It is not to the point to say that the views of Lucretius and Bruno, of Darwin and Huxley, may be wrong. I concede the possibility, deeming it indeed certain that these views will undergo modification. But the point is, that whether right or wrong, we claim the freedom to discuss them."

Well, who forbids the discussion? Who denies the right of march? In our opinion, science would be more dignified if it ceased to pretend that anyone seriously restrains or interferes with it. Professor Tyndall was elected President of the British Association, although no person mistook him for a Christian. The British Association was welcomed to Belfast by men of all Protestant denominations, who never dreamed that the slightest reticence would be imposed upon its members by respect for the dearest convictions of the living or the last hope of the dying. Nineteenth of the clergy who listened to Professor Tyndall would have been heartily glad if he had spent his time (since he could not enjoy dry science without a theological relish to give it relish) in saying frankly how far science had really and decisively revised views which theologians used to hold. They regard the world as a volume written by God's finger, and therefore, so far as it has been fully demystified, as a better commentary upon His other volume than all traditions and prophecies put together. At its bidding they have surrendered frankly any notion that the world was non-existent a few thousand years ago, or that within a week after it bounded ready-made out of the void Adam and Eve were cultivating the soil of Eden. Science has reminded them that the Scriptures represent the seventh day as lasting still, and all that believe as entering into its rest; and taught by this experience they are quite ready to accept as much as science has shown herself disposed to stake her credit upon.

If religious men complain of Professor Tyndall it is because he set his sword against our deepest convictions, and ignored entirely the solid and scientific basis on which our convictions rest. He made an aggressive speech exactly where no person could answer him, and said he did so on behalf of free discussion. He used his rank as President of a Scientific Association to give eclat to surmise.

It matters less that his historical summary should be defective and unjust; that he should at once elevate the intellectual attainments of Pagan and Saracens, and depress those of medieval Christianity; or that he should attribute to theology the burning of Bruno, without making the slightest mention of the Reformation, but for which he never could have said that Kepler "from his German home defied the power beyond the Alps." Macaulay wrote, "it is chiefly to the great reformation of religion that we owe the great reformation of philosophy," and showed in particular that the reformers were the first to shake off the yoke of Aristotle. Yet Professor Tyndall has contrived to give a history of philosophy, of the harmful influence of Aristotle, and of the interference of theology, without any mention of the fact that theology led the van of free thought. This is not scientific, for science gives equal weight to palatable and impalatable truth.

Our chief complaint, however, continues to be this; that the greatest living experimentalist, who could have taught us so much within his own province, threw his chance away in order to hurl at our faith in God a series of mere conjectures. His hostility to religion could not even pass the reasonable game of Newton without remarking that his study of other subjects "led to render him less, instead of more competent to deal with theological and historic subjects." If this were true, it would usually be true of Tyndall as of Newton. But the only importance of the very ad-

dress we are considering is derived from our instinctive feeling that it is not true—that intellectual prowess, proved in one field, is not left behind when the attention is earnestly directed elsewhere. One who thinks that a man is made up of body and brain should be the last to condemn us for prizing the opinion of the sublimest organization which ever "secreted thought," that there was more in itself than a body and a brain. But, in truth, Newton's meditations gave him a matchless right to be quoted upon the subjects of our day. For the supremacy of law throughout nature was never more keenly felt than by him who bound the planets in the chain of gravitation. If, therefore, the laws of nature were really inconsistent with belief in God, the inconsistency would have been as apparent to the discoverer of gravitation as to the expounder of the convertibility of force.

The fact nevertheless remains. Professor Tyndall declares Newton unfit to think about theology because he was distinguished in science; and goes straight forward to attack theology under shelter of his own scientific eminence. Such an assault will not unsettle his case. Yet he does not even pretend to have overthrown us, but only to predict that we shall be overthrown by and by. Two theories of existence are in the field. One teaches that a personal God "made" the world by repeated modifications of matter which He "in the beginning created." Grant its premises of a personal God, and its conclusion presents no difficulty, for His perfection (which is not the author of confusion) accounts for the orderly and methodical progress of creation as exactly as development can do. Nor is this theory embarrassed, as its rival is, by the impossibility of leaping over certain vast chasms, from death to life, to the mammalia, to consciousness, to reason, to adoration.

It is not forced to own, in the act of deriving thought from sensation, that "we try to soar in a vacuum the moment we seek to comprehend the connection between them." It has not to confess concerning religion, concerning love, concerning nature, poetry and art, concerning even the sweetness of sugar and the bitterness of aloes, that "no adequate reason has ever been rendered" for these facts of consciousness. The theory is adequate to grapple with all these phenomena; while Professor Tyndall confesses that "an Archimedean fulcrum is here required which the human mind cannot command, and the attempt to solve the problem is . . . like the effort of a man trying to lift himself by his own waistband." Nor does he touch our Christian evidences, testifying with irrefragable emphasis to a history which involves this theory. Neither does he produce any counterbalancing evidence of the historical truth of the rival theory. He will not even assert that its conclusions follow from its premises; nor affirm with any confidence that even if we grant atoms to have been endowed with the mysterious preliminary impulses, they could even then have evolved an animal or a world. Even grant, an animal, and he distinctly refuses to permit that other animals can be evolved without intelligent superintendance. These startling confessions are implied in the following quotation:—

"The strength of the doctrine of evolution consists not in an 'experimental demonstration,' for the subject is hardly accessible to this mode of proof." "The whole process of evolution is the manifestation of a power utterly inscrutable to the intellect." "The views of Darwin and Spencer may be wrong. I concede the possibility, deeming it indeed certain that these views will undergo modification."

Thus it stands confessed that all the atoms theory is built on a 'perhaps,' on mere speculation, — which may be wrong, and which are certain to undergo modification. Matters stand thus:—It is plain that God (Who is our postulate) could create a world. And we assert that historical evidence is forthcoming for events which involve both the existence of God and the fact of creation. But, on the contrary, when we grant the postulate of atoms impelled by some attraction or affinity, you still need a "mysterious power," an "insoluble mystery;" you are still unable to produce any "experimental demonstration;" you are still dependent upon theories which "may be wrong," and are certain to be "modified." People are somewhat hasty who think dreams of this kind, dignified by the name of science, to be very dangerous to Christianity. You cannot profess to explain the world by introducing insoluble mysteries;

and you need not claim to have refuted anything, if you promptly confess that no experimental demonstration is possible. You are not very scientific when you "prolong the vision backward across the boundary of the experimental evidence, and discern in matter the promise and potency of every form and quality of life." What new faculty has our animated matter now evolved, which can thus "discuss" a "promise and potency" that lie entirely beyond "the experimental evidence?" Above all, how shall we reconcile all this with the statement that "not unto Aristotle, not unto subtle Agnosticee, not unto Church, Bible, or Mind tradition, must we turn for a knowledge of the universe, but to the direct investigation of nature by observation and experiment?" After such a paragraph, one is more amused than terrified to find the same address propounding "subtle hypotheses," which require us to prolong our vision beyond all the evidence of experiment.

But this is not all. The theory, even as a dream, is confusedly unable to grapple with the phenomena which must be explained. We are told plainly that every antecedent has its equivalent consequent, every consequent its equivalent antecedent, and that vital as well as physical phenomena are "under the law of causal connection." It follows that the atoms are alike responsible for every act of felicitous and execrable, of Luther and Leo X., of Mahomet, Caliphia, Inca, and Christ. This generalization, we read, "binds nature fast in fate," and it certainly confines man as rigidly. What antecedent can be shown, then, to account for our sense of the radical difference between the most mischievous blunder and the most profitable crime? If we have evolved ourselves from the Acidities to the Tentacles by the struggle for existence, how could such antecedents result in our profound respect for self-sacrifice, which plainly contradicts this fundamental law of the world? If the atomic theory be correct, vice and virtue are alike inevitable, blameless, and equidistant; but the general acceptance of such a doctrine would shake society to its foundations. Mr. Browning's lurid fancy of wild acts in a red-hot iron cage would not be more repulsive than a community which believed in nothing deeper than the struggle for existence (as Mr. Professor Tyndall grandly puts it, "that the weakest comes to the wall"); which bowed down to nothing holier than his new Gospel, that "our meat and drink, and air and exercise have a perfectly transcendental value and importance," and which live of nothing more enduring than "streaks of incensing cloud." Any society built on such a creed would tend itself to pieces within twelve months. Yet what antecedent, we ask, ever before caused truth to be thus partial? Can there be the gates of truth through which materialism would push us straight to something far more dreadful than the Commune? Again, what "causal connection" ever made a falsehood elevating and sublime? Yet the highest and by far the most powerful moral influence, which the world has ever known was that of Christianity; and the highest ideal ever conceived is that of our Redeemer's character. No student of that character and that influence can deny that their roots were nourished by faith in a personal and an active God. Can it then be through the doors of falsehood that the world was led upward from the Roman mobs to the hospitals, almshouses, and poorhouses by which Christianity protests against "the survival of the strongest?" And, once more, what were the antecedents in the Judaism of the first century, from which natural selection evolved a Christ; and what the antecedents, all over the world, of which the natural consequents were saints, virgins, and martyrs?

Mr. Bristol, of Belfast, in an admirable sermon,* has pointed out another fatal flaw in the argument. He shows that science assumes from the existence of physical wants and capacities the existence of what will satisfy them. When the insect and the flower supply a mutual want, science concludes them to be adapted for one another. And he asks whether we have not deep spiritual necessities which only the Supreme Spirit can satisfy. Professor Tyndall confesses, but leaves utterly unconsidered, "the immovable basis of the religious sentiment." He says—"To yield this sentiment reasonable satisfaction is the problem of problems at the present hour." But he is content to compress it into an iron theory, which it will shatter as inevitably as steam shatters a boiler without a valve.

* The Principles of Science and Religion the same. Adm. Eckart.

We shall conclude by quoting Herbert Spencer's condemnation of the Christian hypothesis, and seeing how far the Athistic theory comes under the same lash. He writes in the Principles of Biology— "The hypothesis of special creations turns out to be worthless; worthless by its derivation, worthless in its intrinsic intolerance, worthless as absolutely without evidence, worthless as not satisfying an intellectual need, worthless as not satisfying a moral want" (p. 264). Here are five grounds of censure. But what has Mr. Spencer's admiring and disciple certified? 1. The derivation of the rival system is certified to be in a vision prolonged backward across the boundary of the experimental evidence. 2. Its intrinsic coherence is frankly described by its apostle in the following words—"When 'nascent species' are spoken of, when 'the differentiation of a tissue, at first vaguely sensitive,' is spoken of, and when these phenomena are associated with 'the modification of an organism by its environment,' the same parallelism without contact, or even approach to contact, is implied. There is no fusion possible between the two classes of facts—no motive power in the intellect of man to carry it without logical rupture from the one to the other." 3. As for evidence, he has told us that its strength "consists not in an experimental demonstration, for the subject is hardly amenable to this mode of proof." 4. Instead of satisfying an intellectual need, we are told of its "unsurmountable roots," of "logical rupture," and of "pouring in a vacuum," when we try to connect its causes and results together. 5. And for our moral wants, it preaches the "perfectly transcendental value" of "meat and drink."

When Mr. Spencer and Professor Tyndall have settled these difficulties of their own, we shall discuss with them the difficulties and—what they conveniently forget—the evidences of them.

G. A. C.

See of Kilmore—Election of Bishop.—This day the Ven. Archbishop Darby was duly elected to the See of Kilmore. The total number of votes in his favour were 163 lay, and 100 clerical. Canon Ingham stood second on the Short List.

Church Notes of the Month.

Diocese of Armagh.—A window of stained glass in memory of Dr. Dawson and Mrs. Elizabeth Dawson, has just been placed in Donaghadee Church by their son, Thomas Dawson, Esq., of London, joined by the other members of the family. Dr. Dawson was much respected in Donaghadee, where he lived for many years, and his family have been connected with the neighbourhood for more than two centuries. The window was composed from the instructions of Thomas Dawson, Esq., M.P., of London, and has been brought out with the correctness of colouring, beauty of design, and excellence of workmanship, which characterizes the windows of that eminent firm. It has been inserted in the south wall of the nave, next to the intercolumn of the transept. No subjects have been introduced, but it is an example of geometric or geometric work, which has been carried out on the principle of the celebrated geometric windows in York Minster. The only peculiar treatment in the insertion in the apex of the fanlight crest, an eagle, a star of six points, which harmonizes with the general design, and forms a suitable focal point. On the sill, at the base of the window, is inscribed with the following inscription:—"In loving memory of William Dawson, M.D., Donaghadee, died January 23, 1867, aged 86 years, and of Elizabeth, his wife, died August 23, 1867, aged 64 years. By their children, 1874. The window has been completed and secured in its place under the directions of R. B. Hanks, Esq., C.E., of Belfast.

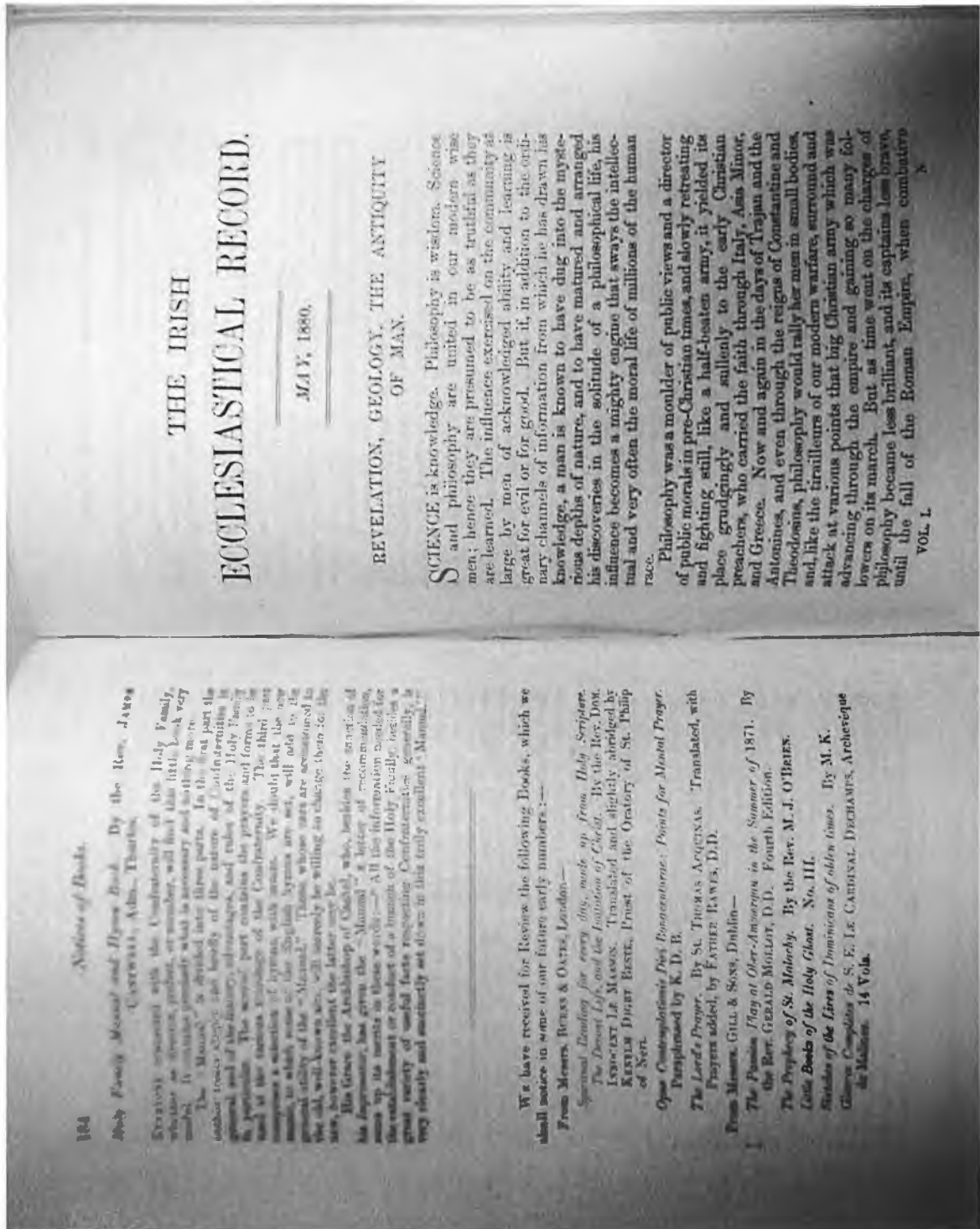
Diocese of Dublin Glendalough and Kildare.—The annual visitation of the diocese of Dublin Glendalough and Kildare will take place on the 27th, 28th, and 29th of October next. The Bishop of Dublin will leave on November 2nd, that of Glendalough on the 6th, and the Bishop of Kildare on the 8th.

The parishioners of Rathfriland presented the Rev. Henry Gullerth with a valuable testimonial and illuminated address on Friday, 25th August. The deputation representing the parishioners was introduced by Mr. Daniel Johnson, and the address was read by Mr. Vance. The address was executed by Mr. James Houghton, 22 Great Brunswick-street, in the most artistic and ornamental style.

The parishioners and friends of the Rev. Kever H. Bincher, M.A., have presented him with an address, on the resignation of the incumbency of the parish, which he had held for more than sixteen years. The address had been illuminated in his last style by Mr. J. Hopkins, of Great Brunswick-street, and it was accompanied by a magnificent and costly specimen of solid silver, from the establishment of Messrs. Waterhouse and Co. of Birmingham, and a cheque for the balance of amount subscribed. Mr. Bincher was presented at the same time with a beautiful gold watch and chain by his many friends. The children of the parish school have also presented him with an address and a cluster pair of drawing-room candlesticks, as a token of their

Appendix C

'Revelation, geology and the antiquity of man' in the *Irish Ecclesiastical Record*, 1880.



Notice of Books.

Holy Family Manual and House Book. By the Rev. JAMES CARRIGAN, A.M., Thurock.
 Extracts selected with the sanction of the Holy Family Society, are printed, arranged, and bound in this little book. A very handy. It contains a summary which is necessary and so they are.
 The "Manual" is divided into three parts. In the first part the author traces the history of the nature of sanctification in general, and of the history, progress, and rules of the Holy Family Society. The second part contains the prayers and forms to be used at the various stages of the sanctification. The third part contains a selection of hymns with accents. We doubt that the new manual, in which some of the English hymns are set, will add to the general utility of the "Manual." Those whose eyes are accustomed to the old, well-known set, will scarcely be willing to change them; but we, however, commend the latter one to be.
 His Grace the Archbishop of Cashel, who, besides the direction of his *Imposition*, has given the "Manual" a letter of recommendation, seems by its merits to have won it. All the information needed for the establishment or conduct of a mission of the Holy Family, besides a great variety of useful facts respecting Centralization generally, is very clearly and succinctly set down in this truly excellent Manual.

We have received for Review the following Books, which we shall notice in some of our future early numbers:—

- From Messrs. BURNS & OATES, London:*—
Spiritual Reading for every day, made up from Holy Scriptures.
The Desert Life, and the Evolution of Christ. By the Rev. DONALD KERR, LE MASSEY. Translated and slightly abridged by KERRIE DICKER HASTIE, Frost of the Oratory of St. Philip of Neri.
Opus Completissimum Dei Bonaventurae: Points for Mental Prayer. Translated by K. D. E.
The Lords Prayer. By St. THOMAS AQUINAS. Translated, with Prayers added, by FATHER HAWES, D.D.
From Messrs. GILL & SOSS, Dublin:—
The Passion Play at Ober-Ammergau in the Summer of 1871. By the Rev. GERALD MOLLAY, D.D. Fourth Edition.
The Prophecy of St. Malachi. By the Rev. M. J. O'BRIEN.
Latin Books of the Holy Ghost. No. III.
Glances Complains de S. E. LE CARDINAL DE BAYLE, Archevêque de Malines. 14 Vols.

THE IRISH
 ECCLESIASTICAL RECORD.

MAY, 1880.

REVELATION, GEOLOGY, THE ANTIQUITY
 OF MAN.

SCIENCE is knowledge. Philosophy is wisdom. Science and philosophy are united in our modern wise men; hence they are presumed to be as truthful as they are learned. The influence exercised on the community at large by men of acknowledged ability and learning is great for evil or for good. But if, in addition to the ordinary channels of information from which he has drawn his knowledge, a man is known to have dug into the mysterious depths of nature, and to have matured and arranged his discoveries in the solitude of a philosophical life, his influence becomes a mighty engine that aways the intellectual and very often the moral life of millions of the human race.

Philosophy was a moulder of public views and a director of public morals in pre-Christian times, and slowly retreating and fighting still, like a half-beaten army, it yielded its place grudgingly and sullenly to the early Christian preachers, who carried the faith through Italy, Asia Minor, and Greece. Now and again in the days of Trajan and the Antonines, and even through the reigns of Constantine and Theodosius, philosophy would rally her men in small bodies, and, like the tirailleurs of our modern warfare, surround and attack at various points that big Christian army which was advancing through the empire and gaining so many followers on its march. But as time went on the charges of philosophy became less brilliant, and its captains less brave, until the fall of the Roman Empire, when combative

philosophy abandoned the field, and appeared to yield the victory to revelation finally and for ever.

Modern scientists will justify themselves in seizing the sword of the fallen Braves of early Christian times, and again resuming the fight - between Reason and Revelation - on a principle that is easily understood.

They are men of *knowledge*. The ancient philosophers were men of *opinions*. The science of the ancients was inductive from some questionable axiom. Their science is positive, being founded on admitted theories. Hence, though ancient philosophers were justly driven out of the field through want of a solid base of operations, modern philosophers can hold their ground against all comers, bearing as they do on the strong fortress of facts.

Here, as it appears to me, is the principle on which the philosophers of our day justify their aggressiveness. They have examined the universe in a manner in which it was never examined before. From the bottom of the sea, from the mysterious depths of the earth, from the air, from the zenith's expanse of the firmament, they have drawn their knowledge, and their knowledge consists of facts. Facts and truth are convertible terms; and no matter what consequences may be, no matter how disastrous to faith and morality, they must bear witness to the fact that is, the truth that is, *there*.

Modern philosophers are presumed to have consciences; but the consciences of some of them appear to me not to be sufficiently tender. Tremble they need not for the consequences of their facts; but for the theories they raise upon these facts they are directly responsible in a moral sense. It is the theorizing of these men on the acknowledged clearness of the facts, and the seeming life of the world, that has made weak and unsteady minds doubt about the origin of the human species as described in Holy Writ. And perhaps the fossil remains of animals and reptiles, and the knives and potteries of man that they have discovered deep in the earth and waters, have done more in their hands to shake the faith of the Young Generation in the narrative of the creation of the world than all the sophistries of ancient or modern times.

We behold a generation of unbelievers in France, Germany, and Italy, and with this unbelieved some learned scientists must charge their consciences. In England, too, it is said, profanity advances with great and rapid strides, and again the cause may be traced to the chair of science.

Even in our own country, whose faith is a proverb, young men abandoned under liberal scientific professors show a tendency to lose themselves from moral and intellectual restraint. Everywhere a pride of intellect is being generated which is widening the area of rebellion against revelation. A few years ago in these countries it was the Church that we saw pined against the churches; now it is the schools pined against the fundamental doctrines of all communities that call themselves Christian.

Where is it to end? Shall we bring back Pagan Rome and Jewish Christian love? And then the gladiators, and finally the "Christians to the lion"?

To stem the coming tide is clearly the duty of staunch believers in revelation. And yet how few opponents have the philosophers had to encounter! They march about in triumphal procession, and everyone appears to applaud them. They are thrown upon our shores under the name of the British Association, and they are feted everywhere. In the morning they inspect our caves and climb our mountains, in the company of honest and believing men, to tell us before night that we are the descendants of apes and baboons, and that our life has originated in a chance combination of atoms!

It is a dangerous thing to wrestle with a giant. And hence timid men, though learned, retire from them, and bold men content themselves with faintly denying their conclusions without proving these conclusions to be false.

The very language in which the thoughts of the philosophers is shrouded is calculated to close the gate against those who ought to be their opponents. Who can follow them into their tangled mazes of thought? Who can penetrate that solid shell of terminology in which they ensue themselves? When I told a facetious friend of mine a year ago that I proposed to dispute the conclusions of Darwin and Tyndall in a scientific paper, he said to me good-naturally, "Take care what you do; you are scarcely capable of understanding their terms, much less of combating their results."

And I should regard it as excessively presumptuous of me to enter upon this combat, if I had only my own resources or powers; but fortunately I have been enabled to draw the points and proofs that I shall bring forward. If there be any merit in what I am about to state, it must

merely by that of collecting and combining, while to others must go all the glory of painstaking research over sea and land, to discover by actual examination if what the philosophers say be true.

Everything leads us to believe that our globe is of immense antiquity. After the creation of our planet it is certain that for long ages it underwent various changes from the action of fire or water, or both elements combined. Moses writing on the subject, in the Book of Genesis, says: "The earth was void and empty, and darkness was upon the face of the deep." Resting on its frame of porphyry and granite, which underlay it and permeated and supported it, as the spine and bones and ribs do the human body, our sphere seethed and swayed a turbid, unsettled mass, until God said: "Let the waters that are under the heavens be gathered together into one place, and let the dry land appear; and it was so done. And God called the dry land earth, and the gathering of the waters he called seas." Scientific writers are forced to admit the truth of the picture presented by the Inspired Word in this passage: for it is a favourite theory of theirs that the secondary rocks found in the depths of the earth were formed there by deposits from turbid waters on its surface.

Geologists tell us that for ages before the appearance of man on this sphere the earth was covered with vast forests, which, in the stillness of nature, undisturbed by voice or sound of living thing, grew their branches and shed their leaves, and when their term came died and fell down into the earth from which they had sprung. Century after century they deposited in the earth trunks and branches, gigantic relics of these primeval forests, until the vast accumulation pressing down, layer upon layer, formed a solid mass of vegetable deposit, endless in extent, and of great consistency and depth. These accumulations are the coal beds which are found in so many places, and which bear upon them the impress of their origin, inasmuch as they are often stamped with the images of the trees of which they are formed.

From an examination of the coal strata, in which but few remains of animal life are found, geologists are constrained to admit that the vegetable kingdom was the first in order of the great creations that took place, after the earth, by its separation from the water, had acquired consistency and firmness. Open the Book of Genesis, and you will find

that this scientific admission is in perfect accord with the Mosaic narrative; for between the morning and evening of the "third day," the very day on which the waters were driven off the earth's surface, He said; "Let the earth bring forth the green herb and such as may seed, and the fruit tree yielding fruit after its kind; which may have seed in itself upon the earth. And it was done."

If Genesis and geology are in perfect harmony as to the fact that the plants and trees were the first living things put upon the earth's surface, they are equally agreed as to the period of the creation of the great reptiles and monsters of the deep. Close upon the coal beds, and spread over them like a carpet, geologists have discovered strata of chalk, green sand, and oolite, which contain a great accumulation of the remains of reptiles of a gigantic size. They have given them fanciful names, such as the Icthyosauri, the Plesiosauri. But what is more to the point, they have exhumed them, and, from closely studying their anatomy, they have been enabled to build them up and exhibit their vast skeletons before us; and they have shown them to be a "frightful throng of lizard, compared to which our own are mere pygmies, which spread terror through the ante-diluvian seas."

Geologists admit that these creeping things were created posteriorly in point of time to the primitive forests, but anteriorly to the great animals that peopled the ancient world.

Again, let us open the Book of Genesis and follow the order of the work of the seven days. On the "third day," as we have seen, the vegetable world sprang into existence. On the "fourth day" the sun and moon were cast into the firmament. But on the "fifth day" God also said: "Let the waters bring forth the creeping creatures having life . . . And God created the great whales and every living and moving creature, which the waters brought forth."

So far revelation and geology walk hand in hand through the mysterious depths of the earth. The former chronicles the creation and life of plants and reptiles, the latter, in similar order, chronicles their decay and death. Equally startling are the coincidences that are presented to us as we continue to read the Divine record of creation in view of the strata that press upon the reptilian beds.

The ordering of life was progressive. After the waters, at the command of the Most High, had given birth to the

"swarming things," a germ of fecundity was imparted to the earth, "to bring forth the living creature in its kind, cattle and beasts of the earth, according to their kinds. And it was done." Now, "the sixth day," that is, the period immediately following the time of piscine creation, was devoted to the creation of the beasts of the earth. As the "fifth day" of creation corresponds with the "secondary" geological formations containing the remains of fishes and reptiles, we should expect to find in the "tertiary" formations the relics of the great animals created on the "sixth day." And so it is. Animals great and small are there buried in the clays, sands, gravel, and limestones of those tertiary formations. Animals of our era, monkeys, bats, genets, and marmots; animals of singular form and colossal size, of which we have no representatives in our age; the diatherium, in shape analogous to the elephant, but much larger; the gigantic mastodon; the megatherium, a kind of monstrous sloth, as large as an elephant; the sivatherium, a stag of enormous size, with four horns: all are found embedded together in their great tomb, witnesses to the grandeur of God's first animal creation, as they are from the position they occupy in the depths of the earth to the truth of the Scripture narrative, which assigns to the mammals a date of creation subsequent to that of the marine reptiles and anterior to that of man. These are truths that cannot have escaped the observation of the scientific lights of our age, yet they seldom bring them forward, and more rarely comment upon them in a sense favourable to revelation. It will not, for some unexplained reason, suit them to argue thus:—"Geology is a recent science; Moses was not a geologist; therefore he was not informed by inspection or personal observation as to the position of things in the depths of the earth. He had no natural means of discovering that the strata of the vegetable kingdom were the lowest, and the strata of the animal kingdom the nearest to the earth's surface, and that between them lay the strata of the great reptiles of the deep. And yet Moses writing his record of the origin of things, describes the birth and life of animals, reptiles, and plants in the same order in which geology depicts their decay and death." Or as follows: "The revealed narrative of creation was in existence three thousand years before the earth was opened up and geology took its place as a science. The opened book of the earth's deepest strata was found to correspond in its main features with the

early recitals of that Divine narrative. Therefore geology so far confirms revelation; and confirming and illustrating the early pages of Sacred Writ, it should naturally and even of necessity strengthen the faith of the believer." Such lines of argument would appear clear and conclusive to the man of ordinary mental capacity; but to the acute vision of our modern philosophers they seem offensive for their candour, and entirely below the scientific standard for their want of obscure terminology, and for perhaps "their unwise coquetting with authority."

A cyclopedist of some eminence gives the following as a correct classification of the earth's strata, beginning near the surface, and ending at the lowest geological depth. First stratum: "Recent deposits of clay, sand, gravel, limestones, &c., from existing rivers, lakes, &c., sometimes containing the remains of man or of his works." Second stratum: "Tertiary formations, composed chiefly of clays, sands, gravels, and limestones containing a mixture of extinct and recent animal remains." Third stratum: "Secondary formations, consisting of chalk, green sand, oolite, lias, new red sandstone, all abounding in organic remains chiefly marine, and all of extinct species." Fourth stratum: "Carboniferous system, consisting of the coal formations or mountain limestone; organic remains, all extinct." Fifth stratum: "The Devonian or old red sandstone . . . with extinct fishes." Sixth stratum: "The Silurian system, the upper and lower parts consisting of sandstones, often micaceous limestones, abounding in the oldest type of organic life and slates. Seventh stratum: "Primary formations . . . granite, porphyry, greenstone . . . a few organic remains in the newest beds only."

You may observe that this writer affirms that remains of organized beings are found in the deepest geological strata. And we should not expect it to be otherwise: for long before the creation of even the vegetable kingdom God had said, "Let there be light, and there was light." And to what purpose could be so early a creation of this bounteous blessing of light unless beings, however imperfectly organized, were created simultaneously with it to feel its influence, and in their way to thank the Great Creator for such a gift! There is a peculiar expression used in Genesis to express the action of the Divinity upon matter before the period of the creation of light. "The spirit of God," says Moses, "lay upon the water." The Hebrew word *merachepeth*, which I have translated by

the English word *lay*, implies incubation. The meaning of the passage is: "The spirit of God rested upon the waters generating life therein." And geology discovering in its lowest strata the vestiges of dawning life, has only come upon the remains of those primitive, though most imperfectly, organized beings drawn forth from the dead waves by that first Divine incubation.

But this does not affect in the smallest degree the agreement of geological research and Mosaic narrative on the *great* creations of life.

In examining the layers of the great tomb in which all are deposited, we follow the gradual advance of organization and the consequent progressive improvement of life. Beginning with the lowest order of shell-fish, the vital spark moved upwards, through the reptiles and fishes of the great deep, through the birds that floated through the liquid air, through the animals that burrowed in the earth or fed upon its surface, always seizing upon a more perfectly organized being until it entered into the most perfect of all—man—the masterpiece of creation, the greatest of the works of God! Though life passes along from the beginning always in an ascending scale, there is no blending of the beings that it animates, as Darwin would have us to believe: no gradual conversion of the body of the fish to the body of the terrene animal; of the body of the animal to the body of man. No monsters of the kind are found in the strata of the earth. Fishes of an extinct species, but fishes still! Animals of an extinct species, but animals! Nothing in their formation or organization as they lie in the depths of the earth to indicate that anything more than mere animal life was theirs; everything, on the contrary, in themselves and their surroundings, to convince us that they were brutes and nothing more. No dawning light of reason is shown in this series of beings as they lie before us from the beginning of the world: even the most intelligent of all animals (they of the monkey tribe) lying in their graves of perhaps ten thousand years, as formed, as organized—consequently as far from man and as near to man—as the most advanced of their species at the present day. Nor going back through this long series of living things do we find man in a more imperfectly formed state than at present, being gradually perfected in his organization by the revolution of ages. Nothing that is of man is found in the Silurian red sandstone, nor in the Devonian old sandstone, nor in the chalk or green sand, nor even

among the great animals of the tertiary formations. What remains of man is found near the surface, in the position that Moses assigns to him in the Book of Genesis, where he says, God, having created the earth and light, the animals and reptiles, completed his great work in these operative words: "Let us make man to our own image and likeness."

H. E. D.

(To be continued.)

A CRUISE ON LOUGH LURGAN.

THE critical reader may perhaps smile at me when I assure him that Lough Lurgan is a lake no longer. At some remote period on which history throws no light, it is thought it burst the land barrier which stood between it and the Atlantic, and has thus come to form one of our largest and most commodious Irish bays. Its ancient name,¹ "Lough Lurgan," is well nigh forgotten, and its modern name of "Galway Bay" is the only one with which ordinary readers are familiar. There are many who, when examining the cliffs of Aranmore, and gazing across on the still more majestic heights of Clare, fancy they see recorded there in nature's handwriting the story of the tremendous shock which severed the island from the mainland, and left the heaving ocean free to rush and swell and boom between those islands and the shore.² The view of the Connemara coast on the opposite side, with its fantastically shaped rocks, which seem from a distance to resemble the spires and domes of some weird city, confirms the opinion that the islands were once portions of the mainland.³

Indeed a similar convulsion occurred on the coast of Conn. A.D. 799. The Four Masters' tell us that "the sea divided the island of Fiitha' into three parts," and that the thunder storm was such on the occasion that one thousand and ten persons were killed in the adjoining country. But we shall leave to geologists and travellers the interest attaching to the sublime cliff-scenery of the Aran Islands

¹ *Jur Connemara*, p. 42.

² Miss Sedgwick tells us the rocks are undeniably a portion of the Connemara district of Clare. — *Early Christian Antiquities of Ireland*, p. 11.

³ *Jur Connemara*, p. 42.

⁴ *New Mullis Island, near Killybegs, Scotland*.

you meet again in an alcove, the ladies knitting, or at some rustic work which never impedes conversation, while the gentlemen read or smoke. If you are ready for an excursion, probably some one will suggest a plan and perhaps accompany you; and when you return to the hotel you are no longer a stranger, and seldom need feel alone. But of course mere hurriers cannot look for this. Need we say more to recommend Ischl to those who will be near it when on their way to Ober-Ammergau?

H. B.

REVELATION, GEOLOGY, THE ANTIQUITY OF MAN.

I SAY designedly, "what remains of man or of his works" is found comparatively near the surface; for of primeval man in his entirety neither skeleton nor fossilized form has up to this time been discovered. There have been great mistakes and delusions in connection with this subject. It is not many years since the learned men of Paris were thrown into a ferment by the discovery of a great skeleton on the banks of the Rhone. History and science were called upon to clear up the mysteries connected with it. A human skeleton it was pronounced to be by the critics, and after a close and lengthened examination of it, they concluded that it was nearly two thousand years old. Finally they identified it as the skeleton of Tentobocchus, who was defeated by the Roman general Marius before the dawn of Christianity. After enjoying immense popularity for some time, it suddenly lost its repute and character; for the learned De Blainville proved to the satisfaction of all the savants that it was "nothing more than the skeleton of a narrow-toothed mastodon."

In the days of the immortal Cuvier another historic skeleton was discovered by a Swiss naturalist named Schuchzer, in the quarries of Oltingen, in Switzerland. Again the critics were called upon, and they decided that it was not less than four thousand years old, and that it might have been a witness of the rising of the waters of the Deluge. Is it wonderful that it was valued at its weight in gold? Cuvier was attracted to it; admired it at first

view, examined it with his piercing eye, doubted about its authenticity, and finally demonstrated in a clear and brilliant manner that it was not the skeleton of man, but of a gigantic salamander.

The fossil man, of what the philosophers denominate *pre-historic times* has not yet been found. But geologists have certainly discovered objects wrought by the hands of man of unknown antiquity, and some of them are under the impression that certain bones that they have discovered belong to a race that peopled the earth long before the most ancient historic period. While we are on this subject, it will not be out of place to represent to ourselves in detail the real and fancied discoveries of human works and bones by the scientists of our day.

In a cave near Torquay, in England, among the bones of animals of a species long extinct, was found, a few years ago, what was believed to be the jawbone of a human being. The position of the cave was such, surrounded by deep valleys, that scientific men were of opinion that the bones must have been conveyed there previously to the excavation of these valleys; and these valleys, they said, must have been excavated by flood or deluge of primitive times. The argument in favour of pre-historic man founded on this discovery may be easily disposed of; for Mr. Tyndall himself has had the candour to admit that the now celebrated jawbone of Torquay is the jawbone of a bear.

A French geologist, M. Boucher de Perthes, is said to have found in the drift gravel in the neighbourhood of Abbeville human remains mixed with flint instruments. These "precious" remains consist of a human tooth and jaw, and they were found at a depth of fifteen feet from the surface. If, on prolonged critical examination, these remains should retain their present repute, they may be found useful in scientifically confirming the Scripture narrative of the Deluge. But as they were found in the *drift*, and not in the *primitive strata*, it is difficult to understand how they can be made use of as an argument in favour of pre-historic man.

Whatever delusions there may have been regarding the discovery of human skeletons and bones of antediluvian date, there is no denying the fact that human potteries, weapons, and knives of untold antiquity have been brought to light by geological exploration, and that human habitations have been discovered in positions in which they may have lain for a thousand years or more. Of these relics of

man's earliest life upon earth, some were found under the mud of the Delta of the Nile; some were found under the gravel of the valley of the Somme; and some were found under layers of stalagmite, mixed among the bones of extinct forms of the lion, bear, hyena, of the mammoth and mastodon. And the human habitations referred to were found deep under the waters of lakes in Scotland, Denmark, and Switzerland.

It was assumed that these mud and gravel deposits took centuries innumerable to accumulate; that these lake dwellings having gradually sunk into the position they occupy, and the rate of descent in a hundred years being something very trifling, must have taken many thousand years to arrive at their present level; and that the stalagmite beds, under which knives and weapons of flint and stone were found among the bones of extinct animals, could not have been laid down within the period of profane or sacred history.

And when we find such *assumptions* as these regarded as *established facts*, we are prepared for flippant, if not profane, observations, such as that made by Mr. Tyndall at the last meeting of the British Association in Belfast: "There can be no doubt as to the fact that man existed before all history." Or that of another interesting scientific writer: "It seems difficult to understand how any unprejudiced person who has really examined the evidence can refuse to believe that man lived on this globe many thousands of years before history began." (*The Stream of Life on our Globe*, chap. ii.)

It is no easy task for a moderately intelligent man to balance his ideas between the theories of modern scientists. Tyndall will have us to believe that man has been upon the earth for ten thousand years, or twice that period, but all through as man. Darwin tells us that man has been on the earth for myriads of years, but not as a man all through, but as an ape or a monkey. The human skulls and flint instruments of Tyndall are against the theory of Darwin's gradual development; and Darwin's animated leaves and intellectual shell-fish and talking baboons have no place in the caves of the extinct animals or the stalagmite beds of Tyndall and his followers!

The pre-historic man (as he is named) of recent philosophic schools is like Shelley's modern Prometheus, a myth and a fiction. Still he has a concourse of approvers and followers. He is supposed by them to

represent a generation that lived upon this earth ages before the dawn of any history that we have. Now, history is sacred and profane. The date of profane history is pretty well ascertained. Homer, the first of historic poets, and Hesiod, his contemporary, lived about 2,800 years ago. Herodotus wrote about 4,300 years before our time. The pre-historic man is supposed to have lived before Homer, Hesiod, and Herodotus, and before the heroes of whom they sang and the princes of whom they wrote. The Egyptians gave themselves a history of 11,340, but it is now well ascertained that the history of that nation falls far short of the date assigned to the Deluge in the Bible. The pre-historic man is supposed to have existed before the Egyptians. The Vedas, or sacred books of the Hindoos, which, they say, were revealed to Bramha in the very beginning of the world, scarcely go back 3,200. The pre-historic man is supposed to have witnessed the compilation of the Vedas, being then some thousands of years old.

So far as regards profane history. The pre-historic man, in point of antiquity, is supposed to hold a similar relation to sacred history. He existed, they will tell you, before Moses! He existed before Noah!!! He existed before Adam!!! This is the meaning of the pre-historic man, if the word has any significance; that man so frequently referred to by geologists, so flippantly talked about by scientific lecturers, so taken for granted by modern schoolboys; a man that lived and worked ages before man is spoken of in profane history, ages before the period assigned to man's creation in the revealed Word of God.

Now, viewing this subject with as little prejudice as one can hold in respect to a daring and profane theory, and endeavouring to discuss it in a strictly philosophical and scientific spirit, we ask, as men of clear heads, strong minds, and common sense, if anything of man or his works found under the surface of the earth, or water evinces his pre-historic existence? Science unquestionably demonstrates that man was contemporary with the mastodon and with extinct forms of the bear and other animals; but this does not prove that he is pre-historic: for the mastodon appears in the drift as well as in the ice and in the tertiary formations, and the date of the existence of the cave bears and hyenas cannot be even approximately ascertained. Science also demonstrates that man existed on this earth for the number of years (whatever this may be) that certain layers of stalagmite took to accumulate, and certain gravel de-

posits in the Soudan and mud deposits in the Delta of the Nile, and peat deposits on certain ancient human habitations; and it proves that he is coeval with certain dwellings that are found under European lakes.

Dr. Southall has written a very interesting book entitled "The Epoch of the Mammoth," in which he undertakes to dispose of the arguments against Christian tradition founded on these scientific facts; and he does so, to my mind, in a plausible and convincing manner. He shows that, at the rate of deposits observed in many existing rivers, layers of stalagmite have been laid down in as many *months* as *centuries* are assigned for them by geologists. And he infers that man is not proved to be pre-historic because his flints and knives are found under thick layers of stalagmite. He proves that there is "no tenable reason for assuming the permanent uniformity of the rate of deposit of river mud." And he infers that man is not proved to be pre-historic because his potteries are found under the mud of the Delta of the Nile. And he makes a common sense statement, which every right-minded man must approve, that not in the course of *thousands*, but in that of a *few scores* of years, floods and convulsions of nature, such as are frequently witnessed in the present era, might have buried the flint tools, the Egyptian potteries, and the Swiss and other lake houses and villages as they are now found."

But it is not alone the position in which man's works are found in the earth that is made an argument in favour of his pre-historic existence; the very works themselves are supposed to prove a continuous stream of human life through myriads of ages.

A curious and ingenious argument is founded on the form and nature of axes, arrow-heads and knives that have been exhumed. Some of them are of flint, some of them are of bronze, some of them are of steel. Of the flint knives and axes, some are chipped and others are polished. Corresponding with these four descriptions of implements scientists distinguish four great geological periods, which they name respectively—1, the Paleolithic Age, or age of chipped stone weapons; 2, the Neolithic Age, or the age of polished stone weapons; 3, the Age of Bronze; and 4, the Age of Iron. Each of these ages is said to be of immense extent, particularly the two former, the duration of which is supposed to be incalculable. Man has existed on earth during all these long ages. Now, if the succession and duration, according to the scientific view, of these ages

was proved and not assumed, it would follow that man who lived through them was upon this earth before the period assigned to his creation in *Genesis*. But the succession of these ages has not been proved.

An eminent writer on geological fallacies says: "There is no proof . . . that the paleo-celts of Britain, the neolithic perforated axes of Switzerland, the bronze of Etruria, and the steel of Greece may not all have been contemporary." "There is," says the same writer, "unquestionable demonstration that the Neolithic Age—that is to say, the time when polished stone weapons were used, or at any rate buried in Switzerland and elsewhere—was an age of high civilization and extensive commerce in other parts of the world." The writer in question might have added that the present age, the most civilized of all, is the age of chipped flint arrow-heads among some remote tribes, and of polished stone clubs among others; that it is, at the same time, a paleolithic and neolithic age in the islands of the South Sea, while it is the age of bronze and iron in civilized communities. "In the lake villages and elsewhere," says another painstaking writer, "among the rudest relics of remote times, among celts and knives made of native slate and flint, are found weapons of nephite brought from Central Asia, and of jade brought from the remotest Indies. This proves beyond doubt that while the comparatively savage tribes sheltered on Swiss mountains or Scandinavian fiords, were hindered in their progress by want of metallurgical skill, the more favoured nations of the Mediterranean and of Asia had reached a civilization of a very high order. It may have been the civilization of Assyria and of the primitive Pharaohs; it may also have been the civilization of post-Homeric Greece, or even of the later Rome. In short, there are no certain or strong proofs that these supposed relics of an indefinitely remote antiquity are not subsequent to the date assigned, we need not say, to the Deluge, but to the Exodus or the reign of Solomon."

Divested of all obscurity, the argument as to man's antiquity between Christian believers and a certain school of modern scientists, is as follows. We say, with the writer of the Book of *Genesis*, that man has been a few thousand years upon earth. They say that man has been upon earth during a succession of almost infinite ages. We prove the truth of our assertion by the authority of the oldest Book in the world, the veracity and authenticity of which are demonstrated by inherent and outward evi-

denies; and we confirm this proof by geological research, which places the remains of man and of his works in the upper strata of the earth's crust. Every argument that they advance in favour of this view is open to this great objection, that it rests on assumptions which, as we have seen, are proved to be fallacious, namely— that there have been no convulsions in the period before iron, altering the position of man's remains in the earth, that the rate of deposit of mud, stalagmite, and gravel, in existing rivers, has been uniform and of infinite tediousness, and that the four great geological periods have been successive all over the earth.

The traces of a great deluge, occurring in the post-tertiary period, are everywhere illustrating the Mosaic account of the drowning of the first generation of men, and the birth of a new generation from Noah. The works of antediluvian man have been found, throwing some light upon the Mosaic account of man's first origin from Adam. The derivation of all existing languages from one primitive language, now admitted by all linguistic scholars, is in accordance with the Mosaic account of the confusion of tongues at the building of the Tower of Babel. The Mosaic account of the Eastern origin of the human race is confirmed by numerous coincidences of profane history. And this glorious record of man's early and continuous life upon earth is to be set aside for theories, which, apart from their scientific value, bear upon them the stamp of absurdity.

From Mr. Tyndall we shall now pass to Mr. Darwin— from the dead friend of the former to the living friend of the latter: or, to explain ourselves more clearly, we bid farewell to the pre-historic man, and take the liberty of introducing to our readers an individual equally remarkable— though haply not a worker in bronze, iron, or flint—the gorilla!

The gorilla is the greatest of apes. With everything of the monkey about him, but his fun (for the gorilla is not facetious but ferocious), he has some characteristics which are peculiarly his own. Some naturalists have said that he attempts to imitate the human voice, but this is incorrect, for he screams and roars most horribly. But, if the gorilla does not imitate the voice of man, he appears to try to imitate his gait, for he shambles along on his two hind legs in a shuffling manner. His fifth finger is somewhat like the human thumb; and his face, blinking and scowl-

ing under his bushy forehead, bears a certain resemblance to that of a very ugly human being. When I saw, in the British Museum, for the first time, the embalmed form of De Chaillu's great gorilla, I began to ask myself if I had ever seen a man like him. And while I was pausing and musing over the subject, the face of an old friend, long dead, obtruded itself on my memory. Yes! I even think I know a living man that bears a striking facial resemblance to this great gorilla. For all this, the gorilla is a perfect ape, covered with hair, and with the low, receding forehead which denotes the possession of merely animal instinct. During the meeting of the British Association in Dublin, in the year 1878, an eminent lecturer flippantly announced that "there is more difference between the highest and lowest order of apes than there is between the former and man," the meaning of which must be that the gorilla is nearer to man than to a stupid member of his own species. If I was disposed to be facetious, in discussing so serious a subject, I would reply to this axiom by paraphrasing a well-known song, and saying almost in the words of the Scottish bard, "An ape's an ape for a that." But, speaking seriously, I must say that a more misleading or less candid proposition was seldom advanced. The gorilla, in brain and intelligence, is farther by numberless degrees from man, than the lowest type of the monkey tribe is from the gorilla. The gorilla is brighter than an ordinary monkey, just as the latter is brighter than a land tortoise; but the gorilla's brightness has a limit, like that of this most stupid animal, and that is the line of demarcation that divides instinct from reason. The hand and face of this monster may bear a sort of resemblance to those of the lowest type of the human race, and, under this respect, he may be more like man than to the "purple monkey." But, with his wild and fugitive habits, his ferocious temper, his screaming wail and his repulsive gestures, his shaggy body and his small brain cavity, he is as much a wild beast as any denizen of the forest.

The gorilla, outside his immediate circle, has made but few friends. He is not an animal to get attached to for his own sake. But, for his fancied resemblance to man, he has one great admirer. Mr. Darwin regards him as a link connecting his infinite series of polypores, oysters, rattle-snakes, wild cats, prairie dogs, ring-tailed monkeys, and spring-antelope, with man. "He is the highest type of the ape," says this philosopher, "and he is not much removed

from the lowest type of man." The whole Darwinian theory rests upon the assumption that man has come to his present state of civilization from the lowest state of barbarism. The progenitors of the most gifted of the human race have been savages, according to him, in whom reason was entirely obscured by the animal passions. This is an essential step in his theory, and he stands upon it, and fancies that he sees the amalgamation of the brute beast with the rational being. His theory is an ingenious and a plausible one, and, clothed in his descriptive language, it has a certain attraction about it. But we shall now see that incontrovertible scientific facts are against it, and that its principal assumption is set aside by the ancient history of the human family as read in the monuments they have left behind.

There is such a science as that which treats of skulls and their capacity. Some skulls have room for comparatively little brains. Others are of great brain-holding power. The skull of the savage is often contracted, even as the skull of the civilized man is expanded. The Aryan skull is the most perfect of all. Now, if we suppose Mr. Darwin's theory of the advance of the human race from savagery to be correct, the oldest skulls discovered should be those of the least capacity. The contrary, however, is the fact. "The earliest human skulls preserved by the fossilizing agencies of the soil are, though not Aryan, of Aryan capacity, and must have belonged to a race quite as far removed from the ape in mental powers and size of brain, if not in actual achievement and knowledge, as the highest humanity of the nineteenth century after Christ." These are not my views merely. The very words in which I have expressed them are borrowed from a writer of great ability and information. They are scientific facts that cannot be questioned. Where then are there, within science, the grounds for stating that the ape, through the savage and the barbarian, has produced the civilized European of our country?

If man has come, through an almost infinite series of transformations, from the lowest form of organized life, his first state upon earth must have been one of animal barbarism; and if, in accordance with the Darwinian theory, man has come from animal barbarism, the traces of his civilization must be diminishing in character and magnitude as we view them through the vista of receding history.

Let us, then, travel over the earth to find the traces of man's early life, and let us read in characters impressed upon its surface by races that have gone before us, evidences of his degradation.

Like the maiden in the fairy tale, who sought for a worthless talisman and found a priceless diamond, we are dazzled by the view that presents itself when we raise the veil that covers the earliest historic periods of man's earthly career. Nowhere do we see traces of barbarism; everywhere traces of incipient or advanced civilization present themselves to our astonished sight. Without travelling outside the limits of our own land, we see among the ruins of Anglo-Saxon castles and keeps, evidences of a more remote Irish civilization in the sculptured ruins of crosses and churches of the earliest Christian date; and of a still more distant civilization, the tradition of which is lost, we behold the monuments in those graceful round towers which raise their heads to heaven in so many places, bidding defiance to the ravages of time.

From Ireland to Egypt, and it is the same. "The rock temples and the pyramids testify that long before the dawn of such history as we have been able to decipher, the valley of the Nile was the seat of an inmemorial civilization."

From Egypt to Palestine and Syria, to behold the ruins of Nineveh and Babylon, silent but eloquent witnesses to the matured thoughts and skilful hands of the ancient races of the world.

From Syria let us travel to Easter Island, "that desolate and insignificant" spot, "remote, by more than a thousand miles, from every other abode of man," and there we will behold "thousands of gigantic stone images, which attest the former existence there of an authority capable of competing, though in a rude fashion, with the earliest labours of Assyria and Egypt."

And our experience as travellers and sight-seers will be confirmed by the observation of those who, a few centuries ago, went out into the untrodden paths of the earth.

"The Spanish invaders of South America found there agricultural skill and wealth, organization, systems of communication, mighty empires, and firm, effective governments, incomparably superior to anything they or their successors have been able to construct. But apparently beneath the civilization of the Peruvian Incas, beneath the stern religion, the military strength, the splendid cities of

Mexico, by buried a prior and not inferior civilization, whose very name had perished, which can hardly have been destroyed immediately by Aztec and Peruvian conquest, since such a conquest must have been arduous and glorious enough to leave the deepest traces in the traditions of the conquerors. It seems, then, reasonable to suppose that in Mexico and Peru as to the northward, savagery had overwhelmed or succeeded the primary civilization, and had been, in its turn, crushed by the historic civilization of the Incas and the ancestors of Montezuma."

- The settlers of the United States, Puritans and Cavaliers, English, French, Spaniards, found no possessors of the soil but scattered, scanty tribes of hunting Indians. The red men were, according to their own traditions, the aborigines of the continent. But under their feet are the monuments of a power that can scarcely have been feebler in organization, in wealth, in numbers, in agriculture, than that of the earlier Pharaohs. The enormous earthen structures of the mound-builders demonstrate the existence of a population extraordinarily numerous, so thoroughly disciplined, that a very large part of its available force could be employed at the will of the government in the erection of fortresses, temples, tumuli, such as have not, probably, their like in the world. There must have been a surplus agricultural wealth to maintain this vast body of unproductive labourers. There was, beyond question, a geometrical skill and knowledge capable of producing works on a gigantic scale, yet as strictly accurate, as our best engineers could now accomplish."

In travelling over the earth's surface we encounter tribes sunk in savagery; but everything in themselves and their surroundings convinces us that they have degenerated under the hardships of climate and of the position into which they have been driven by higher and more powerful races.

"The Esquimaux," says a writer in the *Standard*, "according to all the best authorities, belong to that which is supposed to have been the aboriginal race of Europe; and, driven to the extremity of the world by Aryan conquerors, they have retained just so much of civilized appliances as an inclement climate, an utterly barren soil, and a frozen sea could furnish or would allow them to use."

"The Fuegians, again, driven to the extremity of South America; are the lowest and most miserable of its

races, not for innate want of intelligence, but from hereditary starvation in a land which produces them no food but shell-fish."

"The hill tribes of India, the Vedduhs of Ceylon, the Boesjemen of South Africa, are equally examples of races driven by conquest into situations where degeneration was inevitable, and they have degenerated accordingly."

"In no case does history or tradition relate or allow us fairly to infer the spontaneous self-elevation of any people from a semi-barbarous to a semi-civilized state. Wherever we know anything of the origin of civilization, we know that it came from abroad. . . . Wherever the traditions of a people record the origin of its civil, agricultural, manufacturing, political arts, in short, of its civilization, they tell us that the founder came from beyond the seas or from the sky, that is, from beyond an inaccessible horizon . . . in a word, all the facts yet known to us seem to imply that every civilized country derived its civilization from an older country than itself."

It is difficult to see how the Darwinians can elude the force of the blow which this group of living facts deals to their system. For, out of these facts arise a number of questions which may be crudely put in the following plain terms.—Was it Darwin's apes that moved through the great American continent from North to South, erecting those stupendous earthen constructions in the Central States of the American Union on their way, and, when they rested in Mexico and Peru, building monuments of stone which are still the admiration of the world? Was it Darwin's baboons that, three thousand years ago, civilized the valley of the Nile or built the Temple of the Sun at Heliopolis? Was it Darwin's monkeys that raised Carthage or cast the city of Tyre into the sea, and surrounded it with massive ramparts to break the fury of the waters?

A theory, however plausible, ought to be abandoned when it is met by a concurrence of hard facts. And Darwin's theory of the origin of man, curious, insinuating, sassy—I might almost say attractive—dealing with coincidences and verisimilitudes, and tracing fancied resemblances and incipencies, and hiding its improbability under supposed ages of interminable length, cannot stand the simple test of experience. It is refuted by the evidences of man's early civilization, which are all over the earth, and of so remote a date that they touch that

very period in which the first vestiges of his foot-prints are traceable on the surface of our globe.

How pleasing to us, as humble believers in revelation, must it be to find the Scriptural account of the origin and creation of man vindicated by true science and history correctly read! Without furnishing us with many details on the subject, the writer of the Book of Genesis gives us grounds to infer that great majesty beamed in the eyes of that first man, to whom God delivered the earth and the sea and all living things therein, to rule and use them as his creatures; and that great intelligence animated his bright, fresh soul, who was able, at the bidding of the Most High, to call by suitable names all the fowls of the air and the beasts of the earth. And we are forced to conclude that man's first state upon earth was one of entrancing mental beauty, to verify the design of the Most High, who, when about to mould him, said, "Let us make man to our own image and likeness."

Physically beautiful, mentally active and powerful, Adam, though fallen, left to his descendants a legacy of intelligence that was capable of accumulating vast stores of knowledge; and the accumulation went on, always increasing after the Deluge, until it culminated in the early civilization which, passing along through Phœnicians, Egyptians, Assyrians, Greeks, and Romans, has preceded barbarism everywhere, and which, when overwhelmed by barbarism, as at the fall of Rome, has risen again from its ruins, in modern times, to dominate over all the great empires of the West.

Individuals and races have, it is true, fallen out of the course of advancing civilization. But circumstances were against them. A cloud may have descended upon them and darkened and obscured their mental vision; but the latent spark of intelligence was smouldering beneath the cloud, ready to burst out, under altered circumstances, into a vivid flame, and conduct them back to that early path of light traversed by their fathers.

And so, while touching the two extremes of almost pure spirituality on the one hand, and when forced down by adverse circumstances of animal sensuality on the other, man, in his ever-abiding tendency upwards, vindicates the truth of the inspired writer's description of his precedence among created beings, "Thou hast made him a little less than the angels."

H. E. D.

THE RHYTHMUS SANCTI THOMAE.

IT is praiseworthy to desire to do good in the world, praiseworthy to desire that the good we are enabled to do may last long after our own lives are ended; and surely it is not unnatural to desire that with the lasting good we may have done, our own names should be associated in the minds of men. Philosophers may moralise, cynics may scoff, people who are never likely to do anything worthy of being remembered may talk about the desire of fame as one of the illusions that beset and that beguile poor frail humanity; still we cannot divest ourselves of the feeling that it is a great destiny—that which has been reserved for a man here and there in the great host of men—to leave his name and his fame as heirlooms to the generations of his race, to have his name remembered, his personality preserved, his memory cherished, when the dust of ages and the silence of oblivion have fallen on those who trod by his side the paths of life.

It need hardly be said that there are not only various degrees of fame, but various kinds—one kind almost radically different from another; and speculative minds will ponder on the question, the answer to which is no bad test of the character of the answerer—what kind of fame is best worth having? We know the fundamental answer which so few of the famous have seemed to remember. To be kept in memory, yes, but in a memory that never faileth. "In memoria eterna erit justus," and only he. Humanly speaking, one would perhaps desiderate a fame that would be something more than admiration for achieved result, with which would mingle some warmer feeling of something as nearly like personal affection as can be given to a man who has long been in the grave. And perhaps from this point of view the fame of the poet is the brightest and the best. Only *he* seems to live in the hearts of the future, kindles eyes, draws tears, lives again in the hearts which *he* touches into a life that is, for the moment, like what his once was. To be the author, not of a long, elaborate poem, which everyone would feel bound to admire, but which very few would care to read, and these few only as a duty due to their own culture, but the author of a short, sweet, heart-touching poem, that would force itself upon the human memory in spite of its feebleness, and rise to the lips of itself whenever the occasion of which it was born