Archives of natural history 39.2 (2012): 253–269
Edinburgh University Press
DOI: 10.3366/ANH.2012.0093

www.eupjournals.com/anh

The natural history review (1854–1865)

MIGUEL DeARCE

Smurfit Institute of Genetics, Trinity College, Dublin 2, Ireland (e-mail: mdearce@tcd.ie).

ABSTRACT: The *natural history review* was a quarterly founded in 1854 by Edward Perceval Wright, then an undergraduate student of zoology at Trinity College Dublin. Its first editorial committee (1856–1860) held traditional views of natural history. By 1860 *The natural history review* had failed, ostensibly for lack of subscribers, and Wright put it in the hands of Thomas Henry Huxley who, together with Joseph Hooker, John Tyndall and others, was then looking for a vehicle to disseminate the agenda of what Huxley later called "scientific naturalism". Against advice from his friends, Darwin, Lyell and Hooker, Huxley accepted the editorship, preserving the title but giving *The natural history review* a new direction by replacing the former editorial team with some of his like-minded colleagues. Extant correspondence between several of these comprises dozens of letters in which *The natural history review* (1861–1865) was discussed. By the end of 1862 Huxley had given up on it, but the periodical survived until July 1865 with Hooker at the head. Throughout this second series, Charles Darwin exercised an unofficial, effective, and to today's eyes, ethically questionable editorial role. *The natural history review* ceased publication under Hooker in 1865. Competition from other publications, the lack of a clear purpose and the prevalence of ideology over business sense in the editor-in-chief were the likely reasons for its repeated failures.

KEY WORDS: Darwinism – Thomas Henry Huxley – Ireland – nineteenth century – science journal – publishing.

INTRODUCTION

Entry 2771 in *The Waterloo directory of Irish newspapers and periodicals* (North 1986: **2**: 375) sketches the short and relatively complex history of *The natural history review* (hereafter *NHR*) (1854–1865). Inspection of the twelve volumes of *NHR* shows a succession of five publishers, two series and editors-in-chief, sixteen associate editors, several sub-titles, widely varying selling prices, an unfocused brief – publishing not only reviews but also original work – and an insufficient readership. Such unexplained complexity invites investigation. Further details have emerged over the years in brief paragraphs in books and articles, but the fuller history of the *NHR* has not received concentrated attention. The continuity between the *NHR* and the journal *Nature* (founded in 1869) provided by Thomas Henry Huxley and other members of the X Club as co-editors and frequent authors in both journals, with Charles Darwin actively involved in the background, makes both publications at least distantly related, and adds interest to the story. This paper considers the *NHR,* drawing from direct access to all the parts issued (but see below, p. 261), the materials referred to above, and from abundant correspondence passed between some of the key scientists involved in the publication.[1]

FOUNDATION, EDITORS AND PUBLISHERS, SERIES ONE

Biographical sketches of Edward Perceval Wright (Dixon 1910; Nelson 2004a; Andrews 2009: 1048–1049) tell us that he founded the *NHR* in 1854, when he was just 20 years of age, one year after entering the University of Dublin. Initially it probably was a solo effort, with the first editorial team announced in the third year. It is not known whether Wright saw the *NHR* primarily as a business venture, or to provide himself, as he obviously did, with a vehicle to publicize his own and his colleagues' work (Wright 1854, 1855a, 1855b, 1857a, 1857b, 1857c). Wright made a good income from translating French texts and had various academic interests in natural history and medicine.

All volumes of series 1 had three parts: the first contained anonymous book reviews, the second comprised summaries of original papers published in foreign natural history journals, and the third reproduced selected proceedings of different natural history societies. Those mentioned on the title-page of volume **1** (1854) were the Belfast Natural History and Philosophical Society, Cork Cuvierian Society, Dublin Natural History Society, Dublin University Zoological Association of which Wright was a regular member and contributor, and the Literary and Scientific Institution of Kilkenny. Later the botanical and geological societies of the University of Dublin were added. Wright was also a member of the latter two societies, and many other members belonged to more than one society, thus reducing considerably the potential market for the *NHR*.

The first co-editors to work with Wright were Alexander Henry Haliday (1806–1870), William Henry Harvey (1811–1866), and Samuel Haughton (1821–1897). Haliday was an entomologist of international repute with a special interest in Diptera (O'Connor and Nash 1989). He could read and write German, French and Italian, as well as Latin, and had done work on Darwin's *Beagle* insects (Smith 1996). Harvey was a well-known botanist and botanical illustrator, and was friendly with Joseph Hooker and Charles Darwin (Nelson 2004b; DeArce 2008). Harvey had received Darwin's *Origin* with a humorous review[2], although his views gradually changed. The third editor was Reverend Samuel Haughton, geologist, comparative anatomist, diligent administrator and man of many talents (DeArce 2012). By 1860 changes had occurred; Haliday was moving to Italy on account of his poor health, and was replaced by Arthur Riky Hogan (1832–1880), another entomologist, and a graduate of Dublin and Oxford.

Details of the changing publishers and printers for series 1 can be found in North (1986: 1048) and probably resulted from Wright's search for the lowest bidder. Selling prices for the first four volumes were 8s. 0d., 10s. 6d., £1. 0s. 0d. and 15s. 0d., respectively. Volume **7** carried an address to the readership (Anonymous 1860: 63–65) explaining the changes about to take place in the management and scope of the magazine, saying that its Irish focus made for very limited circulation and support, which at the time amounted to fewer than a hundred paying subscribers.

CONTENTS SELECTION, SERIES ONE

Many of the works reviewed in series 1 were catalogues or listings of faunas or floras from localities around the world, or descriptions of new species. Works by Wallace (1853), Hooker (1854), Wollaston (1854), Harvey (1852), Forbes (1853), Jukes (1853), Gosse (1854), Waters (1853) and Unger (1854) were reviewed in the first volume. Volume **2** (1855)

contained reviews of publications by Darwin (1851, 1854), Gosse (1855–1856), Busk (1852–1854) and Zetterstedt (1855), among others.

The next two volumes reviewed foreign societies and publications, with volume **3** containing the *Journal of the Geological Society of Dublin* in its entirety. Wollaston's (1856) book on *Variation of species* was reviewed, indicating the awareness of the editors of the problems that subtle observations of species morphology were opening up, which would be an important part of Darwin's most famous, but then unpublished, book.

Volume **5** (1858) contained one of the few debates in the *NHR*; it was between Philip Henry Gosse and Joseph Beete Jukes, following an anonymous review of Gosse's (1857) *Omphalos: attempt to untie the geological knot* (for review see Anonymous 1858). In the book Gosse mentioned how all creatures bear a mark of their origin from their parents, such as the navel in humans and other mammals, but that newly created individuals, being newly created should not bear that mark. However, the Creator added the unnecessary mark on them precisely to make them indistinguishable from all other members of their species. From this starting point, Gosse construed this as evidence for creation. Jukes (1855), gently but firmly, and with better logic, made a devastating criticism of the book. Gosse was given the chance to reply in the same volume (Gosse 1858: 126), but Jukes mentioned that this response was purely evasive and that it did not address his criticisms, and finally the original anonymous reviewer (1858b) concluded the debate by dismissing both contenders. *Omphalos* was a failure. Wollaston's (1856) reflection on the nature of the systematic rank of genus was reviewed in volume **5**.

Volume **6** (1859) reviewed Haughton's paper on nicotine as an antidote against strychnine (see p. 261 below). When volume **7** appeared (1860), two editions of Darwin's *On the origin of species* had been printed, on 26 November and 26 December 1859 (Peckham 1959: 24), but neither had been reviewed in the *NHR*. Instead, an author using the pseudonym Philonous published a paper entitled "Biogenesis, Haughton's reasoning against Darwin's theory of evolution from a numerical study of the instinct of bees to optimise the use of wax when building their prismatic-hexagonal cells", concluding that the evolution of such a trait would be impossible, and that such cells end up being regular hexagonal prisms due to physical constraints, in the way that equally sized spheres pack most tightly forming hexagons (Philonous 1860). Other reviews included Huxley's (1859) work on Hydrozoa and Richard Owen's (1860) *Palaeontology*.

APPARENT AND REAL CAUSES OF FAILURE, SERIES ONE

Before dealing with what must have been the real causes of failure we should rule out apparent causes, especially in the light of later developments, that is, the migration of the *NHR*, physically and ideologically, to the camp of British "scientific naturalism" (Lightman 2009: vii; Huxley 1892) and its subsequent failure there too. Did series 1 fail for being anti-Darwin? This is an anachronism. While it is true that both Haughton and Harvey were initially mildly opposed to *Origin* (Bowler 2009), and that scientific naturalism had been at work in Britain before Darwin, (Turner 1993: 132–133), by the time *Origin* appeared and began to act as a catalyst to divide naturalists into two camps, the fate of the *NHR* was already sealed for commercial reasons. That the *NHR* was not rigid in its conservatism was indicated by the discussion between Gosse and Jukes. Haughton's criticism of *Origin* was not religion-based, but derived from a technical, mathematically grounded observation.

In an editorial note in volume **7** (Anonymous 1860), after an apology for a serious error in a previous review that had caused offence to both reviewer and author, the editor (Wright) alleged that it was the fact that the *NHR* referred mostly to Irish societies which limited its circulation. But this was his opinion, and it was only partly true. The publication was a disorganized mix, inconsistent and unpredictable as to the journals and societies whose contents or proceedings were reported in each issue. No two issues reported on the same societies, and no advanced notice was given to readers to this effect. Besides, with the exception of the Cuvierian Society of Cork (1835–1876) (McSweeney and Reilly 1958), which featured very rarely in the whole series, all of the societies reviewed published their own proceedings, all were quite small (each with fewer than 150 members, who were also members of one or more of the other, larger societies like the Royal Irish Academy and the Royal Dublin Society). Unpredictability and redundancy of contents, high price and low production values (paper and printing quality, editing, indexing), seem to be more realistic reasons for the lack of subscribers, and thus the ultimate cause of failure must be attributed to the poor focus and lack of commercial vision of the first editor-in-chief.

In addition, other science publications, some of them Irish, competed against Wright's *NHR*. *The Dublin University magazine* (1833–1880) and *The Atlantis* (1848–1862) reported Irish science, had frequent science reviews and had high production standards. *The Atlantis* was the scientific publication of the Catholic University of Ireland, and was produced by Longmans. The extant *Philosophical magazine* (founded 1798), which in the period 1850–1875 was re-titled *The London, Edinburgh and Dublin philosophical magazine and journal of science*, published contributions from many leading (some Irish) scientists and included some natural history and reviews. In Dublin, it was sold by Hodges and Smith, Grafton Street. Irish readers with a serious interest in the natural sciences could obtain information relatively easily through primary journals that were at least nominally Irish, or through review journals other than the *NHR*.

THE SEARCH FOR A NEW STYLE OF NATURAL HISTORY PUBLICATION

In the 1860s the study of natural history was changing. Rather than going to meet nature outdoors, the new naturalists brought nature into their laboratory, subjecting plants and animals to instrumental analyses. That this new style of natural history, heralded by Huxley and his scientific friends, called for a new way to publicize its anti-establishment agenda came to be perceived by the representatives of scientific naturalism as a desirable objective in the decade 1850–1860 (Barton 1998; McLeod 1969; Huxley 1918: 409). For many years a common way of presenting science to the public had been through science columns in the widely read literary reviews. While these were not dedicated primarily to science, judging by their popularity they must have contributed substantially to making science known among the reading public. For instance, Huxley had published reviews of Darwin's *Origin* in *MacMillan's magazine* (Huxley 1859a) which had a monthly print-run of 16,000 copies, and anonymously in *The Times* (Huxley 1859b), which had daily sales of 60,000 copies. Leonard Huxley (1903) recalled:

> Huxley, Hooker, and Tyndall had discussed, early in 1858, the possibility of starting a "Scientific Review," which should do for science what the *Quarterly* or the *Westminster* did for literature. The scheme was found not to be feasible at the time, though it was revived in another form in 1860; so in the meanwhile it was arranged

> that science should be laid before the public every fortnight, through the medium of a scientific column in the "*Saturday Review*."

Such an arrangement was well known to Huxley, who through his career wrote more than 50 such contributions to review journals (Houghton *et al.* 1989: **5**: 391), but this was unsatisfactory because it meant the further dispersal of natural history, a large subject in itself.

Joseph Dalton Hooker, a good friend of Huxley, had, unlike him at this time, considerable experience of many aspects of the production of scientific journals. His father, Sir William Jackson Hooker (1785–1865), had been involved in the publication of no less than five botanical journals since the 1830s, all short-lived (Brock 1980: 107). This multiplicity occurred also in the abstracting publications and the reviews, which for natural history were often produced by the smaller societies to barter for valuable titles instead of subscribing to them (Meadows 1980: 49). In 1857 Hooker, having persuaded his father to give up the failing *Kew Gardens miscellany*, was trying to rationalize the natural history publications and had tried to revive the journals of the Linnean Society, by integrating botany and zoology into one publication, as his associate and keen businessman Richard Taylor (1781–1858) had done in the 1840s (Brock 1987: 108). Hooker found that to overcome the chronic procrastination of potential contributors was hard work, and that financial loss was always looming (Huxley 1918: 404–420). Besides, "the Journal", Hooker wrote, "falls squarely on my shoulders", as no one would share the ultimate responsibility for it. The young guard gathering around Darwin, with Huxley, Tyndall and Hooker among the better-known, faced the choice between popularity or scientific currency as opposite and mutually exclusive core values of any potential new science publication, because their peers were often too few and too poor to guarantee with their subscriptions the financial viability of any publication addressed only to practitioners of one of the natural sciences. Clearly, a new inter-disciplinary science publication that they could control editorially would be beneficial to the advancement of science.

HUXLEY DECIDES TO ACCEPT THE EDITORSHIP

It was in this context that Huxley had been approached by Wright in July 1860, as he recorded in a letter to Hooker.[3]

> Some time ago Dr Wright of Dublin talked to me about the Natural History Review, which I believe to a great extent belongs to him, and wanted me to join in the editorship, provided that certain alterations were made. I promised to consider the situation and yesterday he and Greene dined with me and I learned that Haughton and Galbraith were out of the Review, that Harvey was likely to go – that a new series was to begin in January with Williams and Norgate for publishers over here – that it was to become an English and not a Hibernian concern in fact – and finally that if I chose to join editorial control would be pretty much in my own hands. . . . I am decidedly inclined to close with the offer, though I shall get nothing but extra work by it.

Huxley mentioned Lubbock and Rolleston as possible co-editors and asked Hooker for the help of one or two of his assistants at Kew. In reply[4] Hooker named Frederick Currey and Daniel Oliver but warned Huxley that private publishing was very time-consuming and expensive.

Huxley had also sought Darwin's blessing for the new venture, to which Darwin replied[5]:

> . . . if not too late, I hope you will consider deliberately before you decide. – Remember what a deal of work you have on your shoulders; & though you can do much yet there is limit to even the hardest worker's

> power of working. – I should deeply regret to see you sacrificing much time which could be given to original research.

Darwin continued:

> Would you not do more good by an occasional Review in some well established Review, than by giving up much time to the editing, or largely aiding if not editing, a Review which from being confined to one subject would not have a very large circulation? . . . Lyell, I remember, on analogous grounds many years ago resolved he would write no more Reviews.

Huxley had offered Darwin the opportunity to write reviews for the *NHR*, and he replied[6]: "With respect to Reviewing myself; I never tried: any work of that kind stops me doing anything else, as I cannot possibly work at odds & ends of time; I have, moreover, an insane hatred of stopping my regular current of work."

With John Lubbock, Darwin displayed unusual candour as he wrote on 20 July[7]:

> I am puzzled what to think about the Review. – Good periodicals undoubtedly do very good service in cause of Science. – Unless good men will devote some time to them, they will never be good; yet I cannot avoid regretting that men like Huxley & yourself sh^{d} give up much of your precious time to such work. If you had not the Bank work, I sh^{d}. be strong for your assisting. – I suppose you could not do such work in Banking hours? If not I must say I doubt about wisdom. . . . of his undertaking the work.

In November 1860 Darwin received a prospectus announcing the new editorial team[8], and he sent his name as subscriber by return of post. By 22 November[9], he was impatient to receive the first number and began to think that "it could do very much good" to the cause of natural selection.[10] Huxley had good intentions for the *NHR*, to make it open also to Darwin's critics, as long as they were scientific and respectful[11]:

> P. S. I have just received your note & the inclosure from Asa Gray – How can you imagine there can be a doubt about the reply? Of course I shall be exceedingly glad to have it if it is good – I wish to see articles both for & against, so as to have it clearly understood that the Review is a 'Champ libre' –. Paying for it however is what I unfortunately do not see my way to at present – Until the circulation reaches 6 or 7 hundred we shall hardly be able to pay anything . . .

The first number of the new series was duly published on 1 January 1861, and Darwin did not waste his time or spare his praise for it, writing on 3 January[12]:

> I have just finished No^{r} 1 of N. H. Review & must congratulate you, as chiefly concerned, on its excellence. The whole seems to me admirable . . . I am rather a croaker & I do rather fear that the merit of the articles will be above the run of common readers & subscribers.

EDITORS FOR SERIES TWO

Huxley's new editorial team included Wright and another ten naturalists with a more Darwinian understanding of biology: George Busk (1807–1886), William Benjamin Carpenter (1813–1885), Frederick Currey (1819–1881), Thomas Henry Huxley (1825–1895), Joseph Reay Greene (1836–1903), John Lubbock (1834–1913), Robert McDonnell (*fl*. 1850s–1860s), Daniel Oliver (1830–1916), Charles Wyville Thompson (1830–1892) and Philip Lutley Sclater (1829–1913). Joseph Hooker (1817–1911) initially refused to be formally drawn into the project, but later came to the rescue, informally and with his usual generosity and good humour.

Busk had come to natural history late in life, having been a naval surgeon for 25 years. By 1860 he had valuable experience as editor of the *Microscopical journal* in 1842, and the

more successful *Quarterly journal of microscopical science* (1853–1868) (Woodward and Foote 2004). Carpenter was a popularizer of science with no particular specialization. He wrote textbooks, and explained spiritual phenomena as the result of nervous system activity. He reviewed *Origin* favourably for the *NHR* (Carpenter 1860). A committed Unitarian he saw no difficulty in accepting evolutionary views alongside his religious views (Smith 2004). Currey and Oliver were colleagues of Hooker at Kew. Charles Wyville Thomson was a collaborator of Carpenter's (Rice 2004), and was appointed Professor of Natural History in Queen's College, Cork in 1853, but the following year transferred to Queen's College, Belfast, where he became Professor of Geology and Mineralogy in 1862. By 1860, Sclater was a renowned ornithologist (Edwards 2004). McDonnell was a zoologist and physiologist who had published on the electric organs of fish[13], and was an early convert to Darwin's doctrine on species[14], and was, with J. R. Greene (Professor of Natural History, Queen's College, Cork), an active member of the Royal Irish Academy during the 1850s and 1860s, elected member in 1857 (Anonymous 1859). Busk, Lubbock, Hooker and Huxley would become members of the X-Club (Barton 1998, 2004). Founded in 1864, the club gathered men with a keen interest in the overall direction of science in Britain and who were eager to extend its influence in society. Some of these were administrators of scientific societies, while others were businessmen.

CONTENTS SELECTION, SERIES TWO

Comparisons between human beings and animals, especially with regard to the anatomy of the brain, and new data concerning the antiquity of *Homo sapiens* were part of the novelty in the contents of series 2. This provided a welcome break from biblical literalism, giving a more realistic time-span for human evolution.

The first volume of the new series (1861) contained among the reviews a study on the natural position and limits of the Protozoa, including work by Greene (1862), a controversial subject which is still being discussed (Cavallier-Smith 2002). Among the original work, Huxley (1861) had a contribution on the zoological relation of humans with the lower animals, written in opposition to Richard Owen's (1861) earlier suggestion that there were three areas in the human brain that were peculiar to the genus *Homo*. While current neuroanatomy sides clearly with Huxley in this regard (Gross 1993), the root issue of whether the human brain is qualitatively unique is still debated (Gazzaniga 2009). Shaaffhousen (1861), from Bonn, the discoverer of the Neanderthal fossils in 1857, had a paper "On the crania of the most ancient races of man". Huxley made fresh comments specifically on Neanderthals in a later issue of the *NHR* (Huxley 1864), and the comparisons between brains of *Homo sapiens neanderthalensis* and anatomically modern humans are still an object of intense study (Gunz *et al*. 2010).

Volume **2** reviewed, among others, St Hilaire's (1856) work on the systematic position of *Homo sapiens*, Hooker's (1862) *On the cedars of Lebanon*, and work on the coexistence of humans with the great fossil mammals by Edward Larter (1862). Among the original work, Lubbock (1862), published "On the evidence of the antiquity of man afforded by the physical structure of the valley of the Somme". A new section was started under the heading "Miscellanea" which included a review of Darwin's (1862) note on dimorphism in *Primula*.

Evans (1865) had reported a cranium and a jaw of *Archaeopterix*, which Owen (1863) had declared to be a bird – to the scorn of some Darwinians like Hugh Falconer[15] – in spite

of the three-clawed digits on its wings. The April issue carried another report of *Eozoon canadense* in the Connemara and Galway green marble originally reported by Jones (1865). To Darwin's disappointment[16], William King, Professor of Geology in Queen's College, Galway, would soon demolish the validity of any such creature (King and Rowney 1869), although the reverberations of the *Eozoon* debate did not die down until much later (Mitchell 1971).

THE INVISIBLE EDITORS

Although Darwin was not officially an editor of the *NHR*, long friendship or sheer authority supplied a privileged line of communication with Huxley and the other editors, some of whom were very much his juniors. He referred some queries to them which they unquestioningly answered. For instance, writing to Huxley on 22 May 1861[17], Darwin mentioned a review of *Origin* that he would like to see published in *NHR*, adding:

> (Chauncey) Wright's Review on my Origin will be sent from Trubner[18] in a day or two to Williams & Norgate. Asa Gray writes, he thinks that "if Huxley accepts it he sh^{d} prefix a list of Books on these subjects, viz Books which have philosophised on the origin of species. And Huxley is at liberty to add supplement, strike out ad libitum." – . . . I have directed a copy & advertisement to be sent to Nat. Hist Review. For Asa Gray's sake (& my own) could you insert notice literally only of two or three length?? His Reviews have struck others besides myself as very able.

Chauncey Wright (who was not related to Edward Perceval Wright) was an American naturalist who had sent his review of *Origin* from Boston, but it appears that the manuscript never arrived to the London publishers, as Darwin reported to Huxley after hearing from Asa Gray.[19] In May, Huxley informed E. P. Wright that the *NHR* would be printed in London, by Williams and Norgate, with the proof reading done by Busk.[20]

The 1862 January issue was also a "capital number".[21] On 10 October that year Huxley acknowledged receiving from Darwin a paper on the auditory sac of cirripeds[22], "a curious organ" whose function was clarified in the January 1863 issue (Darwin 1863). Darwin's now customary praise for the *NHR* came again on 10 January 1863, adding an oblique request[23]: "I have sent Lubbock a little Review of Bates' paper in Linn. Transact. which L. seems to think will do for your Review." The October 1864 issue drew fresh gratitude from Darwin for Huxley's defence of *Origin* in the *NHR*, this time against the German biologist Albert Kolliker and the French Pierre-Jean-Marie Flourens (1794–1867).[24]

Hooker began to have a direct role in the editorship of the 1862 volume. Huxley confirmed this in a letter dated 4 December 1862: "My Dear Hooker – I look upon you as art and part of the *Natural History Review*, though not ostensibly one of the gang" (Huxley 1901: 256). His induction as editor was literally a joke on Darwin, and on the readers. He put forward a paper, on sexual dimorphism which he said was written by Daniel Oliver, *a propos* of a review of an earlier paper by Darwin[25], who for a long time had been both fascinated and frustrated by the subject.[26] However, in November a playful Hooker[27] confessed to Darwin of a misdemeanour:

> And now my dear Darwin, I may as well make a clean breast of it, & tell you that I wrote the Nat. Hist. Review notice too – to me a very difficult task, & one I fancied I failed in, comparatively. Of this you are no judge & can be none, you told me to tell Oliver it pleased you, & so I am content & happy.

Earlier[28], Hooker had mentioned to Darwin some news about the *NHR* and made a telling comment on Huxley's managerial style:

> There is a capital review of the "Nat. Hist. Review" in the Parthenon, I wonder who wrote it, it expresses my opinion exactly. The last number of the Review is a sad falling off & the last page is disgraceful for errors & misprints: poor Oliver is quite down-hearted about it – they all seem afraid of Huxley who has undertaken sole responsibility of Editorship, which he is not up to & has not time for.

In November 1862, Darwin had sought reassurance from Hooker about the identity of Samuel Haughton of Trinity College, Dublin, one of his early opponents: "Do you know whether there are two Rev[d] Prof. Haughtons at Dublin; one of this name has made a splendid medical discovery of nicotine counteracting strychnine & tetanus; Can it be my dear friend? if so, he is at full liberty for the future to sneer & abuse me . . ." (see p. 255 above).[29] Hooker reassured him that there was only one Samuel Haughton in Trinity College.[30]

In January 1863 Darwin[31] was "burning with indignation" about Owen's reaction to a paper on fossil American elephants by Falconer (1863) published in the *NHR*. Hooker replied[32] that Darwin's ire against Owen was fully justified, but Hooker had an issue too with the editor-in-chief:

> I do wish he had cut it (Falconer's paper) into 4 – for a non-Zoologist like me it is an appalling thing to have 70 pages of such an article in one quarter. The "Review" is much better than usual, but confound them they have printed the Index of New genera of last volume on last page of first number of this volume!. it is too bad of Huxley.

Lyell joined in the criticism of Huxley, in rather harsh terms, expressed privately to Darwin[33] and other friends (Huxley 1901: **1**: 217): "I entreated him not to undertake the Natural History Review before it began. The responsibility all falls on the man of chief energy and talent; it is a quarterly mischief, and will end in knocking him up."

As the first number for 1864 arrived on schedule, Darwin bestowed his highest praise, this time addressed to Hooker: "I have read by a great effort two-thirds through last N. Hist. R. & by the standard of what interests me, it is the best number which has appeared. Several of the Bot. papers have interested me: that on Decaisne, I presume, is by Bentham.– Am I right?"[34]

Fresh advice for the *NHR* arrived in September[35] recommending a new paper to be reviewed by Oliver. Similarly in January[36] and April[37] of the following year Darwin questioned Hooker about the identity of some of the reviewers in those issues, a curiosity that Hooker was able to satisfy.[38] By July, Hooker reported that the *NHR* was about to die: "I have not seen Nat Hist. Review which will not pay, is all but defunct I hear! & cannot go on beyond the year."[39] However, Leonard Huxley (1901: 296) reported that his father "published in February 1866 a paper in the *Natural History Review* on the "Pre-historic Remains of Caithness", based upon a quantity of remains found the previous autumn at Keiss." If an issue dated February 1866 was produced, it must have been in a very short run because none of the extant collections have it.[40]

The paragraphs above show Darwin's interest in the *NHR* through his correspondence between July 1860 and July 1865. At least 50 letters to members of the editorial staff are extant: ten to Huxley, eleven to Oliver, 14 to Lubbock and 15 to Hooker. They dealt with the business of the *NHR*, not just to praise the quality of the contents in general, but also to give his opinion on specific items, to suggest subjects or authors to review, including reviews of his own work, to preview proofs of papers about to be published or to find out the identity of anonymous reviewers. More seriously, there appear to have been double

standards on the part of the editor-in-chief, because when quizzed by Henry Charlton Bastian[41] on the identity of the referee of one of his papers submitted to the Royal Society, where Huxley was chairman and thus chief editor, Huxley[42] took refuge in the traditional ethical standard of confidentiality which prevented him from revealing the referee's identity; but for Darwin's curiosity about the *NHR* reviewers there had been no such reserve.

THE CAUSES OF FAILURE, SERIES TWO

It is clear that Huxley could choose subjects of enduring importance, and he might have lifted the circulation of *NHR* from 100 to just below 700 copies per issue, a significant achievement but not enough to make it commercially viable in Britain, and here again we have to look behind the claim of low circulation to get at the real causes of failure. Differential subscription rates for individuals and institutions were only introduced in the twentieth century (Brock 1980: 108), so the size of the potential market in the mid-1800s was more determined by the price of an issue and content than by type of subscriber. The estimated membership of 169 natural history societies listed in *Nature* (Anonymous 1873), which excluded societies based in London, Edinburgh, Dublin and the whole of Wales, was 20,000. Brock and McLeod (1976: 44) put the membership of London's scientific societies in 1865 at 6,480. From selling two copies to each learned society alone, the British *NHR* could easily have sold 400 copies. Each issue of the *NHR* cost 4s. 0d. It would be reasonable to expect that a considerable proportion of these approximately 26,000 naturalists could be enticed to spend four shillings per quarter to buy their own copy, if the product was satisfactory. All that can be stated, without further analysis, is that the figure of fewer than 700 subscriptions represents a very small proportion (less than 3%) of the potential market of individual naturalists. Thus it seems that the product, while affordable, was not attractive to most potential readers, men of science or the general public. There were issues of market targeting, over-specialization, partisanship and technical execution.

The *NHR*'s brief was unclear. Although called a "review", it included primary papers. In his prospectus, Huxley had said that the *NHR* would be addressed to the general public, discussing general biological problems in a philosophical spirit, for both a specialist and a general audience. In these objectives he signally failed (Barton 1998: 434). Series 2 was a specialized review and hence unattractive to the general reader. It was partisan and hence unattractive to a majority of naturalists, and it had technical flaws that Huxley was unable to eliminate, as he failed to motivate his subordinates.

The specialism of series 2 was obvious even to Hooker, who complained[43] of "70 pages of zoology" referring to Falconer's (1863) contributions on fossil American elephants. Indeed it could be assessed quantitatively. Of the 51 original papers published, most had an evolutionary background, many referred to humans, a great majority were on comparative anatomy (human versus higher animals including apes), referring in particular to the brain, nervous system or the cranium and spine. The next most common subject was the antiquity of humans.

Neither should we be misled by Huxley's stated intention of non-partisanship when he wrote to Darwin: "My desire to have an anti-Darwinian article–is not so much because I want to see you criticized & because I want all the world to understand that it is not a party

journal."[44] To give the appearance of a non-party journal might have been Huxley's wishful thinking, comparable to his later claim that the X Club had no other purpose but "bringing together a few friends who did not want to drift apart" (Barton 1998: 413). Barton (1998: 413, note 6) has shown that such disclaimers were not uncommon. But a journal that was, as mentioned above, "mildly episcopophagous"[45] – which could have referred not only to Samuel Wilberforce, Bishop of Oxford, but to Richard Owen, known as the Archbishop of Anthropology – and where "Darwin and Lyell (could) have a fine opportunity if (they) wish it for slaying (their) adversaries"[45] would appear to be contradicting such non-partisanship from the start.

The issue of partisanship in the *NHR* can also be substantiated quantitatively. In series 2, all statements about Owen's work were negative. There were ten editors assisting Huxley, to whom we can add Hooker, Rolleston and Darwin, none of whom appeared explicitly on the list. They wrote 29 of the 51 original papers published in the five volumes, Lubbock signing not less than seven, not counting reviews. Among the other authors were George Bentham, a friend of Hooker, A. R. Wallace, H. Falconer and other personal friends of the editors. There was one author from Oxford and one from Glasgow, but none from Cambridge or Dublin outside the editorial panel. The *NHR* was thus nearly entirely written by the Darwinian, anti-Owen editors and their cronies.

Desmond (1982: 19–56) and Rupke (2009: 193) have investigated Huxley's use of the *NHR* as an instrument to publicize negative reviews on the work of Owen, and Darwin's extant correspondence stands as a record of his and Huxley's hatred of Owen; this was as Huxley had promised Darwin in 1860, that the *NHR* would serve as a platform to attack his enemies[33], but a review of the Ayrton-Hooker affair (Endersby 2008: 282–300) clearly demonstrated that such hatred was fuelled not just by science issues, but, closer to home, by personal, status-related issues and by the dislike of the current government, Gladstone in particular.

Both Lyell and Hooker criticized technical presentation errors in different issues of the *NHR*. In January 1863 Lyell complained that: "the responsibility all falls on the man of chief energy and talent; it is a quarterly mischief, and will end in knocking him up."[33] And, Hooker observed, on the same volume: "The "Review" is much better than usual, but confound them they have printed the Index of New genera of last volume on last page of first number of this volume!. it is too bad of Huxley."[46]

The *NHR* in the context of mid-Victorian periodicals publishing natural history

More remote causes of failure can be gleaned by studying other comparable publications. Ellegard's *Directory* (1971: table 13) mentioned the *NHR* among another ten science review periodicals of which three referred to just one discipline (geology or zoology), two were launched after the period studied here (1860–1865), and one (*Recreative science*) was not addressed to professionals. *The quarterly journal of science* included all the sciences, engineering and aspects of science policy, scientific biography, and teaching. Its book reviews were very short, barely publisher's notices. *Annals and magazine of natural history*, founded by Richard Taylor (later of Taylor & Francis), included geology, zoology and botany, focusing on systematics, not unlike the first series of *NHR*. Taylor drafted eminent naturalists to the editorial panel of *Annals* and had a virtual monopoly on advertising, making *Annals* – with 2,000 active subscribers – the most successful natural history publication of the nineteenth century (Brock 1989: 109). The impressive record of Taylor &

Francis, who also published the *Philosophical magazine*, in publishing natural history and science periodicals accurately reflected what was happening in these fields. On the one hand, there was great excitement in physics and chemistry, and on the other hand, natural history remained popular although as a discipline it had not reached such a state of formalization and development as physics or chemistry, Darwin's theory of evolution was an essential starting point. The successes and failures of Taylor & Francis suggest some reasons for the failure of the *NHR*: individual reputations of editors in a field of science do not make up for their lack of business expertise; the backing of academic authority is not necessarily correlated with public interest; as the scientific naturalists fought to displace the amateur and the clerical from the field of science, they themselves faced being displaced from the publishing business by the experienced business professionals who fought with equal zeal to establish their firms on a sound footing; in bidding for grants from official bodies, an ideologically neutral stance might have received a broader welcome than an individual authority that was deeply committed to a specific and then still unorthodox camp or ideology.

CONCLUSION

What we have come to expect from current scientific journals, in terms of style, contents and ethical standards, took time to emerge, and the history of the *NHR* illustrates some steps in the process, which inevitably involved trial and error. This paper proposes that series 1, the Irish phase of the *NHR*, failed after seven years through redundancy of contents and technical and commercial incompetence, and that series 2, the British phase, failed after a similar period because at its core it served primarily the narrow purposes of its doctrinaire editor-in-chief, at a time when the majority of natural science in Britain was still rooted in a deistic natural theology (McLeod 1969b: 469). In more durable science journals the business skills, usually held by non-scientists, or by a science-literate person not acting in his capacity as scientist, worked in synergy with separate groups of scientists that could, respectively, write high quality content and assess the validity of other scientist's submitted work. Separation of functions, primary writing, refereeing, editing, divulging and mastering the business end, would come to be seen as essential basic technical and ethical requirements. Only very rarely could all these aspects of science publication merge in one and the same person, and for different reasons, neither phase of the *NHR* was an example of such a successful convergence. Perhaps more importantly, natural history in the 1860s was not in a state of intellectual maturity comparable with contemporaneous physics or chemistry, that would warrant a multiplicity of publications because of a widening specialist readership.

ACKNOWLEDGEMENTS

I am grateful to the Archivist of the Huxley collection in Imperial College London for providing photocopies of the manuscript letters quoted here and for permission to refer to them in this paper. Similarly, to Cambridge University Press for permission to quote Darwin letters from the volumes of *The correspondence of Charles Darwin* mentioned in the notes below. Two referees made very useful comments to a previous version of this manuscript, and Professor Tony Kavanagh proof-read the current version. I also thank Mr William Darwin for permission to quote from the hitherto unpublished letter referred to in note 16 .

NOTES

Abbreviations used

CD = Charles Darwin
JH = Joseph Dalton Hooker
TH = Thomas Henry Huxley.

[1] The originals of Darwin's letters are in the Darwin Archive (DAR) of Cambridge University Library (CUL), where each item is referenced by a box and item number, for instance; CUL DAR 102: 71. Occasionally repositories other than CUL are mentioned.

Similarly, the major repository for Huxley's original correspondence is in Imperial College London (ICL), where each letter is referenced by mentioning the short name of the repository, followed by the volume and letter number, for instance; ICL 3.119. Photocopies of the letters were obtained from the Huxley Archive and the transcripts quoted here are the author's own.

[2] CD to JH, 30 May [1860] (Burkhardt *et al*. 1993: 231–232): CUL DAR 115: 59.

[3] TH to JH, 17 July [1860]: ICL 2.67.

[4] JH to TH, 18 July [1860]: ICL 3.119.

[5] CD to TH, 20 July [1860] ICL 5.125.

[6] CD to TH, 20 July [1860] ICL 5.125.

[7] CD to John Lubbock, 20 July [1860] (Burkhardt *et al*. 1993: 296–297): CUL DAR 264 40a English Heritage.

[8] CD to TH, 10 November [1860] ICL 5.143.

[9] CD to TH 22 November [1860] ICL 5.147.

[10] CD to TH 22 November [1860] ICL 5.147.

[11] CD to TH 5 December [1860] ICL 5.130.

[12] CD to TH 3 January [1861] ICL 5.155.

[13] CD to TH 16 November [1860] ICL 5.145.

[14] CD to TH 22 November [1860] ICL 5.147.

[15] Hugh Falconer to CD 3 January [1863] (Burkhardt *et al*. 1998: 4–7): CUL DAR 164: 10.

[16] Darwin's opinion on *Eozoon* went from "Eozoon is a very important fact . . ." (CD to JH 31 May [1866] CUL DAR 115: 290), to "Eozoon is done for . . ." (CD to JH 25 March [1874] CUL DAR 95: 317–319).

[17] CD to TH 16 May [1861] ICL 5.164.

[18] Trubner was a British publisher of German descent.

[19] CD to TH 11 December [1861] ICL 5.166.

[20] TH to E. P. Wright 11 May [1861] ICL 29.107.

[21] CD to TH 22 January [1862] ICL 5.252.

[22] CD to *Natural History Review* 10 October [1862] (Burkhardt *et al*. 1997: 453–454): CUL DAR 166: 295.

[23] CD to TH 10 December [1862] ICL 5.183.

[24] CD to TH 3 October [1864] ICL 5.205.

[25] JH to CD 9 June [1862] (Burkhardt *et al*. 1997: 237–238): CUL DAR 101: 40–41.

[26] CD to JH 9 February [1862] (Burkhardt *et al*. 1997: 75): CUL DAR 115: 143.

[27] JH to CD 7 November [1862] (Burkhardt *et al*. 1997: 507–508): CUL DAR 101: 73–74, 68–69.

[28] JH to CD 24 July [1862] (Burkhardt *et al*. 1997: 335–336): CUL DAR 101: 48–49, 70: 171.

[29] CD to JH 3 November [1862] (Burkhardt *et al*. 1997: 499–500): CUL DAR 115: 171.

[30] JH to CD 12 November [1862] (Burkhardt *et al*. 1997: 520–522): CUL DAR 101: 75–76.

[31] CD to JH 3 January [1863] (Burkhardt *et al*. 1998: 7–9): CUL DAR 115: 78.

[32] JH to CD 6 January [1863] (Burkhardt *et al*. 1998: 13–16): CUL DAR 101: 88–91.

[33] Charles Lyell to CD 15 March [1863] (Burkhardt et al. 1999: 231).

[34] CD to JH, 27 January [1864] (Burkhardt *et al*. 2001: 31): CUL DAR 115: 218.

[35] CD to Daniel Oliver, 17 September [1864] (Burkhardt *et al*. 2001: 329): CUL DAR 115: 249.

[36] CD to JH 19 January [1865] (Burkhardt *et al*. 2002: 29): CUL DAR 115: 258a.

[37] CD to JH 10 April [1865] (Burkhardt *et al*. 2002: 115–116): CUL DAR 115: 263.

[38] JH to CD 12 April [1865] (Burkhardt *et al*. 2002: 120–121): CUL DAR 102: 17.

[39] JH to CD 13 July [1865] (Burkhardt *et al*. 2002: 198–202): CUL DAR 102: 30–33.

[40] No reference can be found to a sixth volume of the *NHR* dated 1866. A paper by Thomas H. Huxley with a title similar to that mentioned by Leonard Huxley was published that year by Williams & Norgate as a chapter in a book by Laing and Huxley (1866) comprising only two parts, each written by one of the authors. The first part, by Samuel Laing, was an 80-page paper, and the second, of similar length, was Huxley's. Both contained many illustrations (Laing's paper had seven full-page plates, and Huxley's 30 plates) which must have made it expensive to produce. It is possible that both papers were intended for the first issue of *NHR* for 1866, as Leonard Huxley mentioned, and that, on the failure of the journal, and having spent much time and money in producing them, the publishers and authors decided that the papers should see the light in the format of a book. Laing described the cultural artefacts, and Huxley the bones found with them, although Huxley did much more, reviewing data on crania from similar findings from all across Europe, as well as the Neanderthal skulls. Huxley must have been keen to have the work published because it is a continuation of a paper by Thurnam (1865) published in the April 1865 issue of the *NHR*. It is conceivable that it was the production of these very expensive papers that contributed to the demise of the already struggling *NHR*, since the usual Royal Society grant of £50 towards publication expenses would have been quite insufficient in this case.

[41] Henry C. Bastian to TH 25 January [1877] ICL 10: 238, 10: 240 and 10:242.

[42] TH to Henry C Bastian, 26 January [1877]: ICL 10: 243.

[43] JH to CD 6 January [1863] (Burkhardt *et al.* 1999: 13–16): CUL DAR 101: 88–91.

[44] TH to CD 14 December [1860] (Burkhardt *et al*. 1993: 527): original ms in Gray Herbarium of Harvard University, Cambridge, Massachusetts, 39.

[45] TH to JH 17 July [1860]: ICL 2.67.

[46] JH to CD 6 January [1863] (Burkhardt *et al*. 1998: 14): CUL DAR 101: 88–91.

REFERENCES

ANDREWS, H., 2009 Wright, Edward Perceval, in volume **9**, MAGUIRE, J and QUINN, J. (editors) *Dictionary of Irish biography*. Cambridge.

ANONYMOUS, 1858a Omphalos: an attempt to untie the geological knot. By Henry Joseph Gosse, F.R.S. Van Voorst. London 1857. *Natural history review* **5**: 55–60.

ANONYMOUS, 1858b The Omphalos controversy. *Natural history review* **5**: 184–188.

ANONYMOUS, 1859 Record of meeting. *Proceedings of the Royal Irish Academy* **7**: 119–122.

ANONYMOUS, 1860 Address to our readership. *Natural history review* **7**: 63–65.

ANONYMOUS, 1873 Local scientific societies. *Nature* **8**: 521–524.

BARTON, R., 1998a Huxley, Lubbock and half a dozen others: professionals and gentlemen in the formation of the X Club, 1851–1864. *Isis* **89**: 410–444.

BARTON, R., 1998b Just before Nature: the purposes of science and the purposes of popularization in some English popular science journals in the 1860s. *Annals of science* **55**: 1–33.

BARTON, R., 2004 The X Club. *Oxford dictionary of national biography* (URL: http://www.oxforddnb.com/view/theme/92539?&back=4168 accessed 10 December 2010).

BARWICK, G. F., 1911 The magazines of the nineteenth century. *Transactions of the Bibliographical Society*, **11**: 237–249.

BOWLER, P. J., 2009 Darwin's Irish opponents. *Proceedings of the Royal Irish Academy* **109C**: 409–420.

BROCK, W. H., 1980 The development of commercial science journals in Victorian Britain, pp. 95–122 in MEADOWS, J. A. (editor), *Development of science publishing in Europe*. Amsterdam & Oxford.

BROCK, W. H., and McLEOD, R. M., 1976 The scientists' declaration: reflexions on science and belief in the wake of *Essays and reviews*, 1864–5. *British journal for the history of science* **9**: 1–66.

BURKHARDT, F., BROWNE, J., PORTER, D. M. and RICHMOND, M., 1993 *The correspondence of Charles Darwin*. Volume **8**. *1860*. Cambridge.

BURKHARDT, F., HARVEY, J., PORTER, D. M. and TOPHAM, J. R., 1997 *The correspondence of Charles Darwin*. Volume **10**. *1862*. Cambridge.

BURKHARDT, F., PORTER, D., DEAN, S. A. and TOPHAM, J. R., 1998 *The correspondence of Charles Darwin*. Volume **11**. *1863*. Cambridge.

BURKHARDT, F., PORTER, D. M., DEAN, S. A., WHITE, P. S. and WILMOT, S., 2001 *The correspondence of Charles Darwin*. Volume **12**. *1864*. Cambridge.

BURKHARDT, F., PORTER, D. M., DEAN, S. A., EVANS, S., INNES, S. and PEARN, A., 2002 *The correspondence of Charles Darwin*. Volume **13**. *1865*. Cambridge.

BURKHARDT, F., PORTER, D. M., DEAN, S. A., EVANS, S., INNES, S., PEARN, A. M., SCLATER, A. and WHITE, P., 2004 *The correspondence of Charles Darwin*. Volume **14**. *1866*. Cambridge.

BUSK, G., 1852–1854 *Catalogue of marine Polyzoa in the collection of the British Museum*. Parts I and II. London.

CARPENTER, W. B., 1860 Darwin on the origin of species. *National review* **10**: 188–214.

CAVALIER-SMITH, T., 2002 The phagothrophic origin of eukaryotes and phylogenetic classification of protozoa. *International journal of systematic and evolutionary microbiology* **52**: 297–354.

DARWIN, C. R., 1851–1854 *A monograph of the sub-class Cirripedia*. London. 2 volumes.

DARWIN, C. R., 1862 On the two forms or dimorphic condition, of the species of *Primula* and on their remarkable sexual relations. *Journal of the Proceedings of the Linnean Society of London, botany* **6**: 77–96.

DARWIN, C. D., 1863 The auditory sac in Cirripedia. *Natural history review*, series 2, **9**: 115–116.

DeARCE, M., 2008 Darwin's Irish correspondence. *Proceedings of the Royal Irish Academy* **108B**: 43–56.

DeARCE, M., 2012 The parallel lives of Joseph Allen Galbraith (1818–1890) and Samuel Haughton (1821–1897). *Proceedings of the Royal Irish Academy* **112C**: 1–27.

DESMOND, A., 1982 *Archetypes and ancestors: palaeontology in Victorian London 1850–1875*. London.

DESMOND, A., 1998 *Huxley: from devil's disciple to evolution's high priest*. London.

DESMOND, A., 2004 Huxley, Thomas Henry (1825–1895). *Oxford dictionary of national biography*. (URL: http://www.oxforddnb.com/view/article/14320 accessed 3 October 2011).

DIXON, H. H., 1910 Edward Perceval Wright. *The Irish naturalist* **19**: 61–63.

ENDERSBY, J., 2008 *Imperial nature: Joseph Hooker and the practices of Victorian scientists*. Chicago & London.

EDWARDS, J. C., 2004 Sclater, Philip Lutley (1829–1913). *Oxford dictionary of national biography*. (URL: http://www.oxforddnb.com/view/article/38295 accessed 29 November 2010).

ELLEGARD, A., 1971 The readership of the periodical press in mid-Victorian Britain: II Directory. *Victorian periodicals newsletter* **13**: 3–22.

EVANS, J., 1865 On portions of a cranium and of a jaw in the slab containing the fossil remains of *Archaeopteryx*. *Natural history review*, series 2, **5**: 415–421.

FALCONER H., 1863 On the American fossil elephant of the regions bordering the Gulf of Mexico. *Natural history review*, series 2, **3**: 43–114.

FORBES, J. D., 1853 *Norway and its glaciers: visited in 1851; followed by journals of excursions in the high Alps of Dauphiné, Berne and Savoy*. Edinburgh.

GAZZANIGA, M., 2008 *Human: the science behind what makes us unique*. New York.

GOSSE, P. H., 1854 *The aquarium*. London.

GOSSE, P. H., 1855–1856 *A manual of marine zoology for the British Isles*. London. 2 volumes.

GOSSE, P. H., 1857 *Omphalos: an attempt to untie the geological knot*. London.

GOSSE, P. H., 1858 Correspondence. *Natural history review* **5**: 126–132.

GREENE, J. R., 1862 *A manual of the subkingdom protozoa, with a general introduction on the principles of zoology*. London.

GROSS, C. G., 1993 Hippocampus minor and man's place in nature: a case study in the social construction of neuroanatomy. *Hippocampus* **3**: 403–416.

GUNZ, P., NEUBAUER, S., MAUREILLE, B. and HUBLIN, J.-J., 2010 Brain development after birth differs between Neanderthals and modern humans. *Current biology* **21**: R921–R922.

HARVEY, W. H., 1852 *Nereis boreali-americana or, contributions to a history of the marine algae of North America*. Washington, D.C.

HAUGHTON, S., 1860 Biogenesis. *Natural history review* **6**: 23–32.

HOOKER, J. D., 1854 *Himalayan journals or notes of a naturalist in Bengal, the Sikkim and Nepal Himalayas, the Khasia mountains* . . . . Volume **1**. London.

HOOKER, J. D., 1862 On the cedars of Lebanon, Taurus, Algeria, and India. *Natural history review*, series 2, **2**: 11–19.

HOUGHTON, W. E., HOUGHTON, E. R. and SLINGERLAND, J. H. (editors), 1989 *The Wellesley index to Victorian periodicals 1824–1900*. Toronto. 5 volumes.

HUXLEY, L., 1901 *Life and letters of Thomas Henry Huxley*. New York. 3 volumes.

HUXLEY, L., 1918 *Life and letters of Sir Joseph Dalton Hooker. Based on materials collected and arranged by Lady Hooker*. London.

HUXLEY, T. H., 1859a Time and life: Mr Darwin's 'Origin of species'. *Macmillan's magazine* **2**: 142–148.

HUXLEY, T. H., 1859b Darwin on the origin of species. *The Times*, 26 December: **8**.

HUXLEY, T. H., 1859c *The oceanic Hydrozoa: a description of the Calycophoridae and Physophoridae observed during the voyage of H. M. S. Rattlesnake in the years 1846–1850*. London.

HUXLEY, T. H., 1861 On the zoological relations of man to the lower animals. *Natural history review*, series 2, **1**: 68–84.

HUXLEY, T. H., 1864 Further remarks upon the human remains from the Neanderthal. *Natural history review*, series 2, **4**: 429–446.

JUKES, J. B., 1853 *Popular physical geology*. London.

JUKES, J. B., 1858 Correspondence. To the editors of the Natural history review and Quarterly journal of science. Natural history review **5**: 106–110.

KING, W. and ROWNEY, T. H., 1869 On "Eozoon canadense."? *Proceedings of the Royal Irish Academy* **10**: 506–551.

LAING, S. and HUXLEY, T. H., 1866 *Prehistoric remains of Caithness, with notes on the human remains*. London.

LARTER, E., 1862 Fossil mammals, regarded as characteristic of the latest geological period. *Natural history review*, series 2, **2**: 53–71.

LIGHTMAN, B., 2009 *Evolutionary naturalism in Victorian Britain*: *The 'Darwinians' and their critics*. Farnham.

LOCKYER, N., 1919 Valedictory memories. *Nature* **104**: 189–190.

LUBBOCK, J., 1862 On the evidence of the antiquity of man afforded by the physical structure of the Somme Valley. *Natural history review*, series 2, **2**: 144–169.

McLEOD, R., 1969a Science in Grub Street. *Nature* **224**: 423–426.

McLEOD, R., 1969b Macmillan and the scientists. *Nature* **224**: 428–430.

McLEOD, R., 1969c Macmillan and the young guard. *Nature* **224**: 435–438.

McSWEENEY, M. and REILLY, J., 1958 The Cork Cuvierian Society. *Journal of the Cork Historical and Archaeological Society* **107**: 9–14.

MEADOWS, J. A., 1980 Access to the results of scientific research: developments in Victorian Britain, pp 43–64 in MEADOWS, J. A. (editor), *Development of science publishing in Europe*. Amsterdam & Oxford.

MITCHELL, M. E., 1971 On Eozoon canadense. *Isis* **62**: 381–383.

NELSON, E. C., 2004a Wright, Edward Perceval (1834–1910), *Oxford dictionary of national biography*. (URL: http://www.oxforddnb.com/view/article/37035, accessed 12 July 2010).

NELSON, E. C., 2004b Harvey, William Henry (1811–1866), *Oxford dictionary of national biography*. (URL: http://www.oxforddnb.com/view/article/1253 3, accessed 9 December 2010).

NORTH, J. S. (editor), 1986 *The Waterloo directory of Irish newspapers and periodicals, 1800–1900*. Waterloo, Ontario.

O'CONNOR, J. P. and NASH, R., 1989 Notes on the entomological collection of A. H. Haliday (1806–1870) in the National Museum of Ireland, with a recommendation for type designations. *Proceedings of the Royal Irish Academy* **82B**: 169–175.

OWEN, R., 1860a Darwin on the origin of species. *The Edinburgh review* **111**: 487–532.

OWEN, R., 1860b *Palaeontology*. Edinburgh.

OWEN, R., 1863 On the *Archaeopterix* of von Meyer, with a description of the fossil remains of a long-tailed species, from the lithographic slate of Solenhofen. *Philosophical transactions of the Royal Society* **153**: 34–47.

PECKHAM, M. (editor), 1959 *The origin of species. A variorum edition*. Philadelphia.

PHILONOUS, 1860 Biogenesis. *Natural history review* **7**: 23–33.

RICE, A. L., 2004 Thomson, Sir Charles Wyville (1830–1882). *Oxford dictionary of national biography*. (URL: http://www.oxforddnb.com/view/article/27295 accessed 29 November 2010).

ST HILAIRE, I. G., 1856 On the systematic position of man. *Histoire naturelle generale des regnes organiques*. Volume **2**. Paris.

SCHAAFHAUSEN, D., 1861 On the crania of the most ancient races of man (from Muller's Archiv, 1858: 453) with remarks and original figures, taken from a cast of the Neanderthal cranium. Translated with comments by G. Busk. *Natural history review*, series 2, **2**: 155–175.

SMITH, K. G. V., 1996 Supplementary notes on Darwin's insects. *Archives of natural history* **23**: 279–286.

SMITH, R., 2004 Carpenter, William Benjamin (1813–1885). *Oxford dictionary of national biography*. (URL: http://www.oxforddnb.com/view/article/4742 accessed 29 November 2010).

THURNAM, J., 1865 The synostosis of the cranial bones specially the parietal as race-characteristic in some ancient British and African skulls. *Natural history review*, series 2, **5**: 242–268.

TURNER, F., 1993 *Contesting cultural authority*. Cambridge.

UNGER, F., 1854 *Botanical letters to a friend . . . translated by Dr B. Paul*. London.

WALLACE, A. R., 1853 *Palm trees of the Amazon and their uses*. London.

WATERS, J., 1853 *The natural history of the birds of Ireland, indigenous and migratory, containing descriptions of the habits, migrations, occurrence, and economy, of the 261 species comprised in the fauna*. Dublin & London.

WOLLASTONE, T. V., 1854 *Insecta maderensia. An account of the insects of the Madeira group of islands*. London.

WOLLASTONE, T. V., 1856 *On the variation of species with special reference to the Insecta followed by an inquiry into the nature of genera*. London.

WOODWARD, B. B. and FOOTE, Y., 2004 Busk, George (1807–1886). *Oxford dictionary of national biography*. (URL: http://www.oxforddnb.com/view/article/4168 accessed 10 December 2010).

WRIGHT, E. P., 1854 Notes on the occurrence of rare birds in Ireland, from February 1853 to February 1854. *Natural history review* **1**: 95–98.

WRIGHT, E. P., 1855a On collecting and arranging the British molluscs. *Natural history review* **2**: 66–86.

WRIGHT, E. P., 1855b On fungi parasitic on insects. *Natural history review* **2**: 55–59.

WRIGHT, E. P., 1857a Entomological notes. *Natural history review* **4**: 34–35.

WRIGHT, E. P., 1857b Notes of a visit to Mitchelstown caves. *Natural history review* **4**: 231–233.

WRIGHT, E. P., 1857c Discovery of *Lipura stillicidii*. *Natural history review* **4**: 233.

ZETTERSTEDT, J. W., 1855 *Diptera Scandinaviae disposita et descripta*. Lund.

Received 29 January 2011. Accepted 13 December 2011.