

A microscopic look at Mary Ward: gender, science and religion in nineteenth-century Ireland

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Robert Young claims that at the ‘heart of science we find a culture’s values’;¹ this has certainly been the case since the Victorian era, when the relationship between contemporary science and culture began to develop, a connection that is confirmed by Mary Ward’s science writing. With the aid of optical equipment, Ward set out to reveal to her readers new worlds and new ways of seeing. However, what is actually unveiled in her writing is a careful negotiation and affirmation of conservative Victorian values.

Scholars have long acknowledged that science writing can be made to act in support of individual and cultural preconceptions; as Eveleen Richards demonstrates, despite the ground-breaking developments offered by Charles Darwin, his scientific theories also provided sustenance for Victorian male chauvinism:²

The chief distinction in the intellectual powers of the two sexes is shown by man’s attaining to a higher eminence in whatever he takes up, than can woman – whether requiring deep thought, reason or imagination, or merely the use of the senses or hands.³

In *The descent of man* (1871), Darwin purports that man is ultimately biologically superior to woman, thereby authorizing a white male supremacy through an apparently scientific conception of female nature. In this way, science was used to deny women’s full participation in intellectual disciplines, particularly during the Victorian period, as women began to encroach upon male-dominated science disciplines.⁴

Although it may have seemed that, for the most part, the natural sciences were becoming a new way of defining and organizing the moral and social order of the nineteenth century, in many respects these scientific disciplines simply underlined traditional ideologies in relation to race, class and gender. In this way, those aspects of intelligence attributed to women – intuition, perception and imitation – were

1 B. Lightman, ‘Introduction’ in B. Lightman (ed.), *Victorian science in context* (Chicago, 1997), pp 3–8. **2** E. Richards, ‘Redrawing the boundaries: Darwinian science and Victorian women intellectuals’ in Lightman, *Victorian science in context*, pp 119–43. **3** C. Darwin, *The descent of man and selection in relation to sex*, 2 vols (London, 1871), 2, p. 326. **4** Lightman, ‘Introduction’, p. 8.

simply dismissed by Darwin as being characteristic of the lower races. In other words, they were viewed as evidence of a lesser state of civilization.⁵ Unsurprisingly, several other leading scientists, such as Francis Galton (1822–1911) and Patrick Geddes (1854–1932), followed Darwin's direction; together, these intellectuals forged a formidable body of biological determinist theory that purported to show that women were inherently different from men and could never expect to match the intellectual and cultural achievements of their male counterparts.⁶ Thus, science could be made to devalue women's ability to produce quality work in these areas. At the same time, the move to the professionalization of science led to bifurcations in science practices and increasingly pushed women to the periphery, granting them a supporting role but rarely enabling them to become forerunners in their field.

Nonetheless, as Ann B. Shteir has shown, nineteenth-century women were an important part of the broader map of Victorian science, operating as readers, writers, investigators and helpmeets.⁷ It would seem that despite the institutional and cultural changes that sought to resist women's participation in scientific disciplines, women continued to produce work, albeit textually and discursively restricted. What is of particular interest here is how Ward negotiates such gender constraints in order to contribute to scientific knowledge; in fact, in many ways, science is the means through which Ward is able to resist the role of the archetypal Victorian female. At the same time, this close textual analysis will illustrate how, for Ward, science also confirmed certain preconceived ideas about the world in which she lived. By considering the formal, discursive and visual negotiations of Ward's science writing, it will be argued that while she cautiously disrupts gender discourses, she leaves other narratives, such as religion, firmly intact.

Although Ward has been largely overlooked by literary scholars, in recent years she has received some recognition from historians of science. For example, Owen Harry's invaluable recuperative work has demonstrated how Ward's family background played a major part in awakening and encouraging her interest in science.⁸ She was born on 24 April 1827 to Revd Henry King and his wife Harriett, who was sister to Alice, the mother of William the third earl of Rosse, a relative who was to have a profound impact on Ward's life and career. The family home was a spacious mansion called Ballylin in Co. Offaly; it was the hub of a large estate close to and incorporating the town of Ferbane. While residing in the parental home, Ward's upper-middle-class background ensured that she had sufficient leisure time to investigate the natural world around her; and although she was typically restricted in terms of her education and her mobility, her parents encouraged her early interest in science. The fact that her father inscribed for her a copy of Buffon's *Natural history*,

5 Richards, 'Redrawing the boundaries', p. 119. 6 Ibid., p. 120. 7 A.B. Shteir, 'Elegant recreations? Configuring science writing for women' in Lightman, *Victorian science in context*, p. 236. 8 Ward's biographical information is largely drawn from Owen Harry's invaluable article, 'The Hon. Mrs Ward (1827–1869): a wife, mother, microscopist and astronomer in Ireland, 1854–1869' in J. Nudds, N. McMillan, D. Weaire, S. McKenna-Lawlor (eds) *Science in Ireland, 1800–1930: tradition and reform* (Dublin, 1988).

a present on her seventh birthday, perhaps indicates the level of her curiosity.⁹ Throughout her childhood, she plundered whatever books, newspapers and periodicals she could lay her hands on in the vast library at Ballylin. Gradually, she began to assemble her own collection of books about astronomy, the microscope, entomology and zoology.¹⁰ But, perhaps even more influential than her reading habits was her social circle. As noted above, her cousin was William Parsons (1800–67), the third earl of Rosse and the inventor of the famous 58ft Leviathan Telescope, an instrument that was to remain the world's largest telescope for over fifty years. Living nearby, Ward was a regular visitor to Birr Castle, where her cousin lived, and he involved her closely in the consultations leading up to the completion of his instrument. In fact, between 1840 and 1845, Ward chronicled the building of the Leviathan and she was among the first to mount its gantries and galleries to view a world unavailable to the naked eye, evidence of which can be found in the photographs taken by William's wife Mary.¹¹ Clearly her cousin had a profound impact on Ward by inspiring and encouraging her interest in astronomy, a fact she acknowledges in her dedication to him in *Telescope teachings* (1859).¹²

It was also through William that Mary Ward and her sisters had the opportunity to meet many of the most celebrated men of science at this time, including Sir James South (1785–1867), Sir William Rowan Hamilton (1805–65) and Sir David Brewster (1781–1868), for whom Ward illustrated several books and articles and who assisted her search for scientific papers and specimens.¹³ Brewster in particular was impressed by Mary's keen powers of observation and her ability to record natural objects in an accurate and artistic manner. As a result, the illustrations of Newton's telescope and both aspects of Lord Rosse's telescope in Brewster's *Memoirs of the life, writings and discoveries of Sir Isaac Newton* (1855) were produced by Ward.¹⁴

In 1854, at the age of 27, Mary married Henry William Crosbie Ward (1828–1911) of Castle Ward, Northern Ireland. This was a union which provoked a rather telling comment from Henry's mother, Lady Bangor, who wrote in a letter to a friend that her new daughter-in-law was 'A most *independent* young woman, but very pleasant'.¹⁵ Henry Ward had served in the Crimea but resigned his commission in 1855 and had no regular employment thereafter; this brought great domestic and financial difficulty during the period when their family was growing – Mary conceived eleven times between 1855 and 1867, giving birth to eight live infants. Amazingly, during this period of childbirth and childrearing, Ward managed to study and to write, perhaps out of necessity. Her initial public effort was a home-printed article entitled 'A windfall of the microscope' (1856), which was a careful, detailed description of her investigation of caddis flies. Prefiguring her later texts, the article

⁹ S. McKenna-Lawlor, *Whatever shines should be observed* (Dordrecht, 2003), p. 21. ¹⁰ For a full list of titles, please refer to Harry 'The Hon. Mrs Ward', p. 190. ¹¹ D.H. Davison, *Impressions of an Irish countess: the photographs of Mary, Countess of Rosse, 1813–1885* (Birr, 1989). ¹² M. Ward, *Telescope teaching* (London, 1859), p. iii. ¹³ Harry, 'The Hon. Mrs Ward', p. 187. ¹⁴ D. Brewster, *Memoirs of the life, writings and discoveries of Sir Isaac Newton* (Edinburgh, 1855). ¹⁵ Harry, 'The Hon. Mrs Ward', p. 191.

was lively, enthusiastically told and nicely illustrated.¹⁶ Her first book was published in 1857 when she commissioned Shields, the local printer and stationer in Parsonstown to reproduce a collection of short letters which had been written to a friend some years earlier. The letters examined the structure of common objects suitable for scrutiny under the microscope.¹⁷ Ward had completed drawings to exemplify her instruction and she lithographed the plates before arranging them to be hand-coloured by a Dublin engraver. The plates and the text were then bound together into *Sketches with the microscope*, which she sold by private subscription. It was a great success. By the end of the year, she had sold all the copies and had a waiting list for the reprint. The book was eventually taken to London by a relative and shown to the publisher Groombridge and Sons, who published it under the name *A world of wonders revealed by the microscope*. It went through a number of print-runs between 1858 and 1864, when it was extensively revised and expanded into *Microscope teachings*, the companion volume to *Telescope teachings*, which Ward had produced in 1859. These books are probably her best-known scientific writings. With their combination of easy style and attractive illustrations they quickly became established as popular and accessible studies of microscopic and telescopic objects.

From 1859 to 1869, Ward wrote on a number of subjects: toads in Ireland; hummingbird moths; insect development; and astronomy. Consequently, she became well-respected for her scientific work. This is evident from the fact that Sir William Rowan Hamilton requested the Royal Astronomical Society to include her on its list of eminent people and institutions entitled to receive its monthly notices.¹⁸ Ward was one of only three women to achieve this honour, holding rather esteemed company with Queen Victoria (1819–1901) and Mrs Mary Somerville (1780–1872). In a further groundbreaking move, she was allowed entry to Greenwich Observatory, despite their strict rule against women. Taken together, these accolades clearly signal the esteem in which her work was held by her contemporaries.

Despite such apparent respect from individual male scientists and the fact that the growth of popular scientific culture during the eighteenth century had shaped an audience of women and children who participated in home-based scientific education and experiments, nineteenth-century women such as Ward generally found it difficult to engage in the increasingly professionalized world of science. For many scientific professionals, such as Huxley, women were ipso facto amateurs, clearly out of place in a masculine arena where their very presence seemed to threaten the mid-century establishment of Darwinian expertise and status.¹⁹ Accordingly, they were excluded from learned societies and formal education. In a series of knock-on effects from such beliefs and practices, women's lack of formal education in certain areas was cited as a reason for refusing to accept their entrance into professional circles, and yet

¹⁶ M. and T. Creese, *Ladies in the laboratory 2: western women in science, 1800–1900* (Oxford, 2004), p. 41. ¹⁷ Harry, 'The Hon. Mrs Ward', p. 194. ¹⁸ He also helped Mary obtain particulars of the most recent developments in science in books and articles to which it was difficult for her to gain access. See Harry, 'The Hon. Mrs Ward', pp 194–5. ¹⁹ Richards, 'Redrawing the boundaries', p. 126.

they found it extremely difficult to gain access to those learned institutions that would provide the necessary preparation for admittance to these professional institutions and societies. On the whole, Ward's experience was no different: she had not received any recognized training, but she was fortunate to have parents who nurtured her early interest in natural history. As Owen Harry outlines, in 1845 when Sir James South was visiting the house, he observed her making drawings of small objects seen through a single lens magnifying glass and noted her ability; he suggested to her parents that she should be provided with a quality microscope capable of higher magnification and better resolution. An instrument by Andrew Ross, one of the best then available in London, was ordered immediately;²⁰ her debt to this piece of equipment is exemplified by the prominence it is afforded as the frontispiece of all the editions of her microscope books.

Furthermore, despite Ward's exclusion from libraries and laboratories, through her cousin she was fortunate to be brought into an intellectual community where she could participate and engage in scholarly debates and discussions with leading scientists of the time. Nonetheless, the gender bias of Victorian culture meant that not everyone was readily convinced of her scientific ardour; she wrote:

It was easy to ask Professor Owen about the deer in Richmond Park and on that lead to tell him how exceedingly common red deer's remains are in the beds of Irish rivers, and moreover, how I had myself scraped together a good number of bones of one of them; on which he began to think I was not merely pretending to care for natural history.²¹

It seems that in order to distinguish themselves from numerous female counterparts who enjoyed the natural sciences as a middle-class past-time, those women scientists fortunate enough to encounter experts in their field had to prove the seriousness of their interest. In addition, they had to be careful not to step on any intellectual toes, finding it hard to voice dissent or disagreement, particularly with the scientific heavyweights of the Victorian period. Such difficulties are exemplified in a scrapbook of Brewster's articles that Ward compiled. She includes his address to the Edinburgh Philosophical Society on 11 November 1851 that attempts to reconcile fundamental Christian beliefs with the new theories and discoveries of science, especially astronomy. He relates new ideas about the formation of asteroids between Mars and Jupiter. On an additional scrap of paper, Ward has written: 'The above is not to be depended on, as it is not in my power to *give my authority*. But it is what I should say were I asked'.²² But, of course, generally women were not asked.

For many women who wished to pursue a career in science, it was necessary to find a niche, a way to produce scientific knowledge without really appearing to do so. For Ward, this meant positioning herself as an adjunct to male writing on science, as she does in this letter to *The Irish Times*:

²⁰ Harry, 'The Hon. Mrs Ward', p. 192. ²¹ *Ibid.* ²² *Ibid.*, p. 193.

Sir,—As I happen to have obtained a good view of the meteors this morning from 12am till their subsidence at 3.30am, I beg to send you an account of what I saw, thinking it may supplement the far more precise and scientific reports which are likely to appear in your columns.²³

As this letter exemplifies, like many other women of the time, Ward exercises a textual sleight of hand that self-effacingly sets her up as a necessary mediator. She continually positions herself as someone who can move between the worlds of professional masculine science and more plebeian neophyte explanations of the natural world and 'heavenly bodies'.²⁴ It is by assuming this conciliatory role that Ward leaves the myth of masculine authority intact while simultaneously dismantling the notion of separate intellectual spheres. In this way, women scientists took care to differentiate themselves from the masculinized persona of the knowledge-giver; this determined that their publications were, ostensibly at least, aimed at a readership derived from the broader public rather than from scientific circles as Barbara Gates has previously explored.²⁵ In Ward's writing, this intention is iterated by the fact that she dedicates and directs her texts to younger readers and other amateurs, often specifically cited as women, such as her mother and her friend Emily.

During the early and mid-Victorian years, science writing directed explicitly to women and children was a particularly productive labour, as it found a place on the lists of many publishers.²⁶ At this time, the audience for educational books was expanding quickly and affordable instruments were available, making microscopy and astronomy fashionable hobbies,²⁷ a fact that Ward herself notes.²⁸ Considering the financial difficulties faced by her family, it is not surprising that Ward wished to avail of the popularity of texts written for so-called amateurs; in this way, she markets her texts by setting up a particularly gentle form of pedagogy, as seen in *Entomology in sport*:

The following pages are intended, not so much for the scientific, as for the young or the comparatively uninstructed reader. The authors have therefore aimed at making them entertaining, rather than complete or systematic; an agreeable bait, in short, by means of which unwary youth may find themselves caught in the meshes of science, while seeking only for amusement.²⁹

In this text, Ward assumes a rather maternal role, acting as a gentle guide who will lead others through the elementary stages of scientific learning; this can be read as a quasi-feminist move that seeks to democratize science by making it available to other

²³ M. Ward, correspondence to the *Irish Times*. Clipping in Ward's scrapbook held in Castle Ward. Dated 15 Nov. 1866. ²⁴ Ward, *Telescope teachings*, p. v. ²⁵ B. Gates, *Kindred nature: Victorian and Edwardian women embrace the living world* (Chicago, 1998). ²⁶ Shteir, 'Elegant recreations', p. 244. ²⁷ Creese, *Ladies in the laboratory* 2, p. 41. ²⁸ Ward, *Microscope teachings*, p. vii. ²⁹ M. Ward, 'Preface' in *Entomology in sport; and entomology in earnest* (London, 1859).

women similarly excluded from gaining access to such information. At the same time, such sidestepping also suggests a discursive negotiation that deliberately disguises any aspirations of professionalism or expertise and denies the disruption of separate intellectual spheres. Accordingly, academic science is largely absent from the first half of *Entomology in sport*, which is written in rhyming couplets and decorated with playful illustrations of anthropomorphized insects. However, the amateur approach is somewhat reconstituted in the second part of the text, entitled *Entomology in earnest*. Although this section is written as a friendly dialogue between the two characters, Sylvius and Eugenius, it is full of detailed information and helpful hints for studying entomology.

Graeme Gooday argues that, by the mid-century, conversational structures in science writing had largely disappeared.³⁰ Stylistically, the use of dialogue had been common practice in narratives of science, particularly within those texts that incorporated some degree of natural theology or were introductory works of informal education, such as those by Jane Marcet.³¹ Furthermore, moral and spiritual topics were typically given authority through writing that conventionally took the form of educational conversations or letters. But, by the mid-century, this formal strategy was considered old-fashioned and feminine;³² therefore it is significant that Ward, whose avid reading of science writing would certainly suggest an awareness of textual development, chooses to present her information in such an anachronistic manner. Thus, this structure can be seen to act as a buffer for the level of scientific knowledge contained within, a stylistic move also adopted in *Sketches with the microscope*.

In the first edition of Ward's best-selling text about microscopy, personal ambition is deflected as a motive for her scientific writing; she claims that she writes because of the desires of others, specifically a female other:

My dear Emily,
You have expressed a wish to receive tidings from the world of wonders which surround us, and which is revealed only by the microscope.³³

However, by 1859, Ward has eschewed the epistolary structure, a literary format that was used by women writing in various masculinized genres in order to create a distance from the more academic and authoritative tones assumed by their male counterparts. Thus, while *Microscope teachings* and *Telescope teachings* are clearly marketed to an amateur readership, Ward seems to have established herself sufficiently to no longer need to couch her work in the same way. At the same time, it remains necessary for her to stress the accuracy of her information by invoking the male

³⁰ G. Gooday, 'Instrumentation and interpretation: managing and representing the working environments of Victorian experimental science' in A.B. Shteir and B. Lightman (eds), *Figuring it out* (London, 2006), p. 249. ³¹ A. Shteir, 'Articulating the mimosa' in A. Fyfe and B. Lightman (eds), *Science in the marketplace* (London, 2007), p. 172. ³² Shteir, 'Elegant Recreations', p. 247. ³³ M. Ward, *Sketches with the microscope* (Parsonstown, Co. Offaly, 1857), p. 1.

authorities in the various disciplines she refers to, such as Paley (1743–1805), Linnaeus (1707–78), Kirby (1759–1850), Spence (1783–1860) and Herschel (1738–1822), and by asserting that her knowledge is received through keen observational skills, a fact she proves through her use of accurate illustration.

In Ward's texts, alongside the light-hearted characters that appear as frontispieces and the various colourful distractions, there are a number of highly precise drawings, a feature of her work that Lightman and Shteir have noted the importance of:

At a time when T.H. Huxley and his allies were trying to force women out of scientific societies, it was of paramount importance for women engaged in writing popular science, like Ward, who worked to construct the narrative of natural history, to present in their works visual images that bolstered their authority as interpreters of nature.³⁴

By supporting her texts with visual representations, Ward could demonstrate clearly the power and acuity of her observations. And yet, simultaneously, illustration was seen as a definitely feminine activity. Many female would-be scientists had to satisfy themselves with illustrating the works of their male counterparts rather than producing new knowledge themselves. As Lorraine Kooistra explores, the relationship between the visual and the written reflects the gender politics of the time: the visual (the feminine) being viewed as secondary to the written word (the masculine) for most of the nineteenth century.³⁵ In this way, Ward's accompanying illustrations can be seen to feminize texts that were verging on a masculinized epistemological approach. At the same time, the illustrations can be seen to authorize Ward's populist texts. It seems that in her work, Ward strives to strike a balance between the two modes of expression: professional and populist. Thus, her illustrations are meant to delight as well as instruct, to have aesthetic as well as pedagogical purposes.³⁶ It is this dual motive that we see most apparently at work in *Entomology in sport* and its companion piece *Entomology in earnest*. Taken together, there is an equilibrium achieved between the light-hearted introduction to the insect world and the more advanced consideration of life beneath a lens. Even Ward's choice of scientific disciplines reflects the symbiosis she is striving to achieve in her work. Ultimately, the microscope and the telescope enabled Ward to undertake scientific activities within the domestic setting, which meant they could be made to fit around her female duties of wife and mother. At the same time, it was precisely these activities that propelled her beyond the role of the angel of the house. In a sense, the new technology offered, in more ways than one, a world beyond that which was immediately available to a middle-class nineteenth-century woman.

³⁴ A.B. Shteir and B. Lightman, *Figuring it out: science, gender and visual culture* (London, 2006), p. 232. ³⁵ L. Kooistra, *The artist as critic: bitextuality in fin-de-siècle illustrated books* (Aldershot, 1995). ³⁶ B. Gates, 'Those who drew and those who wrote' in Shteir and Lightman, *Figuring it out*, p. 192.

As Kate Flint has argued, the Victorians wanted to make the world visible, to make things available to the eye and ready for interpretation, and this inclination can be linked to the rise in ophthalmic inventions.³⁷ Technological innovations enabled and encouraged many budding scientists to look at things from different perspectives and to see the apparent truths of the natural world. Ward writes: 'The most important thing in managing a microscope is to place the object in the clearest light, or else we cannot find out the truth about them'.³⁸ Lightman explains that the Victorians were driven by a quest for clarity in an effort to escape vagueness and inaccuracy, and that they were fascinated by new worlds.³⁹ Certainly, Ward seems to see the ophthalmic equipment as a means of fulfilling this pursuit for transparency and discovery:

With a suitable instrument, and a little leisure time at command, how happily is the observer brought face to face with the minuter parts of God's creation, and how easy it seems at once to enjoy and to learn. It is like visiting a rich, but hitherto undiscovered region – like opening a page, hitherto unread, or a treasured volume.⁴⁰

By breaking up domestic routine and offering greater visibility, the instruments appeared to open up a new world. But, what Ward ultimately revealed about the world was largely a confirmation of her preconceived value-system, particularly in relation to religion:

We are enabled, with the microscope –
To trace in Nature's most minute design
The signature and stamp of power divine.⁴¹

For many during the Victorian period, science did not so much explain away the mysteries of the earth as reinforce the very idea that there was so much more to life than what met the eye, thereby providing evidence of God's work. Undoubtedly, in Ward's writing there is a fundamentally Christian attitude. However, it is pertinent to question the extent to which religion is employed as yet another discursive negotiation. This is not to suggest that Ward was not religious, her family background would dispute that, but it could be argued that in her more informative texts, she may have felt the need to stress her religiosity in order to counter the epistemological.

For many women encroaching onto the masculine world of scientific writing, a religious explanation for the world's natural sciences was often asserted, even after the Darwinian watershed, because for them it provided an acceptable motive for their

³⁷ K. Flint, *The Victorians and the visual imagination* (Cambridge, 2000), p. 8. ³⁸ Ward, *Sketches with the microscope*, p. 9. ³⁹ B. Lightman, 'Introduction' in B. Lightman (ed.), *Victorian science in context* (Chicago, 1997), pp 1–2. ⁴⁰ Ward, *Microscope teaching*, p. ix. ⁴¹ Ward, *Sketches with the microscope*, p. 8.

interest in scientific knowledge. At this time, middle- and upper-class women were largely regarded as the moral and religious centres of their society; therefore, it was generally perceived that they were the providers of the Christian well-being of those within their homes and communities, whereas their male counterparts were seen to provide the intellectual, economic and political ideals. By citing religion as the motivating force behind their scientific interest, they remained within the demarcated gendered spheres; they placed themselves beyond criticisms of personal and intellectual ambition. For example, Margaret Gatty's work on seaweed is contextualized and authorized by claiming that an educational and evangelizing Christianity motivates her publications. She situates her scientific work within the context of teaching about God's wonders and encourages other mothers to pass this same message along to their children. Gatty further reinforces her familial concerns by asserting that the publication of her work is necessary for the financial welfare of her own family. Through these discursive constructs, Gatty evokes the image of a mother of nature, extending her normalized role of domestic carer to the natural world. Therefore, by negotiating the representation of scientific knowledge, it could remain a comfortably 'feminine' topic. However, this led to some peculiar configurations: Mrs E. Perkins actually went to the extent of censoring the botanical classification system because it referred to the reproductive organs of plants, which was simply inappropriate for her female readers. Perkins' text is dedicated to the newly crowned Queen Victoria, and in her effort to comply with the ideals of the middle-class virginal Madonna emblemized by the young queen, she excises those references that she believes are 'peculiarly unsuited for the perusal of female youth'.⁴² Like Perkins, numerous Victorian women writers melded scientific information and religious conviction, writing with an eye to shaping the values of their chosen audiences. But not all women wrote with an evangelical mission. Because discussions of moral and spiritual topics were an acceptable mode of expertise, other female authors, such as Ward, adopted a religious tone as a way to balance more academic information rather than necessarily as a means of spiritual persuasion.

Therefore, it can be argued that Ward's Christian doctrine works in the same way as her art: both allow her to push at the gender constraints enforced by nineteenth-century culture and society and to engage in the increasingly exclusive world of science. Thus, although the main texts of *Microscope teaching* and *Telescope teaching* are largely devoid of natural theology, there are occasional gestures toward a spiritual approach to science, most notably in the Prefaces, which end with a definite acknowledgment of God's role in science and nature. Significantly, in the latter, Ward closes her introduction by quoting from Herschel's *Treatise on astronomy*, which is followed by Psalm cxlvii, 3, 4: 'He healeth the broken in heart, and bindeth up their wounds. He telleth the number of the stars; he calleth them ALL by their names'.⁴³

⁴² Mrs E.S. Perkins, *The elements of botany, with illustrations* (London, 1837), p. xxi. ⁴³ Ward, *Telescope teachings*, p. vii.

In this way, her text is astutely bolstered by the authority of the Bible and a male scientist.

Nonetheless, it would seem that for Ward, religion is more than merely a textual negotiation. For her, science and religion are totally compatible and complementary. While in some instances her Christian beliefs may be employed to couch certain modes of representation, religion, like science, seemed to open up another way of seeing. In both cases, the lesson to be learned is that there is so much more than what meets the eye, that 'we must not judge by outward appearance'.⁴⁴ Thus, Ward comes to the conclusion that 'certainly no entomologist can be an atheist'.⁴⁵

Under the guise of correcting the problems of the naked eye and the limitations of what it saw, Ward used the microscope and the telescope. Yet, as we have seen, even with this technological aid the gaze is never innocent; it is always imbued with the cultural, political and subjective persuasions of the viewer.⁴⁶ For Ward, the new optical inventions of the nineteenth century may have enabled her to penetrate further into the very heart of life itself, confirming her religious convictions, but they also worked to counter the cultural myopia that saw women as intellectually inferior. However, although new technology enabled Ward to push at the boundaries of her nineteenth-century life, it was unfortunately also to be the cause of her death.

In the summer of 1869, she and Henry went on an ill-fated trip to Birr Castle to visit the widowed Lady Rosse and her sons. On 31 August she went with Henry to visit the tomb in the grounds of the old churchyard to pay her last respects. That afternoon, she went with Henry and Clare and Charles Parsons on a steam road locomotive designed and built by Lord Rosse. When turning a sharp corner she was thrown from her seat and killed, giving her the dubious honour of being the first person to be killed in a car accident. To mark the 150th anniversary of her death, in 2009 the Birr Estate mounted a commemorative plaque. While it is certainly appropriate to acknowledge the death of this pioneering woman, we must take care not to forget how she lived. She may have been unable to move beyond her personal religious beliefs, but she certainly pushed at the boundaries of gender constraints through textual, visual and discursive negotiations that produced interesting, enlightening and inspiring texts for many budding female science writers.

⁴⁴ Ward, *Entomology in earnest*, p. 38. ⁴⁵ *Ibid.*, p. 42. ⁴⁶ D. Spurr, *The rhetoric of empire* (London, 1993).