

# CATALYSTS, COMPILERS AND EXPOSITORS: RETHINKING WOMEN'S PIVOTAL CONTRIBUTIONS IN NINETEENTH-CENTURY 'PHYSICAL SCIENCES'

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Across its multicultural history the accepted exceptionalism of women in the rosters of science endeavour turns on an oft-repeated fact, the alleged coinage in 1833 by William Whewell (1794-1866) of the term 'scientist'. His portmanteau label for a status, authority and hence 'career' in the shaping of knowledge of the physical world then directly informs the increasing professionalization of the sciences since the 1830s. Their concomitantly exclusive, and exclusionary practices have thus sharpened the foci of women's history of science since the 1980s in its multifarious recuperation and recognition of the many unheralded women in science before and after '1833'. Work by Abir-Am and Outram (1989) and Creese and Creese (1998) has been pivotal to making visible the many 'uneasy careers' of hitherto unacknowledged 'ladies in the laboratory', as disclosed by the 'intimate lives' of the wives, daughters and sisters who were the illustrators, translators and amanuenses of (more famous male) scientists. Influential feminist methodologies and frameworks, such as by Fox Keller (1996) and Harding (2004), have also targeted the perennial gender(ing) of science and its publication, to spearhead more thorough investigation of archives and footnotes for the many occluded women who were highly active in fields such as geology (Burek and Higgs, 2007). These invaluable re-feminizing critical frameworks, however, overlook other models, outlets and trajectories for women's scientific work. More detrimentally, they may inadvertently perpetuate the paradigms for 'the scientist' that collocate with the established professional 'pipeline' model for science which so demonstrably affects the situation of women in STEM today.<sup>1</sup> A major woman scientist is thus belated ('the first

woman –ologist’), secondary (‘Crick *et al*’) or worse. Athenas, Hypatias and ‘Pandoras in breeches’ (Fara, 2004) are always potentially ‘hybrid’ and ‘leaky’, whether as impostor-monsters and/or as ‘#DistractinglySexy’ (Morrison, 2019).

Such caricatures and stereotypes for aberrant (read exceptional) women in science are also revelatory as counter faces of the ‘archetypes’ (Golinski, 1999) and paradigms of science, and hence its paradigm shifts (Kuhn, 2012).<sup>2</sup> The object of this chapter is therefore to question the ‘scientist’ paradigm and its professional ‘pipeline’ model as the authoritative norm for evaluating, and *evacuating* women’s (major, important, significant) contributions to science. Our starting point is a close re-examination of William Whewell’s much-cited review essay of 1834, ‘On the Connexion of the Physical Sciences’ to inform our main argument: women’s history of science has much to gain from renewed critical scrutiny of the published ‘standpoint’ theories (Harding, 2004) by key *men* of science in a given pivotal period of its development, especially when produced in direct response to *a major woman* in their field. If *her* situation, optics and contributions benchmark the assumed parameters for best science practice of the day, they will also demonstrate *her* negotiation of the major models, outlets and trajectories that are available for women’s scientific work. If this can be explained neither by her ‘intimate life’ with men in her science(s), nor by the gendering of her science, the proven viability, and sustainability of her models will then emerge. To test such an approach, our chapter examines the publication of science in English by women active at the time of Whewell, but not engaged primarily in botany – the ‘feminine’ science in the tradition of Rousseau – and by women as seemingly different in background, ‘career’ and ‘intimate’ scientific circumstances as Mary Somerville (1780-1872), Maria Graham (1785-1842), Charlotte Murchison (1788-1869), Sarah Bowdich (1791-1856), Margaret Gatty (1809-1873) and Athénaïs Michelet (1826-1899). If such women together prove

too many exceptions to the new rules for ‘the scientist’, they reveal other stakes for the ‘professionalizing’ of science from the 1830s, including its major resetting of national science agendas and official historiography.

*Whewell Revisited: A Riposte that doth Protest too Much?*

The complete title of the anonymous (Whewell’s) Article III in the *Quarterly Review* in 1834 is ‘*On the Connexion of the Physical Sciences. By Mary Somerville.*’ Holmes (2014) highlights the unrivalled ‘bestseller’ importance of her work, and its influence on major contemporary ‘scientists’ such as Herschel, Babbage and Lyell in Britain, and Arago, Biot, Guy Lussac and others in France. What has not been adduced more crucially from these striking qualities is that Somerville’s published work of disseminating, clarifying and hence contributing to the latest (French) sciences in 1834 challenges not only Whewell’s expertise in her fields in which he has *not yet* published. It also directly challenges his many preconceptions and premises about the who and how of scientific expertise itself, because these are integral to her own clear objectives as Whewell reports:

In her simple and brief dedication to the Queen, she says, ‘If I have succeeded in my endeavour to make the laws by which the material world is governed, more familiar to my fellow countrywomen, I shall have the gratification of thinking that the gracious permission to dedicate my work to your Majesty has not been misplaced.’ And if her ‘countrywomen’ have already become tolerably familiar with the technical terms which the history of progress of human speculations necessarily contains [...] if they have advanced so far in philosophy, they will certainly receive with gratitude Mrs. Somerville’s able and *masterly* (if she will excuse this word) exposition of the present state of the leading branches of the physical sciences. For our own parts, however, we beg leave to enter a protest, in the name of that sex to which all critics (so far as we have ever heard) belong, against the appropriation of this volume to the sole use of the author’s *countrywomen*. We believe that there are few individuals of that gender which plumes itself upon the exclusive possession of exact science, who may not learn much that is both novel and curious in the recent progress of physics from this little volume. (pp. 55–56, emphasis in the original)

In exemplary form in her dedication, Somerville adroitly uses what feminist literary criticism (Poovey, 1984; Eger et al, 2001) calls the ‘modesty topos’, the rhetorical ploy of women authors of Somerville’s period precisely to allay fears and maintain a pretence: here is no ‘unfeminine’ or worse, ‘bluestocking’, interloper into the territories in Whewell’s words of ‘that gender that *plumes itself* upon the exclusive possession of exact science’ (my emphasis). By thus averring the shocking truth that science in fact has no sex, Whewell must at the same time circumscribe and equal out Somerville’s superior intellectual prowess. With pseudo-chivalry that returns her *work* to its place, he can then underscore and promote his expertise in a championing royal ‘we’ – ‘we beg leave to enter a protest’ – that must acknowledge a ‘*masterly* exposition’ (with mixed comfortableness in his bracket), to then settle the account: ‘this little volume’. Such a diminutive, the belittling qualification, thus gives Whewell leave himself in the next main part of his essay to *appropriate* Somerville’s main point of ‘this volume’ as in fact his own, because she had set out in her dedication ‘to make the laws by which the material world is governed, more familiar to [her] fellow countrywomen.’ His point scoring is then to take her keyword, ‘Connexion’, and translate it into his term, ‘unity’:

[...] we must recollect that her professed object is to illustrate ‘The *Connexion* of the Physical Sciences.’ This is a noble object; and to succeed in it would be to render a most important service to science. The tendency of the sciences has long been an increasing proclivity to separation and dismemberment. Formerly, the ‘learned’ embraced in their wide grasp all the branches of the tree of knowledge; the Scaligers and Vossiuses of former days were mathematicians as well as philologers, physical as well as antiquarian speculators. But these days are past; [...] If a [...] poet, like Goethe, wanders into the fields of experimental science, he is received with contradiction and contempt; and, in truth, he generally makes his incursion with small advantage, for the separation of sympathies and intellectual habits has ended in a destruction, on each side, of that mental discipline that leads to success in the other province. But the disintegration goes on, like that of a great empire falling to pieces; physical science itself is endlessly subdivided, and the subdivisions insulated. We adopt the maxim, ‘one science only can one genius fit.’ [...] between the mathematician and the chemist is to be interpolated a ‘*physicien*’

(we have no English name for *him*), who studies heat, moisture and the like. And thus science, even mere physical science, loses all traces of unity. (pp. 58–59, emphasis in the original)

For Whewell, Somerville's '*Connexion*' 'nobly' counters the prevailing 'disintegration' and specialisation of expertise that requires the necessary interpolation that is contemporary physics. Yet in being a throwback to (the best of) 'former days', Somerville's work cannot also now cast its author as the leading contemporary '*physicien*' ('*physicienne*'). Too terrible to contemplate for Whewell is the potential equation by analogy to 'physician' of a pioneering British 'doctress' of physical sciences. Because so ardently an advocate of 'unity' himself Whewell then casts his maxim, 'one science only can one genius fit,' as appropriation *for the present* of a Somerville model in the past, to out-manoeuvre himself into the space of that '*him*' (the English '*physicien*') that is also 'genius'.<sup>3</sup>

Whewell's impasse pivots on equivalence masked as the lack of equivalents, whether established English traditions or specific terms for modern scientific practice. Establishment figures elsewhere, such as the '*physicien*' in France, usefully confer gender (m.), class (level of education) and cultured identity (French), yet grammar and known circumstance in France also permit the 're-gendering' and hence re-appropriation of physics by women such as Somerville. In her publication she is demonstrably adept in the physical sciences (pl.) as well as their multiple *applied* re-translation in English. The lack of English term for serious students of science thus represents a troubling vulnerability to the twofold threat that is 'Mary Somerville', as the ensuing argument from 'unity' framing Whewell's famous coinage makes very clear:

A curious illustration [...] may be observed in the want of any name by which we can designate the students of the knowledge of the material world collectively. We are informed that this difficulty was felt very oppressively by the members of the British Association for the Advancement of Science [...] in the last three summers.

There was no general term by which these gentlemen could describe themselves with reference to their pursuits. *Philosophers* was felt to be too wide and too lofty a term, and was very properly forbidden them by Mr. Coleridge, both in his capacity of philologist and metaphysician; *savans* was rather assuming, besides being French instead of English; some ingenious gentleman proposed that, by analogy with *artist*, they might form *scientist*, and added that there could be no scruple in making free with this termination when we have such words as *sciolist*, *economist*, and *atheist*—but this was not generally palatable; others attempted to translate the term by which the members of similar associations in Germany have described themselves, but it was not found easy to discover an English equivalent for *natur-forscher* [sic]. The process of examination which it implies might suggest such undignified compounds as *nature-poker*, or *nature-peeper* for the *naturae curiosi*; but these were indignantly rejected. [...] It is one object, we believe, of the British Association to remedy these inconveniences by bringing together the cultivation of different departments. To remove the evil in another way is one object of Mrs. Somerville's book. (pp. 59–60, italics in the original, underlining added)

The overwhelmingly 'oppressive' threat that 'Mrs Somerville' represents for Whewell's own praxis could not be more apparent here in his direct overwriting of the key terms in her quoted dedication – '[her] endeavour to make the laws by which the material world is governed, more familiar to my fellow countrywomen' – in *his* 'students of the knowledge of the material world collectively'. Whewell's 'students' thus include women in theory, because they are *already* present in practice. The incontrovertible proof is Somerville's prowess (despite girls' education normally barring them from learning mathematical and scientific subjects), and the sessions packed by women at the British Association for the Advancement of Science (BAAS) (Ellis, 2017). Indeed, the very 'laws by which the material world is governed' that Somerville displays to her 'countrywomen' alongside those of the physical sciences are of the male advantage and privilege prevailing in science by cultural precedent first and foremost. Such assumptions clearly determine Whewell's '*scientist*', both by analogy – with '*artist*' (Mr. Coleridge) – and by equivalence with '*Philosophers*', '*savans*' (m. sing. and pl. Fr.), 'ingenious gentleman', '*natur-forscher*' (m. sing. and pl. Ger.), and '*naturae curiosi*' (m. pl. Lat.). Whewell's 'anxiety of influence' (Bloom, 1973)

is clearly triggered here by perception of the greater prowess of French and German science practitioners and, because they are men, Somerville's (greater) 'mastery' over them through her taking forward of Linnean and former classical (Latin and Greek) 'gentlemanly' models in their new international European vernacular forms. Of modest rank Whewell had had no direct encounters in 1834 with 'cutting-edge' European science, *savants* and *Naturphilosophen* in the major institutes and academies of Paris or Berlin, unlike Somerville. Moreover, as the writer of the third Bridgewater Treatise in 1833, *Astronomy and General Physics considered with reference to Natural Theology*, Whewell also invents 'scientist' in opposition to its other opposites, 'sciolist, economist, and atheist'.<sup>4</sup>

Mary Somerville and her work are therefore a catalyst of most major significance for Whewell's essay of 1834 and its proposed term, 'scientist', on at least two counts. First, she already epitomizes how to do science, both to prevent its 'great empire falling to pieces' (the 'unity' question) and to reassert Anglophone pre-eminence in its future 'connexions'. Second, she already embodies the quintessential (modern European) 'scientist' that provokes Whewell's coinage for such as status as so necessary. The remainder of his essay is then a very stark lesson on why the term 'scientist' will remain so vexed for women practitioners if science has no sex and hence covers 'Somervilles' that are indistinguishable, if not superior, in quality from 'Scaligers and Vossiuses' (and 'Whewells'):

Our readers cannot have accompanied us so far without repeatedly feeling some admiration rising in their minds, that the work of which we have thus to speak is that of a woman. *There are various prevalent opinions* concerning the grace and fitness of the usual female attempts at proficiency in learning and science; [...] But there is this remarkable circumstance in the case,—that where we find a real and thorough acquaintance with comparative ease, and possessed with unobtrusive simplicity, *all our prejudices* against such female acquirements vanish. Indeed, there can hardly fail, in such cases, to be something peculiar in the kind, as well as the degree, of the intellectual character. Notwithstanding all the dreams of theorists,

*there is a sex in minds. One of the characteristics of the female intellect is a clearness of perception, as far as it goes: with them, action is the result of feeling; thought, of seeing; their practical emotions do not wait for instruction from speculation; their reasoning is undisturbed by the prospect of its practical consequences. [...] In men, on the other hand, practical instincts and theoretical views are perpetually disturbing and perplexing each other. Action must be conformable to rule; theory must be capable of application to action. The heart and the head are in perpetual negotiation, trying in vain to bring about a treaty of alliance, offensive and defensive. The end of this is [...] inextricable confusion—an endless seesaw of demand and evasion. [...] He learns to talk of matters of speculation without clear notions; [...] to deal in generalities; to guess at relations and bearings; to try to steer himself by antitheses and assumed maxims. Women never do this: what they understand, they understand clearly (pp. 64–65, emphasis added)*

The very ‘matters of speculation without clear notions’ in which Whewell indulges concerning intellect in ‘women’ and ‘men’ nicely illustrate his own ‘inextricable confusion’ (because a man?). Whewell has also steered himself here ‘by antitheses and assumed maxims’ about (male) minds and genius, to determine in the coining of ‘scientist’ the defining status for serious physical sciences. If the key sentence emphasized above ‘In men...’ were to begin ‘In “scientists”...’, their powers of rule and ‘theory [...] capable of application to action’ will indeed dictate the narrowed ‘pipeline’ model for future scientists (m) that acknowledges very rare inclusions of a Hypatia and Agnesi (p.66), or a Madame de Chastelet ‘translating and commenting on the “Principia” of Newton’ (ibid.), that is exemplars of ‘female intellect [as] a clearness of perception, as far as it goes.’ Whewell then avoids the defining name that reproves his new rule for the male ‘pipeline’ in science leaking out the occasional woman: ‘on the same subject, in our own time, the “Mécanique Céleste” of Laplace, has been [translated and commented] by a lady of our country’ (ibid.). He can name her only in his concluding remark thereby to include her with a qualification: this Mrs. Somerville ‘we are obliged to confess, is Scotch by her birth, though we are very happy to claim her as one of the brightest ornaments of England.’ (p. 68).

Whewell's famous essay therefore unstitches where it most wants to stitch up the term, 'scientist', for modern English gentlemanly science to which he aspires, to ensure that it connotes a distinct class and provenance for 'all students of the knowledge of the material world'. In the 'connexions' of his essay 'scientist' proves altogether charged to defend one defining gender from a present danger. This is the equality, if not superiority, of the many subject-defining women in the field as indicative of the future, and this despite their many educational disadvantages.

*'One of the characteristics of the female intellect is a clearness of perception' that goes far?*

By 1833 Mrs Somerville epitomizes the cluster, and hence visible critical mass, of women publishing prominent works of science in Britain in the 1820s and early 1830s. She is, moreover, often the influencer, support and encourager of scientific pursuit in other women, such as Charlotte Murchison (1788-1869) (Kölbl-Ebert, 1997a). If Darwin is still aboard the 'Beagle' (1831-1836), Maria Graham (1785-1842), one of Somerville's Scottish women friends, has returned from major expeditions to India (1812), Chile (1822) and Brazil (1824), albeit couched in the lesser disguise of a *Journal of a Residence in....* Graham's article of 1824 on the earthquake in Chile – the first to be published by a woman in the *Transactions of the Geological Society of London* (Thompson, 2012) – catalyses the particular ire of male insiders to geology such as her interlocutor, George Bellas Greenough (1778-1855), the founding President of the Geological Society of London. Despite the scientific evidence and findings of her work, his vituperative print responses to it demonstrate only his blatant, belittling sexism: what can a woman know? In her knowing perhaps too well resides the same 'Somerville' effect. Greenough was himself 'not an original researcher, but saw his scientific task as a diligent gatherer of information' and manifested a 'strong bias against the "Plutonists" or "Huttonians"' (Kölbl-Ebert, 2009). In similar vein, the cartoon by Henry T. De la Beche in 1832 of Charlotte Murchison 'The Light of Science dispelling the

Darkness which covered the World' – or is it in fact a Davy lamp, and in her other hand a miner's/geologist's hammer?<sup>5</sup> – underscores the perilous state of *husbands* in physical sciences of the time, such as Roderick Murchison, William Buckland and Humphrey Davy. Their reputations built directly on the *prior* scientific interests and expertise of their future wives, respectively Charlotte Hugonin (Kölbl-Ebert, 1997a) and Mary Morland (1797-1857) (Kölbl-Ebert, 1997b), or wealth and social position of Jane née Kerr, *olim* Lady Apreece, Lady Davy (1780-1855) (Golinsky, 1999). Having himself been asked for separation and divorce by his wife Letitia (née Whyte) in 1826, De la Beche was at work (1832-1835) on the first geological map of Devonshire over which he would soon lock horns – also via cartoons -- with *Roderick* Murchison in what became the 'Devonian Controversy' (Bate, 2010). The known visibility – even nascent female 'club' or 'society' – of such adept women in the coteries of the physical sciences in London social circles might well explain the 'oppressiveness' (Whewell, *supra*) they represented in 1834. Men in gentlemanly and mercantile classes were vying to make their scientific reputations in (manly) physical sciences. Women of such obvious merit in science as 'gatherers' of information and specimens like Greenough, and as 'masterly [...] exposit[ors] of the present state of the leading branches of the physical sciences' like Whewell could not be other than a threat to the self-fashioning of 'scientist' as an immaculately masculine profession, status and career ('pipeline'). The final words in Whewell's essay therefore reveal the ultimate defence. The brightest women in science are its 'ornaments'. Even the best feminist critics fall in with this flagrant pretence when they continue to assume the value of the man in the 'creative couple' (Pycior *et al*, 1996) as the more worthy because of his un-decorative contributions to the collective of science. The remainder of this essay will now uncouple such assumptions about serious ('pipeline') versus decorative ('sampler') science by examining indicative expert women catalysts, compilers and expositors in

the '1833' period working outside the 'pipeline' in two often intertwining categories. These are women who outlive the spousal scientist model literally – through writing science as pre-married women and as widows – or who do not espouse it because their own independent scientific interests and expertise are not those of the partner.

*Widows Shaping Science for the Future. Case Study 1: Sarah Bowdich (Lee), 1791-1856*

In 1833, and only a year after his death, the first biography in English was published of George Cuvier (1769-1832). The London and New York editions of *The Memoirs of Baron Cuvier* saw the French translation and publication of the *Mémoires du baron Georges Cuvier* in Paris the same year. Its author, however, was not a member of the Geological Society of London, or the recently established Société Géologique de France of 1830, but a 'Mrs R. Lee'/'Mistress Lee' (1833).<sup>6</sup> The inside title pages reveal more of her identity as 'formerly Mrs T. Ed. Bowdich'. Why would publishers such as Longman or Harper commit to this publication, and Fournier additional funds for the translation if this author was not an 'authority' despite being a woman? Yet given the array of qualified established national scientific figures (m. pl.) available to write it, including Cuvier's disciples, why and how is 'Mrs/Mistress Lee' better placed than they? After all, Cuvier was not only France's leading comparative anatomist and 'Father of Palaeontology' for more than two decades. He was also the celebrated official memoirist for deceased colleagues at the Paris Jardin des Plantes: his *Éloges* ran to several volumes and included encomiums to eminent foreign as well as French scientific figures. However, the bitter 'Querelle des Analogues' [Quarrel of the Analogues] of 1830 with his longstanding colleague, Étienne Geoffroy Saint-Hilaire, left hollow Cuvier's narrow victory in the debate (respectively 'transformisme' versus 'révolutions du globe'). It also left moot Cuvier's longer scientific reputations in 1832 for his 'Éloge' writer-successor.

Who better qualified to rise to the challenges of this crisis than the best outsider-insider in his sciences because a woman like Somerville with particular additional translation (and inter-relational) skills? The distant future will name this impossible double position the ‘glass cliff’ for women leaders who have also smashed the ‘glass ceilings’ in their field (Bruckmüller and Branscombe, 2010).<sup>7</sup> The penultimate paragraph of Mrs Lee’s Introduction sums up her particular authority in Cuvier’s science and further qualifications yet adherence to her ‘secondary’ positions in accordance with the modesty topos:

Mr. Bowdich had returned from his second, and I from my first, voyage to Africa, in the year 1818, and shortly after Mr. Bowdich proceeded to Paris, where his reputation as the successful African traveller, was already known. The letter of Dr. Leach was scarcely necessary with the Baron Cuvier, who received him with that warmth and encouragement which always marked his conduct towards men of talents younger than himself, that interest which he extended to all who were devoted to science. Struck with the facilities afforded for study in the French capital, Mr. Bowdich determined to remain there some time, in order to qualify himself for the principal object of his ambition, a second travel in Africa. We both accordingly went to Paris in 1819; and from that moment the vast library of the Baron Cuvier, his drawings, his collections, were open to our purposes. We became the intimates of the family, with whom, for nearly four years, we were in daily intercourse. We left France with their blessings; and on returning alone to Europe, I was received even as a daughter. My correspondence with M. Cuvier’s daughter-in-law, and other branches of the family, has been uninterrupted since that period; I have paid them repeated visits at their own house; and for fourteen years not a single shadow has passed over the warm affection which has characterised our intimacy. (MBC, 5)

It is only in careful reading of the *Memoirs* that the unprecedented record of a woman in Cuvier’s science emerges in parallel to her account of his ‘biography’ (her own term, MBC, 4) as witnessed in the slippage here from ‘Mr. Bowdich’, to ‘we’, to ‘my’, and finally to ‘our’ (between the Cuviers and Sarah alone). Sarah’s highly unusual positioning, rather than position, as a woman in science therefore derives from her work on West African Fish – Cuvier’s ‘notes’ on them appear in the 1826 French edition of the 1825 *Excursions in Madeira and Porto Santo* – and, when widowed,

from her onward close collaboration with Cuvier to provide materials, including drawings, for his new twenty-two volume *Histoire naturelle des poissons* [The Natural History of Fishes] (1828-48) (Orr, 2016). As the first major appraisal of Cuvier's long 'uneasy career' at the Jardin des Plantes/Muséum National d'Histoire naturelle, Mrs Lee's *Memoirs/Mémoires* appraise with the eye-witness authority as his 'disciple' his many scientific publications, his public roles in science and *his* 'intimate life' (Abir-Am and Outram, 1989) in science.

The pivotal crisis in science that Cuvier's death epitomizes in 1832 therefore clearly informs the future of French as well as of international science: his major work on the reclassification of vertebrates (including fossil), and especially fishes is the new standard for all major national scientific studies. Works appearing in the 1830s in Britain on British fauna are no exception, except that they uniformly fail, unlike Cuvier, to acknowledge groundbreaking work before them where this is clearly by a woman with the latest specialist training, such as Sarah Bowdich. One example makes the case and as further proof of the 'scientist' crisis, Leonard Jenyns's *Manual of British Vertebrate Animals* (1835). The archive edition of the online Oxford Dictionary of National Biography entry for 'Blomefield, Leonard, formerly Leonard Jenyns (1800-1893)' clarifies his credentials:

He was the first resident vicar at Swaffham Bulbeck, but [...] Cambridge was within an easy ride, and he was thus able to maintain an intimacy there with such of his contemporaries as shared his love of natural history. These [...] included such names as Henslow, Whewell, Darwin, Adam Sedgwick, Julius Hare, and Bishop Thirlwall. In 1834-5 (preface dated Swaffham Bulbeck, 24 Oct. 1835) he wrote his useful 'Manual of British Vertebrate Animals,' which was issued by the syndics of the Cambridge University Press. [...] Before he had completed it, at the earnest request of Charles Darwin, he undertook to edit the monograph on the 'Fishes' for the 'Zoology of the Voyage of H.M.S. Beagle,' published in 1840. The post of naturalist to the Beagle had first been offered to Henslow and then to Jenyns, but he hesitated to leave his parochial work, and joined Henslow in recommending Darwin for the place.

Jenyns comes to his expertise on Darwin's Fishes by way of his major recent 'gathering' work on British 'Pisces' (including sharks and rays) in the final section of his 1835 *Manual* (pp. 306–524). Its long justificatory introduction (v-xxii) pays particular attention to their regard in his scientific arrangement ('of the Fish is [...] similar to that in the *second edition* [that is 1817] of the "Regne Animal" [sic]', p. xvii), method and nomenclatures – 'The "Histoire Naturelle des Poissons" of [Cuvier] has been exclusively resorted to in the Class of Fish', p. xix – and practice underpinning his endeavour:

To Mr Yarrell in particular, he begs publically to return his sincere thanks for the able help which he has experienced at his hands, and such as alone has enabled him to complete the work upon the plan first contemplated. This help has been especially felt upon the subject of the British Fishes. Had it not been from the very liberal manner in which that gentleman offered him the almost unlimited use of his Manuscripts and rich collections, the author has no hesitation in saying that he could never have extended the Manual to that department, or presumed to enter upon a field, to which he was previously almost an entire stranger. (pp. xx–xxi)

For Fishes, therefore, Jenyns did not operate from first-hand observation in the field as a fisherman (unlike Yarrell), or *in situ* at the catch as was Sarah Bowdich's practice for her *The Fresh-Water Fishes of Great Britain* (1828-1838). In 1833 she was mid-way through their annual installments of four fishes *per* number, because she accompanied each description with her own exquisite watercolour drawing taken directly from the life. Jenyns's reliance on Yarrell (who publishes his two-volume *A History of British Fishes* in 1836) therefore directly contradicts or stretches the truth of his opening introductory remarks. There Jenyns underscores the necessity '[...] to take care that the descriptions should as far as possible be obtained from the animals themselves, and nothing inserted upon the credit of other writers which was capable of being verified by personal examination. *The day is for ever gone by in which mere compilations will be thought to be of any service to the science of Zoology.* (pp. v–vi, emphasis added). Jenyns in 1835 wants to distance his

work from close rivals such as the “History of British Animals” by Dr Fleming [...] completed in 1827 and published the year following, since which time period a great variety of species have been added to the Fauna of this county, more particularly in the Class of Fish’ (p. vi). Yet in this very gap, Jenyns’s introduction deliberately fails to mention Sarah Bowdich’s new work that already before his employs Cuvier’s new classification, despite recording her clearly in the ‘Alphabetical List of Works Quoted’ (p.xxv): ‘*Bowd. Brit. Fr. wat. Fish.*—Bowdich (Mrs. T. E.). The Fresh-water Fishes of Great Britain; drawn and described. Lond. 1828, &c. 4to. (*In course of publication.*)’. Jenyns uses the same wording in the bracket for ‘*Yarr.*’ (p. xxxii) since only volume one had appeared in 1835. More egregiously in his own description *compilations*, Jenyns then also deliberately forgets to include her descriptions of the (fresh-water) fish in question in what was clearly a detailed ‘personal examination’ of Bowdich’s publication. As *per* the Cuvierian model, he duly records ‘*Bowd. Brit. Fr. wat. Fish*’ in the list of previous authorities heading each of his descriptions, but refers only to the number of her illustration, ‘Draw. no.’, in every case with one notable exception for the ‘Grig Eel’ (pp. 477–478. See Appendix A<sup>8</sup>). Jenyns’s work had no accompanying illustrations, or woodcuts (as in Yarrell). Moreover, since Bowdich’s book had only a limited circulation of some fifty copies, Jenyns’s referral of his readers to her illustrations alone ensures that few will read and compare her text descriptions from the life that precede his own (and also Yarrell’s). Such manoeuvring to make himself of ‘service to the science of Zoology’ and later Darwin’s fishes constitutes the same move as Whewell’s ‘scientist’. Contributors trained in the latest science in France particularly if they are women, such as Somerville and Bowdich, brook no argument as rivals: they can only be ‘mere’ rather than ‘serious’ compilers whatever the evidence of their scientific work as demonstrably discipline-leading among scientific peers.

*Scientific Husbands, Fathers and their Cousins in Secondary Roles as 'Book-Keepers',  
Translators and Editors: Case Study 2—Margaret Gatty, 1809-1873*

For men in British science in the early 1830s the powerful 'Somerville' effect, caused by the prominence of genteel women at BAAS and the 'polymathic' work of women such as Bowdich from mercantile classes, can be explained by their accident in history. These women had come to science through the advantages of (self-)education, (self-)expression in print and circumstance in the transitional period of the late Enlightenment (including Napoleonic period) that also permitted men such as Whewell from outside leisured gentlemanly ranks to advance a scientific 'career'. In Britain, the unbroken lineage of 'clergyman science' across the creedal and class spectrum from a Joseph Priestley (1733-1804) to a Gilbert White (1720-1793) could include William Buckland (1784-1856), Leonard Jenyns, Richard Lowe (1802-1874), Hugh Millar (1802-1856) and William Whewell. For women born around the second decade of the nineteenth century, and therefore coming to their science after 1830 when they were also importantly of marriageable age, the 'Somerville' effect was in negative rebound for them. Theirs are the 'secondary' roles – as wives, daughters and sisters – in their engagements with science precisely because more men are vying for prominence in the physical sciences through its hotbed of competing debates and public 'controversies' including in print, for example the 'Cambrian-Silurian Dispute', augured in France by the 1830 'Querelle des Analogues' and epitomized later by Darwin. More to the point these scientific debating platforms mirror pulpits, courtrooms and hustings, to relegate women in science in all social classes from (exceptional) speaker to invariable listener. Enlightened 'clergyman' science in Britain more broadly conceived, however, provided important conduits for women's independent access to, and pursuits in, science. Mary Horner (Lyell) 1808-1873 benefitted immeasurably from her Scottish geologist father Leonard Horner's principled commitments to

factory reform and the education of women (starting with his six daughters). Margaret Scott (Gatty), 1809-1873, exemplifies more literally the double benefits of enlightened ‘clergyman’ science. The immense collections of books belonging to her father the Rev. Alexander J. Scott, Royal Navy Chaplain to Nelson, that were hers to explore, and then her clergy house upon marriage in 1839 to Alfred Gatty also filled with books, provided her lifelong needs for the home ‘laboratory’ that is her published work on British seaweeds. Somerville’s Scottish Enlightenment legacies of self-education and public self-expression in print deriving from the privileged company of family books and non-conformist parenting for girls therefore reset for the history of nineteenth-century science the importance of rethinking the *men* – principally enlightened fathers and husbands – who play key secondary support roles that enable women into post-1830 science.

The work that Margaret Scott brought to her marriage, and continued alongside her more well-known seaweeds research and publication of ‘parables’ for children, is therefore of primary interest here. *The Book of Sun-dials* (1872) was published the year before her death, to be reedited and enlarged in 1889 by her daughter, Horatia R. F. Eden, and Eleanor Lloyd, Margaret’s lifelong friend and correspondent ‘scientist’ in the project.<sup>9</sup> Margaret’s original dedication is so revolutionary in its upending of accepted gender conventions (for acknowledging wives) that it escapes notice:

TO THE DEAR HUSBAND  
TO WHOM I AM INDEBTED FOR THE BEST HAPPINESS OF  
THE HOURS OF EARTHLY LIFE,  
AND WITH WHOM I HOPE TO SHARE THE EXISTENCE  
IN WHICH  
TIME SHALL BE NO MORE,  
I DEDICATE THIS VOLUME,  
IN THE COMPILATION OF WHICH HE HAS TAKEN SO GREAT  
A PART AND INTEREST.

Margaret had started her work in 1835. Alfred's 'part and interest' is therefore as the secondary supporting participant for a project that is about privileging *women's* time and its making (long before Kristeva in 1981 corners the philosophical question of women's displacements from historical time) as much as it is about sun-dials. Their long and important history in astronomy and the development of scientific instrumentation coequally permit the successful navigation of land and sea and 'domestic' time at home. Moreover, as a work of horology – the art and science of time measurement – Margaret's collection is no 'mere compilation' (Jenyns). It accounts for the numerous time pieces across civilisations that helped regulate work and observance (religious, astronomical, social community). Because their association is with the 'decorative' (in form and use of mottos), sun-dials and Margaret's authority concerning them – 'as one of the brightest ornaments' (Whewell) – have been ignored in histories of scientific instrument-making and its assumed non-participations by women. Margaret's work about a women's time-piece collective – Eleanor's and Horatia's parts in her scientific time team – thus reconsiders 'scientific' time as rather more than mechanical (clocks), teleological (including evolutionary), and even eternal. It lies outside this essay, but Margaret Gatty's meticulous observational work on seaweeds and on sun-dials is co-extensive with her understandings of longer patterns in organic planetary time. Recent science is only catching up with the importance of seaweeds as important fixers of carbon (and sunlight) throughout geological time (Muraoka, 2004).

Margaret Gatty's scientific works on time and seaweeds supremely epitomize the importance of women catalysts, compilers and expositors for the futures of science. Her wealthy second half cousin, Charles Henry Gatty (1836-1903), clearly found her work on seaweeds very much more than an interest that 'possibly influenced [...] his considerable collections among the Channel Islands and along the south coasts of England and although he did not publish his

observations he continually passed his information back to those who took an interest in the same pursuit, in particular the St Andrews' Fisheries Laboratory in Scotland' ('Charles Henry Gatty', 2003). His private fortune could turn her direct inspiration, knowledge and place in print that he could not match into his place in science as its benefactor. The multiple gifts Charles Henry Gatty makes to the University of St Andrews in 1892-1895 establish its Gatty Marine Laboratory.

Case Study 3—Athénaïs Michelet (1826-1899)

In 1872, a rather different life's work was published in English by T. Nelson and Sons (London, Edinburgh and New York), *Nature: The Poetry of Earth and Sea*. 'With Two Hundred Designs by Giacomelli (Illustrator of "The Bird")'. From the French of Madame Michelet'. Yet no French publication with accompanying illustrations preceded this English translation by W. H. Davenport Adams. His translator's preface is unequivocal:

The volume [...] was written expressly for its English Publishers by Madame Michelet, and would have been produced at an earlier date but for the interruption caused by the Franco-Prussian War, and, afterwards, by the illness of M. Michelet. [...] The Illustrations were also designed expressly for the Publishers by M. Giaocomelli [...]. The conception and execution have occupied him for upwards of two years; and he wishes to be stated that he [...] is willing to rest upon them his future reputation as an artist. (p. v)

Davenport Adams's reputation also rested on this work as T. Nelson and Sons' translator for all four of the 'nature' books by Jules Michelet (1798-1874); in 1872 of *The Bird* (*L'Oiseau*, 1856) and *The Mountain* (*La Montagne*, 1872), and in 1875 of *The Insect* (*L'Insecte*, 1857) and *The Sea* (*La Mer*, 1861). Yet Jules Michelet's otherwise towering importance as the father of French historiography for Gabriel Monod (editor of the Michelet *Œuvres complètes*) and for Roland Barthes his major twentieth-century popularizer is blighted by a key fact. The nefarious actions of Madame Athénaïs Michelet (1826-1899, née Mialaret) upon Michelet's death – to control the

rights to his manuscripts from the clutches of Alfred Dumesnil (Michelet's son-in-law and also a historian) and her subsequent 'editing' (re-writing) of his last works for posthumous publication – show her to be an un-natural wife, wicked step-mother, harpy and witch. These pejorative terms reflecting the titles of Michelet's trilogy of the same period as the 'nature' books, *L'Amour* (1858), *La Femme* (1859) and *La Sorcière* (1862), inform subsequent critical responses to Athénaïs. The 'abusive widow' (Smith, 1992), for Gossman (2001) she 'subsequently succeeded (thanks to her husband's name and reputation?) in carving out a minor literary career for herself [for] her *Mémoires d'une enfant*' (p. 333) [*Memoirs of a Girl Child*] (1866, reedited by Monod in 1888, republished in 2004). In consequence she could never be a (French woman) historiographer and natural history writer in her own right.<sup>10</sup>

*Nature: The Poetry of Earth and Sea* (1872) puts a very different case that independently corroborates Athénaïs's many *leading* roles in the writing of 'Michelet's' 'nature' books. Although Jules Michelet endorsed these severally in his will (published by Athénaïs in 1875 in *La Tombe de Michelet*) and in prefaces (e.g. *L'Oiseau*) – that she masterminded and 'collaborated' in the joint project of the 'nature books', and thereby restored his intellectual and material fortunes – her primary roles are never believed by her many critics, because she can only be the abusive manipulator of posthumous revelations. These include her further defense in print in 1876 of her full 'collaborations' and hence fifty percent royalty rights for all four of the 'nature books' (*Ma Collaboration à «L'oiseau», «L'insecte», «La mer», «La montagne». Mes droits à la moitié de leur produit*). Davenport Adams's above preface to *Nature* clearly details Athénaïs's sole authorship and conception of her work in its commissioning and at least two-year production schedule that encompasses the delivery of the two hundred accompanying illustrations and her adverse material circumstances. Although *Nature* appears the same year that 'The Mountain' is

first published in France, Jules Michelet clearly cannot be the ghost writer: he is ill. Nor could Athénaïs have executed it entirely from scratch in only two years in the circumstances of a major war, nursing her ailing husband and collaborating (fifty percent) on 'The Mountain'. Her long preface to *Nature* clearly outlines the provenance of her work as deriving from her earliest, longstanding, interests in natural history:

*This Book, which I have attempted unaided, gives, under the form of a natural history, a whole life of impressions, of study, of faithful attachment to her who seized my affections as a child, and, if I may dare say so, cherished and fashioned me by successive teachings, by a slow and gentle initiation.*

*This modest exploration of Nature – at first my mother, and afterwards my companion – is, at the same time, an exploration or examination of myself.* (pp. xiii-xxxii, p. xiii, italics in the original)

Childhood exploration of her garden and surrounding landscapes inspired a responsiveness to nature through self-expression that prepared the only daughter of Yves Mialaret (Secretary to François-Dominique Toussaint L'Ouverture (1743-1804) leader of the Haitian Revolution), to correspond with Michelet directly about matters of history during the 1848 Revolution. She married him in 1849 aged twenty three, after his revolutionary sympathies cost him his government post. Athénaïs's 1872 introduction in English to *Nature* only confirms the latter's conception and *production* as in fact the delivery of her original project of 1854 for the four 'nature books' as outlined in French in her *Collaboration* of 1876:

In 1854 I started to help him with his history works. I would correct his proofs. I would make extracts for him and I also undertook the major part of his correspondence.

But the taste for natural history that I had enjoyed in the countryside during my childhood remained so strong that while acting as his secretary, I would also find time for these favourite studies.

My project was to write a series of little books for children: I started *The Bird*.

One morning, when running over my first draft, my husband was completely smitten ['séduit'] and said, 'Let's write it together.' [...] Hence my share in the collaboration. I would undertake the first readings. I would go to various libraries, especially those at the Museum [of Natural History/Jardin des

Plantes], and excerpt from the rare books and pamphlets that could not be borrowed the passages that we needed. At the same time I would study the collections. I would spend hours with the living animals which even in captivity were a precious assistance to us.

When I got home, I would put my notes and observations in order and little by little the book would take shape.

We would travel extensively together in the interests of our studies [...] While my husband was working on a volume of his *History of France*, I would prepare one for the *Natural History*. I would catch insects or dredge the seabed. My bedroom soon became a field site for observations.

Equipped with a good microscope that Professor Robin had taught me to use I entered the world of discoveries. (*Ma Collaboration*, 1876, p. 6, translation by essay author)

Many of the vignettes in *Nature* then also directly correspond to sections in the ‘nature books’, particularly aspects of *The Mountain* and *The Sea*, albeit in two different keys. In the former is the exuberant ‘poetry’ of Athénaïs’s voice even in English translation. In the latter, the more sober impersonal viewpoint yet often luridly sexualized fascinations with the fecundity, wildness and cruelties of the natural world richly suggest Jules Michelet’s inadvertent ‘examination of [him]self’. Claude Pujade-Renaud’s fictional remake of Athénaïs Michelet’s widowhood in *Chers Disparus* (2004) drawing on Michelet’s diaries dares to name what Michelet critics cannot. Here is an abusive husband violating her writing, because he also engaged in predatory voyeurism and regular violations of her body, to stimulate his own. Domestic abuse and its difficult legacies for the victim then provide different explanations for Athénaïs’s determined fight, including in print, for the rights to his papers including his private diaries, and for a ‘sanitized’ version of Michelet’s reputation. Her *Nature* is therefore an extraordinary survivor narrative of multiple forms of abuse, redolent of the widespread violations of women’s (collaborative) work in science: silencing, editing out, belittling. Athénaïs’s refusals to suffer these in 1870-1872 concomitantly make *Nature* the restoration narrative of her original early project for the nature books, to write natural history for children. *Nature* and, ironically, all of (‘Jules’) Michelet’s nature books in English translation

form T. Nelson's 'Gift Book' list in 1872, this genre deemed especially suitable for young women readers (Renier, 1964). After Michelet's death in 1874, however, Athénaïs does more than 'popularize' and 'anthologize' Michelet's histories for school curricula (Creyghton (2016). She almost completes in 1899 another sole-authored work, also begun in the late 1850s, entitled *Cats*, published by Monod posthumously with her preface in 1904. If she there reveals that she was offered ten thousand francs for the rights to *Nature* such being *her* reputation for natural history writing, *Cats* also reveals the comprehensive and specialist natural history work she undertook for it as the same for the ('Jules') Michelet nature books. Athénaïs's many researches in the archives were supplemented exhaustively by her requests for information in correspondence with scientific experts of *her* generation. The letters to Athénaïs that Monod collates in the appendix to the 1904 edition include replies from among others Auguste Mariette (1821-1881) for ancient Egypt, Georges Pouchet (1833-1894) for prehistory and Charles Darwin (1809-1882) for natural selection.

### *Conclusions*

*Unnatural* selection, however, turns out to be the overriding issue for recognition of women in science that this essay investigates and challenges through its different critical reappraisals of '1833'. These included the watersheds of Cuvier's death, and the 'Somerville effect' for men in science in this pivotal period for its modern development and formation of the 'pipeline' model. Close scrutiny and reassessment of the published 'standpoint' theories of key men in science, such as Whewell's, therefore prove essential for renewing future research on women in the history of science on two counts. First, such position statements identify the received ideas of a given period that allegedly explain how and why science by women is (naturally) secondary to that of men, with

very occasional exceptions (science has a sex). Second, they locate particular, as well as accepted, reasons for *perceiving* women's science and its production as less important. Because the position statements of Whewell and Greenough were primarily responses, indeed clear (over)reactions to the published science of Somerville and Graham, they visibly contradicted and thus reset the normative assumptions about women's secondary places and exceptionalism in science (science has a gender). The essay then tested out the corollaries of inverting the automatically assumed primacy of men in science and in science by women. Following Somerville's best science practice and negotiations of the models of her day, the different indicative case studies investigated the published science by women of the period who innovated in their fields. Their science proved part of the rule in its methods of observation, compilation of multiple evidence and exposition of findings, rather than the exception. The essay could then identify how the developments of science by these women in, and outside, the model of 'creative couples' (Pycior, 1996) were positively and negatively impacted by the secondary roles of male relations.

The lessons of Mrs Somerville, Mrs Bowdich, Mrs Gatty and Madame Michelet are clear. Women of independence of mind and expression, scientific talents and the means to pursue them find mainstream, alternative and entrepreneurial ways to undertake and publish their work, because science has no sex as Whewell realized. The problem for women in science (and men outsiders) of the period is then the facilitation, critical reception and evaluation of their work, as Cuvier noted in his important blueprint for assessing the merits of all major contributions to science in 1828 (Pietsch, 1995, pp. 1–2). As all the indicative case studies in this essay endorse, further research on nineteenth-century history of women in science needs to target the mixed (non-)reception of their work to counter further omissions of its presence, and to investigate other models for its facilitation (or blockage) that lie outside the paradigms of *women's* 'uneasy careers and intimate

lives' (Abir-Am and Outram, 1989). The findings of our case studies have particular resonance for women publishing science today. Malign and abusive 'co-authors' and 'editors' still selectively omit, skew, rearrange and even falsify the evidence of the excellence, variety, entrepreneurialism and range of women's work, and the extent of its contributions.

If science has no sex (Cuvier's position) in the crucial '1833' period for the development of modern science, the question of the *unnatural* (de)selection of women in its work highlights the issue and processes that embedded a dominant gender for the study and hence historiography of the physical sciences. The coining of the term, 'scientist', by Whewell is less important for the increasing professionalization of science than his many reasons for doing so. As elucidated in the comparative approach to the history of women in science of this essay, women with 'overseas' and 'home' expertise are of particular interest for future study, especially if their work is 'polymathic' (a qualifier often used of men including Whewell, but not women in science). Somerville and Bowdich differently exemplify in 1833 what Whewell frames as paradigmatic for the (male) 'scientist' henceforth: international-level expertise, reach and renown. His professional status deriving entirely from the academic (and clerical) orders to which he belongs but women cannot then elides modern 'scientists' neatly and unequivocally with gendered institutional frames of reference, legitimation and evaluation for their future work. Its 'pipeline' model will increasingly narrow the parameters for acceptable expertise and scientific productions, to distance them from the work of 'popular' science. The distinctions that Whewell and Jenyns make about 'mere', as opposed to 'expert', compilers is already indicative of the innate gendering of 'pipeline' science and its popularizations, including decorative 'sampler' science. If the history of nineteenth-century science is to advance knowledge of the plethora of women's science in print when this cannot exist institutionally, there is an urgent need to reinstate appropriate terms for 'serious' science work so

that these circumnavigate the term 'scientist' as the measure of evaluation. Throughout, this essay operated this approach in opting for the term, 'catalyst', in its chemical and metaphorical meanings. Another, and cognate with 'scientist', is the gender-neutral term 'specialist' also exemplified by the women above.

The snapshot of major women catalysts of the 1833 period in this essay therefore richly exemplifies the central, not exceptional, place of women in nineteenth-century science for its increasing development and diversity of specialist interests. Women's science cannot be pivotal within institutionalized nineteenth-century science, but their wider-ranging work is axiomatic and axiological of it. The number and far-reaching influence of women in science of the period has been celebrated negatively in the stereotypes and caricatures of their work in publications by men in science. This essay now invites further critique of 'informed' science writing by men in nineteenth-century science for particular 'standpoint' theories that are caricatured to be absurd. They will then yield up more prominent women in science like Charlotte Murchison, all busy shining lights into the darkness of its many (pipeline) worlds.

#### Endnotes

<sup>1</sup> See for example the EU report 'Women in Science and Technology: Creating Sustainable Careers' (2009) and on 'Keeping Women in Science' (White et al, 2015).

<sup>2</sup> Feminist literary criticism of *fin de siècle* texts and visual arts depicting women as threatening vampires and seductresses luring men to their peril.

<sup>3</sup> Feminist reappraisals of the gendering of 'genius' lie outside this essay. See for example Kristeva (2004).

<sup>4</sup> The sciolist, ‘A superficial pretender to knowledge; a conceited smatterer’ (OED) manifests many attributes of the dilettanti, the fop and the modern understanding of an ‘amateur’ as a non-expert. By counter-analogy, Whewell’s direct reference to Coleridge as artist and philosopher, but also major supporter of the upstart Sir Humphrey Davy, is also highly significant for his coinage of ‘scientist’ aligning with his own, serious self-fashioning as the future Master of Trinity College, Cambridge. See Golinski (1999), but also the longer aesthetic heritage of ‘The Poet as Sciolist’ (Fraser, 1967).

<sup>5</sup> A rather grainy reproduction of the image can be viewed on the ‘Trowelblazers’ website, <https://trowelblazers.com/charlotte-murchison/>, accessed 29 Jan. 2019.

<sup>6</sup> The inside front cover of the French edition states more ambiguously that the work is ‘publiés en anglais par Mistress Lee, et en français par M. Théodore Lacordaire sur les documents fournis par sa famille.’ In France, Lacordaire was assumed to be the author (Morren, 1870) as in his French Wikipedia entry. [https://fr.wikipedia.org/wiki/Th%C3%A9odore\\_Lacordaire](https://fr.wikipedia.org/wiki/Th%C3%A9odore_Lacordaire). Consulted 30/1/2019. Further references from the English edition printed in London will take the form ‘MBC’ followed by the page number in question.

<sup>7</sup> Our central argument about Whewell’s coinage of ‘scientist’ as a response to the crisis in science for *men* aligns with the findings of Bruckmüller and Branscomb (2010): ‘It might seem somewhat counter-intuitive that a higher selection of women for precarious positions should be at least as much, or even more so, about men and leadership than about women and leadership. In fact, it may not be so important for the glass cliff that women are stereotypically seen as possessing more of the attributes that matter in times of crisis, but rather that men are seen as lacking these attributes and that the attributes that men stereotypically have do not fit with what is perceived as needed in a leader in times of crisis.’ (p. 448).

<sup>8</sup> The argument draws more finely here the place of and usage by Jenyns of Bowdich's *Fresh-Water Fishes* as set out in the only study to date of the *non*-reception of her contributions to British ichthyology (Orr, 2014, especially pp. 227–228). The appendix to this chapter enlarges and corrects the information given in note 58 (p. 228) of this publication.

<sup>9</sup> See the excellent online text and supporting resources for *The Book of Sun-Dials* at respectively: <https://digital.library.upenn.edu/women/gatty/sundials/sundials.html> and <https://digital.library.upenn.edu/women/ewing/parables/memorial.html>.

<sup>10</sup> For an extensive discussion of Athénaïs Michelet's work in anthologizing and popularizing Michelet's *œuvre*, not as a co-writer or collaborator in it, see Creighton (2016).

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