

# Muelleria

36: 51–73

Published online in advance of the print edition, 16 March 2018.



## On the threshold of mycology: Flora Martin née Campbell (1845–1923)

Sara Maroske<sup>1,4</sup>, Tom. W. May<sup>1</sup>, Angela Taylor<sup>2</sup>, Alison Vaughan<sup>1</sup> and A. M. Lucas<sup>3</sup>

<sup>1</sup> Royal Botanic Gardens Victoria, Birdwood Ave, Melbourne 3004, Victoria, Australia.

<sup>2</sup> Blackburn, Victoria, Australia.

<sup>3</sup> Paignton, Devon, United Kingdom.

<sup>4</sup> Corresponding author, email: saramaroske@optusnet.com.au

### Introduction

Flora Martin née Campbell mostly features in the history of mycology as a collector of fungi (Willis 1948; May 1990; May and Pascoe 1996). Recent investigations have revealed her to be a pioneer woman scientist who not only collected fungi but published, presented, experimented in, and gave expert testimony on, the subject of mycology (Maroske & May in press 2018). In addition, she made significant contributions to the development of this discipline in Australia, facilitating the appointment of professionals, and the issue of key publications.

As she was already an adult when Australian universities admitted women in the 1880s (Kelly 1993), Flora had to turn elsewhere for a scientific education. Her science of choice, mycology, was an emerging discipline in the latter part of the nineteenth century, and it offered students and researchers opportunities to discover new species, to investigate their relationships with other organisms, and their impact on practical disciplines such as agriculture, forestry and horticulture.

The struggle for acceptance and recognition faced by the first professional women scientists is an established area of historical research (e.g. Creese 1998, 2004, 2010, 2015). Less well known are the stories of women who attempted to reach their scientific goals in an era when the great amateur tradition of natural history was giving way to academic science. Flora Martin exemplifies the situation of these women, especially in the colonies where she not only faced barriers due to her gender, but

### Abstract

Flora Martin née Campbell was a pioneer mycologist active in collecting, research, publication and advocacy in nineteenth century Australia. Standing in the way of her scientific advancement were a number of substantial barriers, including entrenched prejudice against women, and the relatively isolated and undeveloped state of her colonial scientific community. Despite this, she still managed to achieve a suite of scientific firsts for a woman working on Australian fungi. Recent archival discoveries indicate that for two decades she was at the centre of Australian mycological activity, with connections to fellow scientists in a number of Australian colonies, New Zealand, the United Kingdom and Europe.

**Key words:** mycology, botany, colonial Australia, women, amateurs, professionals

also because of her isolation from the main centres of scientific research in the northern hemisphere.

A precocious talent with strong self-belief, Flora revealed the limitations of a gendered and hierarchical scientific system that was capable of inspiring gifted colonial women, but also frustrating them. Aware of her unequal treatment, she made acerbic comments on the shortcomings of others, further setting her apart from colleagues who accepted the *status quo*. While significant gaps remain in her story, it is clear that Flora was an exceptional individual, not only for her contributions to mycology, but also because she dared to make them.

## Background and early years

### Colonial Australian botany and mycology

Australia offered European botanists an enviable field of research with diverse and highly endemic vegetation. In the first seventy-five years of British settlement, much of this investigation was undertaken by short-term visitors to the various colonies, or longer-term users of Australian materials in northern hemisphere herbaria and museums. In Australia itself, the discipline of botany was imported with settlers as an established part of school curriculums, and taught at the first Australian universities, but opportunities for paid professional careers remained remote up to the end of the nineteenth century (Gascoigne & Maroske 2013).

German-educated Baron Ferdinand von Mueller (1825–96) dominated the Australian botanical scene from the time of his appointment as Government Botanist in Victoria in 1853, eventually drawing thousands of others, including women, into his research projects through a large network of collectors (Maroske 2014). Mueller focused his research on higher plants, not having sufficient funds for the resources needed to cover the lower plants or cryptogams (which included fungi). At first Mueller sent his own and his collectors' fungal specimens to the Rev. Miles Joseph Berkeley (1803–89), a clergyman and independent scientist in Britain for identification and description (Mueller 1881).

While it was an exciting era for the study of fungi, with new discoveries in fungal reproduction and morphology (English 1987: 157), Australian species did not contribute to these developments. Berkeley waited twenty years to

work on Mueller's specimens, in part because they were of poor quality (May 1990), but the delay led to fungi being 'less studied than any other series of Australian plants' (Mueller 1872). Moreover, Berkeley's initial belief that most Australian species 'were identical with species in Europe', tended to discourage local research (Mueller 1891a). This was all to change in the 1880s when new participants entered the field, and the richness of Australian mycology began to be revealed.

### Flora's childhood and education

Flora Mary Campbell was born at Dilston, Tasmania on 22 February 1845 (Anonymous 1845). Thereafter she disappeared from the historical record for more than thirty years. When added to a lack of surviving anecdotes about her childhood, this means details of her early life remain frustratingly speculative. Nevertheless, while Flora did not record her own story, she did see merit in copying down her father's reminiscences just before he died (Martin 1890). These provide an indirect outline, in part, of her chronology, and are especially revealing in regard to Alexander Campbell's (1805–90) role in her life.

Like other precocious women, Flora probably developed scientific confidence, and the contacts to further it, in the context of a strong father-daughter relationship. The importance of this kind of bond is evidenced in the life of an exact contemporary of Flora's in New South Wales, Georgina King (1845–1932). Her father, the Rev. George King (1813–99) sympathised with her thirst for knowledge, and when she exhibited a passion for geology he described her proudly as 'his little philosopher'. In an assessment that could be applied to Flora, Georgina's biographer claimed that she inherited the Rev. King's drive, displaying his 'Celtic pugnacity' in her efforts to become acknowledged as a scientist (Carter & Cross 2013).

Flora's father followed his brothers from Scotland to the colony of Tasmania in 1825. After eleven years he moved to the colony of Victoria and settled at Port Fairy as a whaler and ships' captain. Powerfully built and charismatic, he became known as 'Port Fairy Campbell', and also left his name on the coastal town of Port Campbell (Anonymous 1887). Aged 40, Alexander married Mary Ann Coulson (Anonymous 1844), and his wife returned to her family home in Tasmania to give birth to their first child, Flora Mary. A second daughter

(Ann Eliza), and a son (Alexander Nicholson), were born at Port Fairy in 1847 and 1851 respectively.<sup>1</sup>

Just before the discovery of gold in 1851, Flora's father was appointed the first harbourmaster of the Port of Melbourne. The Campbells moved into a series of dwellings in the heart of the growing city, with a fourth and final child, George Neil Campbell, joining the family in 1856.<sup>2</sup>

As in other middle-class families, the Campbell children were probably educated at home, possibly by their mother and/or a series of private tutors. Boys and girls were usually taught different subjects at this time, but the lack of educational facilities in early Melbourne may have allowed Flora more freedom to pursue her interests than children of the next generation. She clearly learnt to read, write and to draw, and was given a thorough Christian education in the context of the Presbyterian Church. It does not seem, however, that she had any exposure to Latin, an important language in nineteenth-century scientific literature, and especially in taxonomy.

## Botanical and mycological awakening

### Botanical awakening

Flora was 24 when her father retired in 1869 (Anonymous 1869b). Still in good health, he decided to take up grazing cattle on 650 acres at Fulham, in the Gippsland region, 200 km east of Melbourne. Here, according to Flora, he did 'fairly well' (Martin 1890). It was at Fulham that Flora began a serious study of botany, claiming in 1888 that she had been 'at' this subject for fifteen years (Campbell 1888a: 129). The identification and illustration of plants was a respectable interest for young ladies (Jordan 2005), and the diverse and novel vegetation in Australia was an additional incentive for budding naturalists to take up botany. In this regard, the still substantially native vegetation of Gippsland offered

a rich and dramatic landscape for Flora to explore. Later it was claimed that 'in her young days, she was 'a lover of plants, and a diligent student of botany' (Pitcher 1925: 176).

In 1874, Flora acquired part two of Balfour's *Class book of botany* (Balfour 1852–4), which was 'much studied, judging by the multitudinous marginal notes and underlinings throughout' (Pitcher 1925: 177).<sup>3</sup> By the 1880s she came to regard Balfour as old-fashioned, and lamented the fact that 'in our Herbarium and University they still use and recommend [his books]' (Campbell 1885b; Campbell 1889). Flora also acquired the seven volumes of Bentham's *Flora Australiensis*, a substantial and expensive work, and the most up-to-date and comprehensive treatment of Australian flowering plants and ferns (Bentham 1863–78, Pitcher 1925).

Both Balfour and Bentham recommended students of botany make their own herbarium, or collection of dried plants. This was to facilitate the identification and exchange of specimens, and to establish a collection for future reference (Balfour 1852–4: 1075–1082, Bentham 1863: ch. 4). Flora's earliest surviving dated specimens are from Fulham in January 1880,<sup>4</sup> but she probably began her herbarium several years earlier (Campbell 1888a).

In 1877, Flora's Australian botanising was interrupted for a couple of years, when her father took his family (minus the sons), on a tour home to Scotland. They left on *Highflyer* in March and returned on *Loch Garry* in August the following year (Anonymous 1877; 1878). Whatever the discomforts of long-distance travel, Flora apparently took them in her stride, and she made a number of substantial sea and land journeys in the next decade.

### Mycological awakening

The year after returning to Australia, Flora made a two-month journey to the colony of Queensland. She sailed on *Ly-ee-moon* in July 1879 from Melbourne to Sydney, with Miss Effie Gerrand and Effie's cousin John Gerrand (neighbours in Gippsland) for company (Anonymous

1 No. 8225/1847, birth registration of Ann Eliza Campbell <https://online.justice.vic.gov.au/bdm/indexsearch.doj> viewed January 2017. No. 9284/1851, birth registration of Alexander Nicholson Campbell <https://online.justice.vic.gov.au/bdm/indexsearch.doj> viewed January 2017.

2 In 1856, Mary Ann Campbell gave birth 'at her residence, Bourke-street' (Argus, Melbourne, 7 January 1856: 5). In 1863, the address of 'Campbell, Alex., harbourmaster' was '373 Spencer-street' (Anonymous 1863). Between 1866 and 1869, his address was '119 Spencer-street' (Anonymous 1866, 1868, 1869a). No. 567/1856, birth registration of Neil Campbell <https://online.justice.vic.gov.au/bdm/indexsearch.doj> viewed January 2017.

3 The library catalogue at the Royal Botanic Gardens Victoria states that one of the library's three copies of Balfour (1852–4) belonged to Flora Campbell. An examination of the copies, however, was inconclusive.

4 e.g. MEL 1601090A *Rytidosperma caespitosum* (Gaudich.) Connor & Edgar.

1879a).<sup>5</sup> Just what prompted Flora to set out on this trip is not clear, but it may have been to visit her brother, Alexander Jr, who eventually died in Queensland.<sup>6</sup>

On the Sydney to Brisbane leg of the voyage, Flora and her companions were joined by a famous Australian naturalist, Father Julian Tenison-Woods (1832–89) (Anonymous 1879b; Borchardt 1976). Although mainly occupied with writing government reports, Tenison-Woods was also in the process of preparing a foundational paper on Australian mycology with Queensland botanist Frederick Manson Bailey (1827–1915).<sup>7</sup> Later Flora remembered Tenison-Woods noting, and lamenting, the rapid spread of weeds like cacti and lantana in Queensland (Campbell 1885c).

It is possible that Tenison-Woods was responsible for sparking Flora's interest in fungi (which she dated from 1879) (Campbell 1885c). In the mycology paper, Tenison-Woods gave an overview of the discipline and its possibilities in Australia, stating clearly that his purpose was 'to popularize the subject with a view to stimulate enquiry' (Tenison-Woods & Bailey 1882: 51). The paper acknowledged about a dozen collectors, and made a single reference to 'Miss F. M. Campbell' as the contributor of a specimen of *Irpex flavus* Klotzsch,<sup>8</sup> a bracket fungus, from the river port of Ipswich in Queensland (p. 73).

### Frederick Manson Bailey

Tenison-Woods' co-author, Bailey, was a self-taught Australian botanist initially residing in South Australia and from 1861 in Queensland. He published extensively on the vegetation (including fungi) of Queensland over a long career as Government Botanist (Marks 1969). Flora made contact with Bailey in Brisbane (probably facilitated by Tension-Woods), and he became the first professional botanist with whom she developed a collegial relationship (Pitcher 1925).

While none of Flora and Bailey's correspondence

has been found, his letter registers indicate that they communicated almost monthly from 1879.<sup>9</sup> In an early letter, Bailey sent Flora a recently issued census of Brisbane plants (Bailey 1879; Bailey n.d.), and continued to supply her with his works in the same way as he did other highly regarded correspondents (Pitcher 1925).<sup>10</sup>

Like Flora, at this stage of his career Bailey was a relative novice in fungi. No botanists in Australia were yet naming new species in this group, not even Ferdinand Mueller, and the flow of specimens was to taxonomists overseas. Bailey introduced Flora to a handful of international experts, and initially forwarded her specimens to them. The first new taxon based on one of Flora's collections was *Parmelia campbelliae* C.Knight (as '*Campbellii*'),<sup>11</sup> a lichen, gathered by her at Mt Kosciuszko, New South Wales. Bailey forwarded the specimen to Charles Knight in New Zealand, and he published a description (Knight 1884).<sup>12</sup>

### Miles Joseph Berkeley and Christopher Broome

Bailey also forwarded Flora's specimens to the then foremost mycologists in the English-speaking world; the Rev. Miles Joseph Berkeley and his research partner Christopher Broome (1812–86). Based in provincial England, they published a series of articles on fungi from different countries, including Australia.

Berkeley and Broome's first article to cite Flora's collections was published in 1882, although it was mainly concerned with Queensland fungi (Berkeley & Broome 1882). In a letter to Berkeley a couple of years later, Broome described Flora's first specimens as 'very bad' (Broome 1884), being both insufficient in

5 The names of Flora and the Gerrards occur in the passenger lists of each part of voyage to and from Queensland, which suggests they were travelling together.

6 Alexander Nicholson Campbell died in Burketown, Qld, on 21 April 1891, but was buried with his parents in the Brighton Cemetery, Melbourne <https://billiongraves.com/grave/Alexander-Campbell/15156272#/> viewed March 2017.

7 The paper was read before the Linnean Society of NSW on 25 February 1880.

8 Now known as *Flavodon flavus* (Klotzsch) Ryvardeen (May et al. 2004).

9 In and Out Letter and Packet Book, Letter Register, Colonial Botanist, 1879–1894: Queensland Herbarium, Toowoong, Qld, Australia.

10 Flora's copy of Bailey (1883) is in the library at the Royal Botanic Gardens Victoria, inscribed: 'To Miss Flora M. Campbell with the authors compliments 4–8–83'.

11 Now known as *Hypogymnia mundata* (Nyl.) Oxner ex Rass. (McCarthy 2017).

12 The plate associated with this article is labelled *Thysanothecium Campbellii* Knight. In undated notes with the type specimen, Bailey states: 'This curious Lichen was collected by Miss F. M. Campbell a lady to whom I am indebted for many botanical specimens she gathered this on Mount Kosciusko in Victoria and if you find it new do me the favor to let it bare her name I have not had a new plant from her that I could do so as she has not been further north than Brisbane and of the Southern Plants one seldom finds them new for Baron Mueller has his collector out in those parts I do not approve in general of naming after persons but you see it is the best way to them for their kindness in sending us specimens' (Museum of New Zealand Te Papa Tongarewa Herbarium).

sample size, and often mouldy. As Mueller had already experienced, however, this is a common problem for novice mycologists, because fleshy fungi are notoriously difficult to preserve, and even when successfully dried, shrink and change shape considerably (May 1990: 267).

The solution was to improve collections and to make detailed notes and illustrations to accompany them, and Flora quickly adopted these practices when encouraged to do so. In a surviving letter to Christopher Broome she promised: 'I will try and send in a better condition and larger quantity,' explaining that while she often started out thinking she had gathered a 'great number' of specimens, the final collection was usually much reduced by the vicissitudes of travel and the process of drying specimens (Campbell 1885b).

In 1887, Berkeley and Broome published a second article citing Flora's specimens, and made three the basis of new species. These included *Tympanis toomansis* Berk. & Broome, a fungus growing on *Banksia* L.f. cones found at Tooma, NSW (Berkeley & Broome 1887: 222). This species, in turn, has now become the type of an iconic endemic Australian genus, *Banksiamyces* G.W. Beaton (Beaton & Weste 1982). Berkeley and Broome were especially interested in the truffle-like fungi sent by Flora, and suggested 'that a great deal remains to be done among these Orders in so vast a country as Australia' (Berkeley & Broome 1887: 217).

## Botanical visiting

The trips that Flora made to Scotland and Queensland were an accepted part of the life of middle-class families in the nineteenth-century. It was common practice for ladies to visit and stay with relatives and friends for extended periods. Flora's level of engagement in this activity, however, was unusual, especially as she combined visiting with botanising, amassing hundreds of specimens of flowering plants and cryptogams.

Absent from home for months at a time, she often toured through remote country where roads were primitive and travelling conditions uncomfortable. In 1885, she found a 'beautiful' specimen of *Clavaria* L. (coral fungus) in Tasmania, and carried it 'five miles on horseback[,] 10 miles in a waggonette, then packed for the sea voyage [to Victoria] 240 miles', before posting the specimen more than 10,000 miles to Broome in the northern hemisphere (Campbell 1885d).

Campbell family networks and contacts ensured that Flora found hospitality at many pastoral homesteads, although few of these can now be identified.<sup>13</sup> It is also unlikely that she travelled alone, but unfortunately the names of her companions have also mostly been lost. Beenak on the southern slopes of the Great Dividing Range was a favourite collecting locality, which Flora described as 'a very wild mountain district' and she lamented the fact that 'there is no place for a lady to stay in except the selectors invite you and their homes are very rough' (Campbell 1885b).

Because of the loss of most of Flora's letters, surviving specimen labels, and records of her correspondence with Bailey, provide the surest evidence of where and when she conducted her botanical excursions. While the geographical range of most colonial Australian women collectors was usually limited to around their homes, she ventured to four colonies; Tasmania, Victoria, New South Wales and Queensland (Maroske & Vaughan 2014). From July 1880 to early 1881 Flora was in New South Wales including at Tooma and 'at the base of Mt Kosciuszko', the tallest mountain on continental Australia. From August 1881 to March 1882 she was based at Kiewa in northeast Victoria, and later she also visited Mt Buffalo, Mt Hotham, and the Grampians in the same colony. Flora recruited her own network of collectors among fellow settlers, who were responsible for at least some of the specimens attributed to her in surviving herbarium data sets (Campbell 1885e).<sup>14</sup>

## Societies and mentors

### Field Naturalists Club Of Victoria

In April 1882, Flora's father sold his Fulham farm and moved his family back to Melbourne. At first they rented on Punt Hill, South Yarra, not far from the Botanic Garden, but the following year Alexander Campbell bought a cottage nearby at 38 Caroline Street, which became Flora's new home base (A. Campbell 1885).

Being in Melbourne allowed Flora access to the

<sup>13</sup> An exception relates to a specimen of *Buellia* De Not. collected by Flora at Wooriwyrite in November 1886. Wooriwyrite was the property of the Scottish born pastoralist Thomas Shaw who was probably well known to the Campbell family (Wooriwyrite Homestead <http://eheritage.metadata.net/record/VIC-69290> viewed March 2017).

<sup>14</sup> Flora's collectors included: F. M. Wilson, Mrs Nealy, Mrs Gapes, Mrs Inglis (wife of John Inglis, Tarwin, c.1827–1916), Miss Howard, Mr Sayce, Miss Robinson, C. Bailey, and Alice [Berham].

scientific life of the city, although a number of societies, such as the Royal, were at this time closed to women beyond special occasions (Tyler n.d.).<sup>15</sup> This was a significant disadvantage for autodidacts like Flora who needed contact with more experienced researchers, with whom she could exchange and refine her views. Later she referred to her early mycological efforts as 'very very stupid' (Campbell 1885c), but she proved to be a quick learner.

In 1880, a new society emerged in the Melbourne scene. Open to women from the beginning, the Field Naturalists Club of Victoria (FNCV) had progressive first presidents (Houghton 2005). In 1884, congregational minister the Rev. J. J. Halley (1834–1910) (Gunson 1972), told members that he was convinced of the scientific benefits of inclusiveness, and hoped that, 'before many years have passed, to listen to this annual address delivered by one of the sisterhood of our guild' (Halley 1885: 4).

Flora attended FNCV meetings from June 1883 (Anonymous 1883a), and was voted a member on 9 July (Anonymous 1883b). At her first meeting she exhibited a collection of fungi, and continued to display fungi, lichens, fossils, plants, paintings and other objects at regular intervals (Appendix). After the 1885 annual conversazione, Flora boasted to Broome that the word most often applied to her display of fresh fungi was 'Wonderful'. 'They had never seen the like', she told Broome proudly, and the exhibit 'kept a crowd round it' (Campbell 1885b).

In July 1885, Flora became the first woman to publish an article in the Club's journal, (a list of fungi) (Campbell 1885a, see also 1886, 1887a), and a year later became the first woman to write a talk for the Club, and then to present a talk to the Club.<sup>16</sup> Flora was initially 'shy' about speaking in public, and her first address, 'Notes on edible fungi', was read by the Club secretary, Francis George Allman Barnard (1857–1932). A summary of this presentation in the *Victorian Naturalist* indicates that Flora had adventurous views on fungal edibility. She claimed that ten species common in Victoria and 'usually

regarded as poisonous' were, in fact, harmless, 'if eaten when young and fresh'. 'The paper was very interesting,' the *Victorian Naturalist* noted, 'and created some little discussion' (Anonymous 1886b).

At least two Club excursions benefitted from Flora's fungal commentary and identifications.<sup>17</sup> On the Queen's birthday in May 1885, she joined about 25 members and friends on a train to Lilydale (then a separate village on the outskirts of Melbourne). Nearly 100 species of fungi were collected on the day and 'I was the only one who knew the [sic] anything about them', she told Broome (Campbell 1885b). A report of the excursion in the *Victorian Naturalist*, supported this claim noting: 'our mycologist had almost as much as she could do in collecting specimens or packing away those brought to her by other members of the party' (Anonymous 1885: 33; Campbell 1885a).

### The Cryptogamic Section

By 1886, there were enough mycologists, lichenologists and bryologists in the FNCV to form their own section within the Club (Anonymous 1886a; May 2005). Flora served the section for a time as honorary secretary (Martin 1892), and exchanged specimens with other members including Felix Reader (1850–1911), a German-born pharmacist; the Rev. Francis Robert Muter Wilson (1832–1903); Melbourne pharmacist Francis G. A. Barnard; and Richard Austin Bastow (1839–1920), a draftsman in the Victorian public service (George 2009). In fact, a number of Flora's surviving specimens at Australian herbaria seem to have been lodged as part of these colleagues' herbaria.<sup>18</sup>

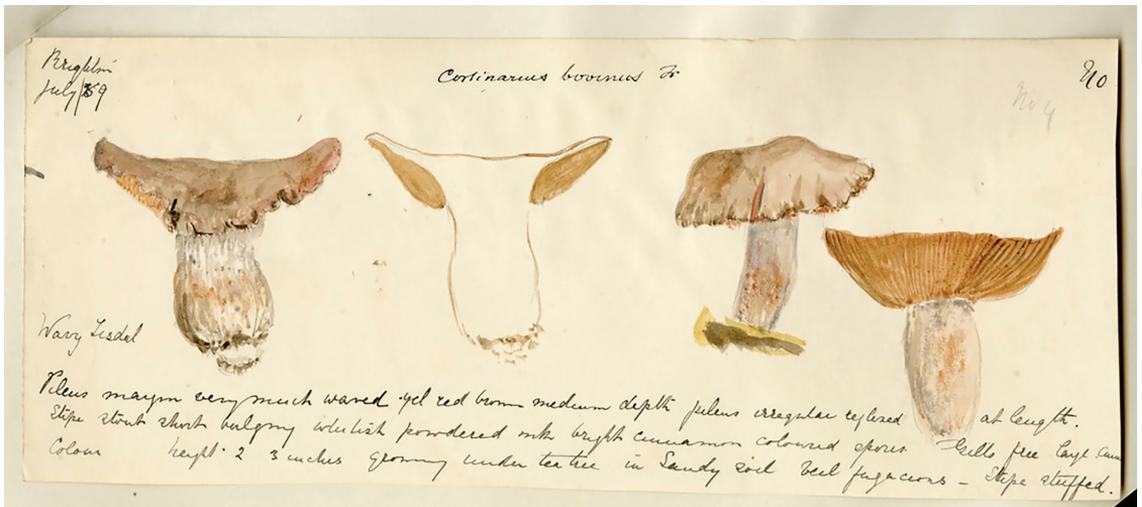
Another keen mycologist in the section was Henry Thomas Tisdall (1836–1905), a schoolteacher who lived and collected for a time in Gippsland (Gardiner 1990; George 2009). Tisdall gave a number of talks on fungi to the Club, but lacked the confidence to draw conclusions about his specimens without reference to expert taxonomists (May 1990: 270). Flora found fault with Tisdall's nomenclature, complaining in 1889 that he interchanged the terms 'spore' and 'seed'. '[W]ill I

15 The first female member of the Royal Society of Victoria, Helen Neild, was elected as an associate member in July 1889 (<https://rsv.org.au/wp-content/uploads/historyrsv.pdf> viewed 2017).

16 A number of Flora's first talks were not published: 'Notes on edible fungi', March 1886 (presented by Barnard); 'Notes of a trip to Cabbage-tree Creek, East Gippsland', April 1888 (presented by Flora); 'an account of work done in cryptogamic botany during the year' (Anonymous 1890g).

17 Flora went with Club members to Lilydale in May 1885 (Campbell 1885), and to Cheltenham in June 1886 (Anonymous 1886c).

18 Based on searches in 'Australia's virtual herbarium', <https://avh.chah.org.au/> viewed March 2017. Reader's herbarium was purchased by the National Herbarium of Victoria about 1906, F. R. M. Wilson's herbarium was purchased by the National Herbarium of Victoria after 1896 (Short 1990: 5–6).



**Figure 1.** *Cortinarius bovinus* 'Wavy Tisdal [sic]', water colour painting by Flora Martin (RB MSS A50, Library, Royal Botanic Gardens Victoria)

call a chrysalis an egg next', she exclaimed, 'and not be corrected in our club?' (Campbell 1889).<sup>19</sup> She and Tisdal remained colleagues, however, and Flora referenced him in her familiar name 'Wavy Tisdal [sic]' for a species of a locally occurring fungus with a wavy edge on the cap, *Cortinarius bovinus* Fr. (Figure 1).

### A very clever man

The 1880s were a time of rapid scientific development for Flora, but rather than attributing this fact to the FNCV, she claimed it was because she had come 'under the care of a very clever man' (Campbell 1888a: 129). Acquiring a mentor was almost a necessity for talented women scientists in the nineteenth century. Georgina King had George Bennett (1804–93), a venerable naturalist in New South Wales (Carter & Cross 2013: 36–37). Male mentors were invaluable in negotiating with scientific circles, which continued to consist mostly of men, and the mentors also conferred a certain measure of authority by association (Maroske 1993, Maroske & May 2018).

Flora's 'clever man' was almost certainly Daniel McAlpine (1849–1932), a lecturer in biology at Ormond College, a Presbyterian residential college at the University of Melbourne. Four years younger than Flora, McAlpine was born and raised in Scotland, matriculated

at the University of London in 1873, and attended lectures by leading scientists such as Thomas Huxley (1825–95) and William Thiselton-Dyer (1843–1928). McAlpine established his career in Edinburgh, lecturing at the new Veterinary College and at Heriot-Watt College, and publishing a series of biological atlases (White 1986).

In 1884, McAlpine migrated to Australia with his family. Flora reported attending his lectures in 1885, for which she would have needed the permission of both McAlpine and Ormond College. 'I was delighted with a lecture by Mr D. McAlpine on Lichens', she told Christopher Broome, 'and worked hard at them with the Rev. Mr Wilson, a colleague in the Cryptogamic Section of the FNCV (Campbell 1885b).<sup>20</sup>

By 1886, Flora's friendship with McAlpine had developed to the point where she gave him half her herbarium, 'as I wished to forward his interests here and if I could in any way assist in keeping him in our Colony, it would be good for us' (Campbell 1886b). This was a significant act of generosity, as Flora claimed her collection of fungi was the largest in the southern hemisphere.<sup>21</sup>

<sup>19</sup> Felix Reader was also critical of Tisdal's terminology and published a list of corrections to one of his talks in the *Victorian Naturalist* (Tisdal 1886, Anonymous 1886a).

<sup>20</sup> Wilson called Flora 'an indefatigable collector of lichens as well as of other plants' (Wilson 1887), and recognised her herbarium in a list of Australian lichen collections (Wilson 1890). See also Ralston (2001). The text book used by Wilson and Flora was Leyton (1871) (see MacDonald 1916).

<sup>21</sup> MS annotation by F. Martin on her copy of McAlpine (1895): Library, Royal Botanic Gardens Victoria, Melbourne, Vic., Australia.

The only other likely rival herbarium was that of Ferdinand Mueller, but Flora estimated that his collection of fungi was only a quarter of the size of hers, and 'miserable'. 'I have just been over for the fourth time', she told Broome in 1886, 'and nothing hardly new in it for the last four years' (Campbell 1886b). Mueller, and his collectors, were in fact significant contributors of new fungal taxa, but many of the types remained in institutions overseas, and Mueller did not systematically keep duplicates of fungi (May 1990).

### Baron Ferdinand Von Mueller

Although regarded as a generous teacher by many women, including Georgina King (Maroske 2014; Carter and Cross 2013: 79–82), Mueller's relationship with Flora remained poor. One source of tension lay in how she distributed her specimens.

In 1885, Mueller gave a talk on fungi to the Club. Taking the opportunity to outline the best path for mycology in Australia, he remarked:

*To those not initiated in mycologic studies I would like to point out the desirability of sending Australian fungi [sic] to specialists through any great phytologic institution, so as to avoid clashing of various professional observers' studying similar material (Mueller 1885).<sup>22</sup>*

This methodology also allowed him to keep across botanical developments, and to ensure proper recognition for his own contributions.

As Flora was already communicating with taxonomists overseas, Mueller's admonition stung. To her it seemed to be more about control than communication. As she wrote to Club secretary Francis Barnard: 'The Baron bitterly complains of my daring to send things to Mr Bailey'. Flora thought this was especially unfair as Bailey had told her that Mueller often named or distributed Queensland plants without consulting him. 'I can't write at the moment', she protested to Barnard, 'I am so indignant' (Campbell 1885c).

As Flora developed expertise in mycology, she became increasingly willing to back her own judgement over Mueller's. 'There is a brilliant small Fungus in the Domain, South Yarra', she wrote to a newspaper, described by Cooke and Masee as *Agaricus pulchellus*

Cooke & Masee (Cooke 1889a) on the basis of one of her specimens.<sup>23</sup> 'I have reason to think Baron Von Mueller mistook [it] for *Agaricus muscarius*', a European species (Martin 1912) (Figure 2).<sup>24</sup> Mueller's error was understandable, as both fungi have spotted red caps, although in the former the spots are yellow, and in the latter white. *Agaricus muscarius* L. was likely introduced into Australia, but was not confirmed as occurring in Victoria until 1940 (Willis 1940).<sup>25</sup>

## Practical mycology

### Vegetable pathology

By 1887, Flora's mycological interests had begun to focus on the study of fungi as pathogens, or the discipline of 'vegetable pathology', and she gave a talk on the subject to the FNCV (Campbell 1887b). This was not the kind of natural history that usually occupied the Club's meetings or filled the pages of its journal, and signalled the beginning of Flora's disengagement from the Club. Flora did not abandon the collection and identification of fungi, but she would thereafter spend more of her time studying 'the great economic importance of this group of our plants' (Campbell 1887b: 125).

While it is not clear exactly why Flora began to investigate vegetable pathology (McAlpine may have been an influence), her efforts coincided with a rise in community concern about 'wheat rust'. The pathogen causing this disease was a fungus formally known as *Puccinia graminis* Pers. Rust caused the greatest crop losses sustained by wheat farmers (Parbery 2015). In 1885, the Victorian government established a Royal Commission into Vegetable Products to make recommendations on how to reduce the colony's reliance on wheat, as a means of mitigating the economic impact of wheat rust.

Emboldened by her recent research, and her contacts with international scientists, Flora came forward to give evidence at the Royal Commission. Of the witnesses

22 'For years Mrs Martin and also Mr Bailey have caused me trouble in respect to fungi, which I particularly blame on the latter, since he only was led late in life to botanical collecting through me by correspondence' (Mueller 1890).

23 This Australian species had in fact already been named by Berkeley in 1845 as *Agaricus xanthocephalus* Berk. It is now known as *Amanita xanthocephala* (Berk.) D.A. Reid & R.N. Hilton (May et al. 2004).

24 Flora repeated this claim in an annotation next to the entry for *Amanitopsis pulchella* (Cooke & Masee) McAlpine on her copy of McAlpine (1895): Library, Royal Botanic Gardens Victoria, Melbourne, Vic., Australia.

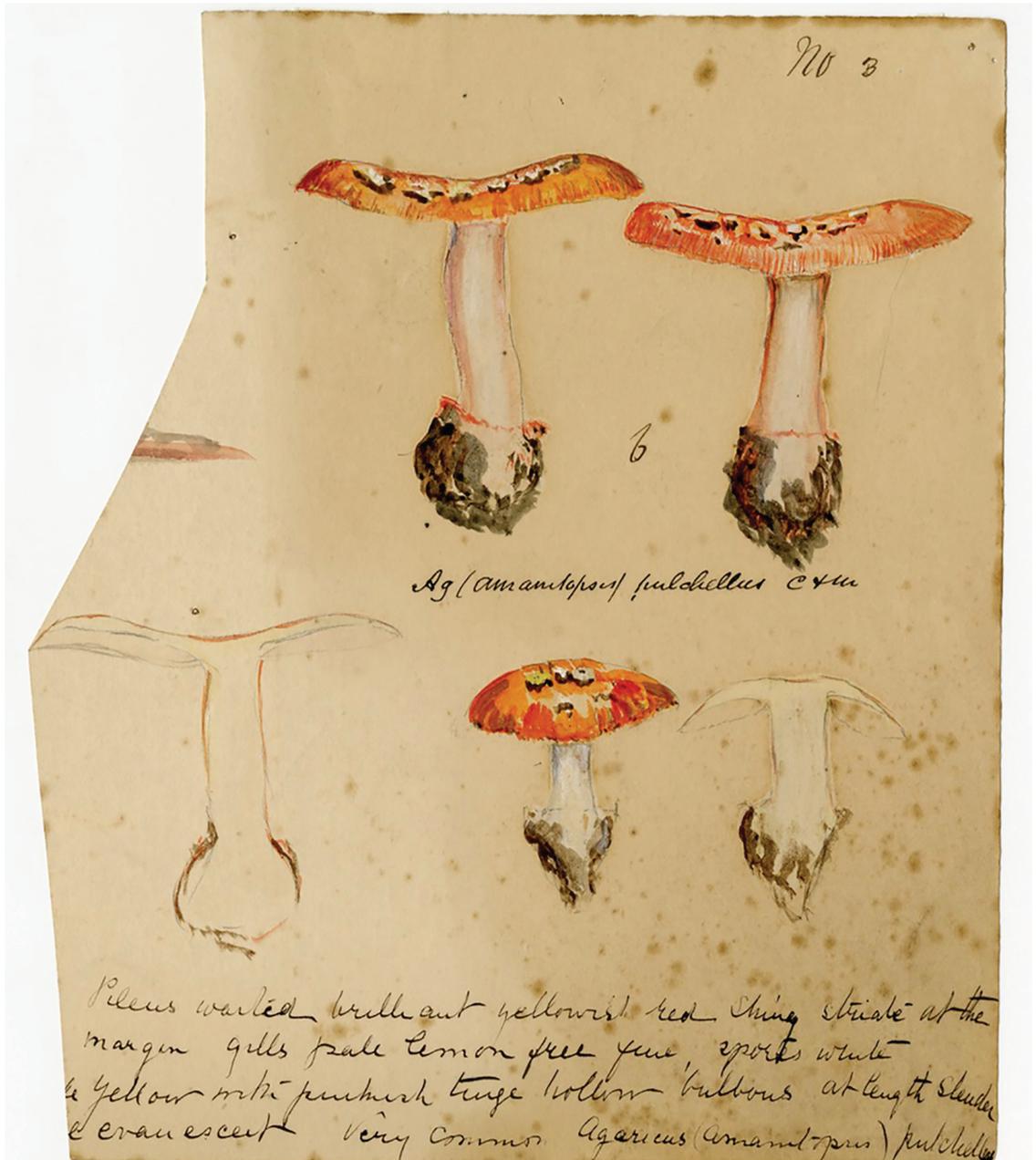
25 *Agaricus muscarius* is now known as *Amanita muscaria* (L.) Lam. (May et al. 2004).

examined by the Commissioners, a Mrs S. Simpson, whose specialty was fruit preserving, was the only other woman.

Flora's presentation was competent and engaging, illustrated by fungal samples she picked up in shops on her way as evidence. Arguing that plant disease was often the product of both insect and fungal action, Flora advocated the appointment of a government

vegetable pathologist who was an expert in both mycology and entomology (Campbell 1888a). The need for more scientists in the Department of Agriculture was reiterated by other witnesses before the Royal Commission including Ferdinand Mueller (Madden et al. 1888).

Flora gave evidence in January 1888, and the following month toured parts of Victoria, examining



**Figure 2.** *Agaricus (Amanitopsis) pulchellus*, water colour painting by Flora Martin (RB MSS A52, Library, Royal Botanic Gardens Victoria)

diseased elms at Benalla (Campbell 1888b, Anonymous 1888a), diseased vines at Mooroopna, and pathogens in hop fields, and gardens around Bairnsdale (Anonymous 1888b). Although she does not seem to have been given any remuneration for this excursion, it was made with the imprimatur of the Vegetable Commission and the Victorian Agricultural Chemist, A. N. Pearson (1856–1933) (Jewell 1988). 'If you think you would be able to take up for investigation the habits of the hop 'spider',<sup>26</sup> Pearson wrote to Flora, 'you would probably find it best to go down to Bairnsdale at once' (Pearson 1888).

While in Gippsland, Flora also visited Cabbage Tree Creek, the southern-most occurrence of the Fan Palm, *Livistona australis* (R.Br.) Mart. In this instance, she was acting on behalf of the Minister for Agriculture, John Lamont Dow (1837–1923) (Dow 1972), with a view to have the palms 'placed under protection from destruction' (Anonymous 1888b). On her return to Melbourne, she presented 'an interesting description' of the locality to the FNCV (Anonymous 1888c). The following year the FNCV officially joined in lobbying for the protection of the palms at Cabbage Tree Creek, and as a result they were placed in an expanded reserve (Presland 2016).

## Marriage

Busy as she was with fungi, Flora made space in her personal life in 1888 to court and marry widower and building contractor William Martin (c.1830–1909). Little information survives about this relationship, which may have begun in shared Presbyterian circles. Fifteen years older than Flora, William was born in Wishaw, Scotland, to master weaver, Thomas Martin, and Jane née Innes. In 1853, William married Jane Alexander who appears to have died soon after, and he made the voyage to Australia the following year alone.<sup>27</sup>

In Melbourne, William joined John Peacock (c.1830–1905) in establishing 'Messrs Martin and Peacock'. Flora was proud that this firm built a number of Melbourne icons, including the Mint (Anonymous

1870), Government House (Anonymous 1872), St Paul's Cathedral (Anonymous 1879c), 'and far too many buildings to mention' (Martin 1894e). With this work history, William was able to develop a modest portfolio of property and private assets, including a house in the Melbourne bayside suburb of North Brighton (Mueller).<sup>28</sup>

## Fungi on vines

Marriage to William Martin did not diminish Flora's commitment to fungi, and she later recalled 1889 as a year in which, 'all my spare time was employed studying the fungus diseases of the vines and their treatment', examining thousands of diseased leaves, and sending many specimens to Europe (Martin 1894a; 1894b, 1894c). Three diseases in particular were the focus of her research; downy mildew, phylloxera, and anthracnose, all scourges of the colonial wine industry.

Unfortunately, few of Flora's findings survive, due to the destruction of records in the Department of Agriculture. In a sequence of letters to Melbourne newspapers, however, she revealed that she was familiar with the most up-to-date information on fungal diseases, and current scientific names. She conducted experiments in her own garden, but was aware that her results needed to be replicated and alternative explanations considered, before she could declare her conclusions to be sound. Taking her lead from current literature, she trialled mixtures of lime and sulphur as fungicides, with the addition of extra ingredients such as bluestone and yellow clay, and consistently reported the production of 'good crops', and enhanced flavours in the produce (Campbell 1888a; Martin 1893; 1894a).

## Government scientists

This was exactly the kind of research that Flora, and others, had advocated to the Royal Commission, and indeed its final report recommended the creation of new scientific positions (Madden et al. 1888). Under strong pressure from the agricultural sector to act, the Victorian government appointed Charles French (1842–1933), a former employee of Ferdinand Mueller and active member of the FNCV, as government entomologist in 1889 (Pescott 1981), and Daniel McAlpine, Flora's 'clever

<sup>26</sup> Pearson put 'spider' into single inverted commas, because although commonly referred in this way, the organism was in fact an acarid or mite.

<sup>27</sup> Death certificate 1909/461, William Martin: Births Deaths Marriages Victoria, Melbourne, Vic., Australia. Victoria, Australia, Assisted and Unassisted Passenger Lists, 1839–1923 (images of original documents, ancestry.com.au viewed March 2017).

<sup>28</sup> Probate and administration files, William Martin, VPRS 28/P003, unit 105, item 114/654, Public Record Office Victoria.

man', as vegetable pathologist in 1890, likely the first full-time appointment to a permanent post of its kind in the British Empire (White 1986, Ainsworth 1996).

French lost no time in publishing the first part of a *Handbook of destructive insects of Victoria* (French 1891). The FNCV was delighted with this achievement and at the July meeting the president moved a motion to congratulate French 'on the successful issue of his book'. Flora, however, was not impressed, and took the opportunity to give 'some adverse criticisms' of the work. The *Victorian Naturalist* did not record any details of Flora's remarks, noting only that the president's motion 'was carried with acclamation' (Anonymous 1891a).

Angered by the omission, Flora wrote a letter to the editor of the Melbourne *Argus*, arguing that her comments needed to be published, 'in justice to others working at our fungus plant diseases'. Flora thought French's book failed to acknowledge the important relationship between insects and fungi in plant disease, and she was highly critical of French's imprecision, use of terminology and lack of practical detail (Martin 1891). Moreover, although she did not say so, French had also overlooked her contributions, including her investigations into the 'Red Hop Spider'.

Unexpectedly, Flora's letter caught the attention of satirical newspaper, *Melbourne Punch*. Its gentlemen journalists took great delight in mischaracterising her technical language as 'charming' and 'poetical', and quoted some of Flora's more abstruse terms as humorous examples. 'What captivates us ... about the affair', the satirists proclaimed, 'is that a lady should write in this way. Most of the delicate fancy work of literature has so far been done by men' (Anonymous 1891b).

While Flora was unenthusiastic about French's appointment, she was elated with that of McAlpine, and believed strongly that she had played a significant part in it (see below). Ferdinand Mueller also claimed credit for the appointment. In fact McAlpine's most powerful advocate was probably Alfred Deakin (1856–1919), Chief Secretary of Victoria in 1889 (i.e. the political leader) (Norris 1981; McAlpine 1890; Deakin 1889).

Mueller and Flora were both vital sources of information on Australian fungi for McAlpine. Mycology was part of McAlpine's scientific education in England, but initially his 'interests were broad and his focus on fungi did not sharpen until the late 1880s' (Parbery 2015:

51).<sup>29</sup> In particular, Flora's gift of half her herbarium, and her own experimental work in vegetable pathology were rich resources that McAlpine could deploy.

### Australian Association for the Advancement of Science 1890

At the same time as Flora lobbied for McAlpine, she was preparing a paper for the second congress of the Australasian Association for the Advancement of Science (AAAS later ANZAAS). Founded in 1888 on the model of the British Association for the Advancement of Science (MacLeod 1988), the AAAS was another scientific society open to women from the beginning. They made up about 4.5% of the membership at the first congress at Sydney in 1888 (including Georgina King), and increased to 6.5% at the Melbourne congress in 1890 (Liversidge & Etheridge 1889; Spencer 1890).

The week-long congress provided a rich intellectual diet for participants. One such was Allan Campbell (1836–98, no relation of Flora's), a politician from South Australia. He had a particular interest in wheat rust and commented:

*By dint of not confining my attendance to one section I have been hearing and seeing a good deal. I have been in the sanitary section reading a report; also the social science section, listening and speaking; in the engineering section listening and speaking, and in the biological section listening to bacteria lectures and diseases of plants and speaking too (Campbell 1890).*

The paper on 'Diseases in plants' was, in fact, given by Flora, who thereby became the first woman to submit or present a paper at an AAAS Congress.

Her achievement went largely unremarked in newspapers.<sup>30</sup> The correspondent for the *Sydney Mail and New South Wales Advertiser*, described Flora as 'the first lady to read a paper at the congress' (Anonymous 1890a),<sup>31</sup> although a rival newspaper, the *Sydney Morning Herald*, not only failed to grasp the significance of the event, but also attributed Flora's paper to 'Mr.

<sup>29</sup> Parbery (2015:51–52) suggests Mueller and Cooke as important sources of information about Australian fungi, but does not seem to be aware of Flora's contribution.

<sup>30</sup> C. A. Topp, president of the FNCV, noted Flora's achievement in his annual address (Topp 1890: 3).

<sup>31</sup> The FNCV also noted Flora's achievement: 'the only paper read by a lady at the association was one on the diseases of plants by Mrs. Martin, so well known to her fellow-members of this Club for her interest in fungology' (Topp 1890).



**Figure 3.** 'The Baron discourses': possible portrait of Flora Martin (*Illustrated Australian news and musical times* 1 February 1890: pp. 8, 17)

William Martin' (Anonymous 1890b). Unfortunately no copy of Flora's paper survives as it, and a number of others given in the same section, were not published in the AAAS Report.

The congress over, Flora joined a group of 53 (including seven women) on an excursion to the Australian Alps (Anonymous 1890a). The party left on Wednesday 15 January and returned to Melbourne the following Saturday. Reports of the tour were favourable, although most participants regretted the excessive dust and heat, with the temperature rising to 90°F by midday at 5,050 feet on Mount Hotham ([Hurst-Browne] 1890). Several artists and photographers accompanied the excursion and a double-spread of sketches appeared in the *Illustrated Australian News and Musical Times* (Anonymous 1890f).

In lieu of any other portrait of Flora, these sketches may include the only representation of her to survive. Given that there were only seven women in the party, there is a reasonable chance that the woman leaning forward, looking intently at a plant being held up for inspection as 'The Baron discourses' could be Flora (Figure 3).

### **Cooke, Massee and the Handbook Mordecai Cooke and George Massee**

While Daniel McAlpine's appointment as vegetable pathologist heralded a new era of professional mycology in Australia, the description of novel species continued to be dominated by taxonomists overseas. Berkeley retired from active work in the mid 1880s and Broome died in 1886 (English 1987), but they were replaced by another famous English partnership; Mordecai Cooke (1825–1914) a curator at the Kew Herbarium, and George Massee (1845–1917) a public lecturer and assistant at the Natural History Museum.

No correspondence between Cooke or Massee, and Flora has been found, but between 1889 and 1892, the pair published thirteen articles citing her specimens in Cooke's journal, *Grevillea*. Flora claimed that she gave the remaining half of her herbarium to Cooke (Campbell 1886b), and judging from surviving collecting numbers this may have included as many as 1,000 specimens. Cooke and Massee used these to describe 78 new taxa, and identify numerous new records for Australia (Cooke 1889a; 1890a–f; 1891a–e; 1892b).

Although rarely dedicating new taxa to collectors,<sup>32</sup> at Flora's request, Cooke and Massee named a new genus of pored mushrooms after her father, *Campbellia* Cooke & Massee (Cooke 1890d),<sup>33</sup> and also named (of their own volition), a new subgenus of leaf-spotting fungus after her, *Polystigmia* subg. *Martinella* Cooke & Massee (Cooke 1889a: 7; Saccardo 1892: 409).<sup>34</sup> Reports of these taxa were published in Melbourne newspapers, probably forwarded by a delighted Flora. 'It is rather a common occurrence', claimed the *Leader*, 'in Victoria at least, to have one's name associated with a species, but when it is a new genus to which the name is devoted, then the honor is all the greater' (Anonymous 1890c; Anonymous 1890d; Anonymous 1890e).

Like Tisdall, Flora did not suggest any scientific names for her discoveries (except for eponymy), but she did give brief descriptions of the key macroscopic features including spore-print colour, and also recorded details that could only be observed using a hand lens. Flora owned a microscope, but she rarely seems to have recorded information on microscopic characters.<sup>35</sup> Cooke and Massee made liberal use of her notes, often reproducing parts of them verbatim.<sup>36</sup>

32 'Dr Cooke has alienated several Australian fungi collectors by always refusing to dedicate any species to the collectors and those inspired to collect. Such a request after all the efforts, expense and dangers is surely an excusable ambition' (Mueller 1893).

33 In an annotation on her copy of McAlpine (1895), Flora wrote next to the genus *Campbellia*: 'Named in remembrance of the Bold Pioneer Alex. Campbell, my father. F. M. Martin | The only specimen was found by Robert Sharp[,] Beenak, Victoria | It was a beautifully coloured sp.: Library, Royal Botanic Gardens Victoria, Melbourne, Vic., Australia. The genus *Campbellia* is now known as *Rodwaya* Syd. & P. Syd. (May et al. 2004).

34 *Martinella* (Cooke & Massee) Sacc. (1892) is preoccupied by *Martinella* Baill. (1888) Bignoniaceae.

35 A surviving collection of Flora's water-colour illustrations contains some details that she may have observed through a microscope (RB MSS A52, Library, Royal Botanic Gardens Victoria, Melbourne, Vic., Australia).

36 e.g. *Agaricus (Pholiota) disruptus* Cooke & Massee (now *Pholiota disrupta* (Cooke & Massee) McAlpine) (May et al. 2004). In the notes on her drawing of this species Flora wrote: '613 | Pholiota spores sepia brown or bright yellowish brown or light red | stipe confluent and homogenous with the hymenophore with friable persistent or fugacious ring | Brighton | Turnip bed | Nov 1890 | F. M. M. - | height 3-6 inches | Pileus warted pale mushroom colour sometimes almost smooth on margin, recurved - fleshy - Gills dull dirty pinkish white at length brown free small sinus [-] Stipe long same colour as mushroom bulging above then slender hollow yet firm ragged - bulbous at base much strong mycelium spores brown white veil disappearing' (RB MSS A52, Library, Royal Botanic Gardens Victoria, Melbourne, Vic., Australia). Cooke and Massee's description is: 'Pileus convex, fleshy, creamy white, at first smooth, then cracked deeply into large areolae, especially about the fleshy disc (8-10 c.m. broad), margin incurved. Stem elongated, cylindrical, expanding into the pileus, sometimes slightly swollen at the base (10 c.m. long, 10-15 m.m. thick), same colour as the pileus, hollow, striate, cracking, and subsquamulose, with a strong cord-like mycelium.

Flora's collections of leaf spots proved to be a particularly rich source of new taxa, but she sent so many to Cooke that he eventually asked her to stop. 'I collected about [250] for Dr Cooke,' Flora recalled later, 'a number of them being determined by him to be new to science. He wished to have these, but wrote at last that he was very tired of working at the 'diseases of the eucalypts'' (Martin 1895b). Even today, eucalypts continue to yield high numbers of novel fungi (Cheewangkoon et al. 2009).

### **Handbook of Australian Fungi**

In 1890, Cooke was uncertain if his position at Kew would be renewed (English 1987, Cooke 1889b). Looking for a new source of income, he revived an idea to produce a handbook of Australian fungi. A couple of years earlier Mueller had investigated and rejected the proposal as 'impracticable' (Cooke 1889c; Mueller 1889b), but this time Flora became involved and was enthusiastic. She wrote to all the Australian Secretaries of Agriculture on Cooke's behalf, and he was eventually granted £150 from New South Wales, £50 from South Australia, and £100 each from Victoria, Tasmania, and Queensland (McAlpine & Smith 1891; Cooke 1892a; Anonymous 1892d; Pearson 1890).

Mueller, who may not have known about Flora's actions, credited the grants to McAlpine (Mueller 1891b), and McAlpine's biographer credited them to Mueller (Parbery 2015: 51). Cooke, however, makes Flora's role clear in his Preface where she is mentioned three times. 'My thanks are due', he declared, 'to Mrs. Flora Martin for her unflagging energy in smoothing the way for the accomplishment of this long-cherished design, now brought to a close' (Cooke 1892a).

Cooke's *Handbook of Australian fungi* was published in London by July 1892.<sup>37</sup> Initially well-reviewed in Australia (e.g. Anonymous 1892a; 1892b), it eventually proved frustrating for users. The handbook provided only brief descriptions of taxa, and although the associated illustrations were very fine, they were often made on the basis of imperfect material. This meant that users found

Ring narrow, pendulous. Gills adnate, rather ventricose, broad, not crowded, dull pinkish white, then umber. Spores elliptical, tawny brown, 14 x 18 u. On the ground. Victoria (Mrs. Martin, 613)' (Cooke 1891b: 89).

37 Flora exhibited a copy at the August 1892 meeting of the FNCV (Anonymous 1892c: 63).

it difficult to identify specimens from the handbook with confidence (May 1990, English 1987).

Flora's opinion of the handbook has not survived, but Cooke sent her a copy enclosing an inscribed photograph: 'In kindly remembrance of the good offices of Mrs. Flora Martin in advancing this work in the colonies, and in securing its official recognition, my thanks are ever due' (Pitcher 1925). Something of an outsider himself, Cooke found no difficulty in acknowledging Flora's contributions as those of an 'enterprising Australian mycologist' (Cooke 1890d: 87).

While Flora was likely satisfied with these tributes, Ferdinand Mueller was less so. Ever sensitive to perceived professional slights, he grumbled that Cooke gave him insufficient credit, 'while amateurs, who communicate directly with Dr Cooke, get infinite praise, so that it looks as if I had neglected altogether this branch of knowledge' (Mueller 1891b). Mueller did not begrudge amateurs acknowledgement, usually being scrupulous in this regard himself. His comments were motivated by a concern that the government could use such remarks to cut funding to Australia's few professional scientists (Mueller 1891b).<sup>38</sup>

## Later years

### Drouin

Flora struggled with unspecified health problems in her thirties and forties, often taking the mountain air as a rest cure. Seeking a more permanent remedy, in 1892 she and her husband moved to 'Weebar', a farm of about 310 acres at Drouin in Gippsland (Martin 1894e).<sup>39</sup> The couple used most of their land to raise Ayrshire dairy cattle, but also kept fowls and grew oats, and potatoes (Martin 1894d; Anonymous 1898; Anonymous 1904; Anonymous 1912).

In 1895, Flora delivered a final talk to the FNCV on the results of her research at Drouin. Called 'A ramble amongst fertilizers', it argued that weedy or even diseased plants, when properly fermented, could be a boon to farmers in preparing ground for crops or pasture. Flora likened the process to 'putting yeast

into bread', resulting in an aerated and nutritious soil (Martin 1895c). Flora's mentor, McAlpine, attended the presentation, and afterwards said that he hoped 'other ladies would follow her example and share in the scientific work of the Club' (Anonymous 1895).

Flora's husband, William, must also have supported Flora's research interests, although there is evidence of tension over them at Drouin. In a letter written at the farm, Flora confessed that she was afraid William would return to contracting, 'if he has not more to occupy his time at 'Weebar'' (Martin 1894e). The letter's recipient was William Henry Archer (1825–1909), government statistician (Close 1969), and Flora asked Archer to use his influence to appoint William a justice of the peace at Drouin. Archer obliged, and a local newspaper duly made the announcement a few weeks later (Anonymous 1894).

### *Systematic Arrangement of Australian Fungi*

Later Flora claimed that she moved to Drouin because country life provided her with myriad opportunities to conduct experiments into vegetable pathology (Martin 1895a). This research appears to have been undertaken in association with Daniel McAlpine and the Department of Agriculture. A letter survives from 1894 signed by Flora as 'Honorary Assistant Vegetable Pathologist' (Martin 1894e), an unprecedented appointment for a woman in Australia.<sup>40</sup>

Unfortunately, lack of surviving records from the Department of Agriculture makes it impossible to investigate the details of Flora's position, although McAlpine appointed at least one other honorary assistant, Gerald Henry Robinson (1873–1961). Unlike Flora, however, Robinson went on to become a full-time paid assistant in 1900 (George 2009; White 1986).

McAlpine proved to be a prolific author as Vegetable Pathologist, issuing hundreds of publications (McAlpine 1910). Early works covered rusts, blights, galls and other pathogens of commercial crops, but none of these mentioned Flora. This is surprising given her

<sup>38</sup> Mueller's own position was precarious, being subject to six-month renewal as an officer over the expected retirement age of 60 (Home et al. 2006: 19–22).

<sup>39</sup> Pitcher (1925), however, states the move was made 'owing to her husband's retirement there for health and other reasons.'

<sup>40</sup> Other early female government scientific appointments include Mary Emma Greayer who was employed as a computer at Adelaide Observatory from 1890, Charlotte Emily Fforde Peel, who was employed as a star measurer, computer and astrographic assistant at Melbourne Observatory from 1898 (Stevenson 2014), and Sarah Hynes who was appointed a botanical assistant at the Technological Museum in Sydney in 1898 (now PowerHouse Museum) (Hooker 2005).

semi-official position, and the fact that McAlpine did reference Robinson, and numerous other contributors of practical information. The oversight, however, may signal, or indeed help to explain, a breach between Flora and McAlpine that occurred in the mid 1890s.

In 1895, McAlpine published his first major book, *Systematic arrangement of Australian fungi*. It was a check-list of all known fungi in Australia with brief diagnoses and notes on state distribution. Universally well-reviewed, the *Systematic arrangement* immediately became a foundational work in Australian mycology (Pascoe 1990).

As soon as it was issued, McAlpine sent an inscribed copy of the book to Flora: 'With D. McAlpine's Compliments'. In a scrawl beneath this acknowledgement, she wrote: 'Essence of Insult'. Given her former praise of McAlpine this remark is shockingly curt (Figure 4).

Flora made a number of pointed annotations on the Preface. Next to McAlpine's praise for her 'indefatigable labours in extending our knowledge of Australian species', Flora repeated claims about the large size of her herbarium. She stated that she was responsible for McAlpine's appointment as Vegetable Pathologist, and claimed priority for public use of the term 'vegetable pathologist' in Victoria.

It is not possible to say if McAlpine's lack of appropriate acknowledgement was solely responsible for the falling-out, but Flora clearly felt underappreciated. In turn, what McAlpine thought of the matter, and when he became aware of it are unknown. The *Systematic arrangement* suggests McAlpine regarded Flora principally as a mycological collector, but he had also praised her research abilities to the FNCV (see above). Elsewhere, McAlpine indicated that he felt equivocal about women as students. In an address to the Melbourne Horticultural College, he acknowledged that women already attended such colleges overseas, but remained doubtful about their ability to move beyond branches 'such as flower-gardening, fruit-preserving and scent-making' (McAlpine 1893).

### ***Polyporus Mylittae* Cke & Mass.**

The rise and fall of Flora and McAlpine's relationship underlines the importance, and power, of a mentor to a woman attempting to walk beyond traditional

pathways. It was his measure of her worth, more than any other that influenced how she was regarded in Australian mycology.

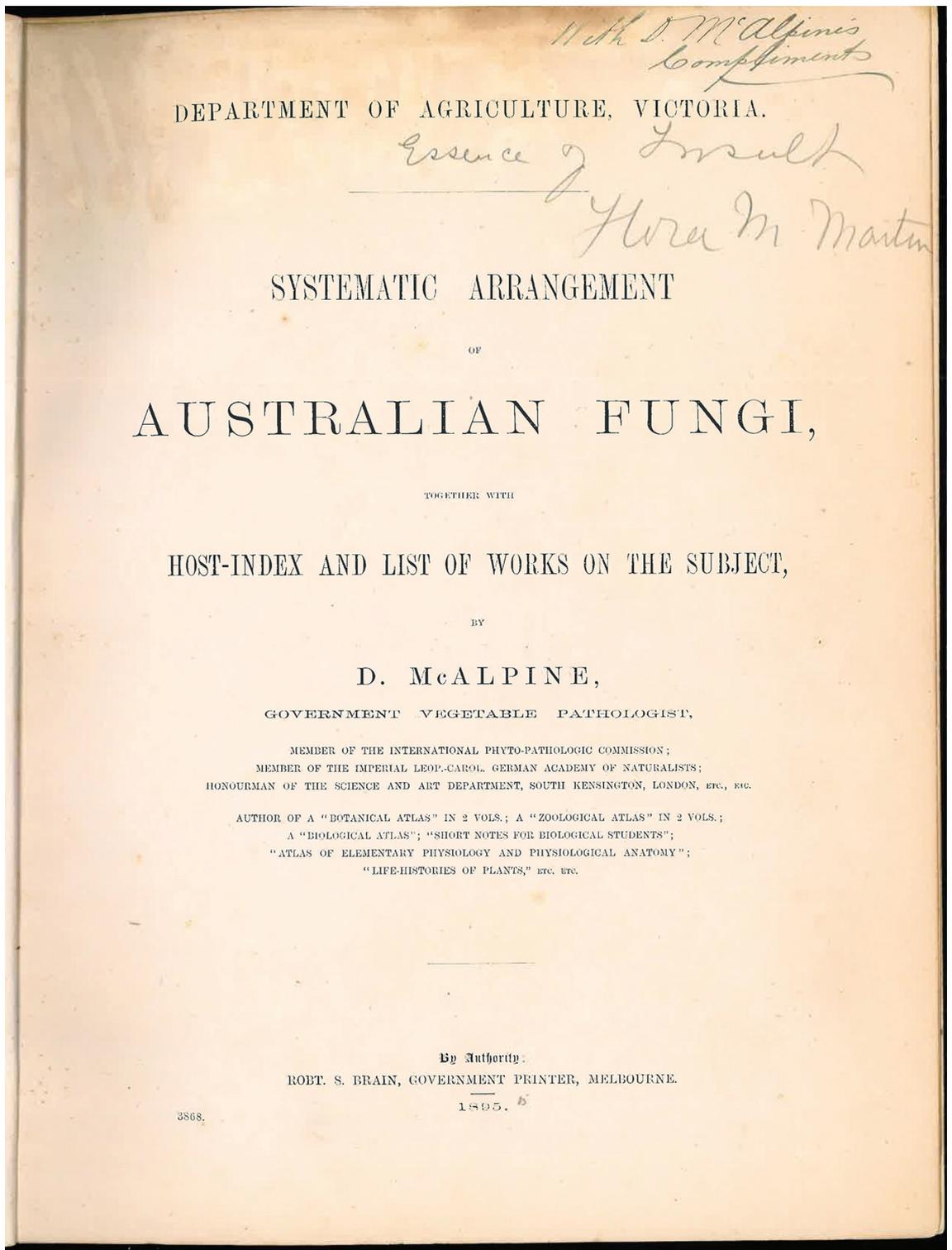
In 1904, McAlpine published an article on the remarkable Australian fungus *Polyporus mylittae* Cooke & Masee, or native bread.<sup>41</sup> The sclerotium (underground growth) of this organism was first sent to the United Kingdom by James Backhouse in in the 1830s, but the fruit body that grew out of it was not observed until 1885 by Henry Tisdall. McAlpine made a list of five known specimens of fructification, curiously omitting one made by Flora, despite having already noted evidence that she sent it to Cooke in 1892 (McAlpine 1904; Barnard 1892). Flora was living at Drouin at the time McAlpine wrote this article and he could have contacted her for clarification.

The Director of Kew Botanic Gardens, William Thiselton-Dyer, read McAlpine's article and wrote to inform him that the type specimen of *Polyporus mylittae* had indeed been collected by Flora Martin, and returned to her 'at her request' (Thiselton-Dyer 1904). Flora's colleague at the FNCV, Francis Barnard, quoted Dyer's letter in the *Victorian Naturalist* in 1923, shortly before Flora's death, to correct the record. Noting that Cooke's type description stated only that the type specimen came from 'S. Australia',<sup>42</sup> he added, 'there is no doubt that it was a specimen sent from Victoria by Mrs. Martin, better known in the early days of the Club as Miss F. M. Campbell, an ardent fungus collector' (Barnard 1923).

Among her annotations on McAlpine's *Systematic arrangement of Australian fungi*, Flora noted next to the entry on *Polyporus Mylittae*: 'The year [1892] I was working hard at the Fungi[.] Plenty in this District Weebar Drouin[.] Specimen sent to Cooke now in Botanical Gardens Melbourne[.] Unfortunately, the specimen can no longer be located, and from the point of view of posterity Flora would have been wiser to entrust it to Mueller's Herbarium than to the Director of the Melbourne Botanic Garden, William Guilfoyle, (1840–1912), only a few boxes of whose museum specimens survive.

41 Now known as *Laccoccephalum mylittae* (Cooke & Masee) Núñez & Ryvarden (May et al. 2004).

42 Barnard actually wrote 'South Australia', but the original text in Cooke's type description was 'S. Australia', and may well have meant 'Southern Australia'. The specimens cited before and after *Polyporus mylittae* were both attributed to Flora (Cooke 1892b: 37).



**Figure 4.** 'Essence of insult': Flora's copy of D. McAlpine (1895). *Systematic arrangement of Australian fungi* (Library, Royal Botanic Gardens Victoria)

## Legacy

As in the first decades of her life, Flora almost disappears from the historical record in her last decades. She remained at Drouin after her husband's death in 1909, writing a few letters to newspapers (1912; 1917a; 1917b), notably to Donald MacDonald (1859–1932), a nature writer with the *Argus* (Anderson 1986, e.g. MacDonald 1915, MacDonald 1916). With age and isolation she seems to have been effectively shut out of the mycological circles in Melbourne that had so occupied her in the previous century.

After her death on 13 March 1923, her will made clear that mycology, and her contributions to it, had always been uppermost in her mind. To 'the Master for the time being of Ormond College' (the institution where she had attended McAlpine's lectures) she left:

*all my collections of botanical bacteriological and other scientific specimens and all my fittings instruments<sup>43</sup> and appliances in connection therewith and all my books and my book cases ... and I desire that as many of such chattels are suitable therefor shall be placed in the McFarland library at Ormond College ... (Martin 1923).*

This generosity was of sufficient interest to be noticed by Melbourne newspapers (Anonymous 1924), although probate records indicate that it was only partially enacted. Presumably at the request of the College, certain of Flora's books, bookcases and 'etc.' were sold, and the proceeds of £11-10-0 forwarded to the Master.<sup>44</sup>

There is no mention of Flora's specimens in probate records, and according to FNCV member Frederick Pitcher, 'but for the kind offices of a relative of mine, who owned the property adjoining Mrs. Martin's farm, numerous books along with 'numberless botanical specimens, sketches, coloured plates and drawings of fungi' might have been 'destroyed as valueless, after the disposal of other property'. Pitcher put 'a large number of them together, in case they might be of service to the Agricultural Department or members of the Club' (Pitcher 1925). A few of these items are now at the Royal Botanic Gardens Victoria, but the fate of the rest remains unknown.

<sup>43</sup> Probate records indicate that Flora's instruments included a microscope from her Drouin property.

<sup>44</sup> Probate jurisdiction, Flora Mary Martin, 7 March 1924, Public Record Office, Victoria, Australia.

## Conclusion

A talented, middle-class, colonial woman with sufficient leisure to pursue her own interests, Flora Martin née Campbell found purpose and meaning in the study of Australian fungi. Over four decades she laboured to make a significant contribution to mycology despite the restrictions of a gendered and hierarchical scientific system. She collected, illustrated and annotated type specimens of at least 83 new taxa (Maroske & Vaughan 2014), thereby accumulating a significant herbarium. She undertook original research into vegetable pathology, and communicated her results in letters and articles, as a witness to a royal commission, and at a conference of the AAAS.

While unable to advance her own career beyond honorary positions, Flora played a role in the appointment of the first government vegetable pathologist in Victoria, and in the issue of the first fungal flora of Australia (Cooke 1892a). She benefitted from engagement with male colleagues in Australia and overseas, and established her own network of collectors, but was most connected to Daniel McAlpine. He allowed her to attend his classes, and to contribute material and observations to his research, but only acknowledged her work as a collector in his publications.

Flora's life and work personalises the story of colonial women who aspired to make science their vocation but could not quite overcome the barriers in their way. Her frustration with this situation is evidenced in criticisms of colleagues in letters and annotations. Even leaving a record of her achievements proved to be a struggle with Ormond College declining a bequest of materials made in her will. Appropriate recognition from key peers may have been withheld from Flora during her lifetime, but there is enough surviving information about her life and work to establish that she not only made a significant contribution to Australian mycology, but also achieved a suite of firsts for a woman in Australian science.

## Acknowledgements

We thank the following individuals for facilitating access to collections containing information about Flora Martin née Campbell: Dr Jacky Edwards, Agriculture Victoria; Philip Bertling, Library, Royal Botanic Gardens Victoria; and Bridget Bauman, Te Papa, Wellington, NZ. We also thank Helen Cohn and Sue Janson for editorial comments.

## References

See also *Manuscripts* (below)

- Ainsworth, G.C. (Webster J. and Moore D., eds) (1996). *Brief biographies of British mycologists*. British Mycological Society: Stourbridge.
- Anderson, H. (1986). Macdonald, Donald Alaster (1859–1932). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/macdonald-donald-alaster-7335/12731> (accessed 29 April 2017).
- Anonymous (1844). Married. *Launceston Examiner* [Launceston, Tas., Australia], 1 June 1844, p. 4.
- Anonymous (1845). Birth. *Cornwall Chronicle* [Launceston, Tas., Australia], 5 March 1845, p. 2.
- Anonymous (1863). *Sands & McDougall's Melbourne and suburban directory*. Melbourne.
- Anonymous (1866). *Sands & McDougall's Melbourne and suburban directory*. Melbourne.
- Anonymous (1868). *Sands & McDougall's Melbourne and suburban directory*. Melbourne.
- Anonymous (1869a). *Sands & McDougall's Melbourne and suburban directory*. Melbourne.
- Anonymous (1869b). Victoria. *Tasmanian Times* [Hobart, Tas., Australia], 8 March 1869, p. 3.
- Anonymous (1870). Town news. *Australasian* [Melbourne, Vic., Australia], 24 December 1870, p. 19. [Melbourne Mint contract.]
- Anonymous (1872). *Argus* [Melbourne, Vic., Australia], 27 November 1872, p. 5. [Government House contract.]
- Anonymous (1877). Shipping intelligence. *Age* [Melbourne, Vic., Australia], 21 March 1877, p. 2.
- Anonymous (1878). Shipping intelligence. *Argus* [Melbourne, Vic., Australia], 30 August 1878, p. 2.
- Anonymous (1879a). Shipping intelligence. *Argus* [Melbourne, Vic., Australia], 11 July 1879, p. 4.
- Anonymous (1879b). Shipping. *Brisbane courier* [Qld, Australia], 19 July 1879, p. 4.
- Anonymous (1879c). News of the day. *Age* [Melbourne, Vic., Australia], 31 December 1879, p. 3. [St Paul's Cathedral contract.]
- Anonymous (1883a). The Field Naturalists' Club of Victoria. *Southern Science Record* [Melbourne, Vic., Australia] **3**, 181.
- Anonymous (1883b). The Field Naturalists' Club of Victoria. *Southern Science Record* [Melbourne, Vic., Australia] **3**, 205.
- Anonymous (1885). The Field Naturalists Club of Victoria. *Victorian Naturalist* **2**(2), 17–18.
- Anonymous (1886a). The Field Naturalists Club of Victoria. *Victorian Naturalist* **3**(5), 53–55. [Formation of Cryptogamic Section.]
- Anonymous (1886b). The Field Naturalists Club of Victoria. *Victorian Naturalist* **2**(10), 149–150. [Summary of Flora's talk 'Notes on edible fungi']
- Anonymous (1886c). The Field Naturalists' Club of Victoria. *Victorian Naturalist* **3**(3), 26.
- Anonymous (1887). To correspondents. *Australasian* [Melbourne, Vic., Australia] 27 August 1887, p. 24.
- Anonymous (1888a). Diseased vineyards. *Australian Star* [Sydney, NSW, Australia] 1 February 1888, p. 5.
- Anonymous (1888b). *Bairnsdale Advertiser and Tambo and Omeo Chronicle* 25 February 1888, p. 2.
- Anonymous (1888c). The Field Naturalists Club of Victoria. *Victorian Naturalist* **5**(2), 17.
- Anonymous (1890a). Gossip. *Sydney Mail and New South Wales Advertiser* [NSW, Australia] 1 February 1890, p. 243.
- Anonymous (1890b). Australasian Association for the Advancement of Science. *Sydney Morning Herald* [NSW, Australia] 14 January 1890, p. 7.
- Anonymous (1890c). Agricultural notes. *Leader* [Melbourne, Vic., Australia] 6 September 1890, p. 9.
- Anonymous (1890d). Horticultural notes. *Australasian* [Melbourne, Vic., Australia] 6 September 1890, p. 7.
- Anonymous (1890e). Australian fungi and fungologist. *Weekly Times* [Melbourne, Vic., Australia] 13 September 1890, p. 30.
- Anonymous (1890f). The visit of the members of the Australasian Association for the Advancement of Science to the Australian Alps. *Illustrated Australian News and Musical Times* [Melbourne, Vic., Australia] 1 February 1890, pp. 8, 17.
- Anonymous (1890g). The Field Naturalists' Club of Victoria. *Victorian Naturalist* **7**(4), 42.
- Anonymous (1891a). The Field Naturalists Club of Victoria. *Victorian Naturalist* **8**(5), 65.
- Anonymous (1891b). Puncheries. *Melbourne Punch* [Vic., Australia] 23 July 1891, p. 2.
- Anonymous (1892a). Handbook of Australian Fungi. *Adelaide Observer* [South Australia] 10 September 1892, p. 9.
- Anonymous (1892b). Review. *Victorian Naturalist* **9**(5), 74–75. [Mueller claimed that this review was written by the editor of the *Victorian Naturalist*, Arthur Henry Shakespeare Lucas (1853–1936)—see Letter, F. Mueller to W. Thiselton-Dyer, 5 September 1892, RBG Kew, Kew Correspondence, Australia, Mueller, 1891–96, ff. 34–35.]
- Anonymous (1892c). Exhibition of specimens. *Victorian Naturalist* **9**(5), 63.
- Anonymous (1892d). The Agricultural Gazette. *Sydney Mail and New South Wales Advertiser* [Australia] 22 October 1892, 906. [Cost of Cooke (1892).]
- Anonymous (1894). *Gippsland Farmer's Journal* [Traralgon, Vic., Australia] 27 July 1894, p. 2. [Justices of peace.]
- Anonymous (1895). [Report of paper] By Mrs. W. Martin entitled "Notes on fertilizers". *Victorian Naturalist* **12**(7), 73–74.
- Anonymous (1898). Agricultural intelligence. *Argus* [Melbourne, Vic., Australia] 14 February 1898, p. 6. [Oats at 'Weebar'.]
- Anonymous (1904). Potatoes. *Argus* [Melbourne, Vic., Australia] 23 July 1904, p. 13.

- Anonymous (1912). Ayrshire. *Argus* [Melbourne, Vic., Australia] 19 October 1912, p. 4.
- Anonymous (1924). Bequest to university. *Argus* [Melbourne, Vic., Australia] 5 March 1924, p. 19.
- Bailey, F.M. (1879). A census of the flora of Brisbane. *Proceedings of the Linnean Society of New South Wales* **4** 1879, 137–204.
- Bailey, F.M. (1883). *A synopsis of the Queensland flora containing both the Phaenogamous and Cryptogamous plants*. Government Printer: Brisbane.
- Balfour, J.H. (1852–4). *Class book of botany: being an introduction to the study of the vegetable kingdom*. Adam and Charles Black: Edinburgh. [Pitcher (1925) stated that Flora owned only Part 2 of this work *Vegetable physiology and systems of classification*.]
- Barnard, F. (1892). Native Bread. *Victorian Naturalist* **9(9)**, 144.
- Barnard, F. (1923). *Polyporus mylittae*. *Victorian Naturalist* **39(11)**, 159–160. [Paper dated 12 February 1923.]
- Beaton, G. and Weste, G. (1982). A new species of *Scleroderma* from Victoria Australia. *Transactions of the British Mycological Society* **79**, 41–43.
- Bentham, G. (1861). *Flora Australiensis*, vol. 1. Lovell, Reeve and Co.: London.
- Bentham, G. (1863–78). *Flora Australiensis*, 7 vols. Lovell, Reeve and Co.: London.
- Berkeley, M.J. and Broome, C.E. (1882). List of fungi from Brisbane, Queensland; with descriptions of new species—part II. *Transactions of the Linnean Society of London. Botanical series* **2**, 53–73.
- Berkeley, M.J. and Broome, C.E. (1887). List of fungi from Queensland and other parts of Australia; with descriptions of new species. Part III. *Transactions of the Linnean Society of London. Botanical series* **2**, 217–224.
- Borchart, D.H. (1976). Tenison-Woods, Julian Edmund (1832–1889). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/tenison-woods-julian-edmond-4700/text7787> (accessed 5 February 2017).
- Campbell, A. (1890). The hon. Dr Campbell. *Express and Telegraph* [Adelaide, SA, Australia] 18 January 1890, p. 3.
- Campbell, F.M. (1887a). Victorian fungi. *Victorian Naturalist* **4(6)**, 95–96.
- Campbell, F.M. (1885a). [Fungi collected at Lilydale]. *Victorian Naturalist* **2(3)**, 34. [Club excursion to Lilydale took place on 25 May 1885.]
- Campbell, F.M. (1886a). Victorian fungi. *Victorian Naturalist* **2(2)**, 139 [as p. '127'].
- Campbell, F.M. (1887b). Vegetable pathology. *Victorian Naturalist* **4(8)**, 124–125.
- Campbell, F. (1888a). 'Miss F. Campbell examined'. In W. Madden et al., *Royal Commission on Vegetable Products: fifth progress report, and continuation of the minutes of evidence; together with appendices*, pp. 127–129. Government Printer: Melbourne.
- Campbell, F. (1888b). Reports to the Vegetable Commission. *Argus* [Melbourne, Vic., Australia] 9 March 1888, p. 5. [On elm trees and anthracnose; republished in *Kerang Times and Swan Hill Gazette* [Vic., Australia] 9 March 1888, 5; and *Australasian* [Melbourne, Vic., Australia] 10 March 1888, 20.]
- Carter, J.M.T. and Cross, R. (2013). *Ginger for pluck: the life and times of Miss Georgina King*. Wakefield Press: Kent Town, South Australia.
- Cheewangkoon, R., Groenwald, J.Z., Summerell, B.A., Hyde, K.D., To-Anun, C. and Crous, P.W. (2009). Myrtaceae, a cache of fungal biodiversity. *Persoonia* **23**, 55–85.
- Close, C. (1969). Archer, William Henry (1825–1909). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/archer-william-henry-2895/text4153> (accessed 6 March 2017).
- Cooke, M.C. (1889). New Australian fungi. *Grevillea* **18(85)**, 1–8.
- Cooke, M.C. (1890a). Australian fungi. *Grevillea* **18(87)**, 49.
- Cooke, M.C. (1890b). Australian fungi. *Grevillea* **18(87)**, 49–51.
- Cooke, M.C. (1890c). Australian fungi. *Grevillea* **18(88)**, 80–81.
- Cooke, M.C. (1890d). On *Campbellia*. *Grevillea* **18(88)**, 87.
- Cooke, M.C. (1890e). Australian fungi. *Grevillea* **19(89)**, 5.
- Cooke, M.C. (1890f). Australian fungi. *Grevillea* **19(90)**, 44–47.
- Cooke, M.C. (1891a). Two Australian fungi. *Grevillea* **19(91)**, 81–83.
- Cooke, M.C. (1891b). Australian fungi. *Grevillea* **19(92)**, 89–92.
- Cooke, M.C. (1891c). Additions to *Merulius*. *Grevillea* **19(92)**, 108–109.
- Cooke, M.C. (1891d). Australian fungi. *Grevillea* **20(93)**, 4–7.
- Cooke, M.C. (1891e). Australian fungi. *Grevillea* **20(94)**, 35–36.
- Cooke, M.C. (1892a). *Handbook of Australian fungi*. Williams and Norgate: London.
- Cooke, M.C. (1892b). Australian fungi, supplement to handbook, by M. C. Cooke. *Grevillea* **21(98)**, 35–39.
- Creese, M.R.S. (1998). *Ladies in the laboratory, I: American and British women in science, 1800–1900: a survey of their contributions to research*. Scarecrow Press: Lanham, Maryland.
- Creese, M.R.S. (2004). *Ladies in the laboratory, II: West European women in Science, 1800–1900: a survey of their contributions to research*. Scarecrow Press: Lanham, Maryland.
- Creese, M.R.S. (2010). *Ladies in the laboratory, III: South african, Australian, New Zealand, and Canadian women in science: nineteenth and early twentieth centuries*. Scarecrow Press: Lanham, Maryland and Rowman & Littlefield Publishers: Lanham, Maryland.
- Creese, M.R.S. (2015). *Ladies in the laboratory, IV: Imperial Russia's women in science, 1800–1900: a survey of their contributions to research*. Rowman & Littlefield Publishers: Lanham, Maryland.
- Dow, John Lamont (1837–1923). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/Dow-john-lamont-3433/5227> (accessed 7 April 2017).
- English, M.P. (1987). *Mordecai Cubitt Cooke: Victorian naturalist, mycologist, teacher & eccentric*. Biopress: Bristol.
- French, C. (1891–1911). *A handbook to the destructive insects of Victoria: with notes on the methods to be adopted to check and extirpate them*, 5 vols. Government Printer: Melbourne.
- Gardiner, L. (1990). Tisdall, Henry Thomas (1836–1905). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/tisdall-henry-thomas-9255/text15469> (accessed 5 February 2017).
- Gascoigne, J. and Maroske, S. (2013). 'Science and technology'. In A. Bashford and S. McIntyre (eds), *The Cambridge history of Australia*, volume 1: Indigenous and colonial Australia, pp. 438–461. CUP: Cambridge.

- George, A. (2009) Reader, Felix Maximillian. *Australian botanist's companion*. Four Gables Press: Kardinya, Western Australia, p. 526.
- Gunson, N. (1972). Halley, Jacob John (1834–1910). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/halley-jacob-john-3698/text5791> (accessed 5 February 2017).
- Halley, J.J. (1885). Ladies and gentlemen, members of the Field Naturalist Club of Victoria [Presidential address]. *Victorian Naturalist* **2**(1), 3–13.
- Home, R.W., Lucas, A.M., Maroske, S., Sinkora, D.M., Voigt, J. and Wells, M. (eds) (2006). *Regards yours: selected correspondence of Ferdinand von Mueller*, vol. 3: 1876–1896. Peter Lang: Bern.
- Hooker, C. (2005) Hynes, Sarah (Sally) (1859–1938). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/hynes-sarah-sally-1300/text23499> (accessed 9 March 2017).
- Houghton, S. (2005). "If it is not against the rules": women in the FNCV 1880–1980. *Victorian Naturalist* **122**(6), 290–306.
- [Hurst-Browne, M.] (1890). The Australasian Science Association: the trip to the Australian Alps. *Argus* [Melbourne, Vic., Australia] 21 January 1890, p. 6. [Miss Hurst-Browne is identified as the correspondent of the *Argus* in Anonymous (1890a).]
- Jewell, W.R. (1988). Pearson, Alfred Naylor (1856–1933). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/pearson-alfred-naylor-8002/text3945> (accessed 11 February 2017).
- Jordan, C. (2005). *Picturesque pursuits: colonial women artists & the amateur tradition*. MUP: Carlton, Vic.
- Kelly, F. (1993). Learning and teaching science: women making careers 1890–1920, pp. 35–75 in Kelly, Farley (ed), *On the edge of discovery: Australian women in science*. Text: Melbourne.
- Knight, C. (1884). A description of a new species of *Parmelia* from Victoria. *Proceedings of the Royal Society of Queensland* **1**, 114.
- Leighton, W.A. (1871). *The lichen flora of Great Britain, Ireland and the Channel Islands*. Published by the author: Shrewsbury.
- Liversidge, A. and Etheridge, R. (eds) (1889). *Report of the first meeting of the Australasian Association for the Advancement of Science held at Sydney, New South Wales in August and September 1888*. AAAS: Sydney.
- McCarthy, P.M. (2017). *Checklist of the lichens of Australia and its island territories*. ABRIS: Canberra. Version 12 April 2017 <http://www.anbg.gov.au/abris/lichenlist/introduction.html>.
- Macdonald, D. (1915). Notes for boys. *Argus* [Melbourne, Vic., Australia] 3 August 1915, p. 10. [Morels.]
- MacDonald, D. (1916). Nature notes and queries. *Argus* [Melbourne, Vic., Australia] 15 December 1916, p. 5. [Lichens.]
- MacLeod, R. (1988). *The commonwealth of science: ANZAAS and the scientific enterprise in Australasia 1888–1988*. OUP: Melbourne.
- Madden, W. et al. (1888). *Royal Commission on Vegetable Products: fifth progress report, and continuation of the minutes of evidence; together with appendices*. Government Printer: Melbourne.
- Marks, E.N. (1969). Bailey, Frederick Manson (1827–1915). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/bailey-frederick-manson-2918/text4211> (accessed 5 February 2017).
- Maroske, S. (1993). "The whole great continent as a present": nineteenth-century Australian women workers in science". In F. Kelly (ed.), *On the edge of discovery: Australian women in science*, pp. 13–34. Text Publishing: East Melbourne.
- Maroske, S. (2014). "A taste for botanic science": Ferdinand Mueller's female collectors and the history of Australian botany. *Muelleria* **32**, 72–91.
- Maroske, S. and May, T.W. (2018). Naming names: the first women taxonomists in mycology. *Studies in Mycology* (in press).
- Maroske, S. and Vaughan, A. (2014). Ferdinand Mueller's female plant collectors: a biographical register. *Muelleria* **32**, 92–172.
- Martin, F.M. (1890). The late Captain Campbell: sixty-five years in Australia. *Argus* [Melbourne, Vic., Australia] 27 May 1890, p. 9.
- Martin, F.M. (1891). The handbook of injurious insects of Victoria. *Argus* [Melbourne, Vic., Australia] 18 July 1891, p. 5. [Review of C. French, 1891 *A handbook of the destructive insects of Victoria*, as letter to the editor.]
- Martin, F.M. (1893). Disease on currant vine's. *Argus* [Melbourne, Vic., Australia] 23 August 1893, p. 10.
- Martin, F.M. (1894a). Diseases in vines. *Argus* [Melbourne, Vic., Australia] 23 January 1894, p. 7. [Republished as Martin 1894b, 1894c.]
- Martin, F.M. (1894b). Anthracnose and its treatment. *Mildura Cultivator* [Vic., Australia] 27 January 1894, p. 5. [Republication of Martin (1894a).]
- Martin, F.M. (1894c). Anthracnose and its treatment. *Western Mail* [Perth, WA, Australia] 9 June 1894, p. 47. [Republication of Martin (1894a).]
- Martin, F.M. (1894d). Yorkshire fog. *Australasian* [Melbourne, Vic., Australia] 12 May 1894, p. 7.
- Martin, F.M. (1895a). Bitter herbs and disease. *Australasian* [Melbourne, Vic., Australia] 6 July 1895, p. 9.
- Martin, F.M. (1895b). The diseases of the Eucalypts. *Argus* [Melbourne, Vic., Australia] 21 November 1895, p. 6.
- Martin, F.M. (1895c). A ramble amongst fertilizers. *Victorian Naturalist*. **12**(8), 87–91. [Read before the FNCV on 14 October 1895.]
- Martin, F.M. (1898). Germs and the dishcloth. *Argus* [Melbourne, Vic., Australia] 20 August 1898, p. 10.
- Martin, F.M. (1912). Injurious mushrooms. *Argus* [Melbourne, Vic., Australia] 21 May 1912, p. 9.
- Martin, F.M. (1917a). Hospital herb. *Gippsland Mercury* [Sale, Vic., Australia] 16 November 1917, p. 4. [Republished as Martin (1917b).]
- Martin, F.M. (1917b). Hospital herbs. *Every Week* [Bairnsdale, Vic., Australia] 22 November 1917, p. 1. [Republication of 1917a.]
- May, T.W. (1990). 'History of the study of Australian Agaricales'. In P.S. Short (ed.), *History of systematic botany in Australasia*, pp. 265–272. ASBS: South Yarra, Vic.
- May, T.W. (2005). From fungus to Fungimap: fungi and the FNCV. *Victorian Naturalist* **122**(6), 319–326.
- May, T.W. and Pascoe, I. G. (1996). History of the taxonomic study of Australian fungi, pp. 171–206 in *Fungi of Australia*, vol. 1A. ABRIS, CSIRO: Canberra.

- May, T.W., Milne, J., Wood, A.E., Shingles, S., Jones, R.H. and Neish, P. (2004). *Interactive catalogue of Australian fungi*, version 3.0. Australian Biological Resources Study: Canberra and Royal Botanic Gardens Melbourne: Melbourne. <http://data.rb.gov.au/cat/index.php/fungicatalogue>
- McAlpine, D. ([1893]). Botany in its relation to horticulture. *Monthly lectures delivered at School of Horticulture, by various specialists, during 1892–1893*, pp. 7–18. Government Printer: Melbourne.
- McAlpine, D. ([1910]). *List of scientific works, papers, bulletins, &c.* Government Printer: Melbourne.
- McAlpine, D. (1895). *Systematic arrangement of Australian fungi*. Government Printer: Melbourne.
- McAlpine, D. (1904). Bibliography of the fungus *Polyporus mylittae*, Cooke and Massee. *Victorian Naturalist* **21(4)**, 59–60.
- McAlpine, D. and Smith, F.C. (1892). Fruit diseases. *South Australian Register* [Adelaide, SA, Australia], 12 February 1891, 3. [Cost of Cooke (1892).]
- Mueller, F. von (1885). Notes on Victorian fungi. *Victorian Naturalist* **2(6)**, 76–80.
- Norris, R. (1981). Deakin, Alfred (1856–1919). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/deakin-alfred-5927/text10099> (accessed 27 February 2017).
- Parbery, D. (2015). *Daniel McAlpine and the Bitter Pit*. Springer International Publishing: Bern.
- Pascoe, I.G. (1990). 'History of systematic mycology: 1800–1900'. In P.S. Short (ed.), *History of systematic botany in Australasia*, pp. 259–264. ASBS: South Yarra, Vic.
- Pescott, R.T.M. (1981). French, Charles (1842–1933). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/french-charles-6246/text10753> (accessed 5 February 2017).
- Pitcher, F. (1925). A student of fungi—Mrs Flora Martin's work. *Victorian Naturalist* **42(7)**, 176–177.
- Presland, G. (2016). *Understanding our natural world: the Field Naturalists Club of Victoria 1880–2015*. FNCV: Blackburn, Vic.
- Ralston, K. (2001). Francis Robert Muter Wilson: pioneer Australian lichenologist. *Bibliotheca lichenologica* **78**, 369–388.
- Saccardo, P.A. (1892). *Sylloge Fungorum omnium hucusque cognitorum. Vol. 10. Supplementum universale*. Sumptibus auctoris: Typis seminarii, Patavii.
- Short, P.S. (1990). 'Politics and the purchase of private herbaria by the National Herbarium of Victoria'. In P.S. Short (ed.), *History of systematic botany in Australasia*, pp. 5–12. ASBS, South Yarra, Vic.
- Spencer, W.B. (ed.) (1890). *Report of the second meeting of the Australasian Association for the Advancement of Science held at Melbourne, Victoria in January, 1890*. Sydney.
- Stevenson, T. (2014). Making visible the first women in astronomy in Australia: the measurers and computers employed for the astrographic catalogue. *Publications of the Astronomical Society of Australia*, DOI: <https://doi.org/10.1017/pasa.2014.12> (accessed 9 March 2017).
- Tenison-Woods, J.E. and Bailey, F.M. (1882). On some of the fungi of New South Wales and Queensland. *Proceedings of the Linnean Society of New South Wales* **5**, 50–92.
- Tisdall, H.T. (1886). Fungi of North Gippsland. *Victorian Naturalist* **2(9)**, 106–109.
- Topp, C.A. 1890 Annual address by the president, C. A. Topp, Esq., M.A., LL.B., F.L.S. *Victorian Naturalist* **7(1)**, 3.
- Tyler, P.J. (n.d.). 2010 Royal Society of New South Wales. *Dictionary of Sydney*. [http://dictionaryofsydney.org/entry/royal\\_society\\_of\\_new\\_south\\_wales](http://dictionaryofsydney.org/entry/royal_society_of_new_south_wales) viewed 2017.
- White, N.H. (1986). McAlpine, Daniel (1849–1932). *Australian dictionary of biography*. <http://adb.anu.edu.au/biography/mcalpine-daniel-7283/text12629> (accessed 11 February 2017).
- Willis, J.H. (1940). Fungus haunts and habits. *Wild Life* [Melbourne, Vic., Australia] **2(7)**, 7–9, 46.
- Willis, J.H. (1948). Botanical pioneers in Victoria—II. *Victorian Naturalist* **66(6)**, 103–109.
- Wilson, F.R.M. (1887). Notes on a few Victorian lichens. *Victorian Naturalist* **4(6)**, 83–87.
- Wilson, F.R.M. (1890). 'Australian lichenology'. In *Report of the second meeting of the Australasian Association for the Advancement of Science, held at Melbourne, Victoria, in January 1890*, pp. 549–553. AAAS: Sydney.

### Manuscripts

- Bailey, F.M. (n.d.). [notebook], Queensland Herbarium, Toowong, Qld, Australia.
- Broome, C. (1884). Letter C. Broome to M.J. Berkeley, 17 September 1884: Natural History Museum Archives, Broome Correspondence.
- Campbell, A. (1885). Codicil to the Last Will and Testament, Alexander Campbell 5 May 1885: Public Record Office Victoria, Australia.
- Campbell, F.M. (1885b). Letter F. Campbell to C. Broome, 3 August 1885: Natural History Museum Archives, Broome Correspondence.
- Campbell, F.M. (1885c). Letter, F. Campbell to F. Barnard, October 1885: Archives, Field Naturalists' Club of Victoria, Blackburn, Vic., Australia.
- Campbell, F.M. (1885d). Letter F. Campbell to C. Broome, 3 September 1885: Natural History Museum Archives, Broome Correspondence.
- Campbell, F.M. (1885e). Letter F. Campbell to C. Broome, 30 November 1885: Natural History Museum Archives, Broome Correspondence.
- Campbell, F.M. (1886b). Letter F. Campbell to C. Broome, 23 August 1886: Natural History Museum Archives, Broome Correspondence.
- Campbell, F.M. (1889). Letter F. Campbell to F. Barnard letter, 24 February 1889: Archives, Field Naturalists' Club of Victoria, Blackburn, Vic., Australia.
- Cooke, M.C. (1889b). Letter, M. Cooke to F. Mueller, 1 September 1889: RB MSS M31, Library, Royal Botanic Gardens Victoria, Melbourne, Vic., Australia.
- Cooke, M.C. (1889c). Letter, M. C. Cooke to F.M. Bailey, 3 December 1889: B202 F. M. Bailey inward correspondence, Mitchell Library, State Library of New South Wales, Sydney, NSW, Australia.
- Deakin, A. (1889). Letter, A. Deakin to W. Madden, 3 December 1889: Daniel McAlpine box 289, La Trobe Collection, State Library of Victoria, Melbourne, Vic., Australia.
- Martin, F.M. (1892). Letter F. Martin to W.H. Archer, 13 November 1892: 2/121/1, Archer Correspondence, University of Melbourne Archives, Vic., Australia.

Martin, F.M. (1894e). Letter F. Martin to W.H. Archer, 15 March 1894: 2/12/12, Archer Correspondence, University of Melbourne Archives, Vic., Australia.

Martin, F.M. (1923). Last Will and Testament, Flora Mary Martin, 21 February 1923: 194/322, unit 689, VPRS 7591/P0002, Public Record Office Victoria, Australia.

McAlpine, D. (1890). Letter, D. McAlpine to F. Mueller, 18 July 1890: P90/7868, unit 359, VPRS 3992/P inward registered correspondence, VA 475 Chief Secretary's Department, Public Record Office, Victoria.

Mueller, F. (1872). Letter, 20 December 1872, F. Mueller to E. P. Ramsay: ML MSS.562, Mitchell Library, State Library of New South Wales, Sydney.

Mueller, F. von (1881). Letter, 1 January 1881, F. Mueller to M. Berkeley: Natural History Museum, London, Botanical correspondence, vol. 9.

Mueller, F. von (1890). Letter, F. Mueller to J.G.O. Tepper, 12 September 1890: RB MSS M198, Library, Royal Botanic Gardens Victoria, Melbourne, Vic., Australia.

Mueller, F. von (1891a). Letter, 6 October 1891, F. Mueller to P.A. Saccardo: Library, Università degli Studi di Padova Orto Botanico, Italy.

Mueller, F. von (1891b). Letter, F. Mueller to W. Thiselton-Dyer 1 July 1891: RBG Kew, Kew correspondence, Australia, Mueller, 1891–96, ff. 7–8.

Mueller, F. von (1892). Letter, F. Mueller to W. Thiselton-Dyer, 5 September 1892: RBG Kew, Kew Correspondence, Australia, Mueller, 1891–96, ff. 34–35.

Mueller, F. von (1893). Letter, F. Mueller to F. Stephani, 21 August 1893: Conservatoire et Jardin botanique, Geneva.

Pearson, A.N. (1888). Letter, A.N. Pearson to F. Campbell, 6 February 1888: Department of Agriculture correspondence of the Chemist for Agriculture, VPRS 7593/P1, vol. 1, 18 October 1887 to 18 October 1888, correspondence book, p. 190.

Pearson, A.N. (1890). Letter, A.N. Pearson to F. Campbell, 28 March 1890: Department of Agriculture correspondence of the Chemist for Agriculture, VPRS 7593/P1, vol. 1, 18 October 1887 to 18 October 1888, correspondence book, p. 755.

Thiselton-Dyer, W. (1904). Letter, W. Thiselton-Dyer to D. McAlpine, 15 December 1904: MS6273, La Trobe Collection, State Library of Victoria, Melbourne, Vic., Australia.

**Appendix: Flora Martin née Campbell's exhibits at the FNCV**

SSR = *Southern Science record*, VN = *Victorian Naturalist*

No.	Date	Exhibit	Reference
1	9.7.1883	FNCV meeting: "a collection of Fungi, mostly named"	SSR 3(7) 1883: 181
2	10.3.1884	FNCV meeting: "a rare, if not new species of Fungus of the genus <i>Tulostema</i> [sic] from Sorrento"	VN 1(3) 1884: 17
3	17.3.1884	FNCV at Intercolonial Exhibition: "Collection of Australian Fungi"	VN 1(5) 1884: 35
4	29.4.1885	FNCV 5th conversazione: "a collection of fresh fungi"	VN 2(1) 1885: 15
5	10.6.1885	FNCV meeting: "fern new to Victoria, <i>Polypodium phymatodes</i> , from East Gippsland, eight dried Victorian ferns including <i>Botrychium ternatum</i> , <i>B. lunaria</i> , <i>Asplenium nidus</i> , <i>A. flaccidum</i> , <i>Polypodium phymatodes</i> , and <i>P. serpens</i> , new lichens <i>Usnea retipora</i> (Knight) Victoria, and <i>Parmelia Campbellii</i> , (Knight) New South Wales, also rough drawings of fungi obtained during Lilydale excursion"	VN 2(3) 1885: 29
6	14.9.1885	FNCV meeting: "100 species of Australian lichens"	VN 2(6) 1885: 66
7	12.10.1885	FNCV wildflower exhibition: "Smaller but interesting exhibits"	VN 2(7) 1885: 82
8	14.12.1885	FNCV meeting: "five kinds of fossil wood from Glenmaggie, Gippsland"	VN 2(9) 1885: 106
9	8.2.1886	FNCV meeting: "collection of about 350 species of Victorian fungi, dried and mounted, twenty of them being hitherto unrecorded for Victoria"	VN 2(11) 1886: 126
10	8.3.1886	FNCV meeting: "Victorian fungi in illustration of her paper"	VN 2(12) 1886: 150
11	20.4.1886	FNCV 6th conversazione: "fine specimens of fossil woods from Glenmaggie, Gippsland. A large collection of Australian lichens. Books containing veneers of 350 Australian and 100 Japanese woods"	VN 3(1) 1886: 10
12	14.6.1886	FNCV meeting: "fungi, mosses, and lichens, collected during the Club excursion at Lilydale"	VN 3(3) 1886: 26
13	9.7.1886	FNCV meeting: "specimens of an injurious grass ( <i>Sporobolus indicus</i> ), from the Domain, South Yarra"	VN 3(5) 1886: 54
14	11.10.1886	FNCV wildflower exhibition: "contributed to the general display"	VN 3(12) 1886: 83

No.	Date	Exhibit	Reference
15	14.3.1887	FNCV meeting: "Victorian fungi, <i>Podaxon pistillaris</i> and <i>Xylopodium Australe</i> , also plant of <i>Euphorbia Drummondii</i> , with particulars of the drug lately obtained from it"	VN 3(12) 1887: 162
16	4.4.1887	FNCV meeting: " <i>Melaleuca nodosa</i> , from the Whipstick, Bendigo, also <i>Lecedea</i> [sic] <i>Victoriae</i> , <i>Nephromium sub-laevigatum</i> , and <i>Ramalina minuscula</i> , unrecorded Victorian lichens"	VN 4(1) 1887: 2 [as '174']
17	28.4.1887	FNCV 7th conversazione: "A comprehensive collection of Victorian fungi; an extensive series of specimens of fruits, vegetables, and indigenous plants attacked by micro-fungi, illustrative of vegetable pathology; water-colour drawings of fungi"	VN 4(2) 1887: 29
18	9.5.1887	FNCV meeting: "water-colour drawings of Victorian fungi; also a copy of "Plants injurious to Stock," by F. M. Bailey, F.L.S., Brisbane"	VN 4(3) 1887: 34
19	11.7.1887	FNCV meeting: "a large number of lichens mounted and named"	VN 4(4) 1887: 50
20	8.8.1887	FNCV meeting: "paintings of Tasmanian fungi"	VN 4(5) 1887: 67
21	12.9.1887	FNCV meeting: "fossil plant, <i>Cinnamomum polymorphoides</i> , M'Coy, from Cobungra; also thirty fungi unrecorded for Victoria"	VN 4(6) 1887: 82
22	10.10.1887	FNCV meeting: "400 specimens of diseased plants"	VN 4(7) 1887: 99
23	10.10.1887	FNCV wildflower exhibition: "a basket of flowers from various localities"	VN 4(7) 1887: 100
24	9.7.1888	FNCV meeting: "forty rare Australian mosses"	VN 5(4) 1888: 50–51.
25	16.5.1889	FNCV 9th conversazione: "Sixty species of Victorian mosses (including eight new to science)"	VN 6(3) 1889: 53
26	12.8.1889	FNCV annual meeting: "Drawings of 200 species of Victorian Fungi, including eleven new to science"	VN 6(5) 1889: 77
27	14.10.1889	FNCV meeting: "A striking decorative arrangement of native flowers, mosses, &c"	VN 6(7) 1889: 107
28	28.5.1891	FNCV 10th conversazione: "Drawings of some Fungus Diseases of Economic Plants"	VN 8(4) 1891: 63
29	11.7.1892	FNCV meeting: " <i>Heliophyllum yassense</i> (Eth. N. Sp.)"	VN 9(4) 1892: 50
30	8.8.1892	FNCV meeting: "The Fungi of Australia," by Dr. M. C. Cooke; "One Hundred and Ninety Lithograms of Ferns of Queensland," by Mr. F. M. Bailey"	VN 9(5) 1892: 63
31	10.10.1892	FNCV wildflower exhibition	VN 9(7) 1892: 98
32	12.6.1893	FNCV natural history specimens: "Giant Earthworm, from Weeba, Drouin; also, new book, "A Companion for the Queensland Student of Plant Life," by F. M. Bailey, F.L.S."	VN 10(3) 1893: 45
33	9.10.1893	FNCV wildflower exhibition: "good displays"	VN 10(7) 1893: 102
34	14-15.6.1894	FNCV 11th conversazione: "Two Giant Earthworms, from Drouin, 7 ft. 2 in. and 7 ft. 6 in. respectively (measured length)."	VN 11(3) 1894: 53
35	8.4.1895	FNCV meeting: "Two extra large old shells ( <i>Carris cornuta</i> )."	VN 12(1) 1895: 4