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A Lab of One's Own: Science and Suffrage in the First World War

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ABSTRACT

The philosopher Søren Kierkegaard once remarked that life is understood backwards and lived forwards. For me, the point of doing history is to examine how the past has led to the present, and hence to improve the future. In writing *A Lab of One's Own* (2018), I retrieved the neglected narratives of several scientific women from the early twentieth century, suggesting how their lives and experiences have affected the position of women in science today. These three edited extracts, taken from the first, penultimate, and final chapters, discuss the main themes underlying the more detailed presentations of particular women that form the body of the book.

KEYWORDS

Science; women's suffrage

A Lab of One's Own: Science and Suffrage in the First World War

EXTRACT 1

At Cambridge University in the late nineteenth century, female mathematicians symbolized everything that reactionaries found ridiculous about women's invasion of this exclusive male stronghold. In 1884, the satirical magazine *Punch* made sure that the entire country was alerted to the danger:

> The Woman of the Future! She'll be deeply read, that's certain,
> With all the education gained at Newnham or at Girton;
> She'll puzzle men in Algebra with horrible quadratics,
> Dynamics and the mysteries of higher mathematics.
> (Gould, 1997, p. 132)

Mockery is a favourite defence tactic of the frightened, and only six years after this verse appeared in 1884, male fears of being beaten in examinations were realized when Philippa Fawcett came top in the finals examinations for mathematics. A Girton student described travelling to central Cambridge one sunny morning to hear the results. Looking down from the packed gallery of women, she watched the men on the ground floor rowdily cheering the students who had done best—the Wranglers—and banging wooden spoons for the lowest. And then, the long awaited moment arrived. "The Moderator stood there waiting till the noise was hushed, and then the words rang loud through the Senate House: 'Above the Senior Wrangler, Fawcett, Newnham.' The shout and the applause that rang through the building was unparalleled in the history of the University" (Grattan-Guinness, 1972, pp. 118–119).

Women were not allowed to participate in the Cambridge graduation ceremonies until 1948, but instead were sent a certificate through the post to confirm that they had completed the course. Fawcett was never officially awarded her degree, and never received the traditional accolade of being named First Wrangler. Oxford managed to appear less hostile: there were five all-female colleges, the class lists were arranged alphabetically, and they allowed women to graduate formally in 1920. But after heated debates, Cambridge refused to shift. To celebrate their victory, male opponents to the change converted a handcart into a makeshift battering ram, smashing it into Newnham's bronze entrance gates and partly destroying them (Tullberg, 1998, pp. 155–179).

Perhaps mindful of its gates, Newnham College carefully safeguards its paper records of the past. When I visited the library, the archivist proudly showed me a hand-made book with embroidered linen covers that records the activities during World War One of around six hundred Newnham members. Some of them were recent graduates, others were well into their fifties. Inscribed in exquisite red and black lettering on luxuriantly thick pages are the names of doctors who operated at the Front, chemists who developed explosives and poison gases, biologists who

researched into tropical diseases, and mathematicians recruited for intelligence work. Some of them died on service abroad; and many were rewarded with government or military honours, not only from Britain but also from Serbia, France, Russia, Belgium, and Romania (Sharpley & Archer-Hind, 1922).

This unique volume, lovingly created and preserved, offers a rare and poignant glimpse of the vital contributions made by scientific women all over Europe during the First World War. From Newnham alone, there were women investigating industrial fatigue, carrying out ballistics calculations, inspecting factories, investigating how vitamins might be preserved in sun-dried vegetables, testing radio valves, improving high-quality glass, making artificial limbs, compiling statistics on sugar production, and testing steel. The very first page includes a physicist who ran hospital X-ray departments, a mathematician who travelled to Serbia as a doctor, and a scientist who survived a typhus epidemic abroad but died of pneumonia in London soon after returning home. If similar records had been kept at other universities, they too would have revealed the wartime work of many other remarkable women.

Gingerly leafing through the pages, I wondered why I recognized none of the names—and after carrying out more research, that question continued to haunt me. Why had I heard of Vera Brittain and Edith Cavell, but not the chemists who were experimenting with explosives and mustard gas in trenches at Imperial College? Why does our country not commemorate the female doctors who ran hospitals under atrocious conditions in Salonika, or the London University professor of botany who headed the women's army in France? Why are these extraordinary women absent from the numerous books detailing the scientific, medical, and technological advances spurred by the War? I resolved to create my own tribute to these scientific pioneers who had helped win the War and gain the vote.

Counter-intuitively, the country's leading militant suffragette, Emmeline Pankhurst, greatly admired Thomas Carlyle, the Victorian thinker who declared that the history of the world is the history of great men. His way of thinking dominated attitudes for many decades, but fashions changed. During the second half of the twentieth century, Carlyle's version of the past lost popularity with historians, who now preferred a "bottom-up" approach. They began crediting the lives and achievements of ordinary people—first men and then women. As a consequence, there are now many marvellous books about the female ambulance drivers, munitionettes, nurses, bus conductors, farmers, factory workers, and all the other women who effectively ran Britain for four years while their menfolk were away.

A Lab of One's Own: Science and Suffrage in the First World War contains some more unusual and less familiar stories: ones about highly trained female scientists and doctors. Although relatively few in number, these women had a huge impact. They tested insecticides, researched into tropical diseases, analysed codes, invented drugs, ran hospitals . . . yet despite all these contributions, their existence and their activities have been eclipsed. These scientific pioneers have suffered from a double neglect in the nation's memory. First, they are largely ignored in studies of women during wartime: feminist historians have understandably preferred to focus

on wartime manual workers, who were far more numerous and left behind more readily accessible evidence. At the same time, professional women are scarcely mentioned in books about science and medicine during the War, which deal almost exclusively with men.

By 1914, women had been studying science at university for almost half a century, often braving opposition and mockery from fellow students as well as from parents and teachers. The ones who persevered had already demonstrated that they were exceptionally intelligent, courageous, persistent, and full of initiative. At the beginning of the War, many of them immediately started looking for opportunities to serve their country, even if that entailed sacrificing their own careers in the process.

As men left for the Front, first voluntarily and then under conscription, scientifically trained women took over their vacated positions in museums, boys' schools, and government departments. Those already engaged in research abandoned their current projects and switched their attention to the essentials of warfare, such as explosives, drugs, insecticides, alloys, glass, and aircraft design. Others emerged from back-room positions, appearing for the first time on the lecturer's podium or at the experimenter's bench. Medical schools temporarily welcomed female students, and some doctors defied government recalcitrance by going to serve overseas, where they endured exceptionally demanding circumstances. Benefitting from the unusual experience of having worked professionally in one of the few environments where men and women could be equally well qualified, if not equally well recognized, some female scientists attained high administrative positions. For four years, these scientists, doctors, and engineers proved not only that they could take over the work of men, but also that they could often do it better.

"The war revolutionised the industrial position of women," proclaimed the suffrage leader Millicent Fawcett; "It found them serfs, and left them free" (Thom, 1998, p. 1). But many historians no longer celebrate the War as a dramatic turning point for women, but instead interpret it as a temporary opening up of opportunities before the door clanged shut once again. At the time, feminist opinion was divided. Like Fawcett, some former suffragists were jubilant, regarding 1918 as the dawn of a new era when women had at last won the vote and could work side by side with men in conventionally male occupations. But others felt that although women had helped to win the War, they had lost the battle for equality. Conventional hierarchies were rapidly re-established, prompting campaigners to protest that the vote was of little practical use in the absence of professional parity.

As unemployment levels rose during the 1920s, men were given priority in the scramble for jobs. Women who had run hospitals or supervised research teams were forced back into the same low-status positions as before the War, and many factory workers were laid off. Once they had experienced the relatively high wages and freedom of munitions work or farming, women were reluctant to resume their earlier lives in domestic service. Former servants either refused to take back their old posts unless they were offered higher wages and regular time off-duty, or else migrated into shops, offices, and the new light industries.

Under these circumstances, having the vote made little practical difference—but women themselves had changed. They now knew that collectively they were capable of undertaking the same responsibilities as men, even if they were prevented from doing so for the present. As Brittain put it, although 1919 was a terrible year, it was also "the spring of life after the winter of death . . . the gateway to an infinite future—a future not without its dreads and discomforts, but one in whose promise we had to believe, since it was all that some of us had left to believe in" (Brittain, 1979, pp. 467–468). Many people believed that the route to that golden prospect lay through science.

What happened a century ago is important for understanding the present. In science, as in other fields, men returning from the Front reclaimed jobs that women had been competently carrying out in their absence. Yet at the same time, the government poured money into science, industry, and education after the War, so that although former stereotypes and prejudices re-emerged, there were more possibilities for scientific women than ever before. They were still not getting their fair share, but at least the cake was larger. Even if the War did not completely overturn old hierarchies, women had proved themselves capable of carrying out work traditionally reserved for men, and—try as reactionaries might—that unprecedented sense of achievement and power and possibility could not be obliterated.

British society had been indelibly altered, so that although the future seemed unsettled, there was no going back to the fixed and oppressive certainties of the past. My mother was born in 1918—the year women aged over thirty gained the right to vote—and she inevitably passed on to me the hopes as well as the fears of her generation. Like many of my own contemporaries, I have tried to continue the pioneering initiatives of the women in this book and to improve the position of scientific women. Old prejudices still resonate through society, and glass ceilings still restrict women's rise to the top, but the extent of change has been enormous, even if the pace remains frustratingly slow.

There are as many ways to tell a story about World War One as there were people in it. Each would be in some sense right, although none would give a complete picture. *A Lab of One's Own* does not pretend to provide a definitive version of World War One. But what it can do is offer new ways of thinking about the early twentieth century by looking simultaneously at the involvement of science and of women. Often only snippets of information about individuals survive, but I hope this book can act as a paean to the pioneering scientists and doctors whose lives are now obscure but who collectively made my own professional career possible.

EXTRACT 2

In the British general election of 14 December 1918, more people could vote than ever before. As a major break from the past, men no longer needed to own property: being over twenty-one was the only qualification they required. And for the first time, more than eight million women were deemed to be responsible citizens, although their eligibility was hedged around with restrictions—notably,

they had to be over the age of thirty. Because of wartime casualties, there were around eleven women for every ten men, yet they formed well under half the expanded electorate. After all those years of campaigning, political engagement was high. In the next election four years later, turnout was a massive 73 per cent, many of the voters women who turned up immediately the polling booths were opened and—to the amazement of a *Times* journalist—demanded information "on matters not usually considered women's questions. Foreign policy was a strong point moving women in constituencies" (Gottlieb & Toye, 2013, p. 7).

Female scientists, doctors, and engineers discovered that their opportunities closed down once the War was over. Initial gratitude was replaced by popular resentment against women: "to be frank," sighed a *Times* journalist in 1919, "the public has grown tired of uniformed women" (Noakes, 2008, p. 143). As unemployment rose, priority was given to finding work for men, while women who had successfully performed high-powered jobs were steered back towards domesticity. To modern ears, a Ministry of Labour promotional leaflet sounds like a parody:

> A call comes again to the women of Britain, a call happily not to make shells or fill them so that a ruthless enemy can be destroyed but a call to help renew the homes of England, to sew and to mend, to cook and to clean and to rear babies in health and happiness, who shall in their turn grow into men and women worthy of the Empire. (Thom, 1998, p. 41)

Many women who had enjoyed responsible scientific positions during the War were forced into accepting low-status posts. Very often, less-skilled jobs became redefined as jobs for women, thus reinforcing the notion that only men were capable of climbing to the top of a professional career ladder. As one frustrated graduate complained, "for women in the chemical industry magnificent health and a thick skin are more important than a knowledge of chemistry" (Horrocks, 2000, p. 359). Even in traditionally female fields, women were generally no better off than before. Around 80 per cent of female Oxbridge graduates became teachers, yet their average wage was around three-quarters of that for men at the same level. In the face of discrimination, low wages and high unemployment, so many female graduates went into teaching that by the 1930s the profession was flooded.

The battle for the vote had been partially won, but when dealing with daily reality, being a citizen did not necessarily make much difference. Many campaigners continued to insist that achieving economic parity was easily as important as securing suffrage. Whether in the home or the workplace, they argued, women should be paid so that they could lead independent lives. Gaining partial enfranchisement was an important step along the road, but the final destination of equality had not yet been reached. Suffragists had focused on electoral reform, but the first announcement of success in March 1918 was somewhat of an anticlimax. Women still had not attained the suffrage goal of electoral parity with men—another ten years went by before the Equal Franchise Act of 1928. Although the government appeared to be recognizing women's ability to participate in running the country, it had effectively disempowered young suffragists keen to retain their

wartime independence. Women over thirty were more likely to agree that priority for scarce jobs should be given to men, who earned more money for the same work.

Now that the nation was no longer united against a common enemy, earlier peacetime concerns about class and gender differences reappeared. But however much traditionalists argued for a return to the old conventions, the upheavals of wartime had proved that social change *was* possible. Women may not have gained as much as suffragists had hoped, but Britain could never revert to pre-war conditions: attitudes, expectations, and emotions had altered. There had been three major changes. Most obviously, the very fact that women had been so successful during the War transformed perceptions of their abilities and their social roles. Even people who maintained that women belonged at home with the children could no longer justify their arguments by claiming innate female incompetence. In addition, the statistics had altered. Because of wartime training and expanded education, a higher proportion of women now had professional qualifications in science, engineering, and medicine—and there were also more single women demanding to earn their own living. Just as significantly, academic and industrial research programmes were growing as government, military, and private organizations invested heavily in Britain's scientific development.

Opportunities had opened up, but knowing how to behave as a female scientist remained tricky. In 1925, an apprehensive electrical technologist solicited advice from a friend about a professional conference. "Please tell me, am I a lady or an engineer—what are you? Do you notice that at each of the papers there is a special side stunt for ladies," she asked; "I am entirely in your hands to be organised as you think best—either to join in discussion of the papers—to talk . . . to the wives—or merely charm in silence. What ho! I've made a new hat for that—don't be angry" (Pursell, 1993, p. 93). Dashing off hasty notes that travelled back and forth between them like emails, the two women concluded that they should definitely behave not as wives but as engineers—although the most vexing question to be resolved, the one they expressed most anxiety about, was the design of the hat.

Their informal, bantering exchange stemmed from deeper concerns about male and female identities. Aware of the cynics who mocked women's uniforms, these scientific women focused on outward appearance as a symbol of the inner self. From the boardroom to the bedroom, establishing normality became of paramount importance. By one definition, professional women were abnormal because they were rare—but how easy to slip into assuming that they must also be some sort of freak. One disillusioned scientist remarked bitterly that the only women who succeeded in science were "enforced celibates, predestined spinsters, and women cunning enough to maintain complete secrecy in their sexual relations" (Rayner-Canham & Rayner-Canham, 2008, p. 479). Negotiating such conflicts imposed great emotional pressures on women, who felt pushed to be domestic goddesses as well as superwomen scientists.

Yet although scientific theories and economic pressures were combining to shepherd women back towards domesticity, possibilities were opening up for female

scientists because of the imbalance in the population and the national expansion of science-based activities. Government and industry poured money into research: science was here to stay not only in Britain's aircraft and armaments industries but also in the private sector (Edgerton, 2006; MacLeod, 2012). Moreover, women seized opportunities to enter burgeoning enterprises such as pharmaceuticals, fertilizers, artificial fabrics, and paints.

At first, female chemists could dare to be cautiously optimistic about their future. Women at Sheffield who had been trained to a high level in one specific skill were able to continue their routine work after the War:

> That women have been an undoubted success in this branch of industry, is proved by the fact that notwithstanding so many of the men (who are now demobilised) have resumed duty, a large proportion of the women who desired to stay on have retained their positions to the present time. [Knowles, 1919]

The greatest opportunities occurred in those rapidly expanding industrial fields that were not automatically seen as male preserves. In food factories, some women employed on jam and margarine production lines were able to move up into laboratory positions. But even among scientists with high qualifications, all the old stereotypes reappeared: recruitment literature welcomed female graduates not for their brains, but for their "manual dexterity, their delicacy of touch, their conscientiousness and their willingness to bear with a routine under which most men become impatient" [Horrocks, 2000, p. 352]. Rather than being replacements for men as in the War, women were now being segregated into separate career tracks: some advertisements even specified that this open-ended research post was suitable for a man whereas that routine analytical task would satisfy a woman (Horrocks, 2000, p. 352).

For a woman, being a good scientist was not good enough. A careers adviser spelt it out: "When it comes to a permanent post, to obtain equal chances with a male rival, the woman must be obviously a little better" (Rayner-Canham & Rayner-Canham, 2008, p. 477). National unemployment was high, and the most attractive posts went to men. Female scientists were paid less for doing the same work, and often found themselves stuck in dead-end positions carrying out repetitive tests. After struggling for years in a pharmaceutical company, a disillusioned chemist protested that

> the male graduate . . . is paid a reasonable salary and, however young, if his university qualifications are good, he is usually given quite a dignified position from the beginning. The girl who worked side by side with him at the university is hard up and constantly humiliated . . . She will be happier if she is not too enterprising because then her sense of frustration will be less. (Horrocks, 2000, p. 359)

The situation in hospitals was similar. Many medical schools once again closed their doors to women, and the traditional masculine culture reasserted itself (Dyhouse,

1998; Whitehead, 1999). As a female doctor, Isabel Emslie had entered the War with limited surgical experience, but isolated in Serbia and Salonika she had successfully carried out complex operations on wounded soldiers as well as relieving civilians of crippling burns, congenital deformities, and neglected tumours. Despite acquiring great expertise under atrocious conditions, she "knew that it would have been unwise and unprofitable to make surgery my life's work at Home" (Hutton, 1960, p. 177). Reluctantly, she abandoned any prospect of permanently entering this male-dominated field.

EXTRACT 3

To celebrate its 350th anniversary, in 2010 the Royal Society invited a panel of female scientists and historians to choose the ten women who have had the most influence on science in Britain ([Royal Society, 2010]). The emails soon started flying. Being pernickety academics (and here I mean myself), they naturally began by questioning the question: what does "most influence" mean? One easy choice was Dorothy Hodgkin, pioneering chemist and still the only British woman to have won a scientific Nobel Prize. But should the list include the seventeenth-century aristocrat Margaret Cavendish? In her favour, she was the first woman to enter the meeting rooms of the Royal Society—but, as opponents pointed out, she was often ridiculed (by women as well as men) and produced no long-lasting theories. What about Elizabeth Garrett Anderson? Although strictly speaking not a scientist, she was one of the earliest qualified doctors and a leading campaigner for female education who affected countless lives. Then there was the unschooled but enterprising Mary Anning. Braving the cliffs of Lyme Regis, she collected fossils and also learned enough about palaeontology to be sure which specimens were valuable. But how important was she to science in general? And how did the panel feel about Jane Goodall, whose empathy with chimpanzees made her a media darling—she certainly aroused public interest in zoology, but did she perpetuate stereotypes of women as touchy-feely earth mothers rather than hard-headed scientists?

The final selection ranged from the eighteenth-century astronomer Caroline Herschel to the modern geneticist Anne McLaren, who died in 2007. All exceptional, all determined, all high achievers, these scientific women illustrate remarkable changes in attitudes and opportunities over the last couple of hundred years. Whereas Herschel was the first woman in this country to receive a salary for her scientific research, McLaren enjoyed a distinguished career at Cambridge and the Royal Society.

In the early twentieth century, female scientists were occasionally on university payrolls, but discrimination still prevailed. Marie Curie's close friend, the physicist Hertha Ayrton, won a Royal Society medal for her groundbreaking research into electric lighting, but in 1902 was turned down for a fellowship on the grounds that she was married. At last, in 1945, two women were elected as fellows of London's Royal Society—the crystallographer Kathleen Lonsdale and the biochemist Marjory Stephenson. The official line at the time was that great progress had been made in opening science to everyone. During the 1960s Jocelyn Bell, the PhD student who discovered pulsars, self-protectively slipped off her engagement ring every morning

before entering Cambridge's Cavendish Laboratory because she was convinced that a fiancée would not be taken seriously. There was, and there still is, a long way to go.

The chemist Kathleen Culhane, whose life spanned the twentieth century, provides a disturbing example to illustrate the problems faced by female scientists, doctors, and engineers. Born in 1900, she went to university in 1918—the year of the Armistice and the female vote—and lived until 1993. Too young to benefit from the wartime boom in scientific opportunities, after graduating she found that the only way she could even get an interview for a research position was by signing herself "K. Culhane" to disguise her female identity. When that ruse failed, she resorted to teaching, obtaining laboratory experience by working for no pay in her free time. Eventually, she gained an industrial position—but as her employers blithely informed her, at a salary so low that no man would accept it.

Wages were not Culhane's only problem. Employed by a large pharmaceutical company, she was given routine tasks and banned from the staff lunchroom. When some of her experimental results proved different from those of three male colleagues, she was automatically disbelieved—and yes, hers did indeed prove to be the right ones. When she gave a public information lecture about the importance of including vitamins in margarine, a journalist focused on her appearance—a "pretty girl with blue eyes and bobbed hair" [Rayner-Canham & Rayner-Canham, 2008, pp. 485–488]. Astonished to discover that she needed special permission to continue working after she was married, she insisted on remaining until she had children. Imagine her gall when she discovered that her male successor started at a higher salary than her own final one. Culhane's experiences during the Second World War suggest that insufficient lessons had been learned from the previous experience. Despite the labour shortage, it was only after much badgering that she was allowed to become an assistant wages clerk. Even when she became a fellow of the Royal Statistical Society, she earned far less than her male equivalents—and while they travelled first class on official business, she was left isolated in a third-class carriage (Rayner-Canham & Rayner-Canham, 2008, pp. 485–488).

Although no modern female scientist would encounter such a catalogue of put-downs, aspects of Culhane's story remain familiar in the present century. Speakers at conferences—especially session chairs—are predominantly male. Many scientific departments are overwhelmingly male, with exceptions often due to the initiative of a few individuals. Presenters of television programmes on science are mostly distinguished older men—unless, that is, they happen to be glamorous young women. Researchers who take maternity leave complain of being marginalized, and then face the expenses of full-time childcare. Sceptical scientific mothers feel that there is only one way to reach the top: marry a house-husband.

When Culhane was a baby, Curie's friend Ayrton declared that she did "not agree with sex being brought into science at all. The idea of 'woman and science' is completely irrelevant. Either a woman is a good scientist, or she is not" (Ogilvie & Harvey, 2000, [Vol.] I, p. 69). Well over a century has gone by, but are her words any truer now than they were then? The overt differentiation experienced by

Ayrton, Culhane, and many other women is no longer legal, but it appears that discrimination continues to be practised. In principle, equality of opportunity is now firmly entrenched, yet the problem of unequal numbers remains unresolved, especially at higher levels. Even a cursory glance at the statistics reveals that although far more young women are reading science subjects at university than ever before, they are dropping out along the route to the top.

When statistics about women in scientific careers are compiled, I count as a failure. Since leaving an Oxford women-only college with a good degree in physics, I have neither carried out research in a laboratory nor been employed as a scientist: although I could have chosen postgraduate work, I opted for a different career route. I decided to include this autobiographical detail in order to make clear my own position in debates that can become vitriolic and laden with personal accusations. For my first historical projects, I strongly resisted invitations to research into gender. Determined to avoid being branded as an ardent feminist incapable of handling the masculine hard stuff, I picked topics such as magnetism and electricity, Isaac Newton and Joseph Banks. Gradually, I came to realize that for me personally, the main reason for studying the past is to understand the present—and the whole point of doing that is to improve the future. And that is why I have written this book.

Women used to be denied the possibility of pursuing intellectually challenging careers governed by the same ground rules as men. Under modern gender legislation, such blatant discrimination would be impossible. Yet there are still unequal numbers of male and female scientists, especially at higher levels. Equality of opportunity is legally vouchsafed, but—to reiterate two common if unsatisfactory metaphors—glass ceilings and leaky pipelines continue to present tough challenges for ambitious scientific women.

It seems crucial to understand *why* far more men than women are working at the top levels of science. Simply blaming men, accusing them of bolstering their own position, is too easy an answer. Not only men but also women need to scrutinize their consciences and explore the behaviour patterns and prejudices that they have inherited from the past, albeit unknowingly. Looking back can feel reassuring, because there are clearly dramatic differences between the status of women now and that of a couple of hundred years ago. Even so, continuities remain. These are particularly significant when they are concealed, lying dormant, unrecognized, and therefore unconfronted.

Could it be possible that some residual belief in male superiority lurks deep inside even the most egalitarian of psyches? Caroline Herschel heads the Royal Society's list of the top ten scientific women, yet her self-abasement sounds appalling. "I did nothing for my Brother but what a well trained puppy Dog would have done" (Fara, 2004, p. 165). Unfortunately, however tempting it is to gasp with horror at such a declaration, it seems that even high-achieving women have internalized that feeling of innate inferiority. Blind trials show that, just like their male colleagues, women rank anonymized job applications higher when they believe the candidates are men.

And then there's parenthood. Extremely few British fathers take up the opportunity of shared post-natal leave. But could that be a shared problem rather than one restricted to men? In 1826, the official journal of the Royal Society, the *Philosophical Transactions*, published its first full academic article by a woman—Mary Somerville's account of her investigations into the magnetic properties of sunlight. Unlike other researchers, she had not been allowed to present it to the Society's fellows herself. Her husband, a doctor who knew little about her work but did possess the necessary qualification of being male, had read her paper on her behalf. The Society paid tribute to this female scholar by placing her marble bust in the foyer, but continued to ban real-life women from entering. Despite being a gifted mathematician, despite writing numerous books and articles, despite being hailed as the "Queen of the Sciences," Somerville was embarrassed by her own audacity. "I hid my papers as soon as the bell announced a visitor," she confessed, "lest anyone discover my secret" (Fara, 2004, pp. 101–102). Today, female scientists are rightly proud of their success—but how many harbour vestigial traces of Somerville's guilty feelings about neglecting her family?

Blatant mockery and explicit segregation may now have disappeared, but concealed prejudice can be both harder to fight and more keenly felt. Today's scientists point to subtle ways in which women are made to feel like outsiders: the absence of female portraits on corridor walls, the paucity of women's works on student reading lists, the near non-existence of senior women delivering keynote addresses at scientific conferences. If a woman fails to get a lectureship or a research position, is it because a male candidate was better or because she was a woman? Although it is easy to become over-suspicious—sometimes the woman is simply not the most suitable applicant—uncertainty often hovers. Before the First World War, suffragists could see what they were fighting against, but modern discrimination is elusive, insidious, and stubbornly hard to eradicate.

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REFERENCES

Brittain, V. (1979). *Testament of youth.* London: Fontana.

Dyhouse, C. (1998). Women students and the London medical schools, 1914–39: The anatomy of a masculine culture. *Gender & History*, *10*, 110–132.

Edgerton, D. (2006). *Warfare state: Britain, 1920–1970*. Cambridge: Cambridge University Press.

Fara, P. (2004). *Pandora's breeches: Women, science and power in the Enlightenment.* London: Pimlico.

Gottlieb, J. V., & Toye, R. (2013). Introduction. In J. V. Gottlieb & R. Toye (Eds.), *The aftermath of suffrage: Women, gender, and politics in Britain, 1918–1945* (pp. 1–8). Basingstoke: Palgrave Macmillan.

Gould, P. (1997). Women and the culture of university physics in late nineteenth-century Cambridge. *British Journal for the History of Science*, *30*, 127–149.

Grattan-Guinness, I. (1972). A mathematical union: William Henry and Grace Chisholm Young. *Annals of Science*, *29*, 159–185.

Horrocks, S. (2000). A promising pioneer profession? Women in industrial chemistry in inter-war Britain. *British Journal for the History of Science*, *33*, 351–367.

Hutton, I. E. (1960). *Memories of a doctor in war and peace*. London: Heinemann.

Knowles, F. (1919, August). [Letter from Fred Knowles, Sheffield University metallurgy department]. Imperial War Museum (ED. 2. 16/928), London.

MacLeod, C. (2012). Reluctant entrepreneurs: Patents and state patronage in new technosciences, circa 1870–1930. *Isis*, *103*, 328–339.

Noakes, L. (2008). "Playing at being soldiers"?: British women and military uniform in the First World War. In J. Meyer (Ed.), *British popular culture and the First World War* (pp. 123–145). Leiden: Brill.

Ogilvie, M., & Harvey, J. D. (2000). *The biographical dictionary of women in science* (Vols. I–II). New York: Routledge.

Pursell, C. (1993). "Am I a lady or an engineer?" The origins of the Women's Engineering Society in Britain, 1918–1940. *Technology and Culture*, *34*, 78–97.

Rayner-Canham, M., & Rayner-Canham, G. (2008). *Chemistry was their life: Pioneer British women chemists, 1880–1949.* London: Imperial College Press.

Royal Society. (2010, March 21). Most influential British women in science. Retrieved from https://royalsociety.org/news/2010/influential-british-women/

Sharpley, E. M., & Archer-Hind, L. (1922). *War Work, 1914–18* [Unpublished manuscript]. Archive of Newnham College, University of Cambridge, Cambridge.

Thom, D. (1998). *Nice girls and rude girls: Women workers in World War I*. London: I.B. Tauris.

Tullberg, R. M. (1998). *Women at Cambridge.* Cambridge: Cambridge University Press.

Whitehead, I. R. (1999). *Doctors in the Great War*. London: Leo Cooper.