Women and the RAS: 100 years of Fellowship

In January 1916, the RAS elected its first women Fellows. **Mandy Bailey** looks back at the social and scientific circumstances of this step towards equality, introducing a year of articles celebrating the centenary.

1 Three ages of women in the Royal Astronomical Society. Mary Somerville (left) could not attend meetings despite being awarded Honorary Membership in 1835. Annie Scott Dill Maunder (middle), was one of the first women elected as a Fellow in 1916, more than 24 years after first being nominated. Dame Jocelyn Bell-Burnell DBE FRS PRSE FRAS (right), was the first woman Fellow to win an RAS Medal, in 1989, and served as RAS President from 2002. (MS: RAS/SPL. AM: Maunder family. JBB: Max Alexander)

On 14 January 1916, four women were elected to Fellowship of the Royal Astronomical Society – the first women to be accepted alongside men as ordinary members of the Society. This article and those that will follow throughout this year mark this centenary by remembering the women elected in 1916 and those women important to the RAS who both followed and preceded them. The election of these women to Fellowship did not mark the end of the struggle for the acceptance and equality of women in the scientific community, or even the beginning of the end. A century later, women are welcome in the scientific world, although numbers remain low, especially at senior level. National, international and community initiatives now exist to create an open, equal and welcoming workplace for women – and for other groups still underrepresented in our community.

When the RAS was founded in London on 12 January 1820, no thought was given to the idea that women could, or indeed should, belong to this new scientific society. In the early part of the 19th century, this was the sort of opportunity that was open only to men, who were usually amateur astronomers, well-educated and well-off. Although some women were able to engage in significant scientific work, they needed both financial security and family support, both to gain education in the first place and to pursue their research. But the existence of the Astronomical Society of London, as it was first known, opened the door for women to contribute.

Medal but not membership

One of the women to take advantage of that open door was Caroline Herschel who, in 1772, at the age of 22 became her brother William's housekeeper. Part of that role, in time, was to assist him in his astronomical surveys. With his encouragement, Caroline became an accomplished astronomer in her own right. She discovered eight comets, published in the scientific literature and produced a catalogue of nebulae for which she was awarded the Society's Gold Medal in 1828 (see "Gazing at the starry heavens" by Michael Hoskin, page 1.22). It was 161 years before the RAS awarded another medal to a woman: the Herschel Medal to Jocelyn Bell Burnell (figure 1c) in 1989.

Caroline Herschel did not – and could not – join the RAS. The Society did not recognize that women could be Fellows; the Charter and Statutes described Fellows as "he" throughout, and electing women would have contravened them. Council sidestepped this problem in 1835 by introducing Honorary Membership for women, conferring this honour on both Caroline Herschel and Mary Somerville,

Problems with pronouns

The Royal Instuitution (founded 1799), the Zoological Society (1826), the Royal Meteorological Society (1850), the London Mathematical Society (1865) and the Physical Society (1874) all included women as members from the start. The Geological Society of London (1807) and Royal Astronomical Society (1820) did not, nor did the societies that later became the Royal Society of Chemistry. The RAS first admitted women as Fellows in 1916, and the Geological Society did so in 1919; the Institute of Chemistry began to do so in 1892, while the Chemical Society waited until 1920.

Like the RAS, the Geological Society rebuffed amply qualified women because their rules referred to "he" and "him". Opposition to women attending Geological Society meetings ended when an eminent Fellow, Archibald Geikie, simply brought two women to a meeting in 1901. Votes at Special General Meetings of the Geological Society repeatedly rejected women, even when wider polls among Fellows supported them, until the end of the first world war. "In December 1918 … the following simple motion, 'That it is desirable to admit Women as Fellows of the Society', was finally carried by 55 votes to 12 at the SGM of 26 March 1919," says Caroline Lam, Geological Society archivist, "helped along, no doubt by the Sex Disqualification (Removal) Act of 1919 which would have forced the issue anyway."

While women could not be Fellows of some learned societies, this did not stop those societies awarding them prizes for their research. The incongruity of recognizing women's scholarship without considering that it qualified them for Fellowship was not lost on scientists of the time. In 1906, the physicist Hertha Ayrton was awarded the Hughes medal of the Royal Society (founded 1600). William Huggins was then president of the Royal Society and wrote in some anguish to the society's secretary: "Can we now refuse the Fellowship to a medallist?" (Mason 1991). It turned out that they could: the first woman was elected FRS in 1945.

the distinguished mathematician and author (figure 1a). Between 1835 and 1916, Honorary Membership was conferred on a handful of other women who made huge contributions to our scientific knowledge: Anne Sheepshanks, Lady Margaret Lindsay Huggins, Agnes Clerke, Annie Jump Cannon and Williamina Fleming.

The Honorary Members did not rock the boat. Caroline Herschel carried on assisting her brother William and making her own observations. She published under her own name – she was the first woman to publish in *Philosophical Transactions of the Royal Society*, for example, in 1787 – but women could not attend RAS meetings. Mary Somerville's husband attended meetings on her behalf. And Margaret Huggins was widely assumed to be simply her husband William's note-taker, rather than the innovative and inventive experimenter revealed in their laboratory notebooks from 1875 onwards. She does not appear as an author of the papers on their joint work until 1889. One has to wonder how much was published in the name of a male relative or collaborator, obscuring the extent and impact of women's work.

Having proven their intellectual fortitude while maintaining the social caution required of their time, women such as Caroline Herschel and Mary Somerville were accepted in the scientific community; the open door could not be closed. The spread of education among middle-class women in the 19th century also helped, despite the bias towards the arts and, above all, decorous behaviour. But women with open-minded parents or financial independence broke into the scientific sphere. One was Elizabeth Brown, whose father, a wine merchant and meteorological recorder, encouraged her to share his scientific interests. After his death in 1883, Elizabeth began to develop her interest in solar astronomy. She joined the new Liverpool Astronomical Society and became director of the Solar Section. She collaborated with (Edward) Walter Maunder on sunspot work and, as a result, became closely involved in setting up the British Astronomical Association in 1890, as a founder member of the Council.

Turning point

The late 19th century proved to be a turning point for women. Not only was there more opportunity for education, but astronomical societies such as Liverpool and the BAA went out of their way to enrol women members. By 1905 there were well over 100 women astronomers in Britain. The door was opening wider still.

The RAS was slower to respond. The first questions about women Fellows arose in 1886, concerning Elizabeth Isis Pogson of the Madras Observatory. Born in Oxford in 1852, Isis Pogson was the eldest daughter of Norman Pogson, who became director of the Madras Observatory in 1860. At the observatory, Isis was employed as a computer for the equivalent of a cook's wage. In 1886, she was nominated for RAS Fellowship by three Fellows. The RAS Council then deliberated on the question of admitting women to the society. Legal advice suggested that "unless it could be shown that a woman could not consistently exercise the rights and perform the duties of a Fellow" then women should have their names put forward for election (Dreyer 1923). This came at a time when other societies, including other learned societies, were already admitting women as members (see "Problems with pronouns", above). However, on consideration, Council decided that the use of the pronoun "he" throughout the Charter meant that women could not become Fellows. Isis Pogson's proposers agreed and withdrew her name. Isis (by then Mrs Kent) was eventually elected to Fellowship in 1920.

"Maunder and Pogson persevered with their science after rejection by their peers"

Lady computers

Isis Pogson was not the only woman employed in astronomy in the late 19th century. The Royal Observatory Greenwich began employing "lady computers" in 1890. They were the lowest grade of staff employed by the observatory, below even lads of 14 or 15 years, and without the prospect of promotion. They were usually university-educated women and included two Cambridge mathematicians: Alice Everett, who went on to a distinguished career in optics and to be a foundation member of the Royal Television Society, and Annie Scott Dill Russell, later Maunder (figure 1b). They routinely observed as well as performing calculations. Cambridge University Observatory had also employed temporary computers, including Anne Walker who started work there aged 15. Ethel Bellamy started work at the University of Oxford Observatory at the age of 17 in 1899. She stayed there for 50 years, moving into seismology later in her career.

In 1892, Elizabeth Brown, by then director of the BAA's Solar Section, Annie Russell and Alice Everett were proposed for election, largely at the instigation of Walter Maunder. Council reiterated its reasoning of 1886 but, in the changing social environment of the time, neither the women nor their proposers were put off. Council sent the names forward to be considered by the general body of Fellows "as they saw fit". Mary Brück (2009) gives something of the flavour of the debate preceeding the ballot: "A Fellow, John Brett (a professional artist but fringe astronomer), responded that it was 'practically a proposal to introduce into

Mostly satellites, some stars

The first documented woman astronomer in the UK was Margaret Flamsteed (1670–1739), wife of John, the first to hold the post of Astronomer Royal. Margaret assisted her husband at the Observatory at Greenwich – a satellite, as Mary Brück put it – but it was Margaret who ensured that John's great *British Catalogue* and his *Atlas* were published after his death, much as Elizabeth Hevelius did for her husband's *Atlas* after his death in 1687.

Public interest in astronomy was growing during the 17th century, among women as well as men. Books and lectures attracted both sexes; Anne Emlyn, later Lofft, probably inspired the character of a young women eager to learn, in James Ferguson's *The Young Gentleman's and Lady's Astronomy* (1768).

A few women were professionals. At the end of the 18th century, Margaret Bryan ran schools for girls and wrote textbooks on physics and astronomy that were supported by Nevil Maskelyne, Astronomer Royal, among others. And in Edinburgh, Maria Short, daughter of telescope-maker Thomas, ran a public observatory in the mid-19th century.

Most astronomers remained amateurs, and most were wealthy. But the rise of regional astronomy societies and the BAA provided a way for some ordinary women to follow their interests.

these dull meetings a social element, and all we shall require is a piano and a fiddle' and 'to lay down a parquet flooring, and I am sure many of my young friends will be glad to dance through most of the papers'." It seems unlikely that this Fellow had met the women seeking election. The secret ballot at the April meeting in 1892 failed to reach the required three-quarters of the votes to secure election for any of the three.

The door was swinging shut; there was every reason to expect election to follow proposal without difficulty, in those more enlightened times. The rejection was a bitter blow; Annie Maunder made a point of referring to it 22 years later, when Fellowship for women was again considered. It was particularly unjust to Elizabeth Brown who, at 62, had a significant record of contributions to astronomy, although she is not known to have complained.

"We now have many women Fellows, but they do not make up half the membership"

Compromise

All was not completely lost, however. Just a few months later, despite being bound by the language of the Charter, the RAS Council devised a stop-gap that prevented the door from closing completely against women. Council resolved that the President could issue cards of admission "to such persons as it may be thought desirable to admit". This, at least, gave women access to learned scientific discussion.

But the world continued to change, at a pace increased by the first world war. By 1915, women were doing more and more jobs previously considered male preserves. In Cardiff, for example, women were first employed as drivers and conductors on the trams; Kate Adie (2013) documents women at work during the war, building locomotives and repairing the roads. The emancipation of women and the women's suffrage movement were breaking down barriers with a courage and conviction hitherto unseen. It was time, if not long past time, for the RAS to think again.

At the AGM in 1915, Council proposed that the meeting approve the admission of women as Fellows. Beforehand, Council had a draft petition to the King and a draft Supplemental Charter approved by the Privy Council. Not one voice was raised against the proposal at the AGM, despite the fact that it would cost £100 to effect the change – the equivalent of about £8000 today! The resolution was passed by 59 votes to three. On 5 June 1915, at Westminster the Supplementary Charter was granted by warrant under the King's Sign Manual, and received by the RAS before the first meeting of the new season in November 1915. On 14 January 1916, the RAS records the election of Miss Mary Adela Blagg, Miss Ella K Church, Miss A Grace Cook and Mrs Fiammetta Wilson.

The first women Fellows in 1916 were not all distinguished astronomers, any more than their male counterparts were, but many of them were well known in astronomical circles, especially in the BAA, and some were published authors. Another six women were elected to the Fellowship during 1916: Miss Margaret Theodora Meyer, Miss Mary Proctor, Miss Francisca Herschel (great-niece of Caroline Herschel), Mrs S D Proctor-Smyth, The Hon. Kathleen Robson and, finally, on 10 November 1916, Mrs Annie Maunder, 24 years and seven months after her first attempt. Some names are familiar, others not; their astronomical interests were equally varied, as were their lives, not least Fiammetta Wilson, whose devotion to observation, language skills and exploits led to a suspicion of espionage.

Both Annie Maunder and Isis Kent (née Pogson) demonstrated considerable determination and resilience. They persevered with their science after rejection by those they were entitled to regard as their peers. And they went on to join the Society when Fellowship finally became open to them – for Isis Kent, after 36 years. The persistence of the women who first became Fellows of the RAS paved the way for many more women to do so during the 20th century. And now we have a Society characterized by many active women Fellows, with women currently forming 40% of its Council and with three female Presidents in the past two decades (figure 1c).

Looking forward

The door is now open wider than ever – but is it wide enough? There have been many struggles for women to be both accepted and considered equal in the scientific community over the past 100 years. Women who are Fellows now, recall schoolteachers refusing to teach girls physics, not taking them seriously, or being the sole woman on a university physics course, routinely jeered by male students. We now have many successful women Fellows, but they do not make up half the membership. Nor do RAS medals and awards, which recognize and celebrate achievement, reflect the increasing presence and impact of women Fellows. At school, physics remains a minority subject for girls, limiting their choice of careers. And the astronomy, planetary sciences and geophysics communities in the UK do not reflect the society that they serve, especially at senior levels. Through the Committee on Diversity in Astronomy and Geophysics, the RAS is working to increase the appeal of RAS sciences among young people from all social backgrounds. And, in anticipation of the 200th anniversary of the Society in 2020, the RAS has launched RAS200, the innovative outreach programme developed to reach out to audiences who do not normally get involved with astronomy, geophyics and planetary sciences. Perhaps in another 100 years we will be able to celebrate the RAS as the home of inspirational science, whoever the scientists might be. ●

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FURTHER READING

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