‘My Colleague, Miss Saunders’

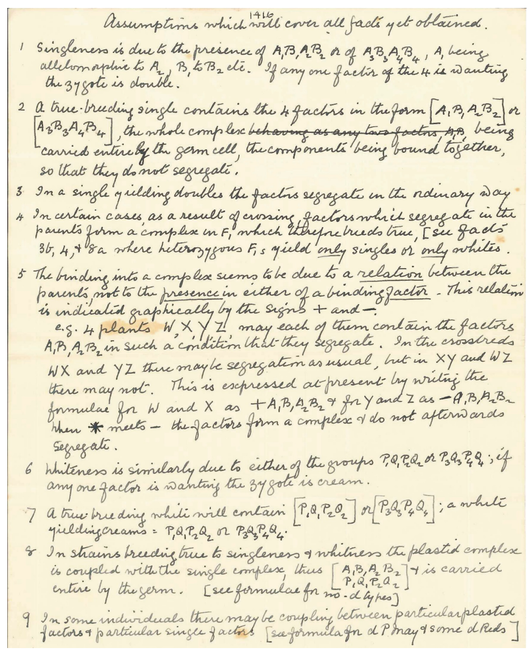
Department of genetics 100 1912 - 2012

Within the field of Genetics, if Edith Saunders' name is recognised, it is through her collaborations with William Bateson. It would be reasonable to suppose that, had this connection not been made, she would only be recalled today – if at all - as a somewhat obsessive botanist with a 'fetish for carpal polymorphism' [Schmid] Though previously isolated from the scientific community, through the research undertaken with Bateson, she fell into the vanguard of a branch of science feeling its way into unknown territory. The detailed reports she submitted to the Evolution Committee of the Royal Society were recognised as major contributions to the field, even before Bateson gave it a name.

If Edith Saunders was an outsider because she was a woman, William Bateson also did not fit into Cambridge science cliques, ‘…the whole biological school being in arms against Will’ [Beatrice Bateson]. His appointment as Assistant to the Professor of Zoology in 1899 [16 years after he graduated] was more to do with filling a teaching gap than recognition. His paper to the RHS in 1899, 'Hybridisation and cross breeding as a method of scientific investigation‘ indicates his reliance on what many considered 'low science’. He also failed to win respect because he was [as Sturtevant expressed it] '...inclined to be rather contentious.' His famous vituperative disputes with fellow scientists were acted out in meetings and letters to, or papers in, the scientific journals. But Bateson possessed a powerful personal magnetism and a way of expressing his ideas which engaged his listeners and attracted followers, despite his relatively lowly position and lack of funds. His associate Reginald Punnett regarded him as a genius.

Bateson and women

Bateson was not just a 'galvanizer' - He was also a feminist willing to stand up and be counted. Unusually, he had been raised to appreciate women's intellectual powers as fully equal to those of men. His mother Anna [Aiken] was an active campaigner for women's rights, a prime mover in establishing lectures for women at Cambridge, and a member of the governing body of Newnham College. Three of his sisters excelled academically [... and 2 of them happened to be students at Newnham when Edith Saunders arrived]. Bateson became one of the foremost male advocates for women's rights at Cambridge, most notably as Secretary of the Committee for Promoting the Admission of Women to Titles of Degree 1896-7. His support was vital not only during the campaign, but even more so afterwards, when there was a further backlash against women, who were wholly unfairly viewed by the Cambridge establishment as attempting to effect some sort of coup, and thus for a time they became virtually unemployable. Bateson not only recognised women's abilities – he recognised an opportunity. Here were trained women keen to work – and he needed assistance with his research. For him, Edith Saunders came as a double bonus – she was not only an exceptional young scientist … she was also in receipt of a Newnham College salary.



Just a few sheets of Edith Saunders’ notes still survive. This is because Bateson had kept them. They are now in the John Innes Archive, together with several letters he considered significant

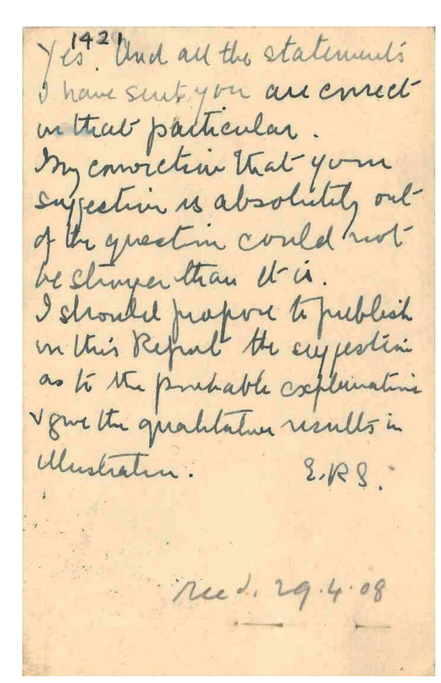
Mr Bateson and Miss Saunders

It is not known when exactly Edith Saunders and William Bateson first made contact. They may have encountered each other through her friendships with his sisters Anna and Mary at Newnham College. Their paths were unlikely to have crossed often at that time, given he was researching overseas, and had only a tenuous connection with the Department of Zoology, whilst Edith’s milieu was restricted to Newnham College and the Balfour Lab. More likely a scientific connection was made later, after she had conducted independent research and he recognised her unique abilities. Her first published paper dates from 1890, 'On the structure and function of the septal glands in *Kniphofia'* . Bateson's early papers all reflect his original training in zoology, but by 1891 a part of his focus in his search for abnormalities shifted to plants. He was assisted in this research by Dorothea Pertz, also Edith Saunders’ friend, who might conceivably have recommended Saunders to him because of her expertise in plant breeding. Anna Bateson was also an assistant to her brother in his early career. But Saunders was never an assistant.

Edith Saunders was an acknowledged colleague from the outset.

Bateson and Saunders’ first documented collaboration dates from summer 1895, when she planted *Biscutella* seeds in a plot in the Botanic Garden and subsequently made close observations of the plants raised, then inter-crossed them the following year. Bateson had noticed that although hairy and smooth versions of this Alpine plant existed side by side in the wild, the two types always seemed to remain distinct. This plant thus appeared to be a perfect example of 'discontinuous variation'. In the resultant paper 'On a discontinuous variation in *Biscutella laevigata*’ [1897] she could not come to any firm conclusions, having used only a small sample, save that the results called into question the ‘blending theory.’ It was her first declaration of support for Bateson, and from then on he often cited her research in his reviews of progress. For five years she worked on experiments to support his theory of discontinuous variation, until his rediscovery of Mendel in 1900 gave their research a new focus. She was then able to test whether Mendel’s results with peas could be applied to other species.

Edith Saunders was the first to notice the existence of the phenomenon initially called ‘coupling’ [ie linkage] before 1902, and she spoke about it at the 1904 BAAS meeting, where its importance was overshadowed by the Bateson/Weldon-Pearson spat. She and Bateson also invented some of the terminology used in Genetics, eg ‘allelomorph’ [allele], though their attempts to ascribe terminology to processes not fully understood, and formulate theories to explain their findings, were often criticised.



Two of Edith Saunders’ characteristically direct, even abrupt, letters to ‘Mr Bateson’, demonstrating the respect he afforded her. She was completely comfortable proposing her own theories, or challenging his views - taken to be ‘… your suggestion [which] is ‘absolutely out of the question’!

Research in the Botanic Garden

Bateson's main benefit to Edith Saunders may well have been in gaining access to funding and spaces to work. If these were without doubt hard-won by Bateson, they would have been impossible to obtain by a woman. Bateson’s 'begging letters‘ for funding and space often made it explicit Saunders' research was to be included. He joined committees, also inaccessible to women, where he saw potential research benefits. One very significant example of this occurred In 1896, when he became a member of the Cambridge Botanic Garden Syndicate. He gained access to vital research plots in the 'experimental ground', had greenhouses built and planting pits dug, and secured the assistance of R I Lynch, the Garden Curator, and garden staff. Though he dropped out of the Committee in 1906, there is evidence in the Annual Reports by 1909 that Genetics research was becoming dominant. Edith Saunders was assigned a 1-acre plot for her initial collaboration with Bateson in 1895, and continued to use plots and pits rent free for many years, including for her independent research, until at least 1924, with the Garden even celebrating her 'well-known' independent cross-breeding experiments.

Finally in 1910, Bateson got his wish for the research station he had envisaged, when he was appointed Director of the newly established John Innes Institute. Some women went with him, but Edith Saunders remained in Cambridge, where she had a secure position and salary. However, they continued to present their research together at meetings, and she conducted some of her experiments at the John Innes Institute.

As well as referencing Saunders’ work in his reviews, Bateson seems to have been assiduous in acknowledging her importance to his work. These are just 2 examples:

‘Had it not been for the work … done by my friends and pupils – first of all by my colleague Miss Saunders, whose name has been so deservedly honoured tonight … I could never have dared … to have asserted that Mendelian research … is of the importance that we now know it must possess’
[Speech at dinner during 3rd RHS Conference on Genetics, June 1906]

'In the early days of Mendelism, and before, Miss E. R. Saunders collaborated with me. A beautiful series of results, especially relating to the heredity of Stocks (*Matthiola*), has been the fruit of her labours exclusively. Not only have these results greatly advanced our knowledge of genetic phenomena, but I think that at a time when Mendelism was, in England at least, regarded with suspicion, the obvious precision of her work and the persistence of her advocacy did much to convince the scientific world of the reality of our assertions.’
[Preface to 'Mendel's Principles of Heredity', 1909]

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Research + Poster = Christine Alexander