



# Electrifying Women: Women In Engineering pre-1919

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*@ElectrifyingWmn*

#electrifyingwomen



# Plan

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- Overview of 'Electrifying Women'
- Women in Engineering pre-1919
- Case studies:
  - Hertha Ayrton
  - Katharine Parsons

Lady Katharine Parsons

## AHRC project: Electrifying Women: Understanding the Long History of Women in Engineering

Public engagement work in partnership with WES, IET, Wikimedia & Science Museum:

### Aims:

- To share stories of women's collaborative participation in engineering from 19<sup>th</sup> century
- To show where more research is needed, how it can be done & how shared
- To enhance Wikipedia pages on women in engineering history through wikithons
- To develop inclusive forms of participation e.g. creative writing and drama
- To support recruitment of women to engineering through heightened historical awareness





## Types of Outreach and Engagement

- Talks
- Blog posts
- Creative Writing
- Archives taster sessions
- Wikithons
- Volunteers

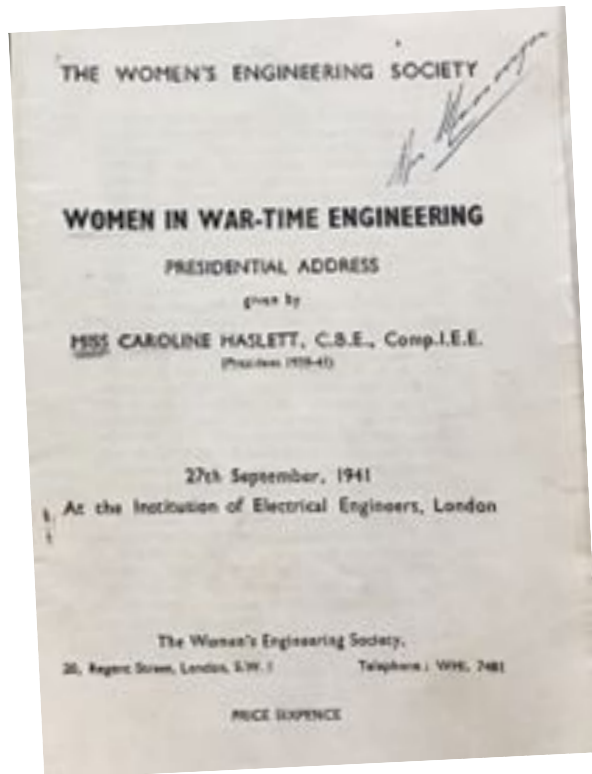
## Where are the women in engineering history before 1919?

- Census data
- Patent records
- Biography/autobiography
- Archives
- Newspapers

Right: Hertha Ayrton in her home laboratory, date unknown.  
Source: *Hertha Ayrton 1854–1923: A Memoir*, by Evelyn Sharp  
(London: 1926).



# Recalling the 1841 Census in 1941



Caroline Haslett's WES  
Presidential Address  
in September 1941

Haslett quoting  
appendix on 1841  
census data in:  
Ivy Pinchbeck,  
*Women Workers  
and the Industrial  
Revolution* (1930)

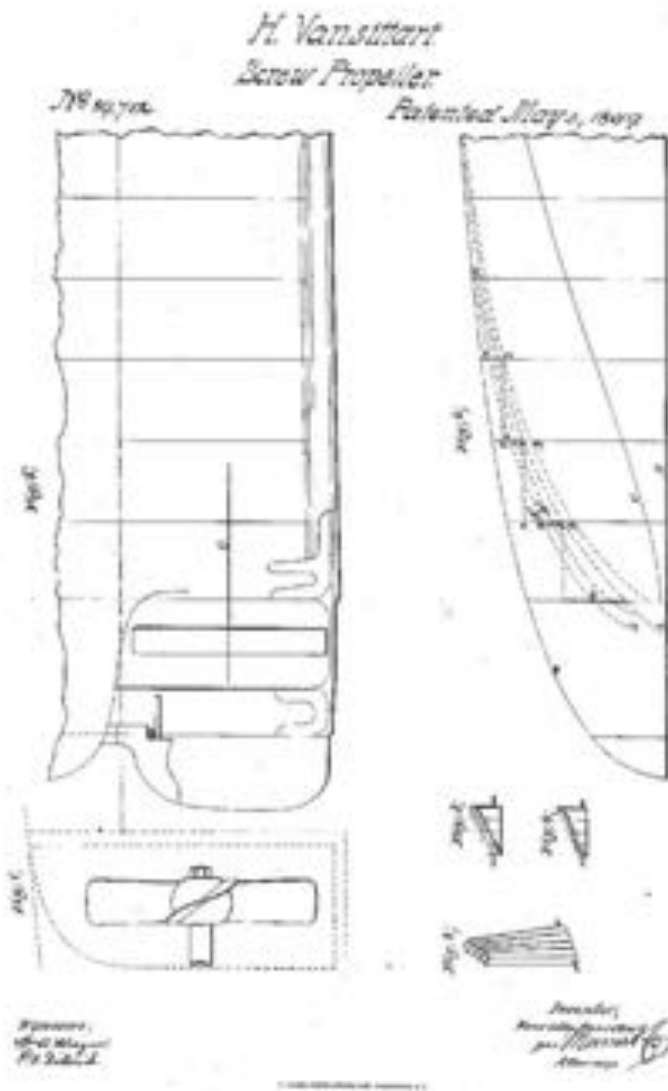
5

employment long before the years of so-called emancipation. The following are for England alone :

	<i>No. of women engaged</i>
Agricultural Implement Maker ..	58
Anchor Smith and Chain Maker ..	103
Blacksmith .. ..	469
Boat and Barge Builder ..	19
Brass Founder and Moulder ..	43
Brazier, Brass Finisher and Tinker ..	110
Buckle Maker .. ..	43
Burnisher .. ..	216
Button Maker .. ..	1,638
Carpenter and Joiner .. ..	389
Chair Maker .. ..	280
Clock and Watch Maker ..	185
Coach Maker .. ..	116
Cooper .. ..	119
Cutler .. ..	159
Die Engraver and Sinker ..	8
Engine and Machine Maker ..	53
Engineer and Engine Worker ..	102
File Maker .. ..	123
Fork Maker .. ..	42
Gas Fitter .. ..	2
Gun Maker and Gun Smith ..	79
Hook and Eye Maker ..	67
Jeweller, Goldsmith and Silversmith ..	365
Lamp and Lantern Maker ..	10
Locksmith and Bell-Hanger ..	42
Mason, Paviour and Statuary ..	150
Mathematical Instrument Maker ..	2
Metal Manufacturer .. ..	163
Millwright .. ..	28
Moulder .. ..	17
Musical Instrument Maker ..	23
Nail Manufacturer .. ..	4,039
Needle Manufacturer .. ..	748

# Henrietta Vansittart (1833-1883)

- Engineer and inventor
- Described herself as self-trained
- Worked with her father and took over his company when he died
- Patent for screw propeller
- Similarities to story of Blanche Thornycroft (1873-1950), another female engineer working with ships, considered the first female naval engineer



# DECORATIVE ELECTRICITY

*Alice M.*  
MRS. J. E. H. GORDON.

WITH  
A CHAPTER ON FIRE RISKS

BY  
J. E. H. GORDON, B.A., M. INST. C. E.,  
DIRECTOR OF AND CONSULTING ENGINEER TO THE METROPOLITAN  
ELECTRIC SUPPLY COMPANY.

ILLUSTRATED BY HERBERT FELL

LONDON:  
SAMPSON LOW, MARSTON, SEARLE, & BIVINGTON,  
LIMITED,  
21, BUNSTAN'S ROADS,  
FETTER LANE, FLEET STREET, E.C.  
1891.

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Alice (Mrs J.E.H.)  
Gordon working as  
an 'engineer by  
marriage'

'Some personal  
experiences', 1891



## Alice Gordon, 'Some Personal experiences'

Of the Gordon installation of an a.c. arc lighting system at Paddington Railway station in 1885-86:

'In spite of the anxiety, the details of the working of this station were of the greatest interest.

I always felt as if the dynamos were sentient beings, and they all had characteristics of their own.

No. 1 was not quite dependable, for her shaft, which was eight inches in diameter, and eleven feet long, had been sprung a sixty-fourth of an inch out of truth in transport, and required incessant nursing for the first few months, and consumed enormous quantities of castor oil.

However, with care, her constitution recovered, and she is now working as steadily as her sisters.'

# Women in Engineering pre-1919

- Few formal opportunities; rare for women to study at university, exceptions include Hertha Ayrton, Ruth Pirret, Margaret Rowbotham, Eily Smith Keary, Alice Perry
- Women gained engineering experience through **familial collaboration/working for family company** e.g. Blanche Thornycroft, Henrietta Vansittart
- ‘Engineers by marriage’: Alice Gordon, Katharine Parsons, Margaret Moir
- Census records suggest more stories to uncover: more research to be done



Lady Margaret Moir, 1864-1942, born Edinburgh, co-founder of Women's Engineering Society, 1919, President of WES 1929-30.

# HERTHA AYRTON

**DR ELIZABETH BRUTON**  
**CURATOR OF TECHNOLOGY AND ENGINEERING**  
**SCIENCE MUSEUM**

Twitter: @lizbruton



# FIRST FEMALE ELECTRICAL ENGINEER IN UK

- **1899:** Hertha Ayrton (1854–1923) elected first female member of the Institution of Electrical Engineers
- Feminist, mathematician, inventor, patent holder physicist, electrical engineer, and suffragist

Right: Portrait of Hertha Ayrton, Girton College, University of Cambridge painted by Héléna Arsène Darmesteter (nee Hartog) [Ayrton's first cousin once removed]; supplied by The Public Catalogue Foundation



# EARLY LIFE

**1854:** Born Phoebe Sarah Marks

**1863:** Invited by her maternal aunt Marion Hartog to live with her cousins and to be educated with them

**1870:** Working independently as a governess

**1876:** Began studying at Girton College, Cambridge University

**1881:** Receives external BSc from University of London

**1884:** Granted first patent for line divider



Girton College archive GPCH 10/2/41 Girton College Fire Brigade 1878 featuring Hertha Ayrton. Image courtesy of the The Mistress and Fellows, Girton College, Cambridge.

# PHYSICIST & ELECTRICAL ENGINEER

**1884:** Studies Physics at Finsbury Technical College, meets Professor William Ayrton

**Early 1890s:** Begins researching electrical arcs – powerful outdoor and indoor lighting

**1899:** Elected first female member of the Institution of Electrical Engineers for her work on electrical arcs



Right: Hertha Ayrton in her home laboratory, date unknown.

Source: *Hertha Ayrton 1854–1923: A Memoir*, by Evelyn Sharp (London: 1926).



# 1899: HERTHA AYRTON



Top Left: Moonlight lamps aka electric arc lighting, late 19<sup>th</sup> century; top right: Ayrton flapper fan, courtesy of IWM.

Right: Illustration of Hertha Ayrton from STEM: The Game by George Doutsopoulos, freelance illustrator.



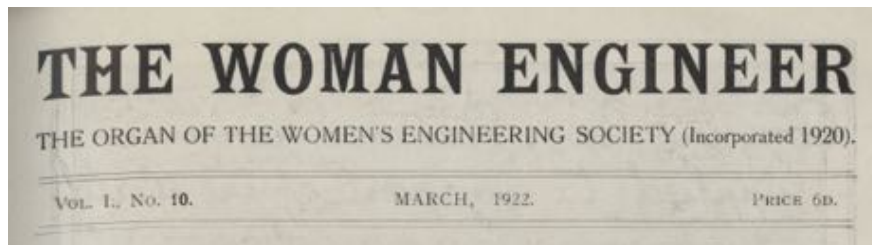
Mrs Hertha Ayrton was I think the first member of the fair, but no longer frail sex, to distinguish herself in the engineering world, though perhaps the woman engineer would not have arrived yet, had not the war, which upset so many masculine traditions, proved that woman was capable of doing many things which had hitherto been considered strictly within the provenience of the more assertive male...

**Stewart, A, 1923, 'On Making the Best of It', *The Woman Engineer* 1, pp 284–286**



# 1919: WOMEN'S ENGINEERING SOCIETY

- **Lady Katharine Parsons and Rachel Parsons**, cofounders of WES with Lady Margaret Moir and four other women
- **Hertha Ayrton**: Early member and supporter of WES
- **Caroline Haslett**: “Organising secretary” from 1919; and first editor of *The Woman Engineer*



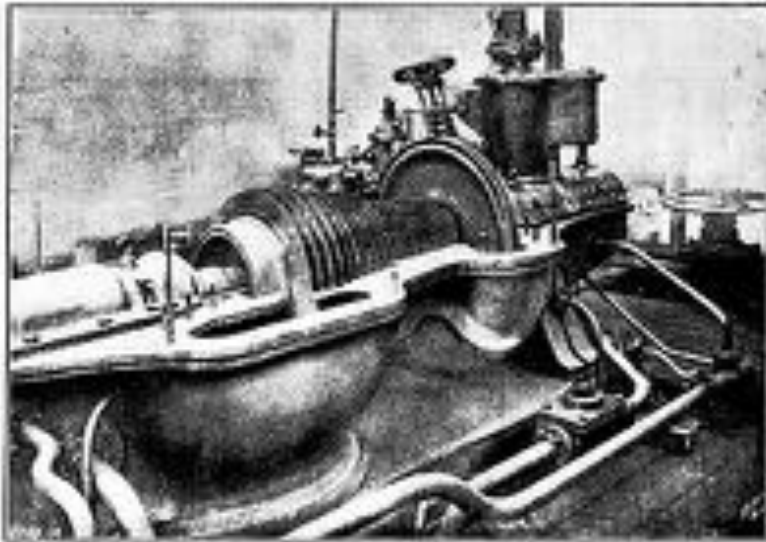
Above-left: Rachel Mary Parsons (1885-1956). Above-right: Caroline Haslett (1895-1957). Images courtesy of IET Archives.  
Above: WES conference, 1923. Image courtesy of WES.

# Women as partners in engineering

- Hertha Ayrton – exceptional separate practice from spouse, William
- Compare Marie Curie – absolute independence in research proven only as widow
- Marital partnerships well documented in 19<sup>th</sup> century science: Maunders etc.
- Partnership working often identifiable in joint research publications
- Spousal partnership in 19thC engineering: women's work much harder to trace
- Alice Gordon's 'Personal Experiences' rare testimony on spousal collaboration
- Role of 'engineer-by-marriage' more visible in early Women's Engineering Society

## Hon. Charles Parsons & Lady Katharine Parsons – spousal partnership

Steam turbine & 'Turbinia'  
c.1894



## Lady Parsons speaks on women's employment in *Transactions of the North East Coast Institution of Engineers and Shipbuilders*

Lecture: 'Women's Work in Engineering and Shipbuilding during the War' July 1919

'It has been a strange perversion of women's sphere – to make them work at producing the implements of war and destruction and to deny them the privilege of fashioning the munitions of peace' – foundational message in promoting W.E.S.

Obituary 'The Hon. Lady Parsons (Hon.Fellow)' published by NECIES in 1933

'She was always at [Sir Charles Parsons'] side, always there to help him when he needed her, always supporting him with her really powerful mind and ready tact, and perfect understanding.

'Lady Parsons was the possessor of a remarkable character, she was almost fiercely independent... She had in many ways a very masculine brain - and a love of business organization and leadership.' (Author: Mary Houstoun).

# Women's Engineering Society

## Articles of Association, 1919 – and 2014

### NAMES, ADDRESSES AND DESCRIPTIONS OF SUBSCRIBERS

E G Shelley-Rolls, The Hendre, Monmouth

Married Woman

Rachel M Parsons, 1 Upper Brook Street, W

Spinster

Katharine Parsons, 6 Windsor Terrace, Newcastle-on-Tyne

Wife of Sir Charles  
Parsons

Janetta Mary Ormsby, 7 Osborne Terrace, Newcastle-on-Tyne

Married Woman

Margaret D Rowbotham, c/o The Galloway Engrs Co Ltd, Kirkcudbright

Spinster

Margaret Moir, 54 Hans Place, SW

Married Woman

Laura Annie Wilson, 22 Savile Park, Halifax

Married Woman

Dated the 23rd day of June, 1919.

The Companies Acts 1985/89

**& Suffrage campaigning,  
First World War work**

# Early Presidents of Women's Engineering Society

- Society's founders/patrons prominent in first decade, three 'engineers-by-marriage':
- Rachel Parsons, (1885–1956) 1919-21 Cambridge University
- Lady Katharine Parsons, (1859-1933) 1921-25 Spousal collaborator
- Laura Annie Willson, (1877–1942) 1926-28 Spousal collaborator
- Lady Margaret Moir (1864-1942) 1929-30 Spousal collaborator
- Verena Holmes (1889 -1964) 1931-1932 Loughborough College
- Elizabeth Kennedy (18??-1958) 1933-1934 J B Stone & Co
- Amy Johnson ('Mrs J.Mollison') (1903-1941) 1935-1937 Sheffield University
- Edith Mary Douglas (1877-1963) 1938-1939 (RAF connections...)
- Caroline Haslett (1895-1957) 1940-1941 Cochran Boiler Co.
- Gertrude Entwisle (1892-1961) 1942-1943 Manchester College
- Margaret Partridge (1891-1967) 1944-1945 University of London

## Longer-term significance of Pre-WW1 women in engineering

- Engineering as family business persists into the corporate era – women's work indispensable
- Many women well-placed to participate in engineering work during First World War
- Women's engineering work in the War of many reasons for getting (partial) vote in 1918
- Seven Key philanthropic/activist women promote retaining women's participation after war
- Founders of Women's Engineering Society in 1919
- Major financial sponsors of WES when recruitment is difficult
- Three serve as Presidents of WES in difficult early decade (turbulence/recruiting challenges)
- Explains in part why the UK has the first continuously running Women's Engineering Society
- Germany - Verein Deutsche Ingenieure (1856) women's section 1933
- USA - Society of Women Engineers, founded 1950

Keep in touch



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Twitter: @ElectrifyingWmn