

WES President Biographies 1919-1985



Nina Baker, Dawn Bonfield
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Women's Engineering Society Presidents (1919-1985)

Contents

1919-1921: Rachel Mary Parsons AINA (25 th January 1885 - 2 nd July 1956)	3
1922-1925: The Hon. Lady Katharine Parsons (nee Bethell) JP (1859 - 16 th October 1933)	3
1926-1928: Laura Annie Willson (nee Buckley) MBE (15 th August 1877 - 17 th April 1942)	4
1929-1930: Lady Margaret Bruce Moir OBE [née Pennycook] (10 th January 1864 – 5 th October 1942)	4
1931-1932: Verena Holmes BSc. (Eng.), AMIMechE, AIMarE. MILocEng (23 rd June 1889 – 20 th February 1964)	5
1933-1934: Elizabeth M. Kennedy (circa 1886-1958)	6
1934-1937: Amy Johnson CBE, BA., A.RAeSoc, HonFSE (Mrs J. A. Mollison) (1 st July 1903 – 5 th January 1941)	6
‘Our Amy’ – more than just a record-breaking pilot	6
1938-1939: Edith Mary Douglas (nee Dale) (13 th November 1877 - 1963)	7
1940-1941: Caroline Harriet Haslett DBE, JP, Companion IEE (17 th August 1895 – 4 th January 1957)	7
1942-1943: Gertrude Lillian Entwisle (1892 -18 th November 1961)	8
1944-1945: Margaret Mary Partridge BSc, MIEE (18 th April 1891 - 27 th October 1967)	8
1946-1947: Dr Winifred Hackett AMIEE (2 nd October 1906 - 3 rd June 1994)	9
1948-1949: Frances Dora Heywood BSc, PhD, MInstMet (nee Weaver) (14 th April 1902 – 18 th September 1994)	10
1950-1951: Sheila Leather (17 th January 1898 - 27 th January 1983)	10
1952-1953: Ella Mary Collin BSc, PhD, FRIC (15 th July 1903 - 1 st February 1973)	11
1954-1955: Dorothy Lilian Pile FRSA, MISI, HonFISMe, HonFSLAET, HonMIM, FIMF, HonFIMet (26 th July 1902 - 1 st February 1993)	11
1955-1956: Kathleen Mary Cook (Mrs D.I.H. Goodwin) AMIMechE, FIBF MIProdEng (25 th August 1910 - 1971)	12
1957-1958: Marjorie Elsa Bell BSc, Grad.IEE, C.Eng., MIISO, MIOSH, HonMWES (26 th December 1906 - 10 th June 2001)	13
1959-1960: Madeleine Marie Nobbs (Mrs. D. Moody) MIMechE, MIHVE, MRSanI (14 th December 1914 - 10 th December 1970)	13
1961-1962: Isabel Helen Hardwich (nee Cox) MA, CEng., MIEE, MIOP, HonMWES (19 th September 1919 – February 1987)	14
1963 & 1965: Jane Cicely Thompson MBE, MA, FIEE, CEng (9 th June 1919 - 3 rd February 2008)	15
1964: Dorothy May Cridland Assoc.IMechE (15 th February 1903 - 25 th May 1987)	15

1966-1967: Rosina “Rose” Winslade OBE MIMC, MASEE, FITE, AMBIM, MSIT (22 nd July 1919 - 16 th December 1982)	16
1968-1969: Elizabeth (Betty) Laverick (nee Rayner) OBE, FIEE, CEng, FInstP, SMIRE, HonFUMIST (25 th November 1925 – 12 th January 2010)	17
1970-1971: May Maple (nee Newby) FIEE, CEng., FRSCA (8 th Aug 1914 - 19 th August 2012)	17
1972-1973: Peggy Lilian Hodges OBE, MA, CEng, FRAeS, FIMA (11 th June 1921 – 21 st November 2008)	18
1974-1975: Gwendolen Alice Howard (“Bunty”, nee Sergeant) CEng., FIMechE, AMBIM (17 th March 1926 - 1 st June 1979)	19
1976-1977: Henrietta (Hettie) Langdale Bussell (19 th February 1917- December 1996).....	20
1978-1979: Veronica Jean Kathleen Milligan (“Ronnie”, nee O’Neil) BA, C.Eng., MIEE, AMBIM (11 th March 1926 - 3 rd September 1989).....	20
1980-1981: Maria (Marja) Ludwika Ziff (Mrs Watkins) BSc, C.Eng., MIEE, FIET, FRSA (circa 1918 – September 2010)	21
1982-1983: Rosemary Ethel Elizabeth West (nee Lambert) MA MIEE, CEng (8 th December 1928 - 6 th February 2013)	22
1984-1985: Daphne Frances Jackson OBE, PhD, ARCS, FInstP. DSc, FIEE, CEng, CPhys, FRSA (23 th September 1936 – 8 th February 1991)	22

These biographies were compiled by Nina Baker for the Women’s Engineering Society Centenary Publication in 2019, with grateful thanks to the IET Archive for their help.

1919-1921: Rachel Mary Parsons AINA (25th January 1885 - 2nd July 1956)

Mechanical engineer who became our first president

Rachel Mary Parsons was the daughter of Sir Charles and Lady Katherine Parsons. She was educated at a number of girls' schools including Roedean and in 1910 went to Newnham College, Cambridge and was one of the first three women to study Mechanical Sciences, although she did not complete the full three years. This added the theoretical background to her early practical interest in engineering fostered by her family, her father of course being the famous inventor of the compound steam engine. During the First World War she replaced her brother as a director on the board of their father's Parsons Marine Steam Turbine Company and oversaw the recruitment and training of women war workers

She and her mother were among the founders of the Women's Engineering Society in 1919. Rachel Parsons chaired the very first meeting of the women who set it up and she became its first president (1919–1921). She continued her engineering interests by founding the Atalanta engineering company with a group of women, and funded by her mother and other influential friends of the Society. In 1922 she became an Associate of the Institute of Naval Architects and was elected a member of the London County Council, serving on the Highways Committee and the Electricity Supply Committee. In 1934 she was elected as a member of the North East Coast Institution of Engineers and Shipbuilders.

In later life Parsons pursued an interest in race-horse breeding. She was found dead on 2 July 1956 and Dennis James Pratt, a former employee, was convicted of her manslaughter in a trial which, unfortunately, painted her character in the worst of lights.

1922-1925: The Hon. Lady Katharine Parsons (nee Bethell) JP (1859 - 16th October 1933)

Our 'Founding mother', suffragette and feminist

Katharine Parsons was the originating founder of the Women's Engineering Society. Described by Caroline Haslett as "a militant suffragette and feminist" it was Katharine Parsons who brought the women together who would, in 1919, become the founder members and signatories of the first articles of association to found the society. She, her daughter Rachel and her famous engineering husband, Sir Charles Parsons were lifelong supporters of the Society.

Born in the East Riding of Yorkshire in 1859, she was the youngest of William Froggatt Bethell and Maria Elizabeth Beckett's 12 children. Her father was a landowner and magistrate. It is most likely that all her education will have been at home as the first proper girls' schools were only being established when she was a young adult. Like a later WES President, Lady Moir, Katharine Parsons was really an 'engineer by marriage'. It is reported that as soon as she married Charles Parsons she started to take a detailed interest in his engineering works at Heaton. During the First World War she and her daughter, Rachel, were much involved in the recruitment, training and welfare of female munitions workers.

In 1919 she became the first female member of the North East Coast Institution of Engineers and Shipbuilders and gave a rousing speech about women engineers at their victory celebration after the First World War. She also published a book: "Women's work in engineering and shipbuilding during the war". Her interest in women's voting rights and their war work in engineering led to the idea for the Society which she partly funded from the start. She advertised for a General Secretary

to help her set up and run the nascent society, and recruited Caroline Haslett. Together they established and ran the society in its early years and in 1922 Lady Parsons became its president. Although never formally trained or educated as an engineer, her contribution to engineering was widely recognised and she was also admitted to the Worshipful Company of Shipwrights and became a freewoman of the City of London. She died in 1933 and is buried in Kirkwhelpington, Northumberland.

1926-1928: Laura Annie Willson (nee Buckley) MBE (15th August 1877 - 17th April 1942)

Campaigner and housebuilder

Laura Annie Willson was a Yorkshire woman to her boots and lived and worked in Halifax most of her life. Born in 1877 to a working class labourer, Charles Buckley, she and her sisters were all sent to work half-time in the textile mills from the age of 10, only getting a very basic education in the afternoons, as was normal for poor families then. At the age of 22, a worsted weaver, she married George Henry Willson who was a machine tool maker. Together they established, Smith, Barker and Willson, a successful engineering works in Halifax and she would become one of its directors. She was a member of the Women's Labour League and the Women's Social and Political Union and in 1907 was arrested twice and imprisoned for her part in a weavers' strike on a charge of 'violent and inflammatory speech'. During the Great War the family's company works expanded and she organised all the women munitions workers they had to take on, including setting up a canteen when she realised how many of them were malnourished. She was one of the first women to receive an MBE, in 1917, for her war work. In the 1920s she became interested in the application of industrial efficiency ideas to housebuilding for ordinary workers, and in 1925 became the first woman member of the Federation of House Builders. She built several low cost housing estates in the Leeds area. She was also active locally in founding and supporting networking organisations for businesswomen, becoming the first President of Soroptimists International's Halifax branch in 1928.

She was a founding member of the Women's Engineering Society in 1919, member of its first council and co-founder of the Electrical Association for Women in 1924. In 1926-28 she was the president of WES and remained active almost until her death in 1942.

1929-1930: Lady Margaret Bruce Moir OBE [née Pennycook] (10th January 1864 – 5th October 1942)

“Engineer-by-marriage”

Margaret, Lady Moir, was born to John and Margaret Pennycook of South Queensferry, Scotland, in 1864. Her father was a quarry manager, so perhaps this was how Margaret met her future husband, Ernest Moir, when he was working as a civil engineer on the south cantilever of the Forth Bridge. We know nothing of her early education but her marriage gave her privileged access not only to the construction site of this bridge but many other major civil engineering works on which her husband worked. She would joke self-deprecatingly, that she was an “Engineer-by-marriage” but, during the Great War, she trained as a lathe operator and was employed in this role for more than eighteen months. When she realised that many munitions workers were not getting any days

off at all, she organized the Week End Relief Scheme for industrial workers; their places being taken by Moir herself and other educated and privileged women. This scheme was launched at the Vickers factories at Erith in Kent, but spread elsewhere. This and her efforts on behalf of the National War Savings led to the award of an OBE in 1920.

Margaret Moir worked with her friends, Sir Charles and Lady Parsons to set up the Women's Engineering Society in 1919 and became its President 10 years later. Throughout her involvement with the Society, her personal financial support and her efforts to encourage other aristocratic women with technical interests to contribute to the Society, were key to its survival in its early decades. She hosted lectures at her London home and also helped to set up the Electrical Association for Women in 1924, becoming its President in 1932 and overseeing the opening of its first public showrooms in London's Regent Street. She was also involved in housing and children's charities and died in 1942.

1931-1932: Verena Holmes BSc. (Eng.), AMIMechE, AIMarE. MIMLocEng (23rd June 1889 – 20th February 1964)

The Society's first practicing engineering president

Verena Holmes was born in 1889 in Kent, where her father Edmund Holmes was a schools inspector and author. She attended Oxford High School for Girls and after initially working as a society photographer found her true vocation when the First World War opened the door to engineering. Her first job was building wooden propellers at the Integral Propeller Co., Hendon, whilst attending evening classes at Shoreditch Technical Institute. She then worked at Ruston and Hornsby, an aero engine firm in Lincoln, as their Lady Superintendant responsible for the selection, control and welfare of 1,500 female employees. However, her real interest was engineering and she persuaded the directors of the company to let her start as an apprentice in the fitting shops. Holmes gained experience as a turner and completed an apprenticeship as a draughtsman before the end of the war. In 1919 she was the only woman who was allowed to stay on with the firm. She attended Loughborough Technical College, and gained an BSc (Engineering) degree extramurally from London University in 1922. From then onwards Verena would produce a steady stream of inventions, of which 17 were patented. One of the more significant was the Holmes-Wingfield pneumo-thorax apparatus, which she designed and made for Dr RC Wingfield, for his work at Brompton Hospital tuberculosis sanatorium. In the early 1920s she worked with various consultant engineers before setting up her own design consultancy in 1925. From 1928 -1931 her patents on locomotive valves got her a job at the North British Locomotive Works, Glasgow, and from 1932-39 she worked at Research Engineers Ltd, designing many new pieces of engineering. She later said that this was one of the happiest times of her life and she also gained her private pilot's licence. When the Second World War started, Verena, as with many of her generation of engineers, saw that the demands for women workers would be the same, with the same problems, as she experienced in the Great War. She designed and instigated a training scheme for women, initially run by the Society, at the Beaufoy Institute and later adopted by the government. In 1940 she became adviser to Mr. Ernest Bevin, the Minister of Labour, on the training of munition workers and was joined by other WES members in this work. In 1946 she and Sheila Leather formed Holmes and Leather, a company employing women to make Bantam metal shearing machines, and other Holmes inventions, in Gillingham. Having been a founder member of the Society, Verena Holmes outlived most if not all the other founders, and remained active in the society until she became frail at the end of her life. She was President in 1931-32, was on council for many years and had two periods as Honorary Secretary in

the early years and then in the 1950s. She was always interested in the educational side of the Society's work and produced a widely used booklet on training women engineers, so it was very appropriate that her £1,000 legacy to the Society on her death in 1964 was used as the funding to start a Verena Holmes Memorial Lecture series which toured schools for many years.

1933-1934: Elizabeth M. Kennedy (circa 1886-1958)

Machine tool expert

Elizabeth Kennedy never described herself as an engineer but nevertheless spent her entire working life in engineering. Very little is known of her background or upbringing. The teenager who had wanted to be a journalist became a recognised expert in the types and qualities of machine tools for both wood and metalworking, having joined J.B. Stone & Co in 1904. She rose to become the company's managing director and remained with them for 30 years. She was adamant that, as it took years to make a competent engineer, she could not claim to be able to operate any of the machine tools about which she knew so much. She became a recognised expert in American machine tools and visited that country in 1927 to learn more. In 1933 her paper about electrical distribution and costs, to the Institution of Electrical Engineers won its Premium for that year. During World War 2 this knowledge was put to use in the national war effort. She joined the Society in 1925 and was immediately active, going straight onto the council and becoming its President in 1933, when she used her presidential address to claim that she "was not a feminist" despite believing that women's abilities and skills should be sufficient for their worth to be recognised and that women engineers were not taking men's work. She never married and retired from Stones in 1934, and died in 1958.

1934-1937: Amy Johnson CBE, BA., A.RAeSoc, HonFSE (Mrs J. A. Mollison) (1st July 1903 – 5th January 1941)

'Our Amy' – more than just a record-breaking pilot

Probably the best known of all the presidents of the Women's Engineering Society, both at the time and also long after her untimely death, Amy Johnson was born in 1903 in Yorkshire into a prosperous fish merchant's family. Her father, John William Johnson, was a devoted supporter of his daughter's aviation exploits, including financially. She went to an ordinary municipal secondary school in Hull and then graduated in economics from the University of Sheffield. Johnson stood out from the crowd during her school days, and continued to do so when gaining a degree in Economics from Sheffield University. Johnson discovered her passion for flying at London Aeroplane Club, Stag Lane Aerodrome achieving her full pilot's licence and the Air Ministry's ground-engineer's licence in 1929, being the first woman to get the latter. 1930 was remarkable for her record-breaking solo flight from England to Australia, and in 1931 the Society of Engineers presented her with the President's Gold Medal for her paper on "The Attention that I gave to Jason's engine during my flight," which was described as "a classic in Engineering". In 1932 she married Scottish pilot Jim Mollison, who had proposed to her during a flight together some eight hours after they had first met. They made a number of high-profile flights together before their divorce in 1938. In 1940, like many other women pilots who were WES members, Johnson joined the newly formed Air Transport Auxiliary (ATA), and rose to First Officer, but on 5th January 1941, while flying an

Airspeed Oxford for the ATA from Prestwick via Blackpool to RAF Kidlington near Oxford, she went off course in adverse weather conditions. Reportedly out of fuel, she bailed out as her aircraft crashed into the Thames Estuary near Herne Bay and died.

Amy joined the Women's Engineering Society in 1930 and was immediately being frequently featured in *The Woman Engineer* every year until her death. In 1932, having set up the society's Aeronautical Section, which was to be the forerunner of the British Women Pilots' Association, Amy became one of the society's vice presidents from 1934-37 was president for an exceptional three years, during which time she was included (with Verena Holmes) in the Jubilee Pageant painting – an enormous panorama of the most significant people and events of the age, for the Ideal Homes Exhibition. Her death was a great loss to the Society which held a big memorial service at St Martins in the Fields, London, raised funds for a scholarship fund for women to train in aeronautics and for a bronze bust which was gifted to the city of Hull and is in their Streetlife Museum.

1938-1939: Edith Mary Douglas (nee Dale) (13th November 1877 - 1963)

Shipyard manager

Born in Cawnpore, India, where her father, George Desborough Dale, was in the Indian Civil Service. She was educated at home in England. Her marriage to Major Clifford Hugh Douglas in 1915 (his second, her only marriage) introduced her to engineering, financial and political matters, not least as he was a founder of the Social Credit Movement in the 1920s, on which he wrote and lectured widely. During the First World War her husband was an Assistant Superintendent of the Royal Aircraft Factory Farnborough, which gave Edith the unusual opportunity to be the first woman to fly in experimental bomber aircraft. When her husband became a co-director of the Swanwick Shipyard on the River Hamble, she too became a director of the shipyard. Although she had no formal technical education, Edith was by no means a silent partner, but became fully involved in the technicalities of running the yard. During the Second World War of course the construction of yachts had to give way to Admiralty orders for small craft. It seems likely that she and her husband retired during or just after the war. Edith joined WES in 1932 and was President of the Society in 1938-9.

She had a daughter and was a keen sailing racer, golfer and lawn tennis competitor and died in 1963.

1940-1941: Caroline Harriet Haslett DBE, JP, Companion IEE (17th August 1895 – 4th January 1957)

Our first Secretary and public voice for women engineers

Dame Caroline Haslett was arguably the woman who had the most impact on the founding and continued success of the Women's Engineering Society. Born in Sussex in 1895, her father Robert Haslett was a railway fitter. This perhaps explains why, on leaving school and getting a very junior clerical job with the Cochran Boiler Company in Annan, Scotland, she was so dissatisfied with the job that she asked if she could move to the shopfloor and learn the technical side.

In 1918, she answered an advertisement for a 'Lady with some experience in engineering works as organizing secretary for a women's engineering society.' This was the Women's Engineering Society, and she would go on to be the guiding influence of the Society, editing the Journal and

becoming President in 1941. She also co-founded the Electrical Association for Women, an organisation formed to reduce the drudgery of women's everyday lives by encouraging the use of electricity in the home. She edited its journal, the Electrical Age, for 30 years and the 6 editions of Electrical Handbook for Women. When she retired from the EAW the association had 14,000 members, most of them housewives, domestic science teachers, and educationists, organized in 160 branches. It flourished into the 1980s and many women remember their mothers attending its courses, evidenced by one of the distinctive explanatory tea towels.

Haslett was very much the voice for women in engineering in the UK and worldwide, advised the Government on planning in the Second World War, and was the only woman member of the Council of the British Institute of Management. In 1953-1954 she became the first female Chairman of the British Electrical Development Association, was the only woman member of the British Electricity Authority from 1947-1956 – leading to them naming one of their collier ships after her. Haslett was also the first Chairman of the British Federation of Business and Professional Women and the first British President of the International Federation. She served on numerous advisory bodies and wrote extensively.

In recognition of her work, Caroline Haslett was awarded a CBE in 1932 and a DBE in 1947. In her final years she lived with her widowed sister who was also active on the political side of electricity supply, and who wrote Caroline's biography. She died in 1957.

1942-1943: Gertrude Lillian Entwisle (1892 -18th November 1961)

Electrical power engineer and motor designer

A Lancashire lass, Entwisle (sometimes mis-spelled Entwistle) was educated at Milham Ford School, Oxford and then at Manchester High School For Girls, where she was awarded an Exhibition to enable her to attend Manchester University to study physics. She was one of the first women to attend engineering lectures at the University, after the engineering faculty decided to open its classes to women mid-way through her physics degree. She was the first woman to be admitted to the technical staff of British Westinghouse, the first woman member of the Society of Technical Engineers and the first Student, Graduate and Associate Member of the IEE (now the IET). She owned a three wheel Harper Runabout – a curious blend of motor-trike and small car. She worked mainly on the design of DC motors and generators until 1923 when she spent about 20 years working on AC before returning to DC motors during the Second World War. One of her largest designs was the DC motor for a motor generator flywheel set on the winding gear at Broken Hill mines in Australia. Towards the end of her career she became a specialist in large exciters for coal and hydropower stations. An early member of WES, she became Vice President in 1937 and president for 1942 and 1943, probably one of the earliest of our presidents to have had a life's career in practical engineering. She retired from Metropolitan-Vickers in 1954 and died in 1961.

1944-1945: Margaret Mary Partridge BSc, MIEE (18th April 1891 - 27th October 1967)

Electrical contractor and campaigner for women's rights at work

Margaret Partridge was born in Nymet Rowland, Devon in 1891 to John Leonard James Partridge (1859–1922), a landowner of independent means, and Eleanor Parkhouse Joyce (1858–1926). The

family moved to Bedford where Margaret attended the High School, and went on to Bedford College, London, on two scholarships. She graduated with a BSc Honours in maths in 1914. Her first job was as assistant mistress at Saltburn High School but soon moved to be an assistant to an eminent heating engineer, Arthur Henry Barker, in London.

In 1917 she went to Lyons and Wrench, to work in munitions, where she learned a lot of practical engineering. As with all other munitions women she lost that job when the war ended and she moved home to Devon, where she set up her electric power supply company, M. Partridge and Co., Domestic Engineers, offering to install electric power in rural homes, with the support of Dr John Purves MIEE, an electrical engineer who would later advise on the electricity supply scheme for the whole of the west of England. Although it was difficult to finance her company, it did have some successes, the first electrification scheme was in Bampton, completed in 1926. Initially many rural people were suspicious of the new technology and the woman installing it but when the lights came on there was great excitement and many more were keen to be connected. Her little power stations were on the DC system and employed male and female engineers. Probably her most famous apprentice was Beatrice Shilling, who started in 1926 with such enthusiasm that Partridge encouraged her to go to university and she ultimately became a well-known aeronautical engineer famous for her work on the Spitfire engines. However, Shilling's enthusiasm to work whenever required was discovered when she was working alone in a power station after 10 p.m., in contravention of the International Labour Organisation (ILO) convention on night working for women and children. This led Partridge and others in WES to a very long campaign to change the law and, in 1934, the international convention was altered to exclude 'women holding responsible positions of management'.

In 1920 Partridge joined the Women's Engineering Society soon after its founding she became its president in 1943-45. In 1922 her exhibition of electric models and domestic appliances in Exeter, was a forerunner of the work done by the Society's offshoot, the Electrical Association for Women, founded in 1924. Partridge became an active supporter and was the EAW Organizer for the South West region and one of the principal authors of the Electrical Handbook for Women.

When the Second World War came, Partridge used her engineering and WW1 experience to help establish Exeter Munitions Ltd., for which she was the company secretary. The company made 18 pounder shells and employed 30 men and 40 women. She was also the government's regional advisor for factories, on the employment of women.

On retirement in 1946, she took an active interest in local activities in Willand, where she lived with her friend and former business partner Margaret Rowbotham. Under her supervision the wiring of the new village hall was completed by members of the Women's Institute. She also acted as a director of two nursing homes, where her sister was chief doctor. She died at her home, Harpitt, Willand, Devon, on 27 October 1967 and was buried in the churchyard at Willand, where Rowbotham is also interred.

In her own words: '.... for sheer exciting experience give me a town to light'

1946-1947: Dr Winifred Hackett AMIEE (2nd October 1906 - 3rd June 1994)

Guided weapons engineer and computer pioneer

Educated at King Edward's Girls' High School, Birmingham, Hackett was an exceptional student and won a scholarship there. She initially went to UCL to study architecture but then returned to Birmingham to study electrical engineering, graduating with a BSc Hons class 1 in 1929 – the first

woman to gain such a degree. This also gained her the Bowen Scholarship for Electrical Engineering enabling her to stay on for a year's research for an MSc. In 1930 she was awarded a grant by the Institution of Electrical Engineers' War Thanksgiving Education and Research Fund which helped her proceed to gain a PhD on selenium cells from University of Birmingham. Her first job was as a Junior Technical Assistant to the British Electrical and Allied Industries Research Association at Perivale and then Leatherhead.

Having been involved with the Women's Engineering Society since 1929, in 1946 she became President at which period she was employed to research dielectrics for "a firm of capacitor manufacturers". She published a number of papers on dielectrics, capacitors and DC design. In the 1950s she was head of the Guided Weapons Division at English Electric, in Luton and later in Stevenage, where she was in charge of the Deuce computer and its programming on punched cards and paper tape. The Deuce was a version of Alan Turing's Ace computer but was a commercial product, of which 33 were sold and which had a library of over 1,000 programs. The period when Hackett ran the guided weapons division also saw the development of the Thunderbird surface to air missile and other ballistic missiles. In the early 1960s she moved to join the Manchester Business School where she did statistical analysis.

Her personal interests included fashion and the theatre, and in retirement her own ill health led her to devise various aids for disabled people. She died in 1994.

1948-1949: Frances Dora Heywood BSc, PhD, MInstMet (nee Weaver) (14th April 1902 – 18th September 1994)

Metallurgical expert on typeface metals

Weaver was the fourth daughter of an itinerant Methodist preacher, she was a Methodist her whole life. She was educated at Bradford Girls Grammar School and Sheffield High School, awarded the Arnott Scholarship to study at Bedford College, University of London in 1920 from which she graduated in 1924 with a first class honours degree in chemistry. She then worked as Assistant Metallurgist to the Lanston Monotype Corporation Ltd, at Harley, Surrey. In the 1930s she started the research for which she is best known and which led to her PhD, on the characteristics of the tin-based alloys used in making typeface. The outcome of Weaver's research was considered to be the definitive work on the subject and was funded by the International Tin Research and Development. During this period she married a research colleague, Dr Harold Heywood and, as was standard then, retired from her paid employment. They had three children. She joined the Women's Engineering Society in 1926 and became its president in 1948. She was interested in education and was on the boards of various colleges and schools.

1950-1951: Sheila Leather (17th January 1898 - 27th January 1983)

Fitness instructor and amateur engineer who became a government advisor on industry

Sheila Leather was born in Cheshire in 1898 where her father was an analytical chemist. She was educated as a boarder at Liverpool High School for Girls but little is known of what post-school education she had. Before the Second World War she was a Physical Training Lecturer at Hockerill Training College, Hertfordshire, having trained in the revolutionary Bergman-Osterberg method of exercise for women, almost certainly at Madame Bergman-Osterberg's Dartford College.

She was an amateur engineer in her own time and in 1940 she was one of the first women trainees on the courses run by the Women's Engineering Society at the Beaufoy Institute in London to prepare women for engineering war work. She showed such aptitude at the aircraft factory where she was sent that she was promoted from the shopfloor to more responsible posts in production planning and in 1943 was recruited by the Ministry of Labour to be one of its Women Technical Officers advising on the employment of women in heavy industry. She joined the Society in 1944 and soon made friends, as she and Verena Holmes set up a small engineering company (Holmes & Leather Ltd, in Gillingham) in 1946 employing only women to make small paper-cutting guillotines.

In 1950-51 she became president of WES and undertook some broadcasting as well as visiting schools to encourage girls to do engineering, and working with other women's organisations to campaign for equal pay. In retirement she enjoyed acting as a volunteer guide in Lincoln Cathedral. She died in 1983.

1952-1953: Ella Mary Collin BSc, PhD, FRIC (15th July 1903 - 1st February 1973)

Metallurgist and educationalist

Ella M. Collin was born in 1903 in Essex into a modest working class family. Her father, Walter George Collin, was a travelling salesman and later a printer. Collin became a metallurgical chemist having gained a BSc in chemistry from Kings College London and a PhD from the University of London in electrolytic analysis for determination of impurities in ores. She first worked in a firm of analytical and consulting chemists in London, specialising in the assaying of non-ferrous, rare and precious metals. In 1945 she became the assistant to the Director of Research and then the Education officer, at the British Launderers Research Association. In 1949 she was appointed to be an HM Inspector of schools (technical branch) with the Ministry of Education, in Manchester, which she did until retiring. She joined the Society in 1946 and immediately took an active role in setting up the London Branch, becoming its chair in 1948. She was the society's president in 1952-53 and used the role to speak about technical education in schools. She was a regular donor to WES in her later years and left the society a legacy in her will when she died in 1973. Ella was also very active in the national and international federations of Business and Professional Women's clubs and helped liaise when both WES and the federations were campaigning on the night working laws and equal pay issues.

1954-1955: Dorothy Lilian Pile FRSA, MISI, HonFISMe, HonFSLAET, HonMIM, FIMF, HonFIMet (26th July 1902 - 1st February 1993)

Precious metals metallurgist

Born in 1902 in Yorkshire, her father was a noted metallurgist, and Dorothy followed him into this field. She does not seem to have had any post-school education but went straight to work at the Midland Laboratory Guild at the age of 18 as a laboratory assistant and presumably learned on the job. The guild was established in 1918 as a co-operative organization providing testing services for several independent firms making non-ferrous products. She progressed there to become a technical assistant working with the scientist in charge, Mr R. Johnston. When he died in 1944 she

became the Assistant Secretary of the Sheet Metal Industries Association. Throughout this time she had gradually become well known in metallurgy due to her research interests in the finishing of fine metalwork and jewellery and research on strain, corrosion cracking and surface defects. This led to her becoming an Associate of the new Institution of Metallurgy in 1947 and in 1949 she was elected at the Birmingham Metallurgical Society's first female president. She was awarded fellowships in a number of metals institutions and returned the compliment in many cases by donated trophies in her name, for student competitions in the trade. In 1950, Dorothy was the only woman member at the Iron and Steel Institute's annual dinner and therefore allowed to bring a female guest, which none of the male members were permitted. She brought Dorothy Cridland. In 1948 she moved again, to become the Industrial liaison officer with the Design and Research Centre of the Gold, Silver and jewelry trade, London. In 1983 she became the first female Honorary fellow of the Institution of Metallurgists and was presented with an inscribed silver dish. Having been involved in the Women's Engineering Society since the 1940s, she became President in 1954 and donated our beautiful President's Badge in 1964. She was freeman of the City of London and a member of the Goldsmith's Company, and died in 1993, whilst living in the Goldsmiths' Company's almshouses in East Acton.

1955-1956: Kathleen Mary Cook (Mrs D.I.H. Goodwin) AMIMechE, FIBF MIProdEng (25th August 1910 - 1971)

Manufacturer and foundrywoman

Kathleen Cook was born in London in 1910 and educated at La Convent of the Sainte Union des Sacres Coeur, North London, followed by a 7 year apprenticeship in 1928 at Hercules Engineering Company, in North London. As far as we can tell she had no formal post-school technical education. Her father, initially a machine shop foreman in the automobile industry, became a director of this small general engineering and press tool company. During the Second World War she and her three brothers ran a factory in Northolt, making gun breech mechanisms. In her spare time she liked to volunteer as a mechanic at Brooklands race track. In 1942 she was appointed director of Hercules Aircraft Construction Co Ltd and in 1945 was a founder member of Universal Equipment Co Ltd. In 1949 she set up Kainder Ltd, to make her own invention, the Kainder Mobile Bed. In 1951 she joined Wilman Engineering Co Ltd, a small manufacturer of making electronic equipment and automatic control units, which was struggling financially and helped resue it. She remarked that the very hard times in engineering she experienced during the depression when she was just starting her career, stood her in good stead when she took on and turned around various struggling firms in her later career. She married Dennis Goodwin, at this period, who was a director of Brentford Foundries, and George Spicer Ltd. She was a fellow of the Institute of Production Engineering and of the Institution of British Foundrymen (their first female fellow). She died in 1971 after a long illness.

Kathleen joined the Women's Engineering Society in 1931 and was immediately energetically involved, joining the council in 1936, vice president in 1951 and president in 1955-6. She died in 1971 after a long illness.

1957-1958: Marjorie Elsa Bell BSc, Grad.IEE, C.Eng., MIISO, MIOSH, HonMWES (26th December 1906 - 10th June 2001)

Electrical engineer and factory inspector

Marjorie Bell was born in 1906 in Edmonton, Middlesex. Her father was an engineering fitter and there were also 2 brothers, so she did not come from a well-off background. Her education was at a convent high school, from which she went straight to work at Cambridge Scientific Instrument Co, following a visit which piqued her interest in technical work. She also worked at the Bungay Gas and Electricity Co., where her duties even included shovelling the coal from which the gas was made. During the 1920s she attended Northampton Engineering College of the City university, thought to have been their first female electrical engineering student and graduated with a BSc. During her course she was able to work in various electrical engineering firms. In 1933 she was a part time lecturer at Woolwich Polytechnic and lived with her mother in Wood Green, North London., and in 1934 started as Demonstrator in local authority electrical showrooms. 1936 saw her start on her long career as an HM Inspector of Factories, which took her not only to postings all over England but also, in 1947, to Palestine where she inspected fruit packing and canning factories (whilst bullets whizzed overhead) for a year before returning to Walsall. Her final post as an HMIF seems to have been as district inspector for London, following which she presumably had to retire from the Civil Service. She undertook various consultancies and committee work on industrial safety, including the first EU CENELEC working group on electric toy safety and was the first woman to chair a BSI technical standards committee, again on toys.

“I remember a story told me by Marjorie Bell. She became a factory inspector, in the days when factory inspectors were respected and feared. She went to visit a factory and chose to go there on her bike. She approached the gatehouse in style, only to be told by the guard, "Get off your bike and get out of the way quick, dearie, the factory inspector is coming!" To which she was delighted to reply, "I AM the factory inspector!" “

As told by Marjorie to Jackie Carpenter

Having joined WES in 1932, she was on various local branch committees, national council and became president in 1957-58. In 1953, along with 2 other eminent members of WES, she was awarded the Coronation Medal and in 1972 was made an Honorary Member of WES.

Marjorie was known for her gregariousness and continued to attend WES conferences almost to the end of her life. Her other interests included being an active member of the Soroptimists, keeping bees and two allotments until just before she died. She died in Enfield in 2001 and, characteristically, had made arrangements to leave her body to science and to have a non-religious funeral.

1959-1960: Madeleine Marie Nobbs (Mrs. D. Moody) MIMechE, MIHVE, MRSanI (14th December 1914 - 10th December 1970)

Heating and ventilation engineer who rebuilt the Old Bailey's building services

Madeleine was born in 1914 and educated at a convent school. Her father, Walter W Nobbs was very well known in the heating and ventilation engineering world and his father had also been a civil engineer. She very reluctantly started her working life as a shorthand typist but persuaded a firm of heating and ventilation engineers that she would be suited to the drawing office, where she started as a tracer. Her studies at Borough Polytechnic enable her to progress to H&V work for an architect's office including estimating and supervising installation. During the war she designed air raid shelters. Then she found a variety of jobs that allowed her to get practical bench and site experience until she was a fully qualified engineer and joined her father's firm as a junior partner. Her father died in 1954 in the middle of a major contract on the rebuilding of the Old Bailey after war damage, so Madeleine stepped up to become senior partner and take over the firm on her own account and complete the contract. Around the same time she met her future husband, Denis Moody, also an engineer and they married in 1961. Unfortunately, he died a few years later and she immersed herself in major building work to convert an old barn into a home, doing most of the work herself, to get over her loss.

She joined the Women's Engineering Society in 1941 and was soon active on the council, becoming president in 1959-60. She contributed many papers on heating and ventilation to The Woman Engineer and gained full membership of a number of engineering institutions. She was very gregarious, loved the theatre, huge houseparties at her home, fast cars and outrageous hats. Sadly, she died suddenly at the age of only 56, in 1970.

1961-1962: Isabel Helen Hardwich (nee Cox) MA, CEng., MIEE¹, MIOP, HonMWES (19th September 1919 – February 1987)

Early graduate apprentice who became a photometry expert

Isabel Cox, known to members of the Women's Engineering Society by her married name of Hardwich, was born into modest circumstances in South London in 1919. She was educated at local council schools and then went to Newnham College, Cambridge where she gained a degree in physics. In 1941 she was one of the first batch of graduates to join Metropolitan Vickers' 'College apprenticeship' scheme in Manchester. This scheme was novel at the time, not only for taking women as well as men on an engineering apprenticeship but for its mix of practical work and explicit training for the graduates to become the firm's future leaders. This included formal dinners for the apprentices, no doubt reported in The Rotor magazine which Isabel edited. Her first job after completing her apprenticeship was in their electron microscope division, then moved to the photometry laboratory. In 1945 she married colleague John Norman Hardwich, who was a man ahead of his time in his unswerving support for his wife's work, even to the extent of joining WES and being involved in some committees. This enabled her to remain at work after they married at a time when this was still rare. In 1947 she joined the Illumination Engineering Society where she started her lifelong interest in educating the next generations of engineers. Metropolitan Vickers expected its staff to do external teaching, which Isabel did in various schools and colleges. In the 1950s Isabel set up a Hilger large UV spectrometer before she turned to X-ray crystallography and designed an X-ray Geiger counter spectrometer. She remained with MV, later AEI, responsible for the recruitment, training and general overseeing of their women engineers. She left AEI when it was taken over by GEC in 1969 and became Chief Clerk to the Open University in Manchester until she retired ten years later.

Isabel joined the Society in 1941, became President in 1961-62 and was then very involved in setting up the International Conference of Women Engineers and Scientists (ICWES) as well as numerous other activities relating to encouraging young women to become engineers. She was made an Honorary Member of WES and after her death, her husband returned the compliment by gifting the Society the beautiful silver WES badge to be the Isabel Hardwich Award, now our highest award, given for outstanding service to WES.

1963 & 1965: Jane Cicely Thompson MBE, MA, FIEE, CEng (9th June 1919 - 3rd February 2008)

Designer of nuclear power stations

Cicely Thompson was born in Acomb, Yorkshire in 1919, and was the daughter of an architect. She was educated at Wyggeston Grammar School for Girls, Leicester, before graduating in mathematics from Girton in 1940. She quickly made the move from maths to practical engineering when she joined the Leicester Electricity Service, surveying and testing turbines and helping to design a power station extension. In 1946 she was briefly an assistant technical engineer in the construction department at Fulham power station before moving into the newly-nationalised power generation system with the British Electricity Authority (BEA), SE Division. She became involved in power station development and design and in 1956 left the BEA to go to Associated Electrical Industries John Thomson Group (AEIJTG), in Sale, as the only woman in the team designing two nuclear power stations for the Central Electricity Authority, including Hinckley Point B. She remained in the nuclear power sector for the rest of her career, working on the designs of such high-profile power stations as Dungeness and spending 10 months in the Milan office of The Nuclear Power Group (AEIJTG was part of this) on the design of Italy's first nuclear power station, with AGIP. Having joined the Institution of Electrical Engineers as an associate member in 1958 she became a fellow of the IEE in 1986, and was awarded the MBE in 1980 for her work in the nuclear industry.

Cicely joined the Women's Engineering Society (WES) as an associate member in 1947 and became the Society's president in 1963 and again in 1965, her work in Italy in 1964 having meant that the usual 2 consecutive years were impossible. Clearly an energetic woman, 1964 also saw her travel to New York to support the first International Conference of Women in Engineering and Science (ICWES), the first of many such which she attended and promoted, and also accepting "Senior membership" of the WES's American younger sister, the Society of Women Engineers. In 1972 she toured the UK delivering that year's Verena Holmes lectures, in 1989 published a history of the society, in 1990 was given the Society's award for outstanding service, the Isabel Hardwich brooch, and in 1993 was made an honorary member. In retirement she lived with a sister in Knutsford and died in 2008, leaving a legacy of £5,000 to the Society.

1964: Dorothy May Cridland Assoc. IMechE (15th February 1903 - 25th May 1987)

Mechanical engineer and technical editor

Dorothy May Cridland was born in north London in 1903, her father being a chemist/pharmacist with his own business. On leaving school in the 1930s with apparently few prospects and not being from a wealthy family, she immediately got a junior administrative job with Leyland Motors Ltd.

She remained with them until 1955 gradually acquiring more technical knowledge of their vehicles and rising through technical sales posts to become deputy to Leyland's southern regional manager. From 1931-34 she took various courses at Kingston Technical college and the City of London College. In 1951 she was one of the earliest women to be elected as an Associate of the Institute of Mechanical Engineers and went to work for them from 1955-63 as a technical editor, despite her lack of formal technical qualifications.

She was WES President in 1964, having been very active in WES since the 1940s and in 1978 she was made an Honorary WES member. She was also involved with various charities for young people and the elderly, was a Freewoman of the City of London, and life member of the Overseas League. She died in 1987 in Maidstone, Kent.

1966-1967: Rosina "Rose" Winslade OBE MIMC, MASEE, FITE, AMBIM, MSIT (22nd July 1919 - 16th December 1982)

Electromechanical engineer and technical educator

Rosina Winslade was another of the Society's presidents who became a highly respected professional engineer despite having had almost no formal education. Born in London in 1919 into a working class family, her father having various labouring jobs, she had to leave school at the age of 14 to work in a factory. Her own interest, and presumably demonstrable intelligence, led to her being moved to be a junior assistant in the laboratories. She started to take City and Guilds courses in Telecommunications Technology but was not able to finish due to a serious illness for 2 years. However by 1939 she was sufficiently knowledgeable and experienced to get a job with the Plessey Company working on development and production liaison on airborne equipment and direction finders. In 1947 she moved to become an engineer in the acoustics laboratory of Goodmans Industries Ltd, a company specialising in audio equipment, then (1950) joining Phillips Electrical Ltd as a sales engineer on electromechanical devices and instrumentation. That division became a separate company, Research and Control Instruments Ltd, with whom she worked until 1967, rising to become Manager (Technical) of their Electronics Division, mainly working on automation schemes. In 1967 she took a change of direction into technical education, which was to be a principal interest for the rest of her life, by become the Assistant Secretary of the Council of Engineering Institutions. This led to involvement in overseas educational organisations, in Europe and the Commonwealth and an appointment to the board of governors of University College Nairobi. She retired in 1977.

Rosina was involved in many professional bodies, often becoming one of their first female members. She was an early member of Society of Environmental Engineers, perhaps due to her interest in vibration measurement, on which she published papers in the 1950s. Rosina was active in the Women's Engineering Society from her joining in 1947 until just before her death. She gave talks, wrote articles, was on the council and became the Society's president in 1966-67. In the Society's 50th anniversary year, 1969, she was awarded the OBE for her services to the society, which continued until just before her death in 1982.

1968-1969: Elizabeth (Betty) Laverick (nee Rayner) OBE, FIEE, CEng, FInstP, SMIRE, HonFUMIST (25th November 1925 – 12th January 2010)

Radar electronics engineer

Elizabeth Laverick was born in Amersham, Buckinghamshire, in 1925, into a family of second-generation chemists, her father, William Rayner, being a manufacturing chemist. Her mother Alice Maria Garland assisted with the administration of the business. She won scholarship to Dr Challoner's Grammar School nearby, then a co-educational school, where she became the only girl in the Higher Schools Certificate class. She and her older sister were both strongly encouraged by their parents to go to University but Elizabeth's November birthday meant Durham could not take her until 1943. She spent that year as a scientific civil servant at the Radio Research Station near Slough, as a Technical Assistant, Grade III. She graduated from Durham in 1946 with a degree in Physics and Radio (a special wartime course) and stayed onto to a PhD on "Dielectric measurements at audio frequencies using a differential". She married a fellow student, Charles Laverick in 1946 and in 1951 they were both hired by GEC Stanmore (Marconi Defence Systems Ltd.) where she worked as a microwave engineer, working on guided weapons systems. In 1954 Laverick moved to Elliott Automation (part of Elliot Brothers) as a microwave engineer, gaining commercial experience in microwave instruments and rising to become the general manager of Elliott Automation Radar Systems. She published papers on some of her work and was involved in the development of the airborne Early Warning system later known as the Nimrod. In 1971 she moved away from practical engineering to become the first female deputy secretary of the Institute of Electrical Engineers, which gave her the opportunity to pursue her interests in applying her management expertise to the Institution's career development for members. In her retirement in 1985 Laverick joined the Court of City University, as well as doing some work as a consultant in advanced manufacturing in electronics

Having joined the Women's Engineering Society in the late 1950s, meet other women engineers and promote the career to girls, she soon joined the London Branch committee and the national council and became the society's president in 1968/69. She continued her active involvement as Honorary Treasurer and was editor of the journal for 7 years.

As well as her OBE in 1993 she was also honoured with an honorary fellowship at UMIST and became a liveryman of the Worshipful Company of Engineers,. Her leisure interests included tapestry and music and she became interested in nursing homes for the elderly, eventually selling the family home in Amersham for that purpose. She married again shortly before she died, to Peter, her longtime companion. She died in 2010.

Oral history transcript made in 1994: [https://ethw.org/Oral-History:Elizabeth Laverick](https://ethw.org/Oral-History:Elizabeth_Laverick)

1970-1971: May Maple (nee Newby) FIEE, CEng., FRSCA (8th Aug 1914 - 19th August 2012)

Electrical power supply contracting expert

May Maple's life before she joined the Women's Engineering Society in 1950 is unclear, but she is likely to have been born in 1914 in Gateshead to Mr & Mrs Albert Newby, and to have married William Maple in 1939. She started her engineering career as a purchasing officer with the London Transport Board and then moved to Edmundson's Electricity Corporation. She gained an HNC in

Electrical engineering doing a 5-year nightschool course from Action Technical College, whilst at Edmundson's. In 1948 when the electricity supply industry was nationalised she continued her work in the Contracts department of the British Electricity Authority, gradually being promoted until she was a 2nd Assistant engineer in Contracts Department (1953). In 1955 she gained her associateship of the IEE, rising through its membership grades as MIEE and Chartered Engineer (1966), to become an FIEE in 1969. By 1965 she was a Contracts Officer with the CEGB, responsible for all electrical equipment contracts and only woman in this position.

She was active in the Women's Engineering Society from not long after she joined, initially on the committee of the London branch, getting involved in education outreach to schools and taking on the onerous task of finding paid advertising for The Woman Engineer for over 10 years. In 1970-71 she was the Society's president and also actively supporting the International Conferences of Women Engineers and Scientists. This involved travelling widely which she continued into her later years. She was made an Honorary Member of WES in 1979 and awarded the society's highest award, the Isabel Hardwich brooch, in 1991. She died in 2012 and left a legacy to the society in her will.

1972-1973: Peggy Lilian Hodges OBE, MA, CEng, FRAeS, FIMA (11th June 1921 – 21st November 2008)

Guided weapons designer

Peggy Lilian Hodges, was born in London in 1921 into modest circumstances which cannot have improved when her father Ernest, a credit draper, died when she was only 4 years old. She was educated at the Westcliff High School for Girls, in Essex and then gained a number of scholarships to take a degree in mathematics from Girton College, Cambridge in 1943. Her first job was as a radio engineer with Standard Telephone & Cable, where she worked on airborne communications and the ILS blind beacon landing equipment. In 1950 she joined the GEC Applied Electronics Laboratories at Stanmore, Middlesex, as a microwave and systems engineer, working on guided weapons. Missile projects included Red Dean and Sea Dart, which relied heavily on the systems assessments produced by Hodges and her team. She became an expert on simulation and systems, including assessments of random aberrations, types of dish stabilisation, target glint and sea reflection problems. She progressed to become Systems Manager and then Project Manager of the Guided Weapons Project (Sea Dart Guidance) in the Guided Weapons Division. She was consulted by other laboratories and government departments and was sent on government missions to the USA. She was a member of the Radome Electrical Performance Panel for Guided Weapons and aircraft for the Ministry of Aviation. Among other projects, Hodges worked in the Underwater Weapons Division on trials planning and analysis for air-launched guided torpedoes, and later worked on simulation, identifying problems affecting guided weapons systems. Her work on guided weapons was featured in a BBC documentary in the 1960s, when she was filmed at work at the Ministry of Defence's guided-missile firing range at Aberporth in Wales. In 1971 she was promoted to Deputy guided weapons project division manager (systems) at Marconi space and defence systems, within GEC. Her division did general performance work, systems studies, simulations, trials planning analysis. Hodges formally retired from GEC in 1981 but continued to do general systems consultancy for the Guided Weapons Division of Marconi Space and Defence Systems (MSDS), Stanmore.

In retirement she did voluntary work in an old people's home, and was involved in the setting up, by the Institution of Electrical and Electronics Incorporated Engineers, of a new annual competition: the Girl Technician Engineer of the Year, later Young Woman Engineer of the Year. She was Chair of the Caroline Haslett Trust set up to encourage girls, by means of scholarships and

competitions, to take up careers in engineering, and in 1982-3 was President of Soroptimist International St Albans and District. She was also a member of the Fawcett Society, was interested in ballet, opera and classical music.

Having joined the Women's Engineering Society in 1960 she soon became a council member and was the society's president in 1972-3

In 1959 she became an Associate Fellow of the Royal Aeronautical Society and a full Fellow 10 years later, having already been the first woman to take the Chair at a meeting of the Royal Aeronautical Society, when the subject under discussion was "Guided Weapon Simulators."

In 1970 she received the Whitney-Straight Award for outstanding performance by a woman in the field of Aeronautics, and 2 years later she was awarded the OBE in the Queen's Birthday Honours, for her contribution to guided weapons technology. In 1994 Hodges became the first female honorary fellow of Institution of Electronics and Electrical Incorporated Engineers (IEEIE).

She died in 2008 in Buckinghamshire and legacies include the "Peggy Hodges Prize" for the highest performing female student completing the second year of a full time MEng/BEng Engineering degree at the University of Hertfordshire.

1974-1975: Gwendolen Alice Howard ("Bunty", nee Sergeant) CEng., FIMechE, AMBIM (17th March 1926 - 1st June 1979)

REME major in charge of Army's vehicle fleet

Gwendolen Sergeant, known to friends as Bunty, was born in Sussex in 1926, into a family that was immersed in engineering. She was involved from an early age in her father's agricultural engineering works as well as a refrigeration engineering works, and learned blacksmithing, fitting and welding before she left school. She went to Loughborough College in about 1943 and survived a gruelling week-long mathematics entrance test but her studies were interrupted by her father losing his sight. She resumed her studies doing an apprenticeship with the Rheostatic Company, Slough, which later employed her as a technical assistant, gaining an HMC and BSc in mechanical engineering. In 1948 she moved to the industrial design unit of Thorn Electrical Industries, to design fluorescent lighting. Finding her way barred to more challenging roles in industry she took a commission as an engineer in the Women's Royal Army Corps in 1953. Although the army was not integrated at that time, she spent the next 20 years working with REME, rising to the rank of Major in 1964 and working in many parts of the world and becoming Officer-in-charge of General Engineering REME 43 Command Workshop in Aldershot in 1969, where she was responsible for planning the care of the army's entire fleet of 160,000 vehicles. By 1969 she was also a full Member of IMechE. In 1973 she married Lt Cdr John Howard RN, and they both resigned their commissions to set up their own garage. This unfortunately fell victim to the oil crisis at the time and she soon got a job as the assistant secretary to the Admissions Board of the University of Cambridge.

She joined the Women's Engineering Society in 1945 and was active in the local branches when at UK postings. She gave talks about her army work, was the IMechE representative on the Society's council and several profiles were printed in *The Woman Engineer*. In 1974-75 she became the Society's president and, although in ill health, remained involved in the Society until her untimely death in 1979.

1976-1977: Henrietta (Hettie) Langdale Bussell (19th February 1917-December 1996)

Railway bridges engineer

Hettie Bussell was born in London in 1917 but when she was 12 they moved to Newport, Monmouthshire where she won a scholarship to the local new grammar school. Her father Herbert Bussell had been a builders' clerk but joined Great Western Railways where he became a draughtsman in their Wales office. Apart from war service in the Royal Engineers he remained with Great Western Railway (GWR) all his life, which was also where Hettie worked for 40 years. She left school in 1933 in the depths of the Great Depression and found it very hard to find any work but having come 2nd out of 6 entrants in GWR's exam, she became a temporary tracer in 1934. She was the first female in such a role and the only woman in the Cardiff office, as all the clerical work was still done by men only. It is believed that she was the UK's first woman railway engineer. In 1938 she became a permanent member of staff and in 1942 was promoted from tracer to Junior Technical Staff, again the first woman to do this. At this point she started doing trackbed surveys identifying subsidence, eg due to local mining and this was the start of her expertise as liabilities expert for the railway. In 1948 she transferred to what was now British Rail's western region office in London and was soon promoted to assistant draughtsman in the divisional engineer's department. As all this was achieved without any formal technical training she was delighted to be promoted in 1957 to Technical Assistant and in 1966 to Engineering Assistant. Hettie worked in the Road Bridges and liabilities department for whole of BR western region, and had a particular interest in tunnelling. In 1971, at the age of 54, she was promoted finally to Senior Engineering Assistant (Management Grade 1), in the Chief Civil Engineer's Office of British Railways western region.

Hettie joined the Women's Engineering Society in 1951, not long after moving to London and soon became active in the London branch committee, giving talks about her work and writing articles for The Woman Engineer. In 1961 she was on the WES council and became the Society's president in 1976-77 and took a great interest in the training for women engineers. Although seriously ill in 1989 she lived on to die in Colchester in 1996.

1978-1979: Veronica Jean Kathleen Milligan ("Ronnie", nee O'Neil) BA, C.Eng., MIEE, AMBIM (11th March 1926 - 3rd September 1989)

Electrical power engineer

Born in 1926 in Pontypridd, South Wales, "Ronnie" Milligan (nee O'Neil) would spend her entire life living and working in the Principality. Her father was a school teacher and it initially looked as though Veronica would follow in his footsteps, as she gained a degree in English and Economics from the University College of South Wales and trained to become a teacher. However marriage to Francis Milligan in 1945 led to her joining him and her brother, Maitland, in studying part-time for an HNC in electrical engineering, whilst also raising her two baby sons. By dint of offering to work for nothing with the South Wales Electricity Board she was instead offered a paid graduate traineeship and hence became the first female engineer in SWEB. Her first big responsibility was to check and rectify all air break links in the 11kv line in a district, with a gang of 12 far more experienced men to oversee, after previous engineer electrocuted himself. 1959 she gained her chartered engineer status with the Institution of Electrical Engineers (now IET), and moved to planning electrification schemes.

In 1961 she and her husband set up their own consultancy, CivLec Industrial Advisory Services, which was intended to be part time while they both had jobs but quickly became too demanding so the consultancy became full time. She took a diploma in management studies and became a member of the British Institute of Management. This led, in the 1970s to many appointments with government advisory panels on industrial management, principally in the heavy industries and nationalised industries, including the Commission on Energy and Manpower and the Council of Engineering Institutions.

Having joined the Women's Engineering Society in 1964 she was soon active, setting up and running a new branch in Wales in 1966, joining the WES council in 1968 and becoming the society's president in 1978-79. Her great interest was in careers guidance for girls and she visited scores of schools in Wales promoting engineering careers, as well as advising careers guidance professionals. She died in her long-time home in Rhiwderin, Newport, Gwent in 1989 after a short illness and was survived by one of her two sons.

1980-1981: Maria (Marja) Ludwika Ziff (Mrs Watkins) BSc, C.Eng., MIEE, FIET, FRSA (circa 1918 – September 2010)

Electrical engineer who worked on the WW2 PLUTO project

Maria Ludwika Ziff was born in 1918 in Vienna, of Ukrainian parents who were working in Lvov, Maria left in 1938 to study electrical engineering at the University of Edinburgh, the professor having believed her application was from a Polish man. Her family refused to join her and only her younger sister survived the concentration camps. She graduated in Electrical Engineering (Communications) in 1941, and then became a technical assistant at Johnson and Phillips Ltd, who made cabling and navigation items for aircraft, working on technical problems of their distribution systems. Her job included supervising the repair of overhead power cables shot down by drunken soldiers to repairing electrical exchanges damaged by bombings. She was also a research assistant for new airplane guidance systems. During the war she lived in Blackheath, London where she spent her evenings as an air raid warden. She also did research for the PLUTO Pipeline Under The Ocean project and for a new secret airplane guidance system in between air raid warden duties. In 1947 she was appointed a lecturer at South East London Technical College and in 1959 a Lecturer, later a Senior Lecturer at Northampton College of Advanced Technology, now the City University, and also a visiting professor Worcester Polytechnic Institute, Boston, USA. She did research in medical electronics and published about 13 papers on these subjects. Maria was a member of Council and Senate of City University for three years and a member of Council and the Qualification board of the Institute of Electrical Engineering from 1976 to 1979. She became a freeman of the City of London and member and senior steward of the Worshipful Company of Scientific Instrument Makers, and a Fellow of the Royal Society of Arts and a fellow of the IEE.

She joined the Women's Engineering Society as soon as she arrived in the UK in 1939 and took an active part in the London Branch, the Society's submission to the Finiston Enquiry, and its work with schoolgirls. She was WES President in 1980-81 and in 1984 donated the Watkins Medal to the society to be awarded to the best female engineering graduate of the year. She married Thomas (Tom) Brown Watkins, a fellow engineering student, when he returned from the war in 1946 and they lived in Sydenham and had two sons. Away from work her interests were English history, astronomy and skiing. She died in 2010

1982-1983: Rosemary Ethel Elizabeth West (nee Lambert) MA MIEE, CEng (8th December 1928 - 6th February 2013)

Electronic engineer and early microcomputer specialist

Rosemary was born in 1928 in Lyme Regis, Dorset, the second daughter of Edward William Lambert, who followed his father into the family's law firm in Burma before entering the British colonial service and rising to become the Director of the Crown Office in Burma (Myanmar). She was educated at a number of boarding schools in the UK and even in Burma and India during the war years and was accepted to read maths at Oxford, where she was a rowing Blue. Having had a vacation job with Metropolitan Vickers, she changed to engineering and graduated in Engineering Sciences from Somerville College, Oxford, in 1951, only the third woman ever to do so from Oxford. She went straight into a graduate apprenticeship with GEC Ltd in Coventry and by 1957 was one of their electronic development engineers in the Applied Development Laboratories, working on specialised test equipment. The following year her daughter was born which led GEC to sack her, following which she taught in a school and also in Kirkcaldy Technical College. In 1971 she and her husband set up Westek Engineering Ltd, in Ibstock, Leicestershire, developing computer-controlled transducers for test equipment and industrial controls. By 1967 she was a chartered engineer and a full member of the IEE. By the time she became President of the Society she was working as a microcomputer specialist in the Computer Centre at Loughborough University of Technology.

Rosemary joined WES in 1950 and by 1961 was chair of the Midlands branch, becoming the society's president in 1982-3. She wrote several pieces for The Woman Engineer to stimulate members to think about the future of the Society. Given her own experiences of being made redundant and of trying to fit in a career with a family she was very interested in the whole issue of women returning to work after career breaks which must have tied in very well with her successor, Professor Daphne Jackson's similar interests. She wrote an article, Engineering Management for Women, for the IEE Proceedings and produced a WES booklet for schoolgirls, What is Engineering? She died in 2013, in the Isle of Wight.

1984-1985: Daphne Frances Jackson OBE, PhD, ARCS, FInstP. DSc, FIEE, CEng, CPhys, FRSA (23th September 1936 – 8th February 1991)

Nuclear engineer who helped develop the first tomography scanners

Born and schooled in Peterborough, Daphne Jackson came from a very modest background. Her father was a machine tool operator and her mother had been a seamstress. Nevertheless, her attendance at Peterborough County Grammar School for Girls gave her what may have been an exceptionally good grounding in science for a girls' school at that time and she was able to go to Imperial College and graduated in physics in 1958. She then went to the Battersea Institute of Technology (then part of the University of London and now part of the University of Surrey) to do her PhD on "The nuclear density distribution and optical model parameters of Li6", lithium 6 being one of the stable isotopes of natural lithium. By that point she had already been appointed as an assistant lecture at the college and had started her prolific research publications, with several published papers before she had even gained her PhD. She authored or co-authored some 120 papers and books during the ensuing 30 years, including text books and basic introductions to nuclear science as well as her own specialised research. Initially her work was on the structural models of nuclei. In the 1970s she had become interested in the absorption behaviours of the pion

subatomic particle but the final decade of her life was focussed on the medical use of nuclear physics and she was involved in the development of diagnostic tools we now take for granted, such as tomography used in medical scanners.

This incredible level of publication was reflected in her rapid academic rise from assistant lecturer to professor in 1971, much heralded as the first female professor of physics in the UK, becoming Dean of Faculty 10 years later. Along the way she also became the Institute of Physics' (IoP) youngest ever fellow (1966) and gained a DSc from Imperial College in 1970. She became a fellow of the IEE and vice president of the IoP in 1974, and was awarded the OBE in 1987.

Jackson joined the Women's Engineering Society in 1966 and was actively involved in the society until her death. In 1971 she attended the 3rd International Conference of Women in Engineering and Science and took special interest in how engineers were educated at both further and higher education levels. She became the Society's president in 1984, which must have been a hectic time for her as, in 1985, she founded the fellows' scholarship scheme to assist women to return to careers in engineering, that would be named in her honour after her death (Daphne Jackson Fellowships), securing hundreds of thousands of pounds from industry to fund the scholarships. In 1991 she lost her fight with cancer - a disease she had been helping to fight through her research with the Institute for Cancer Research and the Royal Marsden Hospital, and on which she had published so many papers.