Tilly's Orifice

My most satisfying training work was with adults who were looking for a career change. This included many women who were returning to work after a spell of child-rearing. In the past women had to be exceptional to be taken seriously. I have already described the work of Hedy Lamarr and here is another celebration of a remarkable woman engineer working in aviation.

The BBC World Service recently ran a series of programmes entitled 'Spitfire'. The one on 14th June 2020 was about a woman engineer, Beatrice 'Tilly' Shilling, who worked at The Royal Aircraft Establishment (RAE). The accounts of her are usually restricted to her work but the programme covered her as a person, struggling to make a career in engineering in the 1930s.

As a girl she was enthusiastic about machinery. After failing to get a university to take her seriously she took up an apprenticeship. Her employer, Margaret Partridge, was an electrical engineer, contractor and founder member of the Women's Engineering Society (WES) and the Electrical Association for Women (EAW). She encouraged Shilling to study Electrical Engineering at Manchester University. In 1936 Shilling moved to the RAE and worked on many wartime projects.

She was also a motor bike racer and gained the British Motor Cycle Racing Club Gold Star award at Brooklands for riding a lap at an average of over 100 mph. When she and a fellow rider decided that they were suited she said she wouldn't marry him until he too had got the Gold Star award.

The Rolls Royce Merlin was an excellent engine but the early ones had a serious fault. The carburretor was a standard float type, which was fine for cars but caused problems under negative g, such as nosing for a fast dive. Indeed the crash of the last flying UK Mosquito G-ASKH in an air display in 1996 was caused by the port engine failing due to the problem. Negative g caused fuel starvation then flooding. Pilots knew this and avoided such manoeuvres but the enemy pilots knew it as well. They knew they could escape a Spitfire by diving.

Shilling was given the task of fixing the problem at the RAE. She came up with a washer in the fuel line, that had a hole in it preventing the flooding, allowing the engine to continue running. Naturally this was very popular with pilots and was used until a proper solution could be found, which was a pressurised carb in 1943. In those less prissy days the fix became known as 'Miss Shilling's Orifice' or 'Tilly's Orifice'. Not when she was around of course.