
aeroplane pilots was collected and provided with fast and handy aeroplanes. The Navy was not ready to use this force, only being converted to its value in 1918, and it was sent to assist the Royal Flying Corps, when the latter was in difficulties in France owing to the lack of pilots and efficient machines. Unfortunately this effort turned a great deal of the energy of the R.N.A.S. away from seaplanes and anti-submarine work.

There would probably not have been any big British flying-boats but for the vision, persistence, and energy, in the face of disbelief and discouragement, of Colonel J. C. Porte, C.M.G., who designed and built at Felixstowe Air Station the experimental machine of each type of British flying-boat successfully used in the service. His boats were very large, the types used in the war weighing from four and a half to six and a half tons, and carried sufficient petrol for work far out from land and big enough bombs to damage or destroy a submarine other than by a direct hit. The pilots were out in the bow of the boat, with the engines behind them, and so had a clear view downward and forward. The boats were very seaworthy, and no lives were lost in operations from England owing to unseaworthiness.

In designing and perfecting flying-boats there were more difficulties than in producing float seaplanes, for the technical problems were great, while engines of sufficient horse-power were not to be had in the early part of the war, and indifference and scepticism had to be overcome. It was not until the spring of 1917 that suitable flying-boats were in being. But this was in time for them to meet the big German submarine effort, when the great yards at Weser, Danzig, Hamburg, Vagesack, Kiel, and Bremen, working day and night, with production driven to its highest pitch by standardisation, were pouring out into the North Sea an incredible number of U-boats.

During this year—a year when it looked as though the under-sea boats would strangle our merchant shipping, and the danger was greater to England than her people realised—forty flying-boats were put into commission, and sighted sixty-eight enemy submarines and bombed forty-four of them.

A submarine is a steel boat shaped something like a cigar. When on the surface it is driven by two petrol engines. Under the surface it is driven by two electric motors, the electricity being obtained from storage batteries. At the bow and stern are horizontal rudders known as hydroplanes. Under ordinary circumstances, when the submarine is about to dive, water is let into tanks until the boat is just floating on the surface with only the conning-tower showing. The petrol engines are stopped and the electric motors are started. Then the hydroplanes are turned down and they force the submarine under the water. The submarine uses its power of