

# REPORT OF EXPERIMENTS CARRIED OUT WITH A HYDRO-AEROPLANE, WITH NOTES AND SUG- GESTIONS FOR FURTHER EXPERIMENTS.— PRESENTED BY CAPT. MURRAY F. SUETER, R.N.

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These experiments were carried out chiefly by Commander Schwann, in Cavendish Dock, Barrow-in-Furness, a suitable spot for experiments of this kind on account of the water being tideless and yet being only separated from the sea by a sea wall, in case long flights are required. The depth of the water does not exceed 9 feet, and the area of the dock is 142 acres.

The aeroplane is an Avro biplane fitted with a Green engine of 30–35 H.P. Before the test made on 18th November, when the machine rose from the water, the engine was fitted with additional exhaust ports giving it an extra 10 H.P. or so.

The experiments have consisted so far in trying various types of floats to fix to the aeroplane to enable it to rise from the water by its own power.

This has already been done by Curtiss, in America, and Messrs. Fabre and Colliex, in France. The machines of these three aviators are all fitted with higher powered engines than is the Avro, and also carry front elevators, which the Avro does not possess. It was, therefore, felt that the apparatus used in France and America could not be relied on to be of much use with the Avro machine.

To avoid impairing the known good flying qualities of the aeroplane it was decided that, until a successful design of float had been evolved, no alteration should be made to the aeroplane, other than the removal of the landing wheels, that could possibly be avoided. The floats were, therefore, only lashed to the skids of the machine in an extemporised manner. Also it was not thought necessary to fit any shock absorbers to the floats, until a successful type of float had been evolved, so this matter was put aside for the time being.

The following is a description of the various experimental floats tried and the results obtained :—

*Mark I. Float. Fig. 1. Plate 1.*—Two narrow flat-bottomed floats designed by Commander Schwann made of wood and aluminium, each 12 feet long, 12 inches deep, and 12 inches wide, lashed to the skids of the machine. Weight of the two floats 76 lbs.

The machine was first mounted on the floats with its axis parallel to the axis of the floats and in such a position that when floating on the water with the pilot in the machine the bottom of the floats was at an angle of about  $5^{\circ}$  to the horizontal. This caused the tail of the machine to come inconveniently near the water and caused a small float, which had been placed on the tail skid to keep the tail out of the water, to make a heavy wash. The tail skid and float were therefore removed and the rudder was shifted upwards until about two-thirds of its area was above the axis of the machine. A speed of about 18 knots was then obtained with these floats, but there was a considerable wash astern, and the machine would not lift. The floats were then shifted further aft along the skids of the machine until when at rest the floats were at an angle of  $\frac{1}{2}$  a degree to the horizontal, pointing upwards and forward. A trial was made with this arrangement, but on leaving the shed, with a slight following wind, the aeroplane capsized forwards and turned completely over.

These floats were taken off and re-designed.

*Mark II. Float. Fig. 2.*—One main float designed by Lieut. Boothby in the centre, between the skids, and two small steadying floats under each wing tip. Main float 13 feet by 3 feet wide by 12 inches deep, made of duralumin