An All-Metal Flying Boat.

THE new type of all-metal flying boat built by the Rohrbach Metal Aeroplan Company, of Copenhagen, represents a trend in design which should be of especial interest to engineers. The system is being developed by William Beardmore and Co., Ld., at the company's Dalmuir shipyard, where aircraft for both land and marine service, equipped with double and multiple engines, are now under construction. In the Rohrbach-Beardmore system the light alloy "Duralumin" is used throughout for the construction of the boat, no fabric being employed. The constructional principles adopted are similar to those in use for bridge and shipbuilding work, and the structure is built up of riveted girders and plates which makes it possible to employ larger wing-spans—see Fig. 1—and higher powers than have hitherto been employed for flying boats of this class. We believe also that it is the first time a flying boat of this type has been fitted with collapsible masts and sails. As shown on page 354 the boat can be rigged with sails in a short space of time, which greatly increases control in the water under bad weather conditions with a corresponding economy in fuel. The illustrations given on page 354, which show the boat both in the air and on the water, will, together with those herewith, serve to indicate the main features of the design. The flying boat is of the monoplane type with cantilever wings arranged at an enhanced dihedral angle. A rectangular-shaped fuselage to which the wings are secured forms the hull of the ship and metal stabilising floats, which give further support to the machine on the sea, are fitted. Above the wings and raised clear of them by metal struts are the engines—see Fig. 2—an arrangement which, we learn, enables manœuvring to be easily carried out with only one engine running. The following are some of the leading dimensions of the boat:—Span over wing tips, 96ft. 9in.; overall length, 54ft.; and overall height, 15ft. The weight of the machine when fully loaded is 8140 lb., which gives with a useful load of 4400 lb. a total weight fully loaded of 12,540 lb. At ground level the machine is designed for a speed of 124 miles per hour, while it is capable, we are informed, of flying to a height of 13,000ft. and is designed to fly without losing height when loaded to three-quarters full load and with only one engine running.

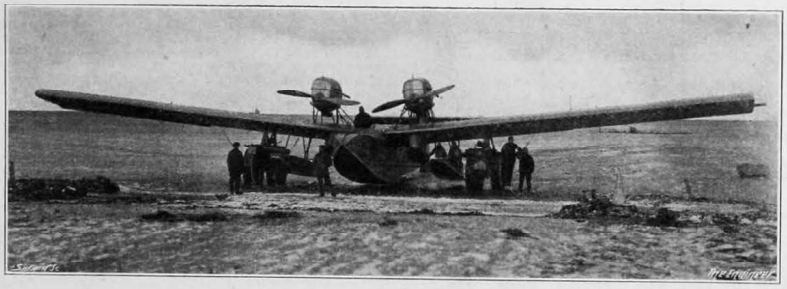

FIG. 1—FRONT VIEW OF THE FLYING BOAT

The engines which so far have been fitted to these boats are of the Eagle IX type, each having twelve cylinders with a bore of 4½in. and 6½in. stroke. When running at a rated speed of 1800 revolutions per minute the motors are designed to develop a total of about 720 brake horse-power. Some of the main constructional features are as follows:

Wings and Supports.—The characteristic feature of the three-part wing construction is illustrated by Fig. 3. A centre member of box section built up of "Duralumin" plates, channels, angles, with internal lattice bracing, and a stressed skin which helps to carry the main load. The scantlings are thicker near the hull and decrease in thickness outwards from it. The wing girder is secured to the hull structure by steel bolts—see Fig. 3—on its upper and lower surfaces, which are supplemented by diagonally placed bolts and straps on the sides. The wing is so strong that the crew can safely walk about on its surface from end to end, a feature which is of considerable value in tying up or other sea work. To the centre wing girders there are attached leading edge and trailing edge section boxes, which are light in construction and are hinged so that the interior surfaces can be examined and re-varnished if necessary at desired intervals. The auxiliary stabilising floats—see Fig. 1—are attached below the wings on either side of the hull and are secured to hull and wings by struts.

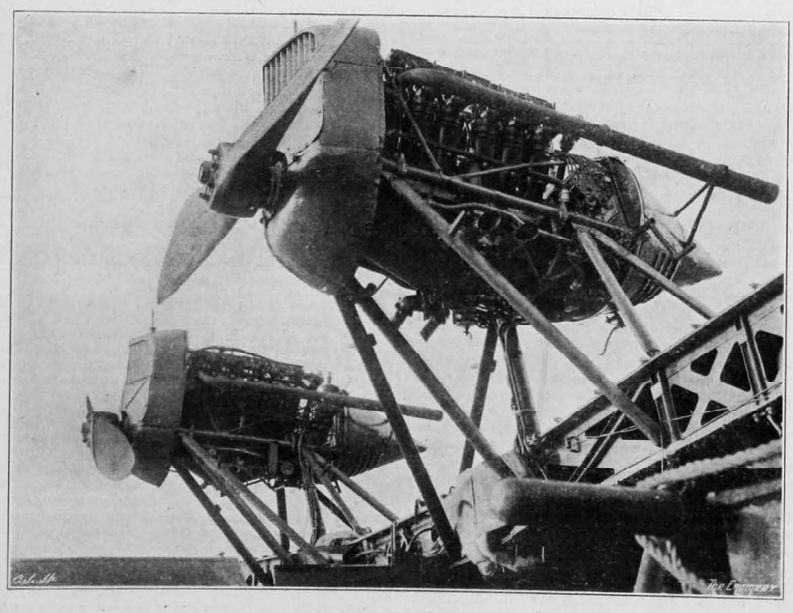

FIG. 2—THE TWO ENGINES

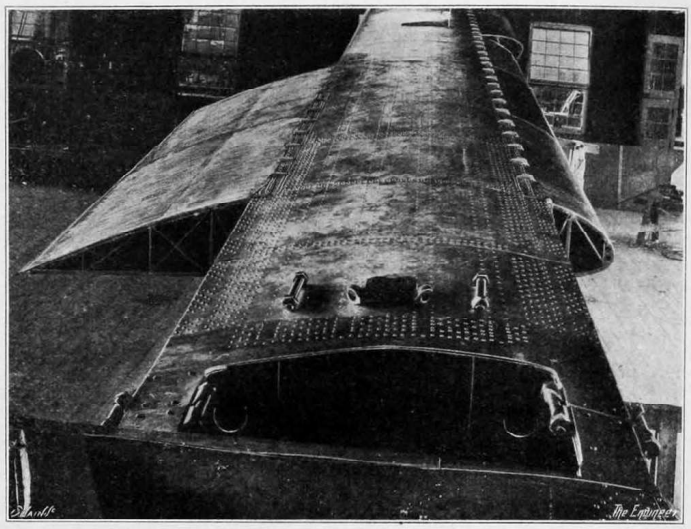

FIG. 3—VIEW ALONG ONE OF THE WINGS

When landing from the sea a beaching trolley shown in Fig. 1 is employed, which gives support to the wings at a point outside the floats. The trolley consists of two pairs of broad-rimmed wheels with light turret supports and guy rope connections, which are secured to the under surface of the wings during the period that the beaching trolley is in use.

Main Hull and Fuselage.—The hull proper is entirely made of light alloy and is generally rectangular in section, with a specially stepped under surface, the shape of which has been determined by an extensive set of tank experiments. It is divided into water-tight compartments by bulkheads with closing doors of an inverted pear shape and is designed so that the machine will float with any two compartments flooded. Fig. 4 shows an interior view of the hull. The cockpit is placed well forward of the wings, with glazed observation windows. At the extreme stern of the fuselage there is a built-up turret, which supports the tail planes. Attached to the upper part of the hull and the wings are the motor supports, which take the form of hollow metal struts and carry the motors and propellers clear of the wing structure.

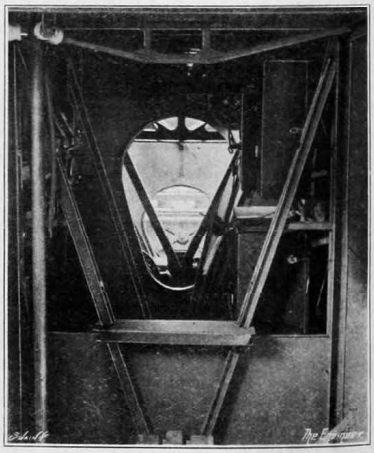

FIG. 4—VIEW IN INTERIOR OF HULL

The arrangement of the engines gives considerable flexibility when manœuvring, even with one motor in operation, and tying up against buoys has, we are informed, been smoothly and successfully carried out. Both at sea and in the air the controllability of the ailerons has proved to be singularly effective, while by means of the side lateral floats and the high dihedral of the wings the boat is well under control even in a sea of considerable magnitude. Generally speaking, the opinion which has been formed as the result of the tests so far carried out is that the machine described constitutes a remarkable advance in flying boat practice. The machine, it is claimed, is also a successful example of the application of the high wing loading theory, which opens out such an enormous field for the extended use of aircraft and makes possible flights up to a range of 2000 miles without the necessity of landing.

THE Swiss Council of States has granted a subsidy of 3,350,000f. for the completion of the Furka Railway, and has agreed that half of any deficit in the working of the railway shall be made good by the State.