

P.7 Bourges I (Bentley B.R.2 engines).



## BOBOLINK TO DELTA . . .

a three-seat, medium-range, postal aircraft, but was in reality an experimental military prototype for investigating the possibilities of fuselage-mounted engines. When *Flight* described the machine, in September 1923, it was remarked that the main object aimed at was reliability—not merely reasonably good reliability, but the nearest approach to absolute reliability which it was humanly possible to provide. Consequently, the whole powerplant installation was planned with this object in view, and other considerations, such as extra-long range and great carrying capacity, took second place. "It will readily be understood," ran our account, "that, however the problem is attacked, a machine with central engines and propellers on the wings must of necessity be heavier than one in which the engines are placed on the wings. Not only is there the extra weight of the transmission gear, but the fact that the engines are centrally placed increases the load on the wings, which, therefore, have to be built stronger, i.e., heavier, than in the ordinary twin-engined biplane with the engines on the wings. When, therefore, Boulton and Pauls have succeeded in building a machine of this type, in which there is still a reasonably large proportion of useful load, this is an achievement which has been rendered possible mainly by virtue of the all-metal construction."

The main structural members were of high-tensile sheet steel, rolled, drawn or stamped to the required section. In many parts the more usual drawn steel tubes were replaced by circular-section members manufactured from the flat sheet by Boulton and Paul patented processes. These processes allowed the tubes to have much thinner walls than could be produced in the ordinary way, with the result that, as the material was high-tensile steel, a great weight reduction could be effected.

The two Napier Lion engines were placed in, or more strictly on, the fuselage, and drove two tractor airscrews and two pusher propellers. An engineer could walk along the fuselage to attend to the engines and could stand upright between them. The "engine room" was lit by windows and electric lights. There were six separate petrol tanks, so arranged that any one could be shut off should it be holed or damaged in any way. The radiators, moreover, were in six separate sections, any or all of which could be shut off so as to reduce the amount of water lost owing to a leak or puncture. *Flight's* observer was much impressed. At first sight, he reported, it seemed impossible that one man could look after all the rev counters, thermometers, oil pressure gauges, taps, etc.; but he conceded that, after an engineer had once become familiar with the various items, he should have no difficulty in keeping an eye on everything.

Air tests showed that the Bodmin was able to fly level on the power of only one of the Lions, and in this respect it scored over conventional "twins" in that, whether one or two engines were running, the thrust was always central, as the front engine drove the two tractor screws and the rear engine the two pushers. Moreover, the airscrews were "handed." The main wheels had oleo-pneumatic shock-absorption with an 18in travel, and a pair of smaller wheels was mounted forward to guard against nosing over.

Two Bodmins were built, numbered J6910 and J6911. Span was 70ft, length 53ft 4½in, wing area 1,204 sq ft, weight empty 7,920 lb, gross weight 11,000 lb, speed at ground level 116 m.p.h., climb to 6,500ft 8.9 min, service ceiling 16,000ft.

**P.64 Mail Carrier** The Mail Carrier was a very clean, twin-engined biplane, built in 1933 to meet an Air Ministry requirement for a high-speed machine capable of carrying 1,000 lb of mail for 1,000 miles non-stop at 150 m.p.h. This performance was to be achieved on approximately half the maximum horse-power, and single-engine flight was to be possible with the remaining engine running at less than its normal r.p.m. The two Bristol Pegasus IM2 geared and supercharged radial engines had Boulton and Paul nonagonal Townend rings with leading-edge exhaust collectors, and fuel was carried in five tanks—four main tanks of 74 gallons each in the outer wing panels, and a collector tank of 29 gallons in the starboard centre-section. The fixed main undercarriage was comprised in two streamline units, faired with plywood, a material which was also used for the extreme nose section of the fuselage. The main structure was, however, of metal, employing standard Boulton and Paul sections. High-tensile steel was used for the more highly stressed members and light alloy for the other parts. The pilot's cockpit was totally enclosed and had dual control, and there was a separate navigating compartment forward of the mail compartment, which was accessible to the



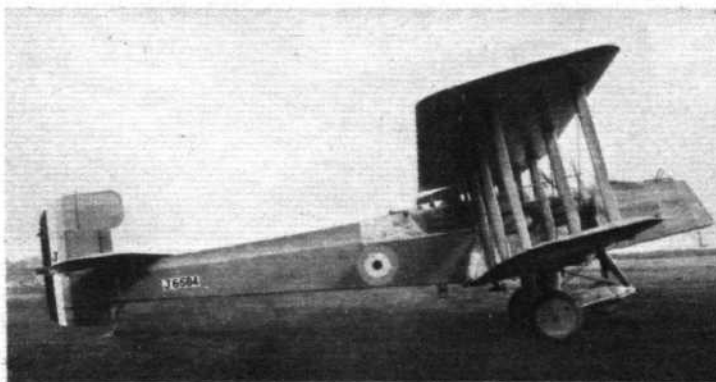
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P.7a Bourges Ia.



P.7b Bourges II.



P.15 Bolton.

crew in flight. On completion, during the spring of 1933, the Mail Carrier made a few test flights before it came to grief on the ground, as later described by its pilot, S/L. Rea. By June, however, it was flying again.

Span was 54ft, length 42ft 6in, empty weight about 7,000 lb and all-up weight 11,267 lb. Top speed was of the order of 185 m.p.h. at 5,000ft, and cruising speed 160 m.p.h. Even at 5,000ft the rate of climb was still 1,200ft/min.

**P.71A** To the order of Imperial Airways, in 1934, Boulton and Paul produced two special developments of the Mail Carrier, powered with Armstrong Siddeley Jaguar VIA engines from the airline's own stock. Other noticeable differences were the swept-back mainplanes, with rounded tips, and the revised tail unit, with triple vertical surfaces. The two machines were named *Britomart* and *Boadicea*, and were fitted out to carry six or seven