

Engine Features from the Paris Show

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Major Bulman is, of course, well known to everyone connected with British aviation, but for the benefit of foreign and overseas readers it should be pointed out that he is Assistant Director (Engines) of Technical Development and Scientific Research at the British Air Ministry. In his official capacity Major Bulman visited the Paris Aero Show on behalf of the Air Ministry to study the progress made during the two years that have elapsed since the last show. The following notes are, Major Bulman points out, based upon personal opinions and do not necessarily reflect the views of the Air Ministry. We consider ourselves privileged to have an article by such an eminent authority on aero engines, and feel certain that not only our ordinary readers but also aero engine and aircraft designers at home and abroad will read the article with the greatest interest.

THE Aeronautical Correspondents of the lay Press appeared for the most part to find the 13th *Salon de l'Aéronautique*, recently held in Paris, unexciting. In terms of aircraft, the enforced absence of the new French fighters undergoing competitive flight trial or, at least, still withheld from public criticism, was, naturally, disappointing to the visitor anxious to compare the relative progress of French military technique with that of his own country; but there was no lack of significance to the openminded concerned with aircraft engines. This Salon appeared to the author, indeed, to be the most interesting of all held since the war, portending a renaissance in French engine development, stung into anxious activity undoubtedly by the obvious superiority of the British exhibits at the 1930 Salon, the Schneider Trophy and Speed Record victories in 1931, and the notable purchases, meanwhile, by other foreign countries, of British aircraft and engines. It would be foolish for us now to under-rate the challenge so gallantly made; and lacking in perspective, too, if we became unduly disturbed at the startling weights per horsepower and the rated altitudes claimed for the new French types homologated or untested as they may be, compared with the performance of current British engines well established in R.A.F. use and buttressed with log-book records amassing thousands of hours of routine operation.

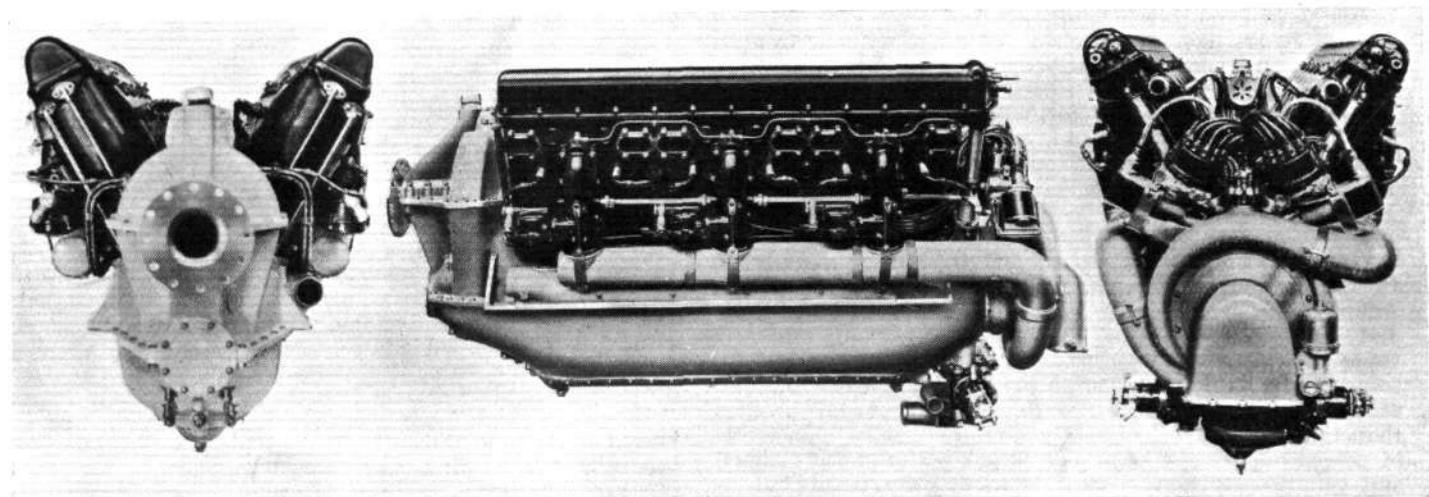
The essential change in French engine outlook is that supercharging has become universal, whereas in 1930 the Farman multi-speed blower was the only tangible evidence of interest in this direction.

It is now a French Government requirement that new types should be supercharged to at least 3,500 metres, but in practice rated altitudes of 4,500 or 5,000 metres are being attempted. Moreover, French supercharging is associated, by Government requirement, with ground boosting on a common basis. A new "standard atmosphere" has been laid down for blower engines, *e.g.*, 880 millimetres or approximately 2 lb. boost for take off, the rated altitude, however, being determined for the most part by the height at which normal pressure, *v.g.*, 760 millimetres, is maintained or, rather, restored. This endeavour to regain

altitude performance and higher take off power is associated with an important step in providing a superior fuel for the new types of some 80 octane value, compared with the current French standard of some 74 octane. The better fuel appears, at present, to be obtained by benzole addition, but the introduction of T.E.L. is undoubtedly foreshadowed for the near future. Two standards of fuel, at any rate, are envisaged, offering an obvious advantage to the French engine designer not confined to producing engines which will live on the poorest fuel which may be available in outlying regions of normal operation.

Whereas, here supercharging is concerned only with suction type carburetters, the French are proceeding vigorously with the pressure system, *i.e.*, the blower delivers air under pressure to the carburettor and not *vice versa*.

The pressure system is obviously attractive, if for no other reason, in facilitating the attachment of the supercharger to a hitherto normally aspirated engine with a minimum of disturbance to the induction pipe layout and the carburettor itself, the latter modified, of course, to provide a pressure balance system to the float chamber, less difficult now than formerly, thanks to the general introduction of petrol pressure pumps from the tanks. Several French exhibits, however, emphasise other contributory advantages. For supercharging air only it is assumed (though yet to be proved) that the special strengthening and rigidity of attachment of the supercharger needed to withstand backfire effect is unnecessary; the supercharger itself, then, and the piping to the carburetters, is lightened. The better distribution and homogeneity of mixture we may claim for the suction system is, at least to some extent, balanced by the general French use of multi-carburetters anyhow. As to whether a lower induction temperature is obtained by cooling compressed air heated in the blower by passing it through the carburettor than by feeding the blower with mixture already depressed in temperature, is a matter for argument, but there is no doubt that by the pressure system freezing tendencies in the carburettor itself are markedly reduced, and the need for elaborate drainage of the blower volute



THE NEW HISPANOS: Alike in external appearance, the 12 X.B.R.S. is shown in front view on the left, and the 12 Y.B.R.S. in rear view on the right.