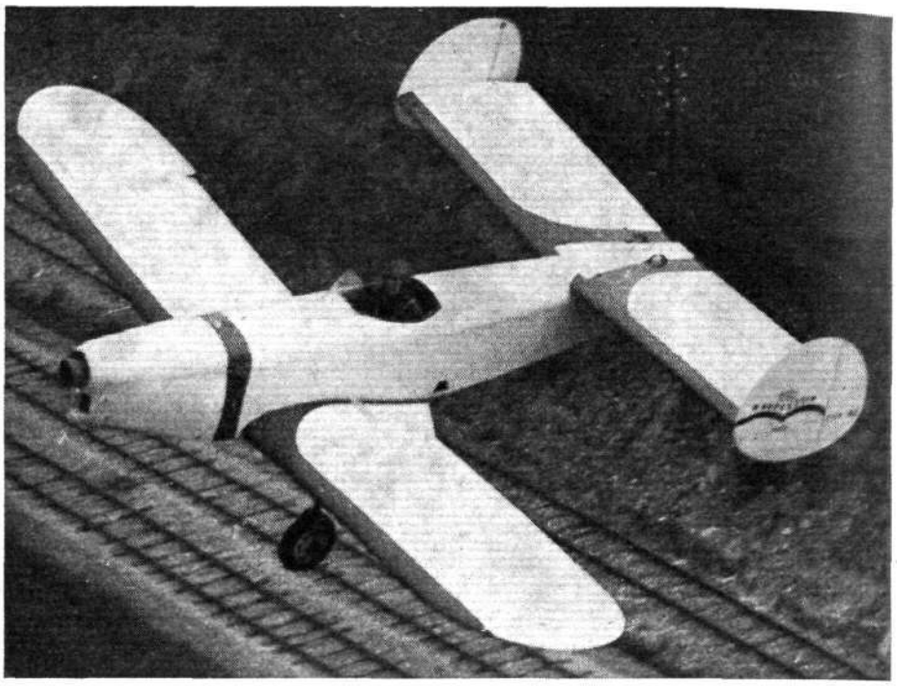
REVIVING the TANDEM

An Interesting French Experiment : Lateral Control transferred to Rear Wing : Flaps on Front Wing



The Mauboussin "Hemiptere" in flight.

EVEN in the early days of flying the tandem arrangement of aerofoils was thoroughly tested by the late M. Gustave Eiffel in his wind tunnels. Relatively poor efficiency seemed to accompany any possible arrangement of the wings, and for many years no practical development of full-scale aeroplanes with tandem wings took place.

Then came the glider competition at Itford Hill and Firle Beacon, near Lewes, in Sussex, at which the greatest duration was established by M. Maneyrol, a French pilot, on a French Peyret tandem glider in which both wings were provided with ailerons so interconnected that they could be used both as elevators and as ailerons. The British gliders taking part in the meeting suffered from inadequate control, whereas the Peyret had ample control, and thus enabled Maneyrol to manœuvre so as to remain in the up-currents from Firle Beacon for 3 hours 21 minutes 7 seconds.

M. Louis Peyret, encouraged by his success, struggled along in an endeavour to develop the tandem aeroplane, but without much success, mainly through lack of capital. Now another French constructor has taken up the development of the tandem machine, but has approached the subject in a somewhat different way. The Mauboussin "Hemiptere" is, presumably, so-called because of its resemblance to the hemiptera family of insects, which have four wings, one pair of which is partly coriacious, or leathery and tough, and partly membranous.

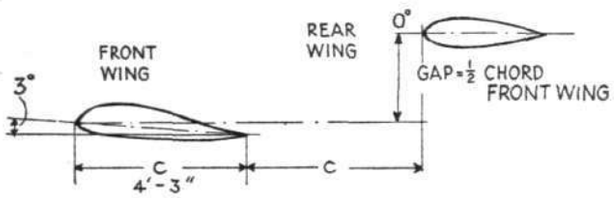
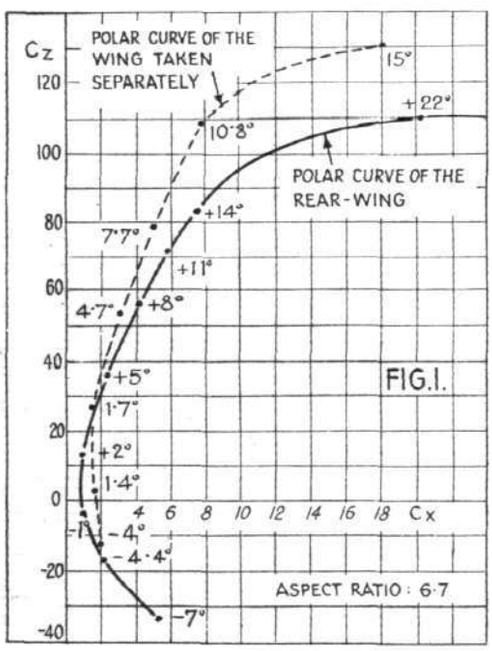


Diagram of wing arrangement in the "Hemiptere."

M. Mauboussin, as already mentioned, has approached the problems of the tandem aeroplane from a different angle. Arguing that if one has a tandem arrangement of the wings, and the c.g. is properly located, the front wing will stall first, putting the machine into a dive before it can go into a spin. If, therefore, the ailerons are transferred from the front to the rear wing, one should have adequate lateral control on the unstalled wing; and even if the front wing should have a slight tendency to spin it will be prevented by the unstalled and fully controlled rear wing from dragging the machine as a whole into a spin.

The fundamental design of the Mauboussin "Hemiptere" (writes R. C. Wood, our Paris correspondent) involves front and rear wings of different aerofoil sections, and arranged with the rear wing mounted on top of the fuselage, while the front wing is attached to the bottom of the fuselage. There is a decalage of three degrees, as the front wing is at an angle of 3 degrees when the rear wing is at 0 deg. incidence. In other words, the arrangement is that of a heavy *negative* stagger, the distance between the front and rear wing being equal to the chord of the front



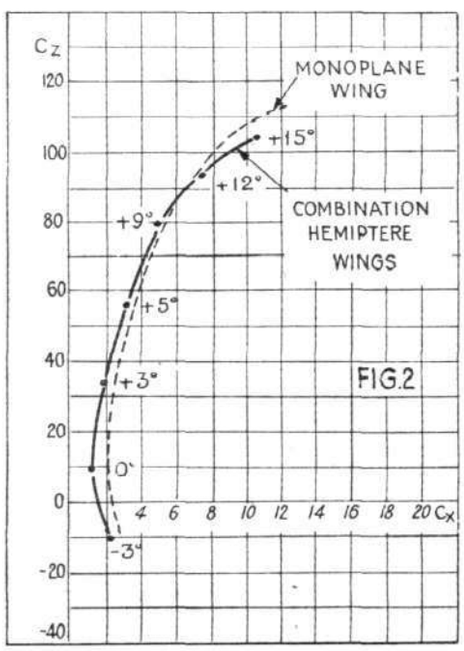


Fig. 1. A polar diagram of the rear wing by itself and of the same wing when influenced by the front wing.

Fig. 2. The tandem wing compared with a monoplane wing. The units are, of course, Continental, and should be divided by 200 to convert them into British "absolute" units.

wing, and the gap one-half of the front wing chord, as shown in the first diagram.

Approximately, the area of the rear wing is 60 per cent. of the front wing area, and some of the loss of efficiency introduced by the tandem arrangement has been recovered by M. Mauboussin by placing the fins and rudders at the ends of the rear wing, an arrangement which reduces "end losses," and which has recently been used with success in French and British bombers.

From the curves in Fig. 1 it will be seen that the minimum drag coefficient of the rear wing is lower than the minimum drag coefficient of the wing when tested by itself. These results, by the way, were obtained on a model of aspect ratio 6.7. At large angles of incidence, on the other hand, the drag coefficient of the rear wing is higher than on the wing by itself; this helps to steepen the glide.

Although the maximum lift coefficient of the rear wing is lower than that of the wing by itself, it occurs at a greater angle of incidence, and so makes for safety by ensuring that the front wing shall stall well before the rear wing.

When the Hemiptere tandem wing arrangement is compared with an orthodox monoplane it is found (see Fig. 2) that, although there is a slight loss in maximum lift coefficient, which may be expected to increase the landing speed somewhat, the drag coefficient of the tandem combination is slightly smaller over a wide range of incidences.

Ailerons are fitted on the rear wing only, while the front wing is provided with trailing edge flaps for increasing the lift. These flaps work in conjunction with the rear wing flaps to give an elevator effect.

The twin rudders can be used together for directional control in the ordinary way, but can also be pulled outwards together to form air brakes.

Any engine of approximately 40 b.h.p. can be used in the Hemiptere. That shown in the photograph is a Train engine. With this engine the machine has a maximum speed of about 100 m.p.h. The tare weight is 230 kg. (507 lb.), and the loaded weight 350 kg. (770 lb.). This figure includes enough petrol load to give a cruising range of 540 km. (335 miles) at a cruising speed of 84 m.p.h. The machine is, of course, a single-seater. R. C. W.

JO'BURG JOTTINGS

The Schlesinger Race Draws Near : News of the Event, The Competitors and Their Machines

HIS MAJESTY THE KING has been invited by the Lord Mayor and Corporation of Portsmouth to inspect the machines taking part in the Johannesburg Race.

◇ ◇ ◇

He may visit the aerodrome on September 28. The race starts at 6.15 a.m. on September 29. H.R.H. the Duke of Kent may be present at the start.

◇ ◇ ◇

The race will finish at the Baragwanath aerodrome, Johannesburg, where the competitors will be guests of the Johannesburg Club and of the Empire Exhibition Committee.

◇ ◇ ◇

The prizes will be presented at Johannesburg by Mrs. Schlesinger. The fastest competitor will receive £4,000, and those placed in the handicap £3,000, £1,500, £1,000 and £500.

◇ ◇ ◇

In addition, Mr. Schlesinger is presenting a large silver trophy for fastest time, with replicas for all finishers. These prizes are at present in London, and a photograph of them appears on page 284.

◇ ◇ ◇

Special trains will be run from London to Portsmouth in connection with the event.

◇ ◇ ◇

It is probable that a commentary on the start will be broadcast by the B.B.C.

◇ ◇ ◇

Car parking arrangements at Portsmouth will be in the hands of National Car Parks, Ltd.

◇ ◇ ◇

So far, no extra tanks have been fitted to the Misri Chand-Randolph Vega Gull. It has a Series I Gipsy Six and fixed-pitch airscrew. A possible non-starter here.

◇ ◇ ◇

All the remaining Percival types have Series II "Sixes" and D.H. variable-pitch airscrews. Their cruising speed is likely to be equal to the maximum we have known hitherto.

◇ ◇ ◇

Captain Percival was testing a Mew Gull last Sunday to determine consumption at various heights.

◇ ◇ ◇

The Mews will probably fly between 8,000 and 10,000 feet.

◇ ◇ ◇

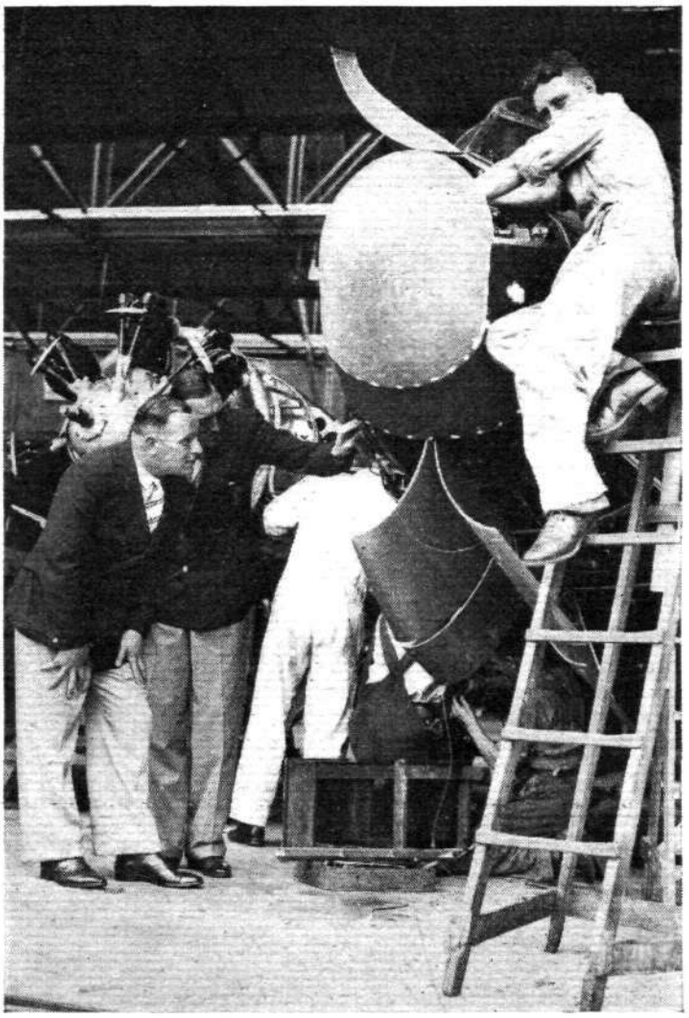
Fuel of 87 octane number has been delivered at Gravesend for the new engines, which have a compression ratio of 6 : 1.

◇ ◇ ◇

Mr. Halse has called his Mew Gull *Baragwanath* in honour of the Johannesburg Aero Club.

◇ ◇ ◇

Capt. Miller's machine rejoices in the title *Golden City*, which is inscribed on one side of the cowling, with the interpretation *Die Goudstad* on the other.



Mr. Ken Waller and Capt. Max Findlay investigate the construction of their Cheetah IX Airspeed Envoy at Portsmouth.

◇ ◇ ◇

The B.A. Double Eagle is retaining its Series I Gipsy Sixes and Fairey airscrews. "Tommy" will be noting consumption this week.

◇ ◇ ◇

The venturis for the blind-flying instruments on the Mews are fitted in the engine-cooling chute.

◇ ◇ ◇

The Sparrow Hawk being flown by Mr. Victor Smith is a new machine, but is similar to "D N L" and "D W W."