

THE ANTOINETTE MONOPLANE.

WHILE it doubtless required Mr. Latham's splendid failures in his attempted cross-Channel flights to bring the Antoinette monoplane into that extreme prominence which it undoubtedly occupies in the public eye to-day, the work of its designer, M. Levavasseur, has ever been deserving of recognition during the long while that he has been working on the problems of flight. If fortune has denied him the greater honours, he has not been discouraged thereby from putting his best into the development of his machine, which stands out to-day not only as one of the most interesting, but also as one of the most carefully-built flyers in the market.

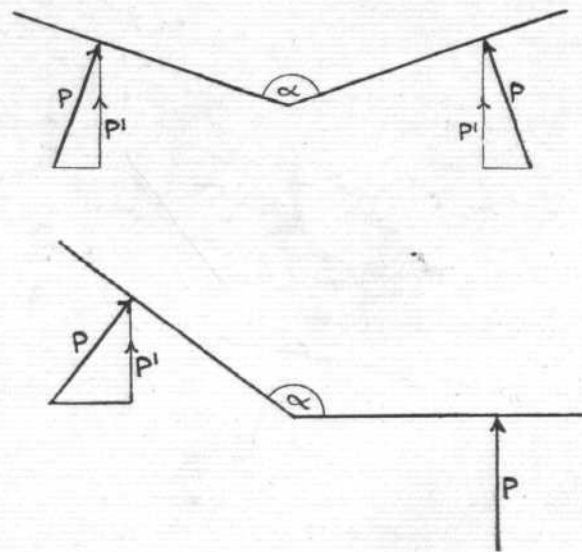
Of the various reasons which led M. Levavasseur to adopt the monoplane system of construction, its simplicity of form, and lower resistance to flight, have been leading factors, although the designer frankly admits that increased difficulties of construction scarcely allow the matter of its simplicity to go farther than the appearance. Certainly, however, the Antoinette firm have ably taken advantage of their opportunity in this latter direction, for its clean, neat "cut" is, perhaps, the most marked of the external characteristics of this machine.

In summarising the leading features of the design of the Antoinette monoplane, it is essential to mention two details relating to the main wings. One is their great thickness, the other is their upward slope, which embodies in the machine the principle of the dihedral angle.

The Dihedral Angle of the Wings.

This principle has for its object the provision of a certain amount of automatic lateral stability by means of the restoring couple brought into play by the difference in the upward components of the air pressure under the wings when the flyer is canted from its normal position of equilibrium. A glance at the accompanying diagram will make this clear. Applying the principle that the pressure on an inclined plane is perpendicular to the surface, it follows that, when in equilibrium, each wing of a dihedral pair is subjected to a normal pressure, P , of which there is an upward component, P' , acting as direct lift. The pressures, P , remain unchanged so long as the speed of the wings through the air is constant, but the values of P' obviously depend on the angle which each wing makes to the horizontal; for P' is a vertical component, being that supporting force which overcomes gravity.

If, for instance, the flyer is canted over into the exaggerated position shown in the second diagram, where one wing is horizontal, then that particular wing would be in a position to have the full value of the pressure, P , exerted as lift, whereas the vertical component resulting from the same value of P on the other wing is considerably diminished below what it was with the machine in equilibrium. It will be noticed that the difference in

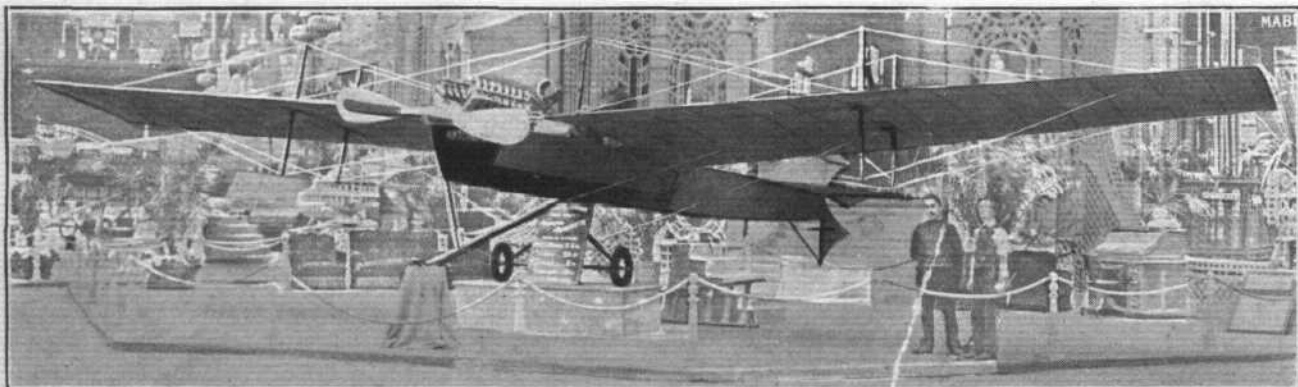


these pressures is always such as to result in a couple tending to right the machine, and it is this fact that makes the dihedral angle such an important principle.

Long as it has been known, the dihedral angle has, however, been little used in practice on full-sized machines for the reason that many designers see in the arrangement a source of danger far more serious than any advantage likely to accrue from the otherwise favourable points of the system. It is argued that the most likely cause of canting is a side gust of wind which, persisting after the cant has been started, will find an increasing area of action on the uplifted wing and so tend to capsize the flyer before restoring force has time to assert itself.

Wilbur Wright in his early gliding experiments tried and abandoned the scheme, and, in fact, it is now nowhere quite so much in evidence as on the Antoinette flyer; hence the reason for drawing early attention to the peculiarity.

(To be concluded.)



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THE ANTOINETTE FLYER.—View of the latest Antoinette monoplane at the Paris Salon. The above view illustrates very clearly the trussing of the spars in the wings.