

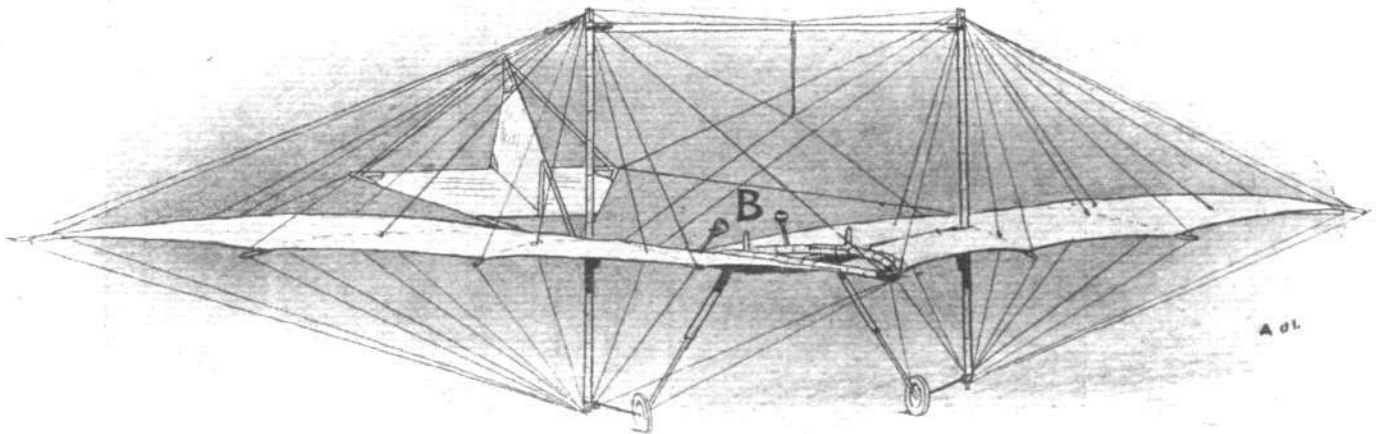
The Pilot's "Seat" and its Consequences.

Although Pilcher was doubtless inspired to his work by Lilienthal's example, it is apparent that he brought an original mind to bear in the constructive details of his task, whatever bias he may have been under to follow his leader's methods in their general lines. Constructionally the two gliders are as different as they can well be for machines of such similarity in size and purpose. But Pilcher and Lilienthal had this much in common, that they both employed the same method of riding their machines, by hanging upon them, and from such experience as has since been collected by the Brothers Wright, there is little doubt that the custom was at the bottom of many of their difficulties, if not actually the cause of Lilienthal's death. One consequence of deciding to use a glider as Lilienthal and Pilcher used

Pilcher had quite satisfied himself upon this point before he came to the end of his experiments, and another matter upon which he became convinced was that the upward slanting of the wings—or the principle of the dihedral angle—resulted in diminished stability in side-wings.

Leading Dimensions.

Of the two machines there is little to choose in weight, as they were both supposed to be in the order of 45 to 50 lbs. when actually in use. Lilienthal's glider has the smaller amount of supporting surface, and even that machine must have been one of the largest he constructed, for he was inclined at first to build gliders having barely 110 sq. feet of deck. The span of 22 feet for the Lilienthal machine is 2 ft. 8 ins. less than the Pilcher,



"Flight" Copyright.

View of the Pilcher glider from in front, showing the method of staying the wings. One hundred wires were employed for this purpose. In the centre of the machine will be noticed two short posts capped with small bolsters marked B. In use they came beneath the arm-pits of the pilot and supported his weight, whilst his fore-arms rested along the frame, and his hands grasped a pair of small handles which are also visible in the sketch.

theirs is the necessity of designing a machine of small weight, for the pilot has to be prepared to carry the load both when launching and landing. Pilcher, it is true, fitted a small chassis to his glider consisting of two spring-suspended wheels, but this addition was no more than a compromise, as its purpose was mainly to enable him to bring the machine more easily into position, and to take some of the initial shocks of landing. In flight Pilcher's body hung suspended beneath the wings, only his head and shoulders projecting above, his weight was borne upon two bolsters fitting under the armpits. Lilienthal was perhaps even more beneath his machine than Pilcher, for his arms rested in sockets beneath the wings, and the bolsters which supported his shoulders were about on a level with the upper surface.

Stability and Control.

The greater part of their weight being thus suspended beneath the supporting surfaces caused the centre of pressure to be considerably above the centre of gravity, and although this is often thought to be conducive to automatic stability by constituting a kind of natural pendulum, as a matter of fact, the inertia of such a system very naturally complicates the control, which in both cases was carried out by the shifting of the pilot's body in whatever direction might be required to restore balance.

and the overall length is 2 ft. shorter. The height is proportionally much less than that in the Pilcher glider, owing to a different system of staying the surfaces and to the absence of a chassis.

The Tail.

Both gliders were fitted with tails of similar type although different in shape, the tail in each case consisting of one vertical plane and one horizontal plane, the latter being set at a negative angle, and being also free to rise unrestricted if subjected to any pressure from beneath. It will be distinctly noticed from the accompanying drawings that the stay wires for the horizontal planes are only arranged so as to resist pressure from above. The vertical tail plane is nominally rigid, although, in the Pilcher glider, it happens to be mounted upon the horizontal member, and thus moves with it. In the Lilienthal machine the horizontal plane is hinged separately to the vertical plane, which is attached rigidly to the main frame. It was Pilcher's object in designing the tail of his machine as shown, to make it as compact as possible for storage, and with this end in view the tail was arranged to fold over on to the main planes.

(To be concluded.)