# A NOVEL SAILPLANE

## By R. Platz

THE following article was written by Reinhold Platz, Technical Director and Chief Engineer, Fokker Aircraft works, from 1913-1932 and was published in *Zeitschrift fuer Flugtechnik und Motorluftschiff-fahrt* edited by G. Krupp, Prof. Prandtl and Dr. Ing. W. Hoff, on 26 Jan., 1924.

The present popular interest in gliding and soaring have induced me to build a sailplane which in spite of the present financial situation would open up the possibility of soaring to all sporting enthusiasts. The requirements are :—

1. A very low initial cost which should not exceed that of a good pedal bicycle.
2. Capable of dismantling into very small parts in order to permit transport per passenger train. (*Ed.—as with skis and foldboat canoes*).
3. Insensitive to rough man-handling and shocks at all and any points.
4. Rapid and easy assembly.
5. Simple and cheap replacement of all parts.
6. The sailplane must be capable of being carried by a single man.

None of these requirements have been fulfilled by any sailplanes built at present. A new way is therefore described.

The fundamental concept was born by a recollection of a trip in a sloop rigged sailing boat, where, with the correct setting of the sails and the coincidence of the centre of pressure of the sails with the lateral centre of pressure of the hull, it becomes possible to sail for long periods without the use of rudder, the sails are in fact 'stable.' A boat so trimmed can be steered within certain limits without the use of rudder by tightening or loosening the jib sail.

If one takes two such sails (two jibs and two mainsails) the second being the mirror image of the first in plan and regards the pilot's weight as the lateral centre of gravity (pressure ?) and turns the whole assembly 90° through its fore and aft axis, one would then have, as can be seen from figure 1, a sailplane with which one can fly straight and whose vertical flight path can be controlled by the setting of the jib sail.

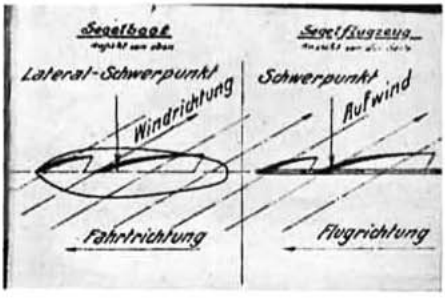


*Fig. I.—Showing the analogy between the forces acting on the jib and main sail of a sailing boat and the split or double winged 'sail' plane*

In view of the over-riding importance of simplicity and low initial cost it was necessary to attempt to avoid introducing additional control surfaces and apparatus. Therefore it was attempted to provide adequate control with this simple layout. Lateral stability could be achieved by adequate dihedral of the spars (or masts, to keep to the sailing boat analogy). It still lacked rudder controls. This function could be undertaken by ('aileron') jibs.

A paper model, shown in figure 2, weighted with a paper clip, served as a prototype test model. Lateral

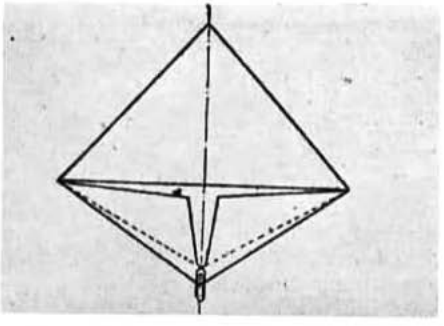

*Fig. II.—Prototype free flight paper model weighted by a paper clip*

stability is good with appropriate dihedral. The Elevator control provided by the fore wing (or jib) is very effective.

With differential use of the fore wings fully satisfactory rudder control was achieved even when the model was released in a stalled condition. (*Ed.—According to modern two-seaters instruction terminology we would prefer to word this differently and talk of aileron control rather than rudder control, but the result is sound.*)

The final form was now found and in four working hours a model of 1.3 m. span and 0.4 m.² wing area was completed. The first trials took place on some sand dunes 6-8 m. high in early Nov., 1922. The calm on the first day was unsuitable for soaring but proved very useful for the exact setting of the fore sail and the correct location for the load, which consisted of a workshop vice.

On the next flying day the first success was recorded. The model 'soared' with a wing loading of 2½ kg. m.⁻² in a light wind. It gained height repeatedly and moved, head into wind, along the crest of the

dunes without losing height for some time in the same way as gulls have been observed to soar, which has often been described.

From this model it was already evident that all the requirements mentioned at the head of this article were capable of solution. In the full scale plane difficulties due to the flexibility of the wing (in particular the changeable profile) could still occur.

To study this question a further model of 2.5 m. span and 1.3 m.² wing area was now constructed in a few hours. Trials proved that there was no noticeable difference between the large and small models. After these experiments a full scale sailplane of 16 m.² wing area was built in a few days.

It consists of a curved keel of steel tubing in whose rear end a solid wooden mast is inserted (this is the fuselage member) it has two cups welded on each side into which the wings spars (solid wooden masts) are inserted. Other main parts are the two sewn-together ' mainsails ' and the jibs, the means of attachment and three tin fittings.

The ' moving ' parts consist of only one screw which holds the jibs together while allowing them to rotate up and down.

The whole sailplane can be dismantled in 10 minutes into a portable pack of 3.3 × 0.35 × 0.25 m. and weighs 40 kg.

The sailplane can be assembled ready for soaring by one man in 15 minutes.

The trials were mainly carried out, as with the small models, in light winds with light loads. The curvature or bending of the sails, control and landings were good as with the small models.

Further trials in the next few days occurred in a strong wind. At sand dunes 25 m. high the sailplane was flown with (*Ed. ' by '*) 75 kgs. of sand ballast. About 50 flights were made without a pilot with preset controls, the sailplane often landed in the sea or behind the dunes without any damage at all.

The next trials were conducted with a pilot in ' captive ' flight, starting with a one weighing 55 kgs. but followed by other sporting enthusiasts of up to 100 kgs. weight. They all noted the ease of operation of the elevators (fore wings—jibs). The sailplane

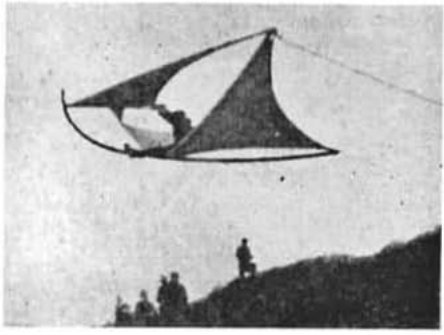

*Fig. IV.—The sailplane stability and controls flight tested in captive flight in slope lift*

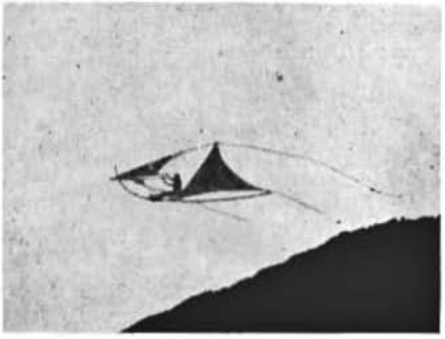

*Fig. V.—Free flight in slope lift*

was held by four lines to tail, wing tips and nose as it was too risky to indulge in free flight at this precipitous point of the dunes without further practise.

The first human ' free ' flight occurred on the next flying day in Feb., 1923 with a moderate wind from a 10-12 m. high dune.

Soaring along the dunes which are not very suitable for this is to be tried next after which the experiment can be regarded as closed.

Even if the aerodynamic qualities of such a sailplane cannot compare with those of a ' performance ' sailplane the advantages listed as our requirements at the beginning of this article should be very great for beginners.

It will be interesting to hear the views and comments of men of science and soaring pilots to this problem and to this first attempt to find a solution.

# AUSTRALIAN NEWS

By F. D. Hoinville.

BUSINESS kept me out of the National Championships, which finished on the 20th January. I had tipped either Bob Krick or Bob Muller, of the Hinkler Soaring Club, to win, but Bob Muller entered for the Matrimonial Stakes (and drew a winner) and had to scratch from the gliding events.

Bob Krick justified my faith in him, and included in his winning score a flight of 220 miles, the longest of the contest. Although he had previously done Gold height, his barograph had failed on the earlier occasion, so he must do the height again before he gets his Gold ' C.'

Merv Waghorn did a flight of 200 miles, his best effort in twenty years of gliding, to complete his Gold ' C ' (No. 5). Other members of the Sydney Soaring Club did good flights, notably Sel Owen, National Goal Record 206 miles, Sel also needs height to complete the Gold ' C.'

In Western Australia, Ric New proved the quality of his ' Laister-Kauffman ' two-seater (and himself as a pilot) with a National Record Out-and-Back flight totalling 144 miles (solo) also two-seater Height Record of 10,000 feet and Out-and-Back 65 miles accompanied by G. R. Higginson.