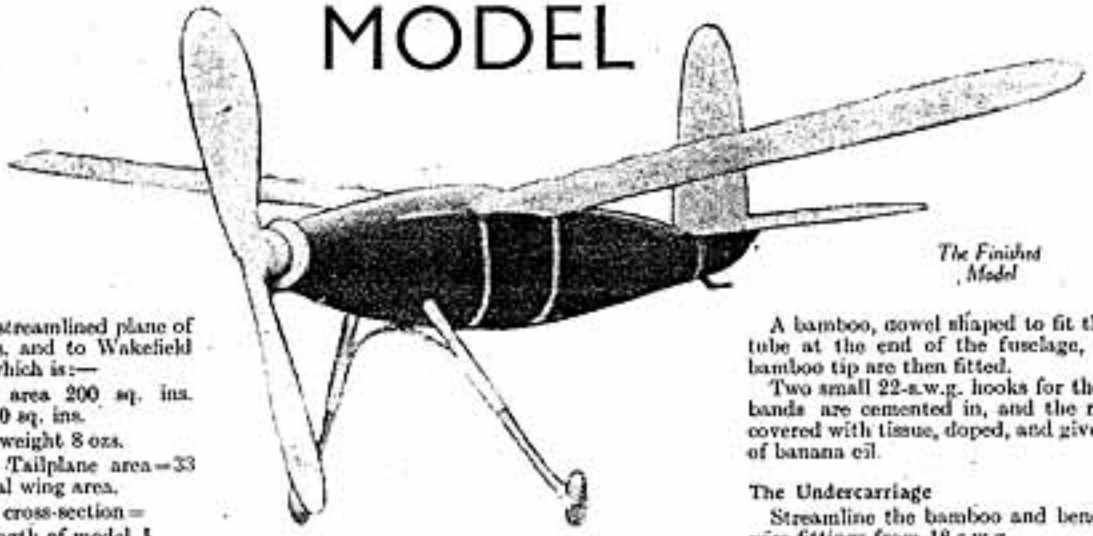
A STREAMLINED WAKEFIELD MODEL



The Finished Model

THIS is a streamlined plane of 206 sq. ins. and to Wakefield formula, which is:—

1. Mainplane area 200 sq. ins. plus or minus 10 sq. ins.
2. Minimum weight 8 ozs.
3. Maximum Tailplane area = 33 per-cent. of total wing area.
4. Maximum cross-section = $\frac{\text{overall length of model}^2}{100}$

First, carefully draw the plans full size.

Fuselage

The fuselage is streamlined and is built of 24 $\frac{1}{16}$-sq.-in. balsa stringers cemented on to formers, cut from $\frac{1}{16}$-in. sheet.

Carefully cut all the formers, and sand to make sure that there are no rough edges to harm the rubber motor.

Cement the top and bottom stringers in position first, and then add the other stringers, checking the fuselage for trueness. Cement $\frac{1}{16}$-in. strip balsa between the two stringers for the undercarriage tubes, and below the wing mounting, as shown. The stringers above the wing mounting are now cut away, and a piece of $\frac{1}{16}$-in. sheet balsa about $\frac{1}{4}$ in. wide is cemented on the top of each side of the fuselage.

Then cut the stringers above the tailplane away and reinforce with $\frac{1}{16}$-in. sheet balsa as shown. Also cement two cross-grained pieces of $\frac{1}{16}$-in. sheet balsa for the $\frac{1}{4}$-in. bamboo peg used for holding the rubber motor in position.

Plank the nose of the fuselage between formers Nos. 1 and 2, with $\frac{1}{16}$-in. sheet.

The 18-s.w.g. brass tubes for the undercarriage are now cemented in place and a paper tube, about $\frac{1}{4}$-in. diameter hole, is cemented at the end of the fuselage. Cover with two layers of tissue, the grain of the first going round the fuselage and the grain of the second going lengthways along the fuselage. Dope, and when dry apply two coats of banana oil.

The Wing

The wing span is 47 ins., with a constant chord of 5 ins., giving a total area of 200 sq. ins. The dihedral is 3¾ ins., and the sweep back 1 in.

It is constructed in two halves, with a leading edge of $\frac{1}{4}$ sq. in. set in diamond, and mainspar of $\frac{1}{4}$ in. by $\frac{1}{2}$ in., and a trailing edge $\frac{1}{4}$ in. by $\frac{1}{2}$ in. shaped to the airfoil section.

The ribs, which are spaced at 2-in. intervals, are cut from $\frac{1}{16}$-in. sheet, and the section used is R.A.F. 32.

Crack the leading and trailing edges for the dihedral and sweep back, but cut the mainspar to shape. Cement well, and reinforce the mainspar with thin plywood.

Bend the tips from bamboo, and cement in position. Make two paper tubes, about 1¾ ins. long and $\frac{1}{4}$-in. diameter hole, and shape two bamboo dowels to fit. Cement one dowel and one tube into each half as shown.

Cement the bamboo pegs used for wing fixing, and reinforce the wing at A and B.

Cover with strong white tissue, dope, and apply two coats of banana oil.

A piece of $\frac{1}{16}$-in. balsa is cemented just behind the leading edge to give the wing the necessary incidence.

The hatch which fits over the wing can now be made from two layers of $\frac{1}{16}$-in.

This Model is Extremely Stable and Capable of Good Flying Performance

sheet balsa, shaped and cemented together. A shaped former is cemented at each end, and the hatch should fit tightly between formers Nos. 5 and 8.

The Tailplane

The tailplane has a span of 17 ins. and tapers from 4 ins. to 3½ ins., giving an area of 66 sq. ins.

The leading edge is $\frac{1}{4}$-sq.-in. balsa set in diamond, the mainspar is $\frac{1}{4}$ in. by $\frac{1}{2}$ in., and the trailing edge is $\frac{1}{4}$ in. by $\frac{1}{2}$ in. shaped to the airfoil section. The ribs are cut from $\frac{1}{16}$-in. sheet balsa, and are spaced 2 ins. apart. The section used is Clark "Y."

Bend two tips from bamboo and cement in position. Two small hooks are bent from 22 s.w.g., and are cemented and bound to the leading edge.

Cover with tissue, dope, and when dry apply one coat of banana oil.

The Rudder

The rudder is 8 ins. high, with a width of 3½ ins. at the tip and 5½ ins. at the base.

Shape a piece of $\frac{1}{4}$-in. sheet balsa to fit on top of the tailplane, for the base of the rudder, and cut the ribs which are streamlined in section from $\frac{1}{16}$-in. sheet balsa.

Cement the leading edge and front spar (which are both $\frac{1}{4}$ sq. in.) to the base, and then fit the ribs to them at 1½-in. intervals.

The rear spar ($\frac{1}{4}$-in. by $\frac{3}{16}$-in. balsa) and the shaped trailing edge ($\frac{1}{2}$ in. by $\frac{1}{4}$ in.) are then cemented in position.

A bamboo, dowel shaped to fit the paper tube at the end of the fuselage, and the bamboo tip are then fitted.

Two small 22-s.w.g. hooks for the rubber bands are cemented in, and the rudder is covered with tissue, doped, and given a coat of banana oil.

The Undercarriage

Streamline the bamboo and bend all the wire fittings from 18 s.w.g.

Bind and cement these fittings and fit a cross piece of light bamboo, to give the required width of track.

The wheels are made of three laminations of $\frac{1}{16}$-in. sheet balsa, sanded to a streamlined shape, and bushed with 18-s.w.g. tubing.

The Propeller

Lay out the block as shown in the drawing, and test for balance.

Carve carefully and when completed make sure that it balances perfectly.

Cover with tissue and apply one coat of thick banana oil. Test again for balance, and fit 16-s.w.g. bush. Be careful not to carve the blades too thin near the spinner.

The freewheel is self-explanatory.

The noseblock is built up of $\frac{1}{4}$-in. sheet balsa, and is fitted with a 16-s.w.g. bush, and a ball-race is fitted between the propeller and noseblock.

The trimming weight (about $\frac{1}{2}$ oz.) can be made of lead, which can easily be beaten into a streamlined shape which fits the fuselage.

This weight runs on thread, which is tensioned by a rubber band at the rear of the fuselage.

Be sure that this weight does not slide too easily on the thread, and does not sway about when the model is flying.

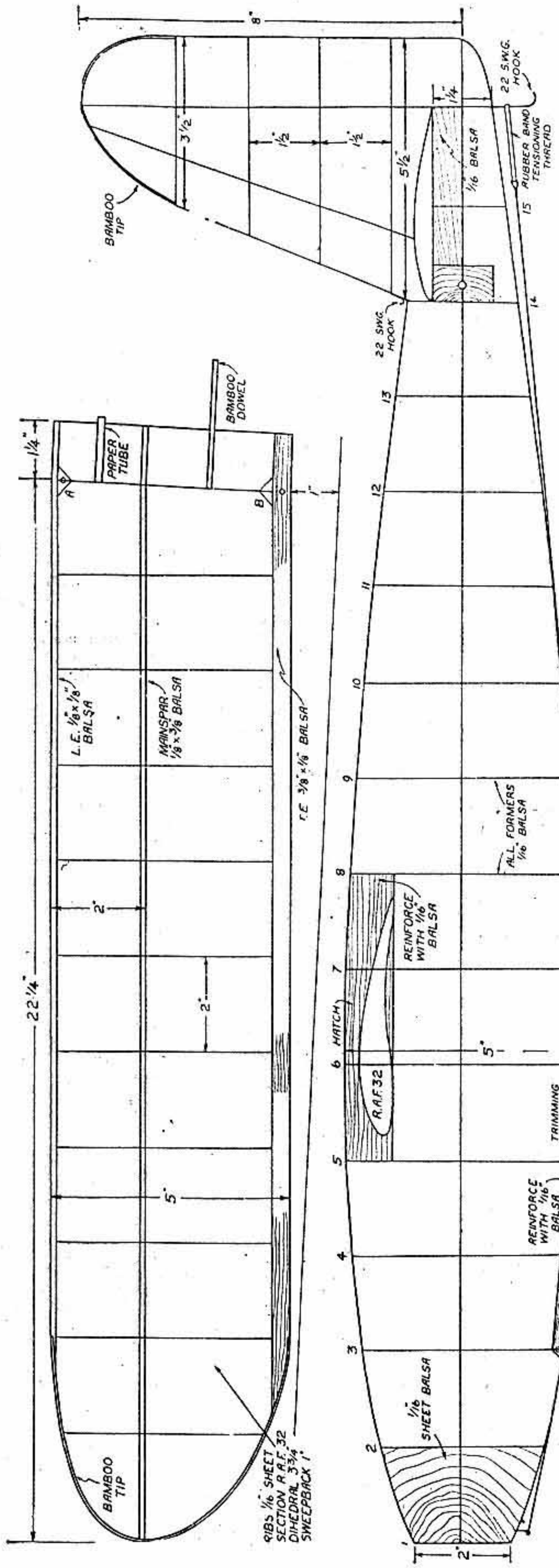
The model flies best on 18 strands $\frac{1}{16}$-in. flat rubber about 48 ins. long, "White" rubber tensioned, and well lubricated. The model is trimmed by moving the weight backwards and forwards along the fuselage.

The wing and tailplane are fixed by rubber bands passing round the fuselage. The rudder is fixed by the peg fitting into the paper tube at the rear of the fuselage, and a rubber band being passed round the fuselage from the hook on the leading edge.

The model is very stable and flies well, the best results being obtained when flying in wide circles against the torque.

Weights

Fuselage	2½ ozs.
Wings	1½ ozs.
Undercarriage ...	½ oz.
Tailplane and Rudder	½ oz.
Propeller	1 oz.
Rubber	2½ ozs.
	8½ ozs.



Constructional details of the streamlined Wakefield model. A full-size blueprint is available from the offices of "Practical Mechanics" for 2s.