

Air Trails SPORTSTER

A 46in. design for free flight by
Ben. E. Shereshaw

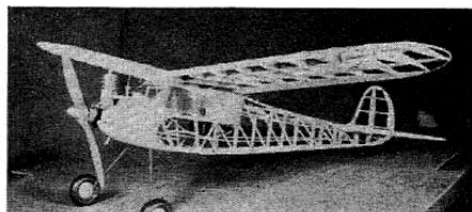
TWENTY-NINE years old this month, this design represents a true vintage sports model for 3.5 cc. to answer the innumerable requests we have had for vintage plans. Initially published in the American magazine *Air Trails*, of fond memory, the Sportster introduced a new classification in engine capacity and started a series of attractive cabin power models which were used for competition as well as fun flying through from 1939 to 1944. Who could deny that the lines are attractive? The vertical fin shape, which was to become the trade mark of the many Ben Shereshaw designs subsequently kitted, the stringered fuselage, the large curving transparent cabin area and the robustness of the structure characterised a model of an era which many old timers hold in happy memory.

When it was introduced in *Air Trails* magazine, the Sportster was a small design for power, particularly when one considers that only spark ignition could be used and the model had to carry the payload of a coil, condenser and flight batteries. Ben Shereshaw had created what was then termed a "small bore" engine which was to have been put out as a do-it-yourself magazine design. Named the "Bantam", the engine proved to be so popular and successful that Ben put into production and for many, this new .19 (3.25 cc.) engine created a new engine capacity class and a new phase in model engine design. For the "Bantam", in terms of power to weight ratio was an exceptional product by any standards. It was practically the first rear disc valve induction engine to go into mass production. It was extremely light in weight. It peaked very happily at high r.p.m. on small diameter airscrews and when subsequently employed for the 1945 period pylon model such as the Goldberg *Interceptor*, it was darned near invincible till the arrival of the Ardens and accompanying Glowplugs.

So, in many ways, this model was a trail blazer and we are sure that by using a diesel to take advantage of the short nose and to eliminate the weight of the batteries and coil, the Sportster will provide scintillating performance today.

The plan includes all the detail exactly as the original presented by Ben had in the March 1939 *Air Trails*. This means that installation of battery box, coil, and relevant formers and bulkheads as necessary, are provided for the vintage purists who

believe in using nothing but the original material. For those using a diesel or a glow engine, such details can be omitted.



As the designer was a perfectionist, his original instructions for assembly were also more complex than those to which we have become accustomed. For example, he recommended the construction of a jig to hold the longerons and diagonal members in place over the drawn positions on the plan whilst the parts were assembled and the cement was drying. The jig was formed by tacking brads on either side of the components; but nowadays, we have become used to using a soft board, household or steel pins and do not go to the extent of using jigs. Assembly begins with fuselage sides by laying out the longerons and by fitting all the diagonal and vertical cross members as can be seen in the side elevation. The sketch on the plan clearly indicates how the cabin is subsequently made as a sub-assembly and the nose framework extends on the basic sides along the line of the horizontal longerons only. Make two sides exactly the same, one over the other, above the plan. When these are dry, they must be joined by the cross members as indicated in the plan view. Start joining the fuselage sides at the cabin area where the width is constant, fitting former C at the third spacer position and this will be found to keep the assembly square. Draw the nose together and then the tail, fitting the intermediate cross members at each point as indicated in the plan view. Use plenty of elastic bands to draw the longerons in at the nose for the rather sharp curve at F1. Formers A and B should also be fitted to help keep the nose assembly square but first check the slot spacing for your engine bearers, having decided which particular engine you intend to use.

The cabin sub-assembly, using formers F3a, F4a, F5 and the upper false longerons which create the wing seat, are self explanatory on sight of the diagram. This can be made up ready to fit on the nose frame and formers prepared to round off the nose. Before fitting these however, bend the undercarriage, noting that it is from doubled lengths of 16 s.w.g. only and bind securely to the cross members at F3b and F3c positions. It should be noted that air wheels are specified on the plans as used during the 1939 period. These pneumatic wheels absorbed a lot of the landing loads and hence there was little need for

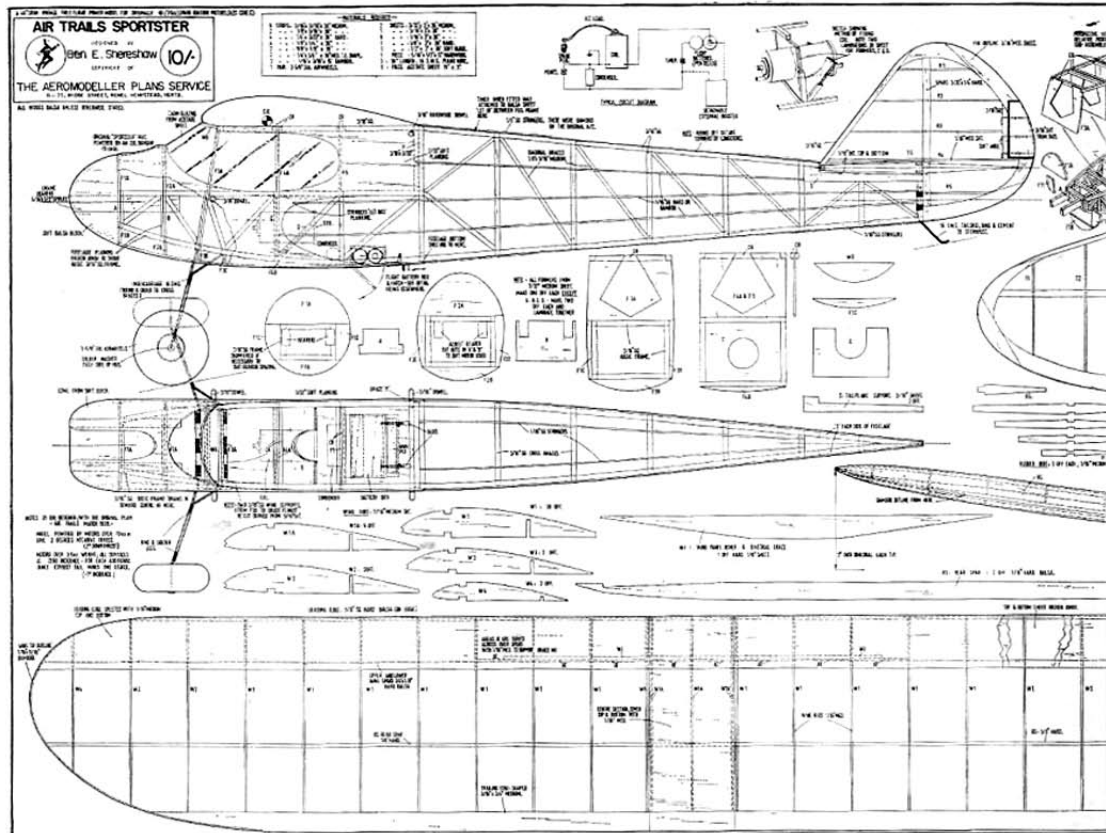
a very rigid heavy gauge undercarriage wire. Those who intend to use solid wheels should increase the wire diameter to 14 s.w.g. When the nose formers are fitted, the cabin is sheeted and nose blocks prepared to provide the shape to suit the engine. A tank can be positioned in the area near F2a and fuel shut-off and modern timer accommodated according to one's modern whims. It should be noted that the original timer which interrupted the circuit for the coil and condenser was positioned above the fuselage, and behind the wing trailing edge. This was a normal position since most flights started by taking off on the undercarriage from the ground.

The tail surfaces should be the next task. The structure is rather like that introduced by the Californian Radio Control enthusiasts in, for example, the "Smog Hog" design by Howard Bonner. The similarity ends when one begins to study the weight of the structure! In each case for the fin or the tailplane, the lower spar is laid down first over the position on the drawing and the ribs cemented in place on the spars. Make sure they maintain proper alignment. The eighth balsa outline is then cemented in place, jiggling it up with scrap balsa over the building board in order that it meets the rib centre lines properly. The outline should be roughly pre-carved to the airfoil contour before making this joint in order not to strain the structure too much after it has been assembled. The upper spar can then be fitted and when thoroughly dry, the assembly

lifted from the plan, and in the case of tailplane, the centre section sheeted. It is recommended that the spar on the tailplane could be boxed in with webs on either side for added rigidity, and the builder should also pay attention to the recommendation for the "T" section false spars to support the trim tab hinges. The tail assembly is deliberately kept light particularly in view of the short nose moment. For this reason, one should choose only soft balsa wood for the $\frac{3}{16}$ in. thick trim tabs.

Study the wing structure carefully before tackling this most important part of the model. Note that the centre section is flat, to seat on the cabin superstructure and there is plain dihedral out to the tips. This amounts to three inches under each tip as shown in the front view. The wing panel joiner and dihedral brace as well as the spar pattern are given full size on the drawing for the sake of accuracy. Cut these parts carefully and make sure that the contours are correct.

The wing is constructed in its three sections, the centre section and the two panels. Start by laying down the $\frac{1}{2} \times \frac{1}{2}$ in. hard balsa lower spar and the $\frac{1}{2}$ in. hard pattern cut rear spar for whichever panel you have chosen. Cement the ribs for that panel at their proper station. Ensure that the ribs are all properly aligned both fore and aft and also that they are perpendicular to the building board. The root ribs (which are laminated two standard ribs) are cemented at an angle which would result in the



proper dihedral for each panel. Refer to the front view and make a small jig or pattern to ensure that this is correct. The original tips can be made of bamboo such as can be obtained from craft shops dealing with basket work material, but in the event of difficulty in local supply one must laminate the tips from $\frac{1}{8}$ in. balsa using four or five laminations to obtain the outline. If bamboo is obtainable it can easily be bent to shape over a gas stove or Bunsen burner. Now attach leading and trailing edges into position. Again making sure of alignment. It might be a good idea to add a few triangular gussets at the junction with the trailing edge in order to preserve a good joint and others might prefer to slot the ribs into the trailing edge, but this must be allowed for when originally preparing the ribs. The upper spar is fitted and for the inner three rib bays, the two main spars are boxed with $\frac{1}{8}$ in. medium sheet between ribs W1. This adds considerable strength and is also used as an attachment point for part WJ—the wing panel joiner. The opposite wing panel is then prepared and also the centre section, fitting the centre section end ribs (which are also laminations of two standard ribs) to accommodate the angle and also to match up with the root ribs of the wing panel so that the correct dihedral results. The three panels are then joined together with part WJ. This must be of strong grade balsa and the joint double-cemented for security. Finally, the entire leading edge is sheeted with $\frac{1}{8}$ in. medium balsa,

sanded before application to about 1/20th so that it is not necessary to rub over afterwards which creates the "starved horse" look of sagging sheet between the ribs. The wing tip area is cleaned up and now we have virtually a complete airframe ready for covering.

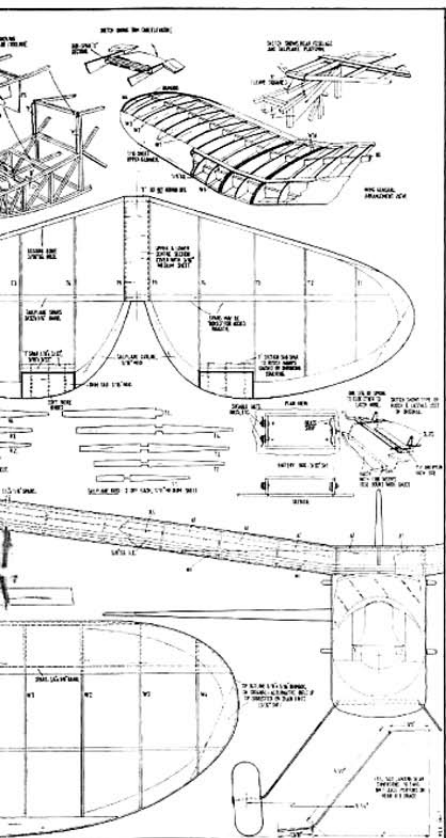
The original aircraft was covered in a light shade of what was then called Bamboo tissue, the nearest equivalent today being wet strengthened Modelspan. Three coats of dope was applied to the colour tissue of the original.

No records have been retained of the weight of the original model but the reader may take it from us that it was *light* by modern standards. Obviously the performance of such a model will be improved by weight saving and careful construction throughout, in fact the Sportster represents a very interesting structural assembly challenge for the modern modeller.

The provision of trim tabs on the tail surfaces and Ben's rule of thumb recommendation for correcting the tail angle according to the weight of the engine (motors over $3\frac{1}{2}$ ounces should demand minus 1 deg. incidence for each additional ounce), make for a very easily trimmed design.

We know from letter requests how many modellers will appreciate this renovation of a good looking model. It comes from an era when the Douglas D.C.5 was news, when the Brown junior engine was still on sale (at \$10 each), the Ohlson 23 had just been introduced at \$16.50 and the latest airliner was the Boeing Stratoliner. The Paris Air Show was showing the latest version of the then new Hawker Hurricane and the Fokker D.XXIII twin-engined twin boom fighter was the sensation of the month. Megows of Chicago had introduced Plane-film, "The Magic Covering" which was a fore-runner of today's MonoKote. And . . . dare we mention it? for each \$1.50 subscription for a year's supply to Air Trails magazine a modeller was offered a FREE kit of Jim Cahill's Wakefield winner!

Times certainly have changed! By building the *A. T. Sportster*, modellers can turn the clock back and appreciate something of the skills of earlier designers and also obtain an enormous amount of pleasure in the process. Today Ben Shereslaw is still connected with this hobby. He has over the past few years, been perfecting his twin cylinder R/C motor, the latest twin carburettor version was displayed appropriately enough among the old timer designs in the vast hangar of Los Alomitos, California, during the 1967 American National Championships. We are indebted to Ben for his permission to reproduce the design and wish him many more years of modelling satisfaction.



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Tailpiece at right displays the lightweight structure of the Sportster—featuring a spar system that was to become widely adopted 20 years after for R/C models.

