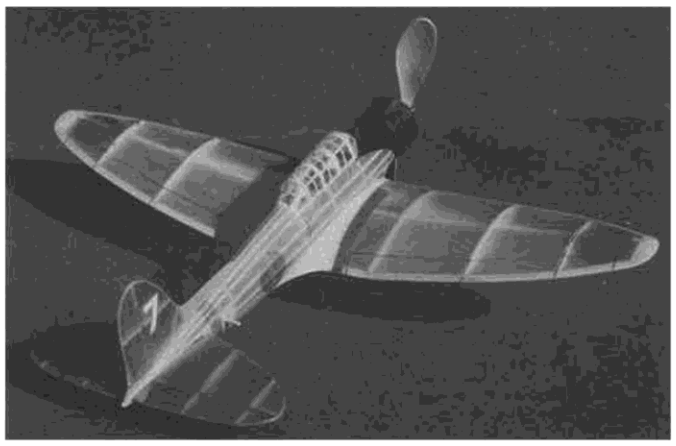
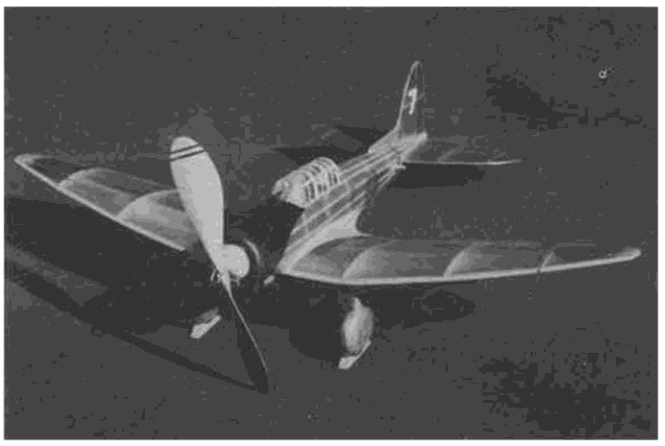




PEANUT SCALE

# Aichi D3A1 'Val'

**By WALT MOONEY . . . This colorful Japanese military aircraft from the earliest days of WW-II featured a fuselage of elliptical cross-section. Walt describes an interesting way of duplicating this in Peanut size.**

• The first aircraft described in *Aircraft of World War II* (600 Full-Color Drawings) by Bill Gunston, is the Aichi "Val." There is a beautiful five-view drawing on pages 8 and 9, which is inspiration enough, but on page 11 there is a color side view of the first production aircraft, that was used in China from the beginning of 1940. This was the real inspiration for this peanut model.

The orange, red and black color scheme really did the trick. I had some nice orange tissue, and some nice red tissue, that was real "Japanese Tissue," and besides, it was given to me by Fudo Takagi, the photographer for all these peanut models, so it should really be used on a model of a Japanese airplane. Well, at least, it seemed very appropriate when there appeared some authentic color data to justify a gaudy finish.

"Val" has a reasonable amount of wing area for a peanut scale model. But in the interest of better flying characteristics, three liberties have been taken with scale truths. The propeller diameter, the wing dihedral, and the horizontal tail area are increased relative to the scale of the rest of the model. None of these changes significantly detract from the attractiveness of the model, as can be seen by the accompanying photos.

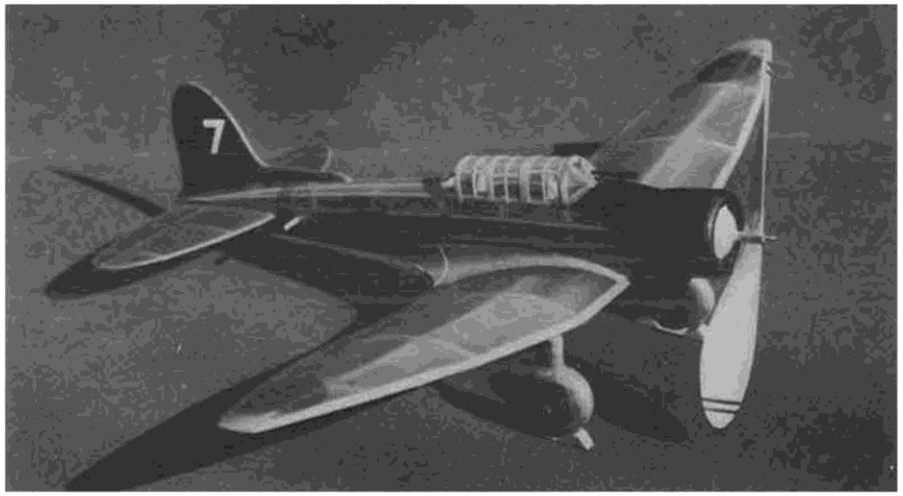
The model is overall orange, with red insignia (of course), a red vertical tail and dorsal fin, a red horizontal tail, a red vertical fuselage band just forward of the tail, and a red symbol on each side of the fuselage. Wing walks, tires, and the front of the fuselage is black. The silver propeller has two thin red stripes on each blade. The "7" is white.

This model did not fly right off the drawing board. The elliptical wing planform, while aerodynamically efficient, is prone to tip stall, and the model proved it once more. A balance point in line with the front canopy frame was required, and ballast had to be added to get it in this location. If the model came close to stalling, the left wing would drop quite suddenly. Even with the center of gravity well forward, the model showed signs of tip stalls until the washout at the rib nearest the wing tip was about an eighth-of-an-inch. That is, at the rib, the wing trailing edge has an eighth-of-an-inch more dihedral than the leading edge. With this much washout, it is important that both wings have about the same amount or the model will roll toward the wing with the greatest washout, especially under power.

Construction is mostly similar to previous peanuts with respect to the wings and the tail surfaces, which use laminated outlines and balsa stick spars and balsa ribs. The cross section of the fuselage is small enough that its structure requires some extensive commentary.

The front of the fuselage has a circular cross-section to match the radial engine that powered the real aircraft. As the fuselage stations occur further and further aft, they become elliptical in cross-section with the major axis vertical. The fuselage is quite well streamlined and its volume is somewhat restricted aft of the cockpit, which does not leave a lot of room for the rubber motor. Conventional formers cut out of sheet balsa, which were strong enough, appear to make the motor volume even more restrictive, so wrapped formers are used on this model. Using 0.020 by 1/16th basswood for former wrapping provided formers only 1/16th of an inch thick all around, with the wood grain always in the direction of the former.

A modern adhesive, like "Hot Stuff," or "Super Jet," or "Zap" is the key to making wrapped laminated formers for the model easily. You don't even have to make any patterns. You can simply start with a roll of masking tape wrapped around a dowel until its diameter is about an eighth of an inch less than the diameter of the front of the engine cowl.



**Too bad we don't have color to show the real plummage of this Japanese bird. Basic orange, with red and black areas cannot be called camouflage!**

*Continued from page 95*

Now, an ellipse is just a special case . . . for a circle. The circumference of an ellipse is the same as that of a circle which has as its diameter the average of the major and minor axis of the ellipse. So if we know what kind of an ellipse we want for a former, we can determine what size circle we need to wrap the lamination stock around to get it. *(You may have to reread that one about 5 times before it makes sense. If you don't get it after 10 times, build a Tailwind! wcn)*

Sound like magic? It isn't. First take a look at the top and side view of the fuselage. Making allowance for two 1/20th stringers and a 1/16th thick former these will give you the minor and major axis of the former. Average these two dimensions (add them together and divide by two), and you have the diameter of wrapping tool you need. Unwrap the tape until your roll is the right diameter. Start by making the forward formers first, they're the biggest and you only have to unwrap tape to size it for formers farther back.

Now, the secret is to wrap the basswood strip around the roll of tape until you have three complete layers. DO NOT BOND THE LAYERS TOGETHER WITH ADHESIVE. Just tack down with a tiny drop of adhesive, the very last eighth-of-an-inch of the top layer so the wrapped basswood won't unwrap. Now carefully remove the circular assembly from the tape roll form. This should be easy because there wasn't any adhesive near the form, what was used was a minute amount at the last layer. This circular part has no significant rigidity because the laminations are not bonded together. Squeeze it gently between your thumb and forefinger while it is flat over the workbench and it will easily deform into an ellipse.

Now, put some wax paper down over the plan. Lay the part over the top view of the fuselage at the appropriate station and squeeze it until it has the correct minor axis. Then bond the laminations together with one of the instant adhesives. Do a small part of the circumference at a time so you can avoid getting yourself adhered, and so you can make minor shape adjustments as you go along. Once the laminations have all been bonded in place, the elliptical former will be found to be surprisingly rigid.

A little trial and error may be required to get all six formers the right size. It took nine attempts to get six for the model in the photos, but all were made in about an hour's time, which is a good deal faster than cutting them out of sheet.

Fuselage assembly, after the formers are made is also a little different. Mark the vertical and horizontal centerlines on all the formers. Cut the firewall former out of 1/8th sheet. Now, on the top view, measure the two widest side stringers and cement them together at the extreme tail at the correct angle. Mark the positions of all the formers. Remove the stringers from the plan and cement them in the proper notches in the firewall former. Now cement all the formers in place between the stringers. Make sure they will be vertical in the side view. Now add a top and bottom centerline stringer from firewall to extreme tail point. These will later be cut away for the cockpit and wing but are needed now to help keep the assembly true. Now add all the other stringers, in matched pairs side-to-side, to keep the fuselage assembly symmetrical. When all the stringers are cemented in place and the cement is truly dry, parts of stringers can be cut away and discarded in the cockpit area and in the area where the wing and horizontal tail fit. Part of the formers must also be removed in these areas. This is also a cut and try procedure to obtain as good a fit as possible.

The rest of the airplane is pretty conventional and requires little comment. The canopy frames were made of paper strips cemented in place over smooth plastic panels. The sliding part of the canopy is made from three separate overlapping pieces. Wing fairings were cut from bond paper which had been covered with orange tissue. They were carefully rolled and fitted in place. The dive brakes under the wing are made from sheet balsa and cemented in place below the sub-spar. The wheel pants are also conventional balsa laminations. A Williams Brother's thrust bearing and a Peck plastic propeller were used on this model.

Other details were made from scrap balsa, carved and sanded to shape, cemented in place, and colored to match.

Have fun with your "Val." •