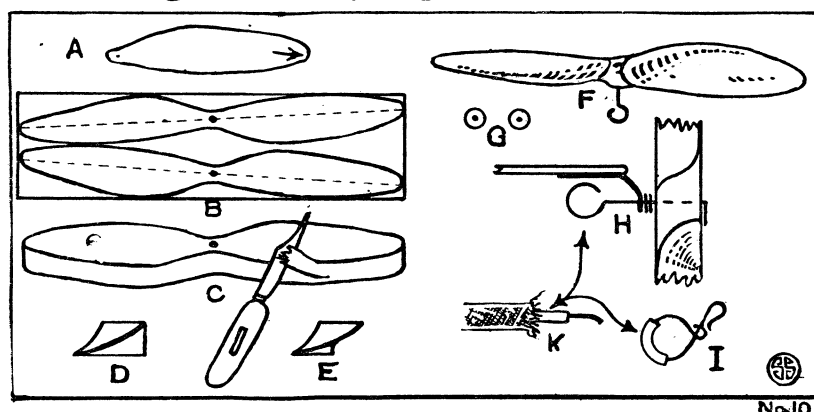


## Building and Flying Model Airplanes



### Making the Propellers of SS-2

This is the seventh of a series of articles by Paul Edward Garber, telling how to make model airplanes. Mr. Garber is in charge of Aeronautics at the Smithsonian Institution.

The propellers of model SS-2 are to be made of balsa wood. Therefore procure material as follows:

- 1 block balsa wood 10" x 2½" x ¾".
- 5" of No. 15 piano wire.
- 4½ inches of No. 10 piano wire.
- 2 small washers or dress spangles.
- 56 inches of rubber thread, ⅛" x 1/32".

A short length of telephone wire.

A small piece of cardboard.

On the cardboard draw a propeller blade to the shape shown in the drawing, making the blade 5 inches from the pivot hole in the end to the tip of the blade with a blade width of 1¼ inches. Cut out this pattern and make a mark on the end of the blade. On the balsa block draw a line at least ⅝" from the edge. Find the center of this line. Put a pin through the pivot hole in the pattern, put this pin in the center of the line, place the mark in the end over the line, and draw around the pattern. Swing the pattern around until the mark is over the opposite end of the line, and trace around it again. This completes a propeller design. Draw another line near the other edge of the block, turn the pattern upside down and repeat the procedure. Thus you have drawn the outlines of your two propellers. Very accurately drill a small hole, (preferably with a No. 58 drill) through each hub, and then cut out the propeller blanks. This may best be done with a band saw or coping saw, but as balsa wood is quite soft, a penknife will suffice. Commence to carve the propeller by cutting as shown in the drawing. Carve away from the upper left edge to the lower right edge, until the

blade when viewed from the end looks like Figure D. The blade should be slightly cupped. Carve the opposite blade and turn the propeller over and carve the backs. These should appear as shown in the other end view Figure E. Both blades should be so thin that when held to the light they appear pinkish. This thinness should extend for the outer two-thirds of the blade. The inner one-third should gradually thicken into the hub. The propeller should be balanced carefully at each stage of its manufacture, namely, as a blank, when cupped and when finished. This balancing is done by inserting a fine needle in the hole and holding it between the thumb and finger or on a frame. Each blade should be alike in every particular. The other blank should be carved as the opposite of this. That is, it should be started by carving from the upper right edge to the lower left edge, and continued in that manner. It also must be carefully balanced, and matched with the other one. The drawing shows a completed propeller. No excess material should be left in the hub. The blades must be sandpapered smooth.

To make the shafts the No. 15 wire is cut into two equal pieces, and bent to the shape shown in the drawing. After insertion in the propeller hub the end is bent over and indented in the hub, and Am-broided in place. These shafts must be exactly perpendicular to the hubs, in order that the propellers may revolve truly without wobbling. Two washers are put on each shaft, and the shaft hooks passed through the nail bearings on the frame. To prevent the rubber motors from cutting themselves on the small wire of the shaft, a piece of rubber tubing is obtained from the insulation of some telephone wire and inserted on the hook. The "S" hooks are made from

the No. 10 wire and are of the safety type, that is, the end of the large hook is twisted over into a catch as shown in the drawing, so that the pull of the motors will not open it. Rubber tubing is used on these also.

The long length of rubber thread is divided in half, and the ends of each piece tied, forming two rings. These are looped to form eight strands, and one piece thus looped is hung onto the frame, by inserting an "S" hook in one end, and passing the other end through the cans and onto the shaft hook. This completes the power plant. In the next article the wing for this model will be described.

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### BIOLOGY

## Nature Ramblings

By FRANK THONE



Sassafras

All through the East and South the sassafras is taking on its gorgeous autumn gold. No shrub or tree can surpass the rich, deep yellow of its odd, three-lobed leaves, which decorate growths ranging all the way from humble roadside scrub to occasional trees thirty or even sixty feet high.

Typically, the sassafras is a shrub. Trees of any size are rarities, and worthy of remark and photography. Hence little is said of its possible value as timber. Of greater moment is the fact that it secretes an odorous substance that resembles nothing else whatever in the world. And like most aromatic things, it has had its vogue as a medicine and beverage. What the medicine may have been good for nobody now knows: it was listed in that vaguest of classes, as a "tonic."

As a beverage, sassafras tea has had an honorable history, though little in demand any more. One of the earliest of English explorers of this continent was attracted to the New England coast by the prospects of a cargo of sassafras. And the prince of all essayists, Charles Lamb, devoted many lines to an intimate and appealing account of his pet charity to the chimney-sweeps of London—treats of sassafras tea.

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