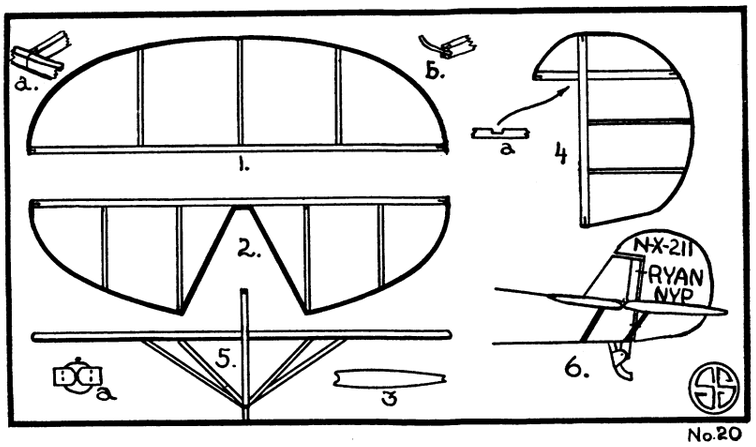
AVIATION

Building and Flying Model Airplanes



This is the fifteenth 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 Tail Units

Four pieces comprise the tail units of this plane, namely the stabilizer, elevator, rudder and fin. In making the first three it will be found an advantage if full sized drawings of the parts are made, over which the pieces of wood are fitted and assembled. This method insures good joints and well shaped pieces. The stabilizer is shown in the above drawing, Fig. 1. It is made out of a spar, three ribs and an outline piece. The spar is 8½ inches long and 3/16 inch square. The center rib is 2¼ inches long and shaped as shown in Fig. 3. The ribs are glued or Ambroided in place and may be wired as shown in Fig. 1-a. The other two ribs are of similar shape but a trifle shorter in order to conform to the outline piece. The latter is made out of 1/16 inch square bamboo which is heated over a candle flame at the points to be curved and bent to shape as was done for similar parts described in previous articles. The outline piece is fastened to the spar by making a "V" cut in the end of the spar and gluing and wiring the bamboo therein Fig. 1-b.

In some models the elevators are made in two pieces but in this one we will join them together as in Fig. 2. The dimensions and construction are similar to the stabilizer, making the outline like a "W" with the cross bar in the center ⅜ inch long.

The rudder is made according to the drawing Fig. 4. The upright backbone is 4 inches long by 3/16 inch square. The upper cross bar is 3 inches long by 3/16 inch square; ¾ inch from the end of each a step is cut 3/16 by 3/32 inch as shown in 4-a and the pieces are joined. The outline piece is shaped from 1/16 inch square bamboo and fastened to the pieces as at 1-a. Two ribs similar in shape to Fig. 3 are Ambroided in place as shown.

These three surfaces are now to be covered. Light paper may be used for this purpose but this is liable to puncture easily, therefore China silk is preferable. Before applying the silk the spars and the rudder backbone are to have their edges curved in order that they may hinge easily, as shown in Fig. 5-a. A piece of silk a trifle longer in length and twice the width of the surface is used for the elevator. The spar is coated with glue or Ambroid and placed in the center of this cloth, and the adhesion well rubbed to insure a firm hold. The ribs and outline are then painted with adhesive on one side, and the fabric fastened thereon, all wrinkles being stretched out and the points of contact rubbed to insure adhesion. The silk is carried over the outline piece and after it is dry the surplus is trimmed off with a razor blade. The other side is then covered in a similar manner. When the adhesive is dry the surface must be "doped." This term means the application of a solution for shrinking and filling up the mesh of the fabric to make it air proof. Model supply houses carry special preparations for this purpose. As a substitute, collodion, or a solution of celluloid in banana oil may be used. Drug stores carry these products. If the latter is used the celluloid must be dissolved until the solution refuses to absorb any more, in other words, a saturated solution. If you are near a flying field real airplane dope can be used, thinned with acetone, another drug store product. The surface is doped with a thinly laid coat.

The elevator and rudder are covered in similar manner, care being taken to fit the fabric well around the "V" in the elevator and the joint in the rudder. In order to duplicate the appearance of the original these surfaces are now to be painted with aluminum paint. The rudder is lettered as shown in Fig. 6. It will be observed that the letters have curved sides, as in the original.

These surfaces are to be fastened with wire at intersecting points to the fuselage, Figs. 5 and 6 show how this is to be done. The stabilizer and elevator are hinged together as in Fig. 5-a with a piece of wire passed through holes in the spars and twisted tightly so that the surfaces may be moved but not be loose, then fasten in front of the rudder part. Double braces are to be used as shown in these figures, in each instance extending from the lower longeron out to the ribs. They are fastened with adhesive and wired or nailed if necessary. The rudder is hinged to the tail piece. The fin consists of a piece of cardboard or thin wood cut and glued in place as shown in Fig. 6.

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SEISMOLOGY

Four Earthquakes in Week

Three earthquakes were recorded by seismographs late Sunday night, November 13, and early on the morning of November 14, according to records received by Science Service from observatories at Georgetown University, Washington; The Dominion Observatory, Ottawa, Canada; and the Meteorological Observatory, Victoria, B. C.

After earthquake experts of the U. S. Coast and Geodetic Survey had studied the data, they stated that the third quake was the one felt in Chile. Its center, they said, was 31 degrees south latitude, and about 71 degrees west longitude, though the latter was somewhat uncertain. It appeared, however, to be near the coast, and not far from the center of a severe quake last April 14.

Borneo may have been the scene of a severe earthquake which occurred at 4.24 on Wednesday afternoon, November 16. By means of records from Georgetown University, Washington; the observatory of the Survey at Tucson, Arizona, and the Meteorological Observatory at Victoria, B. C., the earthquake experts of the Survey have estimated its approximate center as 2 degrees north latitude and 115 degrees east longitude.

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