PART 3

Building Fly Baby

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THE FUSELAGE of FLY BABY is built pretty much like that of a big model airplane, except that the builder has to do a sharper job of gluing. Maybe this is setting aviation back umpteen years like some people say —I look at it as bringing it back DOWN to the level where the tooling and fabrication problems can be handled by moderately competent people who want to fly for fun. We still have America's Cup Class sail boats in spite of all the crude little plywood sailing dinghies turned out in basements and woodsheds. A guy has to start somewhere, but if the first step isn't low enough to reach, he's never going to be able to step up from it to the next one.

The main longerons and inner lower longerons are all ¾ in. sq. spruce, as are all the truss members from Station 2 to Station 6. The side diagonals aft of Station 6 are ½ in. by ¾ in., as shown in Figures 1-1 and 1-2. Using the top line of the upper longeron as a reference line, make a full-size fuselage layout on a suitable work surface. The many little double squares on the first two figures are ½ in. by 1 in. by 3 in. hold-down blocks detailed on Fig. 1-3. These are used approximately in the positions shown to hold the longerons and some of the truss members on the work board. The reason for the ½ in. thickness is so that they will be below the tops of the structure so that plywood can be laid down without interference. The blocks "X" and "Y" on Fig. 1-1 are critical. The pair at "X" mark the forward end of the straight lower longeron line from near Station 6 to the tailpost, and "Y" establishes the low point of the lower

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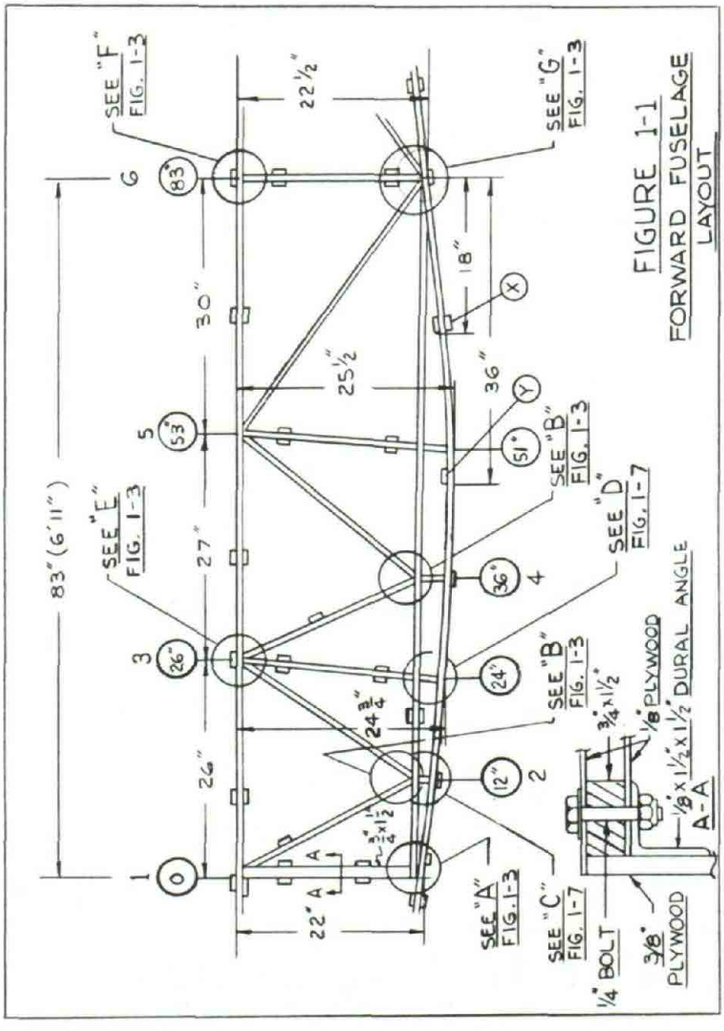

FIGURE 1-1
FORWARD FUSELAGE LAYOUT

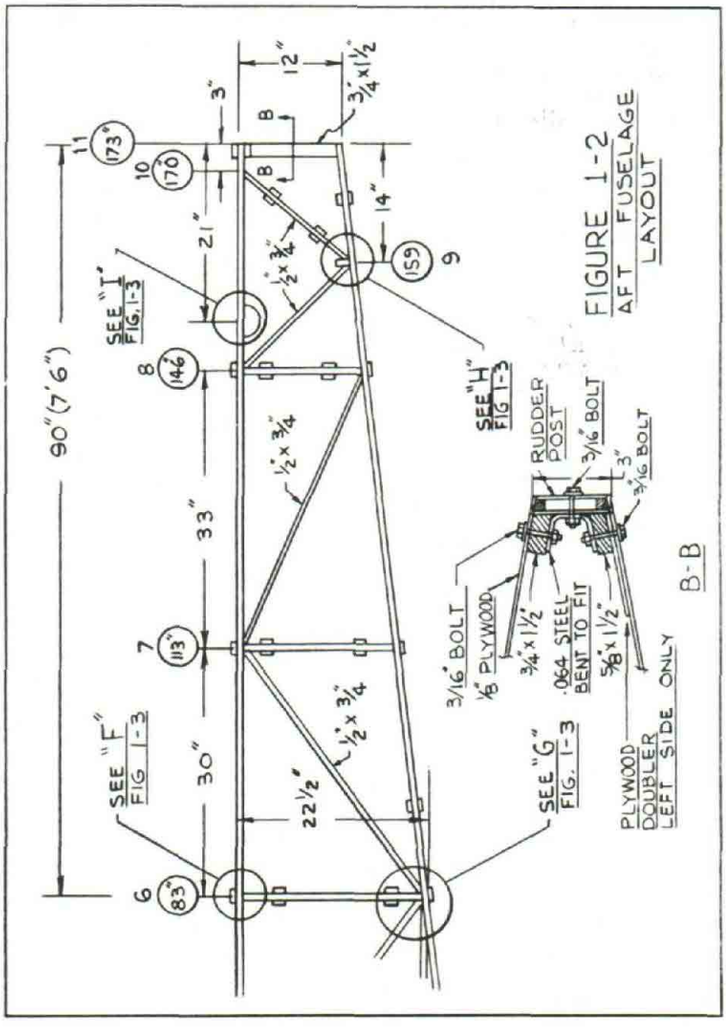

FIGURE 1-2
AFT FUSELAGE LAYOUT

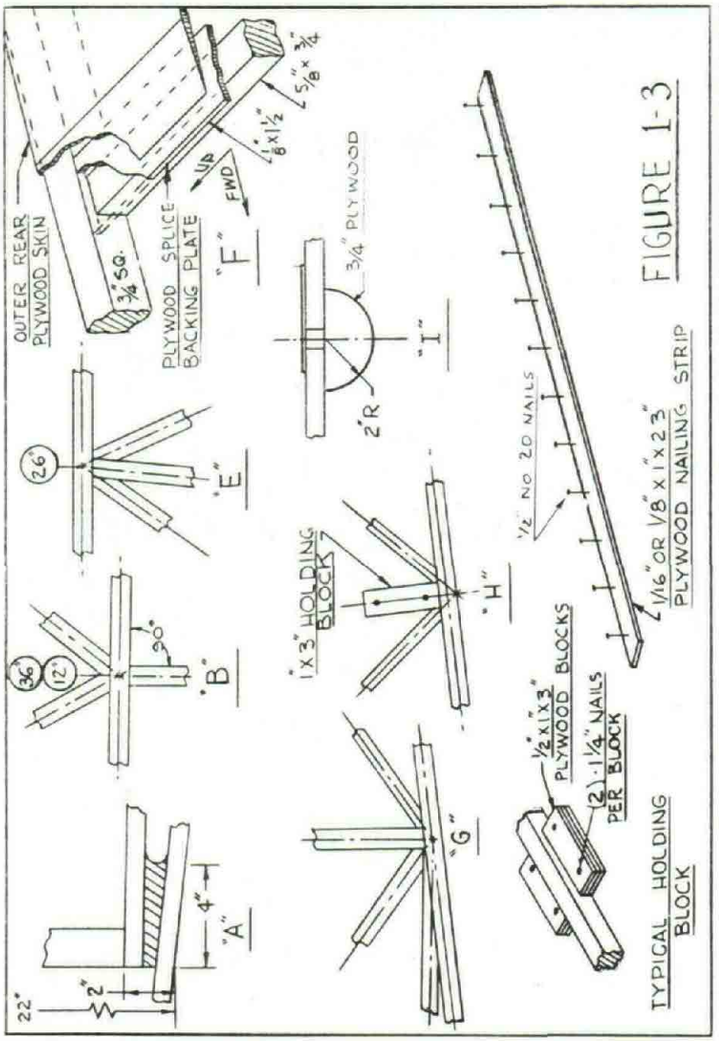

FIGURE 1-3

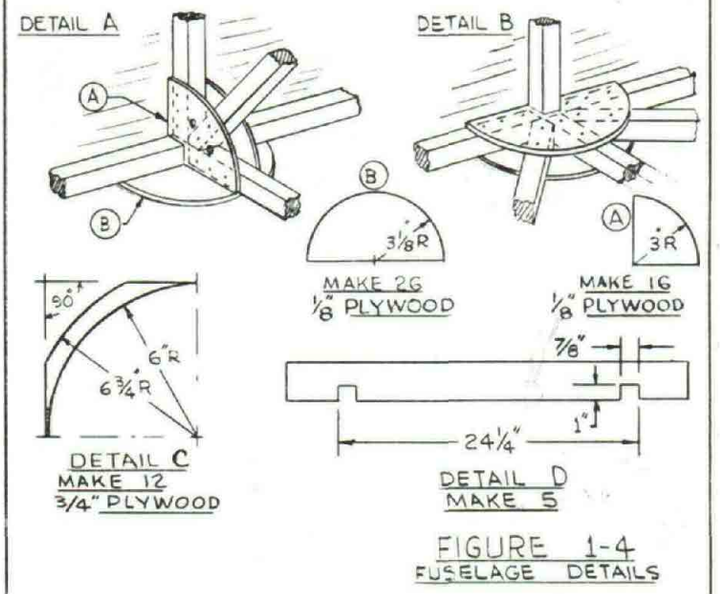

FIGURE 1-4
FUSELAGE DETAILS

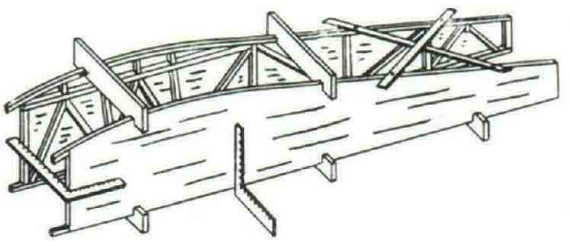

FIGURE 1-5
FUSELAGE ASSEMBLY

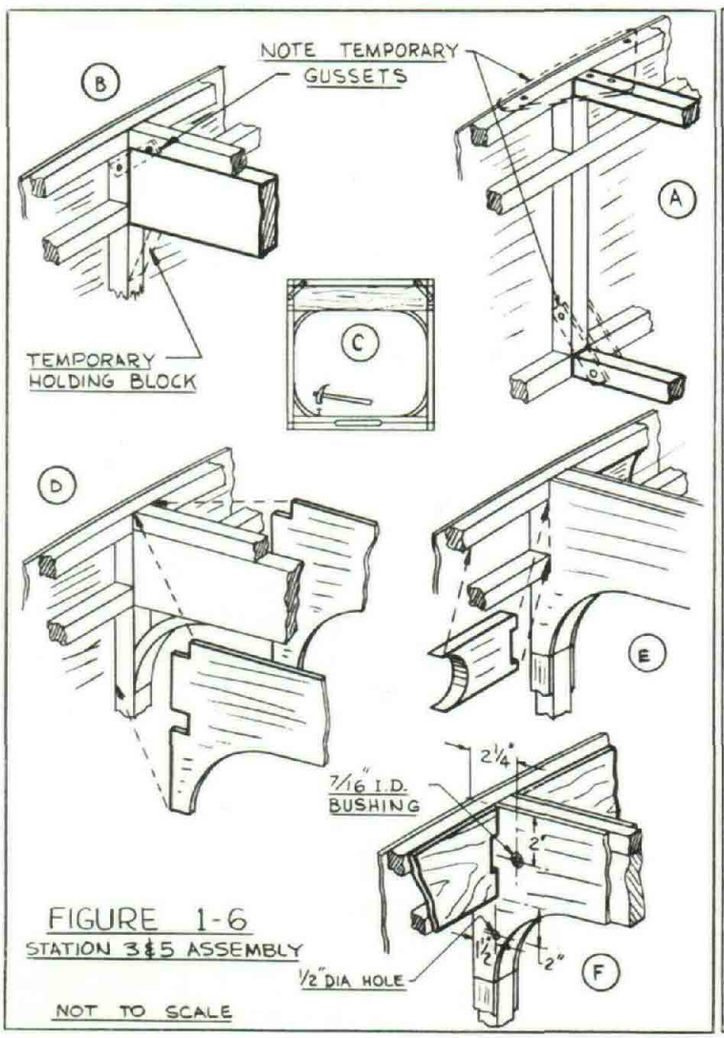

FIGURE 1-6
STATION 3&5 ASSEMBLY

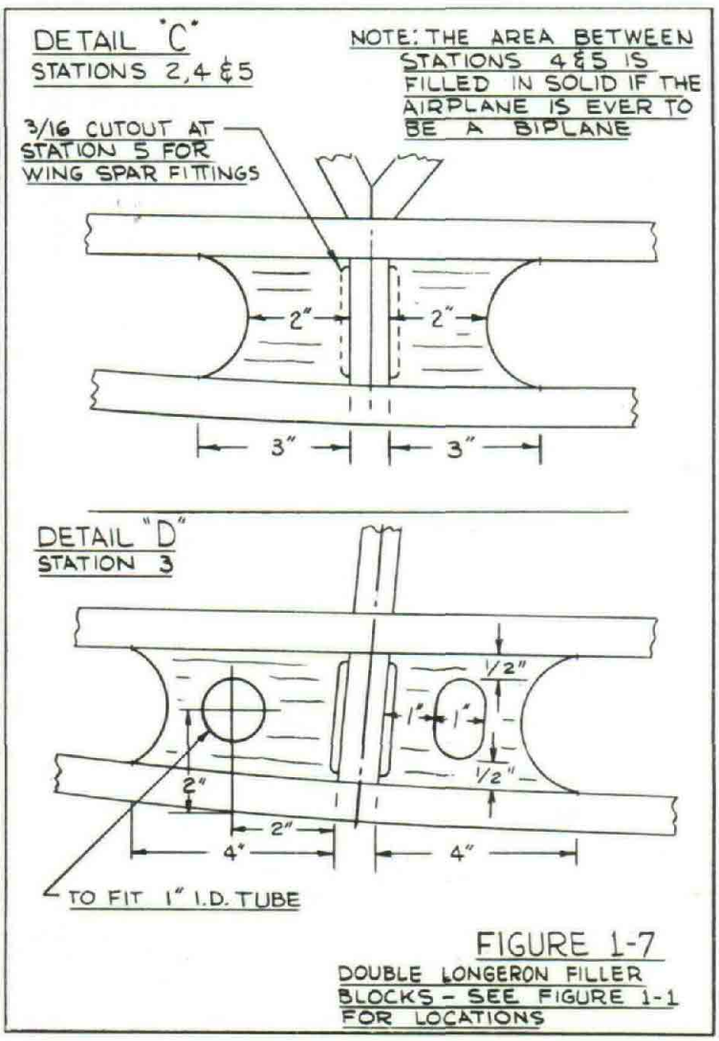

FIGURE 1-7
DOUBLE LONGERON FILLER BLOCKS - SEE FIGURE 1-1 FOR LOCATIONS

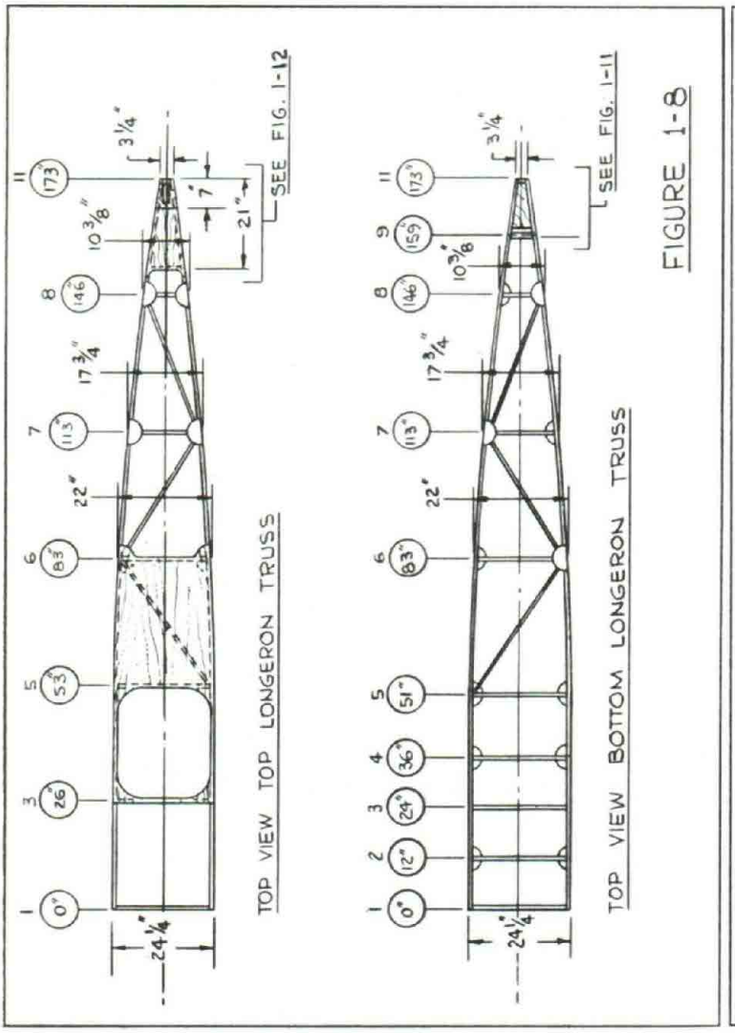

FIGURE 1-8

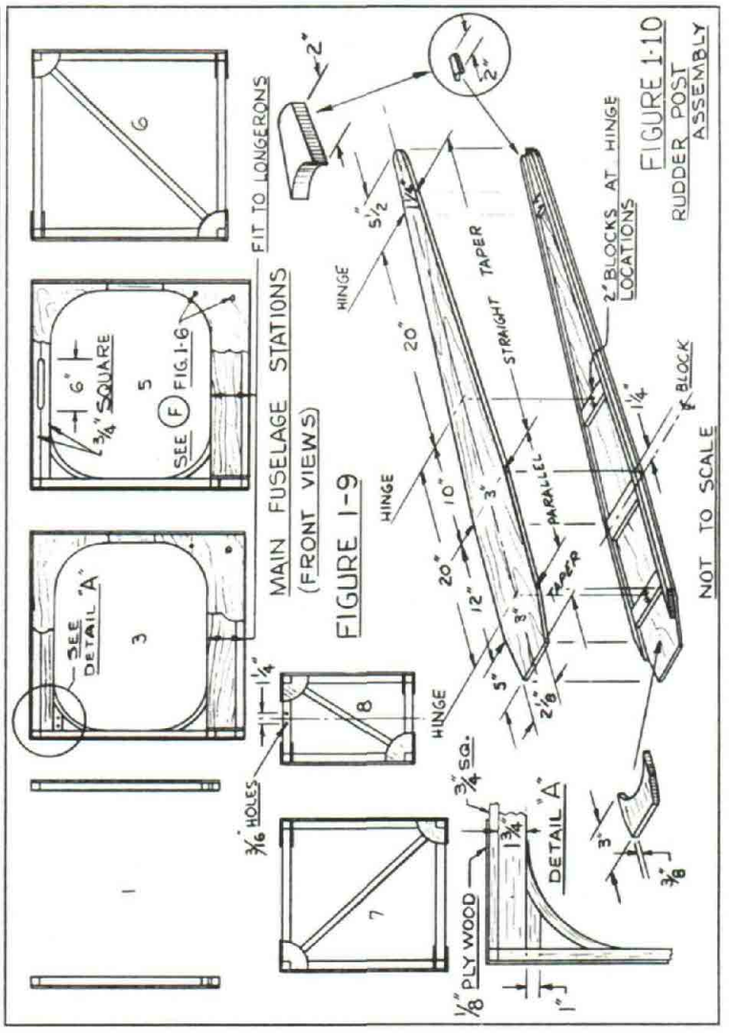

FIGURE 1-9

FIGURE 1-10
RUDDER POST ASSEMBLY

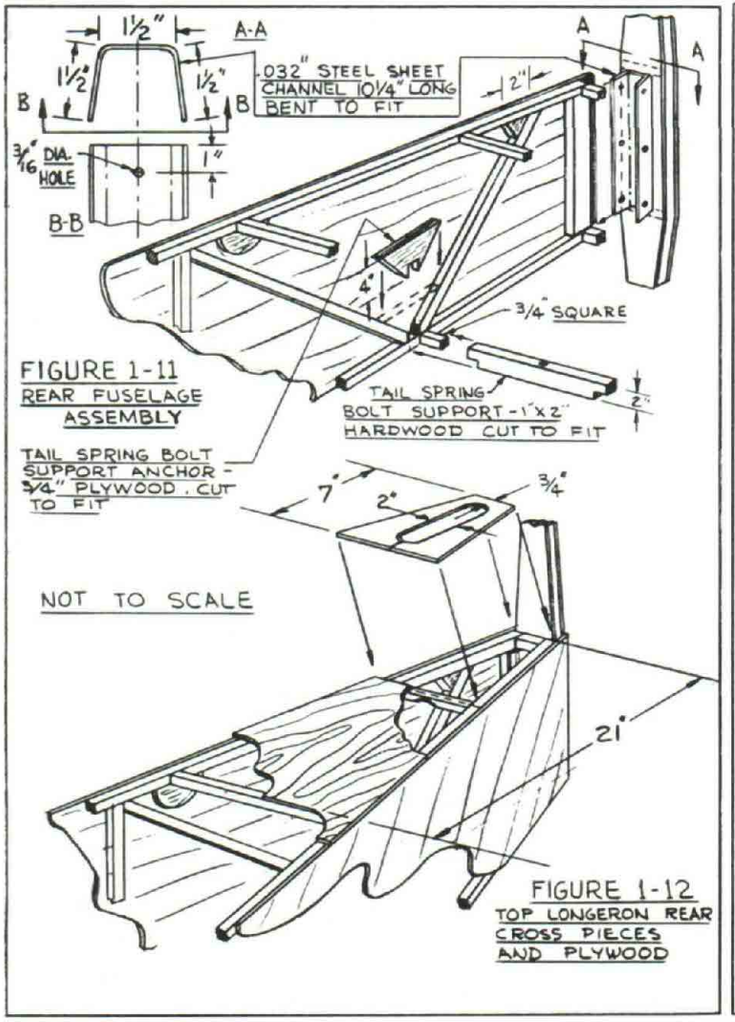

FIGURE 1-11
REAR FUSELAGE ASSEMBLY

FIGURE 1-12
TOP LONGERON REAR CROSS PIECES AND PLYWOOD

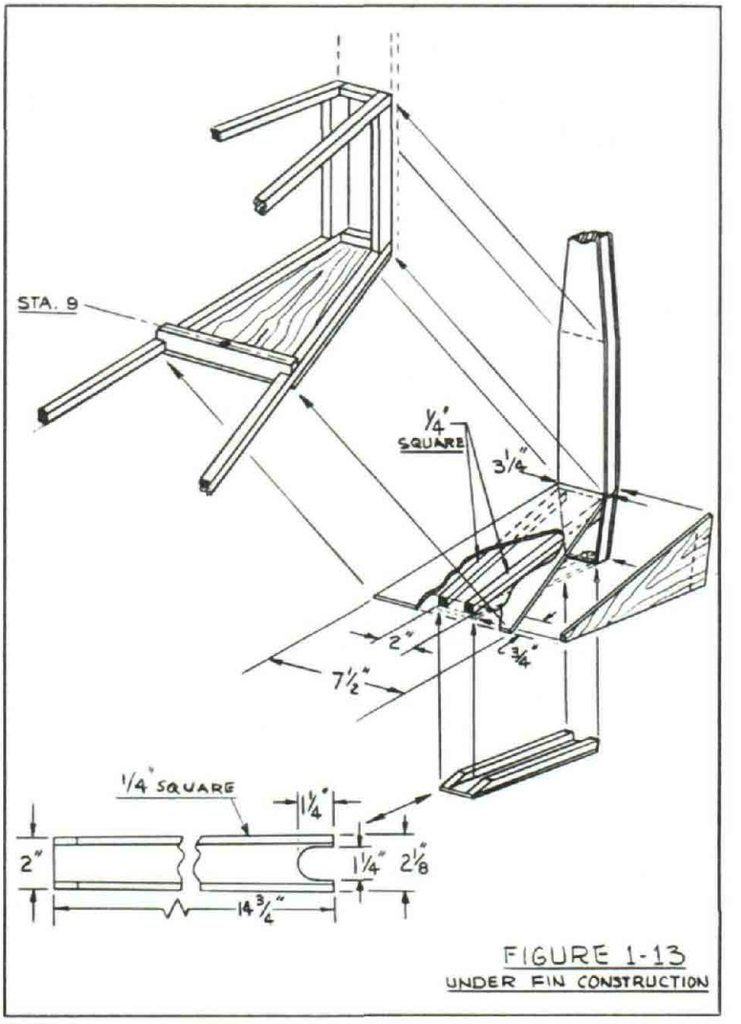

FIGURE 1-13
UNDER FIN CONSTRUCTION

FLY BABY . . .

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longeron curve. Note that the forward end of the lower longeron projects ahead of Station 1 so that it can be held by blocks. After laying down the top and bottom longeron, fit in the lower inner longeron per Fig. 1-1 and Detail "G" of Fig. 1-3. Coat the end with glue before installing. Next, install the uprights indicated by two sets of double blocks, again glue-coating the ends. This end gluing doesn't add to the strength, but it does seal the wood. The ¾ in. by 1½ in. uprights at Station 1 are hardwood, either maple, birch or oak. All others are spruce. With the uprights snugly in place, cut and fit the diagonals, most of which won't need holding blocks if cut to a tight, but not forced fit. Notice that the uprights at Station 6 are ⅛ in. THINNER than the others to take a plywood strip as detailed in "F" of Fig. 1-3. Do NOT install Station 11 upright now.

Cut a sheet of ⅛ in. plywood to extend from Station 6 to 3 in. past the tailpost, and bevel for a scarf splice per "F" of Fig. 1-3. Glue on the 1½ in. plywood backup strip, and slip a piece of ⅝ in. by ¾ in. under the plywood on each side of the upright to back up later nailing. After a trial fit of the plywood skin, apply Weldwood glue with a brush from Station 6 to the tailpost, then lay on the plywood and nail it at approximately 1-inch intervals with ½ in. No. 20 aircraft nails. Use the Fig. 1-3 nailing strip and wax paper at Station 6. As soon as that has been done, prepare the front half of the plywood skin and repeat after the nailing strip is pulled off. Remember that the scarf will be on the INSIDE of the plywood this time. This time use TWO nailing strips side-by-side at the splice. As soon as the second skin is nailed, the whole side can be lifted out of the blocks.

Start the second side the same way, but remember that it is the OPPOSITE side this time, so the plywood backup strip will go against the work board. Since the plywood skin can't be laid down under the frame, and the butt glue joints won't hold, cut small scraps of ⅛ in. plywood and nail onto each joint with one nail in each member driven in all the way. The whole gusset, nails and all, can easily be pulled off later. When the frame is all gusseted, lift it out of the blocks, turn it over, and then put on the plywood skin. Put a ⅛ in. plywood doubler on the inside of the triangle formed by the Station 9-10 diagonal and the tailpost, on the LEFT side of the fuselage only.

The fuselage sides are assembled by the method of Fig. 1-5, using spacer bars of Fig. 1-4. Stations 3 and 5 are built in place first by the cut-and-fit methods of Fig. 1-6 and the filler block details of Fig. 1-7. After these are in, build Station 4 in the same way and then add the fuselage diagonals and cross-pieces back to Station 8 shown in Figs. 1-8 and 1-9, using the two types of gussets shown in Fig. 1-4. Do NOT install Station 2 until after firewall of Station 1 is in. (Details next month).

Build rudder post from two sheets of plywood, ⅜ in. square spruce, and ¾ in. filler blocks as shown in Fig. 1-10, then bevel sides to fit fuselage taper at Station 11. Tack it in place temporarily, and bevel ¾ in. by 1½ in. uprights of Station 11 to a snug fit as in B-B of Fig. 1-2. The one on the left will be only ⅝ in. by 1½ in. because of the double skin. Mark the position of the uprights, remove the rudder post, and glue and clamp the uprights in place. When they have set, remove the clamps, then glue and clamp in the rudder post. Cut and fit the 1 in. by 2 in. hardwood piece at Station 9 per Fig. 1-11, and note that there is a ¾ in. sq. cross piece right behind it. Add the ¾ in. plywood triangles to each side as shown, and bend up the steel rudder post anchor of Fig. 1-11 before adding the two remaining top cross pieces and plywood of Fig. 1-12. The top 3/16 in. hole in the anchor is shown in B-B of Fig. 1-11, but the spacing of the side 3/16 in. holes is not critical.

The underfin is built of ⅛ in. plywood and ¼ in. cap strip per Fig. 1-13. After the cap strips are glued to the large piece of plywood, it is glued under the lower longerons between Station 9 and the rudder post. Build up the diagonal rib as shown, and bend to fit. The side triangles are then cut to fit and nailed and glued to the cap strips.

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(Photo by John Hopton)

What you might call a real rare antique, this old 1929 Junkers A-50 "Junior," sits begging for restoration down in Australia. Not to be outdone by the Americans, the antique airplane movement has been gaining in Australia, and this old-timer won't be left to the elements for very much longer. A two-place, open cockpit job, it was one of the earliest all-metal light aircraft. It is powered by an 80 hp Armstrong Siddeley "Genet Mk. II" engine, and cruises at 87 mph and tops out at 109 mph. Net weight is 770 lbs., gross weight is 1330 lbs., span is 32 ft. 10 in., and length is 23 ft. 6 in. Note the space between the cockpits. One other of this type still remains in operation in England.

New Bensen two-seat gyroglider trainer is designed especially for pilot training. Side by side arrangement permits the instructor to manipulate the stick through student's hand while teaching the maneuvers.