This will give you an idea of how big Onestep is, and how shiny the covering is! Author's grandson shows off the plane shortly after his first flight with it. All photos by the author.

A FEW YEARS AGO I was flying one of the popular kitted trainers, and at my insistence my brother-in-law took the box. He was doing quite well at first, and I turned away to brag about him just as the airplane went into a spiral dive. I was able to recover almost in time. There was little damage to the plane, but the damage done to my brother-in-law has not been so easy to repair. I did not want a repeat of this scenario with my grandson who is on the verge of becoming a modeler, so Onestep was born.

Onestep has been designed to be a gentle trainer, one that is stable and forgiving. With minimum throw of the rudder and elevator and half throttle of a sport .15, Onestep will not spiral dive as long as full up elevator is given. This means that the student has plenty of time to try "the

**A no-frills RC for a .15 engine and rudder-elevator-throttle controls, this model is so forgiving that it's not much of a worry to hand the controls to someone who has no stick time. Simple, straightforward,**

# ONES

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other left" without panic.

Response is slow but solid, and can be speeded up somewhat with more power and more throw of the control surfaces. Even with full throw loops and rolls are leisurely. Landings are almost automatic and quite slow. If the student forgets to flare, the glide angle and springy gear still makes him happy with the results. In fact, the airplane can take hard "landings" that would badly damage heavier machines.

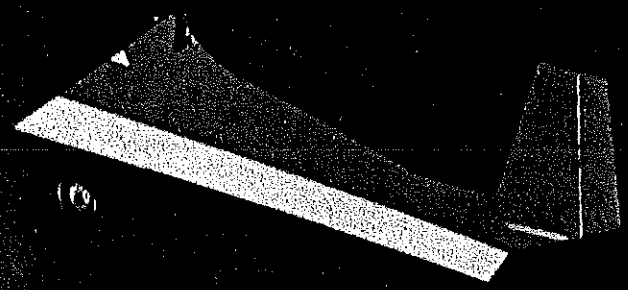
There is one disadvantage to a lightly loaded airplane like Onestep: wind. If it is blowing over 15 miles per hour, leave Onestep at home. It will nearly back up when landing in a strong wind, and that is very disconcerting to the student and expert alike.

I would recommend Onestep as a first project to scratch-build from plans. Although it is not a super-simple airplane to build, it is uncluttered and straightforward. The structure is quite light and strong and easy to align, and the whole thing builds rather rapidly. The photos show the easiest way to proceed through the construction and should clear up any questions that might arise. Remember to build light for best results.

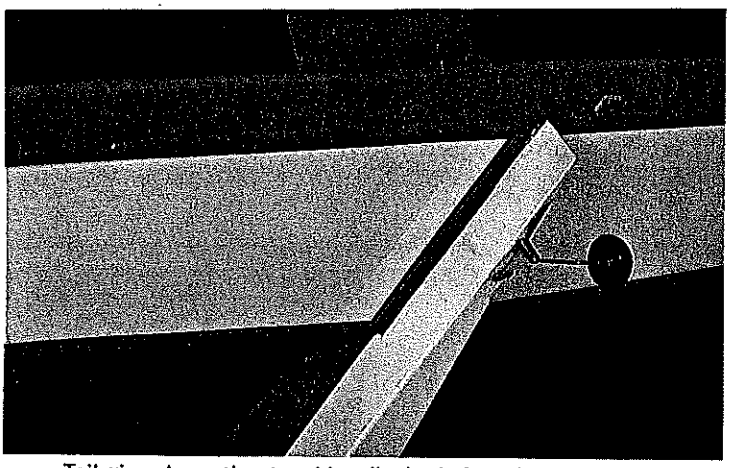
The wing. Trace the rib outline from the plan onto a piece of smooth card stock, like a file folder or stencil blank, and cut out the template. Use a metal straightedge to guide the knife along the straight parts and spar notches, and smooth the round parts with a sanding block until the template is an exact replica of the rib. Using a fine-tipped pen, trace around the template onto 1/16 medium sheet balsa. All the ribs can be cut from three sheets of 3 x 36 in. stock.

Cut out the ribs from your just-made "printed sheet," again using a metal straightedge as a guide for the straight parts. It is best to cut all the notches first, before the outline is cut. There is less danger of splitting the wood this way. Cut so that the grain of the wood tends to guide the knife away

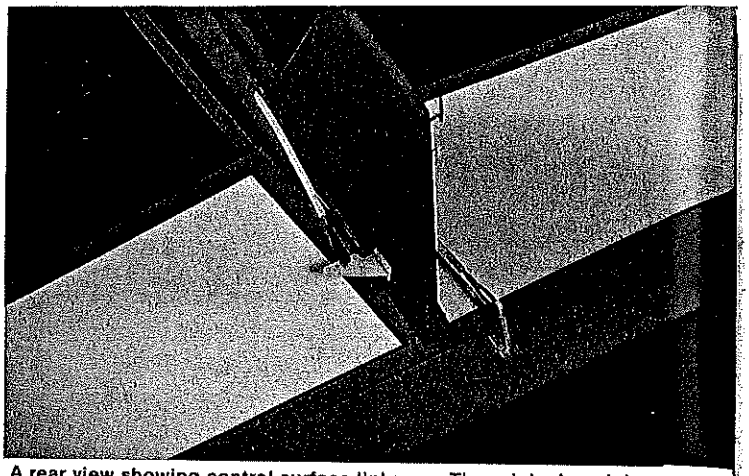
It just couldn't be easier to build and fly. Onestep's just right for an economical .15, and as sturdy as any trainer should be.



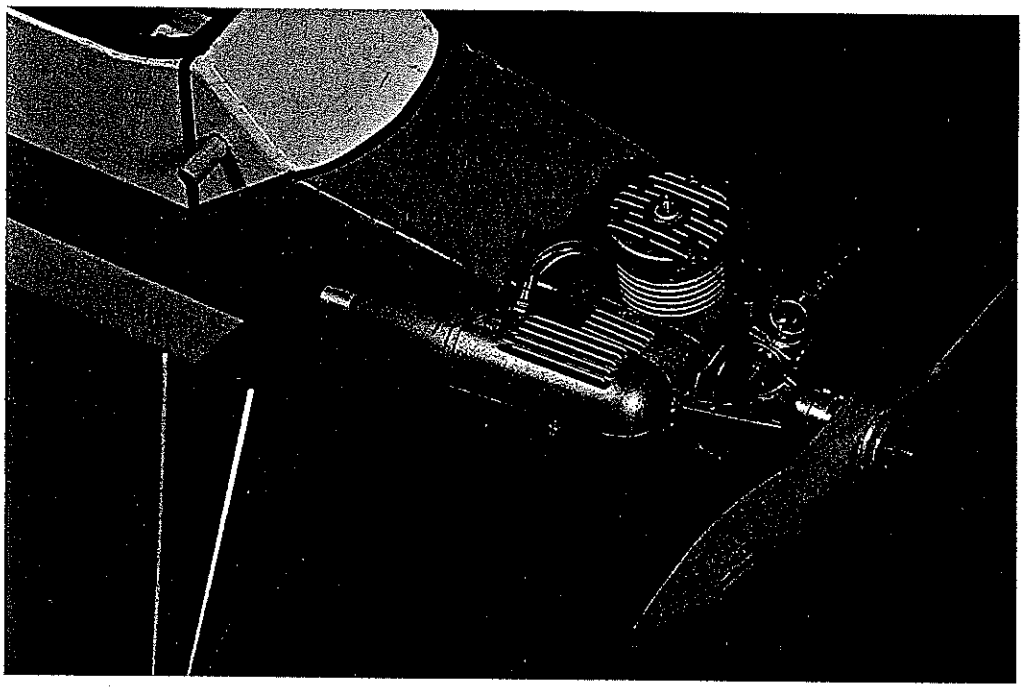
**and rugged, Onestep is great for cruising around on a lazy afternoon, for fun-fly competitions, or a first go at scratch-building . . . one's first step.■ L. F. Randolph**



Tail view shows the steerable tail wheel. A washer is soldered to the music wire to hold the wire in place against the nylon bracket. The wire extends up through the fuselage into the lower part of the rudder.



A rear view showing control surface linkages. The original model was hinged with MonoKote; see text for instructions.



The engine is easily cowled in, by adding balsa to the bottom and sanding it to shape. If you wish, leave off the cowl by cutting the fuselage even with the firewall—it won't hurt performance.

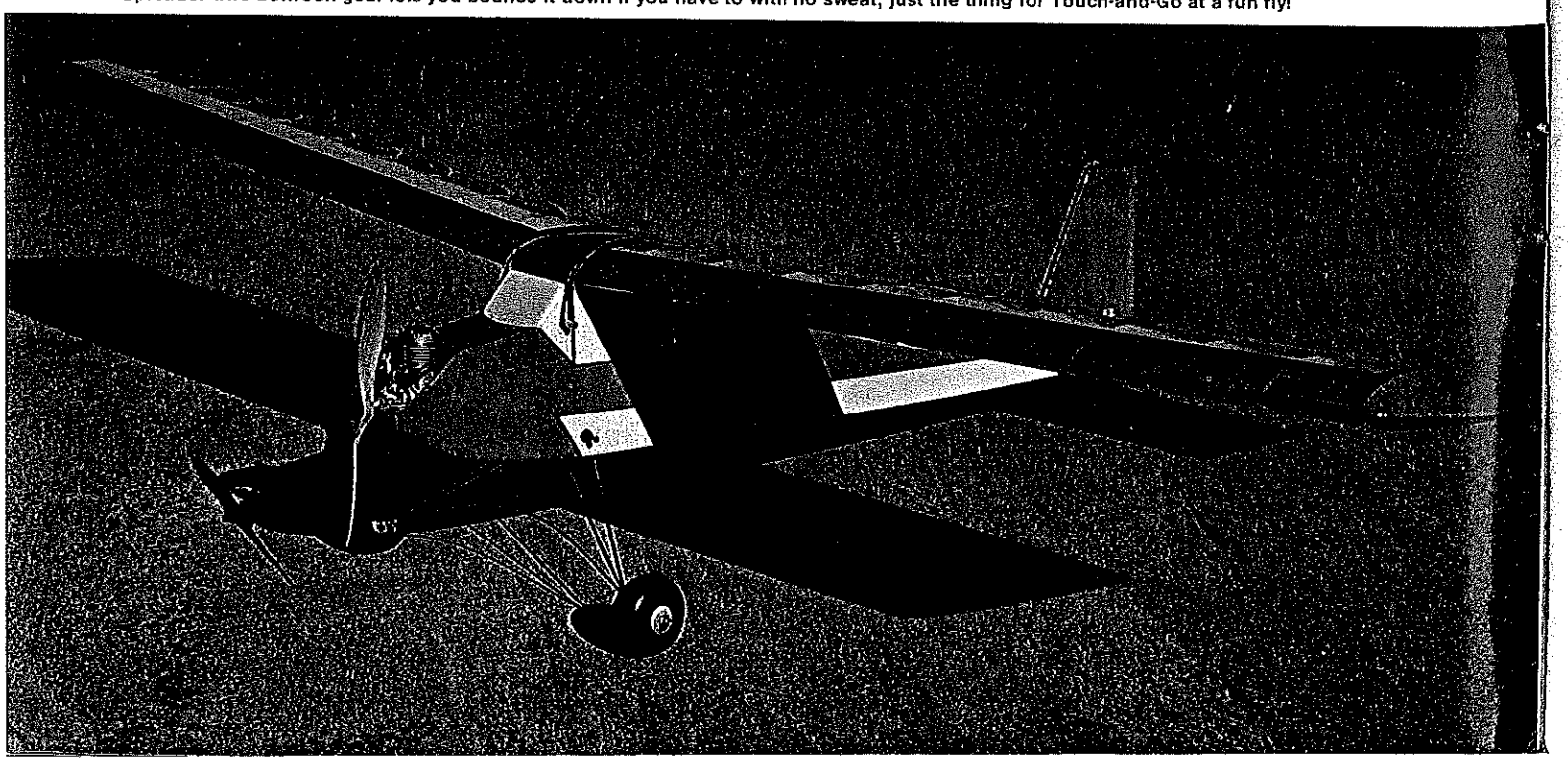
from the rib. When all the ribs are cut, stack them together on a flat surface with short pieces of spar material in the notches to hold them in alignment. Pin them together and sand them to the correct outline with a sanding block and 100-grit sandpaper. When the sanding is finished the ribs should look like they were cut with a bandsaw from a single block.

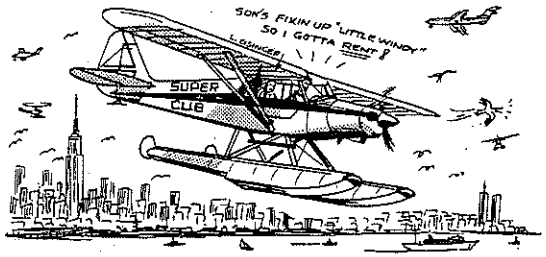
Select four ribs from the stack and slice 1/16 in. from the top and bottom of each. These are the ribs that will go in the center section of the wing. They are trimmed to make way for the sheeting that covers them. Slice 1/16 in. from both sides of the main spar notches of these ribs to accept the dihedral braces, which will strengthen the center section joint.

Cut the dihedral braces for the main spars and the trailing edge from 1/16 plywood. A metal straightedge and a utility knife make this a relatively easy job. Cut with repetitive light strokes. Cut the trailing edge sheet from firm 1/16 sheet balsa and the spars and leading edge from ¼ in. These can best be stripped with a metal straightedge and a sharp model knife. Use care to hold the knife at exactly a right angle to the sheet so the edges of the strips will be true.

Make a jig as shown in the photos to cut the webs. The main spar webs are 2-15/16 x ½ in.,

Onestep all ready to go. The wheels are ahead of the center of gravity, even with the leading edge of the wing, to simplify tail-dragger landings. Spreader wire between gear lets you bounce it down if you have to with no sweat; just the thing for Touch-and-Go at a fun fly!






1/4" SQ. L.EDGE AND RIBS

1/4" SHEET BALSA RUDDER - STABILIZER

1/4" X 1/2" FIN FRAMES

3/16" SQ. BALSA LONGERONS AND FRAMING

1/4" BALSA DORSAL

1/16" SHEET BALSA CENTER SECTION ONLY

NYROD GUIDES OUT FUSELAGE TOP

3/16" X 1/2" BALSA WING SADDLE

1/4" SHEET BALSA STAB. CENTER PLATFORM

1/16" BALSA WEBS OUT TO 6 TH. RIB

1/16" PLYWOOD BRACE AT SPAR TOPS - BOTTOM FRONT AND REAR

1/16" PLY BRACE AT T.E.

1/16" SHEET BALSA TOP AND BOTTOM

1/4" X 1/2" L.EDGE-TIP - SPAR

1/4" DOWELS

1" WHEEL ON 1/16" WIRE THRU BRACKET INTO RUDDER

1/8" BALSA COWLING

1/8" BALSA SHEET SIDES NOSE TO TAIL

1/4" PLYWOOD FIREWALL

.15 ENGINE

1/16" SHEET T.E. TOP AND BOTTOM WITH WEBS

1/8" SHEET BALSA TIPS

F 3 1/8" SHEET BALSA FORMER

3/16" X 1/2" BALSA SUPPORT FOR SERVO TRAY

1/16" SHEET BALSA RIBS ALL EQUAL

1/16" PLYWOOD DOUBLER TO FIREWALL

1/4" X 1/2" BALSA SPARS TOP AND BOTTOM

F-2 1/8" PLYWOOD FORMER

1/4" SQ. BALSA L.E. SPARS TOP AND BOTTOM

1/8" PLYWOOD DOUBLED FOR L.G. MOUNT

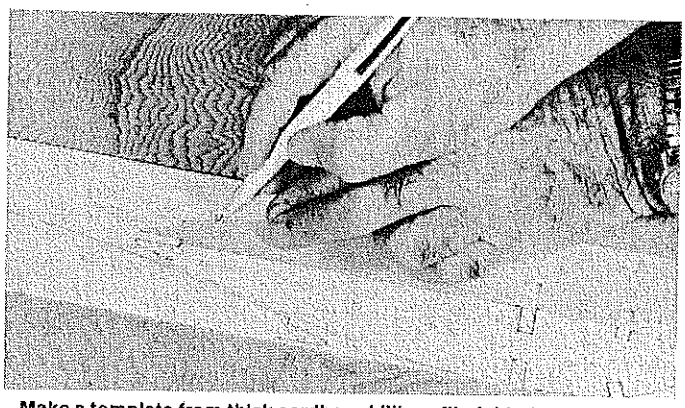
1/4" SQ. LEADING EDGE HARD BALSA

1/4" SHEET FORMER

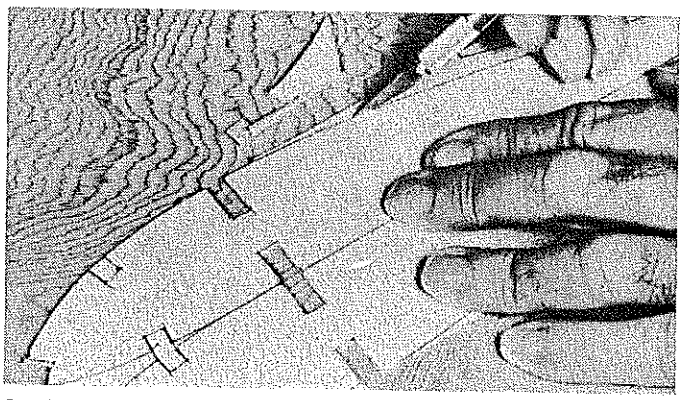
SOFT BALSA BLOCKS

1/16" M. WIRE SPREADER

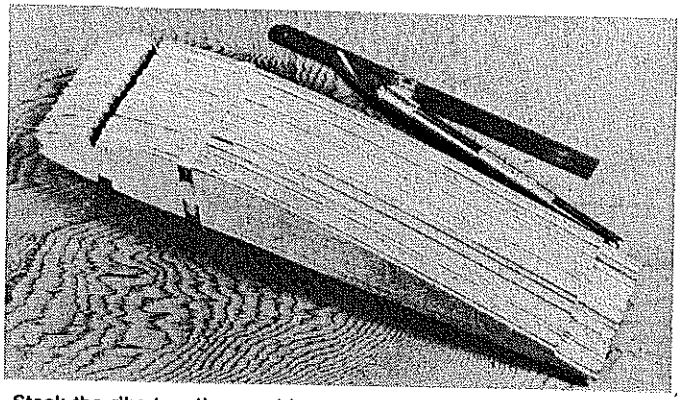
2 1/2" WHEELS ON 3/32" MUSIC WIRE GEAR



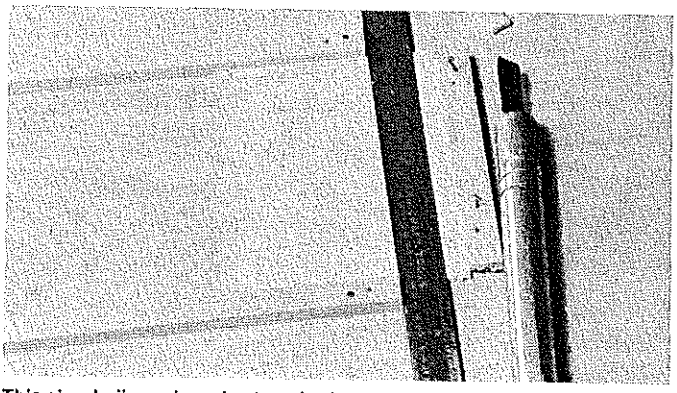
Make a template from thick cardboard (like a file folder), and use a fine point marker to make a "printed sheet" of wing ribs.



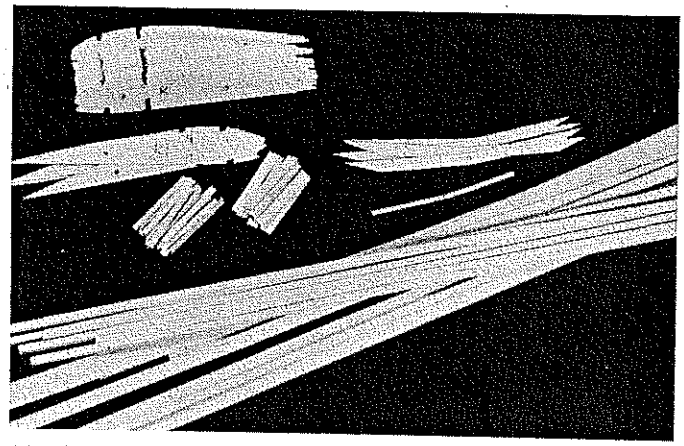
Cut the notches for the spars first, before the rest of the rib. This helps keep you from splitting the wood as you go.



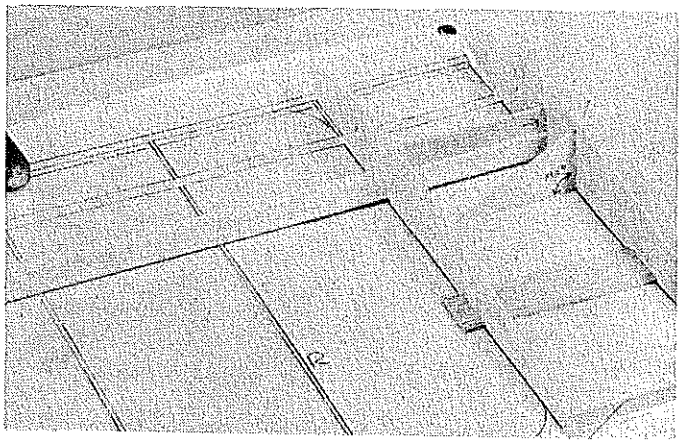
Stack the ribs together, and insert two pieces of spar stock (top and bottom) to hold them in place. Sand the stack until all ribs are smooth.



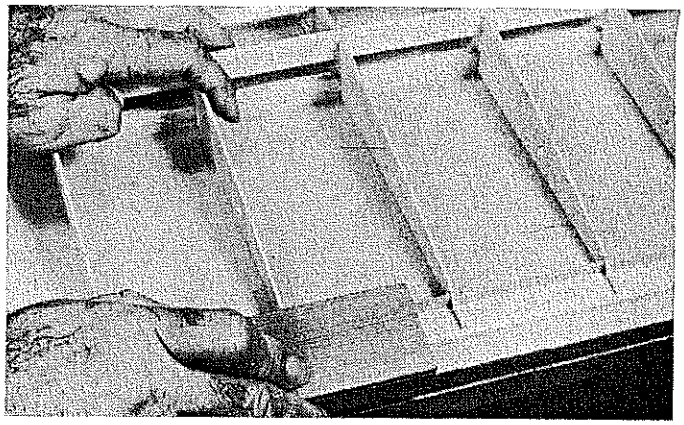
This simple jig makes short work of cutting the spar webs. Side pieces hold the sheet straight; metal straightedge is cutting surface.



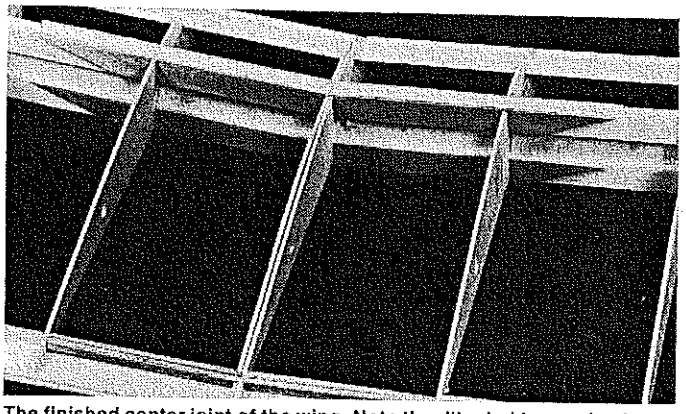
The finished "wing kit." All parts are cut and sanded to shape before beginning construction of the wing. It's easier that way.



Cut a dihedral angle gauge from cardboard or thin plywood (see plans), and use it to set the center ribs at the proper angle.



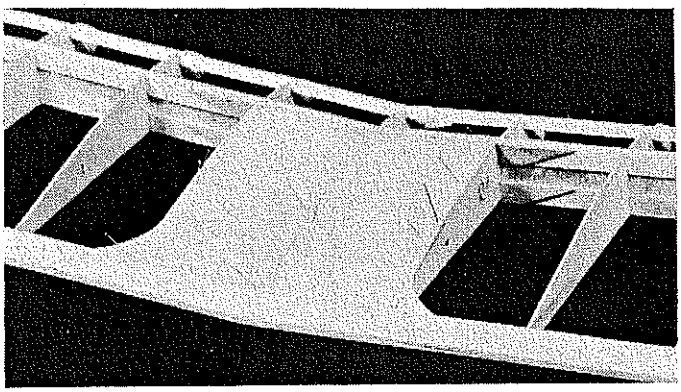
Bevel the trailing edge to allow the top sheeting to fit smoothly.



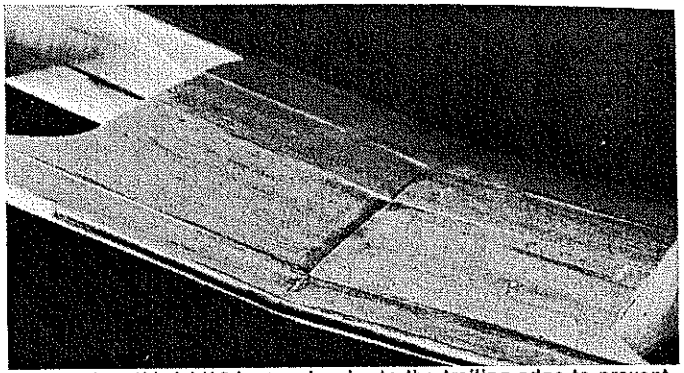
The finished center joint of the wing. Note the dihedral braces in place on either side of each main spar (top and bottom) and the trailing edge.

and the trailing edge webs 2-15/16 x ¼ in. Note that the grain is vertical to the longest dimension. Make a dihedral angle gauge from cardboard as shown on the plans. This is used to set the angle of the center rib so the two wing panels can be joined at the proper dihedral angle. The wing is now ready to be assembled.

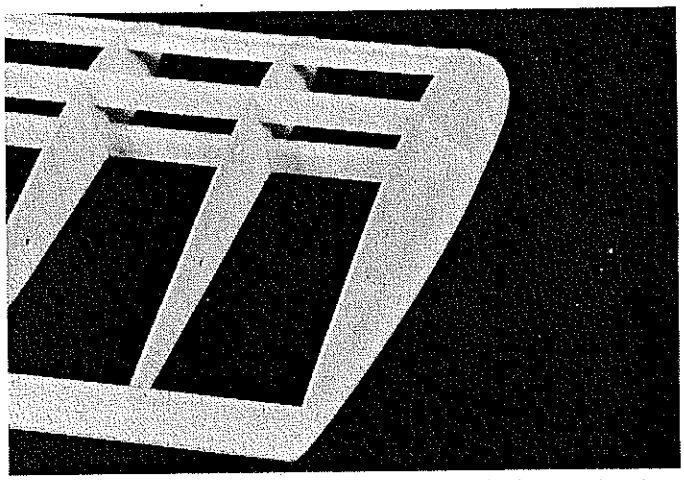
A flat building board is an absolute necessity. It should be 36 in. long and at least 12 in. wide, and of a material that will hold pins firmly. Plywood of ¾-in. thickness works well. Pin the plans to the work board, and cover them with



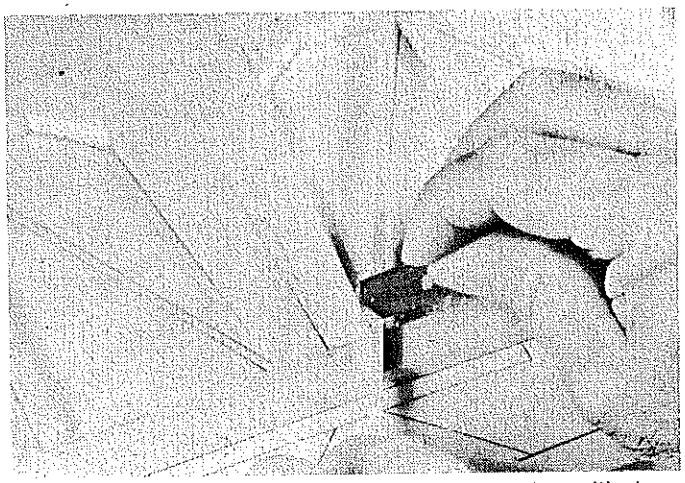
Top trailing edge sheeting in place. Note that it fits behind the spar.



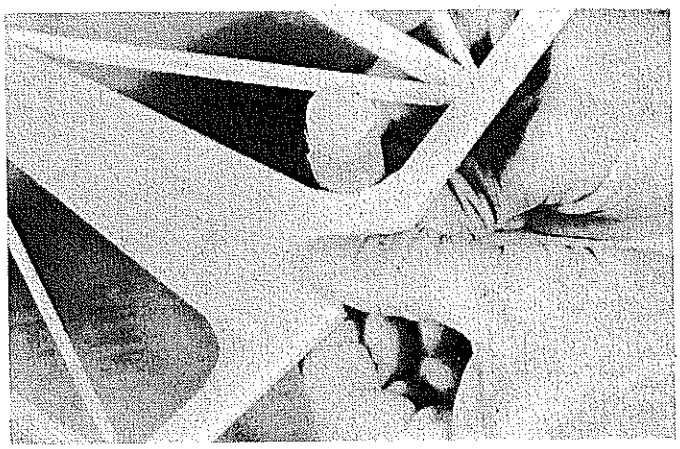
Epoxy a length of 1/16-in. music wire to the trailing edge to prevent crushing the wood with the rubberband wing hold-downs.



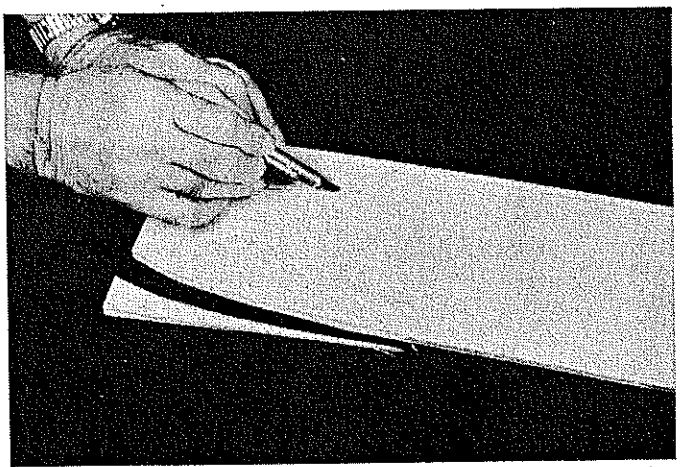
Add gussets to wing tip pieces, and sand a curve in them so that they don't make contact with the iron-on covering.



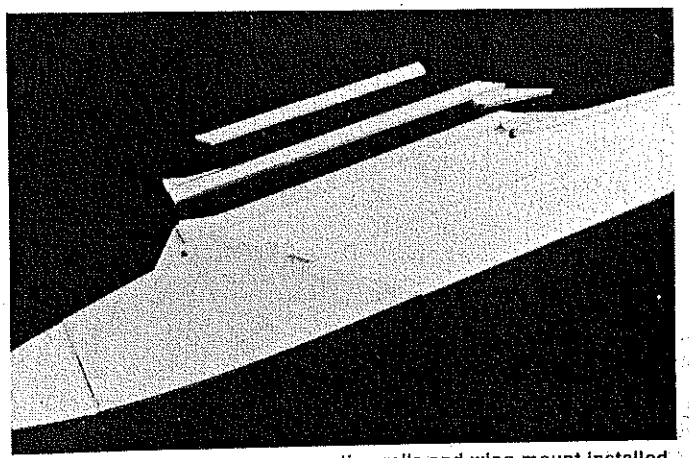
Build the rudder and stabilizer over the plans. Cover plans with clear plastic wrap or wax paper to prevent gluing parts to them.



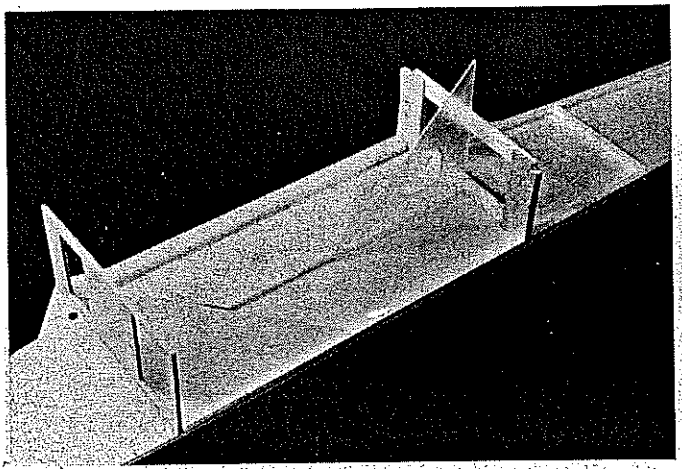
Wrap medium grade sandpaper around a ½-in. dowel, and sand all gussets.



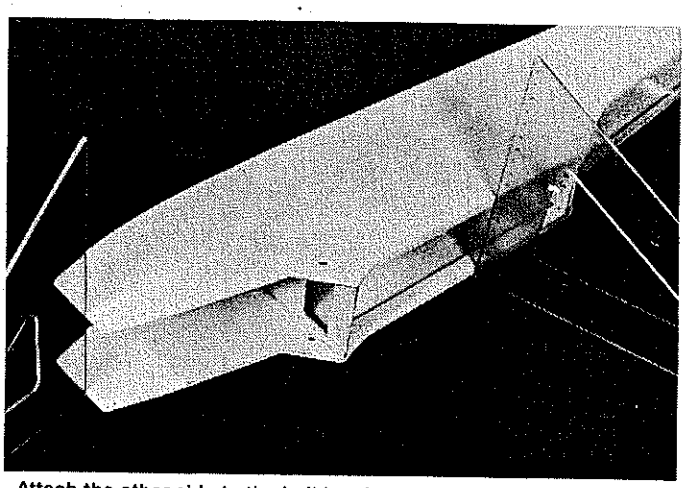
Cut out both fuselage sides at the same time. Pin together and sand.



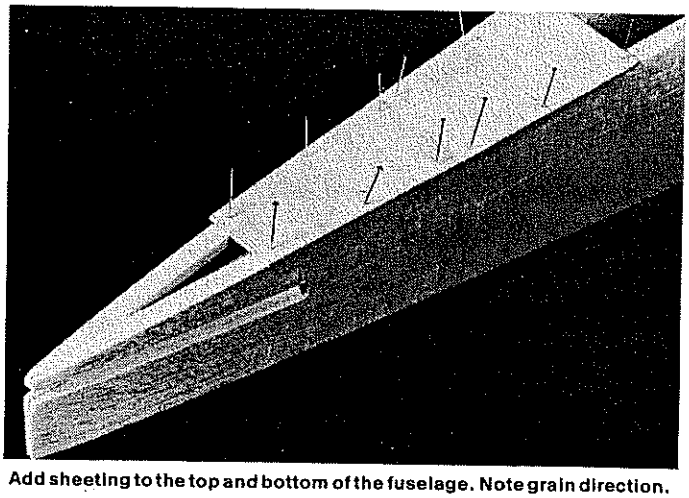
The plywood doubler, servo mounting rails and wing mount installed. Note that wing mount and rails are trimmed to fit over the doubler.



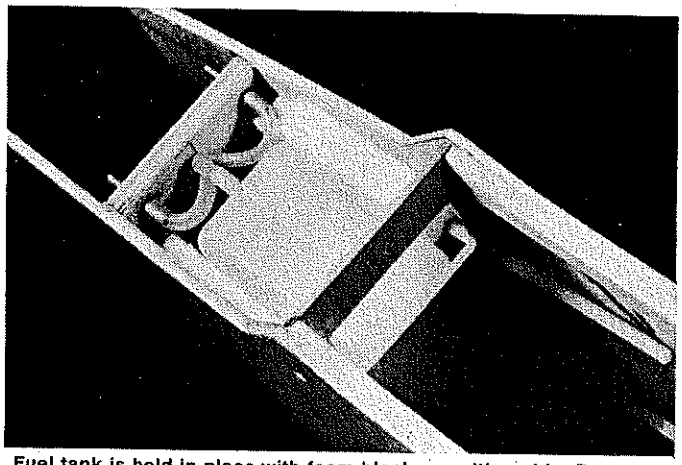
Glue bulkheads to one fuselage side; use a triangle to assure squareness.



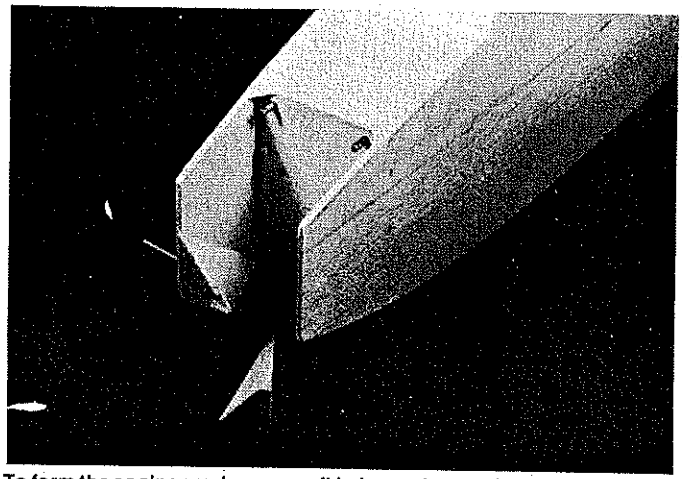
Attach the other side to the bulkheads, checking alignment carefully.



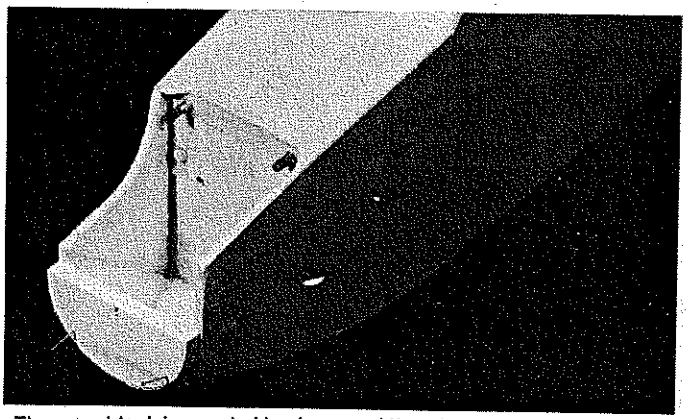
Add sheeting to the top and bottom of the fuselage. Note grain direction.



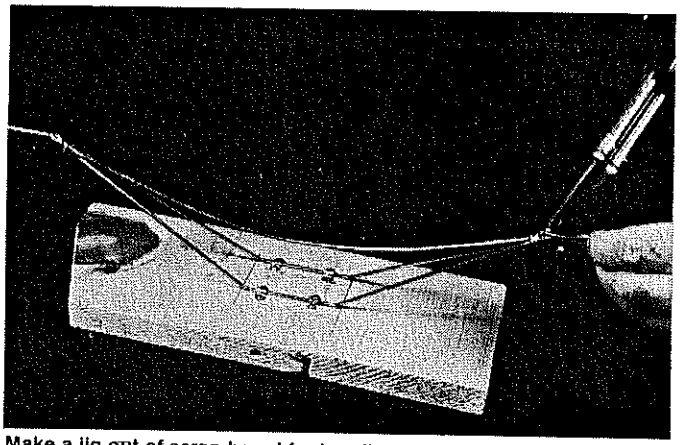
Fuel tank is held in place with foam blocks on either side. Be sure to install the fuel lines so that they do not kink.



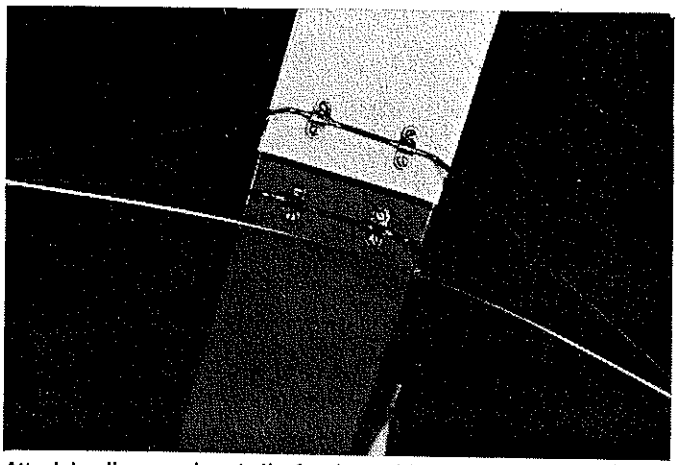
To form the engine cowl, epoxy soft balsa wedges to the fuselage sides.



The nose block is epoxied in place, and the whole front end is trimmed and sanded to shape to fit the engine installation.



Make a jig out of scrap board for bending and soldering landing gear.



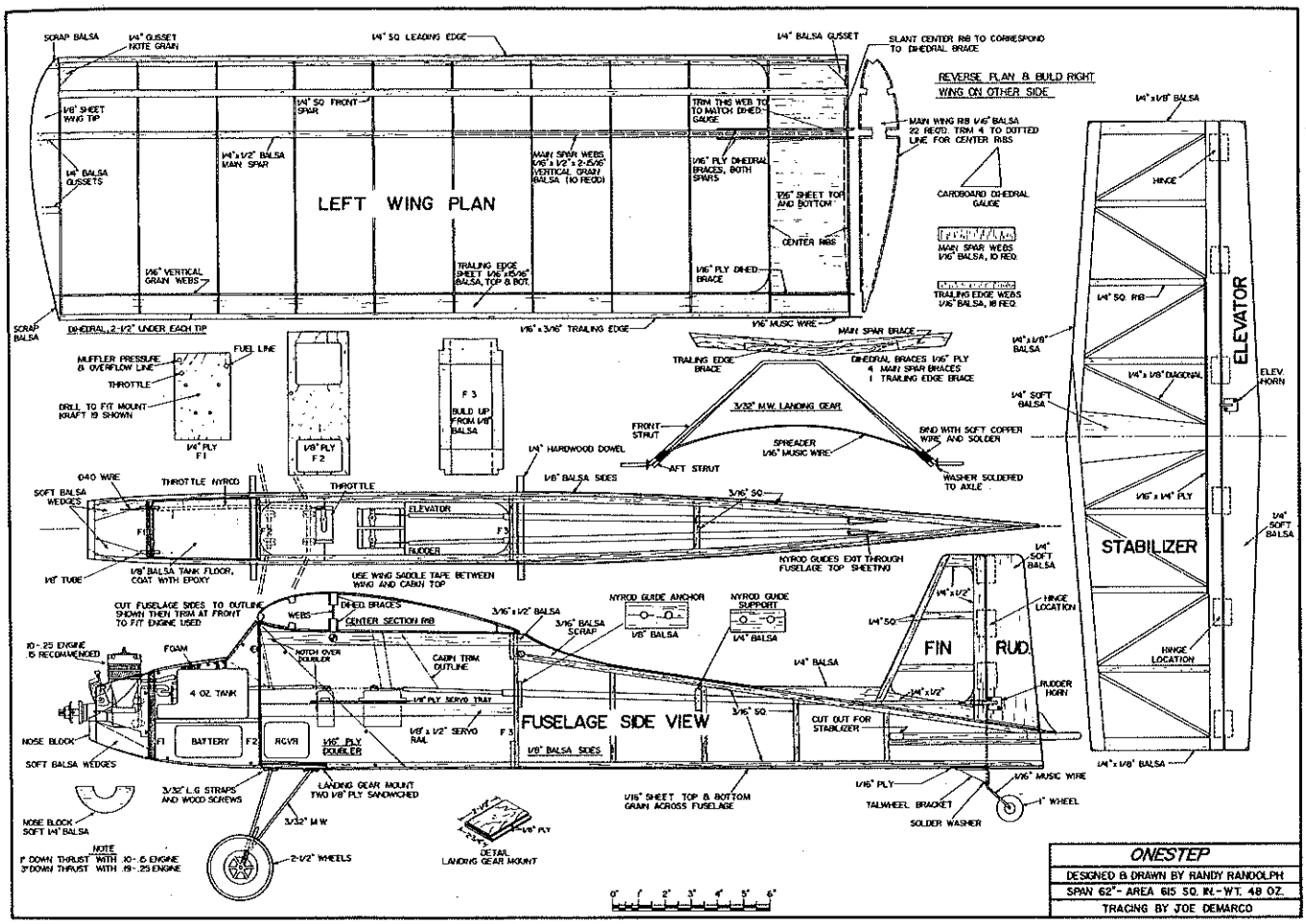
Attach landing gear legs to the fuselage with straps as shown on plans.

wax paper or plastic from a dry cleaner bag to protect them from the glue. Pin the bottom trailing edge sheet and the bottom main spar over the plan. Pin a piece of scrap 1/16 balsa as a shim under the two center ribs. This will hold them off the board and allow room for the center sheeting.

Using the dihedral gauge as a guide, trim the ends of two main spar webs and two trailing edge webs to the dihedral angle. Temporarily place some scrap 1/16 balsa on both sides of the main spar at the center to take the place of the dihedral braces, and install the center rib. Use the dihedral gauge to set it at the proper angle. Glue it only to the top of the spar and the bottom trailing edge sheeting. Glue one of the trimmed spar webs and one of the trailing edge webs in place next to the center rib. Add the next center section rib, glue it to the top of the main spar as well as the webs and trailing edge sheeting.

Install more webs and the first regular rib. The dihedral braces do not extend as far as the top of the main spar. Continue adding ribs and webs out to the tip. The spar webs extend only part way out, but the trailing edge webs go all the way to the tip.

When all the ribs are glued in place, add the top main spar. Be sure to glue it to the webs as




well as the ribs. Add the top front spar. Glue the 1/16 x 3/32 in. trailing edge to the bottom sheeting and the back of the ribs. Do not add the top trailing edge sheeting at this time. When the glue has set, remove the wing half from the plan and add the bottom spar and the leading edge. Build the other wing half in the same sequence, from root to tip.

When both sections of the wing are finished, use a sanding block to bevel the trailing edge to match the slope of the ribs so the top sheeting will fit smoothly. Trim a 1/16-in. notch in the trailing edges of both center ribs, one on each panel, to accept the 1/16 plywood trailing edge brace.

Remove the shims from the spar notches in the center ribs and insert the 1/16 plywood main spar dihedral braces. They should fit smoothly into place on both wings. Use a sanding block to sand the spars, leading edge and trailing edges of both wings to match the angle of the center rib. Place one panel flat on the bench, and elevate the other panel five inches at the tip.

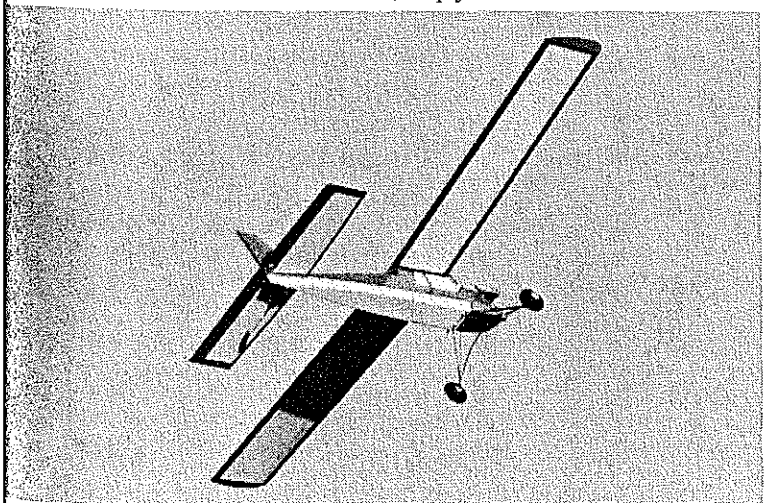
The two panels should fit together perfectly.

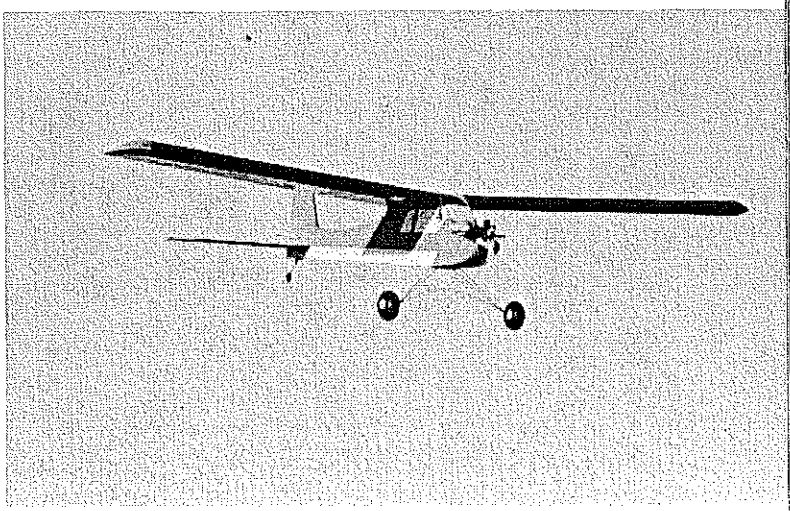
Join the two panels with the dihedral braces at the main spars and at the trailing edges. Clothespins provide good gluing pressure for the spar braces, and are handy for holding things in alignment until the glue sets. Before everything sets check alignment: one panel flat on the bench, the other tip five inches above the board, at the main spar tip as well as the trailing edge tip.

Glue the top trailing edge sheet in place, and add gussets at the center and tip ribs. Sheet the top and bottom of the center section. Note that the sheeting goes between the spars. Cut the tips from soft ⅛ sheet, and glue them in place with gussets at the spar locations and scrap wood at the leading and trailing edges. Dress the leading edge and the tips with 100-grit sandpaper on a sanding block. Even up the trailing edge. Sand the complete wing with fine sandpaper, then epoxy the 1/16-in. music wire at the center. The wing is now ready to cover.

**The fuselage.** The fuselage sides are cut from two sheets of ⅛ in. balsa 6 in. wide and 36 in. long. These sheets can be made by edge-

*Continued on page 107*





**Low fly-by shows off this pert little bird to its best advantage. Tail-draggers have charm, and there's one less linkage when you don't have a steerable nosewheel. Add hands-off stability and solid construction, and you'll see why we like Onestep for training purposes.**

## Onestep/Randolph

*Continued from page 27*

glueing 3-in. stock to form the wider sheets if you can't find any this size. Trace the side view of the fuselage onto one of the sheets. Hold both sheets together with masking tape, and cut both fuselage sides at the same time. Use the fuselage sides as a template to cut the 1/16 plywood doublers. One sheet of 6 x 12 in. ply should provide both doublers. A sharp knife should cut the 1/16 plywood with ease.

Epoxy the doublers in place on the fuselage sides, one left and one right. (Epoxy has less tendency to warp the sides.) Glue in the longerons and uprights. Where they overlap the doublers, trim away 1/16 in. so they will fit smoothly over them. When the glue has cured, place the two sides back-to-back with the plywood-longeron sides out, and sand the edges of both until they are the same.

Cut the firewall, F1, from ¼-in. plywood. Cut the bulkhead F2 from ⅛-in. plywood. Build up the balsa bulkhead F3 from ¼-in. stock. Mark and drill all holes in the firewall for the engine mount, fuel and overflow lines, and the throttle line. Install the blind nuts on the aft side to receive the engine mount bolts. Epoxy them in place.

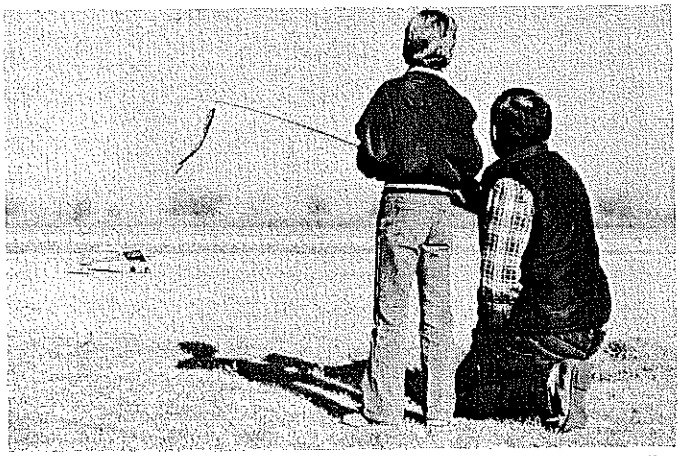
Glue the fuselage bulkheads F2 and F3 in position on one of the sides. Use a triangle to align them at right angles to the side. When the glue has set, glue the other side directly over the first. Bevel the inside of the longerons at the tail so they fit together when both sides are joined, then glue them. Use a straightedge across the stab cutout for squareness. Bring the sides together at the firewall, and epoxy it in place *on* the plywood doubler. Sight down the fuselage to check alignment.

Glue a 3-in. piece of 1/16 balsa with the grain running across the fuselage just in front of the stab cutout on top of the fuselage. Install the outer Nyrods for the elevator and rudder. Use epoxy and microballoons. Install the rest of the top and bottom sheeting aft of F3. The top sheeting just aft of this bulkhead is filled in with scrap wood and trimmed and sanded to conform to the dihedral angle of the wing.

Install a ⅛ balsa floor under the tank location, and spread epoxy in the tank area to protect it from any fuel spill. Install the Nyrod from the firewall to the cabin area for the throttle line.

*Continued on page 112*

Eddie Williams briefs Jon Smothers (the author's grandson) just before Jon's first flight. Onestep is a perfect trainer—it won't spiral dive.



Eddie coaches Jon through his first takeoff as Onestep raises its tail.

Glue the ⅛-in. copper tube for the fuel and overflow lines through the firewall. Cut wedges of foam to fit between the tank and the fuselage sides, and glue them in place. The tank should be a snug fit between the foam, the firewall and bulkhead F2. Connect fuel and overflow lines to the tank and firewall tubes, then complete the top sheeting from the firewall to the wing mount. Put a wedge of foam over the tank during the sheeting to hold it firmly in place.

The fuselage sides can be cut off in front of the firewall if a fully exposed engine is desired. Little or no difference in flying will be noted. If a cowl is desired, cut wedges of soft balsa, and epoxy them to the bottom of the fuselage sides in front of the firewall. When the glue has set, use a sanding block to sand these wedges flush with the sides, then sheet the bottom with soft ⅛ balsa sheet from the front of the cowl to the firewall.

Temporarily install the engine mount and engine on the firewall. Slip a 2½-in. paper disk on the shaft, and trace around it with a soft pencil to mark its location on the front of the cowl. Cut a semi-circle of ¼-in. soft balsa 2⅛ in. in diameter. Epoxy this nose block in the location marked on the front of the cowl.

When the glue has set, mount a 2-in. spinner on the engine. With coarse sandpaper, sand the cowl front to conform to the spinner. Trim the cowl sides to clear the muffler and give access to the needle valve and lines for fuel and throttle. Sand the cowl sides smoothly into the spinner. Make a sandwich of ⅛ plywood for the landing gear mount as shown on the plans. Glue it in place, then complete the bottom sheeting with 1/16 balsa aft of the landing gear mount.

**The tail.** Build the stab and rudder right over the plans—just as the wing was assembled. Do not forget the 1/32 plywood doubler; it adds little weight and much strength. The movable parts are cut from very soft wood and sanded to conform to the outline of the mating surfaces. They will be hinged in place when the covering is applied. Sand the complete airframe with fine sandpaper, and the airplane is ready to cover.

**Covering.** The covering can by any one of the commercially available iron-on coverings. Follow the instructions that come with the covering. When covering the fuselage, the bottom should be covered first, then the sides, and finally the top. Overlap the covering into the engine area, and then paint the firewall, the inside of the cowl, and the seams around the cowl with matching epoxy paint or glue to seal these areas from fuel. The pinstripes between the trim areas are sliced from black film and ironed in place. This seems to stay in place better for me than trim tapes.

**The landing gear.** Scribe two parallel lines 2 in. apart on a piece of scrap board. This will be the jig for assembling the gear. Bend the two landing gear legs from 3/32-in. music wire. Attach the legs across from each other along the lines on the jig board with clips and screws, just as they will be mounted on the fuselage.

Bend the spreader from 1/16-in. music wire. Bind the joints formed by the two legs and the spreader on each side with soft copper wire and solder. Slip a piece of ⅛-in. brass tube over each axle and solder a washer and the tubing to the axles. Slip the wheels on the axles, and hold them in place with ⅛-in. collars. Check alignment, then solder or epoxy the clips to the legs, and remove them from the jig board. Hold the gear in place on the fuselage, and mark the location of the screw holes on the gear mount. Drill 1/16-in. holes at these spots, and install the gear.

Trim the covering away from the top of the fuselage where the fin will be attached and from the center section of the stab where it goes through the fuselage. Hinge the elevator to the stab, and epoxy the fin and stab in place.

Bend the tail gear from 1/16-in. music wire. The top part that goes into the rudder is not bent until after the gear is mounted. Solder the washer in place as shown. Screw and epoxy the gear mount in place. Mount the wheel. Slide the gear through the mount, fuselage and stab, then bend the arm and epoxy it in place as the rudder is hinged to the fin. The wheel should move with the rudder and be in line with it.

**Completion.** Attach the engine mount to the firewall, then mount the engine. Install the radio gear by wrapping the battery pack with foam, sealing it in a plastic bag, and slide it up under the tank as shown in the plans. Mount the servos on the plywood tray. Move the servos and the receiver forward and backward in the cabin until the airplane balances at the location shown. Glue the servo tray in place on the rails. Wrap the receiver with foam to hold it in place. Install the rudder and elevator horns in the locations shown, and connect them to the servos with Nyrods, threaded studs and clevises. All surfaces should be at neutral.

The throttle line is florist wire run through the guide, with a Z-bend attaching it to the throttle arm as well as the servo. Bend a ½-in. U-shape in the line between the firewall and the throttle arm for adjustment and strain relief. Epoxy the ¼-in. dowel wing hold-downs in place. The airplane is ready to fly.

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**Flying.** As in all new installations, range check the radio—and check the movement and direction of the surfaces with the engine running. When everything is working perfectly, it's time for the test flight, or trim flight, as I prefer to call it.

Onestep handles very well on the ground. As with all conventional-gear airplanes, downwind turns are difficult. Tracking on takeoff is excellent into the wind, and lift-off is rather rapid because of the light wing loading. Be ready for it. With a .15 at full throttle, climb-out is at about a 45° angle to the ground. Half throttle provides the best cruise. If the outermost holes in the rudder and elevator horns are used, the control response is quite gentle, and the classic vertical spiral dive must be done deliberately by holding down elevator. Landings are quite slow with the application of back stick.

By increasing the throw of the control surfaces, rolls and snaps may be done. Inverted flight is possible, but requires lots of forward stick. As well as being a solid, stable trainer, Onestep will hold its own in fun flys. It can be bounced in for precision landings, will loop very tightly, and if need be, it can carry more than its own weight of payload.

This model is a good first step.

## Schneider Races/Berliner

*Continued from page 35*

the obviously-faster Passaleva and his S.51 took off just after Biard had finished lap one, expecting to blast the Englishman out of the race. But the soaking the Savoia had received when it capsized in trials had affected the glue in its propeller, and the wooden laminations began to separate. Passaleva was forced to throttle back to keep the vibration at a manageable level. His prop somehow hung together for more than 1½ hours, but he finished almost two minutes behind the winner, Biard. The other Italians were well back, as Biard averaged a record 145.7 mph, Passaleva 142.6 mph, Zanetti 133 mph and Corgnolino 124 mph. But the progress stimulated by the increasingly competitive and prestigious Schneider Trophy had pushed all four finishers to speeds higher than the existing record, set just a year before.

The next race—the seventh in the series—would be held at Cowes, England, in the autumn of 1923. It would see the first serious entry from the United States, and the end of the era in which standard or modified production seaplanes would dominate. From then on, the Schneider would be a race for racing aircraft.

It would also be the second half of the story which would stick in the memories of aviation enthusiasts throughout the world, because it was those races which brought into the spotlight some of the most exciting pure-speed aircraft that would ever be seen.

## RC Aerobatics/Van Putte

*Continued from page 37*

to maintain Knife-Edge when the airplane was rolled 90° clockwise, but that didn't happen. Surprisingly, a bit more right rudder is required on the last point of a Four-Point Roll than before.

Does the pipe cause more fuel to be consumed? Definitely. My Supertigre G-60 used to burn about 10 oz. of fuel in a complete Expert class Pattern flight; now it goes through about 14 oz. That computes to about nine Pattern flights per gallon of fuel. It's a good thing I make my own fuel.

The bottom line is: I don't like the looks or the fuel consumption of a piped engine, but do like the way it makes the Expert pattern easier to do well. I still don't think that the benefits warrant the use of a tuned pipe in the Novice or Advanced classes.

**At the flying field** yesterday, I was asked for advice by an experienced flier. His problem was so easy to solve that I began to wonder if there weren't a few more experienced fliers out there who had the same difficulty, not to mention all the beginners to RC flying. What was the problem? He couldn't keep the airplane from bouncing unless he performed a perfect landing. He had two things wrong with the landing gear setup, and either one of them would have caused bouncy landings.

First, the airplane sat nose-high on the landing gear. This type of setup guarantees difficulty in landings, because the wing is at a positive angle of attack, and lift will be generated as long as the airplane is moving. This means that the airplane will attempt to take off again if it's landed "hot." The higher the angle at which the airplane sits, the slower the speed at which it will try to take off again. The best way to eliminate this problem is to set up the airplane so that the fuselage sits parallel to the runway or *slightly* nose-down. If the nose is slightly down, lift is killed as the airplane rotates onto the nose gear, and the model tends to stick to the runway. However, excessive nose-down attitude will cause the airplane to be impossible to take off smoothly, since it will be difficult to rotate the nose up until the model is moving very fast. If the airplane looks like a hound on the scent, landings may be easy, but the takeoffs will be very abrupt.

The second problem the flier had was that he angled the main gear struts back because he liked the look of them that way. Unfortunately, when the gear struts are angled back, the airplane tends to "squat" on landing, because the vertical load of landing causes the strut to bend further back and up. If the nose gear doesn't do the same

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