LEFT: QSAA Secretary, Pat Bunker, presents the RCM Best of Show Trophy to Bruce Lund for his detailed Curtiss Junior at the Second Annual Las Vegas Quarter Scale Fly-In last October. BELOW: Photo taken in about 1934 of a Curtiss Junior with Bruce Lund on his mother's lap at age 2.

Get off the beaten path with this quarter scale, 118½ inch model that has personality!

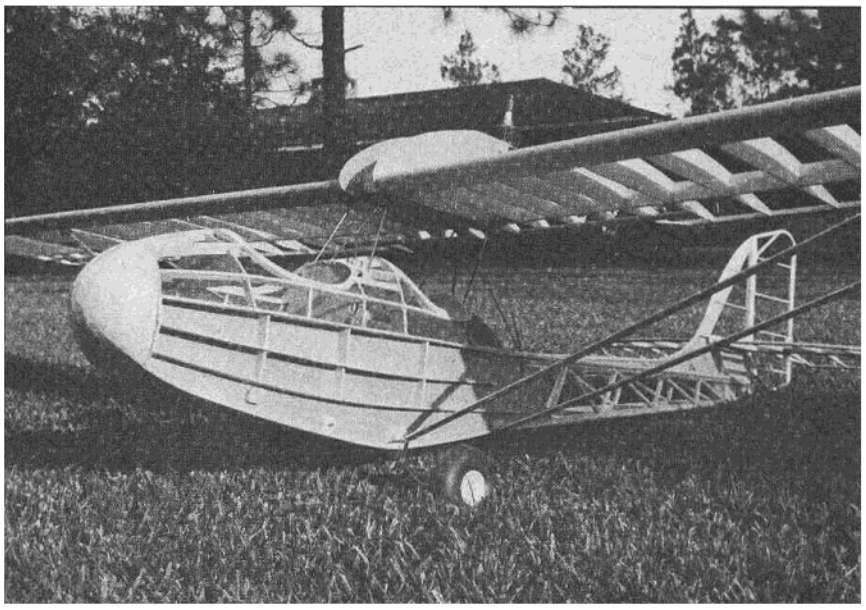
1/4 SCALE

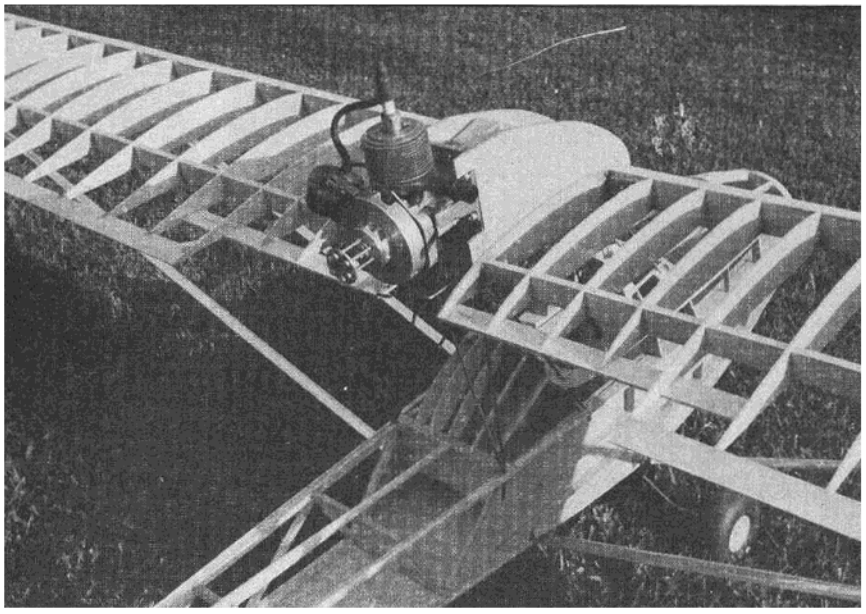
By Bruce R. Lund

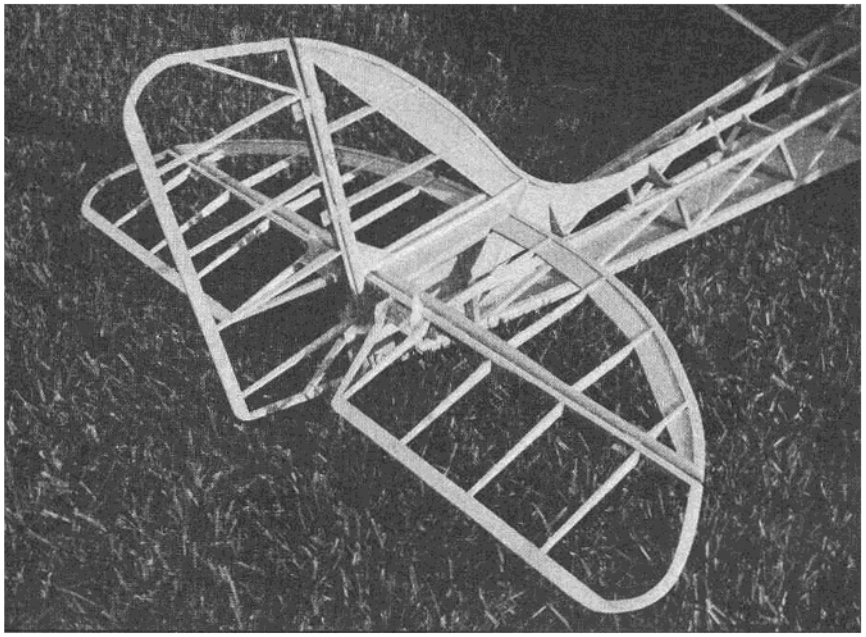
CURTISS JUNIOR

I have always been partial to aircraft of the 1920's and 30's. My first airplane ride was in a Travelair. During this time, my father was flying Boeing 80A Tri-motors, Ford Tri-motors, Stinson Tri-motors and Boeing 247's for National Parks Airways (later to become Western Airlines). No doubt, his tall tales of the "good old days" has influenced me to some degree.

Slow flying Quarter Scale models remind me so much of the aircraft of that era that it was just logical to model one. My interest was really brought to life when, acting as coordinator for the EAA Lindbergh Commemorative Flight, I had the opportunity to observe the Spirit of St. Louis and Stinson Junior in flight. These two planes were just magnificient to observe in the air. This was real flying







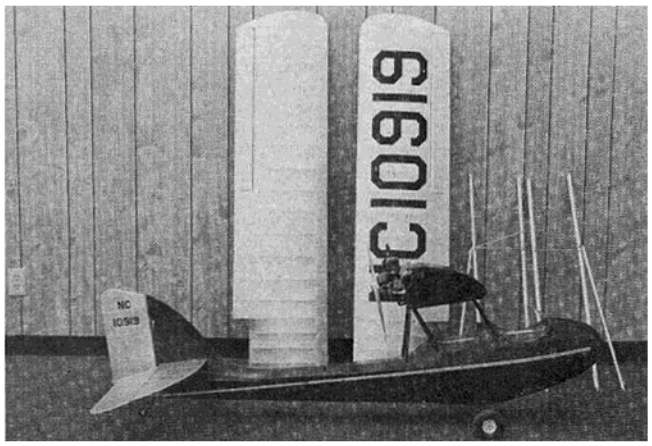
CURTISS JUNIOR CW-1

Designed By : Bruce R. Lund

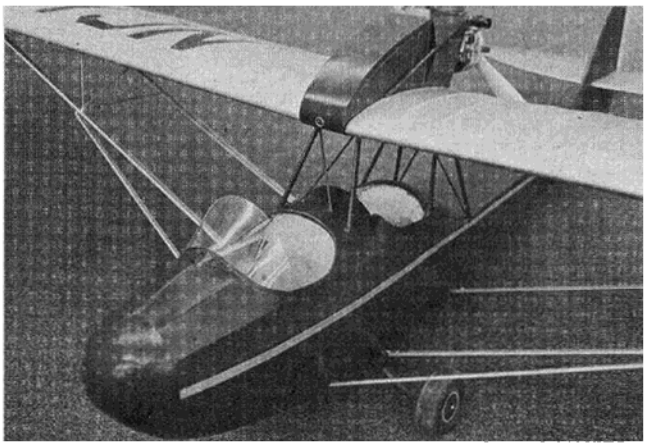
TYPE AIRCRAFT
1/4 Size Stand-Off Scale
WINGSPAN
118½ Inches
WING CHORD
14½ Inches
TOTAL WING AREA
1718 Square Inches
WING LOCATION
Pylon Mounted
AIRFOIL
Clark Y
WING PLANFORM
Constant Chord
DIHEDRAL, EACH TIP
1⅞ Inches
OVERALL FUSELAGE LENGTH
64 Inches
RADIO COMPARTMENT AREA
(L) 16" x (W) 5" x (H) 6"
STABILIZER SPAN
31½ Inches
STABILIZER CHORD (incl. elev.)
10¾"
STABILIZER AREA
307 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Low on Vertical Fin
VERTICAL FIN HEIGHT
14 Inches
VERTICAL FIN WIDTH (incl. rud.)
14½ at Stab
REC. ENGINE SIZE
1.2-1.4 Cu. In.
FUEL TANK SIZE
12 Ounces
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
(2 Servos req'd for Ailerons)
CONTROL FUNCTIONS
Rud. Elev., Throt., Ail.

BASIC MATERIALS USED IN CONSTRUCTION

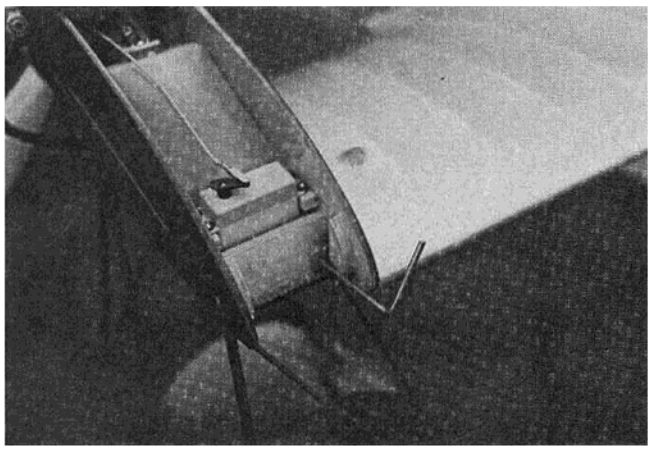
Fuselage	Balsa & Ply
Wing	Balsa, Ply, Pine or Spruce
Empennage	Balsa
Wt. Ready-To-Fly	248 Ounces
Wing Loading	20.78 Oz./Sq. Ft.



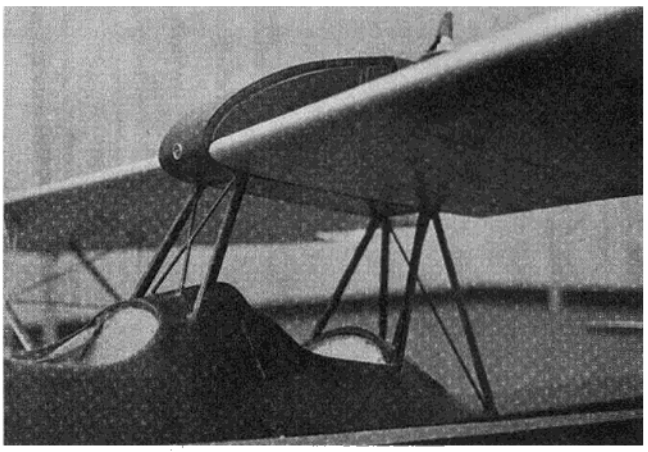
Disassembled ready to go to the flying field.



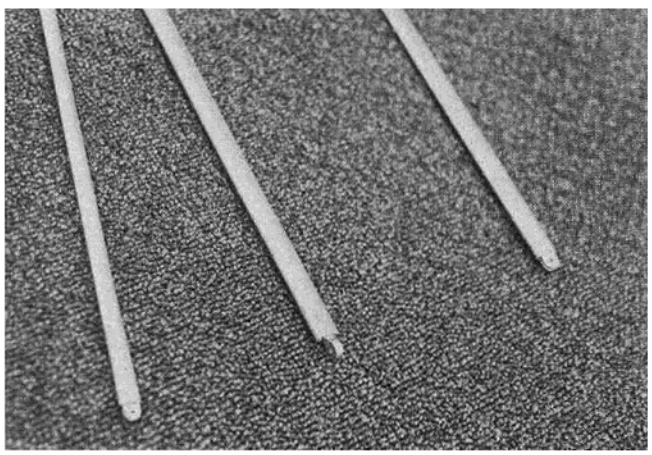
Front quarter view showing general arrangement.



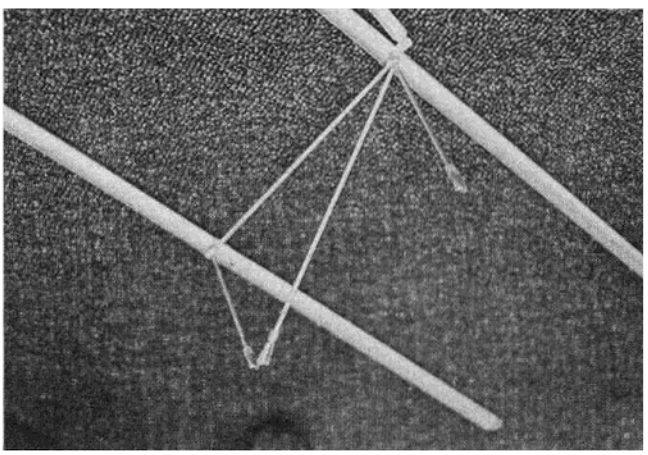
Left wing locking pin being inserted.



Low angle of engine nacelle – note how bottom of nacelle aligns with bottom of wing.



Wing struts – fuselage end.

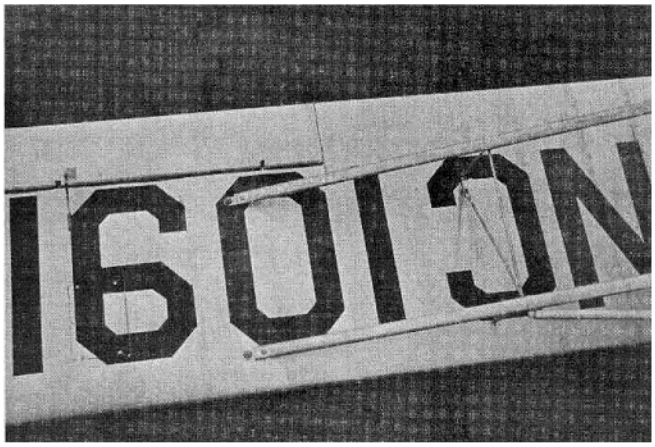


Jury struts attach to main struts.

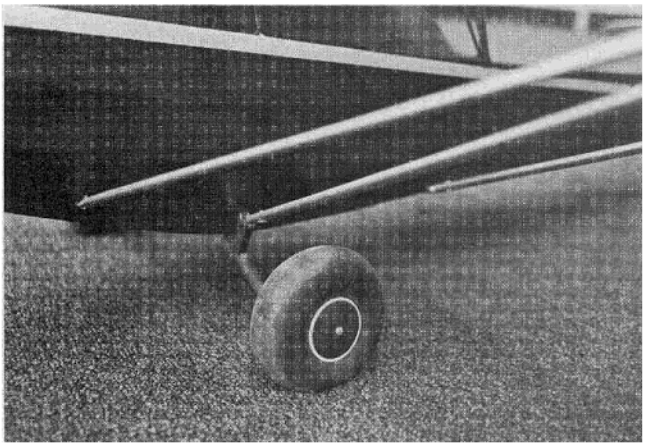
— not just boring a hole through the sky. I immediately started looking for drawings of the Spirit, but it had been modeled and kitted so many times I lost interest. The Stinson Junior had good possibilities but it was a large airplane. A little more model than I had room for. While looking through my Dad's old photos of airplanes he had flown through the years, I came across a photo of myself, at age 2, sitting on my mother's lap in the rear cockpit of a Curtiss Jr. This was it. I just had to model this one.

That same evening I located a copy of Paul Matt's Curtiss Jr. drawings in the Historical Aviation Album, Vol. 11, and started enlarging them. Before the weekend was over, I had the fuselage framed and was working on the tail. Days turned into weeks and the weeks became months. Progress was interrupted for a trip to Oshkosh for the annual EAA fly in. My Dad and I flew up in his restored Piper Tri-Pacer. (Judged best in its class at the 1977 EAA fly in.)

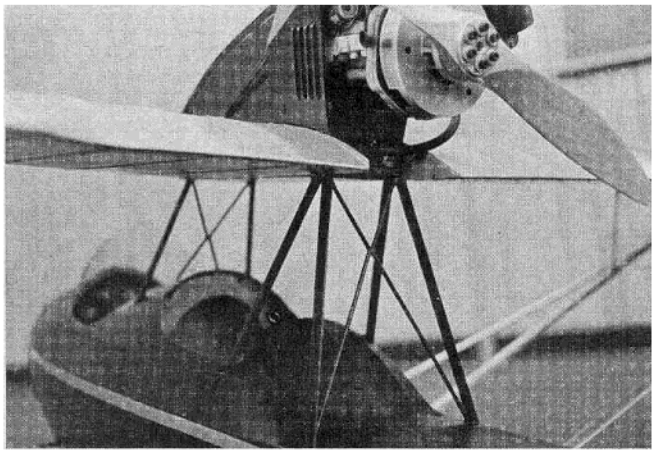
Upon our return, it was back to the Curtiss. It is now mid-August. The major



Wing strut attachment to wing – note servo access hatch.

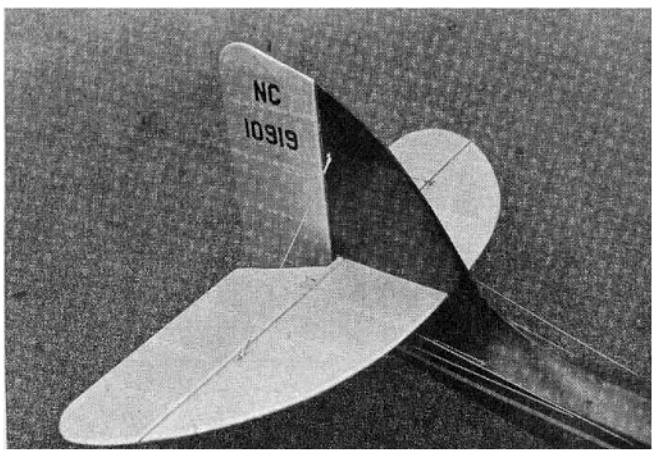


Landing gear and strut attachment

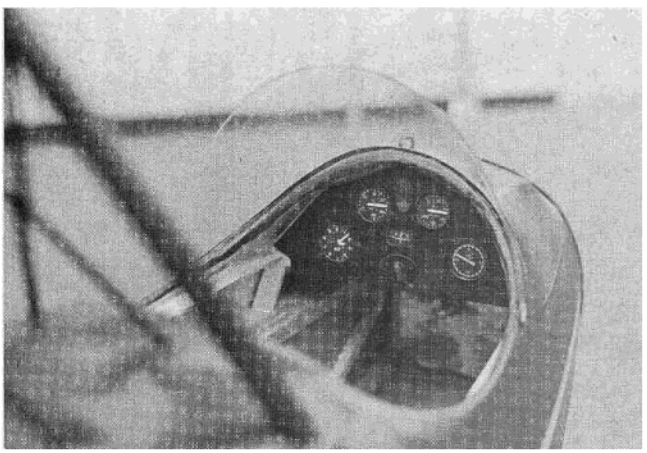


Rear view of cabane struts.

Engine nacelle with wings removed.



Tail assembly – note rib stitching and functional control cables and flying wires.



Note 3½ lb. lead bolted to nose block behind instrument panel.

framework was complete. The plane looks ready for covering, but much work remained. Time was lost trying to decide how to run the functional control cables from the tail to the servos --- more time on what engine to use. Where can I find a left hand prop? Will I have to carve one myself? No way to fit a prop drive into the small nacelle and keep the propeller in its proper place. A Webra .60 will fit, but I doubt that it will fly a plane projected to weigh 16-19 lbs. How about that old O & R Generator that was put up for "some day"? It's heavy, but maybe with some work it can be made to do the job.

Stripping the engine down we discarded the cooling shroud, generator, and fuel tank, and turned the flywheel to remove the cooling fins. Along the way, we decided to mount the prop on the flywheel. This was the strongest end of the double ended crankshaft. This was too easy. Watch out for Murphy's Law --- here it comes --- engine rotation is clockwise. Well, it was a good try, but Murphy loses this round. If we put a conventional prop on the

engine backwards and run it clockwise (looking at the shaft end), we have a store bought pusher prop.

On advice from a friend who had run this type engine in an R/C boat some years ago, we removed the carburetor/fuel pump and installed an Octura carburetor that he supplied from his junk box.

It is now the first of September. The basic airframe is being covered. Should I stitch the ribs for good scale appearance, or should I just forget them? Deciding that 3000 stitches was too much to do for real, but the airplane was looking too good now not to have stitches, I developed a good method of simulating them. It only took a couple of evenings.

Finally ready for the test flight September 16. The contest is 12 days away counting the four days travel time. The biggest unknown is the possibility of radio interference from the engine magneto. Cranked it up and everything seemed okay. After a very long take-off run, the Curtiss lifted off. I should have aborted the take-off for lack of power, but it was too late now. Finally got it to climb to about 10 feet after flying 100 yards. It started drifting left. Knowing now that I would never gain enough altitude to make it around the field, I touched right aileron and the plane answered with an immediate stall. The nose and right wing tip hit the ground with a big cloud of dust. Well there goes the Las Vegas vacation and contest. Running up to the crash site I expected to see lots of little pieces all over the field. Where were they? I know, still inside the Ceconite covering. This wouldn't be the first time I picked up a dacron bag full of small balsa parts. But no!!! There were no small pieces, just pieces that resembled wings, tail and fuselage. What!!! This can't be after a crash like that. Only the cabane struts came loose from the firewall and tore the fabric at the fuselage. Also a broken prop and two bent wing struts. Las Vegas was still in sight. By Sunday night you couldn't tell there had been a mishap.

Now to find out why the 1.2 cubic inch engine was not capable of flying a plane that only weighed 15½ lbs. Putting a tachometer on the engine, it would only turn 5000 rpm. Not enough. Run it again, this time I am able to get it up to 5400 rpm. Why more rpm? Nothing was done to it. Run it again. This time 5800 rpm. Hey! Maybe it just wasn't broken-in. Let's go fly.

Saturday, September 23rd — take-off run was still long, but the plane was climbing. Make gentle turns — watch out for that stall. Each lap around the field the engine came on stronger. After about five minutes I realized that the Junior would fly hands-off. It now had enough power to make tight turns without fear of a stall. Say, this plane flys just great. Its speed is so realistic. Just what I wanted. Throttling back and turning on final was a real thrill. That 10' wing was easy to keep level and everything was looking great, 20', 10', 5', 1'. Whump! I was so excited over the successful flight that I forgot to flair for landing. No damage though, it's a very strong bird. The next morning we packed up and headed for Las Vegas.

CONSTRUCTION

Construction is very straightforward. I will not bore you with glue part A to part B, etc. However, I will describe to you some of the more complex areas of construction.

Fuselage: Two stick sides are made and joined together with crossbracing. Be sure to keep your alignment. Add the formers supporting the cabane struts and the landing gear before placing the 1/16" plywood doubler on each side of the nose. Now you can add F-15 to the bottom and glue the 1/16" plywood bottom sheeting in place. Note that the bottom is 1/16" plywood ahead of the rear wing strut and 3/32" balsa behind. Cabane struts and engine nacelle can now be added. Alignment is checked with the bottom of the nacelle. The cabane struts are laced to the nacelle crossbracing with steel wire and then soaked with epoxy. The nose block and top formers can now be glued in place. Add the stringers and block in around the cockpits. Cut out everything from these blocks that doesn't look right and soon you will have your cockpits framed. The vertical fin can now be set into place. Servo control cables will penetrate the fuselage covering near the tail. I placed small nylon tubing flush with the fuselage covering. This could be seen through the covering before painting. The holes were made in the fabric just before the color was added. The two front cabanes were streamlined with spruce and plywood after servo wires were placed through 1/8" brass tubing. These servo wires were for throttle and ailerons, both in the engine nacelle.

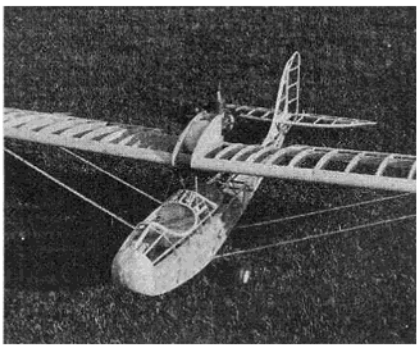
Tail: Nothing special here. Be sure to make provisions for flying wires. Do not use elastic cord. These wires are functional and are as necessary on this model as they were on the full size aircraft. Use 3/64" music wire with metal fittings bolted in place. Do not secure the horizontal stabilizer to the fuselage until the stab and vertical fin are covered.

Wing: Spars are cut from spruce or pine and ribs from 3/32" balsa. Note that the root rib is 1/8" plywood as is the tip bow. Aileron hinges are placed low to benefit from what is called "Frise Ailerons." You will note that as the aileron deflects up, its leading edge deflects down. This leading edge then produces drag and allows the outboard wing, without this drag, to move ahead of the inboard wing during a turn. If you get it just right the model will make coordinated turns with ease. Both "Doc" Edwards and Jerry Nelson were impressed with the smooth coordinated turns that the Curtiss made when I let them fly it during the Las Vegas contest. Aileron servos are mounted outboard in each wing panel. They are connected via 30" pigtails to connectors in the engine nacelle and then about another 16" down through the front cabane strut to the receiver. This long length has presented no problems to date. Wing struts are mounted to the spars by using long screws bent into an "L" shape and epoxied into place. Remember, these struts are functional and must support the entire weight of the model. K & S streamlined tubing was used with fittings riveted in place on each end. The jury struts are Kwik Links attaching to plates on the spars. The wings are attached to the engine nacelle with mounting plates very similar to full size aircraft. These plates are bolted to the spars. Two 1/8" music wire pins secure the wings to the nacelle.

Covering and Finish: Stay away from the super gloss finishes. These old airplanes were not made that way. Back in those days they used linen for fabric and finished it with dope. I chose to cover my Curtiss with Ceconite. This is a heat shrink dacron fabric that is used on full size aircraft. I used 1.8 oz./sq. yd. fabric that is made for sailplanes. It seals fast with just a couple of coats of clear. Two coats of color were sprayed on followed by a coat of clear after the N numbers were added. Rib stitching was simulated by stretching heavy thread from the root to the tip. While held in place with masking tape a drop of dope was placed on each rib. After drying overnight the thread was cut with small scissors leaving a small piece stuck to each rib. 3/8" wide strips of fabric were doped over this stitching and the job was done. The tail was done in a similar manner. The fuselage was covered with as few seams as possible. First cover the bottom. Next, the vertical fin and turtle deck with a seam down the centerline of the model. Now cover the sides and up around the cockpit to the centerline. The area just behind the rear cockpit will be the most difficult but the heat shrink fabric works great in an area like this.

Miscellaneous Detail: The engine used was an Ohlsson & Rice 1.2 cu. in. Generator. It turns a Top Flite 20/6 about 6000 rpm. A 12 oz. fuel tank gives 15 to 20 minute flights. Having the engine so far behind the C.G. requires ballast to be added to the nose. 3½ lbs. of lead was bolted to the backside of the nose block. This brought the flying weight up to 15½ lbs. I am real pleased with the weight of this airplane. Quarter Scale planes can be built light while keeping them strong.

Keep in mind that the heavier a plane is built, the stronger it must be built. You never heard Boeing Engineers say, "Don't worry about the weight," while building the 747. □



From RCModeler July 1979