

GREAT LAKES Trainer

By WILLIAM C. NORTHROP, JR.

Famous biplane of Lindy's Era returns as a great R/C flyer . . . even without radio she's a fine free flyer

■ This Great Lakes Sport Trainer was designed and first built in 1929 by the Great Lakes Aviation Corp. Though production continued for only four years, enough were turned out to make it still possible to come across one from time to time.

Probably modelers have done more to preserve the memory of this pleasing little biplane than any individual or group.

Our R/C model presented here is a tolerant, stable, relaxing flyer that can be flown practically free flight with only an occasional tap on the transmitter button to remind it to stick around.

Speaking of free flight, this is a good answer to the F/F flying scale situation. Reduce some wood sizes, spread out the ribs a little, bolt on a hot .049 or a warm .065 or .074 and you're all set.

If your interest is up to the boiling point, roll up your sleeves or call in your coolies and get to work on the

Fuselage. This is built in conventional manner (I'm showing my age, I guess this isn't conventional any more) with



Full size plans for the Great Lakes Trainer are on Group Plan #658 from Hobby Helpers, 770 Hunts Point Ave., New York 59, N. Y. (50¢)

$\frac{1}{4}$ sq. longerons, $\frac{1}{4}$ sq. and $\frac{1}{8} \times \frac{1}{4}$ uprights and diagonals. The liner of $\frac{1}{16}$ " thick plywood is added (contact cement works best here) before sides are joined. Bulkhead at "B," cross braces at "C," top cross brace at "D," and a temporary cross brace at bottom "D" are used to start the assembly of fuselage sides. Allow this much to dry, watching alignment, before pulling ends together and inserting remaining cross pieces.

Add formers "C" through "H." Be sure the smaller "E-1" former is toward the tail. Stringers are next. Turtle-deck stringers which butt against "E" should be rock-hard $\frac{1}{16} \times \frac{1}{8}$ to resist pull of covering material. Sides stringers are

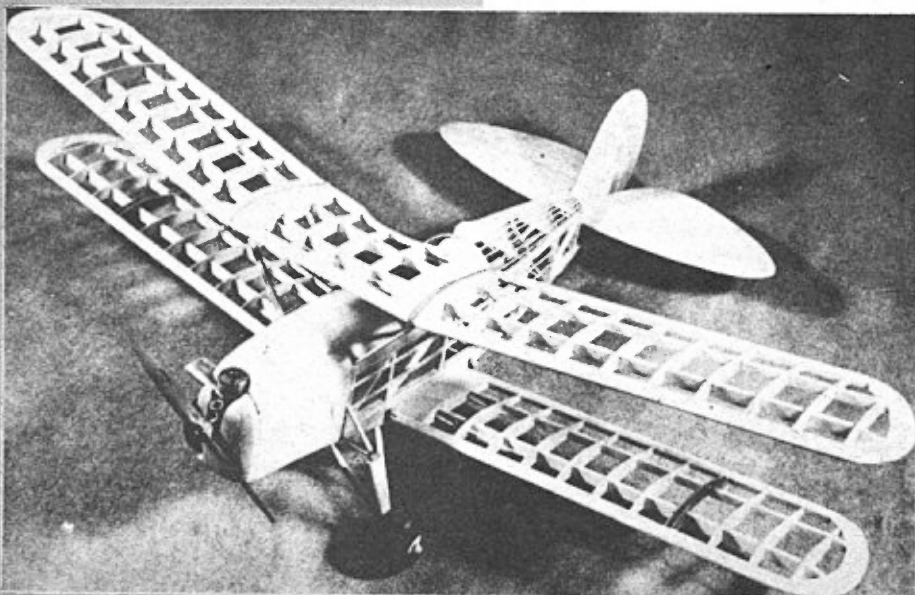
$\frac{1}{16} \times \frac{3}{16}$, tapering to $\frac{1}{16} \times \frac{1}{8}$ at "B" and $\frac{1}{16}$ sq. at "G."

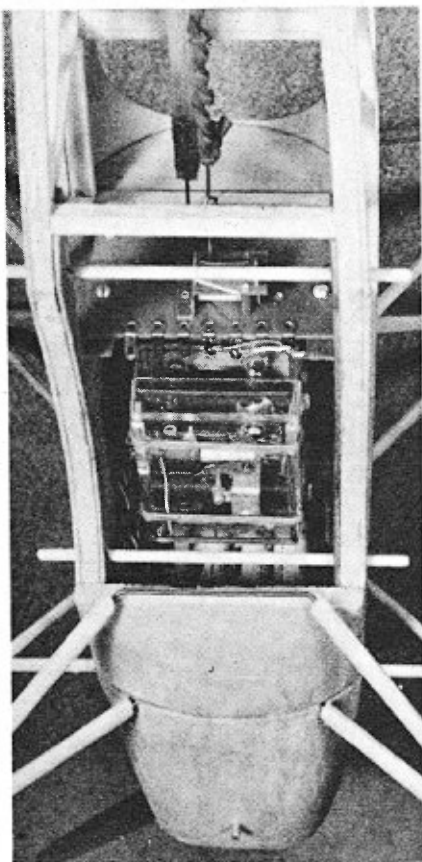
Cut cabane struts from $\frac{1}{8}$ plywood. Form $\frac{1}{16}$ wire struts and wing supports, bind and solder using ply struts as spacing guides. Now glue the ply struts to the wire cage and bind together with nylon or silk. Key the strut assembly to the body by cutting notches out of the ply liners. Leading edge of cabane assembly butts against bulkhead "B"; $\frac{1}{4}$ " balsa blocks fill in around struts to tie unit securely to body.

Forward decking of $\frac{1}{16}$ " balsa can now be put in place. I used 6" wide stock and covered "B" to "E" in two sheets with a joint at "D." Contact cement did this without using one pin. Glue maple motor mounts and "B" battery floor in place, using care to get exact alignment of mounts.

Before building up nose out $\frac{1}{2}$ " sheet stock, mount motor in order to check clearances. Mounting system shown, using aluminum tabs, allows minute changes of side thrust. Cut outline of nose block "A" from solid or laminated stock, hollow out to clear needle valve, exhaust, fuel line, etc., then glue in place. Side and bottom blocks can now be added. A good strong glue for this purpose is Fullers or Elmers white glue. They dry clear, a little slower maybe, but rock hard. Cut another block to serve as removable hatch in top of nose. Notch to fit down over bulkhead between tank and "B" batteries and hollow out to clear tank. Glue blocks inside front for hatch to rest on. Now nose can be carved to final shape while holding hatch in place using only your expendable fingers.

Landing Gear. Bend gear to shape using $\frac{3}{32}$ " and $\frac{1}{16}$ " wire as shown. J-bolt $\frac{3}{32}$ " pieces to bulkhead "B," and, where





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the pieces meet, bind and solder along full length. Strut of 1/16" wire starts and ends at J-bolt in bulkhead "B." The rear end rests against bottom of wing center section to which is glued a piece of sheet aluminum. This allows plenty of spring action. The 1/16" wire strut and main vertical strut are faired with balsa as shown. Solder short length of wire to struts to prevent twisting of fairings. Remaining struts are streamlined with 1/16" sq. rounded on two corners, glued to back of wire strut and then wrapped with three layers of masking tape. Main strut is wrapped at top with about six layers of tape to indicate upper part of Oleo. Three-inch wheels may be soldered or nylon buttoned on. Skid is 1/16" wire bent to shape, sand-wiched in 1/16" ply and glued into place.

Tail. Stabilizer, fin and rudder are cut from 1/8" balsa. Unless barn door size balsa is available, stabilizer must be made in two pieces. Use favorite hinges for rudder. I used 1/2" wide nylon strips cut on the bias. Cut slot out of rudder for torque rod and add 1/16" x 3/8" stiffeners on each side of lower rudder leading edge. Thread ribs under tissue covering may be added before color is put on for extra realism.

Wings. Assemble spars over plan, being careful to get proper dihedral built in. Make sure you have left and right hand spar assemblies for top wing. Cut rib template from aluminum. Drill pin size holes at corners of spar notches. Flash on back of holes grips wood and also marks rib for notching, but pushing pin through holes marks notches better. Leave five ribs blank for top wing center section. Notch these to fit during assembly. Ribs at spar overlaps will also have

extra notches cut to fit during assembly. Build center sections first, then tip up to build left and right panels. Make sure 1/16" ply ribs in bottom wing form a tight fit for 3/16" brass or aluminum tubing. Cover bottom of top wing before adding brass strut fittings.

Original model is nylon covered, followed by four to six coats of thin nitrate and then three-coat Aero-Glossed the colors of the prototype: black body, rudder, landing gear and wing struts; orange wings, stab and body trim and gold pin-stripe. Original model weighed 2-lb. 5-oz. with radio, motor, batteries, etc., less covering. Nylon covering and all dope added only 1 1/2 to 2-oz.

Flying. Everyone has his pet method for testing a new model before full flight. I always try to perfect a good glide and with rudder only a straight-in glide without flare to avoid unnecessary ballooning on the first powered flight. Then with engine plugged for cruising I let it roll away. Incidentally, masking tape on the nose and wing tips will save the appearance of those members through those get-acquainted flights. If the plane fails to rise, rev the engine up a little and/or remove some thrust, *but leave that glide alone*. When trim and stability seem proper, pull out the intake plug and have at it!

GREAT LAKES TRAINER BILL OF MATERIALS

("Balsa" and "inches" unless otherwise noted)

Four 3/8 x 1/2 x 36 for L.E.; (4) 1/4 x 3/4 x 36 for T.E.; (4) 3/16 x 1/2 x 36 for front spars; (4) 3/16 x 3/8 x 36 for rear spars; (2) 1/16 x 4 x 36 for ribs, sheet covering; (1) 1/4 x 3 x 36 for wing tips, gussets, lower body outline, L.G. fairings; (2) 1/8 x 4 x 36 for tail (stab, fin and rudder), body formers; (4) 1/4 x 1/4 x 36 for longerons and uprights; (4) 1/4 x 1/8 x 36 for uprights and diagonals; (3) 1/16 x 1/16 x 36 and (2) 1/16 x 3/16 x 36 for stringers; (4) 1/16 x 1/8 x 36 HARD balsa for turtle-deck stringers; (1) 1/16 x 6 x 36 for cockpit decking; (1) 1/2 x 6 x 36 for nose blocks; (3) 1/8 x 6 x 12 plywood for firewall, cabane struts, and outer wing struts; (2) 1/16 x 6 x 12 plywood for body liners and strut ribs; (1) 3/16 dia. hardwood dowel; 3/8 x 3/8 x 12 maple for motor mounts; (3) 1/16 dia. steel wire for wing struts, landing gear, tail-skid; (2) 3/32 dia. steel wire for landing gear; (4) 4-40 J-bolts; 1 length of 3/16 O.D. brass or aluminum tubing for wing strut sockets; 1-1/2 sq. yards nylon for covering; clear and colored dope; glue; masking tape; 1-1/4 plastic spinner; 12A fuel tubing for cockpit coaming; 1 pair three inch air wheels.