

PHOTOS BY EVERETT COYLE

# GREAT LAKES TRAINER

By BILL NORTHROP . . . Designed when rudder-only was all you could fit into a model of its size, the GLT is now a natural for small-size 3 and 4-channel radio systems. At 1-1/2 inch scale, it transports in one piece.

• Two circumstances brought about this ego trip. For one, the feature R/C aircraft construction project originally planned for this month wasn't quite ready to publish. And for the other, we received our second letter in about 12 years from Everett Coyle, of Yuba City, California.

Everett's first letter, received while we were R/C editor of M.A.N., included photos of, and told about, the Great Lakes Trainer he had built from our plans and construction article in the June, 1958 issue of American Modeler. Incidentally, AM was then a Street & Smith publication, with editorial offices in New York City, when Al Lewis, AMA's first president, was editor.

The second letter from Everett arrived just recently, and in it he enclosed some photos of the G.L.T. he had built almost 20 years ago . . . still going strong after some minor facelifting and the addition of modern radio.

The Great Lakes was this writer's first commercial literary effort and first scratch design/building project . . . you might know it would be scale, and a biplane! Plans were drawn using Wylam 3-views as published in May 1956 M.A.N., and some construction ideas were taken from a control line G.L.T., possibly by Vern Clements, also from an earlier M.A.N.

Using standard free flight procedures, we added stab area and wing dihedral . . . after all, this was to

be rudder-only R/C, and when we say "only", this means *only* . . . the length of engine run was determined by the amount of fuel in the tank . . . period! Incidentally, the original was powered (?) by a McCoy .09 engine. Only a few takeoffs were ever accomplished . . . most flights began from a hand-launch. Very little R/C was needed, as the ship had a natural, wide turn to the left. You simply heaved it off a little to the right of the wind and calmly watched as it navigated the perimeter of the field, finally passing overhead to begin the second lap at about 25 to 30 feet of altitude . . . scale speed has been around longer than you think!

R/C in the original consisted of the great Kraft Single receiver, using a single IAG-4 "hard" tube. It required two 22-1/2-volt hearing aid batteries for the "B" supply and two 1-1/2 volt pen cells in parallel for the filament, or "A" supply. The remaining two cells in the 4-cell Acme battery holder provided 3 volts for the escapement. Rudders were primarily operated by torque rods in those days, so we devised the cute little "L" shaped slot in the rudder to maintain the scale hinge line. It never gave us a problem.

The nose shape may seem a little strange. From previous experience with low thrust-line models, we decided that the normal upright engine version might give us some offset problems (having to use excessive down-thrust), so selected

the inverted Cirrus cowl, which raised the scale thrust line. Actually, the upright version looks a lot better, and the thrust is not all that different. Besides, with today's constant-trimming radios, why worry . . . Simply invert everything forward of bulkhead 'B', and relocate the motor bearer holes in 'B' accordingly.

Speaking of today's radios, the 1-1/2 inch scale G.L.T. ought to be just a ball with rudder, elevator, and throttle. The extra weight and work of adding ailerons would not seem worth it to us. If you decide to go the whole route, drop the bottom wing dihedral to 1 inch and take it all out of the top wing.

We haven't detailed a modern radio installation . . . they are all pretty much the same . . . just keep everything well forward. Surprisingly, the original model required a small amount of tail ballast; this in spite of nylon fabric covering and many coats of clear, orange, and black Aero Gloss dope.

The following construction text is taken almost verbatim from the original article.

## FUSELAGE

This is built in conventional manner (I'm showing my age, this isn't too conventional any more), with 1/4 sq. longerons, 1/4 sq. and 1/8 x 1/4 uprights and diagonals. The liner of 1/16 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 pullings 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 1/16 x 1/8 to resist pull of covering material. Side stringers are 1/16 x 3/16, tapering to 1/16 x 1/8 at "B" and 1/16 sq. at "G".

Cut cabane struts from 1/8 plywood. Form 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"; 1/4 inch balsa blocks fill in around struts to tie unit securely to body.

Forward decking of 1/16 balsa can now be put in place. I used 6 inch 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 in place, using care to get exact alignment of mounts.

Before building up nose out of 1/2-inch 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 battery compartment and hollow out to clear tank. Glue blocks inside front for hatch to rest on. Now nose can be carved into final shape while holding hatch in place using only your expendable fingers.

#### LANDING GEAR

Bend gear to shape using 3/32 and 1/16 wire as shown. J-bolt 3/32 pieces to bulkhead "B", and, where 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, sandwiched 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 inch wide nylon strips cut on the bias. Cut slot out of rudder for torque rod and add 1/16 x 1/8 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 ribs 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

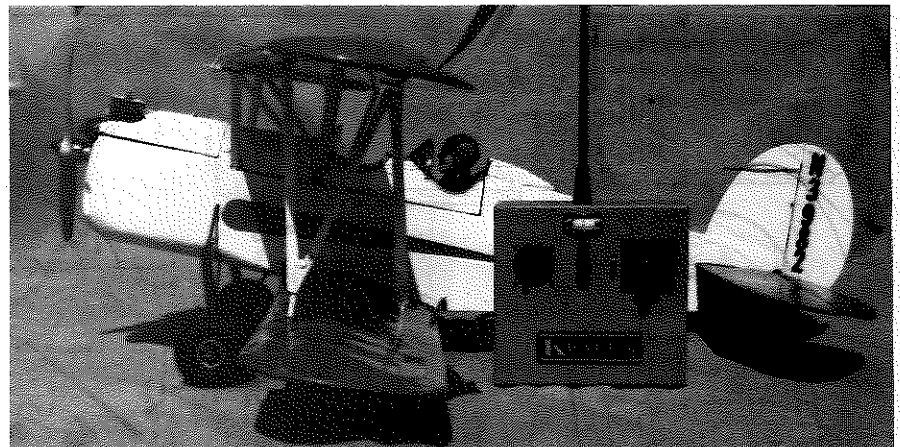
prototype: black body, rudder, landing gear and wing struts; orange wings, stab and body trim and gold pinstripe. Original model weighed 2-lb. 5-oz. with radio, motor, batteries, etc., less covering. Nylon covering and all dope added only 1-1/2 to 2 oz.

#### 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!

Well, in this day and age, test gliding has sort of gone out of style. With the balance point properly located, and surfaces at the approximate incidence angle specified, proportional control provides all the in-flight trim that is necessary to carry a model through its first test flights. Unfortunately, some modelers are content to leave an airplane untrimmed if the radio can overcome its mis-alignments. In our opinion, you can separate the real modelers from the hackers by checking their transmitters. If all the trims are at neutral, and the flier can calmly let go of the sticks, scratch his nose, and watch the plane fly along on its own, he's just about qualified to be a free flihter, and that's what real modeling is all about. •

## MODEL BUILDER



Everett modified his G.L.T. with a radio hatch on top, lower dihedral, and larger engine. Ailerons really not necessary, unless you go to scale dihedral.