

Young Bob Roberts (his dad, Charles, made these pix) holds modified Zephyr in right hand—OS servo, Aristo receiver—on which both cut their RC teeth. Author's natural finish job in other hand. (Now lying in field of balsa-colored barley!)

THE ZEPHYR

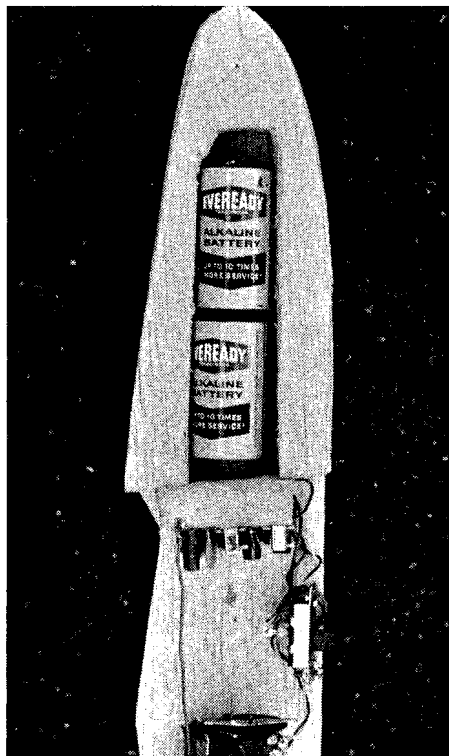
If a lean pocketbook and nervous stomach have kept you on the sidelines of RC, here is a ship to get you on the field quickly and painlessly. All-balsa, it uses almost any single-channel radio.

By DAVE THORNBURG

Zephyr can be built for three to five dollars (depending on the affluence of your scrap box) and will handle almost any single-channel radio. Its slow, graceful flight characteristics make it an ideal stepping-stone to powered models—if you still yearn for noise and grease and vibration after flying a sailplane!

The Zephyr came into being as a slope soarer, when I migrated to sunny (windy) California a year and a half ago. It is one of those rare designs that didn't require a long, painful evolution. Like Pallas Athene, it sprang full-grown from its pappy's head. The only real improvements we've made on the original have been structural rather than aerodynamic.

Old No. 1 soon died of an overdose of Mother Earth (the *extra-strength* plane reliever), but not before it had proven itself an excellent towliner. And



taught me the value of Celastic, and how to avoid the turbulent leeward side of hills!

A second Zephyr was built and presented to a fellow modeler who was just getting started in radio. It not only gave him his first controlled flights, but very nearly reconciled his wife to RC! Needless to say, it was adjudged a complete success.

Ten more Zephyrs have been built since then, two of them by 14-year-old modelers. They go together quickly and are consistent performers. And if you have any qualms about towline flying in general, forget them. The Zephyr is very easy to tow; in any breeze at all she will drag 500 ft. of 18-lb. monofilament straight up over your head.

Now a word to you experts lurking at the edge of the crowd. Here's a plane that will let you find out what all the soaring's about (*Continued on page 58*)

with a minimum of time and effort. Fly it on your old super-regen equipment—an occasional stray signal may be annoying, but is seldom fatal to a glider. And don't look askance at her escapement simply because the whole world is going proportional. She flies with an absolute minimum of radio gear, and Murphy's Second Law still applies: the less equipment, the more flights per headache.

Too lazy to run, you say? Then slope soar, or build a drop-off power pod with parachute. You'll find a good .049 takes her up like an FAI gas job.

True, the Zephyr's no acrobat. A diligent spin will net you a loop or two, but violent maneuvers are out. She's a stable, graceful sailplane, and it takes a lot to upset her dignity. On the other hand, she retains her poise in a 15-knot wind, when all but the most daring of the multi boys are grounded.

And if rudder-only is too tame for you, multiply all dimensions by 1.5 and pack in the multi gear. I am presently flying a nine-footer with a Midas and two Transmites.

Fuselage: The fuselage is literally built around your radio gear. It can be widened or deepened as necessary, so long as the same moment arms are retained. The version shown will handle almost any commercial single-channel receiver and enough sponge rubber for crash protection. A regular escapement is shown, but here again you can modify to suit equipment on hand. If you use a servo, simply omit the bulkhead.

Cut the 3/32" sides from straight-grained hard balsa. RC stock is best. Using a coping saw, rough out the nose block from a 3 x 8" block of the necessary thickness. I usually laminate it from scrap, adding layers until it's about 1/16" thicker than my batteries. The battery compartment, as shown, holds two alkaline "C" cells—enough juice for hours of trouble-free soaring with a relayless receiver and escapement.

Join fuselage sides around the noseblock, pinning tail together for temporary alignment. Glue tail block in place, checking final alignment over top view on plans.

Install escapement and torque rod as a unit, protruding part of the escapement through a small hole in the fuselage side. Cover this with a scrap balsa "blister" as shown on plans. This sounds like a great deal of trouble, but it pays off in the increased performance a slim fuselage gives.

Cover the top and bottom with 1/16" stock, cross-grained. Use 1/16" plywood on the bottom between the noseblock and

the escapement. This provides a solid mount for the towhook and puts an indigestible floor between your radio gear and the tarmac.

Bend towhook from 1/16" piano wire. It can be installed after fuselage is covered. Experience has shown more than one hook to be unnecessary on this model. Cover the bottom of the noseblock with Celastic, as shown.

Note that the plans show a clockwork dethermalizer just behind the wing. This is a good investment, but it is necessary only in inverse proportion to the dependability of your radio. There have been more Zephyrs flown without a DT than with one, and none have yet gone o.o.s. (There have been some long chases, though.) On warm days I always set mine. You can purchase an "extender" wheel at your hobby dealer that doubles the timer's run and makes 12-14 minute flights possible. But wind, wind, wind that escapement!

Wing: Cut the leading edges from medium-hard 1/4 x 3" stock, sanding to cross-section shown on plans. Trailing edges: Sig's 1/4 x 4" tapered stock is a lifesaver here. If not available, go to work on a standard 1/4 x 4" sheet with a good X-Acto knife and #26 blade. When completed, pin trailing edges inverted to a flat surface and glue on leading edges at proper angle. Be sure to use the camber template; the airfoil shown is essential to good performance.

When both wing panels are thoroughly dry, remove from board and sand the ridge of the joints down to the proper cross-section. Join panels at center with dihedral specified (5 1/2" each tip). Allow to dry overnight before applying Celastic to top and bottom of joint. Don't omit the Celastic. No amount of glue or plywood dihedral braces can take its place. (It's been tried!)

Tail Surfaces: Use 3/32" for both rudder and stab, C-grain if available. Cut



This is how the sheet balsa pieces and ribs are assembled.

stab camber block from 1/4" scrap, sand to airfoil. Glue to bottom of stab before finishing. If you don't plan to use a dethermalizer, install a small wire hook on the fuselage rear for stab hold-down rubbers.

Finishing: The performance of a glider, more than any other type of model, is determined by its finish. This point was brought home solidly when one of the local modelers brought out an undoped Zephyr for glide tests one weekend. We towed it a couple of times and it showed promise, so he took it home and finished it: two coats clear, three coats white pigment. Next time out, it required two ounces of lead in the nose to balance, and flew like a lug wrench! Moral: there's a lot of area to this skinny bird—finish it light! I recommend one coat of clear, light sanding, colored Jap tissue water-sprayed during application, two coats clear to finish. Cut all dope 50 percent with thinner.

On two planes I omitted the tissue, giving them three or four coats of clear for a smooth, natural finish. The last of these is now lying somewhere in a field of ripe, balsa-colored barley, grimly awaiting the reaper! Tissue, at 8 cents a sheet, is good insurance.

Flying: As the experts say, "select a calm day for test glides." Check wing and stab for warps, and be sure plane balances within 1/4" of the camber joint on the wing. Hold at shoulder height, nose slightly down, and run into the wind until you feel the plane lift. Release with a gentle push. If plane dives or stalls, and balance is correct, shim stab up or down until good glide is achieved.

Always make your test glides in a large open area—the Zephyr will cover 100 ft. or more from shoulder height, when properly trimmed.

For your first towline flight, use about 100 to 150 ft. of line. (Incidentally, the good folk who make Hi-Flier kites also market a dandy winder for our purposes. It is an ingeniously simple red plastic device available for less than a buck in most dime stores.) Have the pilot launch the plane while helper tows. Until you're used to it, it's not easy to make corrections over your shoulder while galloping along at full speed. The Zephyr should climb straight to the top of the line. If not, note the direction of turn and offset the rudder accordingly.

After she's properly trimmed you can reel out 400-500 ft. of line and squeeze long, satisfying flights out of even the coldest air. Then, when your courage is up, off to a windy slope!