

Left: John Spalding looks over the almost completed fuselage. The sides are 3/16" corrugated cardboard. Authors say to "make believe it is balsa" and to work in same way. Above: Close-up of cardboard details. Takes iron-on films.

# REBEL REVISITED

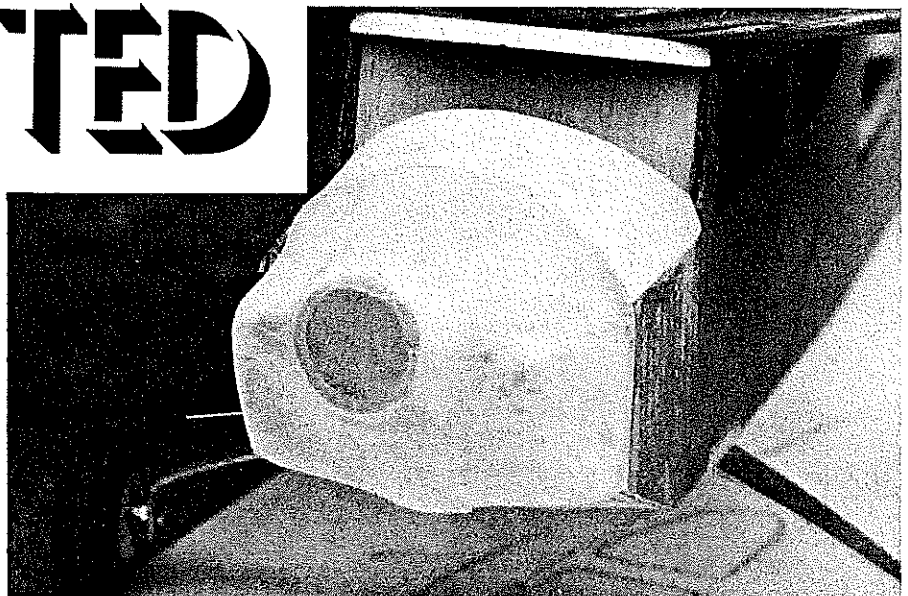
One of the finest of 'pre-multi' kits was the deBolt Rebel. In modernized form it more than holds its own in appearance and as a sport flier on rudder, elevator and engine.

**John Spalding  
Hobie Steele**

IN THE EARLY days of Citizens Band Radio, RC kit manufacturers began to tool up for what became the largest market aeromodeling has ever known. One of the first was Harold "Pappy" deBolt of deBolt Model Engineering Company in Williams-ville, N.Y. (near Buffalo) who had a solid background in Control Line with a real stable of outstanding CL kits.

DeBolt's first was the "Live Wire" Trainer, a bulky box designed primarily to hold the heavy batteries and 465-mega-cycle equipment of early days. It was somewhat heavy itself, and contained a lot of balsa which Hal strove to reduce in the Rebel.

Although similar to the Trainer, the Rebel was more streamlined and had a lighter structure which reduced all-up weight. It also flew like a veritable dream! For its day, the Rebel seemed almost too good to be true. Personal experience with an early pair of them included many hundreds of flights using radios ranging from Ed Lorenz's two-tuber through John Worth's "Simple Simul" Galloping Ghost and even into reed systems. We decided to



You don't have to make a fiberglass nose but it does enhance appearance and stands the scuffing. Article describes use of styrofoam plug and inflated balloon for smooth surfacing.

revisit the Rebel to see how it stacked up today.

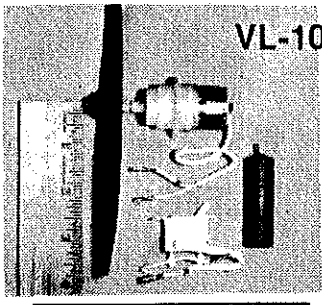
Attacking a set of original Rebel plans (for which we're indebted to Harold deBolt) from the standpoint of modern construction and performance, we ended up with a sleek, symmetrical airfoiled, tail-dragger for quick and inexpensive building. The new Rebel is a composite of tradition and avant-garde, with all the outstanding flight characteristics of the original plus a little better wind penetration and less fuselage

bulk. Topped off with a fiberglass cowling, the Rebel looks as great as any cabin job at the field today and handles really well.

The first thing you may notice on the plans is that the fuselage is constructed of cardboard and balsa. Corrugated cardboard is as strong as balsa, works easily, takes MonoKote beautifully and is cheap. You can buy cardboard in 4 x 8 ft. sheets from any container manufacturer or pick up a good size corrugated packing box from some trash pile. Consequently, the

*continued on page 74*





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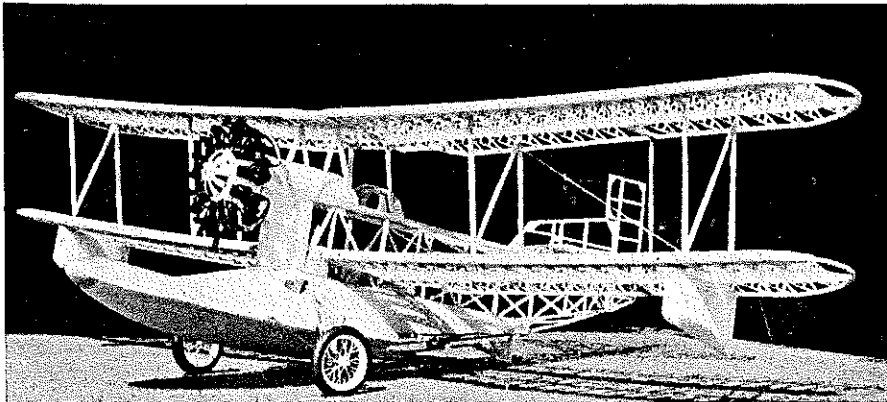
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## Why Scale/Hannan

continued from page 41

Boasting stick-for-stick accuracy, this Loening Amphibian was presented to the designer, Grover Loening, by Fulton Hungerford.



like birds. Clear proof of this split in thinking in the RC classes may be seen by comparing the number of entries in this year's Nationals: Six in "serious" AMA Scale vs. 24 in Sport Scale! Yet, the craftsmanship and accuracy of some of the so-called stand-off scale models would have put them in a competitive position in many AMA scale events. Thus, the question of builder philosophy is again encountered. What motivates the selection of one class over another?

Certainly one must compete against the handful of top-notch craftsmen in the "serious" class, but what about the sheer numerical odds in the alternative category? Some of the best builders are only mediocre fliers, having devoted most of their time to developing construction and finish-

ing techniques. Thus they can be a bit shaky under the pressures of competition, especially with a relatively untested aircraft. Frank Scott puts it this way: "... in flying, there is nowhere a collectively more bungling bunch than scale modelers." There always remains the great equalizer of flying scale models, *luck*. All things considered, perhaps the *average* scale enthusiast has a better chance than he may realize.

### Subject Selection

Another area deserving of closer examination from a motivation standpoint, regards the choice of an aircraft to model. Probably most builders pick a certain type because of a personal fondness for the prototype. Others arrive at a selection in an effort to have a "better shot" at a particular set of contest rules. This "gamesmanship" approach may in itself be some sort of tip-off to a modeler's philosophy, but certainly is not an unfair system, as some have insinuated. Production of a scale model represents a substantial commitment in time and money, so why invest in a loser?

We have frequently heard that some rules are prejudiced against certain types of aircraft. If this is true, why build that sort of model? The answer is easy. Because

one wants to! Freedom of choice is basic to the whole idea of scale modeling. So much of our daily life involves regulation of one sort or another, that our hobbies should not be similarly encumbered.

Some scalers deliberately select offbeat subjects just because they do not want to be part of the "masses." This premise may explain why some (probably most) scale model builders do not enter contests. They are interested solely in their own satisfaction, and see no reason to become involved in competition. But for those who do participate in contests, it certainly seems logical to at least study the rules thoroughly, before embarking on a major project. Why not select a machine that at least has a fighting chance of winning?

Much criticism has been leveled at those who win important events with comparatively simple models. This line of thinking misses a vital point. The craftsman who can produce a superb reproduction of a simple aircraft, could do every bit as well with a complex subject, *if he chose to do so!* To put it another way, those who prefer the so-called "difficult" subjects, are entitled to them, but paraphrasing from the old Katzenjammer Kids comic strip, "They've brought it on themselves, Miss Twiddle!"

### SUMMARY

Motives among modelers may be as varied as the subjects they choose to reproduce. And while many tend to specialize, others participate in all forms of scale modeling. For every builder who takes his models over-seriously, there are perhaps a dozen who view the whole concept lightheartedly. All agree that scale model building is a worthwhile pastime and a continuous learning experience, guaranteed to increase one's patience, skill and craftsmanship, not to mention knowledge of history. The satisfaction of seeing the finished product is its own reward, and while contest trophies may be bonuses, compliments from fellow builders may be the best possible awards. Oh yes, another thing *all* scale modelers seem to have in common, regardless of specialty, is a long waiting list of future projects. Thus, a scaler need never know that common scourge of humanity, boredom!

## Rebel Revisited

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material ranges in price from very reasonable to free. When working with the cardboard, forget that it's cardboard—pretend it's 3/16" balsa and build accordingly.

Wing and stab are conventional balsa construction, although a foam wing could be cut and sheathed with non-corrugated poster board if you're into that sort of thing. The Rebel is easy to build and flies like a dream.

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**Stabilizer:** Cut out ribs and assemble on spar for fit. Note center ribs are smaller for center-section planking. Pin onto flat surface, blocking up leading and trailing edges for perfect alignment. Glue leading and trailing edges to ribs and then the ribs to the spar. Add center sheeting on top and let the entire assembly dry. Turn over and sheet the bottom of center-section and add built-up tips with gussets as shown on plans. When dry, sand smoothly. Cover the stab with MonoKote now if you like—except on top side in the center, where it will be glued to the bottom of the fuselage. Elevator is made of balsa sheet or tapered trailing-edge stock.

**Fuselage:** Cut out sides from corrugated cardboard plus all doublers and bulkheads as specified. (Windows may be cut out or simulated using Trim MonoKote later.) Now glue doublers to the sides using bulkheads F1A, F2 and F3 as spacers, but *do not* glue the formers to sides yet. Add plywood doubler at F2 and glue  $\frac{1}{4}$ " sq. up-rights aft of F3. Don't forget to glue tail doubler in place and allow the whole shootin' match to dry.

Over a centerline drawn on your building board, assemble the fuselage sides to F2 and F3 (mark F2 and F3 with centerlines for alignment); block up and check alignment with a square (or a draftsman's triangle). Allow to dry thoroughly.

Add landing gear plywood plate and

wing saddle gussets to the fuselage assembly, then glue in F1A and filler pieces just aft of it. F1B and F2A can also be glued in place and allowed to dry. Now pull sides together at tail and glue in F6, F5 and F4 in that order. Be certain to maintain alignment over the centerline for a true fuselage. Leave to dry. Next, add  $\frac{3}{16}$ " sq. bottom stringers, top  $\frac{1}{4}$ " sq. and  $\frac{1}{8}$ " sq. stringers from wing trailing edge and fuselage tail.

Fill in at F2 with  $\frac{1}{4}$ " sheet balsa between bulkheads and aft of landing gear. Cut this sheet to blend into sides like a gusset. Now, install hardwood beams to fit your radio (we used EK LRB) and trial fit Sullivan's SS-4 fuel tank and radial motor mount (such as Midwest, Tatone, or Kraft). The cowling can be carved from  $\frac{1}{2}$ " sheet balsa blocks, or laid up in fiberglass if you like.

If you've never laid up a glass cowling, it might be fun to try. First carve a "plug" to shape from "blue" styrofoam. It's soft and easy to work. When the plug suits you, cover it with clear plastic wrap that comes in rolls from the grocery store. Now, lay up several layers of fiberglass cloth with polyester or epoxy resin and push a blown-up toy balloon over the whole works before the final layer cures. Let some of the air out of the balloon as you press it down over your cowling-to-be. The balloon will make the outer surface of the cowl slick

and smooth—easy to prime and paint. When the resin has hardened somewhat, remove your new cowling from the plug and while it is still "green" (not totally cured), trim edges with a sharp knife or shears. Cut out cooling and prop shaft openings and finish it to match the MonoKote you plan to use to cover the fuselage.

**Assembly:** Bend  $\frac{1}{16}$ " wire for steerable tail wheel arm and drill a hole in fuselage just aft of rudder hinge line. Insert wire with hardwood mounting block installed and glue block to the fuselage. Solder

## PERSONAL

If you fit this description, it could mean \$\$\$ for you! You see, *Model Aviation* is in the market for articles, photo features, how-to-do-its, etc.—in addition to the usual plans and construction features. If you have a way with a camera, with a drafting pen, or the gift of gab and something important to show and tell for the benefit of beginners, Sunday fliers, sport modelers—as well as the experts and the competition fliers—you may be the guy(s) we are looking for. In short, the editor is looking for all sorts of things. There's a world of knowledge out there and thousands of people with the need to know. Perhaps you can help—and be paid for it. Our payment rates are among the best in the field. How do you connect? Just drop a line to the Editor, *Model Aviation*, 806 Fifteenth St., N.W., Washington, D.C. 20005. Describe your suggestion briefly and why you think you are the guy to do it. We are all ears. . . .

## Rebel Revisited (continued)

washer to wire on underside of mounting block, then glue rudder to fuselage and glue on stabilizer with tail wheel wire through 1/16" hole in stab. Install filler blocks, epoxy around firewall and let the whole works dry. Now, bend 1/16" wire carefully to make up tail wheel axle and be sure it follows rudder action without any binding. MonoKote goes on fuselage later.

**Wing:** Build wing by pinning down 1/4" sq. bottom spar, blocking up leading and trailing edges of ribs for true alignment. Brace ribs at front with wedges (or long piece of 1/4" sq. under curve of rib). Glue ribs to bottom spar and add top 1/4" sq. spar, 3/16" sq. leading edge and 1/16" leading edge sheeting. Now glue 1/16" trailing edge top sheeting plus capstrips on

top and allow to dry.

Turn wing over and pin to board with wedges for alignment and add vertical grain webbing plus 1/16" bottom leading and trailing edge sheeting. Let dry thoroughly. Block wing panels up for dihedral and fit dihedral braces. Glue the panels together, checking alignment carefully and let dry. Now, add 1/16" center-section sheeting, bottom capstrings and wing-tip blocks. Allow to dry. Now, sand and cover center-section with 4" wide glass or nylon tape using white glue or epoxy for reinforcement.

Cover wing with MonoKote. Fit wing to fuselage, trimming wing saddle as necessary, then cover fuselage with MonoKote and trim. Remember, treat the cardboard like balsa and MonoKote accordingly. If you cut out windows, silicone glue can be used to hold plastic windshield material

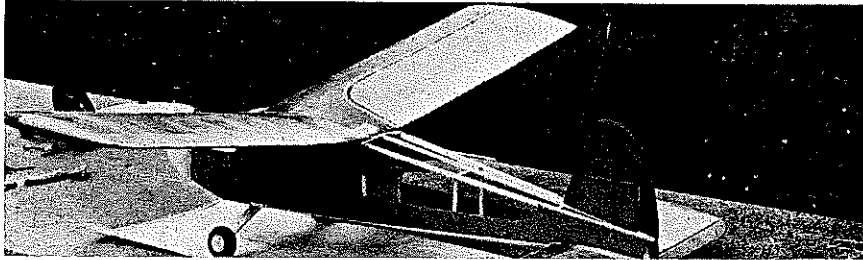
inside of fuselage. Use to install windshield also. If you haven't tried Top Flite's "Heat Gun" you'll find it a wonder in shrinking MonoKote, drying epoxy and softening plastic windshields and canopies for fitting to your fuselages. Bolt or screw dural landing gear to plywood block.

**Wing Hold-Down:** We used a 6-32 x 7/8" bolt for aft wing hold-down. In the fuselage, we glued a square of 3/32" plywood (about 3/4 x 3/4") to the backside of F2 at the highest center part. Then, we bored a 3/16" dia. hole through the centerline about 1/8" down from the top of the F2. At the top of F3, we glued a block of 3/8" spruce about an inch long and deep.

Next, we glued a 3/16" dia. dowel to the leading edge of the wing with a block spacer shaped to fit the dihedral of the wing. Epoxy and tape holds the block/dowel assembly securely to wing. This dowel must be fitted to the hole on F2 in order to hold the wing snugly in its saddle. Then, with the wing carefully centered in the fuselage, we bored a 1/16" dia. hole through the trailing edge into the 3/8" spruce block fastened to F3. The block is then threaded for 6-32 and the hole in the wing reamed to 9/64" so the bolt goes through it easily. We used a steel bolt but a nylon bolt is okay, too.

**Alternate Wing Hold-Down:** By installing 3/16" dia. dowel just aft of F3 and adding another dowel out through the

The Rebel always did look good from both rear and front quarters. The modern symmetrical airfoil enables the ship to do a bagful of maneuvers. Plans show optional flat-bottom section.



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Over the past few years, the Swap Shop has been inundated with built-up models making it extremely difficult to fairly display them all. To provide maximum exposure of each built up model on display in the Swap Shop, 1976 Swap Shop Registration for complete models and airframes will be limited to one per registrant.

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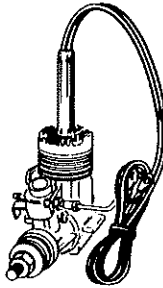
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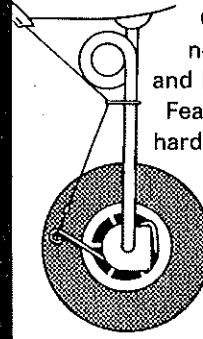
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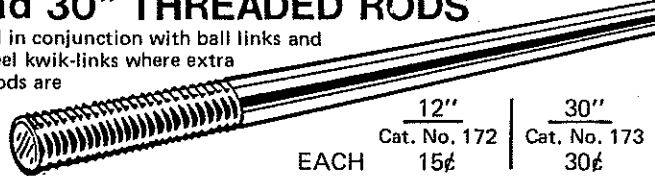
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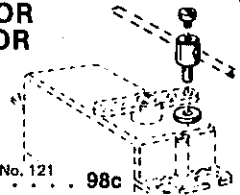
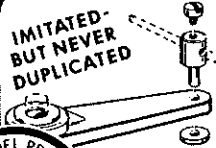
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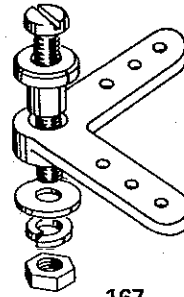
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windshield, rubber bands may be used to hold the wing on. Beef up F2 where the dowel is glued to it, of course.

**Final Set-Up:** Hinge rudder and elevator. Use good, easy working hinges, like Goldberg's, so control surfaces work smoothly with no binding. Install Sullivan SS-4 fuel tank and your engine. Add your favorite pushrod set-up. We used nylon/steel kwik-rods with our EK Brick. Use Goldberg short nylon horns on rudder and elevator. Throttle pushrod should clear fuel tank so that no binding will interfere with smooth and positive engine control. 2 1/2" Williams Brothers wheels are installed to dural landing gear with bolts.

For new fliers, set rudder pushrod clevis in outermost or center hole of (short) horn. Elevator is small enough to keep you out of trouble so the center hole of (short) elevator horn is fine for first flights. Be certain your Rebel balances at CG indicated on plan. This is important! Add lead if necessary to balance.

We've flown the new Rebel on both .15 and .19 engines. With a .19, it's a bomb so a .15 is the most comfortable powerplant and she's even light enough to fly on an .09 rudder only. But with a hot .15 or .19 and rudder/elevator plus motor control (REM), it will perform along with most any modern trainer and do quite a respectable Class A pattern. (If you build

a flat-bottom wing version, the biggest engine is a .15.)

Set all controls neutral and clear off the kitchen table. Now prop up the Rebel's tail until stab is level with the table at leading and trailing edges. Do this by measuring from table top to center of stabilizer leading edge and to center of trailing edge with a ruler. When both measurements are the same, stab is level. Now measure from table top to center of wing trailing edge and then to the center of the wing leading edge. The center of the leading edge should be 1/8" higher (no more, no less) than the center of the trailing edge. This gives the proper decalage (angular difference between wing and stab) and about 4 degrees downthrust built right into the Rebel without visibly "tilting" the engine.

**Flying:** Although the new Rebel is a smooth, sweet flying beauty with no "funny" characteristics, any new pilot should have an expert take her off the first time for a "trim" flight. When he says all is well, go to it! You'll have no trouble with your new Rebel.

Hold full up elevator to taxi out and into the wind. Now advance the throttle, holding a smidgen of right rudder and about one-half up elevator. The tail will jump up and your Rebel will accelerate across the field into the wind (tail-draggers always "weathervane" into the wind).

When she's ready, your Rebel will lift off into her true element—the freedom of flight!

Try a few gentle turns until you're comfortable with her, then wring out your Rebel. We promise you'll be pleasantly surprised at the way she handles. Always land into the wind, flare out smoothly until she slows up enough to drop in on three points. Don't land too fast. Your new Rebel penetrates wind nicely, but she's somewhat of a floater so slow 'er up a bit on final to a nice flare. Although she can be snap-rolled and spins nicely if asked, she won't try any "funnies" (like tip stalling) on her own.

Now enjoy! You've got an up-to-the-minute version of a fine deBolt original and you'll have many pleasant flying hours.

*(Editor's Note: Wing and stable kits, consisting of the flat-bottomed wing section and standard stabilizer, are available for \$12.00 from the DeBolt Model Engineering Co., 3833 Harlem Rd., Buffalo, N.Y. 14215.*

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