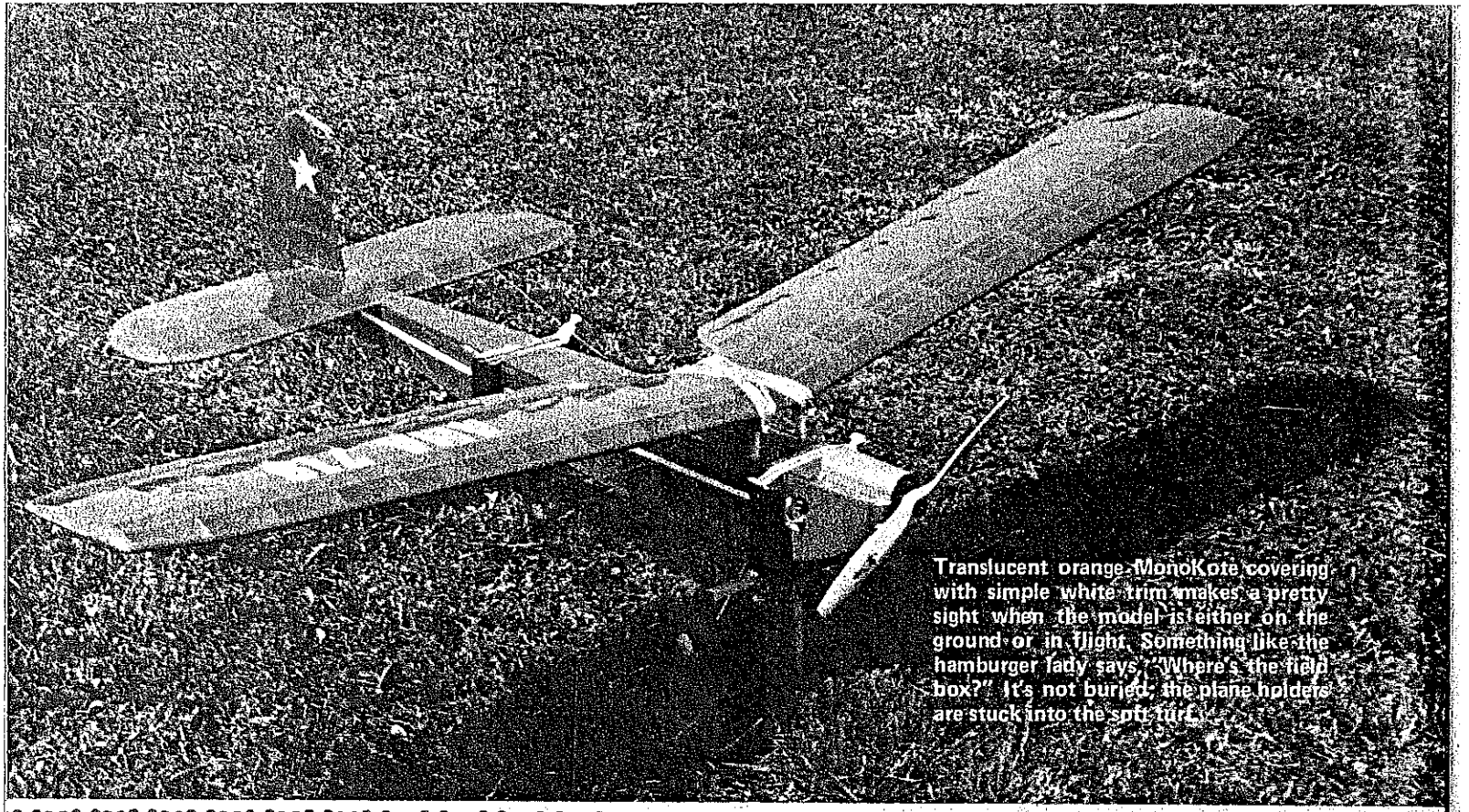

Translucent orange MonoKote covering with simple white trim makes a pretty sight when the model is either on the ground or in flight. Something like the hamburger lady says, "Where's the field box?" It's not buried; the plane holders are stuck into the spit turf.

Bill Winter

LeCrate

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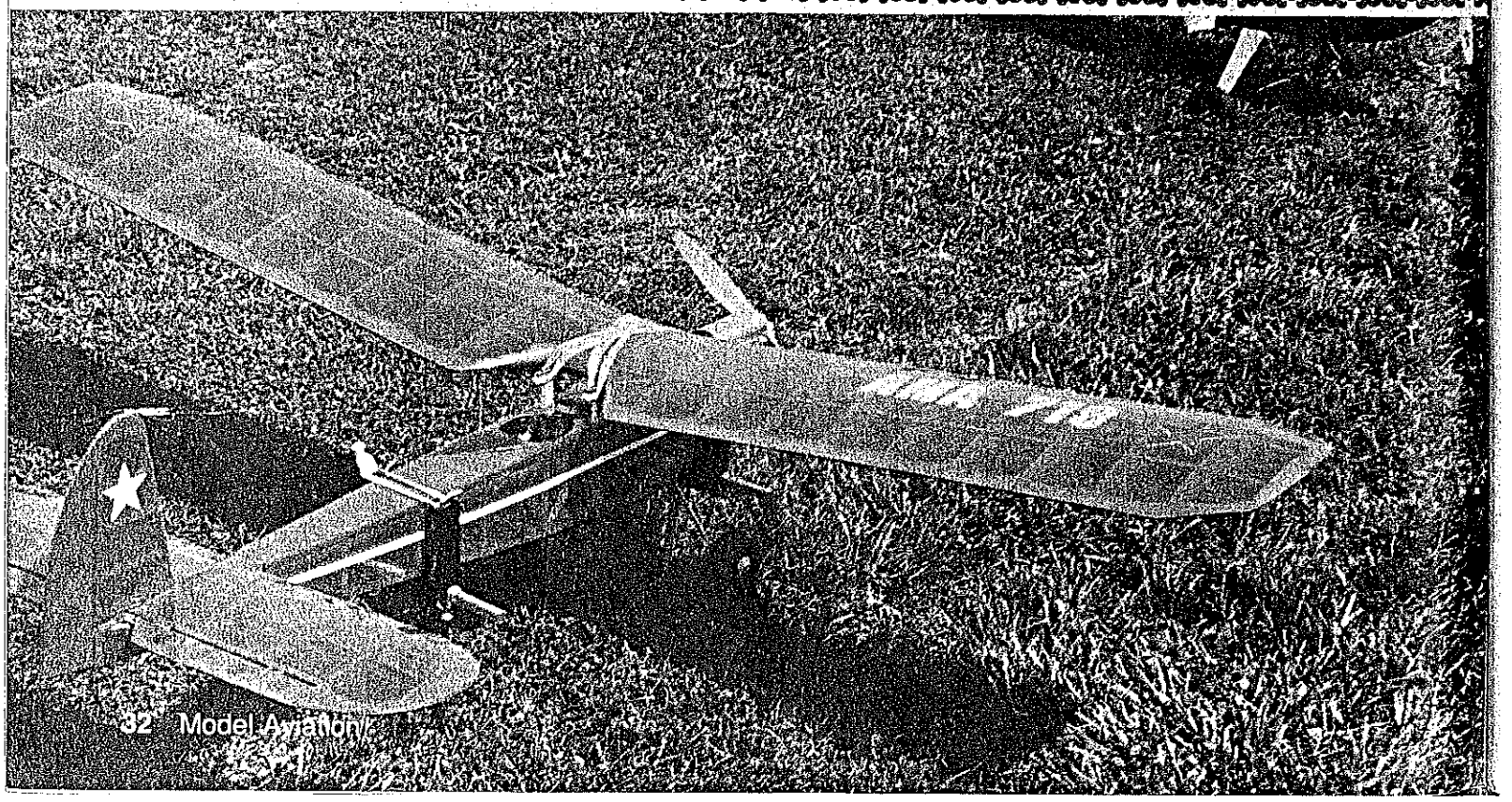


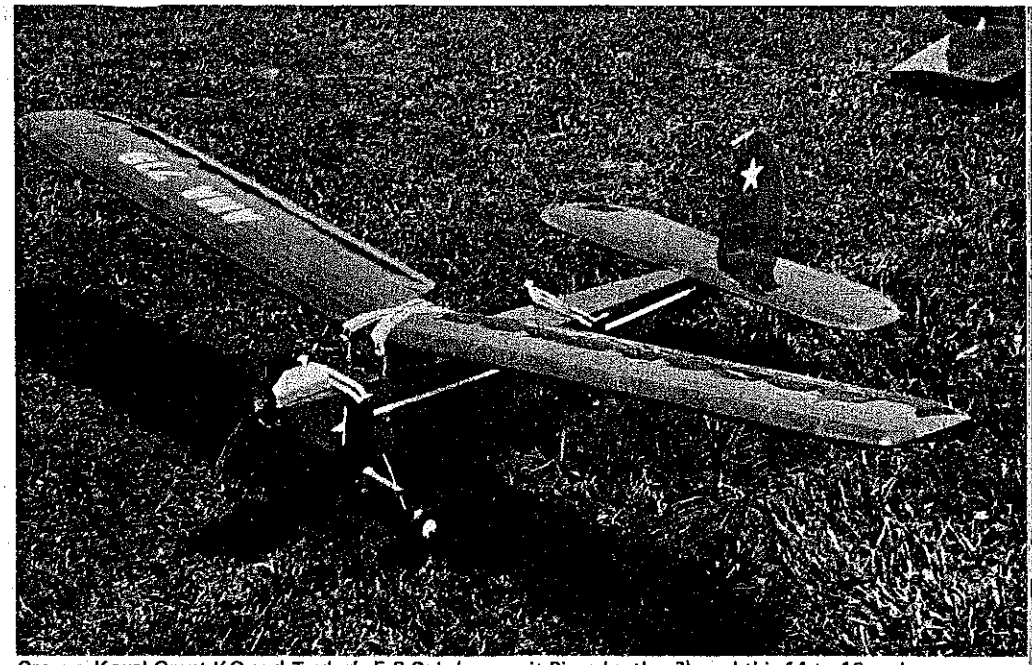
I AM WELL PLEASED with this, my first, Electric airplane design. It has been thoroughly tested in parasol and cabin versions, and with a variety of power systems. It is a good aircraft. One must think twice before inflicting his first of anything on a public which includes a large number of experienced modelers in any design category. I can do so because I have had so much help from many good people—the manufacturers, columnists like Mitch Poling, and through my own column, perceptive inputs from pioneers like Heinz Koerner, Bob Kopski, Gus Munich, and (firsthand in many flying sessions) Don Srull. With such a treasure trove of information, an old FF Rubber and Gas flier (with 36 years of RC sport flying)

If fun flying is your cup of tea, you'll certainly enjoy Mr. Fun's design for his relaxed style of RC Electrics with 10-min.-plus soaring flights in mind. His has been flown mostly with a Leisure LT-50 with gear reduction, but it also flies quite satisfactory with other 05-size electric motors—either direct drive or reduction. It's your choice whether to build it with parasol wing mount or a cabin—though the conversion from parasol to cabin can be quickly done.

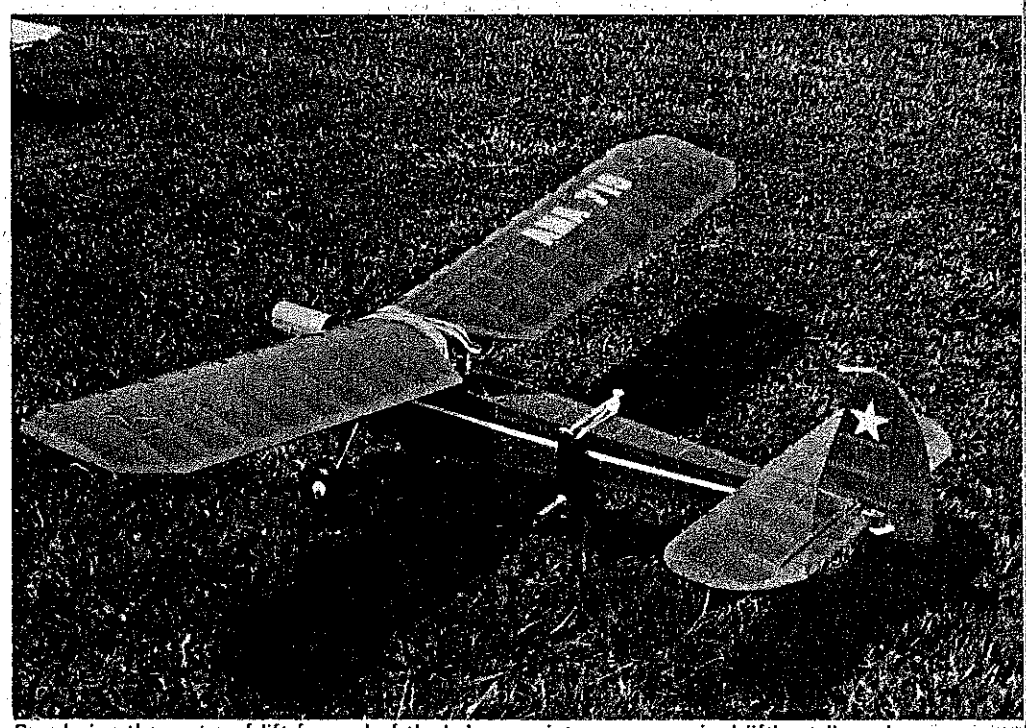
has no excuse for failing to attain a specific performance envelope.

There is much to be said about *simple* electric and piloting techniques, so this is not a construction article in the usual sense. If you can build a model with open framework construction from a plan, you surely don't need me to tell you how. (Pictures show some key points.) Whether you may already be into Electrics, or just a glow-engine RCer not inclined to "bother" with Electric "stuff," why should you build this model? The best answer is to tell you why I did—and why, and how, I found Electrics worthwhile.

(Note: The plan shows a Jomar controller rather than a three-servo setup. This is op-

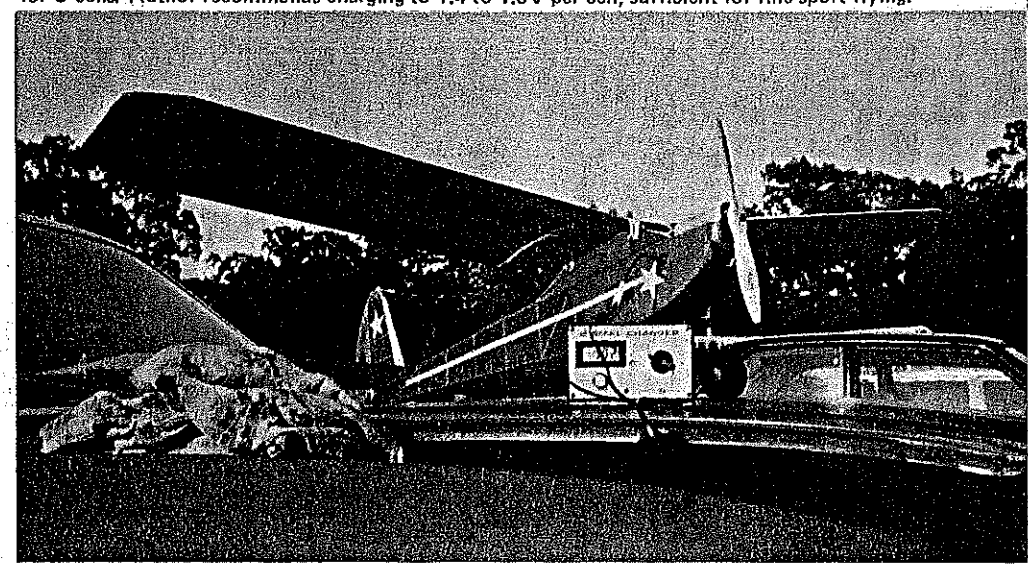


Cross a Kovel-Grant KG and Taylor's E-2 Cub (or was it Piper by then?), and this 14 to 16 mph relaxer could be the result. Installed here is a 2½:1 geared motor, 6 cells, and Rev-Up 11-7½.



By placing the center of lift forward of the balance point, a generous-sized lifting tail can be used to increase total lift. Wing tips are reminiscent of those used by Bellanca and Wittman.

Digital charger allows precise monitoring to 100th volt. Peak charging reads approx. 10.5 volts for 6 cells. Author recommends charging to 1.4 to 1.6V per cell, sufficient for fine sport flying.



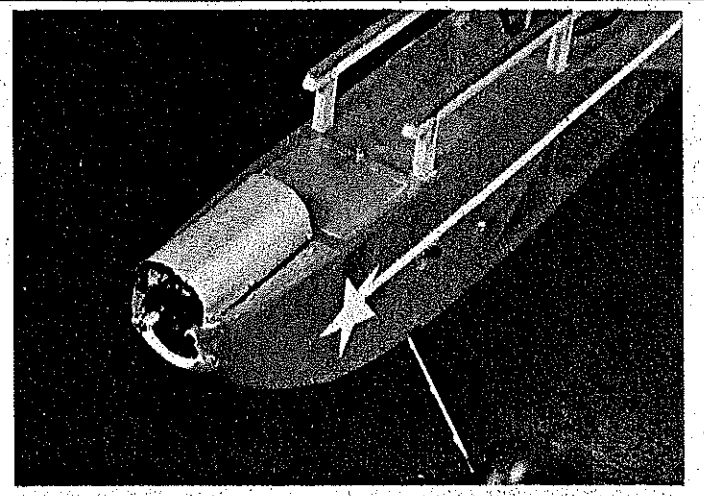
Don Srull gently eases LeCrate into the air (with Bill Winter controlling at left) at a site with deep grass. On a paved surface, takeoffs are automatic without needing control input. This is the cabin version, which has better spiral stability than the parasol—due to the added side area.

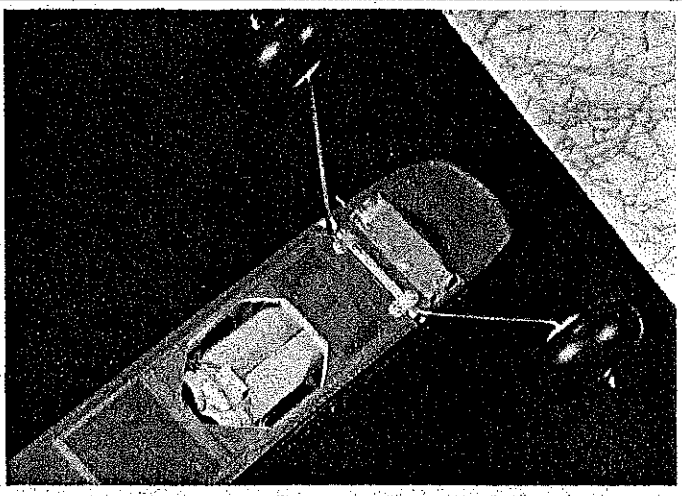
tional. If you use an on/off servo with a microswitch, locate them in the compartment in which the controller is shown.)

I enjoy glow-engine power, but I build Electrics, too. I find both essential. I find Electric is a pleasant addition that allows me to fly in ways and places that otherwise would be difficult or impossible. Electric missionaries bear down that Electric is silent (or nearly so!), that you don't need a heavy field box (if you can park your car nearby). That you don't need to wipe off airplanes. That you flip a switch and fly. You've heard that litany. Basically it is true. However, there are some needed things, and no airplane can fly without some effort—believe me! Let's translate this into real life.

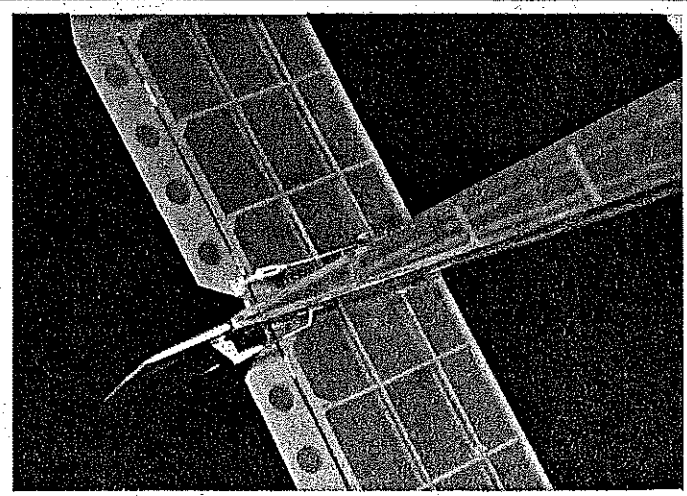
Depending on the design, the kind of flying you like to do, and the propulsion system, you may, or may not, be able to fly Electric wherever you want. (I fly from some "funny" places.) Like Rubber or Gas, there is an energy limit for any plane. With a big tank, you can fly an RC all day, if that turns you on. Beautiful rubber-powered flights are made with a relatively short expenditure of energy. Electric has its own spectrum. You can cram an Electric full of batteries and a high-rpm motor and climb like a rocket—and dump all that energy in a couple of minutes. Or you can design for high soaring flights and gentle performance, expending that energy over a 5 or 10-min. (or even greater) period. The range of design and performance goals is wide, indeed.

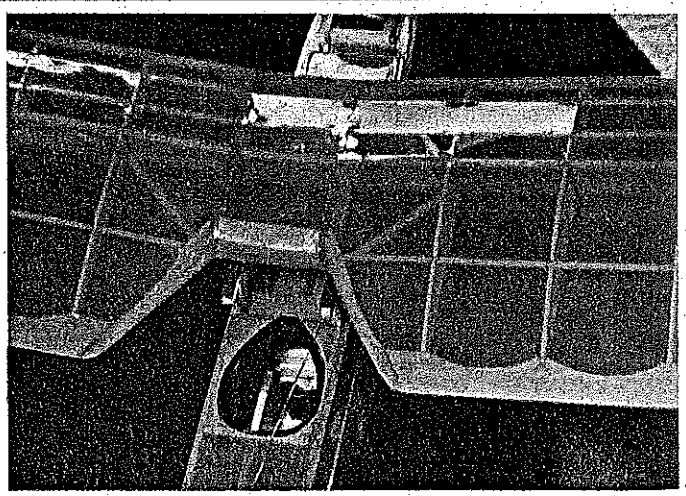
If the mood strikes me, I can let LeCrate take off from the street. I have had 30-min.



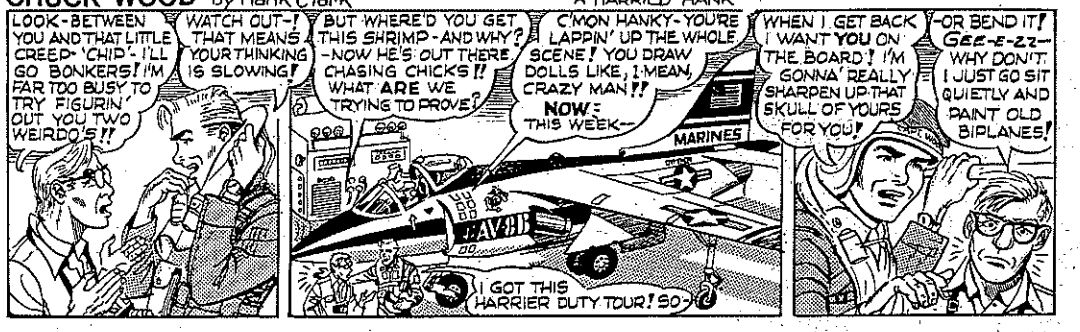


Left: Nose of the parasol version shows the removable cowl (made from an aluminum printing plate), cabane structure, and access hatch to the compartment for charging jack, switches, connectors, and Jomar speed controller (a shut-off servo may be substituted for the latter). Right: Opening provides access to the battery and cooling air flow; later, the opening was enlarged, as per the plan. Has a torsion-type landing gear.

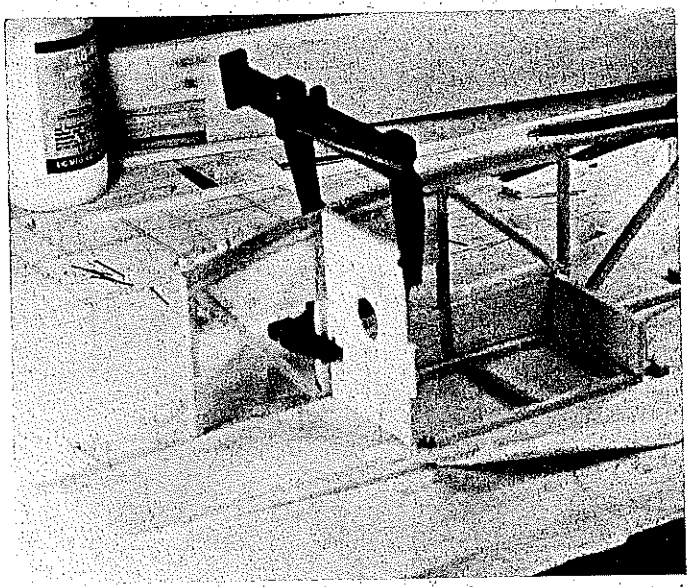


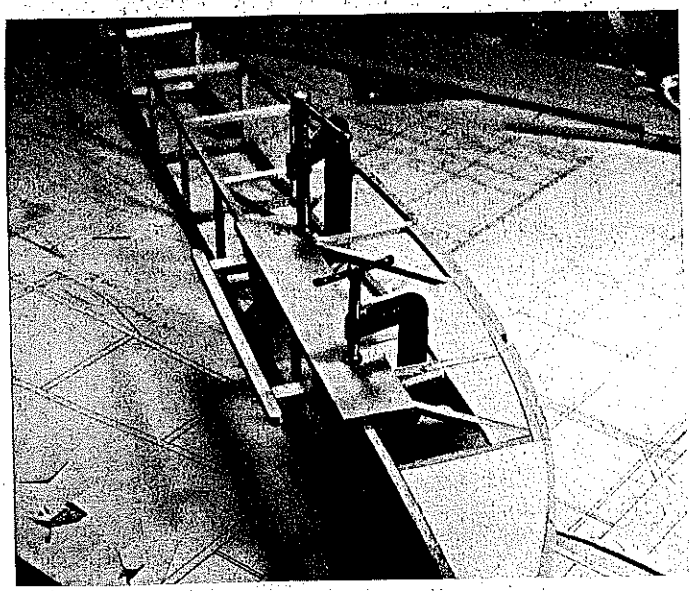


Left: Beneath the tail we see the horns and shortened clevis rods which attach to 3/16 sq. firm balsa pushrods. Right: Center wing section cutout sacrifices a bit of drag for the sake of whimsy. Original wide trailing edge was scalloped to save weight; narrower T.E. per the plan is adequate.

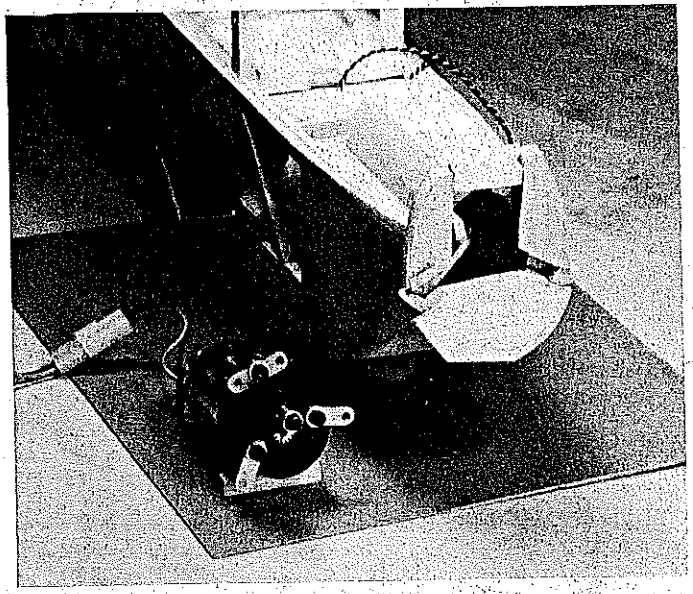


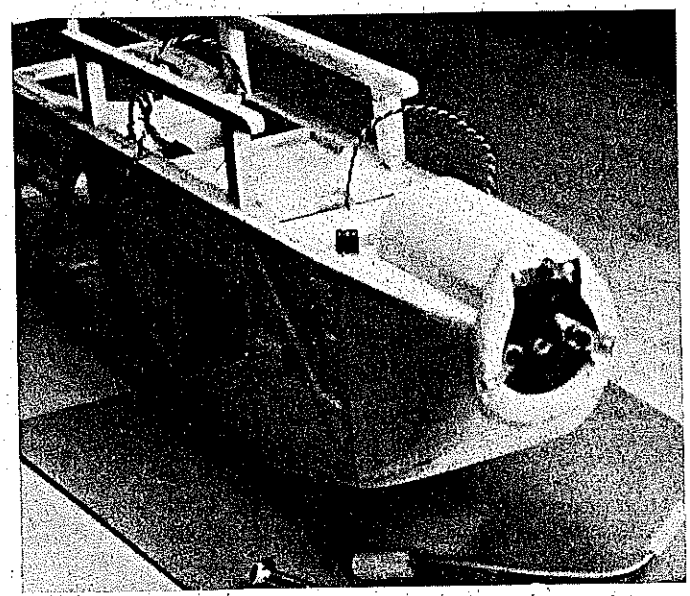
3/16" SQ. MEDIUM BALSA POST AND L.E.
3/16" SOFT BALSA TIPS
1/32" PLY STIFFENER
3/16" FIN ANCHOR BLOCKS
ROCKET CITY STRIPS
1/4" PINE ELEVATOR TIE THRU FIN BASE BLOCK
1/4" SHEET ELEVATORS
3/16" HARD L.E.
3/32" HARD SPARS
3/16" BRACE BOTTOM
1/4" SQ. SPRUCE RAILS (2)
1/4" BALSA T.E. NOTCH FORM
HOLLOW OUT
1/4" BALSA 'COAMING'
1/4" BLOCK ROUNDED
1/4" SQ. SPAR
3/32" PLY SKID
3/16" SQ. LONGERONS AND BRACES THROUGHOUT
3/16" SHEET TIPS
1/32" PLYWOOD WING JOINER
1/4" X 3/8" SPRUCE CABANE STRUTS
3/16" SHEET HATCH CUT FROM 'DECK' FILLER
1/4" X 3/4" BALSA T.E. STOCK
ALUMINUM HOOD
1/32" SHEET WEBS (3 BAYS)
3/32" SHEET ALL RIBS
ALUM. MOUNT STRAPS (3)
3/32 SQ. SPAR TOP ONLY
1/4" SHEET TIP T.E.
LEISURE LT 50 ELECTRIC MOTOR
SANYO SUB C BATTERIES AND SUPPORT HOOKS
250 MAX. BATTERY BOX
3/16" SQ. LONGERON DOUBLER TO E
3/16" BALSA NOSE FORM
3/16" BALSA FILLERS/REINF.
1/4" SQ. HARD L. EDGE
3/32" PLY STA. 'A'
NYLON CLIPS
VENT OPENING
3/32" PLYWOOD L.G. MOUNTS
BLOCKS MOUNT HEAT SINK
NO. 8 TREXLER WHEELS
3/16" SQ. HARD MAIN SPARS TOP AND BOTTOM
1/8" SQ. NOSE SPARS TOP AND BOTTOM L.E.
3/16" SHEET BOTTOM-SIDES
CORNER FILLERS
3/32" PLY STA. 'C'
3/32" TIP
BLOCK TIP FILLER



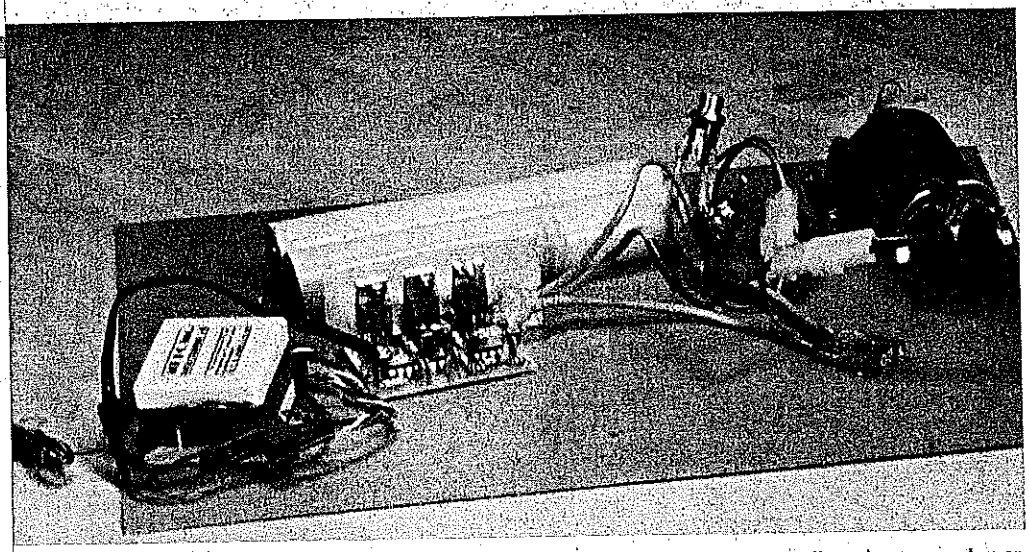


Left: Top longerons glue to the sides of the top nose sheet. Jigged by two clamps, the Lite Ply main former is self-aligning. Note that the bottom longerons are laminated through the cabin area. Right: After the spruce cabane is precisely assembled over the plan and index-marked to align with the fuselage top, each side is clamped in place for gluing (note that ply is used to prevent the clamps from marring the structure).





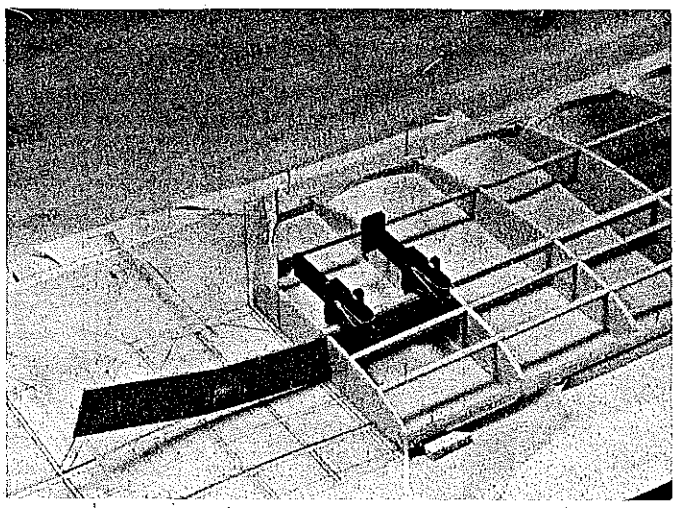
Left: Alternate nose can be shaped from soft scraps if preferred. Ply nose ring lies behind the front scraps with slots cut to take the aluminium motor mounting tabs of the LR-50 motor. Right: Nose roughsanded to shape, the motor being trial-fitted. Take care to avoid any thrust setting to the left or up. Thrust-line adjustments can be made by inserting thin shims between the tabs and the nose ring.

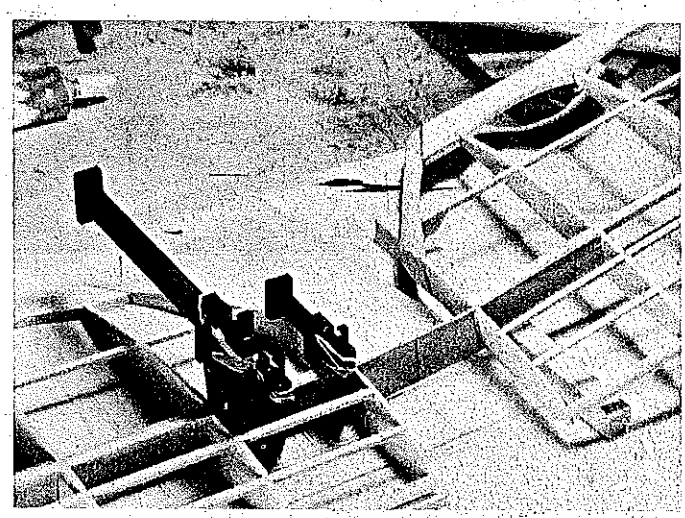


Power system hooked together for pre-installation check. Six sub-C-cell pack at rear, Jomar controller in front of the battery. Holder for Radio Shack 20-amp blade-type fuse is soldered into the positive motor lead. If using a shut-off servo, a microswitch is required.

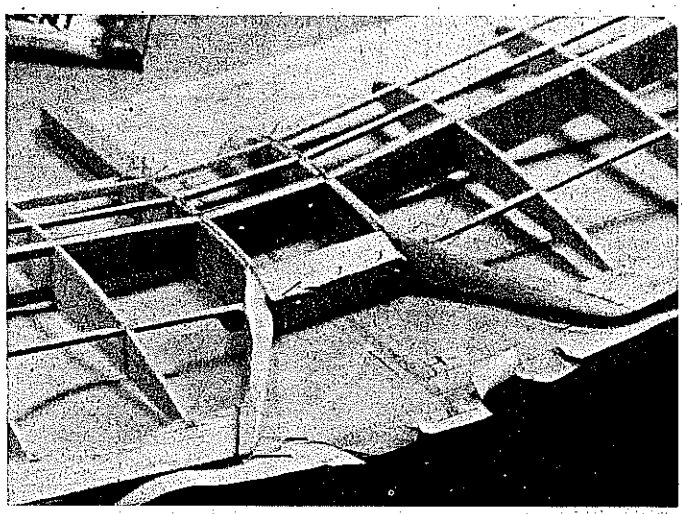
soaring flights from some out-of-the-way field—flying sites are everywhere. Schoolyards, athletic fields, and occasional parking lots are convenient airports—some are less than four blocks away. People don't notice you flying. A kite is equally non-offensive. Joggers circle a track, kids play ball, and no one looks up. You are ignored. An occasional kid becomes interested in the Trexler air wheels—that's it! And if you share flying with one or two other guys doing the same thing, you have a low-key flying session no different from Rubber Scale except for a far higher degree of performance. This does not eliminate glow—it adds to it.

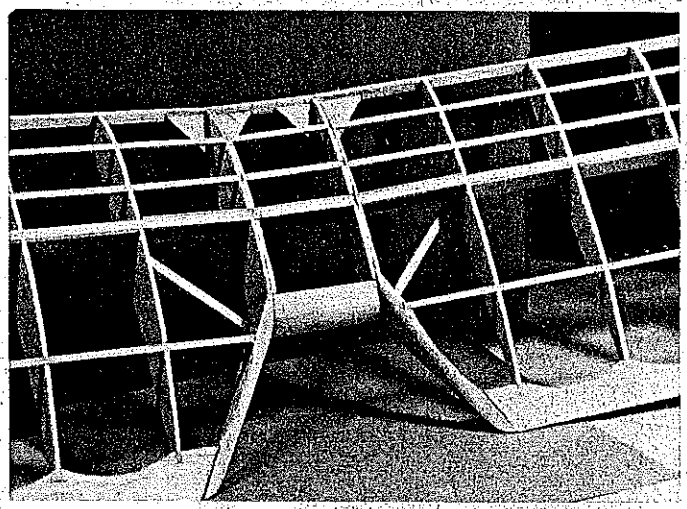
Electric is unique in that it offers a thousand-in-one combinations. You don't build "anything" because it is Electric. You design for opportunities. I zeroed in on the 05-size motor, currently the most popular for sport flying. I've seen 05s zing little crates like the Goldberg Ranger 42—on direct drive. Many start enjoying a lazy Gentle



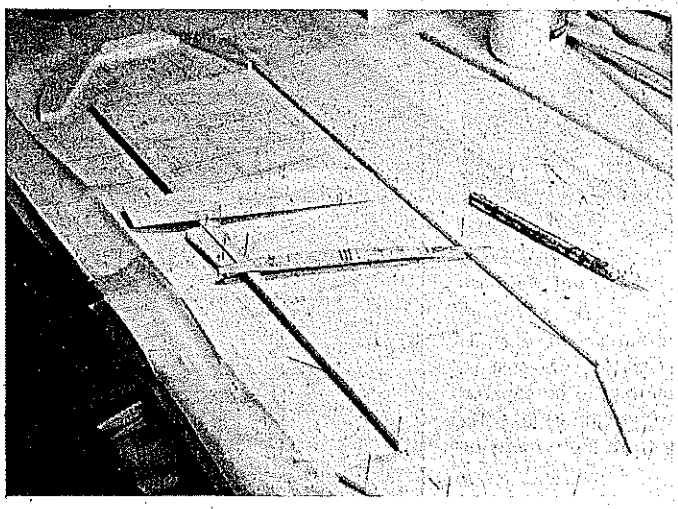


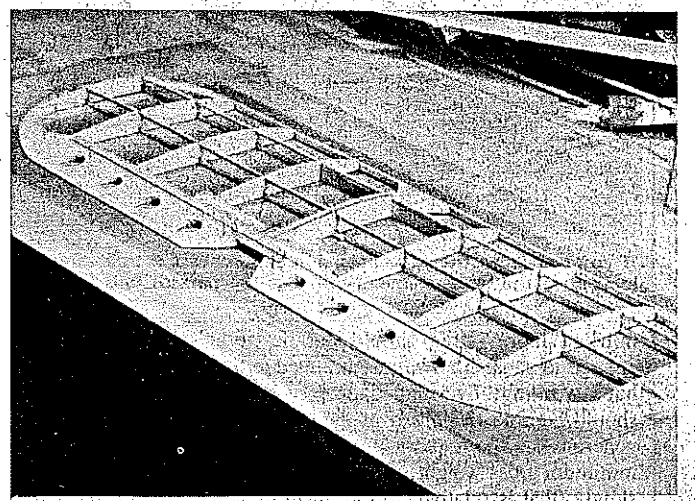
Left: Single full-depth 1/32 ply joiner is clamped and glued to the main spars of one wing panel. Right: After blocking up the first panel, the joiner is attached to the opposite panel. It's a good idea to study all the pictures, the plan, and Hank Clark's cutaway before getting started.





Left: Center section pieces glued in place. Front of cutout is two pieces, not a solid block. Right: After the center section has been completed, leading edge gussets (with diagonal grain) are added. Note the diagonal supports between spars, and vertical-grain sheet webs behind the spars.

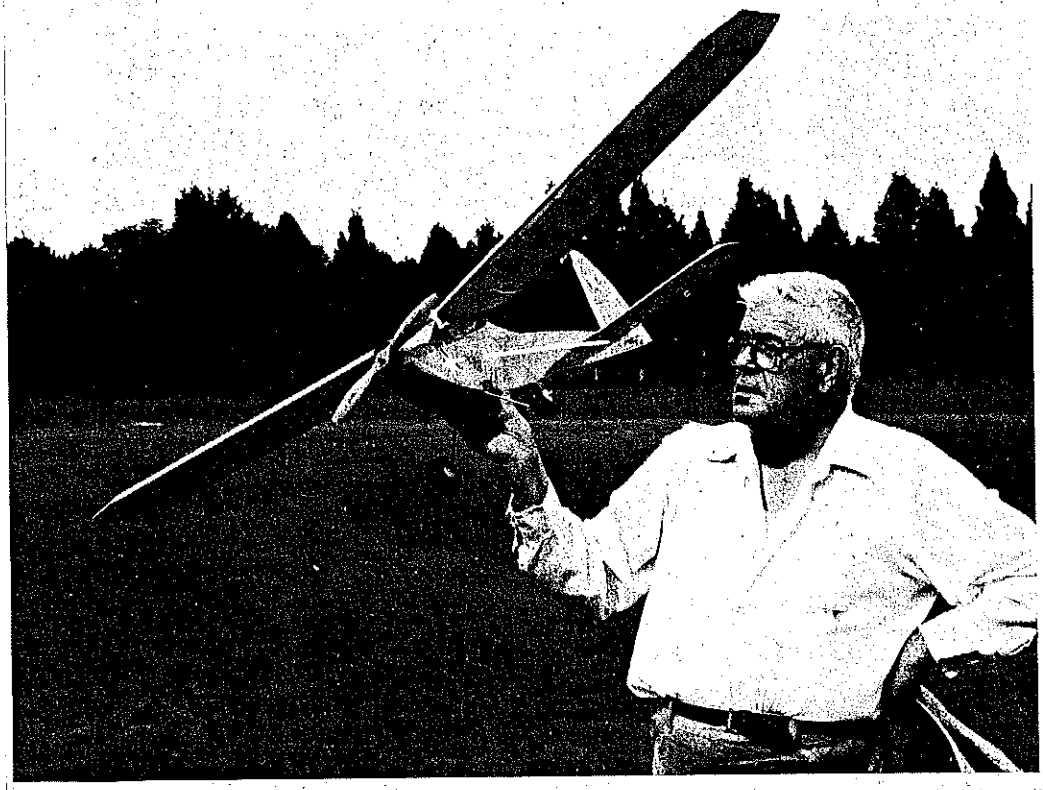




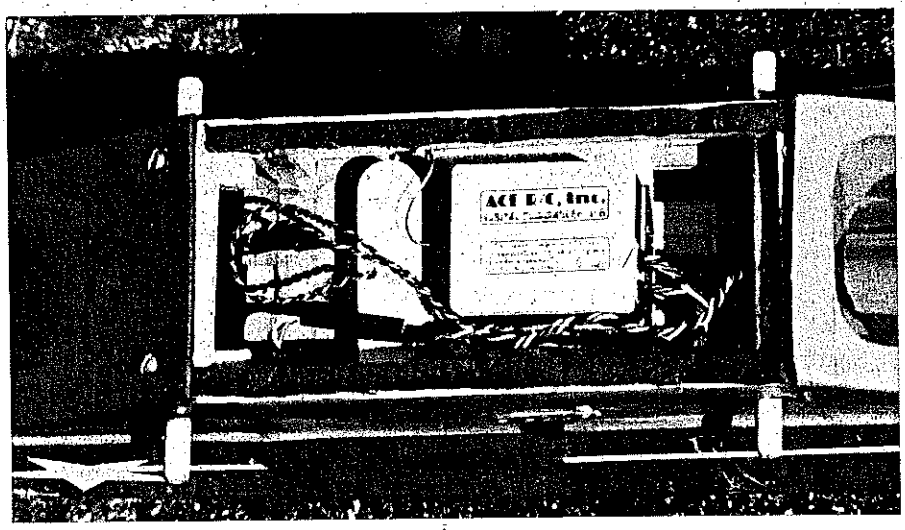
Left: Stabilizer partially assembled. Note thin ply rib template and ribs still stacked after sanding. Notches will be cut with a Zona Saw. Right: Completed stabilizer. Elevators have been assembled and aligned in the cutout area. Center ribs form a slot for the vertical fin.

Lady or Drifter, etc. with the same combination—that's ideally with a 7-3½ or 7-4 nylon prop. But I also have seen 05-powered planes all the way from a scant 300 squares up to 720—using various gear drive ratios and turning giant folding props at only 4,000 or so rpm. Those fans produce enormous thrust. With reduction, the Playboy on an 11-7 is a majestic, easy-to-fly, slow (but high climbing) ship that snares thermals. That has 570 squares. Srull's Electric Sparky with 460 squares is a superb machine on the 05, using everything from an 11-7 up to a 20-in., high-pitch folder, with ratios of 2½, 3, 3.6 and even (homemade) 5-to-1. This set the stage for the LeCrate design presented here. I know *fun* when I see it.

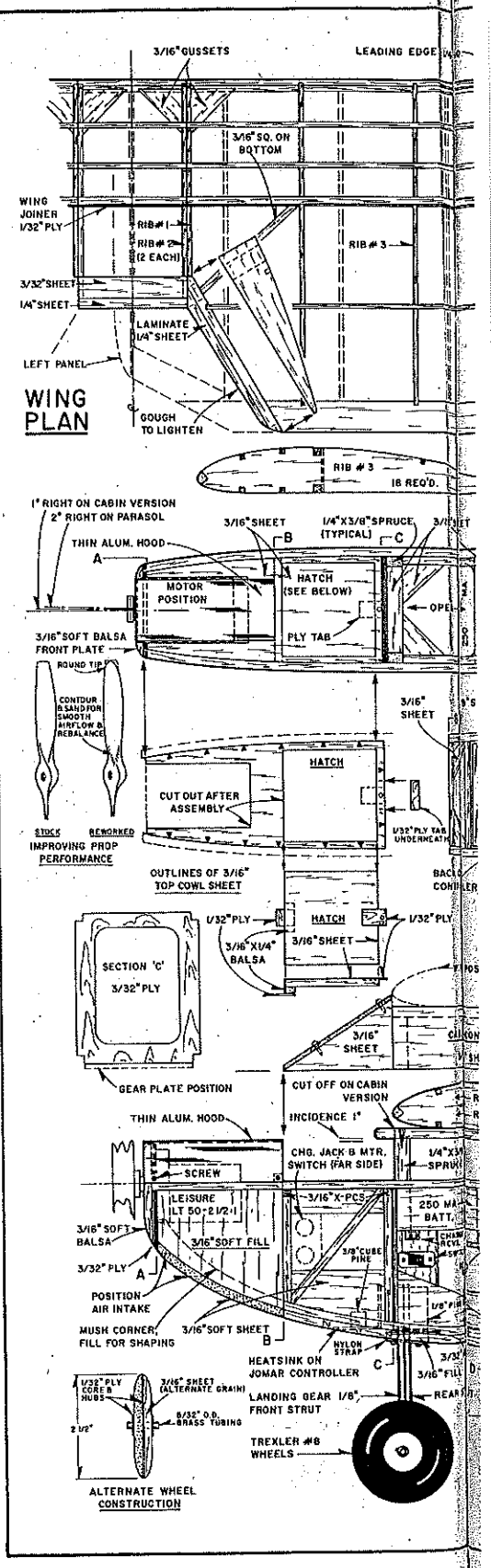
Design objectives. I like to watch planes fly on their own. (You may like aerobatics.) This requires Free Flight stability, maximum motor run time, and an excellent glide. LeCrate would have to climb steadily for at least 5 min. to reach a high altitude (as high as one dares to go). The wing loading should not compromise floating and slow circling glide for lift seeking, or cause fast approach speeds. Duration capability had to be 10



Bill Winter was snapped with the cabin version after the 46th test flight, then with a seven-cell battery and 2½:1 geared motor driving an 11-7 Rev-Up prop. Near press time, the author was trying a cobalt 05 direct-drive with 7-4 prop and getting 8-min.-plus flights. With an LR-50 motor geared 3.8:1 and a 14-10 folder, he expects to get flight duration into the 14-min. range.



If you start with the parasol version and convert it to a cabin, the airborne radio gear will be located in the upper cabin. Note that the parasol rails have been cut off in front and back.

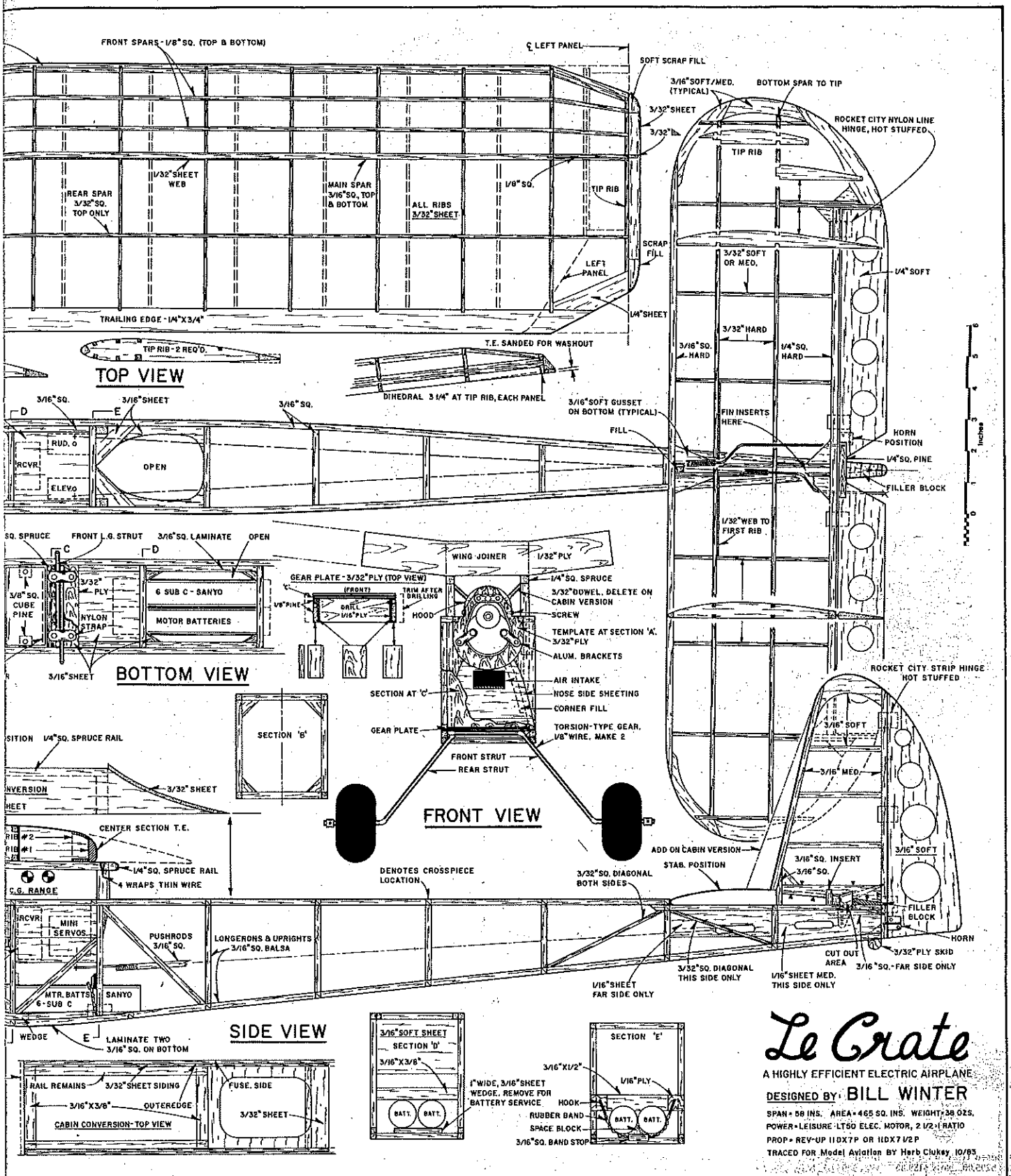


min. or more. Drag should not be great enough to cause high battery drains due to a hard working, overloaded prop. (A prop should be able to unload in the air.) Since generous area is required for duration (and minimum gross weight), the plane had to fly slowly (that is relative) to minimize drag. I chose a 58-in. span. By chance, this resulted in the same area as the Electric Sparky—460 sq. in.

Since I was not scaling-up a classic Rubber job (as Don Srull did with the Sparky) I could use a smaller fuselage and stumpy landing gear. To enhance a slow glide, I resorted to Free Flight experience calling for a large area, lifting-type stabilizer with an aft center of gravity (CG). Sparky has a 10% airfoil. I sneaked up to 13% or so. Anticipating possible publication, a parasol configuration was chosen—ala Q-Tee—just to be interesting. The plane had to be capable of automatic (don't touch anything) takeoffs or easy hand launching from high grass, or in very confined sites.

To offer a builder's choice of parasol or cabin, or *both*, the design was executed to permit building as a parasol, then adding a simple sheet balsa cabin (requires cutting short the parasol mounting rails when you make the change). You can build it one way, then change, or build it as a cabin to begin with. The parasol with the dihedral given will require much more use of the rudder stick—the cabin is more spirally stable and will fly hands-off better—with only occasional rudder inputs needed for "touching up" circling diameters.

The first three flights as a parasol were 6 min. plus, 8 min. plus, and 14 min. plus. Normal "dead air" times after sundown—cool, heavy air—on 5½-min. runs with a six-cell pack, 10:30 to 10:45 total. A glide time almost equal to motor run time is not bad, especially when using an 11-7½ nonfolder, which may eat up as much as 40% of



the potential glide time. On a 90-degree, humid day, total time is off by as much as 1½ min. This is full-scale stuff, raw-truth aerodynamics which you never perceive with almost unlimited glow-engine power and "reserve fuel."

How about weight? A good range for an 05 electric motor is considered to be 35 to 45 oz. To make things a real test, I had used an Ace Bantam receiver and Bantam servos. These are not minis. Still, weight was only 39 oz. on six cells. After changing to a cabin, and the usual wear and tear, it became 41 oz. The plan shows World Engines mini servos (which I use), and if you use a mini receiver as well, you will come out close to 35 oz. with six cells. I use a 250 mAh receiver pack; if in good condition, it provides over 60 min. of flying time—actually more, since I use only two servos and do very little controlling (so there is little servo drain). A good 100 mAh pack will yield about 40 min., but one should change such packs during a flying session or use a field charger, especially after every long soaring flight. I usually won't fly longer than 30 min., but on

Continued on page 40

occasion you might want to soar for an hour or more—so watch it!

Motor and prop. I use the Leisure LT-50, an 05, with a 2½-to-1 reduction gear box. At this stage (as the plan shows), I used the standard six-cell pack as it comes. These are Sanyo batteries, Sub-Cs. Prop is a Rev-Up 11-7½—also has been flown with an 11-7¾, 11-7, and a deBolt-reworked Rev-Up 11-7 (he removes material around the hub, streamlines the root, undercuts a bit near the hub, thins the blades, uses sharp edges, tapers the outer tip slightly, and rounds the actual tip—it does unload, and it gives better climb).

I limit the motor run on six cells to 5½ min. At high altitude it is impossible to know when the motor power fades. It takes a long time before you can detect loss of altitude, and if there is any lift, you will be deceived. You must time the motor run. I have used six min. occasionally. If the run is too long, batteries will overheat. Further, you want to have reserve power for extended approaches or for a go-round if too high. A 5-min. motor run is safe.

Gross weight does not tell the full story. Equally important is the ratio of battery weight to the gross. Srull probably will publish test results, but I am privileged to use his data. With equipment for measuring rpm and current drains simultaneously on any motor and prop combination, it is possible to select optimum combinations of motor, prop, and batteries for any given design. The bottom line is that a percentage of battery weight to gross of 20% is the minimum for reasonable performance. You might fly with less, but 20% is a bit "doggy." The optimum percentage for planes like LeCrate lies between 25 and 30%. It is difficult to obtain 35%, though in a sailplane type you might reach 40%. For example, 30% battery weight on LeCrate at 35 gross would be 10½ oz.; at 45 gross, this becomes 13½ oz. However, when I flew on seven cells, I found that, *for this plane,* I was getting diminishing returns—unless a folder was used. I also flew the Astro Cobalt 05 direct drive on a 7-4 nylon prop, but only with seven cells as used for final tests with the LT-50.

Pilot technique. As so far described, LeCrate is amazingly insensitive to trim when using an 11-7½, regardless of the CG range shown. The big freewheeling prop dampens out all sorts of things. With a big non-folder, I find that as I cut power, I can immediately apply full up-trim. This merely keeps the glide speed from accelerating. As you glide it is possible to gradually add back stick (with the forward CG) until you are holding both full up-trim and up elevator! Normally, too slow a glide always has a higher sink rate, and anything near the mush point is not good. But with a big prop—it will freewheel against the drag of the motor magnets fast enough for you to hear the drive gears at high altitude—any faster airspeed spins the dead prop more rapidly, and the glide time is cut by 50%. The slower the glide, with a big prop, the higher the duration—unless you

use a folder.

The folder will not always fold unless the motor is stopped from freewheeling. The prop can be stopped either by projecting an inner Sullivan rod from the shut-off servo, or by a motor brake resistor.

For takeoffs and climb-out, a couple clicks of up-trim are set before flying. You may need an occasional tap of up-stick after launch. Once up to speed, the climb is steady, hands off. I find it best to allow very large left climbing circles (I think left circles climb better than right) before heading straight upwind—very important if there is any turbulence from upwind trees. With its lifting tail, this plane is climbing when it appears to be in level flight, but do set in a bit of up-trim to accomplish a slight climb attitude. Don't try steep climbs or allow the model to hang on the prop—this produces a higher battery drain and a shorter, lower flight. As the plane climbs high and, say, 3 min. have passed, remove some up-trim to reduce the climb angle slightly. I find this allows a longer motor run.

Since you will be compelled to circle many times under power because the plane does travel far, use those circles for locating lift. Frequently, you find lift before the power is gone, and you can shut off the motor—leaving good reserve after losing a thermal for a continued climb and lift search.

To confine the plane to a desired sector of the flying site, and to search for lift, adjust rudder trim to the right—I find right glide turns more effective than left in finding and using lift. Don't slow the plane to an extreme. When in lift, a fairly fast glide is best for this purpose, not too overbanked, and not diving around the downwind side of the circle. (In strong lift it matters less that the freewheeling prop is a minus.) If you get that glide trim established, on both elevator and rudder, go hands off, using the rudder only for widening or tightening circles. In lift, the plane locks into natural circles. You could put the transmitter down (on the cabin version).

My cabin version tends to glide straight upwind after losing a thermal—then tends to turn slightly either to the right or left, depending on the nearness of lift. On getting into lift again, it will go back to the automatic right turn if you have left the trim alone. I have no explanation whatsoever. I see no duration changes when flown at either full-forward or full-aft CG. However, the front position requires more up-trim for the glide, and you may even reach full up-elevator as time passes. At the rear CG position, less trim and stick are involved, possibly no back stick at all.

An interesting thing happened when I tried seven cells—also moving the CG ⅜ in. back of the aft position shown on the plan. When power was cut, only two or three clicks of up-trim were required—suggesting that a perfect CG could lie aft of the 50% chord point.

Since the glide is long, one has minutes to play before thinking of an approach. I use this period to continue wide circling, some-

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times encountering lift again. When down to about 200 ft., I glide back and forth at 90 degrees to the line of sight, always keeping the nose slightly crabbed into the wind, and never turning downwind. At about 100 ft., I go into a wide downwind leg, coming around a continuous curve onto the approach, but at an intended low altitude to prevent overshooting. Then I add a touch of power to drag the ship just enough to assure hitting the spot.

Jomar controller. Although there are several electric motor "throttles" (controllers) on the market, Joe Utasi had asked me to evaluate the one he described in an *MA* article, produced by Jomar. It replaces the third servo normally required for motor on/off or three-position by means of a microswitch. I use it for on/off, altitude control for landing patterns, touch-and-goes, and for late landing approaches where any tiny, steady increment of rpm can be added, or tooled, at will. Very nice, that. Also, I use it for turning on the motor for takeoff or when hand launching. When the model is high in the air, a slow stick movement of the controller minimizes gear strain—which can be serious with bang-bang on/off power when driving big props. (It is vital to use the specified diode, as directed, across the motor.)

Seven Cells. The climb speed and rate is higher, of course, and controls are more solid. On LeCrate I find no duration improvement—I suspect it is a bit less. I have used 2½-to-1 and 3-to-1 gearing with a Rev-Up 11-7 and 11-7½, respectively, and 3.8-to-1 on the same Leisure with a deBolt reworked Y-O 12-7 prop—but I find the added weight of one more cell produces a faster glide (for my 460 squares) and drives the prop faster in freewheeling. There goes the potential! (At this point, the model should have a folder. Also, I shut down at 5 min. (I begin to worry at 4½ min.!) rather than 5½ as was done with six cells. Diligence must be exercised to slow the glide with seven cells, and with any bigger non-folding prop, even more sink is noticeable (as compared to six cells). It shows on the watch.

Cobalt 05 Direct drive. The nylon Top Flite 7-4 really hums on seven cells. I was surprised after hand launching that the plane had a faster, more solid power performance, and that I could shut off at about 5 min., at approximately equal high altitude. It would take prolonged testing with two people to determine if there is a difference in total time. The big selling point for a cobalt motor is the ability of its brushes to handle heavy drains. That's big in competition where great power is demanded for a shorter motor run. But I noted less battery drain in comparable reduction-drive arrangements with similar props. That spells a longer motor run potential. I find the direct-drive Astro Cobalt 05 quite acceptable on LeCrate.

One can consider the new Super Ferrite motors, too. One in particular is a sleeper.

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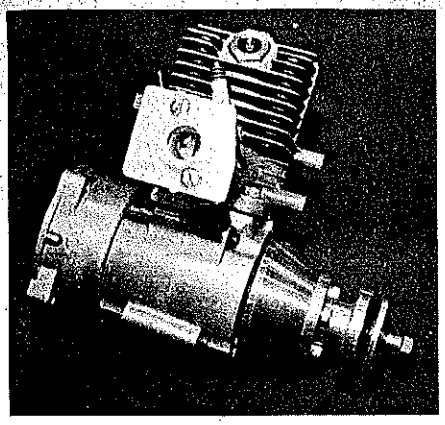
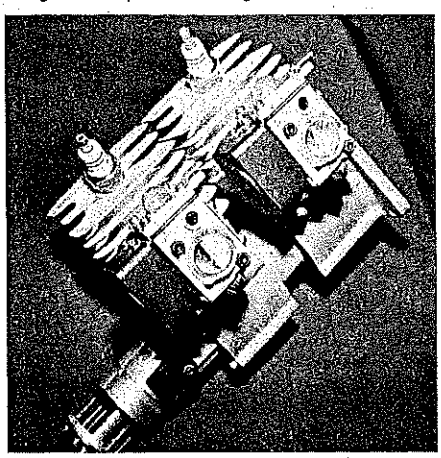


Bob feels the Quadra Q50X glow engine looks almost naked without the flywheel and magneto. With glow, the power is up and the weight down, but with higher fuel costs.



The King 70 In-Line Twin—and another view of the new Walbro carburetors. Instead of choking, you press the flexible clear plastic bubble to prime the engine.

lumbus, OH 43220.

B&B Specialties, 14234 Cleveland Rd., Granger, IN 46530.

Balsa USA, P.O. Box 164, Marinette, WI 54134.

Byron Originals, P.O. Box 279, Ida Grove, IA 51445.

CB Associates, Inc., 21658 Cloud Way, Hayward, CA 94545.

Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, IL 60084.

Don Harris, 23668 Shadow Dr., Auburn, CA 95603.

Horner Sales, Inc., 300 Dixie Hwy., Beecher, IL 60401.

Wendell Hostetler, 1041 Heatherwood Ln., Orrville, OH 44667.

P.K. Products, P.O. Box 6226, Hayward, CA 94540.

Sig Mfg. Co., Montezuma, IA 50171.

Sullivan Products, One North Haven St., Baltimore, MD 21224.

T&D Fiberglass Specialties, 30925 Block, Garden City, MI 48135.

U.S. Quadra, 1032 E. Manitowoc, Oak Creek, WI 53154.

Nick Ziroli Models, 29 Edgar Dr., Smithtown, NY 11787.

LeCrate/Winter

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Astro's 05 and 075 are identical. If you order six cells, you have an 05, if seven you have an 075. I think it will do very well (in LeCrate, that is) either direct—it turns an 8-6—or with reduction.

Using belt or gear reduction techniques, guys with Electric experience probably can obtain a duration performance boost of 25% or so over what my plane currently does. If you use Don Srull's prop techniques (shown in a past For Fun column) and high reduction ratios, I know that *runs can exceed 13 min.* Manufacturers won't believe this, but I have timed Don's planes, and I know.

In the glide, LeCrate is a totally different airplane when a direct-drive motor (seven cells) is installed. The tiny 7-4 prop reduces

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LeCrate/Winter

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drag greatly, so the glide is crisp and faster. Without the big freewheeling prop, the strange damping effect disappears. Instead of being insensitive to trim and elevator, these controls become quite responsive, and it is necessary to fly with precision to avoid partial stalls, even with trim. The first two test hops on the direct-drive 05 showed an approximate 8-min. total each. This is rather good with the seven-cell weight.

Notes: If you wish to gild the lily, there are ways to do so. I used a center section cutout for cosmetic reasons. There is a turbulence loss in that, however. Consider running the trailing edge (TE) straight across. There is nothing to stop you from playing with the aft cabin profile, running the top longeron down to the tail, starting at the TE at the cabin rear. If those top longerons blended into a razor-back, drag would go down still more, also improving the airflow over the vertical tail.

The Trexler air wheels are high drag. However, no one seems to make decent wheels for Electrics. A suggested low-drag wheel is shown on the plan. If you wish the ultimate, use that *type* of wheel. If you elect to use really big folders, extend the landing leg lengths to suit.

I mentioned a "touch of power." You may prefer three mini-servos, one to switch the motor on and off. It is advisable with a big prop, especially with seven cells, to use a three-position switch so you don't go abruptly from full off to full on. That can be tough on reduction drives, so say the troops.

As for construction, be sure to use Lite Ply where shown, and don't alter the wing joiner thickness—it is standard 1/32 ply. Be assured that the light construction will stand up. I have been hit by a CB over a paved parking lot and thought the ship a goner. I flew after the next charge! Unless you impact the nose at a steep angle, mild crackups should necessitate only minor repairs. In such a case, the power pack is a battering ram as well.

I do suggest sticking to six-cell packs for this plane, unless you experiment with things like big folders. Bring the cell voltage up to 1.4 to 1.6 apiece. I find that peak charging is not worth the bother and shortens the battery life unless done with frequent, annoying trickle-charge periods to keep the batteries equalized. On seven cells, your charger probably needs resetting to obtain more charge time, and that means you have to monitor the charger to avoid battery damage. With a 12-volt car battery, you may not be able to peak seven cells. I also recommend installing a fuse in the power circuit, regardless of what anyone says—even with three servos to allow a quick shut off. If you have a radio failure—and I have had this happen—you can lose the works when you don't have a fuse.

If you have exotic questions about Electrics, try the columnists. If you have ques-

tions about LeCrate and equipment I used, you'll get quick answers. After all, I did this to you. Don't make head-to-head comparisons of glow engines and Electrics. With LeCrate I am living a pleasant double life.

Radio Technique/Myers

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airplane, engine, and reversible-pitch propeller such that T-max = 1.3W and T-min = -.67W. Beyond that, all we need is a two-position propeller-pitch control on the transmitter—and it would also be nice to have an additional detent on the throttle to mark the throttle setting for level flight at our chosen design speed (60 mph, in this example).

For test purposes, I tried an RC-Verstell-Propeller, by J. Landert, CH-8625 Gossau, Tel. (01) 9352681, which I bought from somebody at the Toledo Show in 1981, according to the date I marked on the box. It may still be available, for all I know. It seems to be imported from Germany, is 11 inches in diameter, and changes pitch +/- 15 degrees. If the importer is still in business, let me know, and I'll pass it on.

We've finally come to the "Turnaround transmitter." Fitted to my Curare, and controlled by the Landing Gear switch to act like a two-position propeller, the Landert propeller gave me a chance to test my theoretical Turnaround transmitter. Let me comment that I was kept pretty busy, learning to fly the propeller and the airplane at the same time. In order to avoid changing propeller pitch at full throttle, I tried to school myself to Throttle Down, flip the propeller reversing switch, Throttle Up (in reverse pitch) for the dive. Throttle Down again, then initiate the pullout while Throttling Up to the detent (which I filed into the throttle-stick ratchet) for level flight. It was a lot to do, and the main thing I learned was that I need a lighter Curare. Other than that, it worked. One thing for sure, it made me very careful with my landings. You sure don't want to damage that prop!

If anyone is now thinking seriously about building a Turnaround transmitter, my suggestion is to implement the Propeller Pitch Control as a two-position affair with End Point Control. The simplest way I can think of to do that is to use a Buddy-Box-type pushbutton on Channel 5 of an Ace Silver Seven transmitter. This setup insures that the pitch won't be changed accidently by someone fooling with the transmitter. Many of the new RC systems have End-Point Adjustment (EPA) on their Auxiliary controls, so they could be used in the same way.

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