



Sopwith SE5A

a cardboard control liner

photos by the author

• More and more modelers are becoming aware of the possibilities of cardboard as a construction material, both for control line and radio control models. Cardboard is inexpensive, easy to work, lightweight and reduces building time. These models are very easy on the wallet and get you on the flying field fast with a rugged airplane that can take lots of punishment.

The SE5A is an example of what can be achieved using cardboard; the primary construction material being $\frac{1}{8}$ " corrugated cardboard. The model is built to a scale of 2"=1' which gives a wingspan of 53 inches and a wing area of 1060 square inches. The weight is approximately 5½ pounds which gives a wing loading of 12 ounces per square foot. This light wing

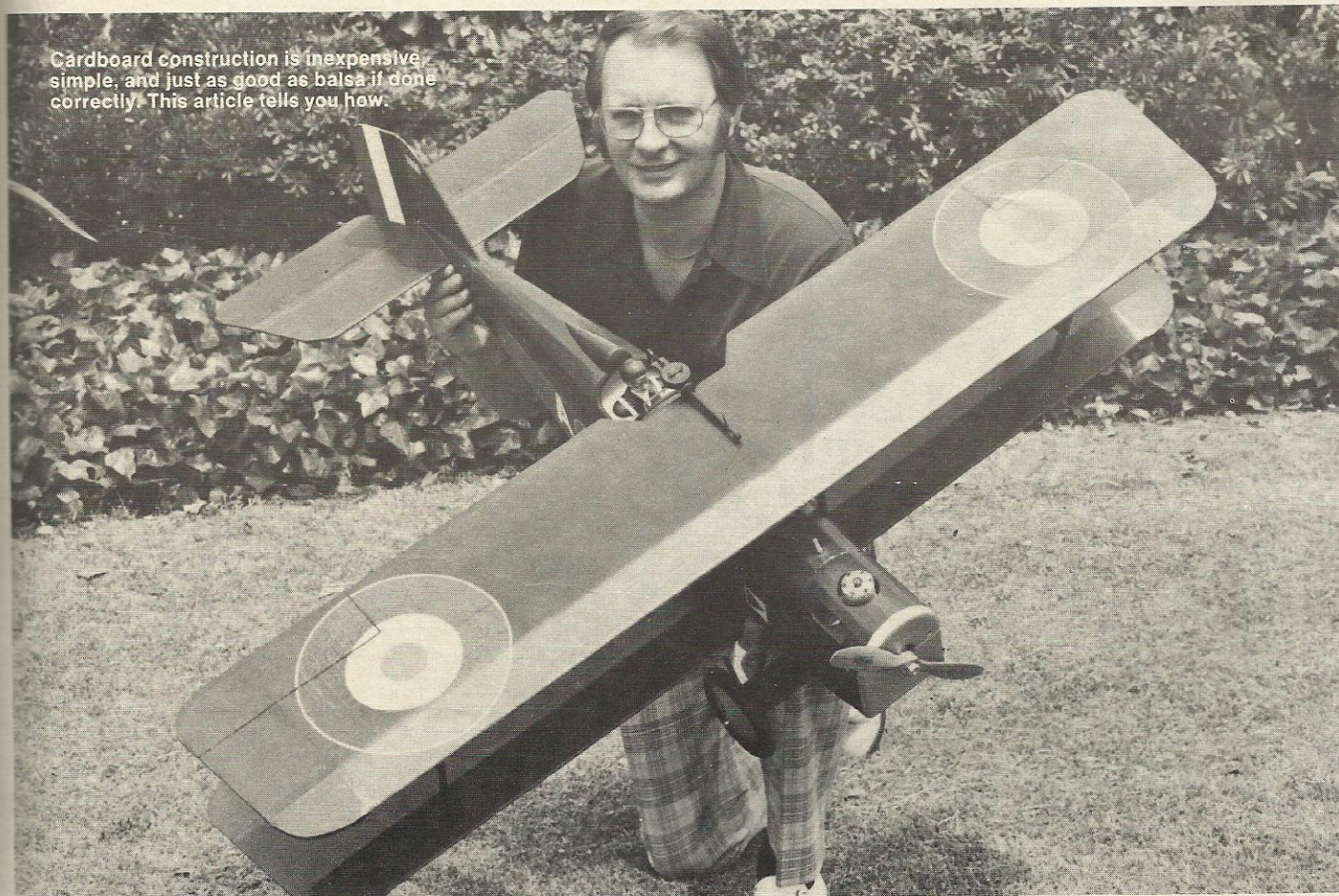
loading results in a very shallow and stable landing glide, and slow realistic flight speeds are attainable. The flat-bottom semi-diamond airfoil section results in high lift at low speeds and enhances the model's stability and handling qualities. A K&B 40 supplies the power.

The model uses both the folding and slitting methods of cardboard construction. The folding technique is used primarily for the wing, which allows each wing to be constructed from two pieces of cardboard. The slitting technique is used on the upper fuselage decking to obtain a rounded shape. Both of these methods are explained in the construction hints.

The specific material used in construction of the SE5A model is $\frac{1}{8}$ " 125-lb. test cardboard, which is the lightest weight of standard cardboard in this thickness. However, the flying qualities of the model will not suffer with the use of heavier cardboard, including 200-lb. test board.

So give cardboard a try. I think you'll agree it puts added fun (and lower cost) into constructing models. I would welcome the opportunity to answer your comments or questions on cardboard

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Cardboard construction is inexpensive, simple, and just as good as balsa if done correctly. This article tells you how.

construction techniques. Just write to me at the following address:

Chuck Felton
10459 Artesia Blvd.
Apt. 72C
Bellflower, Calif. 90706

CONSTRUCTION HINTS

Glue: Water-base glue, such as white glue or Titebond, is recommended. Contact cement is not recommended since parts cannot be shifted when gluing surfaces.

Folding: The scoring of the fold lines is done with a screening tool available at any hardware store. It consists of a handle with a 1½ inch radiused wheel at one end which is run along a straight edge on the fold line.

Slitting: Slitting means cutting through the top facing paper and the inner corrugation paper, but not the bottom facing paper. When slitting, place the cardboard on a hard surface and use a dull razor blade. That's right, a *dull* razor blade. Don't try to make a slit in one stroke. The dull blade requires two or three strokes to be made, but it also prevents you from cutting through the bottom paper as well. Reduce the pressure

on the second and third strokes, as the corrugation paper cuts quite easily. Only a few practice slits are necessary to get the hang of it. When the cardboard is slit, it relieves the tension on one side and the cardboard naturally tends to curve.

Finishing: Cardboard gives a solid surface with no open areas to cover and is non-porous. The easiest method is to give three coats of color dope and two coats of clear dope. However, a wide variety of finishing material can be used on cardboard. Coverings such as Solarfilm, Monokote and vinyl paper can be used. With any of these, it is recommended that the cardboard surface *not* be doped, which will result in a better bond.

Waterproofing: Waterproofing of cardboard is quite simple and can be done to the raw material before you cut out the parts for your aircraft. Simply mix 25 percent clear polyurethane with 75 percent paint thinner. The latter can be the cheapest hardware store variety which is thoroughly mixed with any clear polyurethane. Brush the mixture liberally onto the cardboard sheet and allow to dry for 48 hours. This adds no appre-

ciable weight to the material and renders the cardboard completely waterproof. In addition, when you start to cut the treated cardboard, you will find that it is as crisp as wood and cuts sharply and cleanly.

CONSTRUCTION

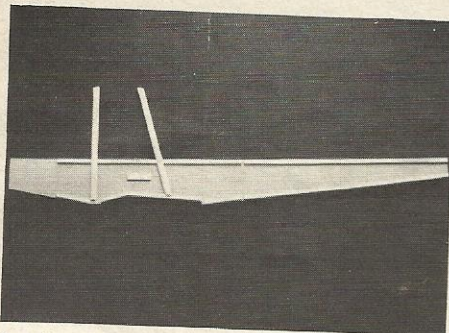
Cut out all cardboard and wood parts using the template outlines. Be sure to note the direction of the corrugations. Fold or slit cardboard parts as indicated on the plans.

Stab & Fin: Glue ¼" x ¼" spruce strips to the stabilizer leading and trailing edges and to the elevator leading edge. Round off the edges of the spruce strips for smooth control surface movement. Hinge elevator to stabilizer with cloth hinges at four places. Fill raw edges of cardboard with glue.

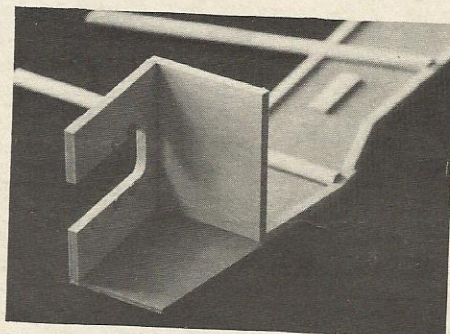
Glue ¼" x ¼" spruce strips to fin trailing edge and rudder leading edge. Rudder is then glued to fin with rudder trailing edge offset ½" to outside of the flying circle. Fill raw edges of cardboard with glue.

Wing: Begin wings by making two wing spars. Spars are a ¼" x ⅜" balsa

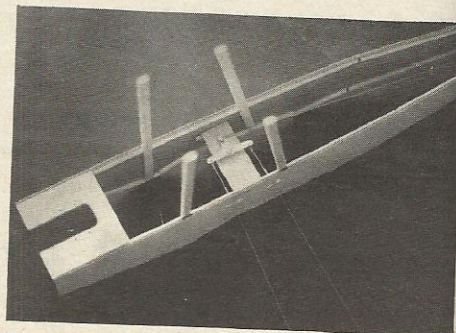
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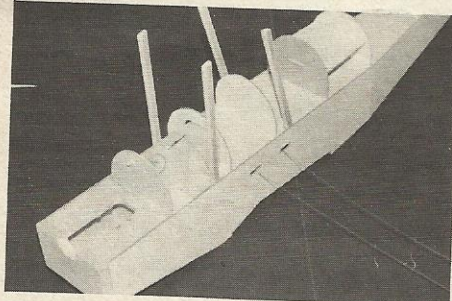
Fuselage side with edging strips and cabane struts in place.



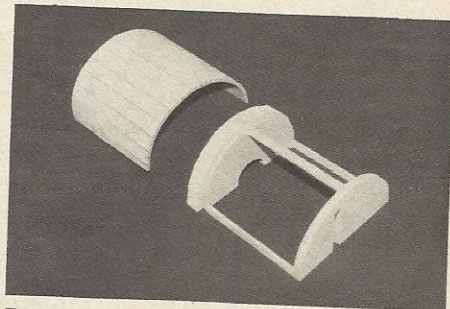
Firewall and engine mount plate installed in nose.



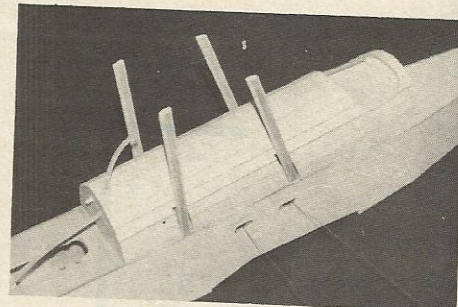
Fuselage sides are joined first at the firewall and bellcrank mount.



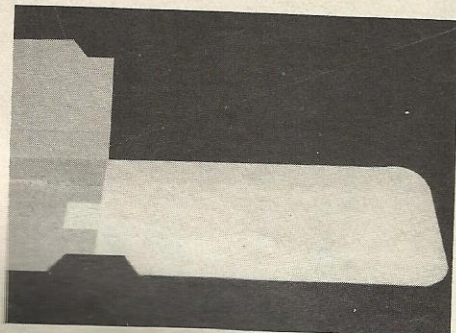
Top and bottom panels are added to form the basic box, then formers glued on.



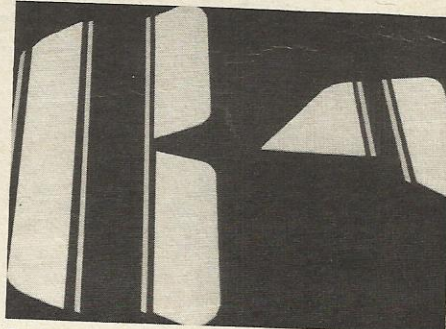
Engine hatch cover is formed by slitting the cardboard covering. Same for . . .



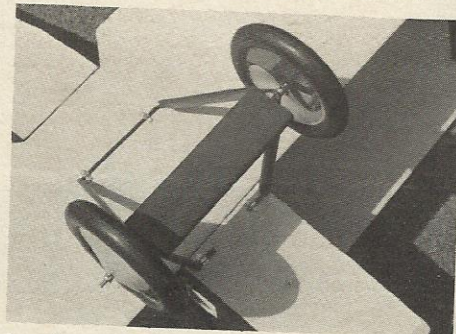
. . . the upper fuselage and turtledeck. Actually easier than planking with wood.



Wing top and bottom made from one piece, folded at the leading edge.



Tail pieces have balsa edging to form hinge lines and provide hinge mount.



Landing gear is mounted to plywood plates with clips and screws.

FREE FLIGHT NEWS

(Continued from page 114)

THE 49 CENT INDOOR TOOLBOX

Once you have all those exotic indoor supplies and are ready to get serious about indoor, you will need some place to put your stash. Recently, Doc Martin had his toolbox stolen (lock your car!) so he went to the art supply store and got a nice artist's oil paint box for 16 bucks to start from scratch. About that time we spotted a box of Cella wine on sale for 11 bucks that was about the same size as Doc's box, but came free with the wine. It was well-made of white birch ply and had nice brass hardware. It came with a rope handle, which we replaced with a 49-cent brass door handle—our total investment in the box. Of course, you could consider that the box cost 11 bucks and the four bottles of wine were free—depends on your point of view.

The photo shows the interior of the box as we fitted it out. It is decorated with various decals but we could use more—see following item on Club of the Month. We had a couple of plastic organizers (the kind fishing tackle shops sell) and some 35mm film cans (we used the greentop Ilford kind) for small parts. We subdivided the interior with an old yardstick (for measuring motors) and the dividers that separated the bottles. In the top we keep file folders, patching film and other flat stuff, held in by the dowels that form part of the model stand. In between the dividers go things like winders, torque meter, pliers, etc. Before packing up, we throw in a folded hand towel—handy for wiping off lube and sweat.

FREE FLIGHT CLUB OF THE MONTH

Way back in the late 'sixties when we began writing this column, we asked free flight clubs to send in their insignia for reproduction in the column and a little publicity with their peers. Somehow this program fell by the wayside, but it is never too late to resume it. If you have an active FF club (USA or foreign) send us a couple of samples of your club decal or stick-on emblem (one for publication, one for my toolbox!) and some info about club history and activities. This month we show the bold colors of the Chicago Aerobots, started by Carl Goldberg in 1935!

THE DYNAMITE PIRELLI CONNECTION

When we were at the W/C in Cardington last summer, indoor fliers from around the world were laying cold cash on Italian Team Member Ferdinando Migani (of Rimini) to get some of the new high energy Pirelli. New World Champ Jim Richmond and most other top fliers used small quantities during the contest, but they all wanted more, at \$30 a kilo. Now we are happy to report that you can deal right here in the USA for your dynamite Pirelli.

The Hobbies of LA has had the foresight to place a large order of the "good

stuff" and by the time you read this, they should have their stash. This rubber is better than anything recently available and will go fast. It is available in 4mm and 6mm widths and sells for \$15 per pound plus \$1 postage. Write Che Hobbies, 10900 Eastwood Ave., Inglewood, CA 90304 and get your dynamite Pirelli today for great gumband flying tomorrow.

Should they be sold out (or if you live in the UK) you might try an inquiry to British FFER Ian Dowsett, 2 Warren Drive, Eastcote, Ruislip, Middlesex, England. We understand that he has imported a vast quantity of the stuff; check with him for price and shipping info.

SE5A

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strip, capped with $\frac{1}{8}$ " x $\frac{3}{8}$ " spruce strips top and bottom. The bottom wing is made from a left- and right-hand wing panel with a cutout on the centerline for the $\frac{1}{8}$ " ply gear support. Glue the two panels together along the bottom centerline. Glue the $\frac{1}{8}$ " ply gear mount in the cutout. Glue the wing spar in place. The tip of the spar is $\frac{3}{8}$ " square balsa cut to a triangular shape. Glue a scrap cardboard doubler over the ply gear mount.

Glue a 1-ounce weight to right wing tip. Apply glue to top of wing spar, wing trailing edge and wing tip. Fold the top wing surface down and weight it down until dry. Seal wing trailing edge, tips and centerline joint with gummed paper tape. Slice paper tape every $\frac{1}{2}$ " to get a smooth finish around the wing tips. Top wing is made in a similar fashion, but does not contain the $\frac{1}{8}$ " ply insert.

Fuselage: Before starting, be sure the following cutouts have been made on the fuselage sides: slot in both for stabilizer, leadout holes and pushrod exit in left side.

Make two forward and two aft inboard wing struts from $\frac{1}{4}$ " square spruce capped with $\frac{1}{8}$ " x $\frac{1}{4}$ " balsa strips. Round off balsa strips to streamlined shape. Glue struts to each side of fuselage. Line the upper and lower edges of each fuselage side with $\frac{1}{8}$ " x $\frac{1}{4}$ " balsa strips. The strips are recessed $\frac{1}{8}$ " from the fuselage edges. Bevel the strips at the ends of the fuselage so that the cardboard sides can come into contact. Add scrap cardboard supports to each fuselage side for support of the ply bellcrank mount.

Glue C1 to right fuselage side, making sure it is perpendicular to fuselage side. Drill holes in motor mount C2 and install 4-40 blind nuts in bottom side. A $\frac{1}{2}$ " engine shaft extension is used, as shown on the plans, so keep this in mind when locating the engine mounting holes. Glue motor mount C2 in place and add side doubler C3. The left fuselage side is then glued to C1 and C2. Add doubler C3 to left fuselage side and bottom piece C4. Add $\frac{3}{8}$ " balsa gussets along joint of

C2 and C3. Give the entire compartment a coat of epoxy for fuel proofing.

The bellcrank installation is next. Attach pushrod and leadout wires to bellcrank. Bolt bellcrank to $\frac{1}{8}$ " ply mount and glue to the cardboard supports previously installed on the inside of each fuselage side.

The fuselage top and bottom are now closed up. Glue F1, F2 and F3 to top fuselage. Glue F4 through F8 to bottom fuselage. Attach fuel tubing to a 4-ounce clunk tank and secure tank to $\frac{1}{8}$ " ply mount with rubber bands. Glue assembly to fuselage between F1 and F2. Glue $\frac{1}{8}$ " ply main gear support just aft of F4. Glue $\frac{1}{2}$ " balsa block, with cutout for engine shaft, to front of fuselage.

The top decking is next. Glue a $\frac{3}{16}$ " dowel into former F9. Cut out former F10 to clear fuel tank. Glue F14 to slots in F12 and F13. Glue formers F9 through F17 to top of fuselage. Glue D2 to formers F9 through F13. Glue D3 to formers F15 through F17. D2 and D3 are slit along the lines shown on the plans and will easily wrap around the formers. Add a balsa block behind former F17 and round off to blend in with the fuselage. Cover D2 and D3 with wet silkspan and dope in place. This covers all the slits in the cardboard and gives a solid surface for painting. When painted, the slit decking gives the impression of stringer and fabric construction.

Cut two hardwood blocks, shown in fuselage side and top view, from $\frac{1}{2}$ " stock. Drill a hole in each for a 4-40 bolt. Install a blind nut in the back face of each block. Epoxy the blocks to motor mount C2. The holes in the blocks must match the holes in C5, so align carefully.

Make removable cowl by joining C5 and C6 with three $\frac{1}{8}$ " x $\frac{1}{4}$ " spruce stringers. Glue $\frac{1}{2}$ " balsa nose block to the front face of C5, with a cutout for the engine shaft. Cover assembly with D1, which is slit cardboard. Cover cardboard with wet silkspan and dope in place. When dry, round off the nose blocks as shown in top and side views. Cut holes in removable cowl for engine cylinder, exhaust and needle valve. Edge these cutouts with glue to fill the raw edges. Give removable cowl a coat of epoxy for fuel proofing. At this time, seal all fuselage seams with gummed paper tape.

Make landing gear axle from $\frac{1}{8}$ " wire and add $\frac{1}{2}$ " balsa fairing sanded to shape shown in side view. Make main landing gear from one piece of $\frac{1}{8}$ " wire. Attach axle to main gear with thread. Add $\frac{1}{4}$ " balsa fairings to main gear struts and sand to shape. Make tail skid from $\frac{3}{16}$ " wire and attach to $\frac{1}{8}$ " ply support by wrapping with thread, which is then impregnated with glue. Glue tail skid into recess in fuselage bottom. Add the cardboard fairing under the tail skid.

Finishing: Now is the time to paint

and trim the model before assembly. The bottom is grey. The top is chocolate brown as are the landing gear fairings. The lettering and trim are made from Monokote. The roundels and fin stripes are red, white and blue. The fuselage lettering is white. The aileron outlines are black. Use split black fuel tubing for cockpit coamings. Make windscreen from plastic sheet and glue in slot in top of fuselage. A Williams Bros. 2" scale Lewis machine gun may be mounted on the top wing, if desired.

Final Assembly: Glue balsa block headrest aft of cockpit. Glue wing to bottom of fuselage. When dry, glue the outboard struts into position in the bottom wing. To make sure that the wing struts stay aligned, slip the top wing over the struts, without gluing, while the struts are drying in place in the bottom wing. When dry, turn the model upside down and glue the struts in place in the top wing. Make fillets of glue around each strut where it enters the wing surface for increased strength.

Glue stabilizer in place, attach a nylon control horn and hook up the pushrod. Glue fin in place. Add 1/16" balsa fin braces to each side of fin. Attach main landing gear with gear clips and wood screws. Add 5" diameter vintage wheels.

Bolt motor to motor mount and attach fuel line and a 10-6 prop. Bolt on removable cowl. Make 1/8" ply line guide and attach to left outboard struts with 4-40 bolts. Pass the leadout wires through the line guide and tie off. Your ship is now complete. Be sure to balance the model at point shown on plans. ■

SOARING NEWS

(Continued from page 33)

be flier, meaning one who flies. In this case, *flyer* means pamphlet or newsletter. Clever, what?

Officers of SVSF for 1979 are Doug Ford, president; John Curran, vice president; Dave Peltz, secretary; Paul Scibetta, treasurer; Chris Adams, editor of the newsletter; Bill Watson and Jerry Krainock, co-chairpersons of the R&D Committee; and Ken Schwartz as librarian.

While still on the West Coast, I'd like to mention the Northwest Soaring Society whose directors for 1979 are: Dave Johnson, Roy Anderson, Gil Horstman, Brian McKay, Jim Howard, Bruce Baumgarner, Dave Wright, Mike Freeman and Dean Suminski. I didn't get the officers' list yet, so will have to mention that later. I'd also like to mention that Dave Johnson nudged out all the other 87 members to capture the highest season's points standing to become the 1978 Northwest Soaring Champion! These points are arrived at by averaging seasonal points using the best 80 percent of contests flown. Percentages are based on the points achieved compared to points possible. Twenty-one fliers flew ten

or more contest days to qualify and these included Tom Neilson (second), Guy Russo (third). However, if you consider seasonal averages for *all* contest days flown, Julius Topf beat out Dave Johnson! More and more clubs are using the point system based on percentages for contests days flown to determine club positions. Incidentally, clubs everywhere have taken to the idea of splitting memberships into expert and sportsman categories so that everyone feels at home flying with his or her peers. After a predetermined number of high placements within the sportsman class, a member is automatically elevated to the expert class. I've never heard of an "expert" becoming a "sportsman," though.

Among women fliers, Barbara Robinson of W.I.N.G.S. became the 1978 HIGH FLYER, selected by point scores from the five best contests flown between June 1, 1977 and June 1, 1978, excluding the AMA Nats, and the LSF Tournament; that is, the major contests. Congratulations, Barb.

For those of you ladies out there who haven't yet joined W.I.N.G.S. (Women's International Glider Soaring) write Lila Stamm, President, 6613 E. 134th Street, Grandview, MO 64030; or Secretary, Joan Nolte, 6300 Edgerton Way, Carmichael, CA 85608. If you'd like the Newsletter, write Karen Toebe, 6126 Marscott Drive., Lansing, MI 48910.

For those of you who wonder why I devote so much time to newsletters, there are several good reasons. The best, perhaps, is that the club newsletter represents grass roots soaring at its finest and tells about what is going on *now* with people *everywhere* in soaring. Second, the club newsletter provides information that is available to me; sometimes the *only* information available when you don't send letters. If you think that I mention only a few, then send me your newsletter—and if I think there is information in it of interest to all soaring people, I'll print it!

In Soaring News from the *DCRC Newsletter*, Bill Cavanaugh writes that Don Clark found Bill's *Paragon* after it had gone down in trees 300 yards down the side of a mountain after running out

of lift. How did he do it? Easy, by homing in on Bill's Thermic Sniffler, which was still running merrily in the downed sailplane. By using his receiver antenna, and following the null (weakest point between two strong signals) Don led the rescue party right to the plane. Neat idea, and one that could save your ship some day. The Thermic Sniffler, for those who haven't heard about it, is a small pressure-sensitive, airborne transmitter that sends out a tone signal. The tone increases in pitch as the sailplane carrying the Sniffler rises in a thermal, and decreases in pitch as the sailplane flies into sinking air or conditions of no lift.

The Sandbag for November '78 presented a fine article by Gene Shelkey stressing the importance of properly balancing your ship before attempting to fly it. You transfer the c.g., or balance point, as accurately as you can from the plans to the wings and fuselage, marking the point with a piece of tape, a dot of paint or other means. Make it a fine line, not broad. Then, using a simple two-point jig (not your fingers—they're too coarse) set the sailplane up on these points right at the c.g. Two empty spray cans, with their nozzles serving as the points of the jig, work well. Now, add or subtract weight until balance is achieved. Remember, you can't do any flight trimming (dynamic adjustment) until your balance (static adjustment) is first taken care of. The glider will balance slightly nose down, perhaps 5 degrees or so, when the c.g. has been properly located and the ship balanced. Remember when building that it is very easy to get the tail too heavy, so make every effort to make the tail surfaces and the rear fuselages as light as you know how. Sometimes that will be light enough so you won't have to add nose weight. With a low-wing model, you balance it upside down, and with a high-winged model, you balance it right side up. Obviously, the nose should balance just a trifle lower (closer to the floor) whether upside down or right side up. Make sure when balancing that everything is on or in the plane that will be there in flight; canopy, battery, servos, control rods, etc., etc.—exactly where they will be

"Bakersfield International Air Races"

May 19th & 20th 1979

Pre-entry only by May 15th. -- Entry fee \$20

Registration & static judging Friday, May 18th

7-10 PM at the ROADWAY INN

Send entry to:

CONTEST MANAGER
Jerry Boyle,
2625 Alder
Bakersfield Calif. 93301
(805) 325-2625

Contest headquarters

ROADWAY INN
818 Real Road
Bakersfield, Calif. 93301
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CONTEST DIRECTOR GLENN SPICKLER

