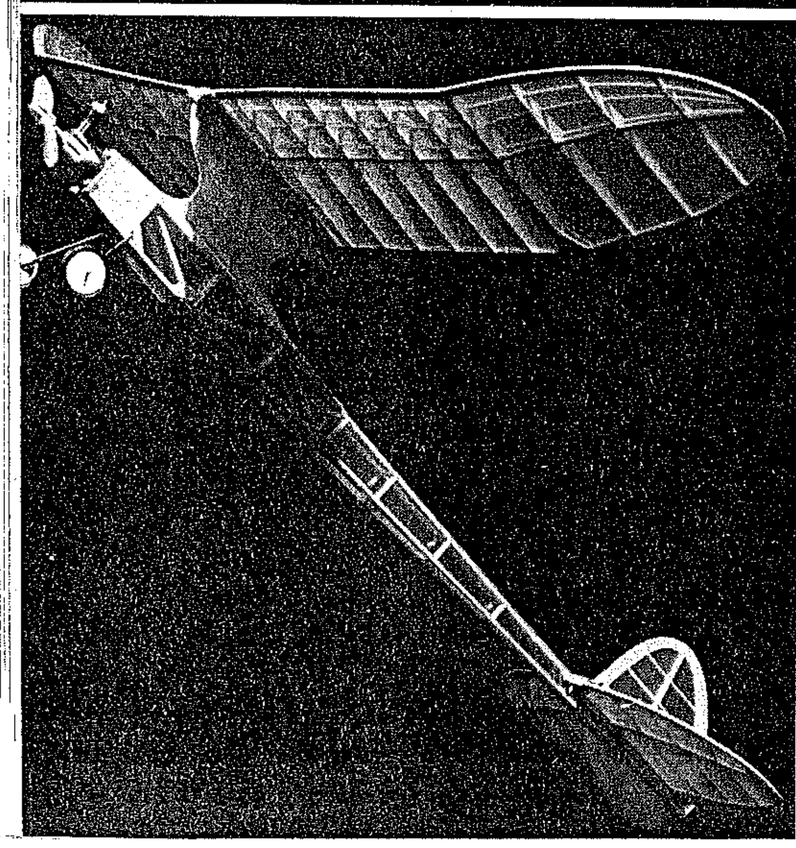
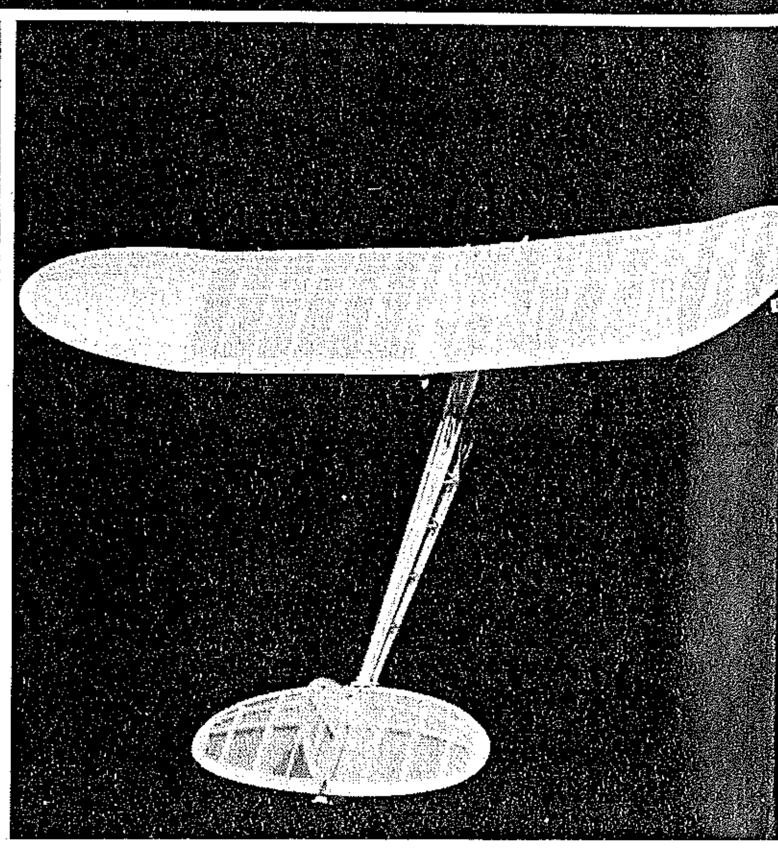
The aesthetic eye will linger on this masterpiece, a magnificent configuration enhanced by just-right structure, picture-book planforms. And, no, it is not a relative of the Playboy.

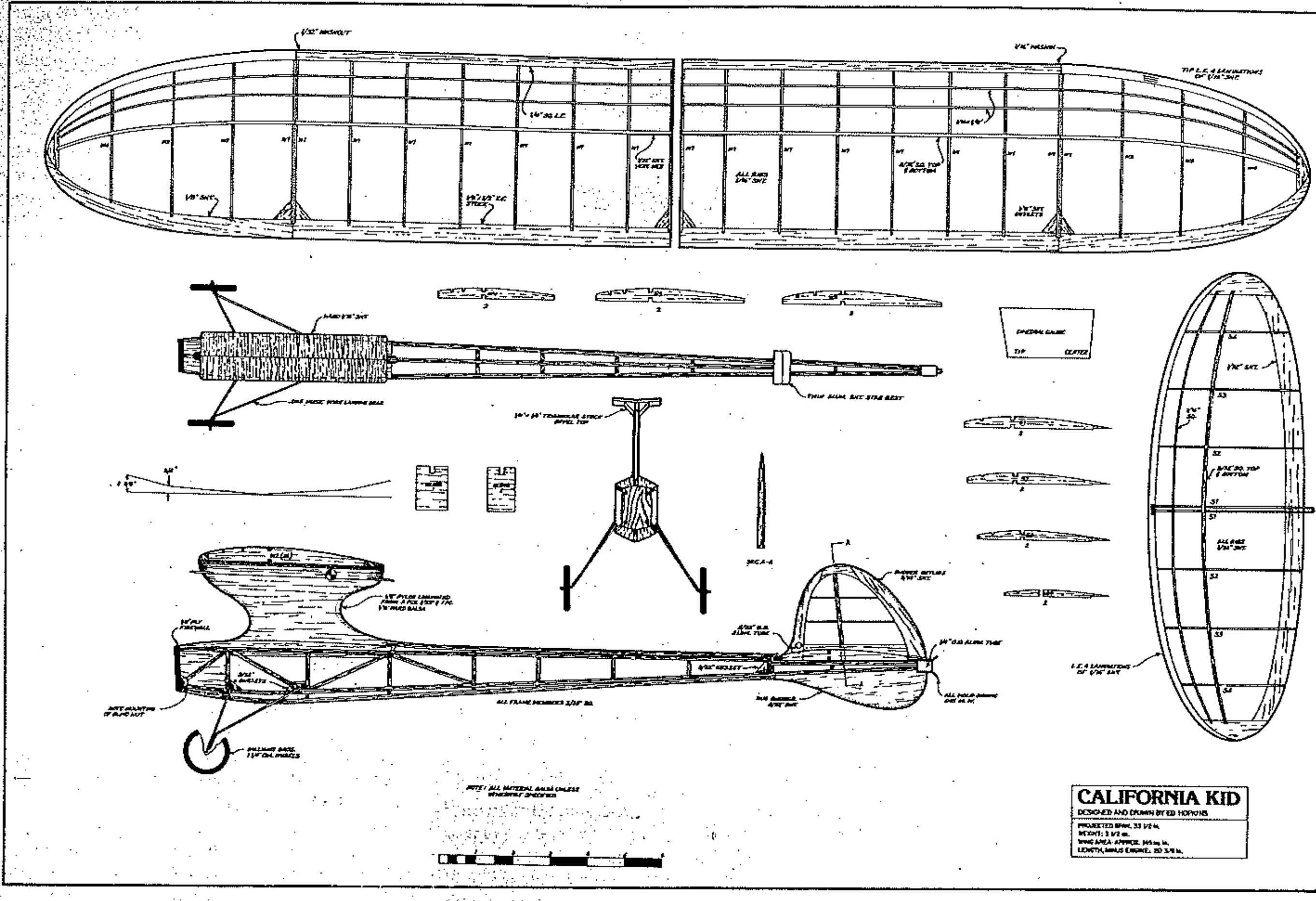
Photos by Bob Lauscher

Ed Hopkins

THE CALIFORNIA KID







FULL-SIZE PLANS AVAILABLE ... SEE PAGE 128

The author was after something small, economical, simple but with zesty performance on its Pee Wee 02. It has much more than that. May we say it has "soul?"

THERE were a number of considerations that influenced the design of the California Kid. One was size. I live many miles from the closest suitable free flight area and with gasoline costs skyrocketing, I wanted to design something that would fit comfortably under the hood of my old VW Bug.

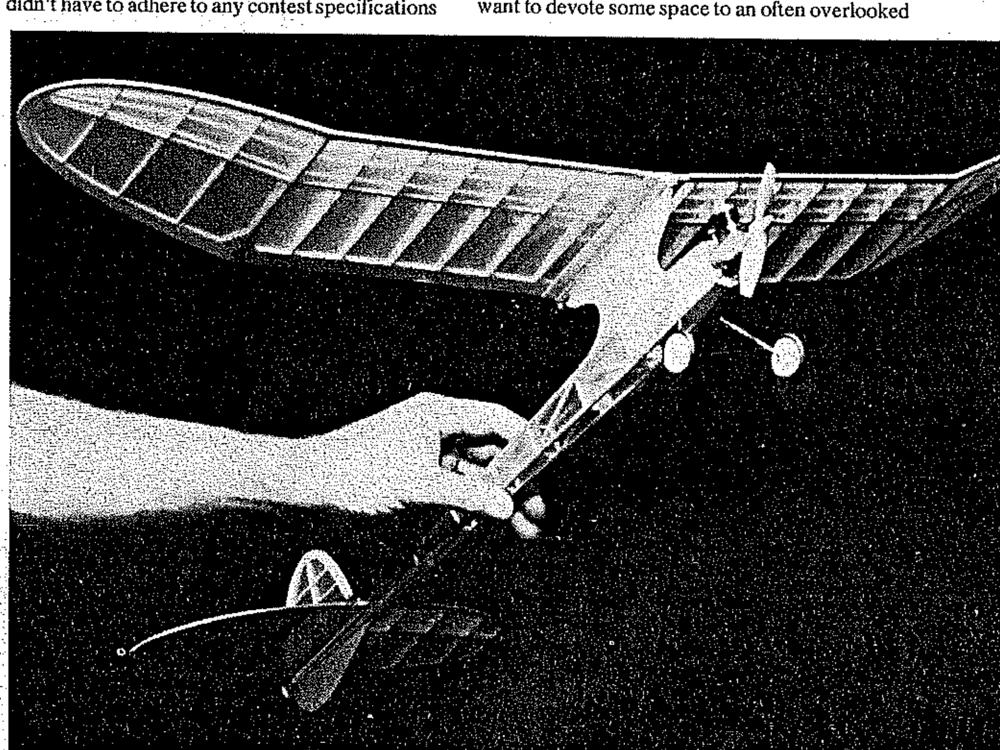
A second consideration was limited, but not too limited, power. I wanted a design that had satisfying performance, yet stopping short of the sometimes hair-raising behavior of the all-out competition machine. And that's how things worked out, but just barely. With the Cox Pee Wee swinging its prop around at 18,000 rpm and just 3½ ounces of all-up weight, the California Kid is anything but docile. In fact, it will perform right alongside all but the very best .020 Replica machines.

Simplicity was a third consideration. After building a number of intricate AMA gas designs, I wanted to produce a plane that would go together quickly and easily. I also wanted to keep the gadgetry to an absolute minimum—hence no V.I.T., auto rudder, or even timer. And keeping things simple had the added virtue of keeping costs down, an idea that becomes more attractive every day.

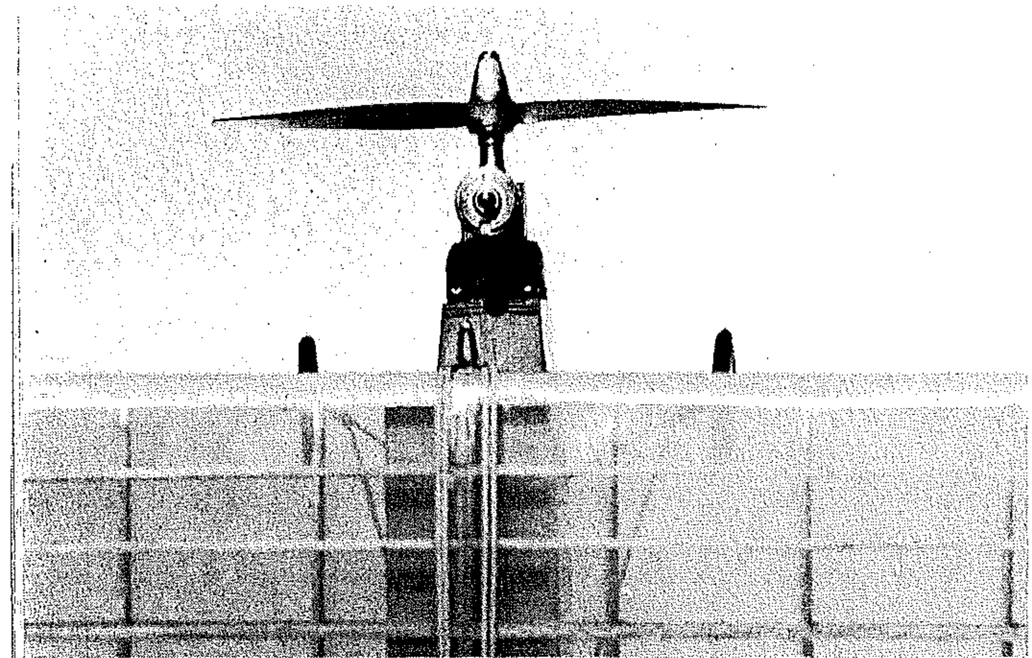
But perhaps the single greatest consideration was appearance. I had become increasingly interested in the Old Timer movement and I wanted to create a plane that incorporated all of the luscious curves and ellipses found in the best Golden Age designs. I suppose that it would have been easier to have just selected one of the fine .020 Replica kits that are currently available, dropped in the Pee Wee engine and gone flying, but there didn't turn out to be any single OT design that I liked thoroughly.

If one design had a well-shaped fuselage, then the rudder would be awkward looking, or if the contour of the pylon looked good, then the wing would be too fat. And so it went. Finally, since I didn't have to adhere to any contest specifications anyway, I decided to design my own. The California Kid is the result.

Preparation: Before getting to the building, I want to devote some space to an often overlooked



At a quick glance one could assume the "Kid" to be one of the gorgeous 6-footers, so the intruding hand makes it all the more startling. Some mighty good things come in small packages.



Looking down on the business end, the Pee Wee that turns the prop at 18,000, with an all-up weight of just 3½ ounces. It's anything but docile, says the designer, who wanted exhilarating flight that stopped just short of the hair-raising performance of the all-out comp machine.

subject, preparation. Much of the most important work that you'll do on this design, or any other design, will take place before you ever cut out your first part.

First, make sure that you've gathered up all of the tools that you'll need. A minimum collection should include razor blades, an X-Acto knife, and several #11 blades, two sanding blocks, one medium and one fine, a 24-in. steel straightedge, pins, glue (Elmer's is fine), epoxy, and a building board.

If you don't already have a building board, or if the one that you have is full of gouges and glue daubs, let me suggest using ½" drywall as a building surface. It takes pins easily and costs very little (about $4 for a 4 X 8' sheet). And you can cut it up into whatever sizes best suit your needs.

I suggest drywall because of a peculiar building technique that I use. I glue the plan directly onto the building board, using either rubber cement or 3M spray adhesive (available at art supply stores). Why? Because the conventional method of taping the plan down, then covering it with wax paper, virtually assures that many of your glue joints will be poorly aligned. To begin with, you have a ripply and usually folded plan that refuses to lay flat on the board even when taped down, and on top of that, you add a wavy surface of wax paper. So, while your building board itself is flat, the surface that you're actually working on is anything but flat. This is why, for example, on a wing the ribs often tend to ride up on the leading and trailing edges instead of being flush with the bottoms. So I glue the plan down, and for the same reason I never use wax paper over it, but build directly onto the plan.

When all of the glue joints have dried and set, I just slide a razor blade under the balsa structure to cut it free from the plan, then sand off whatever paper may have stuck to the underside of the joints. If you elect to try this method you'll find yourself rewarded with warp-free accurately aligned assemblies. One note of caution, however: drywall has little strength of its own, so be sure that you place it on top of a hard flat surface.

Now about wood selection. I'll start with the wing since that is normally what I build first. I use medium weight (and strength) material for the leading edge of the main wing panels. If very strong material is used, greater damage will occur when Murphy's Law guides your ship into the only tree for miles around. This is because the LE, before it breaks, will fracture the ribs for several inches on either side of the point of impact, making repair difficult and time-consuming. I use light/medium wood for the TE of the main panels. The TE will be aft of the CG so I want to keep it as light as possible, consistent with adequate strength.

For the spars on the main panels, I use medium/hard material, which is adequate for a wing of this span. The ribs should be made of medium weight C-grain 1/16 sheet. You can identify C-grain stock by its speckled appearance. Your 1/16 sheet usually comes in 36-in. lengths and if you hold it up to the light you'll probably find some variation in density between one area and another. This is fine. Use the wood from the hardest part for the ribs in the center of the wing and make your ribs progressively lighter as you progress outward toward the end of the panel. For the wing tips, lighten up everything a couple of degrees—light/medium LE, light TE, medium spars and light/medium ribs. Keeping the wing tips light enables the plane to recover its lateral stability quickly after being upset by "lumpy" air and this helps increase duration.

The stabilizer and rudder are likewise built as light as possible. The Pee Wee engine, with prop, weighs less than an ounce and that doesn't give you much weight to counterbalance a heavy tail. So keep it light; the last thing that you want to do is add ballast.

The fuselage longerons should be at least medium/hard while the uprights and spacers can be medium or light/medium. The balsa block behind the firewall can be light, but since it is forward of the CG, it won't hurt to use heavier material.

Construction: OK, let's build this thing! Construction is quite straight-forward, with few problem areas, so I'm just going to cover some important details.

First, the wing. Use cardboard or scrap balsa to make a dihedral gauge as shown on the plans. You'll use this to position the end ribs at the correct angles. Be sure to notch the trailing edge as indicated. If you don't, the covering material will pull the back edge down when it shrinks, leaving your wing with a sort of peculiar undercamber.

It's best to cut the notches for the top spars after the ribs have already been glued in place and the final shaping of the LE has been completed. Just lay a straightedge across the ribs, mark them, and cut. If you cut these notches before the ribs are in place, you're likely to end up with meandering spars that not only look bad but create internal

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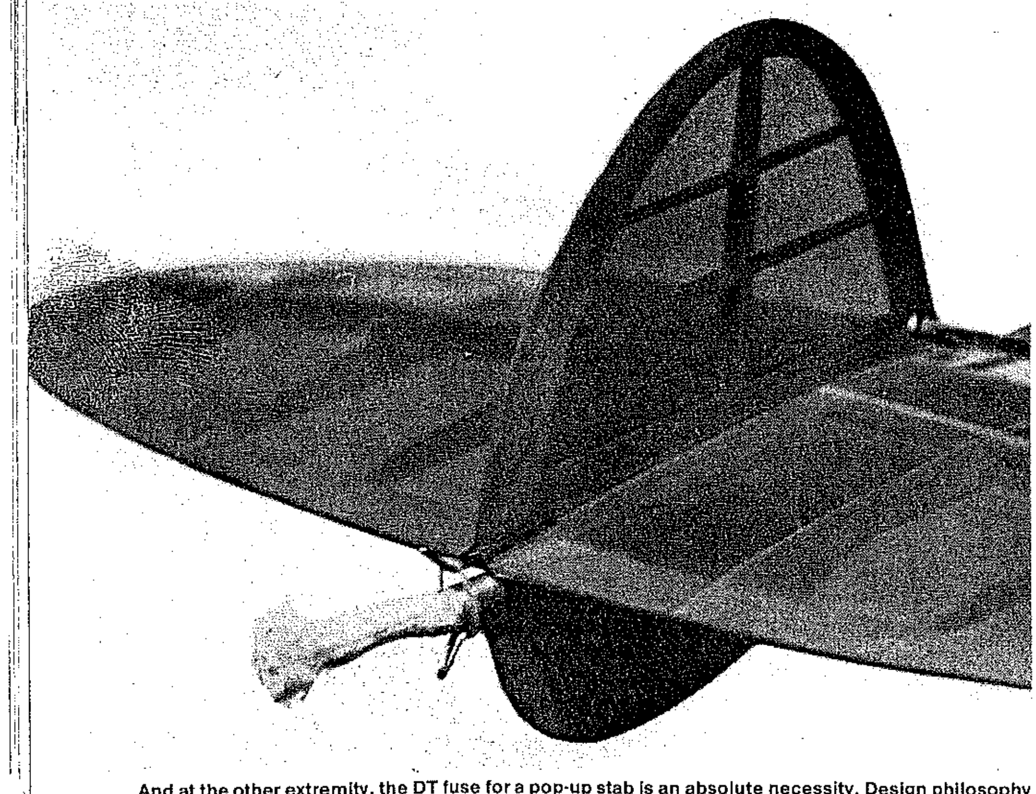

And at the other extremity, the DT fuse for a pop-up stab is an absolute necessity. Design philosophy emphasizes simplicity—no V.I.T., auto-rudder, or even a timer. It's a money saver.

FF Old Timers/Haught

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find it makes a valuable trouble shooting aid in the field. If component failure is suspected simply disconnect the aircraft ignition system and hook up your test box system. This allows you to isolate engine problems from ignition component problems much the same as the glow plug technique allows separation of problems.

Here are a few additional tips on building the unit. I used them in the one shown. Housing is electronics supply house's "experimenter box." The battery box and coil are secured with silicone rubber bathtub caulking cement. The 200 volt, 1/10 MFD Radio Shack capacitor is soldered in next to the coil, the capacitor itself is epoxy cemented directly to the coil. Alkaline "D" cells eliminate the need for booster batteries. All of the leads which exit the box are first knotted inside the box, for strain relief. Alligator clips on the external leads simplify connections.

Another useful device in trouble shooting is a volt-amp meter to check for the presence of current in the system. Lacking such a meter, a simple 3 volt test light can be useful. An inexpensive one can be made from a 3 volt bulb, a bulb socket, and two short test leads. Use these aids to determine battery condition, current at the points, and short circuits to ground.

There's nothing mysterious about trouble shooting. A thorough systematic approach will get you back in the air in minimal time.

The San Diego Aeroneers: The old San Diego Aeroneers are out to recapture the distinction of being *the* club in San Diego! They have a newsletter going now; and the issue I received had a reproduction of the glow plug instructions for Arden engines which listed two mix-it-yourself fuel formulas.

Formula A reveals its ignition era ancestry: 25% SAE 70 oil, 50% white gasoline and 25% No. 1 Nitrophane. This mixture is reputed to be "A very satisfactory gasoline-base fuel and not critical." Formula B consisting of 25% castor oil, 37% Methanol and 37½% Nitromethane described as "An especially recommended alcohol-base fuel very hot and not critical" is not far from today's popular blends. Interesting to say the least. You can contact the San Diego Aeroneers at 2879 Marathon Drive, San Diego, CA 92123.

Cyke Manual: Richard Corey, P.O. Box 597, 415 Homer Road, Minden, LA 71055 is reproducing the Super Cyclone operating instructions. Nicely done in original color and format, the booklet includes trouble shooting and disassembly instructions as well as operating procedures and some dimensioned drawings. Cost of the 16 page manual is $4 postpaid.

New event: Well, sort of. Bob Stalick, well-known in free flight circles as an author, active AMA official, and originator of the SAM name for the Society, is promoting an "Old Timer Scale" event. Currently flown during the indoor season by the Willamette Model Club of Albany, Oregon, the event calls for: "A rubber powered replica of an Old Timer or Antique Gas Model. Maximum wingspan of 24 in. Judged on fidelity to original and duration. Engine compartment and propeller not judged." Sounds like loads of fun and eliminates all the old excuses: "I can't find an engine, my building room is too small for old times, too much work, etc."

Clarence Haught, Rt. 5, Box 16, Couer d'Alene, ID 83814.

California Kid/Hopkins

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stresses as well.

If you use 1/16 gussets top and bottom it will help to prevent those diagonal wrinkles that frequently appear in the corners of the top surface after covering.

The front spar on the stabilizer was made from 1/32 sq. spruce which can be found at any hobby shop that deals in model railroad equipment. If none is available to you, 1/16 sq. balsa works fine. Take extra care cutting out the notches where the stab ribs overlay the trailing edge. These joints must be snug. When the stabilizer is built and the glue has set thoroughly, remove it from the board, sand it to its finished shape and cover it with the material of your choice. When that is done, cut holes between the center ribs for the rudder LE, TE, and spar and build the rudder. Don't attempt to build the stab and the rudder at the same time because, with this type of construction, covering will be a nightmare if they are made into a single unit.

The hole in the rudder is made by using the 5/32 o.d. aluminum tubing as a drill, just twisting it back and forth until it cuts through. When done, cut a 3/32-in. ring off the end of the tube and epoxy it into the hole.

Before you settle down to work on the main part of the fuselage, laminate the hard 1/16 sheet and the two sheets of medium hard 1/32 sheet together into the balsa plywood that you'll use for the pylon. A mixture of 50% white glue and 50% water makes a fine bonding agent. Note the grain direction (1/16 vertical) before you place the sheets together and be sure to pin them down thoroughly so that your ply will dry free of warps. Allow this to dry overnight.

Next, cut out the firewall, drill the four holes for the mounting screws, and epoxy the blind nuts onto the back as indicated on the plan. To insure perfect alignment, bolt the engine right to the firewall and allow the epoxy to dry thoroughly.

If you've ever built a scale model, you'll find most of the fuselage construction to be familiar. Pin the longerons of the first side into place over the plan, then cut out all of the uprights and glue them in position. Now add the diagonal braces, being careful to cut the ends as shown on the plan. Build the second side directly over the first. When the glue on both sides has dried thoroughly, cut them apart by sliding a razor blade between them.

Place the sides on their top edges and pin them in place over the plan, then glue bulkheads #1 and #2 into position, taking care to keep the sides in alignment. When they dry, glue the sides together at the rear, and add the top and bottom spacers behind bulkhead #2. Now carve and sand the balsa noseblock to the correct shape and glue it in place between the two sides in front of bulkhead #1.

When these joints have dried thoroughly, remove the partially completed fuselage from the building board and glue the two pieces of TE stock to the top of the structure. Check to make sure that you've left enough, but not too much, room for the pylon to slip through. Then glue the firewall in place. Be certain that the firewall is set at the left and down thrust angles that are shown on the plan. While the glue is drying, cut the pylon and the subrudder into their final shapes. Now add the tiny spacer blocks and the bottom stringer, glue the pylon assembly into position, and add the top space blocks and stringer. Add the subrudder and, except for a few bits and pieces and the final sanding, you are ready to cover.

Covering: I used transparent MonoKote on mine. I frequently fly in a brush-covered riverbed and I felt that the puncture resistence of MonoKote was worth the slight bit of added weight. Besides, it looks great and works easily over the compound curves at the outer ends of the wing and stabilizer. But if you fly in a more favorable environment, use lightweight Silkspan (00) or Japanese tissue and you'll save a few grams.

When covering the fuselage, do the bottom first, then the sides, the top, and finally the pylon. If you cover in this sequence, the overlaps will all face downward leaving no ridges for fuel to settle into.

When the fuselage is covered, temporarily stick round toothpicks into the holes in the firewall and paint the whole front end with epoxy so that it will be completely fuelproof.

You built the wing panels flat, so it's during the covering that you induce the warps. If you use MonoKote, just iron them in by twisting the panel, applying heat, then cooling it rapidly. If you cover with paper, setting the warps is a little more laborious, since you'll have to shim them in after each coat of 50/50 dope while the rest of the panel is pinned or weighted down.

The landing gear is always a pain and the LG on the California Kid is no exception, although it's less troublesome that most. If you like, you can bend it from two pieces of wire. The LG on mine, however, is made up of four pieces assembled into two units that "plug into" the aluminum tubes on each side of the fuselage where they are secured with a little epoxy.

Whichever way you choose to go, I'd recommend fastening the rear legs to the front ones by this method: Bend the wires to the correct shapes, then glue them together with just a dab of epoxy. When that has dried, bind the joints thoroughly with copper wire. Now take more epoxy and rub it over and through the wire. This technique works fine for a plane of this weight.

Flying: Now comes the moment of truth—the first flight! But before you ever leave home, be sure that the wing warps match those on the plan, that the CG is in the correct location and that the incidence of the wing and stabilizer is built to the correct angle. And if you want to avoid a fly-away you'll have to run some experiments with fuel consumption. You might as well do this at home, too.

Begin by running the engine enough to warm it up thoroughy, then take an eyedropper with a short length of fuel line on the end, draw a small amount of fuel from the can and squeeze it into an *empty* tank. The .020s are misers so it doesn't require much. Then adjust the needle valve to the setting that you'll be using for flight, start the engine and time how long it runs. When you have determined what amount of fuel is good for, say, a 20-second engine run, make some kind of a mark on the dropper neck for future reference. This procedure works fine about 50% of the time and would be nearly foolproof except for the fact that reed valve engines are just as happy running backwards as forward, and start backwards at least half of the time. If you use the starting spring supplied with the engine, your odds will improve considerably.

Now out to the flying field, or to that mythical place with deep grass and no breeze, for some test glides. You're aiming for a smooth, flat glide that will land about 25 feet in front of you. If the plane dives down far short of the mark, shim up the rear of the stab 1/32 in. at a time until the diving tendency disappears. Keep adding negative incidence to the stab until the plane begins to stall, then back off just a bit and you should be all set to go. A couple of final notes on the glide. First be certain that your release is correct. The plane should leave your hand at a slight downward angle. If you release it with the nose high, it will stall no matter how well or poorly it is adjusted. And second, if the plane seems to exhibit a tendency to dive or to stall, try it again. And again. It may be that what you observed the first time resulted from a bad launch or a gust of wind.

Finally, you're ready to send the California Kid up under power. The most commonly used method to test a new high performance free flight gas ship is to begin with reduced power and short engine runs. You observe carefully, make minute adjustments as needed and slowly work up to optimum trim. On the California Kid this method can be used by initially placing the prop on backwards to reduce thrust, and by riching the fuel mixture, which both reduces power and shortens the engine run. In its final trim, under full power, you'll want the plane to fly up in a fairly tight right spiral, followed by a transition to a more open right-hand circle.

If it hangs by the prop, shim in a bit more downthrust. A straight-up climb looks sensational but usually results in a horrible transition. If it dips to the right on its first spiral add a hair more left thrust. If it flies left, go to the hobby store for more balsa. Pylon planes rarely fly to the left more than once.

Good luck with your California Kid and be sure that you light the DT fuse every flight. At 3½ ounces there's just not much reason for it to ever come down.

C-1/Coronel
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This landing gear was bolted to a plywood access hatch approximately 10" in length and in turn bolted with eight bolts to the belly of the aircraft. This allowed the access hatch and landing gear to be removed as one unit, thus allowing additional service room for adjustment of the tilt control mechanisms and the radio. (4) The tail of the aircraft was extended approximately 3" by using a removable tail cone 3" in length designed for the fuselage. This allowed for rapid and obstruction-free access to the rudder control horn if necessary. (5) The stabilizer was converted to a T-tail configuration. This was necessary as tremendous changes in airflow about the lower tail portion of the aircraft could be expected with actuation of the transverse wing system.

The elevator control mechanism consisted of a Nyrod flexible pushrod attached at one end to the elevator horn, and to the elevator servo at the other end. Installation of the Nyrod required the cutting of a curved slot from the top rear of the vertical stabilizer to the bottom front. This allowed the Nyrod to proceed relatively straight through the fuselage to the servo. The front and rear sections of the vertical stabilizer were pinned to a wood board with the Nyrod epoxied the full curved length between. Thin balsa sheeting was next applied to both sides of the vertical stabilizer and allowed to dry.

The horizontal stabilizer was installed on top of the vertical stabilizer with ½" triangles at the joints. A removable access hatch at the top of the elevator covered the elevator control horn and provided the ability for adjustment of the elevator tilt limits. The tail unit was installed an additional 3" to the rear of the fuselage; ¾" triangle blocks were added to the joint for additional support. Care was taken to give the stabilizer a zero-zero angle of incidence with the primary wing. Both the controllable elevator and rudder were given a 20% increase in surface area.

The engine cowl turned out to be the most diffi-