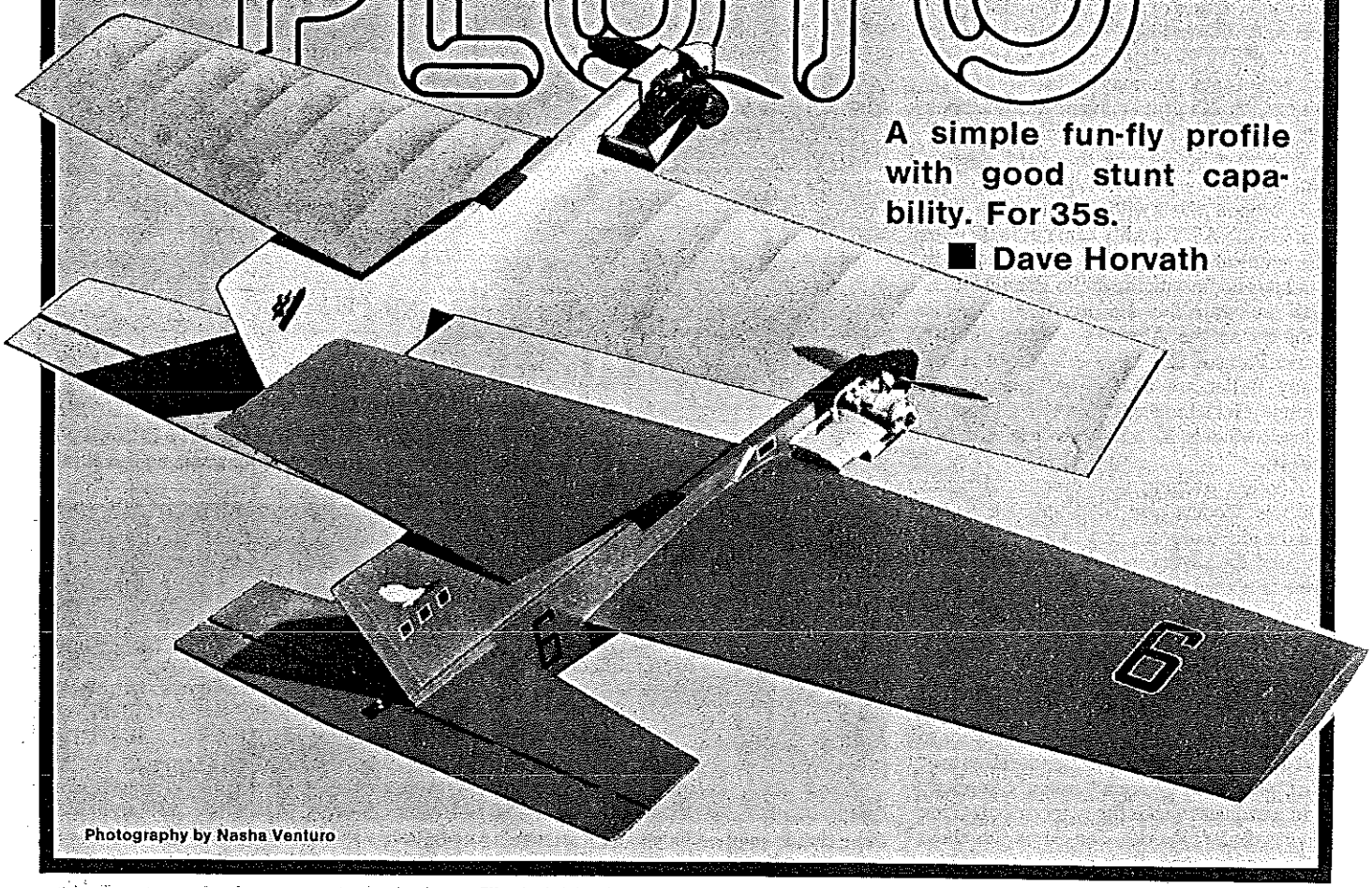
PLUTO

A simple fun-fly profile with good stunt capability. For 35s.

■ **Dave Horvath**



Photography by Nasha Venturo

The builder has choice of framed wing, top, or foam wing. Text gives source and prices for the foam core with spar, and also fully sheeted. He has made six Plutos over five-year period, so the design is thoroughly debugged. Airplane is flown by fellow members of his group.

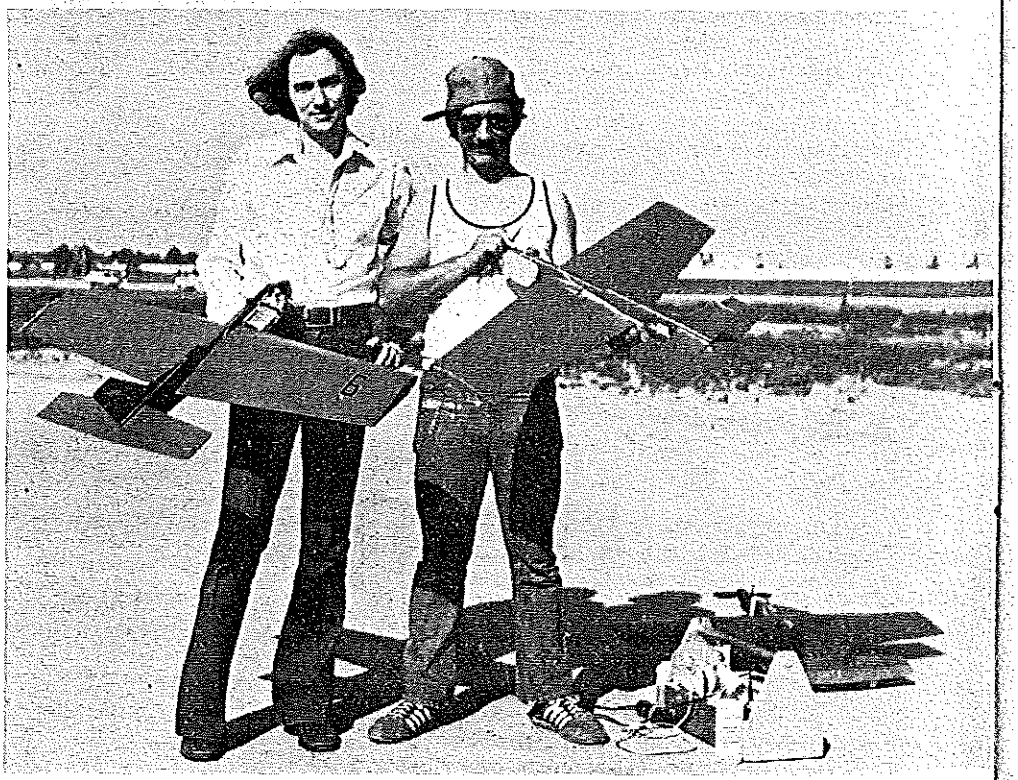
FIVE years ago, I decided to design a clean, simple profile sport-stunt plane for use with a 35 engine. Since then, I have built a total of six Plutos, making minor improvements along the way. There must have been something good in the basic design for me to stick with it for this amount of time, for I am not in the habit of building more than one plane of the same design, especially if the original flies no better than your average Thanksgiving turkey. Straightened out, the preceding sentence means that I think that Pluto flies fine, with its 44-inch wing span and 420 sq. in. wing area. All of the Plutos that I have built weighed in at 32 to 35 ounces, and I have never had to add weight to improve flyability.

I would recommend this model to anyone who has acquired the basic building and flying skills necessary for the project. With the recent improvements in quality and availability of foam wings, I have added a second version of the design to include this feature.

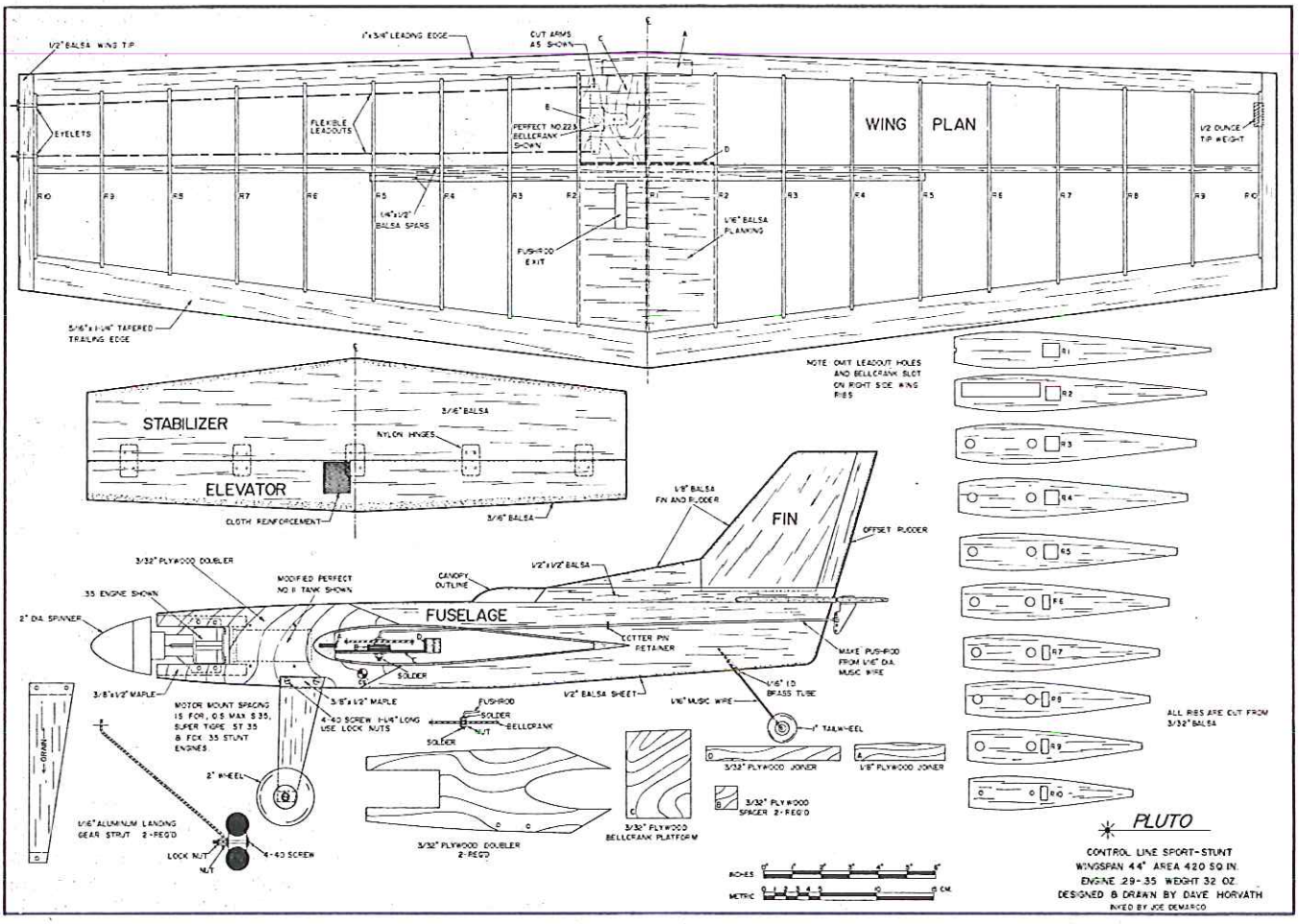
Construction

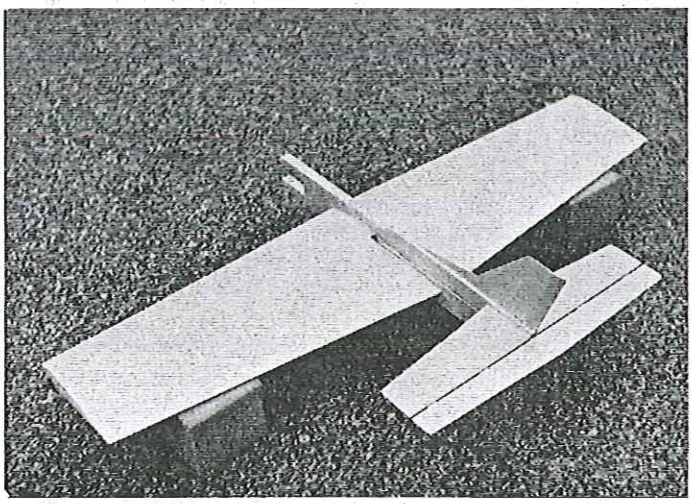
General: First, study the plans to become familiar with the design, then select the lightest and straightest balsa wood. Use aliphatic resin glue for general construction, and slow-setting epoxy where extra strength is required.

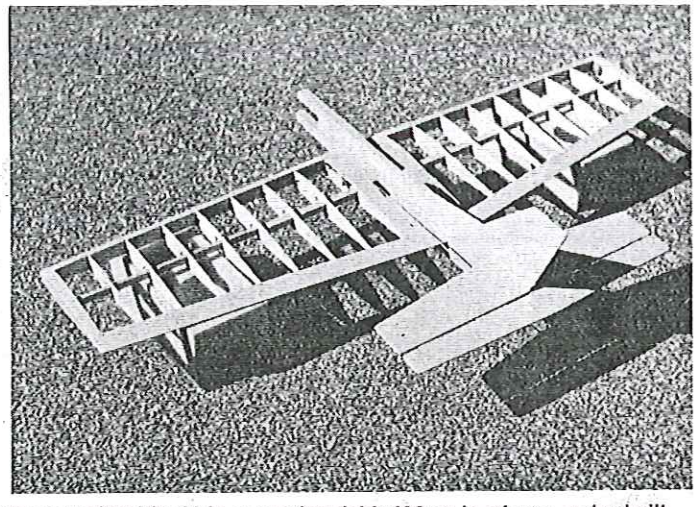
Wing: Foam Wing— The wing used on this



Dave Horvath, left, and Dave Arnote at Sepulveda Basin. One thing nice about CL models is that they are unique in that you actually feel the model flying. Dave is from Czechoslovakia, where he had 36 hours on full-scale gliders. Gungho fliers, these two, we would say.







Left: The foam-wing version before painting and, right, the framed version before covering. The 44-in. span wing yields 420 sq. in. of area, and as built by the author, weights range from 32 to 35 ounces. Dave has found it unnecessary ever to add weight to improve flyability.

version of the design was obtained from J&K Custom Foam Wings, 10261 Janice Lynn, Cypress, CA 90630. The prices are reasonable, and the workmanship is top notch. The price of the foam core with spar is $12, and the sheeted wing is available for $32 postpaid. Instructions are included with the wings, so I will not go into assembly details here.

Built-up-Wing—First, cut the ribs from 3/32 thick balsa sheet. I cut the ribs about 1/16 larger than the outline given, and sand them to shape after the entire wing has been assembled and glued. With this method, you can get a beautifully straight wing in spite of minor cutting and assembly imperfections.

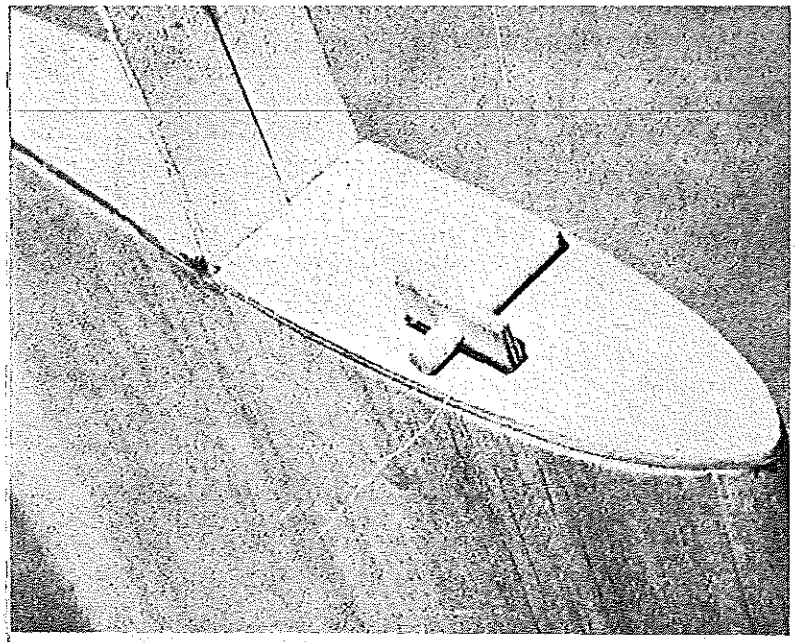
Cut the ¼ × ½ balsa spars and glue them together on a flat surface. Be sure the spar is straight. Next, cut, mark and notch the preshaped leading and trailing edges. Notching is important to get the strongest wing possible. Cut the slot in the leading edge, and epoxy plywood gusset "A." Also attach plywood parts "B," "C," and "D" with epoxy.

Slide the ribs over the spar and frame up the wing over the plans on a good flat surface. First, glue the ribs to the leading edge, and then to the trailing edge. After this is set, glue the ribs to the spar. The ribs can be sanded to shape after this, if they have been cut oversize.

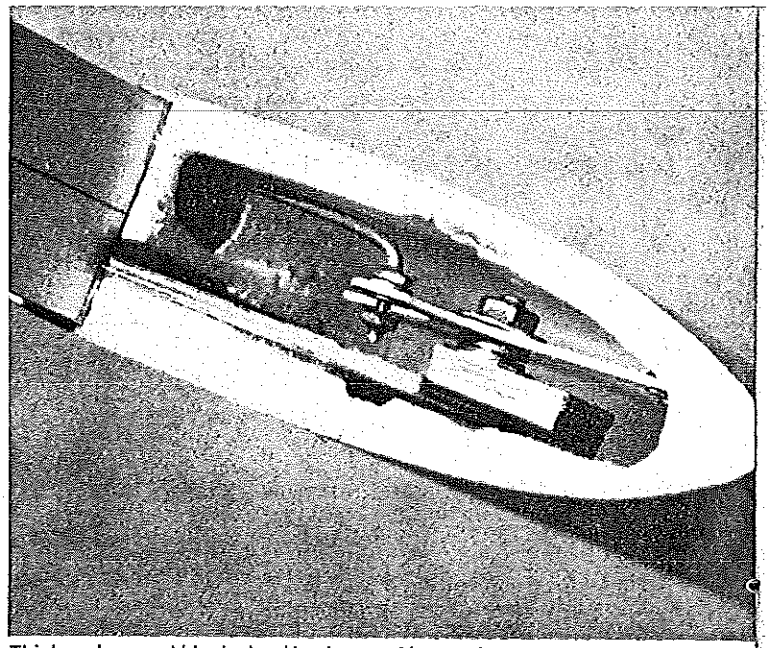
Next, attach plywood bellcrank spacers "B" to platform "C" with epoxy. Add and shape the wing tips. Add the ½-oz. wingtip weight.

Fuselage: Cut the fuselage from ½ × 3 × 36 balsa. Cut out the engine mounting section and epoxy in the ⅜ × ½ maple pieces. Next, cut out the wing slot. Make the wing cut-out as accurately as possible.

Shape the nose section of the fuselage and place it over 3/32 plywood. Mark and



Bellcrank ply mount projects through slot in ply root/cap rib, and dowel inserted through hole insures that bellcrank unit won't pull loose.



Thicker ply mount block glued to ply mount base—does not overhang as distortion in pic seems to indicate. Pushrod passes through spar hole.

cut out the nose doublers. Cut the cockpit section from ½ sq. balsa stick. Make the slots for the rudder and stabilizer. Install the nose doublers and drill the holes for the motor and the landing gear.

Stabilizer and Elevator: Cut the stabilizer and elevator from 3/16 balsa sheet and round off the leading and trailing edges. Use a hinge slotter to make the hinge slots. Use epoxy to attach the hinges and insert a toothpick through the hole. After the epoxy has cured, clip the toothpick off close to the surface and sand flush. Use epoxy and fiberglass cloth to reinforce both sides of the control horn area.

Rudder: Cut the fin and rudder from ⅛ balsa sheet. Note the grain direction shown on the plans. Set the rudder offset as shown.

Controls: The bellcrank used is a Perfect #223. Cut the arms as shown. Lead-out wire is Perfect #225 flexible. Terminate by wrapping with a fine wire and soldering. Make the pushrod from 1/16 diameter music wire. Don't neglect the pushrod retainer.

The control horn I prefer is the Clary #6783. Clary is no longer manufacturing this product but I hear that Fox carries the identical part as #A6783. Bend the pushrod and retain it on the bellcrank by soldering brass nuts to the top and bottom. Also retain the bellcrank with a soldered nut. Be sure that the controls move smoothly and easily.

After the bellcrank, pushrod and lead-out wires have been installed, plank the center section of the wing with 1/16 balsa sheet.

Landing Gear: The landing gear strut is cut from 1/16 aluminum stock. Bend to the shape shown. Install with #4-40 screws and locknuts. The tailwheel strut is bent from 1/16 diameter music wire. Solder on the reinforcing piece of 1/16 I.D. brass tube and attach the assembly into the fuselage

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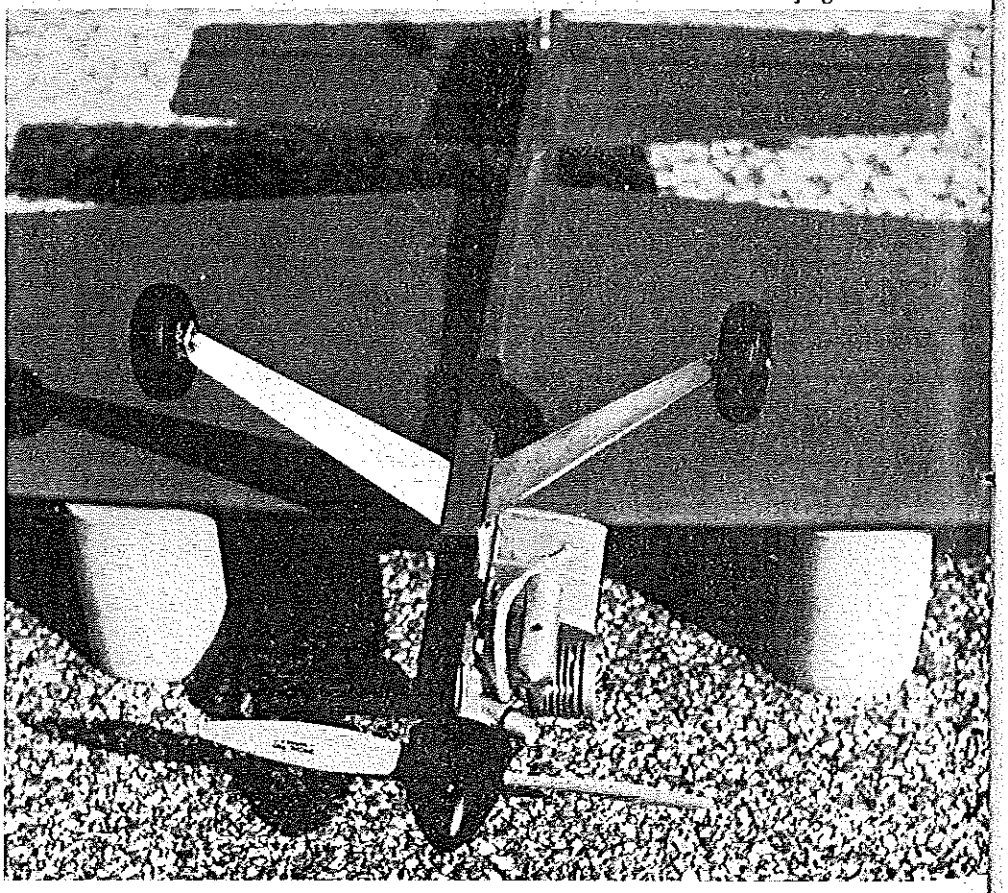
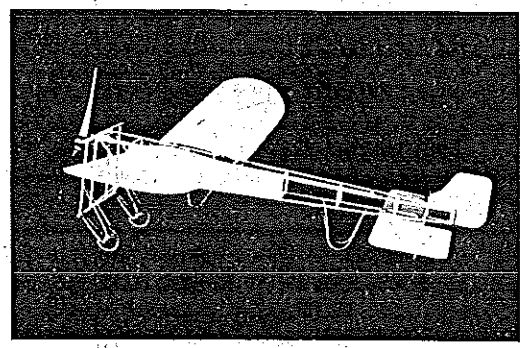
This is how the bellcrank is simply and strongly mounted in the open wing version. The crank pivots through slot in adjacent rib. Note ends of ply doublers. Structure is functional.



Details of sheet-metal gear, engine and tank mounting shown clearly here. Bet that muffler catches your eye. It is homebuilt. Dave flies ST Stunt or G21-35 with 9/6-7 prop and 2-in. spinner.



Three-foot span "Almost Scale" Bleriot by Sherman Gillispie. It's from the 1917 Ideal model and is made from spruce, bass, and balsa. He must have left out the nails because the weight is 2.75 oz. less than original 8.25 figure of the 1917 kit-built model.

John Pond, P.O. Box 3215, 1722 Junction, Bldg. "D," San Jose, CA 95156, lists no fewer than *24* Rearwin Speedster plans! A two-dollar bill to John will bring you the 27-in. span (20F-1) plan of the Stahl machine.

Thanks for the cards, letters, photos, and encouragement!

(Editor's Note: What Bill says about the Speedster is understated. It is a superb subject with good looks, magnificent stability and a force diagram that is just perfect. If one of Pond's 24 plans mentioned by Bill is for the Ed Naudzius Rearwin Speedster, buy it! At either the 1940 or 1941 Nats, this remarkable flier stopped the Nats with a glide that passed over the entire line of gas pits—a memorable picture. You can get an excellent kit for the Stahl Rearwin from Flyline for $8.95. We've seen it fly at "Shangri La.")

Bill Warner, 423-C San Vicente Blvd., Santa Monica, CA 90402.

Pluto/Horvath

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with epoxy.

Fuel Tank: The fuel tank that I used was a Perfect #11, which I cut and re-soldered to the size I wanted. I have since found out that a Fox #86820 will fit without modification. While the usual rubberband installation is OK, I prefer to attach my fuel tanks with slow-setting Scotch epoxy; first sanding the side of the tank with #150 paper to obtain a better bond.

Final Assembly: Epoxy the stabilizer to the fuselage as shown. Glue the top part of the fuselage in place and attach the rudder. Epoxy the wing in place.

Finishing: The types and methods of finishing that can be used would take up more space than I want to devote to the subject, so I'll just briefly describe the technique that I used.

After sanding the entire plane with #320 paper, I brushed on three coats of filler (2 parts talcum powder to 3 parts nitrate dope), sanding between coats with #400 paper. After this, I applied one coat of clear nitrate, and sanded with #600 paper. I then sprayed one coat of K&B epoxy primer, sanding with #600, a sprayed coat of K&B epoxy paint, application of trim and decals and a final coat of K&B clear. I allowed plenty of time after each coat of paint for drying. MonoKote is applied to the built-up wing design.

Engines: Any good 35 engine will put out enough power to do any maneuvers you want to do. Be sure to check the balance of the plane with the engine attached. I use Super Tigre engines, either the 35 stunt or the G21-.35, with a 9 × 6 × 7 prop and a 2-in. spinner. I also run a homebuilt silencer.

I do most of my flying on a field that has tall grass, so I generally remove the landing gear. With a good engine and the plane's light weight, there is no problem in hand-launching. The plane also glides well after the fuel runs out. Pluto has even been flown by a friend of mine in slow combat. It seems that the design is versatile enough to use for almost any conditions. I am sure that whoever builds a Pluto will not be disappointed with its performance.

Finally, I would like to give credit to some of the people who have helped me with this project: Charlie Sabbagh for film processing, Dave Arnote for his help in the shop and on the field, and Don Noon for his help with writing this article.

CL Scale/Gretz

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good scale model can be made to look bad. I wouldn't go so far as to say that exceptional workmanship in these areas can make an out-of-scale or poorly constructed model score good static points, but doing a good job on these *can* make a nice scale model look exceptional. It's part of the artistry of creating a believable "Scale Illusion!" Like diamonds on a ring or chrome on a car, a few prominent details that are well done can make a Sport Scale model sparkle.

True Grit: If you've ever glued a piece of wet-or-dry sandpaper to your model in an attempt to simulate the subject aircraft's wing walks, you undoubtably know that the results are not always satisfactory. For many years we have been using a technique that comes as close as possible, I think, to authentically reproduce most wing walks. It involves mixing sand-like "grit" with a bonding agent and actually painting the wing walk on the surface of the wing in the same way that it is usually done on the full size aircraft.

The sand-like grit is abrasive polishing grain similar to that actually used to make sandpaper, polish metal, or sandblast buildings. There are probably many brands and types with different grades and composition, but what I have always used is No. 100 grit Aluminum Oxide. This or something basically similar and equally suitable can be obtained from a local metal or mineral supply outlet. You will also be able to get it in the near future from Sig Manufacturing Co.

The best type of bonding agent to use is whatever kind of paint you are finishing your model with. If you painted it with dope, mix the sanding grit with black dope of the same brand. If you prefer an epoxy or enamel finish, use black of that type of paint.

The first step in applying the wing walks is to mask off the area to be done according to your scale documentation. Take a little extra time to make sure you're getting it as accurate as possible. As with many final scale details, you often won't have any exact measurements to go by but will have