This RC biplane is a great sport flier, and the structures are straightforward and sturdy. It's just the ticket for a sport .40 engine and four-channel controls.

Wide-track, tire-formed landing gear and a relatively long fuselage moment combine to produce excellent ground-handling performance. Depending on how you set up the controls, you can have mild, trainer-like performance or you can have super aerobatics. Photos by the author.

D. B. Mathews

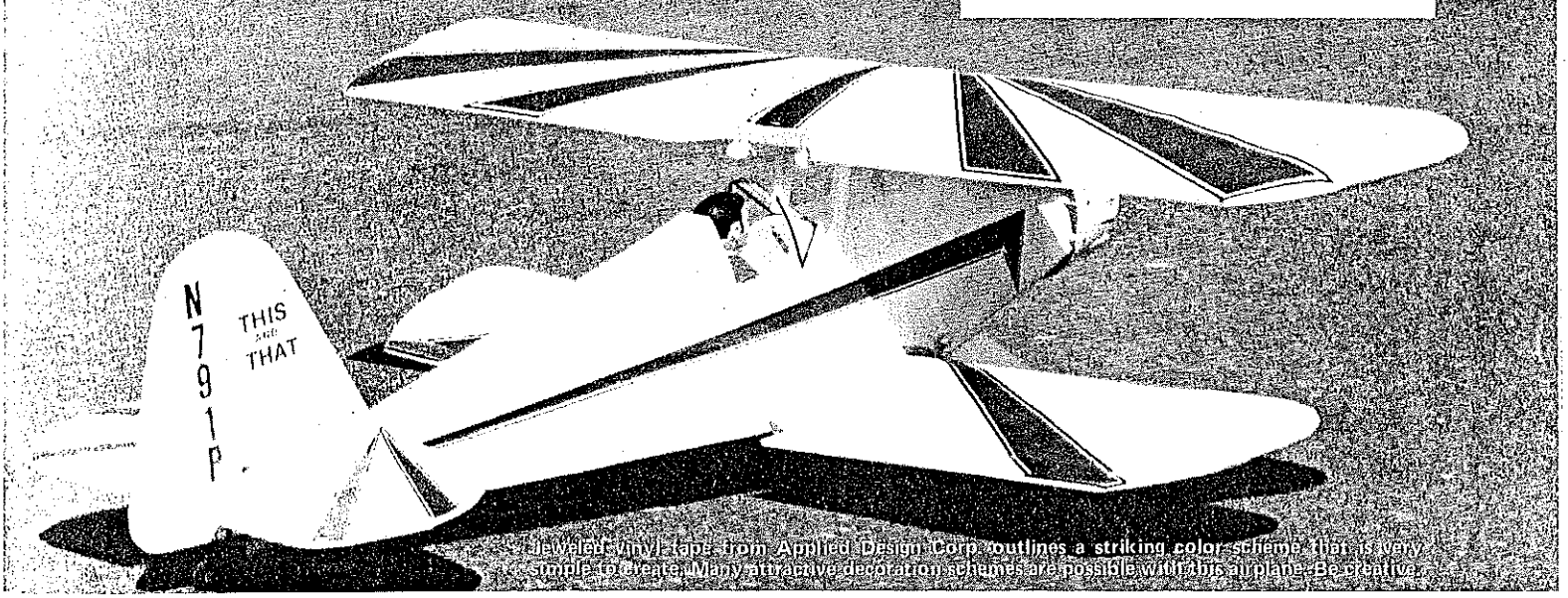
This and That

IT HAS OFTEN BEEN said: "Airplanes with two wings are twice the fun." This model certainly supports that concept.

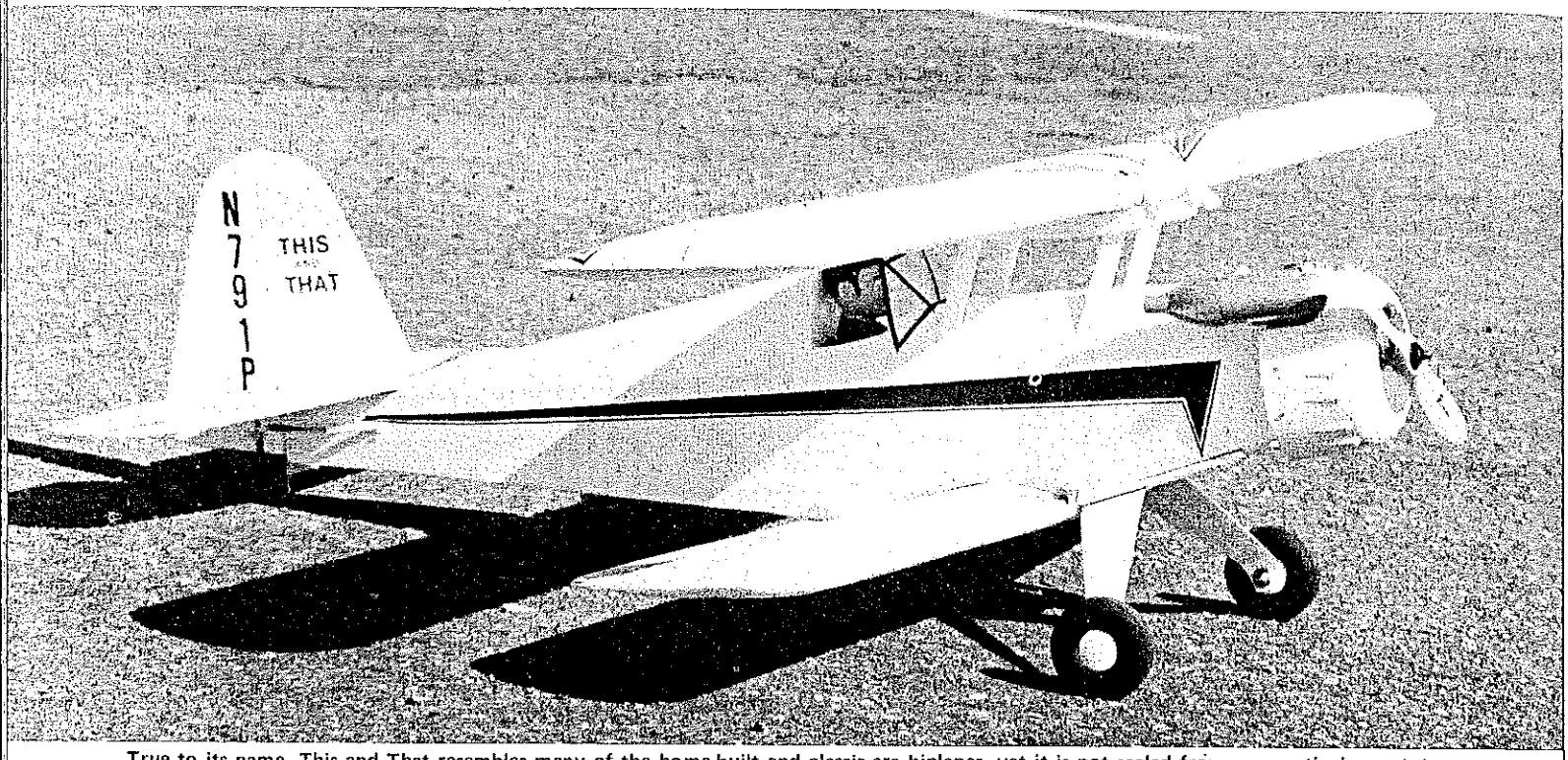
The genealogy of this bipe has been the source of much amusement for me. Invariably the kibitzers take a look at her and become embroiled in a comedy routine we laughingly refer to as the "whatzit."

Her empennage is Smith Miniplane, her fuselage shows a touch of Balsa U.S.A. Pantheon, her cowl appears Waco-like, the wings could be from a Stearman, etc. Truly, she shows a little of this and a little of that. That's where the name comes from.

My design approach was to combine simple yet sturdy structures into a .40-sized bipe that would be easy to fly. Relatively simple to build, exceptionally stable due to



Jeweled vinyl tape from Applied Design Corp outlines a striking color scheme that is very simple to create. Many attractive decoration schemes are possible with this airplane. Be creative.



True to its name, This and That resembles many of the home-built and classic-era biplanes, yet it is not scaled from any particular prototype.

its long moments (yet highly aerobatic), this plane may well be just the ticket for your entry into the "wonderful world of bipes."

Construction

All wood sizes are stock and should be readily obtainable. Do not attempt to "lighten" the framework, as structural integrity could be seriously compromised by substitution of smaller wood sizes. This model is such a delight to fly when powered with a K&B .40 (Model 8011) or a Como (or equivalent) that I would question why any additional power would be desirable. I suggest that a bigger engine not be used.

Wherever possible all balsa-to-balsa joints should be made with cyanoacrylate (CyA) glue. Five-minute epoxy is used on ply-to-ply joints. I am very impressed with Hot Stuff Super "T" for laminating the Lite Ply doublers and to adhere the inner frame to the fuselage. Super "T" is also great for planking the wings, etc.

Fuselage. Cut out all of the parts after transferring the patterns onto the proper wood; you can use carbon paper, Xerox heat transfer, or tack on the patterns with rubber cement. Drill all of the required holes while cutting out the "kit" of parts.

Assemble a right and left side, adding the scrap ply strut boxes. Position the bulkheads onto one side using a triangle to check for squareness, then place the remaining side over the first.

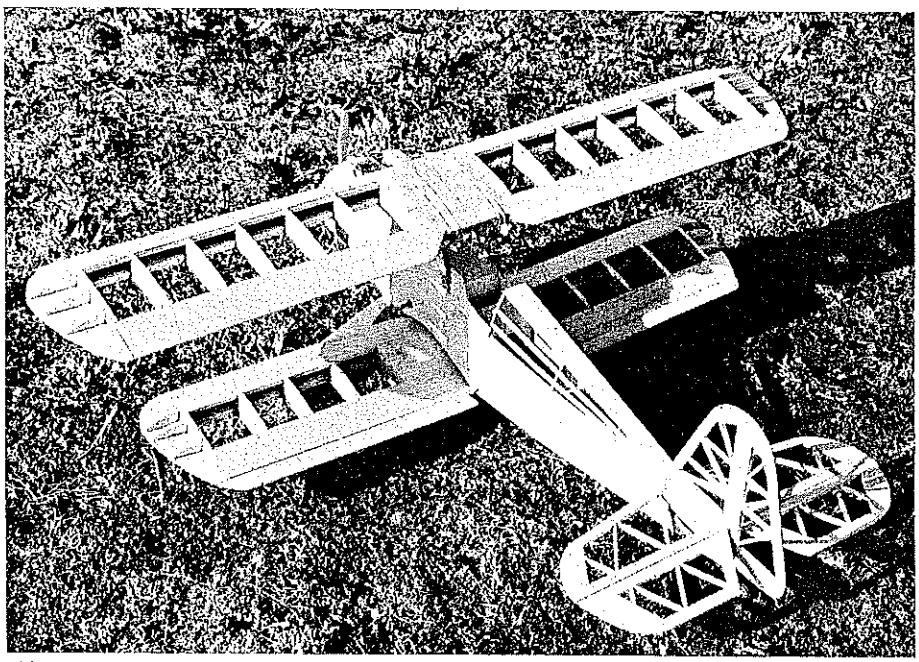
The tail post can be blocked up on the flat work surface or pulled together over the top view. Add the crosspieces, tail wheel bracket, top formers, and bottom hatch.

Fabricate the cabane structure over the side view. Be sure that a left and a right are being made! Drill the ¼-in. holes with one cabane placed over the other. Slide the completed unit into the fuselage boxes, making certain they slide in all the way to the bottom. Check for parallelism with the lower wing temporarily installed. Use clamps and slow-setting epoxy for this step. It must produce a flat and square seat for the upper wing. Perhaps this sounds complex, but it is relatively easy to do.

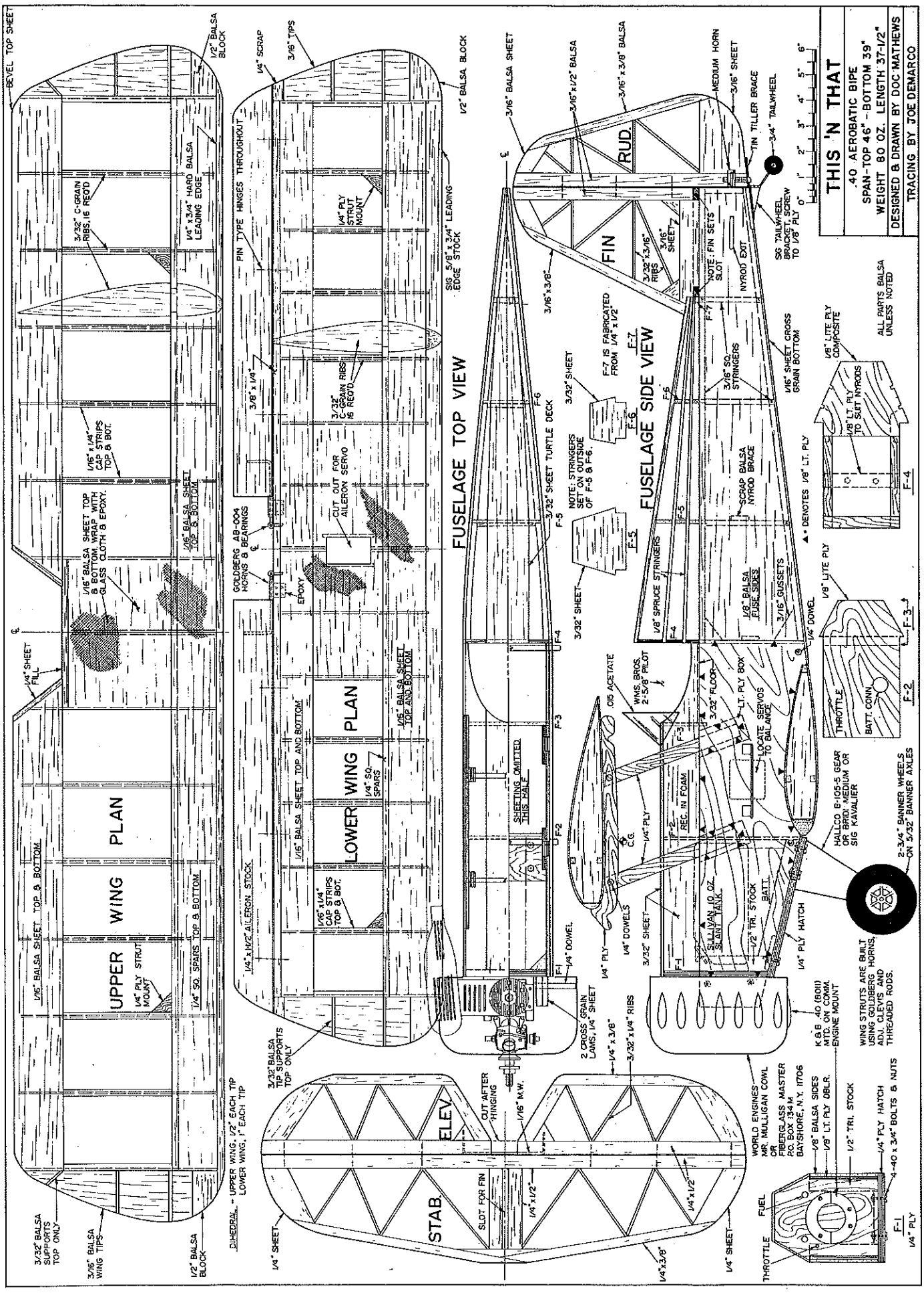
Complete the fuselage framing by installing the ¼-in. dowels, 3/32 sheet deck tops, spruce stringers, and cabin floor. Note the stringers are *not* set into notches; rather, they butt to the back of F-4, set on the outside of F-5 and F-6, and butt into the scrap balsa of F-7. This approach avoids a "starved horse" rib show when the deck is covered.

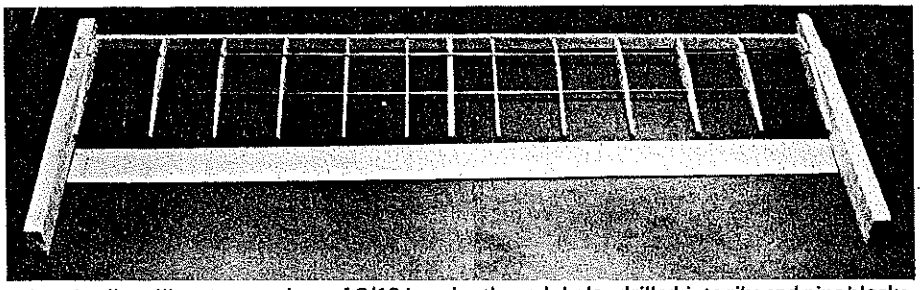
Wings. Please note that this design doesn't use ply dihedral gussets. I am convinced that a wing joint covered with a strip of heavyweight fiberglass tape coated with epoxy is stronger than a more conventional one. Take a look at a crashed wing the next time someone is unfortunate at your flying site. Wings ordinarily do not break at the joint; they almost invariably let go somewhere outboard of the joint. I use glass tape from the automotive section of the Sears store (not the nylon tape commonly available in hobby shops, although it is installed in the same manner with epoxy).

Cut out a set of ribs using one of the techniques for patterns as described for the



Sheet balsa and built-up construction combine to develop a strong, simple, and lightweight bipe.


THIS 'N THAT
.40 AEROBATIC BIPE
SPAN-TOP 46" - BOTTOM 39"
WEIGHT 80 OZ. LENGTH 37-1/2"
DESIGNED & DRAWN BY DOC MATHEWS
TRACING BY JOE DEMARCO
UPPER WING PLAN
LOWER WING PLAN
FUSELAGE TOP VIEW
FUSELAGE SIDE VIEW
STAB.
ELEV.
FIN
RUD.
ALL PARTS BALSA UNLESS NOTED
▲• DENOTES 1/8" LT. PLY
1/16" BALSA SHEET TOP & BOTTOM
1/16" BALSA SHEET TOP AND BOTTOM
1/4" SQ. SPARS TOP & BOTTOM
1/4" SQ SPARS
1/16" x 1/4" CAP STRIPS TOP & BOT.
1/16" BALSA SHEET TOP & BOTTOM, WRAP WITH GLASS CLOTH & EPOXY.
1/4" SHEET FILL
1/4" PLY STRUT MOUNT
3/32" C-GRAIN RIBS, 16 REQ'D
1/4" x 3/4" HARD BALSA LEADING EDGE
BEVEL TOP SHEET
1/2" BALSA BLOCK
3/32" BALSA SUPPORTS TOP ONLY
3/16" BALSA WING TIPS
DIHEDRAL - UPPER WING, 1/2" EACH TIP
LOWER WING, 1" EACH TIP
PIN TYPE HINGES THROUGHOUT
1/4" SCRAP
3/16" TIPS
3/8" x 1/4"
3/32" C-GRAIN RIBS 16 REQ'D
1/4" PLY STRUT MOUNT
SIG 5/8" x 3/4" LEADING EDGE STOCK
1/4" x 1-1/2" AILERON STOCK
GOLDBERG AB-004 HORNS & BEARINGS
EPOXY
CUT OUT FOR AILERON SERVO
3/32" BALSA TIP SUPPORTS TOP ONLY
1/4" SHEET
2 CROSS GRAIN LAMS, 1/4" SHEET
1/4" x 3/8"
3/32" x 1/4" RIBS
1/4" DOWEL
1/4" PLY
3/32" SHEET
1/4" DOWELS
1/4" PLY HATCH
CUT AFTER HINGING
1/16" M.W.
SLOT FOR FIN
1/4" x 1/2"
1/4" x 3/8"
1/4" SHEET
WORLD ENGINES MR. MULLIGAN COWL FIBERGLASS MASTER P.O. BOX 734 M BAYSHORE, N.Y. 11706
FUEL
THROTTLE
1/8" BALSA SIDES
1/8" LT. PLY DBLR.
1/2" TRI. STOCK
1/4" PLY HATCH
4-40 x 3/4" BOLTS & NUTS
F-1
1/4" PLY
K&B .40 (BOII) MTD. ON COMM. ENGINE MOUNT
WING STRUTS ARE BUILT USING GOLDBERG HORNS, ADJ. CLEVIS AND THREADED RODS.
SHEETING OMITTED THIS HALF
F-2
F-3
F-4
F-5
F-6
F-7
F-7 IS FABRICATED FROM 1/4" x 1/2"
3/32" SHEET TURTLE DECK
NOTE: STRINGERS SET ON OUTSIDE OF F-5 & F-6.
3/16" x 3/8"
3/16" BALSA SHEET
3/16" x 1/2" BALSA
3/16" x 3/8" BALSA
3/32" x 3/16" RIBS
3/16" SHEET
NOTE: FIN SETS SLOT
NYROD EXIT
MEDIUM HORN
3/16" SHEET
TIN TILLER BRACE
3/4" TAILWHEEL
SIG TAILWHEEL BRACKET, SCREW TO 1/8" PLY
3/16" SQ. STRINGERS
1/16" SHEET CROSS GRAIN BOTTOM
1/8" LITE PLY COMPOSITE
1/8" LT. PLY TO SUIT NYRODS
SCRAP BALSA NYROD BRACE
1/8" SPRUCE STRINGERS
1/8" BALSA FUSE SIDES
3/16" GUSSETS
1/4" DOWEL
1/8" LITE PLY
THROTTLE
BATT. CONN.
.015 ACETATE
WMS. BROS. 2-5/8" PILOT
3/32" FLOOR
LT. PLY BOX
LOCATE SERVOS TO BALANCE
REC. IN FOAM
C.G.
SULLIVAN 10 OZ. SLANT TANK
1/2" TRI. STOCK
BATT.
1/4" PLY HATCH
HALLCO B-105-5 GEAR OR BRID. MEDIUM OR SIG KAVALIER
2-3/4" BANNER WHEELS ON 5/32" BANNER AXLES



The wing jig utilizes two sections of 3/16-in. wire through holes drilled into ribs and pine blocks.

fuselage, then assemble the wing panels using a simple jig of music wire and blocks—or blocking up the spars, and so forth. The panels should be completely assembled and planked before sanding in the dihedral angles. A sanding block and flat table edge are used to develop the angle when the panel is blocked up the appropriate amount.

Wrap the joints on both wings with the glass and epoxy and add the tips. Then trial-install the ailerons and servo.

Tail Feathers. Note that the fin sets into a stab slot. Also, the rudder cutout in the elevator should be left uncut until the joiner wire and hinges are installed. Other than that, the assembly is very simple.

Details. The ply bottom hatch is retained at the rear by sliding it under the base of the aluminum landing gear. The front end is bolted onto the front stub.

The tail wheel tiller is moved with a strap of sheet metal (tin, etc.) cut to fit inside the rudder horn and its nut plate. If other than Sig horns are used, the tiller will need to be bolted on, or the music wire will need to be run up into the 3/16 sheet.

The cowl is an accessory that can be ordered from World Engines. It is cut away to clear the engine and muffler, then the four projecting sections of dowel are adjusted in the sub-cowl to properly position it. Once a satisfactory position is obtained, glue the dowels with CyA, then drill through the cowl into the dowels for #2 sheet metal screws. It takes a little patience to fit the cowl and hardware, but the procedure is relatively simple, and the installation is durable. A carbide cutter in a Dremel Moto Tool is very handy for cutting the plastic, but a file and knife can be used.

Radio installation is determined by overall balancing requirements. I placed the servos (KPS-14s) well forward, the receiver packed in foam and stuffed in above them. Enough room is available in the forward area for a 10-oz. tank and the battery pack, but it is a squeeze. Actually, the tank in the prototype model was higher than shown on the drawing, since I used a K&B 8011 Series II with its higher-placed Irvine carb.

The nylon pushrods *must* be braced along their lengths to prevent flexing. They should also be rough-sanded on the exterior and epoxied to the braces and at the exit point.

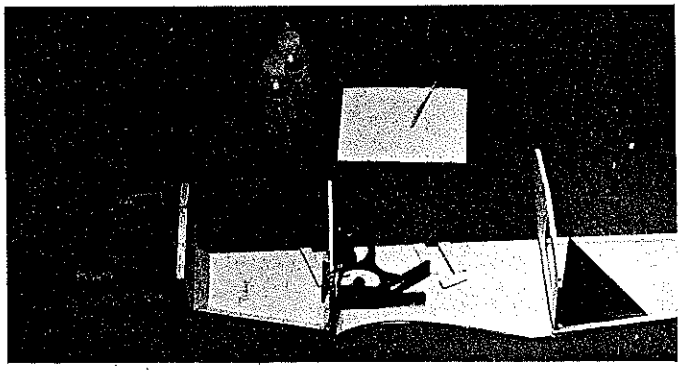
Finish. My model was covered entirely in white FabriKote. The tank area was given a coat of epoxy, the cowl and undercarriage sprayed with polyurethane, and the trim applied with sticky MonoKote.

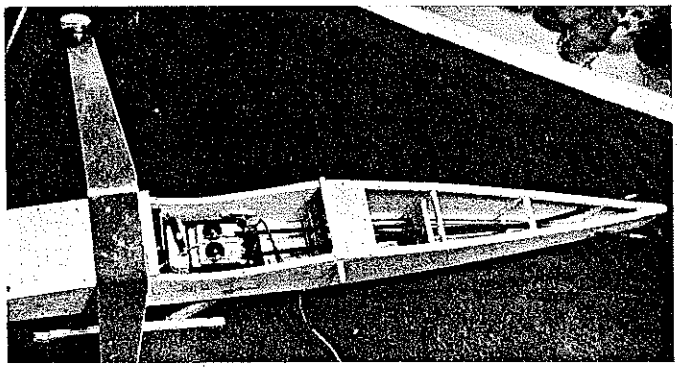
I used dark blue for the sunbursts; these were cut using a straightedge after drawing the design on the backing. Sprayed soapy water was used as a positioning aid, and then it was squeegeed out with a scrap of balsa.

The trim stripes surrounding the sunbursts were done with a spectacular tape from Applied Design Corp., 738 Penn St., El Segundo, CA 90245. Jewel Stripe is a prismatic metallic tape available in several colors and various widths. Applied much like ordinary trim tapes, its reflective nature gives a spectacular brilliance in sunlight. I used red on this model and couldn't be more pleased. I also used die-cut numbers and letters in the same material from A.D.C. for an added touch of distinction.

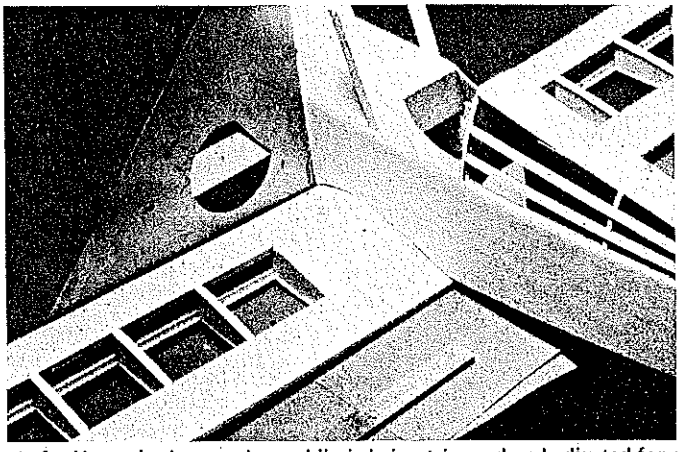
Banner wheels with their hidden axles also added something to the model. Since the hubs were already white, I left them

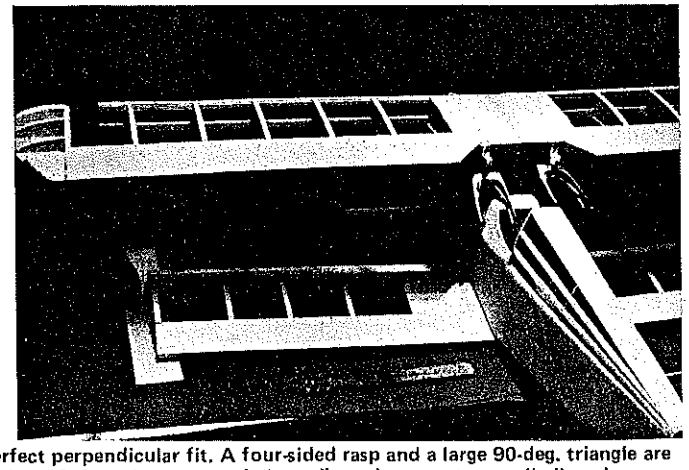
Continued on page 169





Left: Three main bulkheads are epoxied to one fuselage side, and then the other side is added. Note boxes for cabanes and use of squares and a triangle to assure vertical placement. Right: Nyrods are anchored with scrap balsa strips to prevent flexing. They crisscross in order to reduce the angle at the exit point. The fuel tank cover latches under the front lip of the landing gear.





Left: Here, the lower wing saddle is being trimmed and adjusted for a perfect perpendicular fit. A four-sided rasp and a large 90-deg. triangle are very helpful for this task. Right: This picture shows the horizontal portion of the cabane struts being adjusted to create a well-aligned upper wing. When properly adjusted, the horizontals are epoxied in place. A yardstick (barely visible inside the left wing tip) levels the upper wing.

fields, parks, and other limited areas.

Major features of the proposed program include: publication of a how-to-do-it book starting from square one; publication of a quarterly magazine; production of low-cost, brown-wrapper kits for models presented in the book and magazine; providing liability insurance for members; organizing local and regional "Fun Fly-Ins," similar to contests but with no competition; developing a promotional and instructional program to introduce modeling to youth groups and schools; and to foment a nationwide campaign to demonstrate that aircraft modeling is the greatest spare-time activity ever developed—an art, science, hobby, and sport for young and old, rich and poor, male or female. For more information write to Fun Fliers, P.O. Box 95, Volant, PA 16156.

The sport flying (as opposed to competition flying) aspect of this reminds me of a Will Nakashima cartoon; the caption went something like: "I fly just for fun. But I only have fun if I win!"

Yet another space-age material. Getting into a bag of potato chips nowadays is enough of a chore, but have you encountered some of the mailing envelopes that are going around? Impossible to tear! The material looks sort of like doped silkspan, but it's far stronger. Alas, it is too heavy for any Free Flight application I could think up. However, Ed Lidgard thought a bit further; he *splits* the stuff down to whatever thickness he needs.

According to Ed, the name of the material is something like Tyvex—I can't read his writing too well—and is a synthetic-fiber paper made by American Excelsior. The only commercial application he knows of is for mailing envelopes. As produced, it is .006 to .008-in. thick. He peels the stuff apart, then takes the thicker half and peels that apart, and finally worries it with a dull knife down to a thickness of .001 to .002 in., and a weight about equal to that of tissue. But it is light years ahead of tissue in strength! The application: an *inside* covering for rubber-power fuselage tubes. (But if you get some of the stuff in your hands, you'll probably figure out a dozen applications, right off.) Ed sticks it to balsa by applying Titebond to both surfaces, then "cross-linking" it (I guess he means "curing" it) with a MonoKote iron. The smooth surface, which is out, is given a coat of thin dope to make it lube-proof.

Record-breaking Indoor Cabin model. Bob Randolph tallied up his eighth Indoor Cabin record last July at Santa Ana with a flight of 33 min., 37 sec. Here is his story about it:

"My last two Cabin records were made with removable pods, to which the landing gear was attached. Test flights were made with the delicate pod replaced by a flat plate having the same weight and drag as the pod. I learned from this that the drag of a flat plate is only slighter greater than a streamlined form having the same cross section at Indoor-model speeds, and that a flat disc can be built much lighter. Thus the Thin Man was born, and it came out with a total weight of only .00325 oz. I had intended doing comparative tests using a double-cone pod, but the model with the disc flew very well, setting the record on its third flight. Then, I was fortunate enough to win the FAI Team Selection Finals, and so I have had to concentrate on preparations for the World Champs. Additional Cabin-model development will have to wait. I'm sure that, with the use of more boron filament, I could get the weight down even more."

You have to read the rule book rather closely to figure out how the Thin Man qualifies as a Cabin model, but it does. The rubber motor is enclosed in a balsa tube, to which the disc is attached. The disc is covered on both sides with microfilm with a tiny balsa spool separating the two surfaces. The rules require that a Cabin model have a "built-up, enclosed fuselage," and it is a little hard to see how a balsa tube qualifies as a built-up structure. However, a lot of Cabin models have been built that way, so it is apparently OK.

Bob Meuser, 4200 Gregory St., Oakland, CA 94619.

FF Indoor/Tenny

Continued from page 78

sets of rollers would cut about eight fixed sizes from ¼-in., flat Pirelli. It had several disadvantages—it could not be sharpened, there was no possibility of making strips slightly smaller or larger than the built-in size, and it would handle only ¼-in. wide rubber.

Finally, if you could get exactly the size you *did* want from one of the cutter sets, you also got two or three other sizes you *didn't* want, in the same pass!

Vilim Kmoch of Yugoslavia made a Roto Shear-type of cutter which had *adjustable cuts*. It came with many very thin "washers" in one of two diameters from which you assembled the cutters. If you assembled one roller beginning with (for example) eight, .006-in.-thick, large-diameter washers, followed by alternating layers of eight small- and large-diameter wshers, and made the other roller with an exact mirror image, the two rollers would overlap to form a rotary shear.

After assembly came an agonizing trial-and-error period while you adjusted the end pressure on the washers and the amount of overlap until a satisfactory cut was made. Although you could make several very precise sizes (washers came in three thicknesses allowing choice of strip width to .002 in.) with subtle variations in each cutting pass, the adjustment phase consumed several feet of precious rubber. Other advantages were that Vilim's shear could be sharpened and, once adjusted, the waste was less than most strippers of any type.

The *current high-tech strippers* cut rubber off the side of any size of rubber strip the same way that meat slicers in the grocery

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store cut sandwich meat and cheese. They make infinitely-variable-width cuts of acceptable accuracy and excellent repeatability—if the wide strip has good uniformity in width. They can be resharpened a significant number of times without disassembly, and the blades are replaceable.

Are they perfect? No, they are awkward to hold and have no built-in means of mounting. If you are clever and lucky, you can find a place to mount them with a C-clamp so you can turn the handle with one hand and feed rubber with the other, as fast as you can turn the crank. The strip you cut will be as accurate as you can set the adjustments—which takes practice. If the parent strip varies greatly in width (not common, but not very rare, either), the baby strip will also vary, unless you can meticulously adjust the two guides to exactly compensate. The first such stripper (see the photo) was much smaller than the latest ones and was available in 1972 from Ryszarol Czechowski of Poland. Czechowski later made an improved version which was about twice as large, but it has been unavailable for some time.

Another photo shows the latest rotary stripper to become available: Ray Harlan, 15 Happy Hollow Rd., Wayland MA 01778, $82 postpaid anywhere in the U.S. The major changes over earlier units are improved guides with micrometer adjustments calibrated in thousandths of an inch (.001). A sharpening set consisting of a ¼-in.-square hard Arkansas stone and a bottle of honing liquid is available for $6, postpaid if ordered with the stripper, $1.50 additional postage, otherwise.

This discussion has gotten too long, so we'll wrap up the rubber stripper bit next time, including a summary of the advantages and disadvantages of various stripper types.

What size rubber did I cut? One thing is needed to calibrate most strippers and check the output of others—micrometer calipers. The last photo shows two styles—a dial micrometer and a machinist-style micrometer. Most dial micrometers have internal springs which are too strong to measure rubber strip accurately, so many users remove or weaken the spring. My personal preference is the machinist's micrometer; I started with this type. In either case, I take the measurement by closing the jaws while sliding the rubber back and forth between the jaws. Read the measurement at the point where you feel a smooth drag on the rubber. This requires a fine touch and practice, but it has an added benefit. If you hold the setting and check the rubber several places, width variations almost too small to measure accurately can be found—if you care.

Bud Tenny, P.O. Box 545, Richardson, TX 75080.

This and That/Mathews

Continued from page 82

natural. However, they can easily be painted with polyurethane.

Flying. Start with the clevises in the outer holes of medium Sig horns. The ailerons should also be placed at the top of the threaded portion. These settings give "mild" responses and can be sensitized

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No. 427	**Profiles:** FF Travelair Mystery Ship and Miss Los Angeles profile, all-balsa rubber models for sport flying (17 in. span)	$2.00
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once the first flight "jitters" are over.

The balance point shown is also a "mild" one. For more violent rolls and outside turns, add an ounce or two of tail weight. If this is done, I strongly recommend using the outboard wing wire braces.

Set up as drawn, this model is remarkably gentle and easy to fly. She verges on trainer-like behavior at slow speeds. She is also a bipe that doesn't settle like a rock when in low throttle; as a matter of fact, my first three approaches were way long in anticipation of behavior more like the average bipe. She wants to float much in the manner of a Sr. Falcon or other lightly-loaded, semi-symmetrical-airfoiled trainers.

Dead-stick situations are equally impressive. I have actually resorted to S-turns to keep her on the downwind leg while losing altitude. She is a floater.

Takeoffs and landings are greatly simplified with the widely-spread undercarriage. A bit of right rudder as the throttle is advanced is all the control the takeoff needs. Landings are great. Just get the wheels on the ground; she'll take care of it for you from there.

Aerobatics are lovely to behold. Vertical performance with the forward balance point shown is a bit sluggish at my altitude in Kansas, but it improves with tail ballast. On the other hand, rolls, horizontal eights, Cubans, and snaps are gorgeous.

Frankly, the sight of This and That on a fly-by is a thrill not soon forgotten. She's everything you could want in a sport bipe of this size—and more! Build yourself one; let the flying field experts drive themselves mad conjecturing on her lineage while you just fly and enjoy it.

Museum/Berliner

Continued from page 89

of-the-way place and meet the hard working, typically friendly Poles who do what they can to keep things alive. Already, one of the airplanes—the sole surviving deHavilland deH-9A bomber of World War One—has been swapped to the RAF Museum for a spare Spitfire like the ones flown in the 1940s by Polish exile squadrons. Additional trades may someday be possible, such as the Curtiss Hawk for, say, a P-51 Mustang. Or the Me-209V-1 for half the Smithsonian!

Unfortunately, the present political situation in Kracow is so depressing that it's hard to get a letter through, let alone consider planning a trip or a trade. To those of us on the other side of the line, this seems hopeless. To the Poles, it's just one more turn of the screw. After all, the airfield on which the museum sits has served many masters: the Austro-Hungarian Empire, Hungary, Nazi Germany, the U.S.S.R., and finally Poland. It has survived some pretty hard times, as have its wonderful old airplanes and the men who tend to their most vital needs.

Until things get a lot better, the museum outside Kracow will stand as a reminder that even where life is gray and unhappy, there are still people who have time for matters far beyond their own lives.