

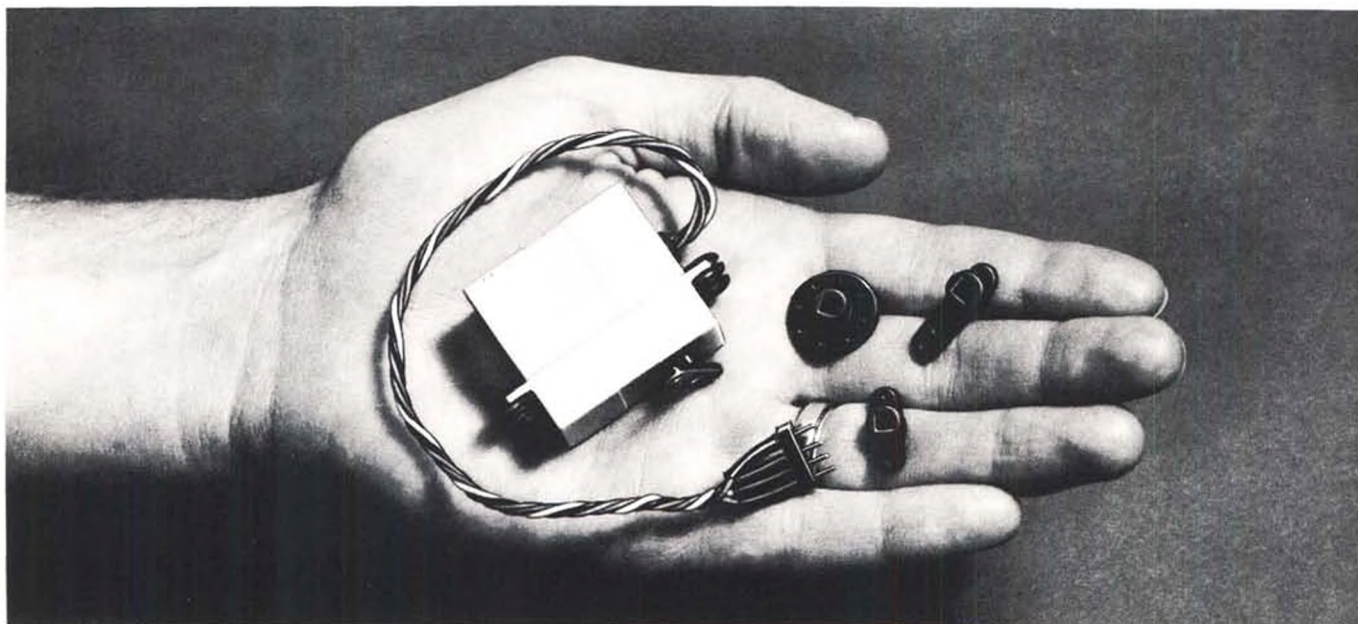
The **MODEL B**UILDER



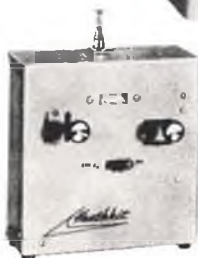
MARCH/APRIL 1972

volume 2, number 6

50 cents



1 1/4 ounces, 3-pound punch!



New Heathkit Sub-Miniature Digital Proportional Servo utilizes an integrated circuit to trim off excess bulk. The Sub-Mini weighs-in at 1.25 oz., measures 1 1/8" from mounting ear to mounting ear, yet provides the same 3-lb. thrust of much larger servos. Features include 90° rotation in 0.5 seconds; 1% position accuracy; ceramic variable control feedback element; nylon gears and molded nylon case. Just 18 components install quickly on printed circuit board. Includes 4 rotary outputs, is compatible with all Heath R/C Systems and most others. Measures 1 1/32" H x 3/32" W x 1 1/8" L.

Kit GDA-19-42, 1 lb.24.95*

Heathkit Miniature IC Servo gives you digital circuitry, proportional control, in a package that weighs 30% less, is 25% smaller than conventional servos — but outperforms them with 4 lbs. of thrust. Includes both linear and rotary output assemblies, universal mounting ears. Weighs 1.75 oz., measures 1 5/8" H x 7/8" W x 2 1/32" L.

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Heathkit 5-Channel Systems include 4 servos; Heathkit Miniaturized Receiver; Slim Line Transmitter with Kraft sticks, built-in charging circuit; flat-pack nickel cadmium batteries & free soldering iron. Specify frequency desired.

System Kit GD-19S, with Sub-Miniature Servos
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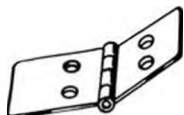
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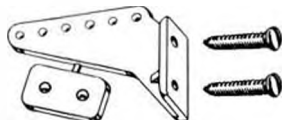
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The MODEL BUILDER

MARCH/APRIL

1972

volume 2, number 6

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Cover: Francis Products Quarter Midget P-51 built by Paul White, Santa Ana, California. Kit has fiberglass fuselage and 304 sq. in. foam cored wing. Power is a Supertigre .15. All up weight, three pounds, with Orbit radio aboard. Scene is Mile Square. Photo by Editor.



from **Bill Northrop's** workbench . . .

WHAT'S THIS MARCH/APRIL BIT?

First off, subscribers, rest easy. You will still get 12 or 24 magazines! if you will notice, the number sequence has not changed (volume 2, number 6), and this is the way your subscriptions are recorded.

Actually, the reasoning behind the combined date for this issue is psychological. From the beginning, we have tried to publish MB date for date. That is November in November, December in December, etc. However, two circumstances have made this just about impossible to accomplish.

For one thing, the rapid growth of MB just about has us climbing the walls. A nice problem, you say. In a way, yes, but on the other hand, the increased paper work, record keeping, shipping problems, etc., doesn't give us a chance

to enjoy it.

Not only that, we have now increased the page content for the second time, so there is much more work involved in the monthly preparation of each issue. And of course, as the word gets around, more and more material becomes available for publication and new departments get started.

The second big problem in publishing on time is the U.S. Mail. Shipments of magazines to dealers on the east coast are taking as long as 2 1/2 weeks for delivery. Actually, the material in the magazine is not old, but it doesn't look good for a NEW February issue to appear on the dealer's magazine rack during the first week in March!

Here's where the psychology comes in. As we said, the material's not old, but because of that eight letter word

"February" on the cover, it APPEARS old. The simplest solution? CHANGE THE DATE! Thus we have the transition issue . . . March/April.

The next issue . . . volume 2, number 7 . . . dated May 1972, will be shipped in the middle of April. OK?

By the way, have you noticed that your arms are getting tired a little sooner from holding MB up to read? It COULD be the added weight of those four extra pieces of paper making up the eight new pages in this issue!

Actually, we had intended to time the addition of these pages so it would coincide with an increase in the sale price of the magazine. (this is the sixth issue at the original introductory price of 50 cents). However, the editorial build-up has made it necessary to give you the extra pages in advance . . . by

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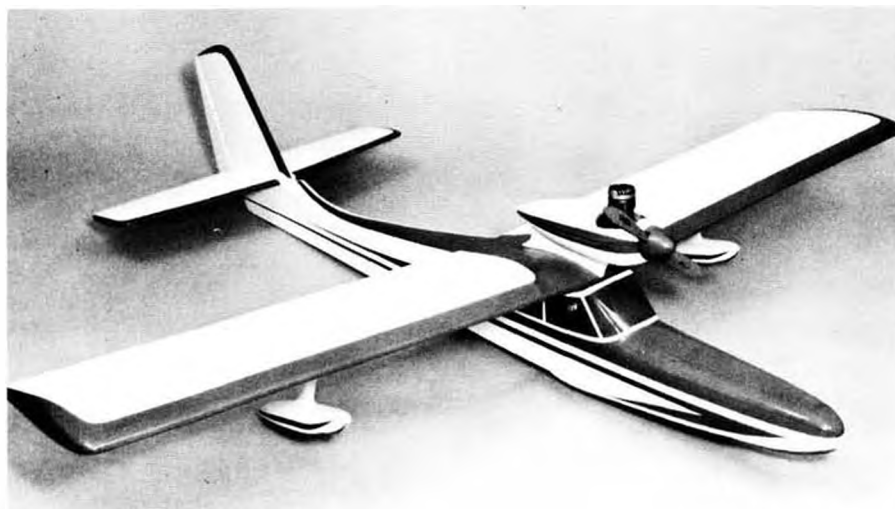
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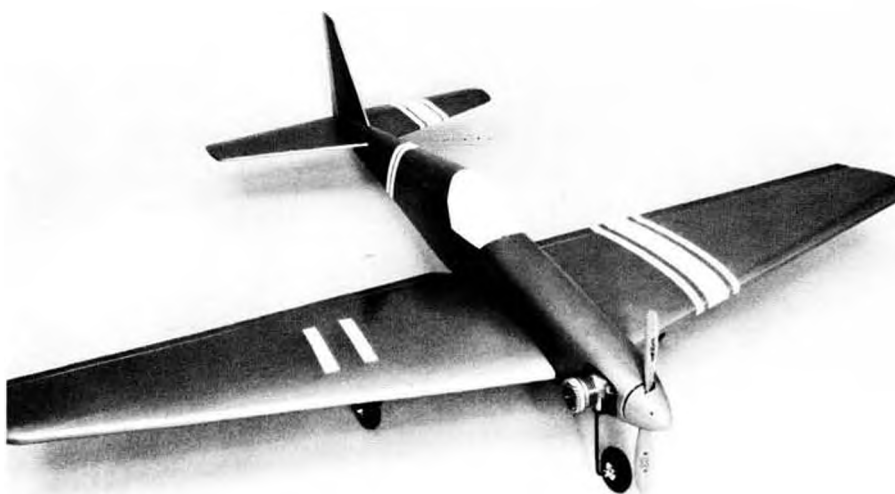
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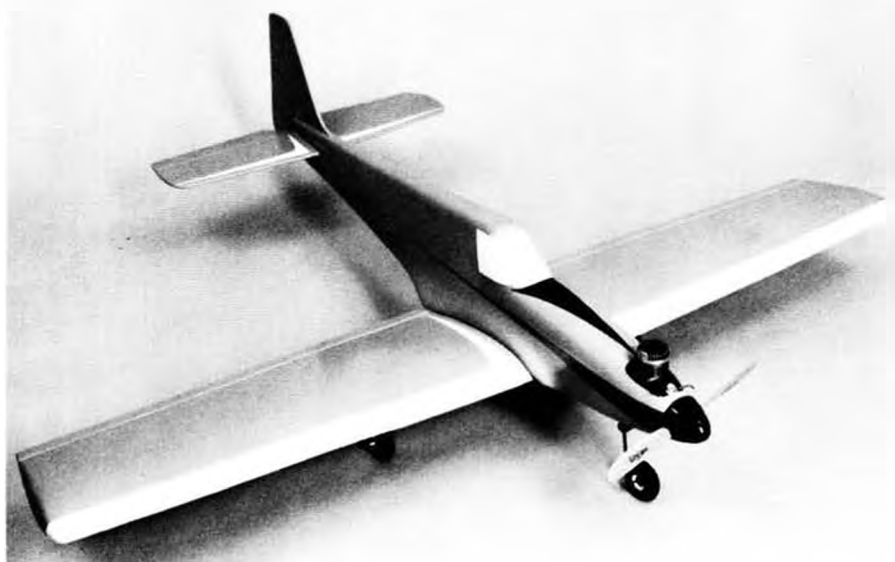




One of a series of new R/C models from Dembros. This is the Waveking, a .60 powered seaplane



Another of the Dembros models, all having fiberglass fuselages; the Scimitar, for .45 to .60 mills.



Nytron is a third model by Dembros. All surfaces are foam, and come with sanded balsa skins.

one month. In fact, it has occurred so fast that we had to cut this month's "Workbench" column down to these four pages (All right, who said "hurray" out there?)

So . . . effective with the publication date of the May issue, April 15, The MODEL BUILDER magazine will sell for 65 cents a copy, subscriptions will be \$6.50 per year, \$11.50 for two years. Obviously, if you want to save a couple of bucks, get your subscription in the mail on or before April 15. Isn't that awful? Federal Income Tax, and now this!

THINGS TO DO

The League of Silent Flight 1972 Soaring Tournament has been set for August 26 and 27. This year the tournament moves from northern to southern California and will take place at the Marine Corps Helicopter Air Station, Mile Square Recreational Park, Fountain Valley, California. Host club is the San Fernando Valley Silent Flyers. SFVSF President Jack Seeley is Tournament Manager. Le Gray, LSF President is Tournament Director. More details later.

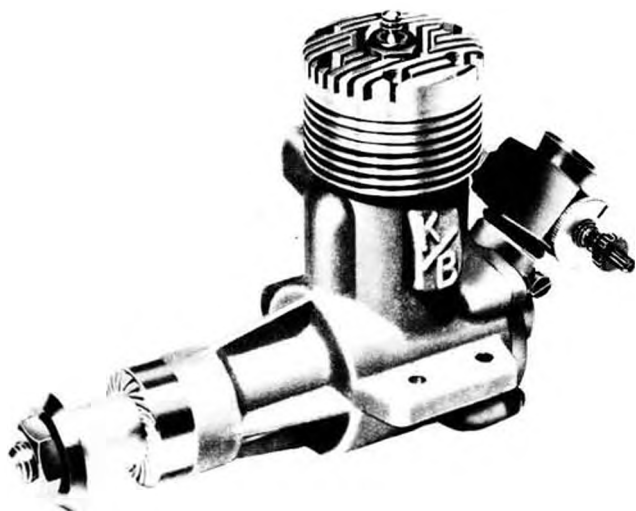
The 19th Annual International R/C Contest, put on by the Forest City Flyers Inc., London, Ontario, Canada, is scheduled for June 17 and 18, 1972. Pre-registration by mail is \$3.00, or two less than registration at the contest. Write Tony Pritchard, 389 Griffith St., London, Ontario, C.D. is Bill Drennan, 1472 Norman Ave., London, Ontario. This is a biggy.

The 3rd Annual Soaring Nats will be held on July 23, 24, 25 in conjunction with the AMA Nationals.

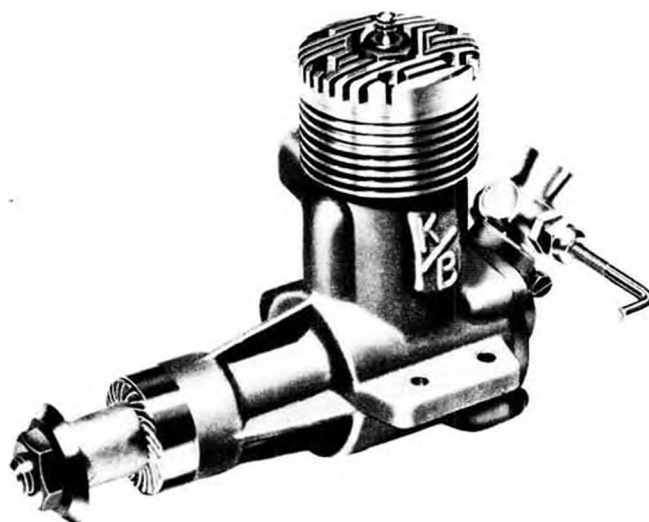
Contestants may enter either Standard (100 inch span or less) or Open (any size), not both, and scale. For further details contact Soaring Nats, c/o Dan Pruss, C.D., Box 49D, Plainfield, Ill. 60544.

OVER THE COUNTER

Dembros Hobbies, Inc., 58 Lake St., Nashua, N.H. 03060 is offering a line of beautifully prefabricated R/C models. The term "ARF" really doesn't apply here, although the basic components are not far from completion. Also, ARF usually implies plastic molded parts, plastic skinned wings, etc., which these are not.



Totally new .15 R/C engine from K & B will undoubtedly end up in many Quarter Midget pylon racers. Schneurle induction system.



Standard version of the new K & B .15. Squish band combustion chambers. R/C price \$30.00, Standard \$28.00.

The four airplanes currently available include fiberglass fuselages with firewalls, motor mounts, nosewheel mounts and wing attach blocks installed, where and if required. The workmanship is excellent, as indicated by the completely missing joint seam where the fuselage halves meet. Wings and tail surfaces are balsa covered foam, tips installed, all sanded smooth, and with land gear mounting blocks and control surfaces attached. Wing braces, formed landing gears, complete with collars and mounting hardware, also pushrods, are all furnished.

The SNOWBIRD, SCIMITAR, and NYTRON are all trike gear low-wing ships, the first two being .50 to .60 powered pattern types, and the latter being a .35 to .45 sport/trainer. All sell for \$69.95.

The WAVE KING is a .60 powered six foot seaplane, which also includes

fiberglass engine pod and wing floats. The latter come completely assembled on struts, ready to mount on wing. This is a particularly graceful and well proportioned model, and our own version of it will be flying at Lake Elsinore this summer. It sells for \$92.00

* * *

Tatone Products, 4719 Mission St., San Francisco, Ca. 94112 continues to come up with much needed items for modelers.

At last something has been done about the 360 degree exhausting Cox .049 engines. These beautifully running, but messy little monsters have long needed the new Tatone Muffler-Manifolds now available at \$2.95 each.

The second item is one for which Tatone inadvertently created its own need. The company's line of universal mufflers and manifolds for larger engines ran into difficulty because of the

mounting strap interference with rotating exhaust baffle mechanisms, such as used by Enya, Veco, and Fox. A new strap is now included with all of Tatone .45-.80 series mufflers and manifolds. The new strap is also packaged separately for 69 cents.

* * *

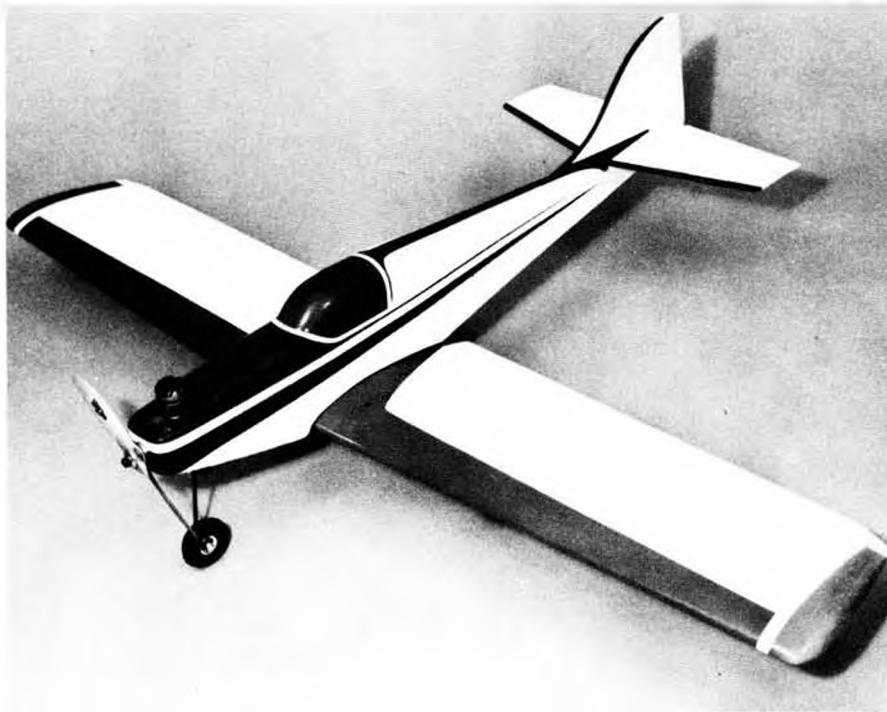
Rubbers winders seem to be scarce, yet this condition is not realistic. As it so happens, Len Marlow, Marlow Engineering, 6850 Vineland Ave., North Hollywood, Calif. 91605, is currently producing two winders in his own shop. They're all metal (plated steel case, color anodized aluminum end plates) with bushed shafts, brazed assembly of all internal components. Free turning wood knob on input crank. In two ratios, 16 to 1 for indoor, 9 to 1 for indoor and light outdoor models, the winders cost \$3.98 and \$4.49 respec-



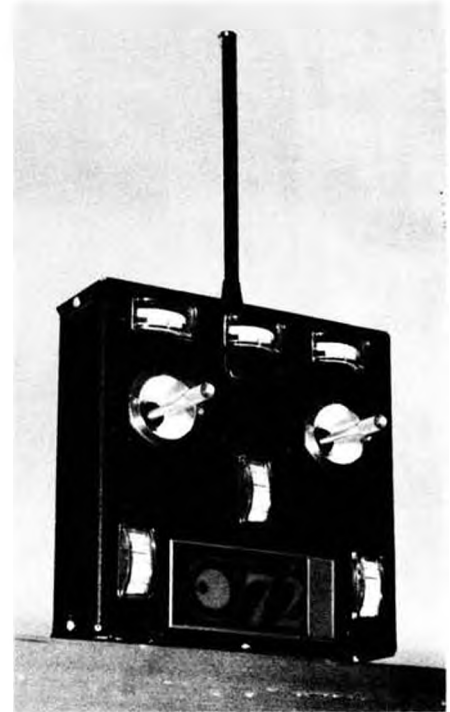
Long needed item for Cox .049 users is this exhaust manifold/muffler. Two types to fit all current and pre 1970 models. \$2.95



New strap included with all large-engine manifolds and mufflers from Tatone. Clears rotating exhaust baffle linkage. Available alone, 69 ¢.



Smallest of new Dembros models, the Snowbird, for .35 to .45 engines. All kits are greatly prefabricated, include all hardware and pushrods.



Orbit's new 6 meter transmitter. Any questions? Call 714-540-1404, ask for Big John.

tively.

While we're at it, the company also markets an excellent "Featherlite" tissue. Not genuine Japanese covering material, but of very good quality, color fast, it shrinks well, and has adequate wet strength. The 20 by 30 inch sheets retail for 15 cents each. A 16 sheet starter package with two of each color, is available for \$2.40.

* * *

In response to our comments regarding the balsa plywood available in Germany as used in Berni Huber's E-III Eindecker model (Feb. '72 MB), Claude McCullough, Sig's Product Engineer sent us a sample of Lite-Ply. This is an 1/8 inch thick poplar plywood available through Sig Mfg. Co. The 9 x 12 inch sample weighs 2 3/4 ounces. At 35 cents a square foot, this should make it an excellent material for fuselage sides, top and bottom, such as last month's Eindecker. Weight saved on unnecessary doublers could more than compensate for the slight additional weight of the ply.

Claude also sent a listing of sub-miniature bolts, screws, and rivets now available from Sig that should make scale fans sit up and take notice. Brass machine screws in hex, round, flat, and fillister head styles can be had in 00-90, 0-80, and 1-72 sizes and in 1/8, 1/4, and 1/2 inch lengths. Related items include

00 brass wood screws, brass washers, brass hex nuts for each size, and taps and dies for each size. Rivets are 1/32 inch diameter and available in aluminum and copper.

Screws sell for 30 to 60 cents a package of 12. Taps are 35 cents, dies \$3.00. Rivets are 59 cents a hundred to \$4.85 per 1000.

* * *

Custom Plans Service, owned and operated by Bob Sweitzer, 2331 S. E. Maple, Hillsboro, Oregon 97123, sells large scale plans of many popular airplanes. Plans are not just outlines, but include structural details for building the model.

Currently there are 25 designs to choose from including a 90 inch Heath Parasol \$4.50, 101 inch Stinson Voyager \$7.50, 108 inch PBY-5A \$10.00, 60 inch Boeing FAB-4 \$10.00, 60 inch Waco UMF-3 \$9.50, and 108 inch J-3 Cub \$9.95.

* * *

Dumas Products, Inc., 790 S. Park Ave., Tucson, Arizona 85716 is modifying several of the hulls in its R/C ski boat line to improve both speed and handling under racing conditions. This is being done in connection with the introduction of a new 36 inch, .60 powered boat, based on the previously available 32 inch, .40 powered design of Steve Muck's "Miss Pretty Penny."

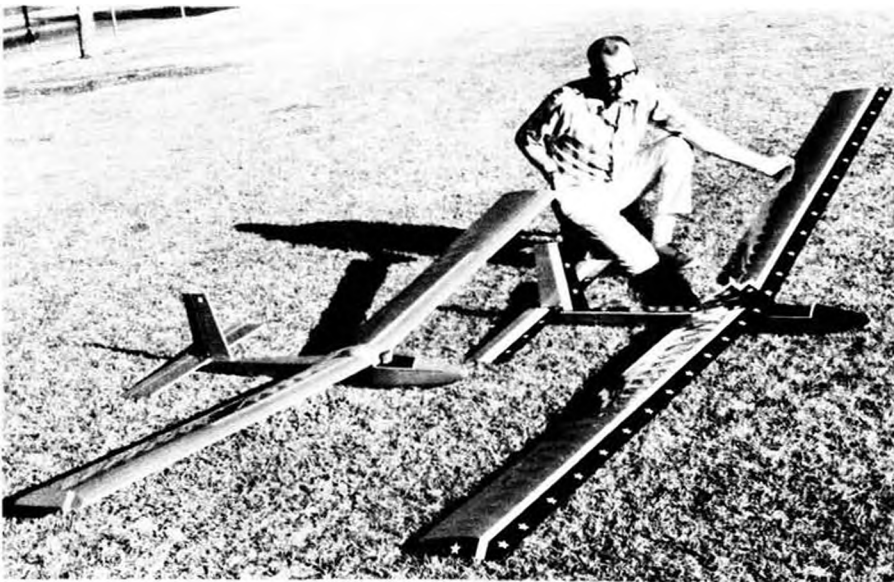
The new hull bottom design features a longitudinal break on each side of the bottom starting at the transom and extending forward to fair out at the chine. The boat thus runs on the lower center portion only, at speed, with the outer portion coming into play in the corners only.

* * *

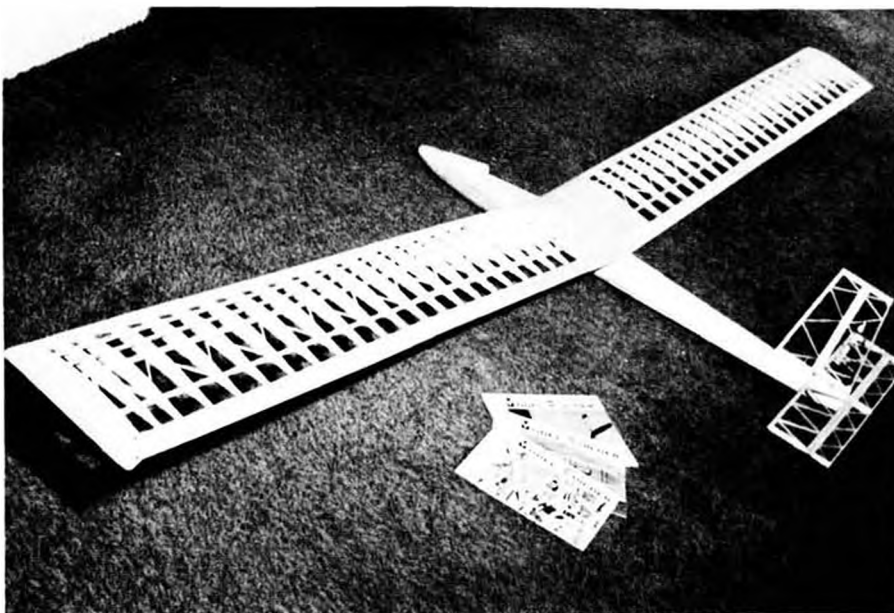
"Boats by Fisher" is the handle under which Charles and Ed Fisher, a well known father and son team, are manufacturing their ski boat hull designs for use by those interested in the sport and hobby of racing R/C boats.

The first model that is available is the "Northwind," a .40 to .60 powered, 33 inch long Ski Boat. Construction of the hull is molded hand cloth layup fiberglass, price \$39.95 F.O.B. 10604 17th S.W., Seattle, Washington 98148. In prototype is a 26 inch, .19 powered hobby and competition Ski Boat "Lil Northwind," to sell for \$34.95.

Cockpit sides are molded into hulls to ensure warp free bottoms. Full size plans include photos and drawings that show exact construction details, exact dimensions on all hardware and installations, fuel tank construction, motor mount installation, radio set-up, prop and running instructions. *(All of this is missing on so many instruction sheets and sorely needed by those getting into the hobby. Ed.)*



The long and the short of it. Author/designer of the YANKEE GULL, Le Gray, poses with the 100" version, built by Bill Whitney, and the 12' "Big Turkey" or "Axelrod's Joy," which he built himself. The 12 footer's nose starred in last month's article on fiberglass reinforcing.



The "bones," cleverly posed by the author with some "objects d'art" for scale effect. The guy obviously has class! Before covering, the wings make excellent escape ladder in case of fire.

PHOTOS BY BILL WHITNEY



"How ya going to get it home, Mister?" Believe it or not, the whole shebang fits in Le's VW convertible. Of course the wings unplug, dummy!!

"Yankee Gull"

The ultimate machine? No. But a different approach to the common problem . . . soaring performance . . . Finesse be hanged . . . here's a direct assault on the world's thermal population . . . an affront by brute force, wrapped in a three-for-one variety package. By Le Gray

● Ralph Dodsworth, LSF/032, in Saskatoon, Saskatchewan calls his 12-foot version the "Canadian Hawk", but like the man said, "A rose by any other name smells." So call it what you will . . . "Tennessee Turkey", "Connecticut Canary" or "Arizona Albatross" . . . the Yankee Gull does one thing very well. It

flies. Of course, Ralph doesn't know that . . . yet. Winter came suddenly one night while he still had a few hours of detailing work left. But come the Spring thaw, his "Hawk" will provide many hours of pleasant thermal soaring . . . before the world turns white and it's "building season" again in Saskatoon.

Bill Whitney, LSF/120, in Woodland Hills, California built the first-to-fly Yankee Gull. It was his first-ever model airplane. He elected to go the 100-inch route . . . same plane as Ralph's, but with a shorter span. Bill's wing seemed stubby with only a 10 to 1 aspect ratio . . . it looked different than "normal"

sailplanes. But Old Flying Buddy (OFB) Whitney's Gull could hardly have worked out better. For its apparent size, the all up weight of 4 pounds was discouraging. It promised to be a lead sled . . . definitely not a beginner's airplane . . . and when it was time for first test flights, we didn't admit our concern to OFB . . . or his wife . . . or his daughter . . . or his son. But that just-over-8-foot-span packed 7 square feet of area, and that big wide wing carried its 9 ounce wing loading like a "conventional" skinny wing does 6 ounces . . . or so it seemed.

After the first flight, OFB's smile . . . and his wife's . . . and his daughter's . . . and his son's . . . made them look as if they were standing behind a white picket fence. We commented about the deep gratification and the sense of satisfaction realized when a designer's creation performs as anticipated. They were kind enough to play-like they believed it . . . even the kids.

The concepts incorporated in the Yankee Gull grew over a period of a year or so from several influences, jealous observation of large free flight gas model glide performance; a hunch that the narrow wing chords used on most R/C sailplanes . . . imitating full-scale appearance . . . might not be too smart due to Reynold's Number effect; and a very interesting NASA publication . . . Technical Note D-2052, "The Design of Sailplanes for Optimum Thermal Soaring Performance", by Clarence D. Cone, Jr. of Langley Research Center. This report makes some pretty interesting claims . . . albeit regarding man carrying machines . . . for very low aspect ratios. Like 6 or 8 to 1. The 100-inch span, 10 to 1 aspect ratio original that OFB built seems to verify that at least one . . . or possibly some combination . . . of these several influences has merit. Wonder which one?

On a winch launch, OFB's Gull climbs like a turpentine cat . . . hands off . . . when lighter machines are struggling for altitude. It floats like a free flight, but has reasonable penetration. Turns are flat and tight when wanted. To sorta sum it up, the Yankee Gull/1000 . . . 1000 for inches of wing area . . . soars like a light-weight yet handles with the solid no-nonsense feel of a heavy machine. The Yankee Gull is an easy sailplane to fly. Well, let's face



The 100 inch, with Bill Whitney on the stick, gets winched up at the 1971 Western Soaring Champs. Site is dry lake bed east of Riverside, Cal. Le on the winch, Dan Dickenson timing.

it. It was OFB's first model and he learned to fly with it . . . including all his LSF Level I work. No disrespect, but . . . like all of us . . . OFB kinda had sixteen thumbs and no depth perception at all. And, on occasion, he too could forget which sailplane in the covey he was supposed to be flying. But OFB and his Yankee Gull stuck together . . . with a total of about three gallons of fast-drying epoxy . . . and are now a coming tiger-team, just having a blast in West Coast sport flying and competition circuits.

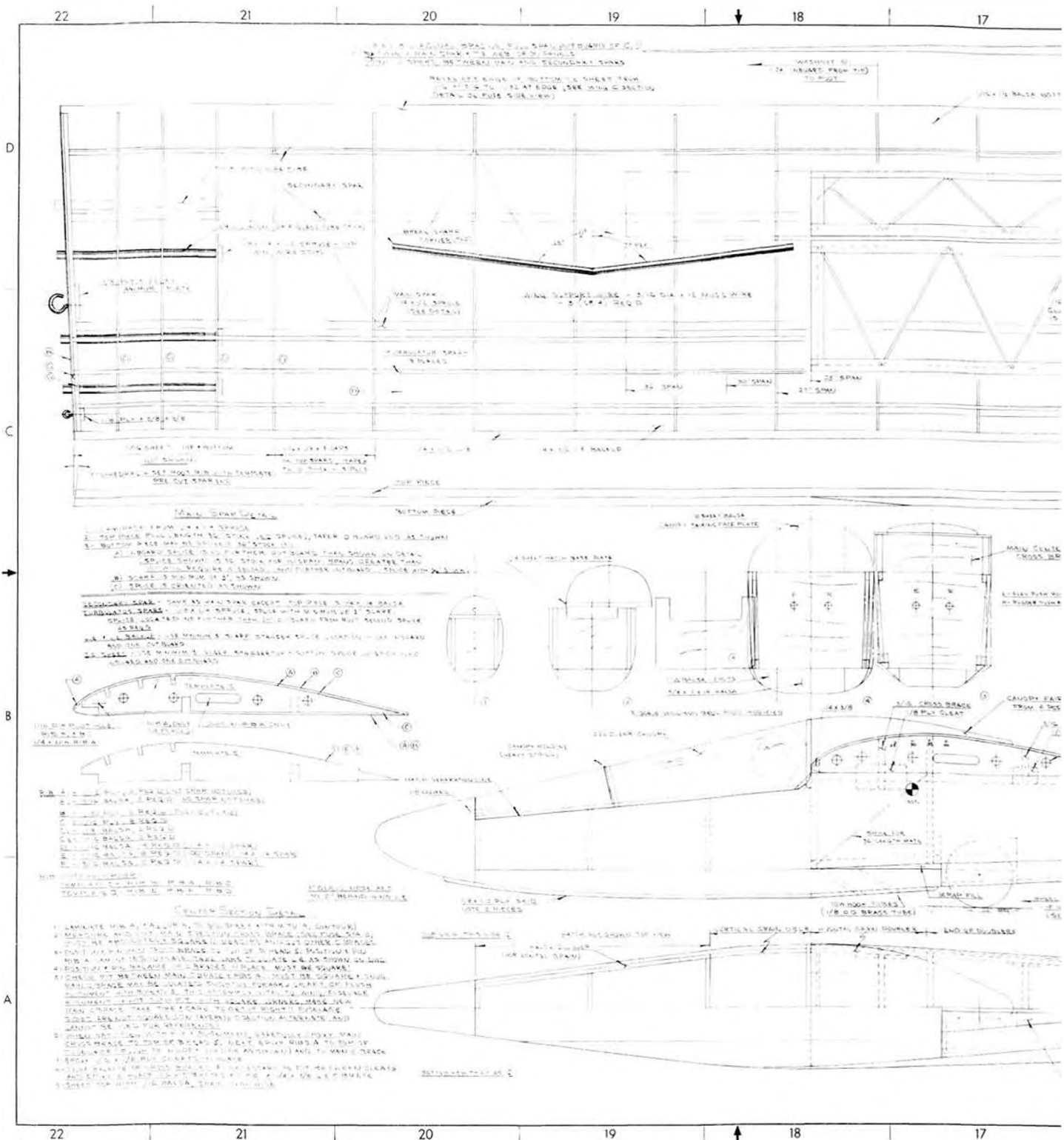
The Yankee Gull represents a brute force approach to soaring through utilization of wing area. The Yankee Gull/1000 gives 7 square feet of area in 100 inches of span. For comparison, the

popular Graupner Cirrus carries 806 square inches . . . 5.6 square feet . . . in 118 inches span. The Gull/1200 spans 120 inches with 8.4 square feet of area. And el monstro, the "1440", serves up 10 square feet within its 12 foot span.

Since Dodsworth's progress in Canada had suffered a white-out, the Yankee Gull/1440 had not been tested, and this had to happen before plans could be published. So to prove . . . hopefully . . . that the big end of the variation stick was valid, we started cutting and glueing. There hadn't been a twelve-footer in our barn for over a year . . . since we wrapped one around a light post on landing approach . . . and we welcomed an excuse to build one. It's simple. Big ones are more fun. In



How's that for a first time model building job? Bill Whitney is rightfully proud. "Windancer" is the name Le has given all of his series of glider designs. All employ his pet turbulator wing spars.



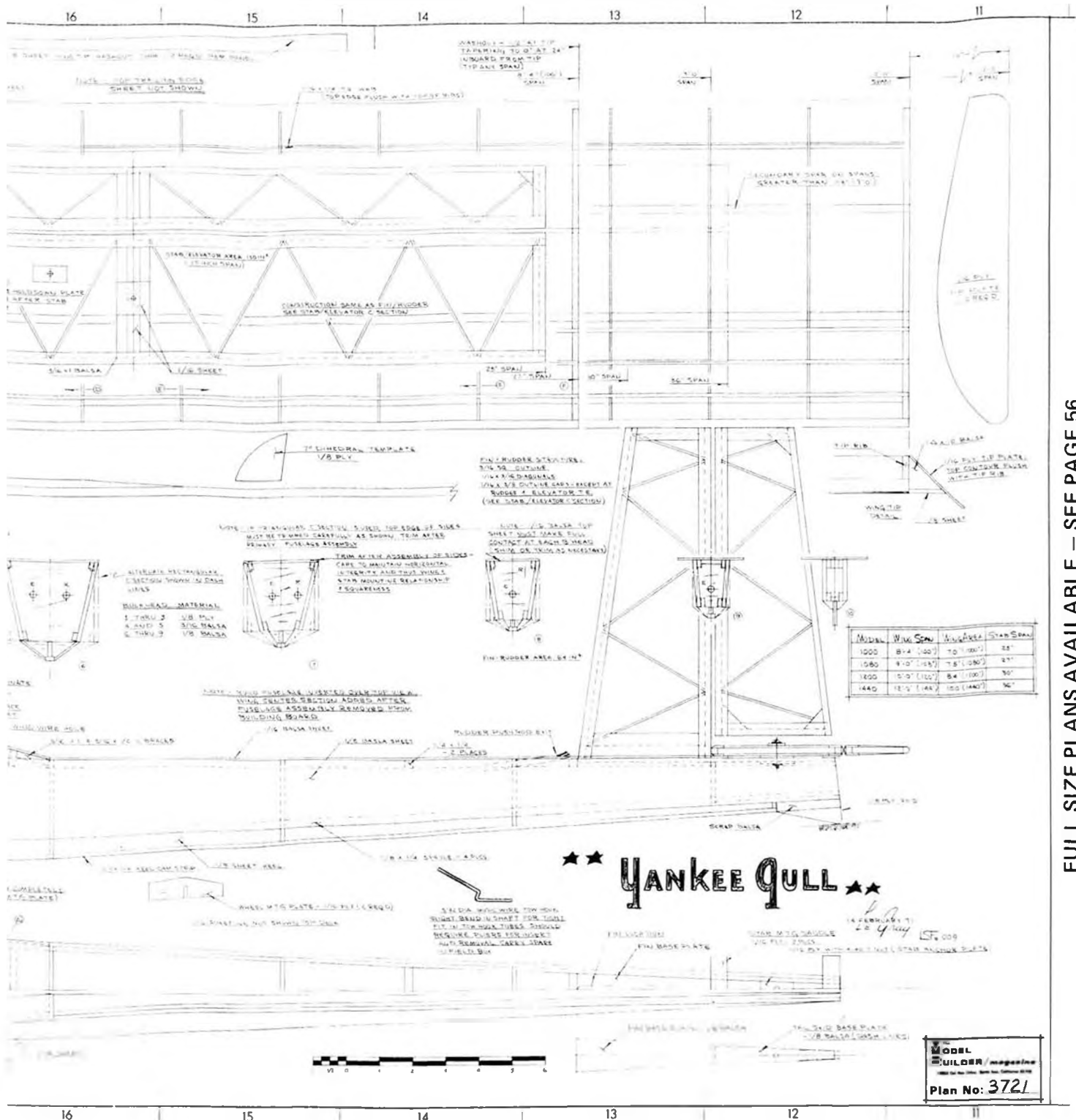
about three weeks, we were ready for test flights. The Yankee Gull goes together quickly . . . in any size.

During frame-up, many experts commented about the short coupled tail and, with the good humor and camaraderie that is so much a part of our sport, let one and all know in very loud voices that ". . . you're an idiot". At first, it was easy to ignore, but after so much repetition, ya start to wondering. It hurts. You don't want to believe 'em. But they seemed so sure.

OFB's "1000" had had excellent pitch stability and control. The new "1440" should be the same . . . or nearly so. But "turn" performance became a worry . . . especially after components were complete enough for a preliminary "block up" assembly. Those 6-foot long, 10-inch wide wing panels go to looking more like surf boards all the time. Thoughts such as "maybe a little taper wouldn't have hurt" kept nagging. The more we looked, the more concerned we became. There was just

no way that a rudder set up as close as the Gull's could have enough power to swing all that wing into any reasonable turn in any reasonable time. Just no way.

And so the day came that all the theory . . . guesses . . . were to be put to test. The fate of "Axlerod's Joy" . . . well it took nearly four rolls of Super MonoKote . . . was on the line. OFB was at hand to help and seemed to have all the confidence in the world that all was well. After all, he was the world's most



FULL SIZE PLANS AVAILABLE — SEE PAGE 56

experienced Yankee Gull pilot, and he anticipated . . . or so he said . . . absolutely no problems. Obviously, we gotta find a smarter friend.

A coupla test glides provided no excuse to go home . . . and did little more than use up a lot of perfectly good breath. And so to the winch. First flight. It looked good. Second flight. Looked better. More flights. More better. A little ballast out of the nose . . . and a shim or two under the stabilizer . . . to slow it up. That was it. No

sweat. When one has confidence, all works out.

That big, long-winged turkey showed excellent pitch control and stall recovery . . . and turns were a delight. Now any 12-foot span model will present a slower roll rate than a 6-foot toy . . . but the Yankee/Gull 1440 gave better turn response than we had even hoped. A result of true design genius. Obviously.

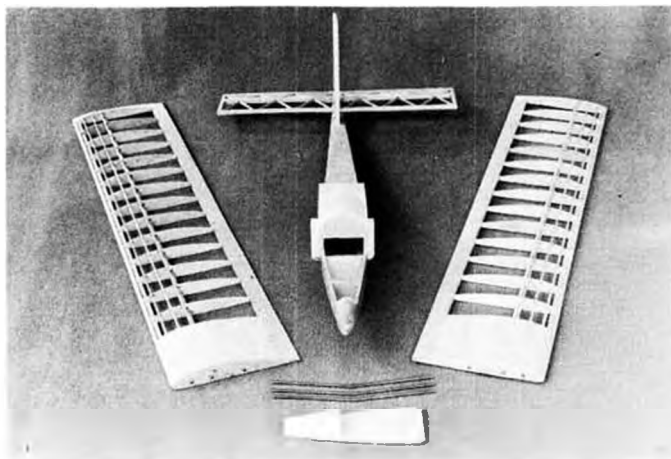
Some points that might be of interest. All the wing ribs are basically the

same, so stack cutting is the order of the day. The canopy is all straight lines and requires no special fabrication techniques. The tail surfaces are all sticks . . . no ribs to cut. All bulkheads are straight lines.

Wing construction utilizes turbulator spars. It requires no leading edge sheeting. Wing tips are triangular balsa stock and plywood plates. Simple, functional and always a conversation grabber: "Are those 'vortex' tips? Any difference in performance from regular?" Well, if you



Close-up of uncovered center section, showing rugged construction. Wire wing rods actually suspend fuselage between plug-in panels.



The 100 inch ready for Monokote skin. Construction is very similar to "E-Z Juan", another Gray design kitted by Midwest Products.

build a Yankee Gull you'll have to make up a story . . . theory. The tips give the wing such an esoteric appearance, it's a real shame to come right out and admit that their main purpose in life is to protect against "abrasive" landings. Maybe the local library has some books that will help pad your part a bit.

One other point. Any of the Y-G's will fit in a VW bug for transport. At least in the older models . . . before the advent of the throne-style front seats. The "1440" takes a bit of care in loading, but it goes. Just don't plan on taking a friend.

Plans show 100 inch, 9, 10 and 12 foot spans. So pick a size that suits ya. Hardly a glamorous description, but the Gulls flown to date have been as docile as a family cow.

A few comments on construction are

in order. Don't let the drawings scare you. There are lots of marks on the paper but that doesn't mean the Yankee Gull is difficult to build. Instructions and notes are on the plans where you can see 'em when you need 'em. Also, four wing sizes and four comparable stabilizers are indicated. That helps fill the space. Look the plans over carefully. Actual construction is quite simple . . . for a high-performance sailplane. Oh yes, remember all the photos are not of the latest configuration . . . so follow the drawings. They have the latest changes.

TAIL SURFACES: These are just a bunch of sticks glued together . . . basically a 3/16 "core" with 1/16 stock on either side around the edges. The 1/16 edges lock it all together, providing a gusset over every joint and holding the covering material up away from the core. Makes for a smooth surface. The covering only touches the structure

around the perimeter.

Start building by laying 1/16 x 3/8 strips and other 1/16 sheet pieces directly over plans, gluing joints as indicated. Next, fit and glue all 3/16 thick "core" pieces over the 1/16 base. Note that trailing edge of elevator and rudder do not have the 1/16 sheet overlay, and thus must be shimmed 1/16 above building surface for proper alignment. Add the top layer of 1/16 sheet, similar to that which went down first. That's it.

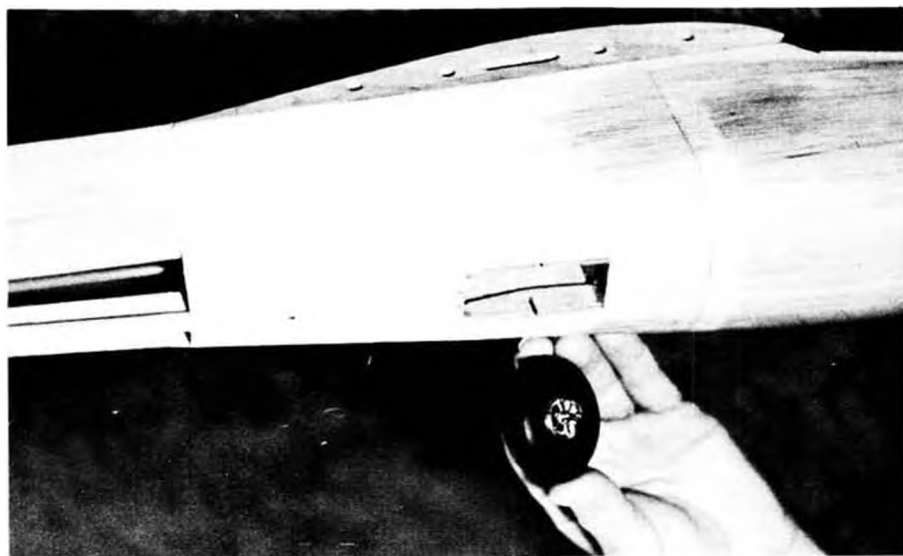
When dry, sand leading and trailing edges round. Final cross section should be like that shown for the horizontal tail surfaces on fuselage side view drawing. Hinge the elevator four places and the rudder two places. Prepare mounting holes for control horns. Note that elevator horn is on center line as the elevator push rod comes straight out the tail end of fuselage.

WING: Cut, splice and laminate all

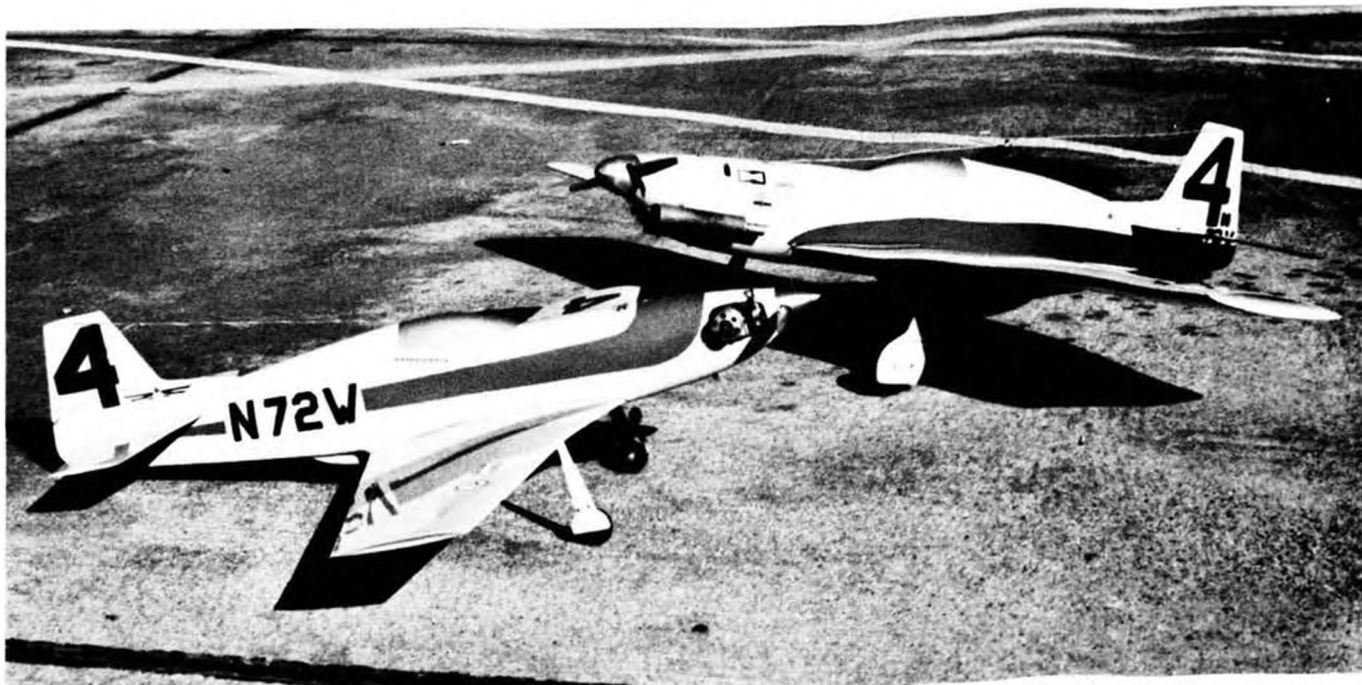
Continued on page 52



Windancers at North-South meet in Bakersfield. Swept forward design is the latest "Scorcher."



Very simple but effective landing wheel mounting. Axle fits into slotted plywood sides of wheel compartment. When ready to leave it in place, just seal up the slots with epoxy and that's it!



Quarter Midget and FAI "Miss B.S.'s" built by Paul White, both with retracts. Dig that finish as evidenced by the reflection. Elbow grease helps.

PHOTO BY CHUCK SMITH

pylon

By Chuck Smith

● The following contest report was written by Marv Kowalewski, NMPRA 9P, who is one of the top racing pilots in the Ohio area:

"The Tangerine International held in Winter Park, Florida on January 1 and 2 hosted 36 entrants and 42 Formula 1 aircraft. The judging and processing was accomplished the evening prior to qualifying . . . this included leisure (hic) conversation in a hospitality suite set up at the Ramada Inn (Bob Violet's plane was auctioned off but he recovered enough to reclaim it). Needless to say everybody was glad (happy) that refreshments were so near.

"Norm Holland and Clinton Smith assisted Walt Schoonard (CD) and did an excellent job of setting up the races, judging the planes and running the smoothest meet this writer has ever attended.

"Qualifying day brought two complete groups of races, one of 20 planes in the morning and one of 16 planes in the afternoon. From this qualifying

group of planes the top 20 aircraft were chosen for the finals the next day (this really separated the men from the boys).

Top qualifying times in Group I were:

Harold Coleson	1:38
E. Jacobson	1:42
Marv Kowalewski	1:44

Tops in Group II:

D.C. May	1:41
D.S. Schewitzer	1:45
Jack Fehling	1:49

"Qualifying in the 20 mph winds was no easy job and some fine planes were lost. Bob Violet rounded pylon Number 3 and found that the wind had flipped him upside down. Ed DeMerritte shattered a wing at the Number 1 pylon and Jim Whitley plowed the sand very early in Round 1.

"The finals started the next day and fog proceeded to cause two aircraft to disappear during landing. Jack Fehling's beautiful Shoestring was lost and recovered half an hour later in a tree with only a scratch on the wing. Jim Maki

totally lost his Shoshonick but eventually found the radio parts. Once the fog lifted the flying really started. Note should be taken that the top ten planes flew consistently between 1:46 and 1:37. Some races were so close that they had to be flown over. Marv Kowalewski and Ed DeMerritte flew twice to determine the winner as the flying was so tight that judges could not call cuts between the two. Both planes were Aldrich Supertiger 40's and were really tuned. DeMerritte finally won when Kowalewski, trying to go the shortest distance, cut the Number 1 pylon.

"Many of the top flyers could not race each other due to frequency (72.08) but a great race occurred between Coleson and May. May flies high to the Number 1 pylon and then dives for 2 and 3 while Coleson flies steadily 30 feet above the ground. This race was actually decided by Coleson's single bad turn at the Number 2 pylon and May won by less than 1 second.

"The awards were presented by Miss Tangerine International (Sharon Shellen-



Sharon Shellenbaum, 19, Winter Park, Florida. . Miss Tangerine International. Oh, the plane? Dave Penry's "Miss Dara", PH40 by G.M.A.



Tangerine winner, D.C. May and his K & B 40 powered Stegall Minnow. His best time was 1:37.5. Better yet was kiss from Sharon!!

baum) and D.C. May enjoyed the kisses (dirty old man). The Tangerine has a perpetual trophy and also awards the fastest time. D.C. May won both while Bob Violet received the best sportsmanship award.

"All in all the Tangerine International is a fine meet to attend. The two days of qualifying and finals made things less hectic and ultimately everybody got to enjoy conversation and refreshments, a great thing for a pylon meet. See you next year in Winter Park, Florida."

* * *

The address of the Stegall Minnow is: Jim Stegall, 1401 Lakeview Dr., Monroe, N.C. 28110.

Marv also talked with the flyers down

in Florida to get their views on pylon racing. It seems that the Florida group had open pylon last year but dropped it due to inadequate rules set up by the AMA. Most of the flyers were in favor of open, all-out pylon.

Concerning Quarter Midgets, most of the flyers liked it but wanted more defined rules and less fooling around with

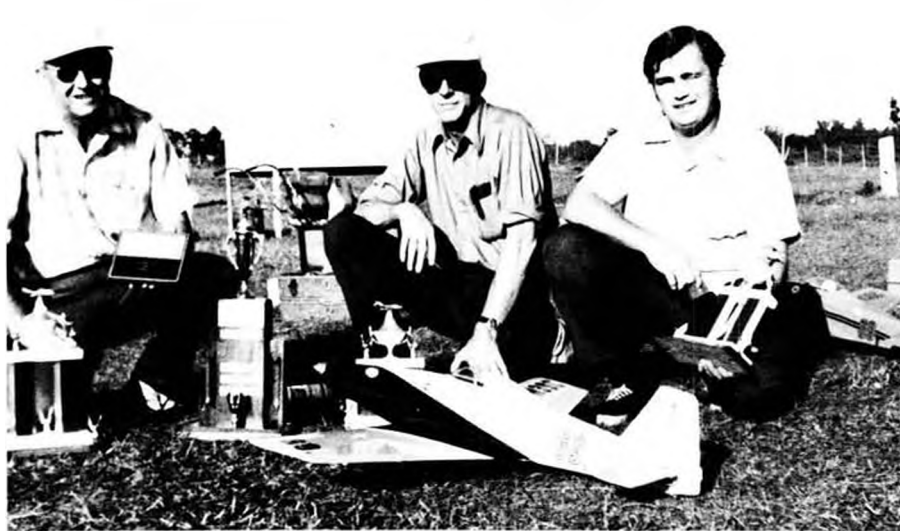
idle. All fliers thought it was a good beginners event; however, they cited few kit planes suitable for this event. Contest management was sour on quarter as they thought the trouble could better be spent on Formula I. (Again, this would depend on who you're holding the contest for. ED.) Interest in FAI appears to be going up in Florida, but

RESULTS

Name	Engine	Plane	Time
1. D.C. May	K&B	Stegall Minnow	1:37.6
2. Ed Weitock	ST	Ballerina	1:39.5
3. Harold Coleson	K&B	Stegall Minnow	1:43.0
4. Austin Leftwich	ST	-----	-----
5. Dave Penry	HP	Miss DARA	1:41.7



Well, you can't win 'em all. Bob Violet heads for the trash can. Gusty wind was tricky.



Left to right it's 1,3, and 2. D.C. May, Harold Coleson, and Ed Weitock. Ed's ST Ballerina did a 1:39.5. Coleson turned 1:43.0 with a K & B powered Stegall Minnow.



NMPRA's busy President, a man of few words...but lots of sentences...Bror Faber. FAI Minnow with Murphy muffler, Los Alamitos.



Close-up of Jack Fehling's fuel pinch-off on left rudder command. It saves weight and 40 bucks! Seen at Tangerine races. Good idea.

everybody talks of the high engine prices in order to compete.

* * *

The following is Part I of an interview that I had with Bror Faber, NMPRA's President. Bror moved to the United States from his native Norway when he was 18 years old and has been modeling ever since. He currently works for McDonnell Douglas in Long Beach, Calif. With the amount of work and time that he is currently contributing to the NMPRA, he will probably be known as the best NMPRA President ever, past and future. Part II of this interview next month will reveal the winning techniques that Bror uses with his racing partner Howard Nupen:

Model Builder — Like many successful pylon racing pilots, you are also an accomplished pattern flyer. How long did you fly pattern competitively?

Faber — I probably flew competitive pattern about three or four years.

MB — Now you have gone exclusively pylon racing?

Faber — Unfortunately, yes, I still like to fly pattern, but pylon racing puts many demands on a pilot. If I was racing as a real relaxing, sometimes-on-a-Sunday-afternoon hobby, it would be, of course, an entirely different story. But if you're out there totally dedicated to win in a fantastic event, it really doesn't leave you much time to fly pattern.

MB — How does the enjoyment that you

receive from pylon racing compare with flying pattern?

Faber — Well, although I was totally turned on about pattern at the time that I was being very competitive, I think that the total satisfaction of pylon as it is developing now, for a person who is extremely competitively minded, makes it by far the most exciting event. For me, pylon is the most satisfying R/C event. I feel that building-wise, I put much more effort into the Formula and FAI birds than I used to put into the pattern birds, particularly in terms of finish, attention to detail and seeing that the aircraft comes out aerodynamically clean. In pattern, we really didn't worry about whether the landing gear wire was hanging out in the breeze. The additional details required, such as engine breathing and cooling problems caused by the cowling, dictate that it takes quite a bit longer to build a pylon bird.

MB — You also take more pride in your racer after it is done.

Faber — Yes, I have much more pride in the model because we have put much more love, affection, perspiration and time into it. They are a thing of beauty, really. When you go to a pylon meet now and see the line up of racers and realize the thousand of man hours wrapped up in those birds, I think we have a right to feel proud.

MB — You're NMPRA President this year and there are many problems that must be solved in order for pylon racing

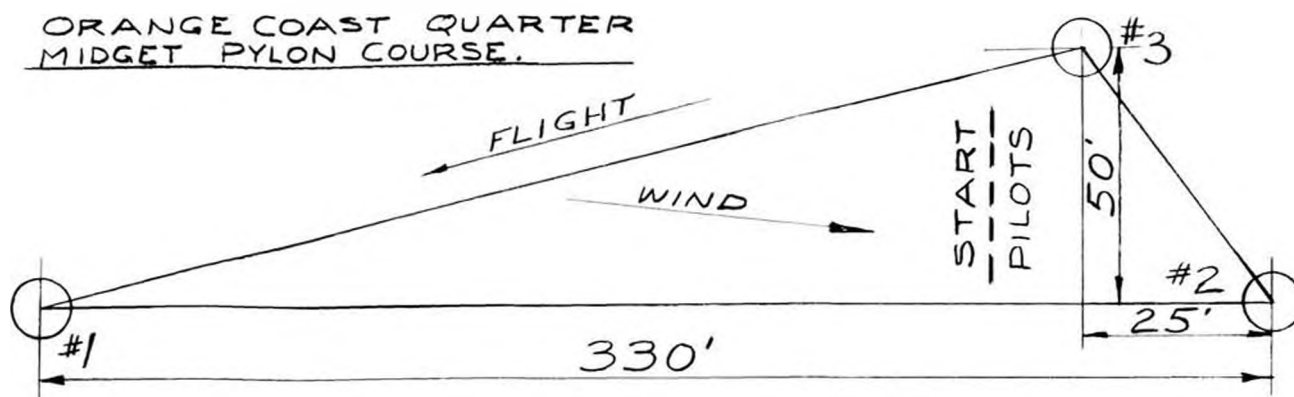
to reach its potential growth rate. What do you feel our potential is?

Faber — That's the kind of question that could take fifteen pages to answer. In terms of spectator interest, there is no comparison. Just look at the last two years at the Nationals, which is a good measuring stick, and compare the amount of spectator interest at the pattern event as opposed to the finals in Formula I. There were many estimated figures of the number of spectators up in the stands in 1970, which I think was outstanding all the way around in the matter of the way the finals were flown, in that just about every heat had all four planes finish in the same lap. I don't think we will see a meet like the 1970 Nats, from the excitement point of view, for a long time. The spectators became personally involved even though they knew nothing about R/C pylon racing. In pattern, the spectators stand back and say, "Ah, um, that was real pretty, what was it?" Unfortunately, as in any model aircraft competition, people still come out hoping that there will be a real good crash that they can remember and talk about.

MB — I think that that is one of the main reasons that Scale seems to attract so many spectators. They go out expecting to see something go splat.

Faber — I think that growth in pylon racing, be it Formula I or maybe in some areas of the country Formula II,

Continued on page 49



PYLON/4

By Fred Reese

Another reporting regular has been signed up by MB! Although we didn't realize it when this short race review was turned in, it's now a fact. Fred has volunteered (?) to keep us posted on Quarter Midget activities around the country.

PHOTOS BY THE AUTHOR

● I won it! What an exciting day. There were twenty-one entries for the ORANGE COAST RC CLUB sponsored event at Mile Square on January 23, 1972. No "zero" heats was the difference as there were several airplanes there that were faster than mine. My congratulations to Ken Holden, Pat Patton and Paul White for the smooth manage-

ment of the races. Six rounds were flown at the rate of one heat every 8 minutes.

A major change was initiated this time and will be continued. Three pylons were used instead of just two. It is much safer for the pilots and the officials, as there is an area that is out of the normal path of the racers. We all

liked it better. See sketch.

I mentioned in the last race report that work needed to be done on airfoil selection for speed and ability to turn. Several people did a lot of work and lap times dropped at an unbelievable rate. The fastest time was 1:39.2 by Orbit's John Elliott flying a SuperTiger powered K & K Ballerina. There was



"Big John" Elliott (rt.) and Frank Sekula. John's Quarter Midget Ballerina turned a 1:39 using a Supertigre 15 with Perry carb. BJ won all races but disqualified himself. That's new Orbit S/S.

NAME	HEAT	1	2	3	4	5	6
1 Fred Reese	2	2	3				
2 Bob Gillespie	0	0	0				
3 Vince Stancato	3	2	3				
4 Kim Thomas	2	0	3				
5 Carl Weyl	3	3	0				
6 Bert Baker	0	0	0				
7 Frank Sekula	0						
8 John Elliott	3	3	3				
9 Dick Reynolds	0	2	2				
10 Ted DeWitt	3	0	3				
11 Sunny Myers	0	0	1				
12 Leonard Dean	3	3	2				
13 James Kelley	1	3	1				
14 George French	3	3	0				
15 Louie Zimmerman	0						
16 Dan Grove	2	0	0				
17 Arthur Groom	0	0	0				
18 Mark Threlly	1	0	2				
19 Stephen Groom	0	0	2				
20 Paul White	2	3	3				

Flight and score board used at Mile Square for well controlled race program. No confusion!



Sonny Myers with his Stafford QM P-51. Kit will be on the market very soon. Jack and Sonny were both turning in 1:40's.



Kent Thomas' O.S. 15 powered QM P-51 is an original design. Placed third in Jan. 23rd races. Note that engine idling during pic shooting.

some controversy regarding the legality of his engine and rather than cause an argument he graciously eliminated himself from any of the prizes even though he had a perfect day. He won all six of his heats. I feel badly about this as I believe that his ship was legal by the rules.

Paul White, Jack Stafford, Carl Weyl and Sunny Myers were all turning times in the 1:40's. There were Super Tigres, a Fox, an OS and an Enya all in this fast group so it seems that depending on the airplane (*and the pilot. ED*), any of these engines can be competitive. Most of the Tigres were using 7-4 props and were really winding up (17,000 on the ground).

The event is drawing many new people and should continue to do so,

Should NMPRA become involved in the organization of quarter midget racing in the U.S.? As president of a newly formed QM association in southern Cal., John Elliot, 19412 Olana Ln., Huntington Beach, Cal., 92646, has been asked to compile the response of NMPRA members to this question. Bror Faber, NMPRA Pres., asks that all readers, and especially NMPRA members, send in their opinions on this matter, to John, as soon as possible.

however this could be in jeopardy unless we act very soon to settle on some

rules. We can't all seem to agree on engine limits or what changes should be allowed. Some want no limits and even no carburetors. I would like to propose that engines be limited to "out of the box" condition with no changes or substitution of parts allowed. This also means that parts such as baffles may not be removed. Jack Stafford turned a 1:45 heat with a stock O.S. Max .15. I say let the guys who do not want engine restrictions fly FAI Pylon. Let's keep this event within the reach of the average flyer. Think about what happened to "Sport" or open pylon. The appeal of this event is low cost and airplanes that can be built quickly while still providing competitive racing. ●



The winner at the Mile Square races, Fred Reese's Cosmic Wind. See following pages for construction article to build this one.



Steve Cummings built this Enya 15 powered "Mr. Mulligan." Relative ease in building QM's should lead to some interesting variations.



MISS COSMIC WIND.../4

Our newly signed QM reporter presents the ship which helped him win his first race..It's just the right plane if you want to give this relatively new and exciting sport a start in the right direction. By Fred Reese

PHOTOS BY THE AUTHOR

● On Sunday, January 23rd the Orange Coast R/C Club hosted Quarter Midget races at Mile Square. There were twenty one entries. At the end of six rounds of flying this airplane was declared the winner. It was not the fastest airplane there, but it was consistent and reliable. It finished every heat either first or second. Almost every other racer either missed a heat, could not get off the ground, did not finish, or cut pylons which resulted in a zero for that heat.

Originally I had an O.S. Max in this airplane, but I switched to the Super Tigre for no other reason than to try it. I don't think the Tigre makes it go any faster and it is more trouble to set up. On KB 500 fuel I am getting about 14,000 rpm on a Top Flite 7-6 with the Max and only about 13,500 with the

ST. The ST is, however, turning 17,000 with the 7-4, which gets this engine into its best power curve.

The "Miss Cosmic Wind" is a good airplane that is reasonably fast, with excellent take off and landing characteristics. At least you know that you are going to fly each race.

Begin construction with the wing. Make two 1/16 x 8 x 33 inch wing skins and cut 12 wing ribs out of 1/16 sheet. Mark off the rib positions on the lower skin and pin down to a flat surface. Glue the 1/2 inch square and the 1/16 x 5/16 inch leading edge pieces down and then add the ribs and the 1/16 x 1/8 inch trailing edge filler strip. Trim off any remaining 1/16 inch sheet from the trailing edge. Using white glue or tite-bond, glue down the top sheet. Use

lots of pins and weights and allow the wing to dry for at least 24 hours, then trim the trailing edge and add the 3/16 x 1 inch T.E. stock.

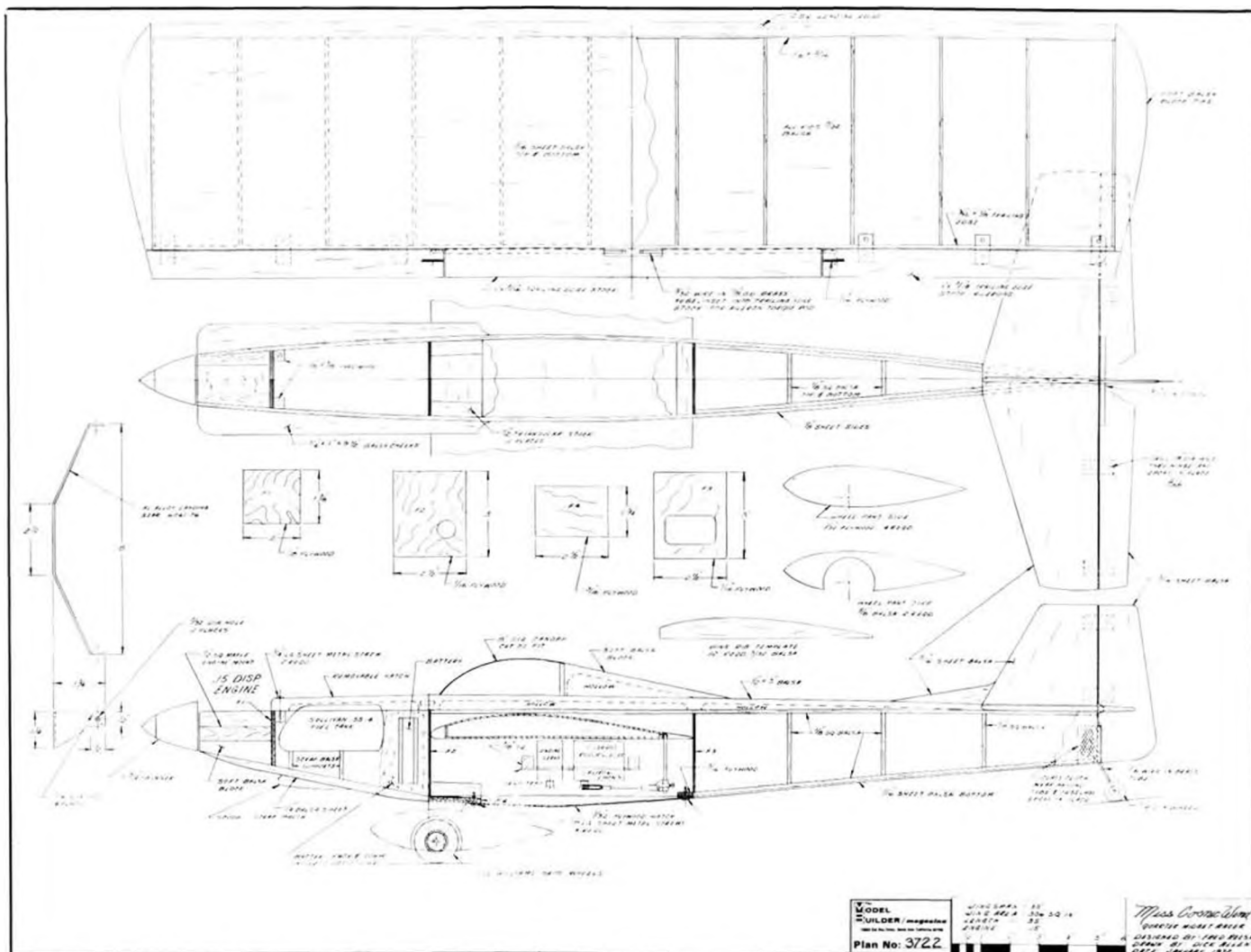
Begin the fuselage by cutting the sides with the wing cut outs, and prepare the bulkheads, the motor mounts, firewall, and the 1/8 inch sq. strip stock. Glue all of the strips down and epoxy the motor mounts to the fuselage sides. Glue the two bulkheads into place and pull the tail together. Premark the centers of the bulkheads and the firewall so that you can check the straightness of the fuselage as you build it. Tack cement the top fuselage block in place and rough shape. Now remove the block and hollow it for lightness. After hollowing, permanently glue the top into place and separate the front hatch. Add



Fred's "Miss Cosmic Wind" is Supertigre powered. He finds the best prop for this engine is a 7x4. Uses K & B 500 fuel.



The smile of a winner! No, guys, it's not always warm and sunny in California, but after all, this was January 23. Put the clip back, Fred!



FULL SIZE PLANS AVAILABLE – SEE PAGE 56

the lower sheeting, front chin block and landing gear mount, and finish shaping the fuselage.

Slide the wing into the fuselage and epoxy in place. Epoxy the rudder and stabilizer into place. Make up the aileron linkages from 1/8 inch OD brass

tubing and 3/32 inch piano wire. Notch the wing to receive the linkages and epoxy them into place.

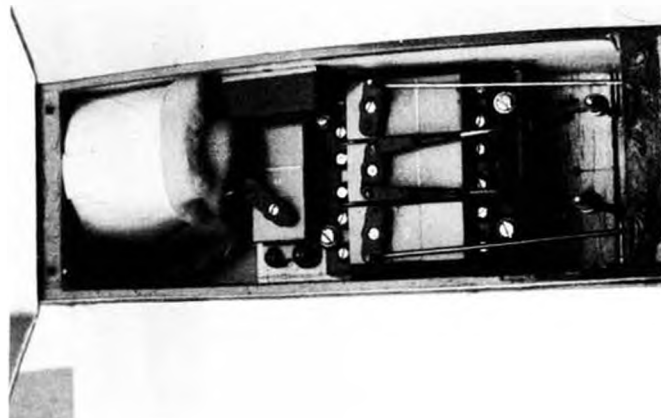
The original was covered with red, white and blue Super Monokote according to the Hirsch three-view. I use No. 4 pan head sheet metal screws to mount

the engine and most everything else. They seem to hold up very well.

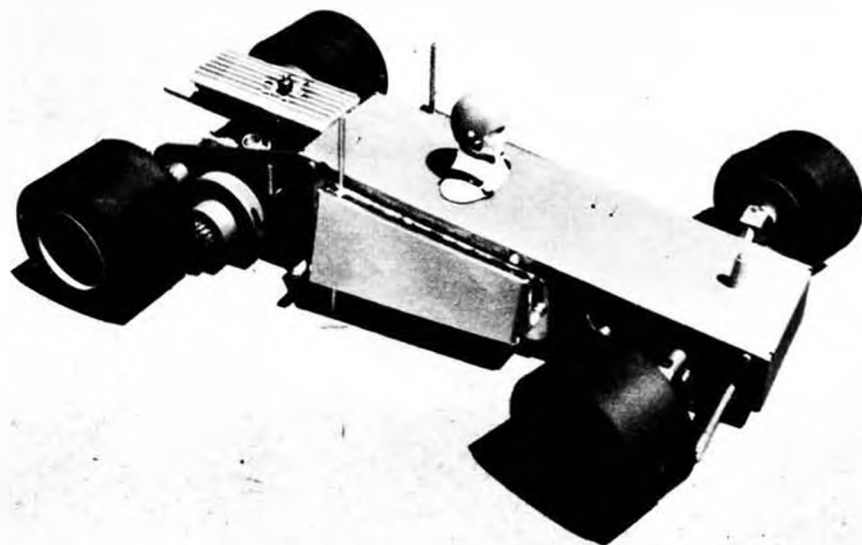
Use a ruler to get all of the control surfaces straight and adjust everything for minimum control movement. You may wish to readjust things later to suit your own preferences. ●



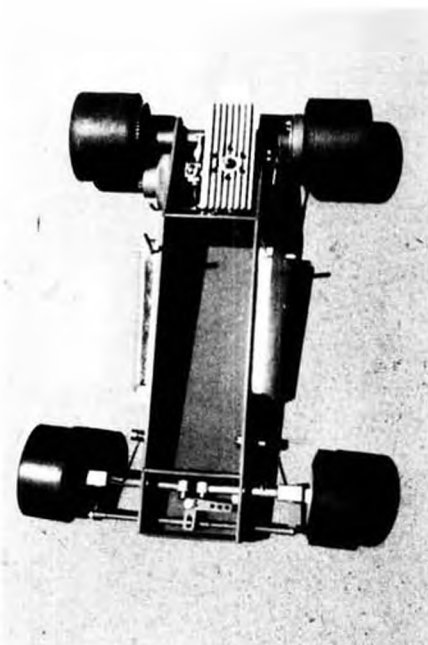
This picture just about tells all as far as the engine and tank installation are concerned. Note carefully wrapped and padded battery pack.



And here's the operations department. One piece construction simplifies linkage setup. Switch has to come out before throttle servo!



A repeat of last month's photo, this is Stan Waters' "Water Baby". Chassis is fully monocoqued and well sealed against fuel and dirt by top pan and lateral bulkheads. Note dual 2 oz fuel tanks.



Top view shows steering bellcrank and forward located tie-rod assembly. Note head/headsink.

R/C AUTO NEWS

Last month we said that maybe R/C cars needed a communication center. Apparently we pulled the cork with that remark, because we're off and running with reports by Chuck Elrick and Dick Norsikian.

● Look out, manufacturers! The Water Baby has arrived, and while it hasn't yet seen competition for lack of radio gear, all outward appearances would indicate that this one-of-a-kind turned out by Stan Waters of Reseda, California, is probably a world beater. At least, a review of the features of this very sanitary prototype better be made now before Stan decides to crank up the production mill and slap a proprietary stamp on the design.

No, the car is not totally scratch; Stan made good use of the excellent tires and wheels bearing the Dynamic label. The body is also by Dynamic. Another commercially purchased part was the Veco 19 engine, but even here, this illustrious builder saw fit to modify, replacing the existing cylinder head with a one-piece head-and-headsink having cooling fins top and bottom plus a predicted increase in compression ratio.

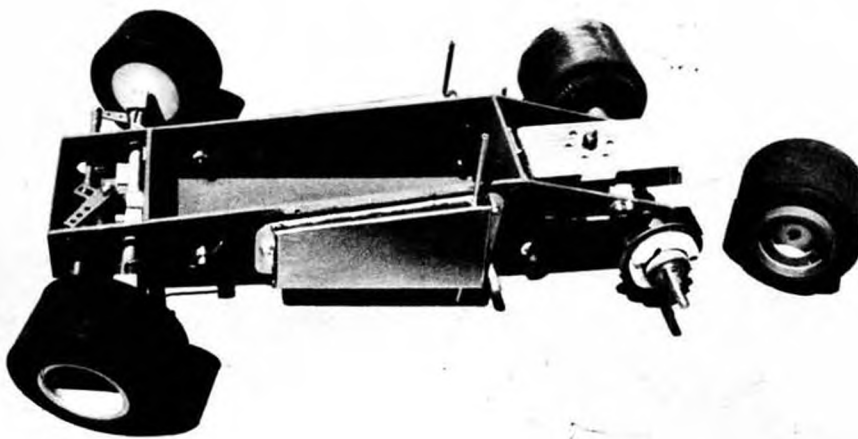
But let's look at the car in detail.

The chassis and all other aluminum components were constructed of 6061-T6 grade metal which was then dip brazed and red anodized to provide an oxidation-resistant, easy-to-clean finish. Stan recommends this operation (performed for him by Precision Dipbrazing Inc of Van Nuys), but cautions that a minimum charge of about \$15 should be expected. Readers in other areas should check their yellow pages under "brazing." Incidentally, the chassis and lateral bulkheads of the Water Baby are of one-eighth aluminum, with belly pan and cover of one-sixteenth thickness.

In checking the front suspension, we note that Stan has bypassed adjustable camber in favor of simplicity and ruggedness. However, baseline camber can



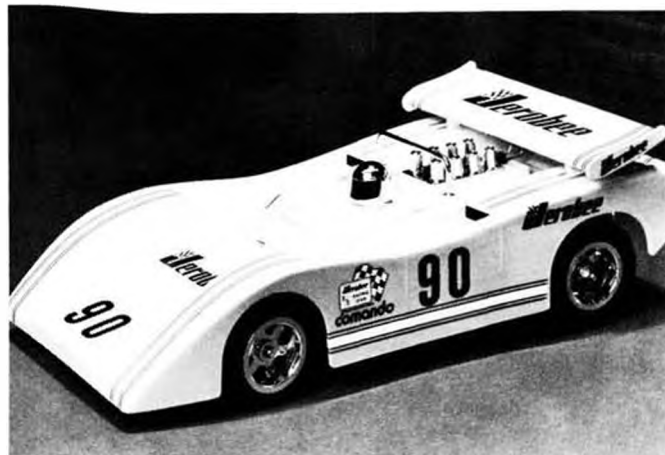
Ready to go, with Dynamic's wheels, tires, and STP McNamara Indy body. Inside Aerogloss.



Piece de resistance is internal expanding brake assembly with nylon shoes, steel drum, and adjustable linkage. Note the torsion spring on left front axle. A shame to cover such nice work!



The car with which Dick Norsikian is winning races in Expert class. Nor/Kar chassis, Associated wheels, clutch, and gears. Deans radio.



The Jerobee 1/12 scale McLaren, showing some of the latest accessories; the aerodynamic wing and custom racing tires, chrome wheels.

be modified by relocation of the bottoming blocks under each of the independently sprung front axles. These axles and king-pin assemblies (yoke and pivot boss) are of silver-brazed stainless steel. The axles pivot on pins jutting through the second bulkhead and are downloaded by helical-coiled steel torsion springs supported on pins approximately 1-1/2 inches behind each axle. Five holes in the chassis behind each spring support permit torsion variation.

Steering is accomplished through a forward-located steel tie rod centered on which is a stainless-steel pin riding in the slot of a one-piece aluminum bellcrank.

The rear axle assembly utilizes a 5/16-inch axle turned at each end for 1/4-28 threads and keyed for wheel lock-on. The axle revolves in a one-piece housing turned from one-inch O.D. stock. Bearings are Nice-brand 1/4-inch I.D., 5/8-inch O.D. flanged ball bearings.

The piece de resistance is the braking system consisting of internal-expanding cam-operated nylon shoes inside of a specially fabricated steel drum attached to the Dynamic left rear wheel. The cam lobes are smooth and symmetrical, permitting activation through either push or pull on the connecting, adjustable linkage and providing any degree of braking from slight draft to full lock.

Another significant feature of the car is the use of dual two-ounce fuel tanks with feed lines T-converged just forward of the engine at belly-pan level. The slim-line tin tanks, silver-brazed for appearance, should be good to the last drop, even during hard cornering.

Stan's quad-pipe aluminum manifold/exhaust bolts to the left chassis side member and features milled fins complimenting the combination engine head and heat sink.

As final touches, Stan has mounted his Kyosho vinyl driver by filling the

soft plastic form with epoxy in which are embedded two 8-32 machine screws. The STP McNamara body by Dynamic is sprayed from the inside with Aerogloss hot-fuel dope in a pleasing combination of silver, black, and orange.

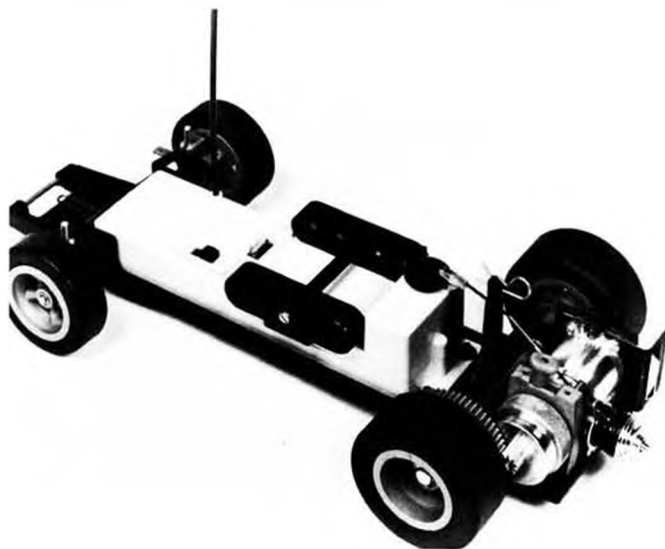
With the addition of a reliable radio, the Water Baby looks as if it will certainly be a consistent finisher, if not always a winner.

Local News by Dick Norsikian

The San Fernando Valley R/C Auto Racers have moved their racing site around the last couple of years and now finally have a real nice track which can be called home. It is located at the Valley Recreation Center, 17400 Victory Blvd., Van Nuys, California.

The club members got together to clean and paint the new track on the weekends. The track's total length is about 630 feet. First official race on the

Continued on page 43



The Jerobee receiver/servo "brick" could also be used for other applications. Note changeable crystal and dry battery holder for radio.



The complete Jerobee radio unit. It's a two-channel proportional set and is under 100 milliwatt....no license required. Range is over 200 ft.



The quietly busy scene at Famosa Field, north of Bakersfield, where the North and South (California, that is) had a go at each other with gliders.

PHOTOS BY CHUCK COLWELL, EDITOR

R/C SOARING

By Le Gray

Le Gray turns the column over to Bob Hahn for a report on the big North-South meet held in Bakersfield California this January. The North won again, but by a very small margin. Wait 'til next year!

● On the 22nd and 23rd of January, 1972, the second annual California North-South meet for R/C gliders was held at Famosa Field in Bakersfield. Although the date may belie the fact, this was the 1971 meet and was hosted by the South Bay Soaring Society, the Torrey Pines Gulls, the San Fernando Valley Silent Flyers and the Harbor Soaring Society. If the past two years are any indication of the future growth

rate of this meet, by 1980 all of the citizens of California should be involved. A total of 102 silent flyers (*Not really silent. You should hear 'em in a bull session. ED.*) from Sacramento to San Diego participated in this year's resumption of the "war" making this the second largest R/C soaring contest held in this country . . . second only to the 1971 LSF soaring tournament in numbers of competitors.

As in last year's meet, the rules were simple. The state was divided at the 36th parallel, with all contestants living to the north of this line comprising the North team and all members to the south carrying the rebel banner. Two notable exceptions to this rule included Tom Prothro from Santa Barbara who insisted he would fly for the West team and Dick Jansson from Maine who was found wandering around the Haight-



"What in heck happened to the lift? It was here a few minutes ago." John Donelson and Bob Hahn (holding watch) kabitz for Le Gray.



Rick Walters launches his famous "White Trash." Mark Smith times. Rick could get his maxes, but the landing spot kept moving away!



Rod Smith launches a prototype of the next Marks Models glider to be kitted. That's Col. Bob Thacker just under the tail.



The "complete" R/C glider pilot, visiting fireman Dick Jansson. It's his thermal sniffer, of course. LSF Treasurer, Hugh Stock looks on.

Ashbury district of San Francisco by a sympathetic member of the South Bay Soaring Society and so was allowed to fly as a member of the North team. Final scores to determine which team would carry home the Mark's Models perpetual trophy were decided by the

LSF ELECTIONS: The results of recent international elections for League of Silent Flight Executive Officers have been announced by Dr. H. I. Smith, Chairman, LSF Election Board. Serving for calendar 1972 and 1973 will be Le Gray, President; Walt Good, Vice President; Keith Brewster, Secretary; and Hugh Stock, Treasurer. Gray, LSF/009, and Brewster, LSF/002, are two of the original founders of the League and have been instrumental in its development since inception. Dr. Good is a pioneer in radio controlled model aircraft, and a member of the Model Aviation Hall of Fame. Stock is a key promoter of R/C soaring activities on the West Coast, and is currently coordinating with the Hawaii Silent Flight on a California-Hawaii inter-state competition.

total of the 5 highest scoring members of each team.

Saturday's festivities were hosted by the South with two rounds of duration. Seven minute maximum flight times with landing required within a 100 meter diameter circle for flight qualification,

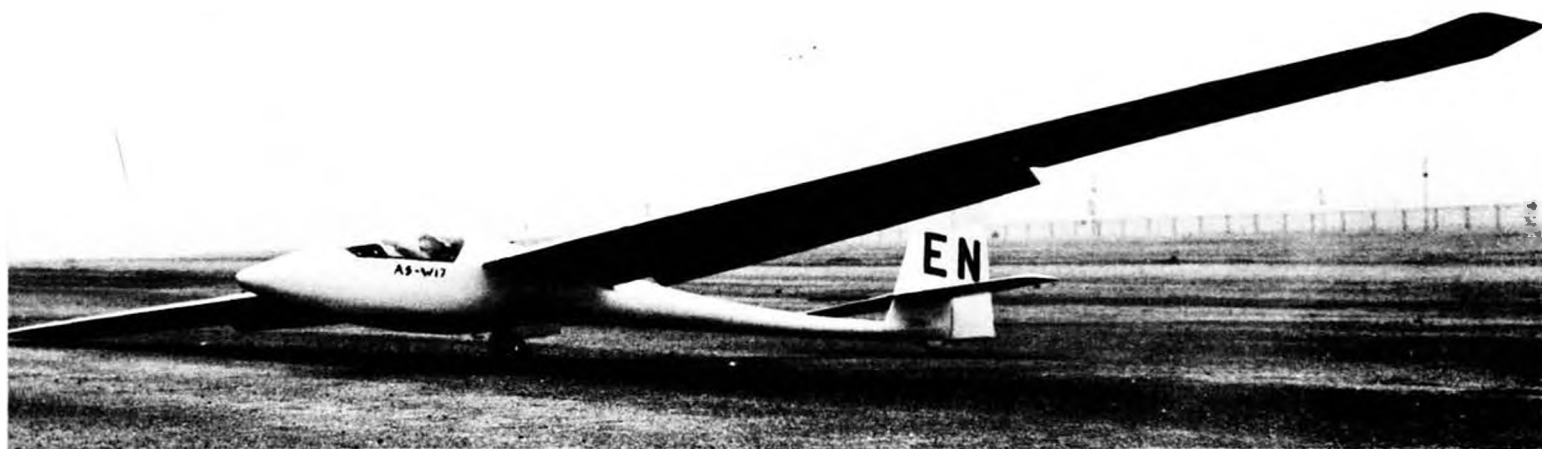
were used to score each round. In addition, a scale runway for bonus landing points was located within the circle. Winners for Saturday's event were John Baxter flying a Cirrus in first place; Marshall Watson flying a Diamont, second; and Brian Stevens flying a modified



Sunday's C.D. and overall winner of the North-South contest Jon Baxter, keeps winches busy.



Typical auto starter and battery powered electric winch with "Dial-a-voltage" selector.



Konrad Nierich scratch-built this beautiful AS-W17 from 3-views. Includes operating flaps and retracting wheel and doors. FG fuselage, foam wings.



Aerial shot from visiting Ercope shows winch stations at top and landing grid at bottom. This angle tends to diminish the crowded appearance Nordic, third.

As many as 5 winches were operating simultaneously to keep the flight lines moving but despite this, and with volunteer Honda drivers retrieving the lines, the pace deteriorated rapidly toward the end of each round due to frequency bunching. Five of the available 12 Citizens Band frequencies had 10 or more flyers on each of them, so frequency control forced a slow down toward the end of each round with so many of the remaining flyers using the same frequencies. This will always be a problem with the limited frequencies we have available and will probably force entry limitations on some of the larger future meets. Or we could do as your editor/publisher suggested and make two clothes pins available on each frequency

at all times. This would make the first round a true "elimination" round and would greatly accelerate the pace for all subsequent rounds. *(Time saved would increase by the duplicate pins, squared! Of course, there are some minor problems to be worked out. ED.)*

Four scale entries put in their first flights at the end of the second round on Saturday. All four had excellent flights but an unfortunate case of radio failure or interference eliminated Bob Thacker's beautiful Wik Kestrel after several minutes of flight.

The end of flying on Saturday saw the North with a slight lead of 4656 points to the South total of 4619 points. So, as most of the contestants headed for the evening dinner at the Ramada Inn, it was obvious that Sunday's event

would be the clincher for the team trophy.

The evening dinner was a great success, highlighted by after-dinner introductions by Le Gray in his own inimitable style. Several interesting films were shown, including footage of the 1971 LSF Tournament. The Kraft Special Award was presented to Dick Jansson for having traveled the longest distance to compete. It was also pointed out during the evening that 12 West Coast R/C clubs were represented at the meet!

Sunday dawned clear and cool. But the weather rapidly deteriorated as the competition got under way. The North team hosted Sunday's competition with two rounds of duration-precision. Seven minutes maximum was allowed for each

Continued on page 44



Ferdinand Hendricks, MB's editor and wife, Frank Zaic laugh it up while Bob Andris (lt.) and Ron Neal hold a thoughtful discussion.



North-South winners: Top row (l to r) Bill Hinman, Brian Stevens, Roland Boucher, and Marshall Watson. Bottom row (l to r) Tom Christian, George Steiner, John Baxter (Second year overall winner), Stu Horton, and Jeff Walters. Bottom row was the North team.

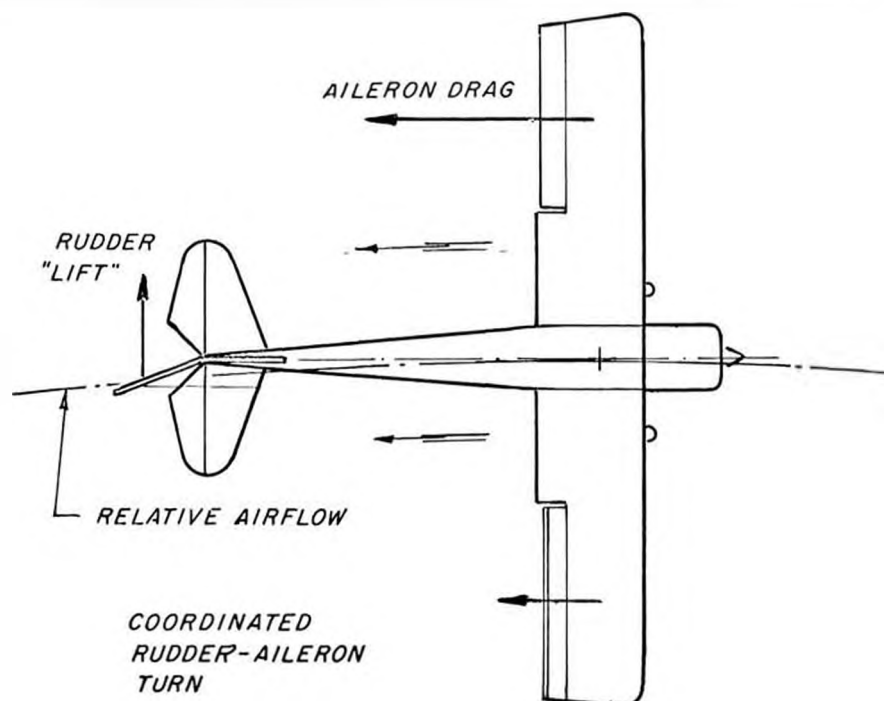


the Model Builder's Classroom

● And who better to instruct than Frank Zaic? A quiet and gentle man who can speak softly and be heard . . . because he has something to say. Frank Zaic . . . one of the first to be elected to the Model Aviation Hall of Fame . . . is without doubt the most prolific writer in the field of model aeronautics. His world famous Model Aeronautic Year Books have chronicled the science and history of model aviation. And these fabulous volumes are all currently available . . . as are such other titles as "Model Glider Design" and "Circular Airflow Theory". Each a classic, but still in stock via re-print from Frank's company, Model Aeronautic Publications, Box 135, Northridge, California 91324. Zaic's works are essential to a complete library for the serious hobbyist, and just plain fun and fascinating reading for the more casual fan. Contact Frank direct for descriptive literature and prices. You'll be glad you did.

But today's lecture is entitled "Ailerons, Dihedral and Rudder". Pay attention. Frank?

"When an aircraft is flying in a straight line, a side force is needed to 'pull' the aircraft into a curved or circular path. The usual method of ob-



Frank Zaic, publisher of the famous Model Aeronautic Yearbooks and a well known model aerodynamicist, lays it on the line about the whys and wherefores of turning. Intro by Le Gray

taining such a side force is by banking or rolling the aircraft so that part of its wing lift is vectored 'inwardly'.

"To bank the aircraft, the two halves of the wing must have a difference in their lift value. For example: To make a right bank for a right turn, the inside or right half must have less lift than the outside or left half. The development of this difference in lift is usually accomplished by ailerons, and/or dihedral angle effect.

"The dihedral angle is brought into action by the application of rudder so that the aircraft will skid or be angled with respect to the flight path. A right rudder skid will cause the left half to present a higher angle of attack than the right one. (Sketch shows the aircraft as being viewed from the flight path. It is the 'face' which the incoming air molecules see). The net result of the skid will be a higher lift for the left side than the right. And the difference in this lift variation will rotate or roll the aircraft into a right turn.

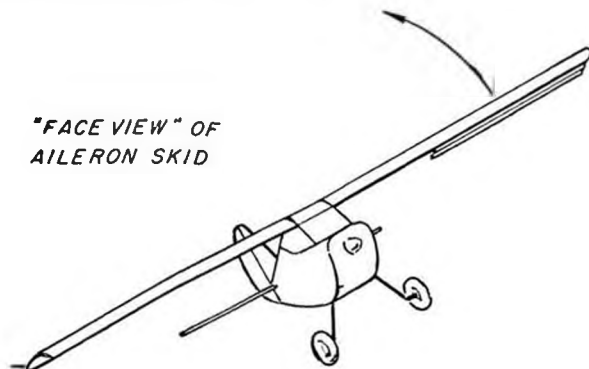
"It should be noted that an increase of lift, due to the higher angle of attack of the left half, also means that its drag is higher than the right. This higher drag will tend to pull the left wing BACKWARD (yaw the aircraft), and oppose the action of the right rudder. But the whole purpose of rudder is to accommodate such counter forces and keep

them under control. Also, the effort expended by the rudder, is in form of lift, so that it is doing its job economically.

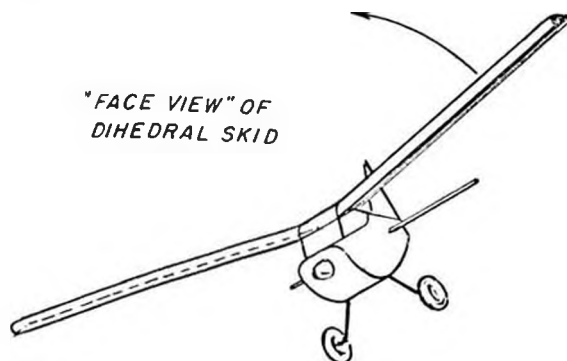
"When the ailerons are brought into action, (assuming standard ailerons on a flat wing) a 'face' is presented to the airflow. This 'face' seems to be similar to the one produced by the dihedral angle in a skid. However, there is a difference. Although the ailerons may appear to present the required difference in lift, due to difference in angles of attack, we do not have a guarantee that it will roll the aircraft into a bank because the natural reaction of the left half (which has higher drag than the right half) will be to swing backward and bring the aircraft into a skid. If there is no counter force to stop or prevent this backward swing, the aircraft will come to some sort of a fumbling situation.

"It is possible, of course, to create drag on the right side to balance the drag on the left aileron, but it would be clumsy and uneconomical. The easy and simple way is to use right rudder to hold the aircraft in flight path.

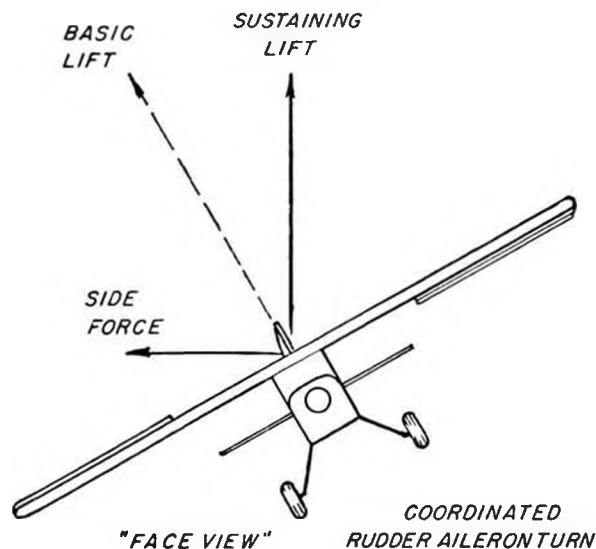
It should be understood that we are chiefly concerned with relatively low speed light weight planes or gliders, which develop low momentum . . . or that the static stability becomes active before the dynamic. Dynamically, the roll maneuver is most sym-



"FACE VIEW" OF
AILERON SKID



"FACE VIEW" OF
DIHEDRAL SKID



"FACE VIEW"
COORDINATED
RUDDER AILERON TURN

metrical about the axis with equal mass on both sides, while the longitudinal and yaw rotations do not have equal masses and more force is required to institute their rotation. All this leads us to say that on slow and light models, the result of the uneven aileron drag . . . when ailerons are applied . . . will tend to yaw the model before the uneven lift will roll it. In contrast, on a high momentum plane, the aileron application will tend to roll it before it becomes subject to the aileron drag difference.

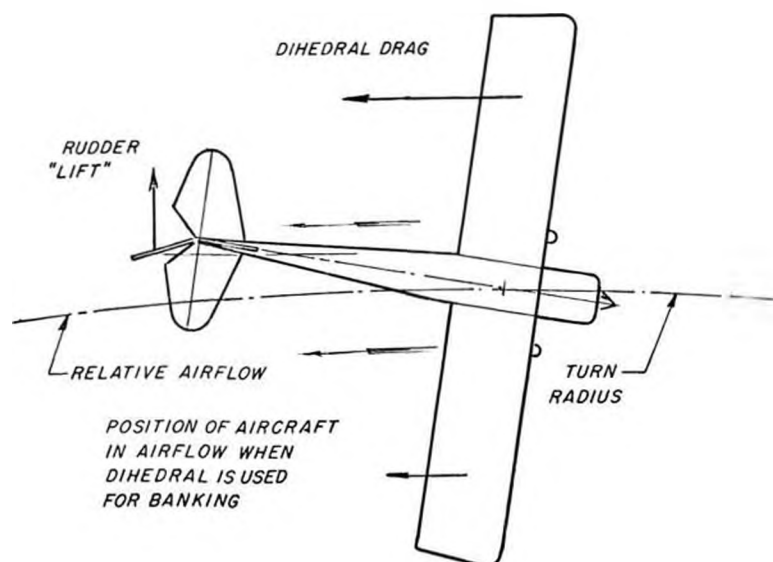
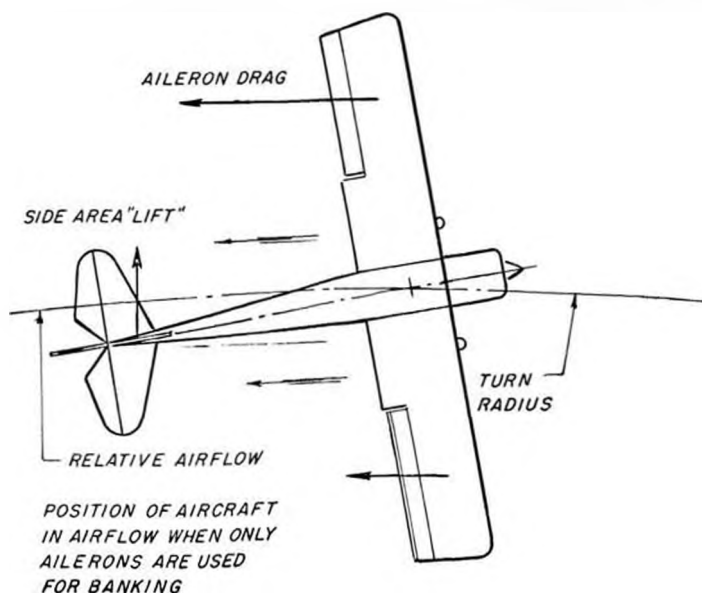
"It is true that some aircraft will develop a turn with ailerons without coordinating with rudder. However, if we were to analyze such a case, we will find that the required rudder effect is ob-

tained by the fixed vertical fin and the fuselage shape. As noted, the natural reaction to the aileron application is for the aircraft to 'yaw' or skid. As it does so, the fixed fin and fuselage side are exposed to the 'new' airflow, and they will act like a movable rudder. So, if you are turning or circling without rudder application, just with ailerons (with assist from elevator), you are skidding the aircraft to obtain the counter force for the aileron drag. The degree of skidding required to obtain the counter force for aileron drag, will depend on the side or vertical area affected in the skid. A large fixed fin and a boxy fuselage may react enough in a small skid. While a small fin and slim fuselage

will require a greater skid angle before they can counter the aileron drag.

"The effect of the dihedral in rolling the aircraft will depend on the skid and dihedral angle, rudder setting and FIXED fin (and fuselage) areas. A large dihedral angle will need a SMALL SKID ANGLE to provide the required rolling force; while a low dihedral will need a greater skid angle in which to generate similar rolling force. It should be obvious that in case of small dihedral angle, the fixed vertical fin and boxy fuselage will tend to oppose the rudder's effort in bringing the wing into the needed skid. So, be prepared to use a larger movable rudder (not the fixed

Continued on page 52





In direct contrast to last month's simpler sheet-built Ford Flivver, we try a built up Bucker biplane for a change of pace. A pretty airplane!

PEANUT BÜCKER JUNGSMANN

By Walt Mooney

What would you call a small model of a German biplane trainer? How about "A Peanut Bucker Sandwich?" If you can get past that without becoming ill, read on and find out how Walt built this little beauty.

● This is a Peanut Scale model of the Bucker Bü 131 B Jungmann, the famous German primary trainer for most of the German pilots that later flew the fighters and bombers in the Second World War. Profile Publication Number 222 has provided the data and the three-views necessary to design this model which is a model of a Bucker Bü 131 B numbered A-57 which was license-built by Dornier-Werke A.G. in Switzerland. It has the standard color scheme applied to all Swiss military Bü 131's after WW II. In fact, this color scheme was the single

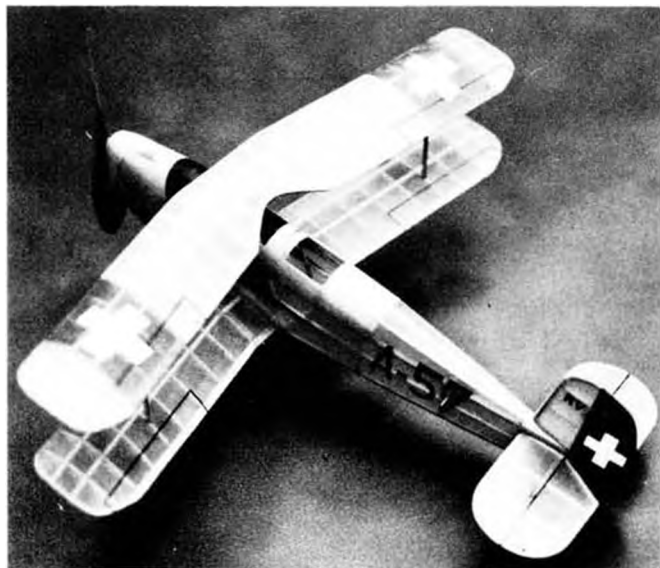
item that inspired the model. The base color is yellow, with white crosses on red bands on the top and bottom of the wings and on either side of the red rudder. It has a black fuselage stripe and black numbers on the fuselage.

The aerodynamic setup of the Jungmann is very good for a rubber powered model with its long nose and ample tail length. In addition, the two wings result in quite a bit of wing area within the 13 inch span limits of the Peanut rules. The prototype model uses a Williams Brothers propeller and small nose plug.

It uses hardwood wheels manufactured by Marlowe engineering, and a simple straight pin for the rear motor peg. It uses one thirty-second diameter piano wire for the landing gear, the propeller hook and the fore and aft cabane struts. The strut fairings, and the interplane struts are made of one sixty-fourth plywood (doubled for one thirty-second thickness in the case of the interplane struts). All the rest of the structure is balsa wood.

The fuselage is constructed in the

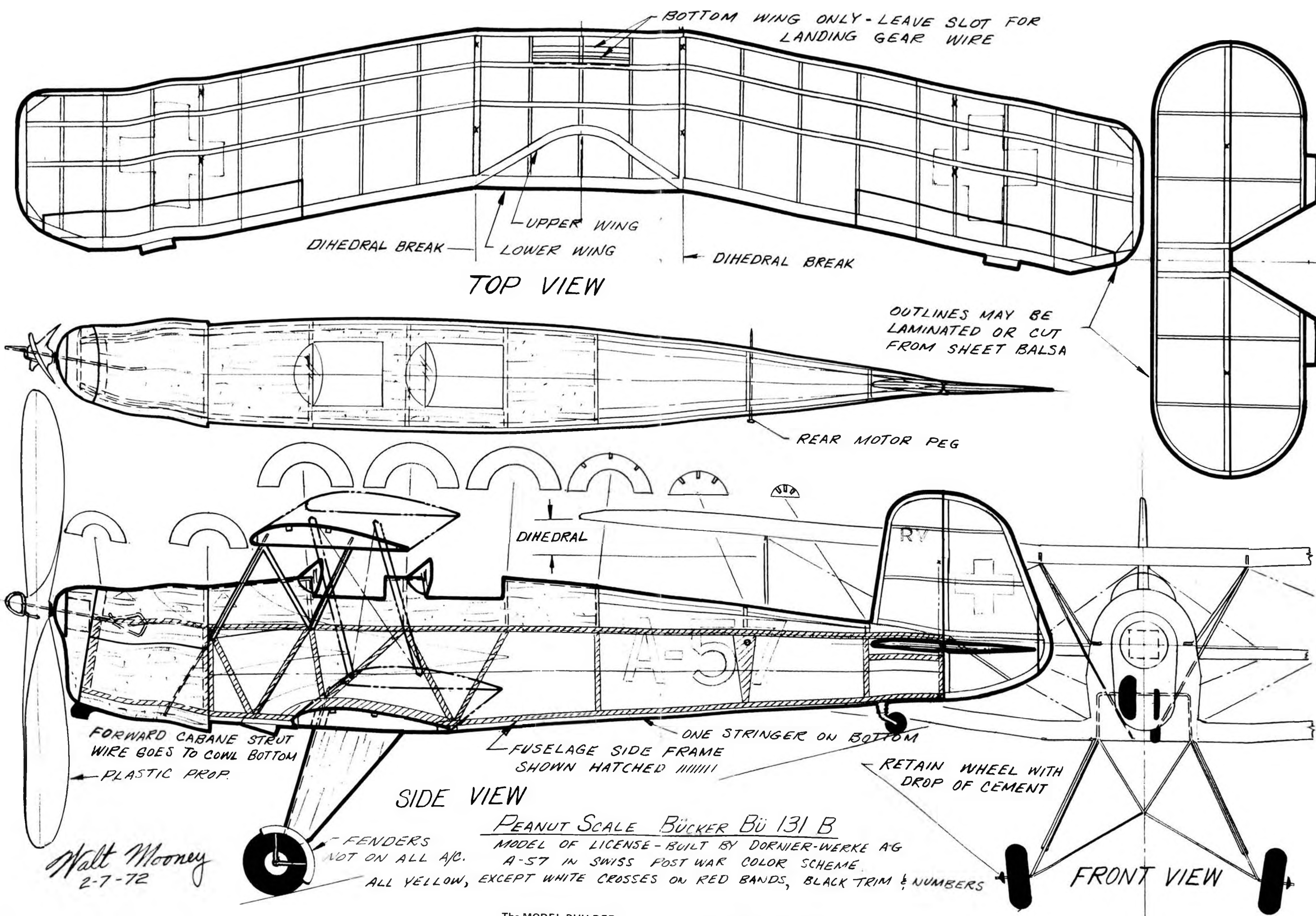
Continued on page 43



Beautiful proportions for a scale model that's expected to fly rather than sit! Walt really went ape with the rib template on this one.



Are you R/Cers thinking what we're thinking? No, not THAT size, but about four times ought to do it....or double for pulse rudder.





Is that ever free-flight country! Mike Taibi and Starduster 600. He is a sharp flier in gas and Nordic. Also flies 1 to 1 scale. Photo by Mary Ortman.

FREE FLIGHT

by Mel Schmidt

WHERE DO WE GO FROM HERE?

● Whether we like it or not, the very future of Free Flight competition depends on the interest the public has in our activities and the management of the flying fields. AMA has tried for years to interest the public and the press in free flight. This effort has been unsuccessful. The basic problem is that free flight is very difficult for the uninitiated to understand. Part of this is the nature of the flying . . . the tendency toward out of sight flights, the retrieving problems, the need for large sites. The fact is that if free flight is to be "sold" to the public and if the flying site problem is to be made manageable, the activity needs some variations that can be kept in close. We need to try something other than just duration. There are OTHER ways to judge the performance of free flight besides duration. For example:

(a) PRECISION FLYING:

The ship is required to take-off and climb four circles to the right then glide four circles to the left and land intact. Scoring could be based on 10 points for each complete circle, 10 points for ROG take-off and 10

points for an upright landing. For each extra circle, or part of, minus points would be scored. One-hundred points would be a perfect score. A ship that takes-off, makes 3-1/2 power turns, then 5 glide turns and then lands upside down would get a score of 75. Multiple flights should be required.

(Editor's Note: If an "R/C'er" may butt in for a moment, we'd like to suggest a precision-spot event similar to one of the 1972 Provisional AMA R/C Sourcing events. This could, and should, be done with a regular F/F endurance competition airplane, so that spectator and flyer would remain familiar with the airplane type.

Object of the event would be to fly a precise length of time from launch or VTA to landing at a predetermined spot. Engine run and DT time [if used] would be up to the contestant, but engine may not run over half of total air time. Launch may be made anywhere within designated contest area. If plane lands [where it comes to rest] within 25 feet of spot - 100 points, within 50 feet of spot - 50 points, more than 100 feet from spot, zero points. Predeter-



Mike Keville pitches his Unlimited. Ten strands 6 mm Pirelli, 160 sq. in. Pic by Mary Ortman.



All sheet structure, plug-in wings and thread turbulators featured on this Wakefield by Jim Waters. Lake Elsinore George Bahrman photo.



Meet Sam (that's what we said) Evans. Husband Ron took the photo and designed the Nordic, but Sam's the one who flies it in contests.

mined flight time should be around 30 seconds. Idea might be to power up for about 5-8 seconds, glide for about 15 seconds and then D/T over spot. Timing score would be a perfect 30 less one point for each second early or late. Best score 130 points. How well do you know your plane?)

Before you assume these are the mad ravings of a lunatic, just listen to some of the advantages of such an event.

1. Flying fields such as Sepulveda Basin and Mile Square in Southern California and similar confined areas in other parts of the country would be ideal.



Free-flyer at work! Walt "Madman" Prey and Satellite. Hez Prez of San Valeers. Ortman photo

2. The design emphasis would not be ultra high speed climbs and floating glides, but on the flyer's ability to predict and control a relatively simple flight pattern.
3. Many existing kits, motors, and designs would be useful. A young boy with a modest investment could be competitive with anybody.
4. The public would better understand the contest and could see it happen. New flyers can only come from the public and how can they learn about free flight if they are never exposed?
5. It places the emphasis on precision of flying rather than fast motors or retrieving equipment. There are fewer fences to climb and the ships will last longer.

(b) ALTITUDE

How high can your ship climb on an eight second motor run?

Altitude could be measured by the same method the rocket flyers use and multiple launches would be required to prove consistency. This event would have appeal to the public, the racing enthusiast, the FAI power flyer, and the modeler. By dethermalizing after power the event could be flown on small fields. This would be a development class with the emphasis on power control. Lessons learned could be used to better control our duration models.

We need fresh ideas to solve our field, public relations, and beginners

problems. When a beginner has great difficulty, even in locating us, something is very wrong. When the public thinks the only way a model can fly is with wires or a radio, something is very wrong. Do you have the picture?

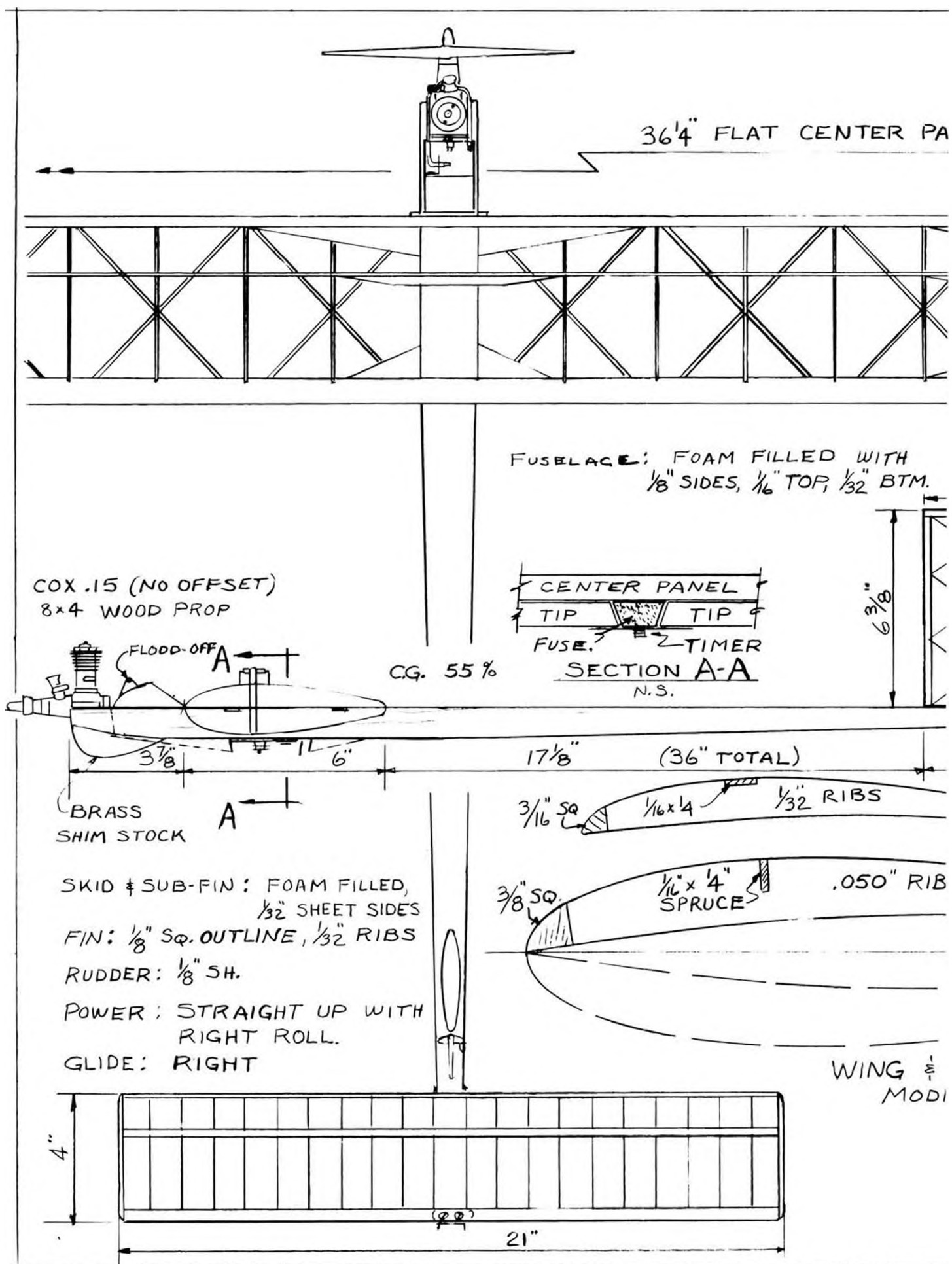
Free Flight is not dead, but we are certainly underground. It's up to us to decide where we go from here. We are the AMA and National Free Flight Society and if we can't solve our problems, no one else will. Here is a challenge for you free fliers. What non-duration events can you think of? It is a fact, that experimental events are best tested at the club level. Club members can conceive an event, or hear of one, then test it in local meets. If the event is of real interest, it will catch on, and as a result, free flight may come out of its wraps of mystery.

INS AND OUTS: by Ron Felix from "Conn. Tact" Newsletter, Ron Evans, Editor.

In an effort to keep style conscious free fliers on the straight and narrow, and maybe to confirm uncertain suspicions, SCAMA presents what will be an annual report of what is in, and that, unfortunately, which is out.

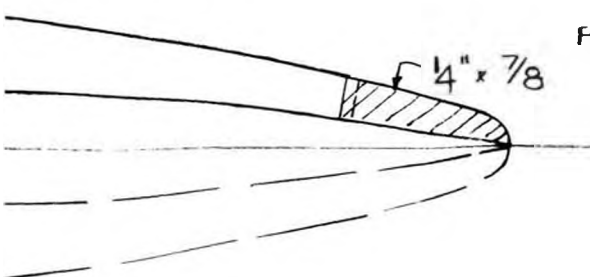
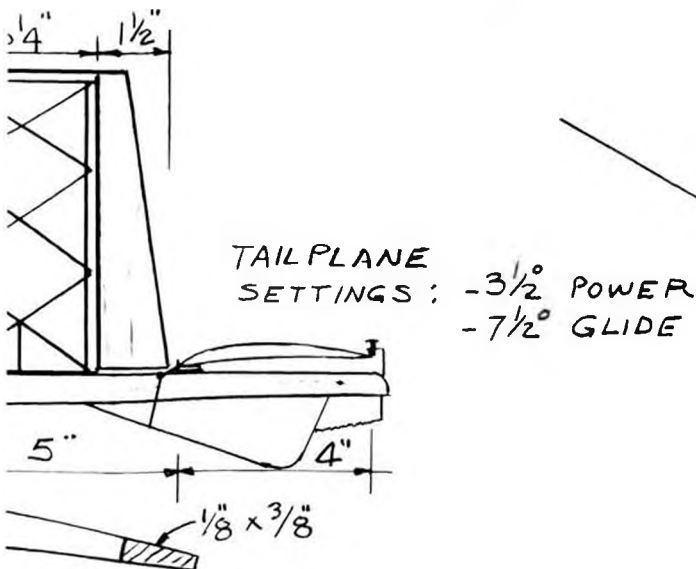
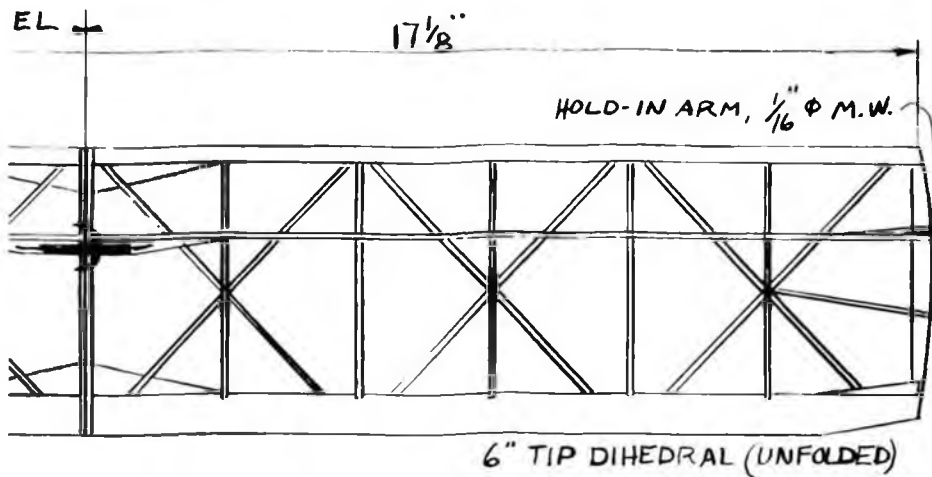
Tee tails, and we've seen several of them this season, are in, as well as rudders mounted behind the stab. Mounting rudders on the stab is definitely out. All sheet Nordics are in, as well as all sheet Wakefields; but if either is overweight, they are out. Fiberglass boom

Continued on page 46



THE "FOLDER"

The unusual A gas design on this two-page spread was designed by Jack McGillivray of Toronto, Canada. This concept is not new, but the designer has succeeded in making it work. He flew it to a first place in the Eastern Canada Open contest after a flyoff. The competition was Andy de Mello's "Half-Nog", which is one of the NFFS "Ten Models of the Year" for 1971, and that speaks highly of the "Folder" performance.

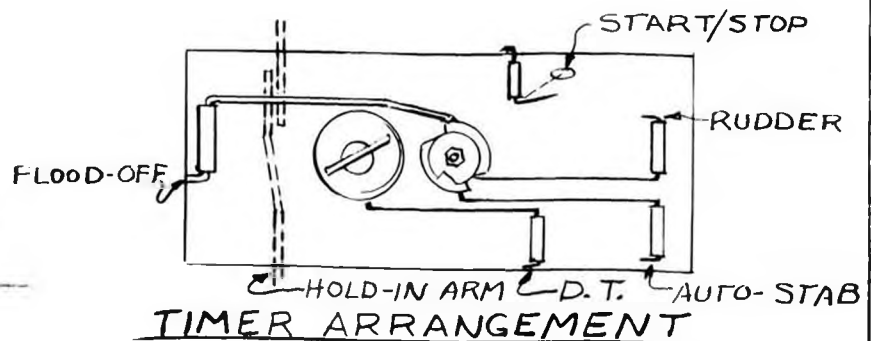
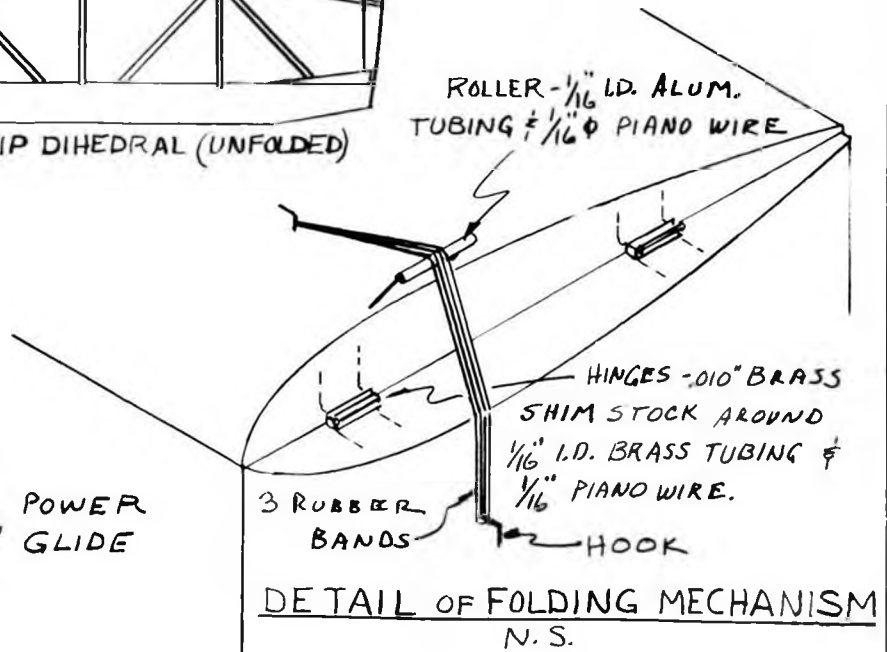


AILPLANE SECTIONS
IED WIREWORM

FOLDER

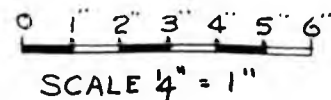
JACK MCGILLIVRAY
TORONTO, CANADA
(FROM TORONTO FAI GROUP NEWS)

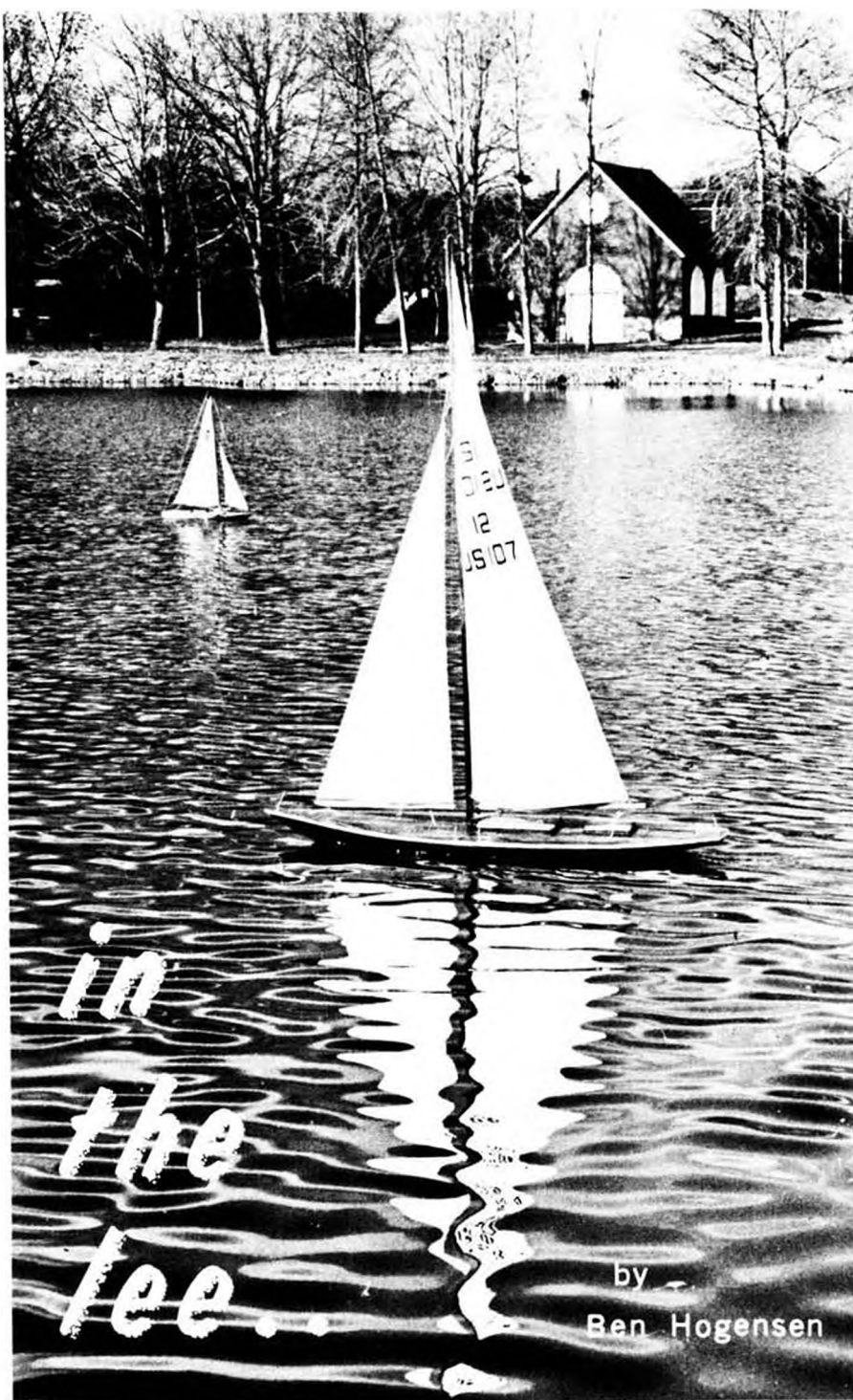
ROLLER - 1/16" I.D. ALUM.
TUBING & 1/16" ϕ PIANO WIRE



MODIFIED SEELIG 1/2 A TIMER
SEQUENCE: 1. FLOOD-OFF & WING
2. RUDDER
3. TAILPLANE

NOTE: DELAY IN UNFOLDING OF WING
WILL BE INCORPORATED IN NEXT SHIP.





● In the January issue of *THE MODEL BUILDER*, Bill Northrop had a short write-up on the American Model Yachting Association which concluded with the challenge: "The big 'IF' is material, we cannot go out and get it. You must make it available to us. It's your move..."

Not one to ignore such a challenge, I scurried home from my friendly hobby dealer's shop with the article in hand and called Bill only to find that he was out at the time. So mid-morning the next day was spent frantically pacing the floor at my abode on the Eastern

Seaboard waiting for the sun to start beaming in California. My impatience caught Bill when he wasn't up yet... and after the fog (smog. Ed.) had cleared from his head as a result of being aroused at an ungodly hour (California Time), Bill and I discussed my writing about R/C yachting.

Bill stressed the need of how-to-do-it articles, and I am in complete agreement with him. The AMYA has a quarterly Newsletter that fully covers regatta winners for the regatta trail boys, so I'll leave that publication as the source of

regatta news and devote my efforts to the how-to-do-it aspect of model yachting. (But, if you're interested in AMYA, a letter to me will inform you all about the association.)

Now that you know the background, and how this article came into being, let's delve into what R/C model yachting is all about....

For many years model yachtsmen have been seeking a method of controlling the direction of a model when sailing it on a pond. First attempts were quite crude... fixed sails and weighted rudders were used. The path over the water was series of scallops instead of a true course! Next came the Braine Gear in 1900 and a much more accurate course could be sailed. And in later years the Vane took over from the Braine Gear. With both of these methods of sailing you could sail a fairly accurate course. But there was one drawback... you had to re-adjust the gear each time a change in course was desired.

Some 20 years ago, R/C model yachting was undertaken in England without much success. R/C equipment was big and bulky and the method of winching the sheets left much to be desired. However, in this country when the new solid state R/C equipment became available and R/C was starting to really flourish in the model aircraft field, skippers took another long look at controlling a model yacht by R/C!

Truly efficient sail winches have been developed, and these, coupled with the new generation of R/C gear, has put the realm of model yachting far beyond the wildest dreams of the skippers of yesteryear! For now you can sail a true course and tack at will! Sails can be trimmed while under way! Closed course racing without touching the boat is possible for the first time!

CONTROLLING THE BOAT: Controlling a model yacht by R/C is very simple; only two controls are used. One control actuates the rudder and the other actuates the sail winch. (Some skippers add a trim control to vary the relationship between the jib and the main, but that is an added refinement that is not absolutely essential in order to sail successfully!) However it is possible to sail a small two-foot model without employing a sail winch and sail by rudder only. This method of sailing is satisfactory for sport sailing, but for racing, the two

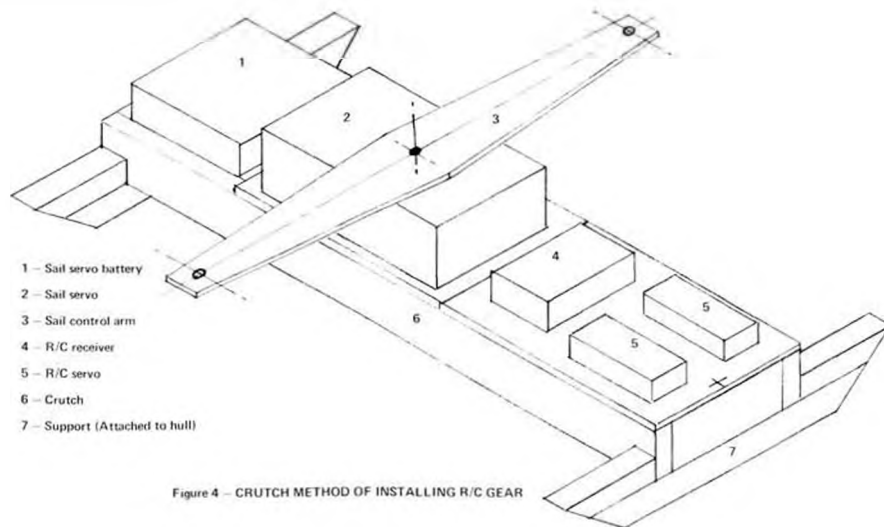
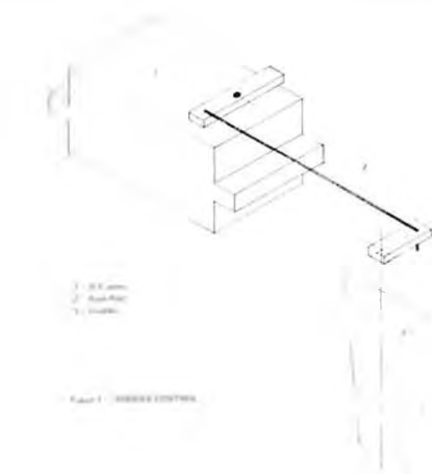


Figure 4 - CRUTCH METHOD OF INSTALLING R/C GEAR

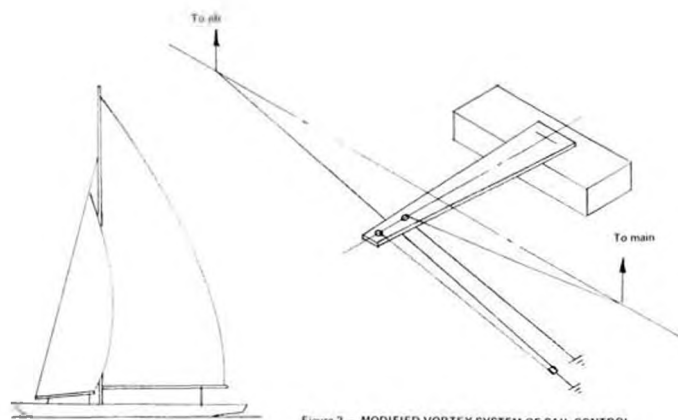


Figure 2 - MODIFIED VORTEX SYSTEM OF SAIL CONTROL

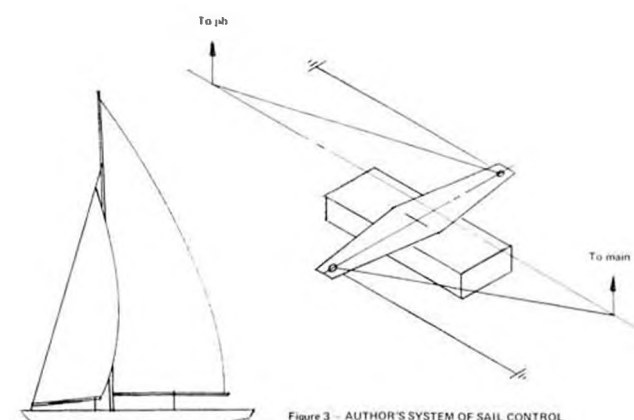


Figure 3 - AUTHOR'S SYSTEM OF SAIL CONTROL

control system is a must.

When it comes to choosing the R/C transmitter, it is wise to choose a model that has two sticks rather than a single stick or sliding controls. This will be explained under SAIL CONTROL.

RUDDER CONTROL: Rudder control is identical to hooking up a rudder in a model aircraft insofar as basic principles are concerned!

An arm is placed atop the rudder post and a drag link is used to connect the arm to the servo. Any of the fittings used in model aircraft work will serve the purpose nicely; no special fittings are used. Also, you observe the same

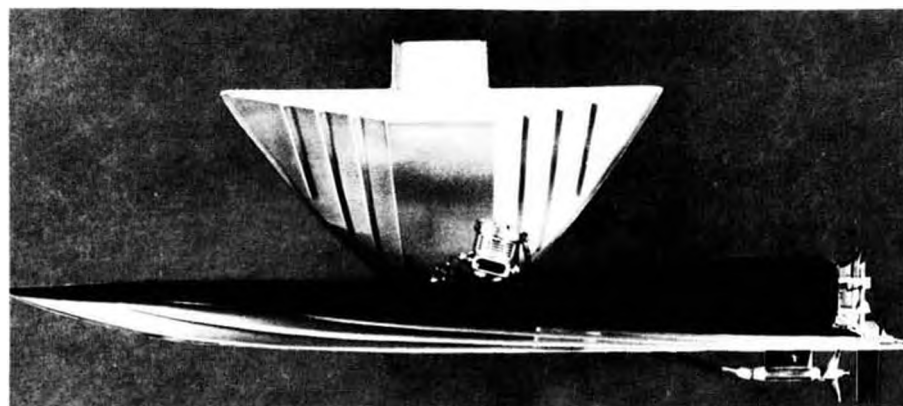
precautions to avoid noise! The old rule of no metal to metal contact still applies! Figure 1 shows a typical set-up.

If you have flown U-Control, you know that there is a certain point beyond which added elevator travel doesn't affect the flight path to make the loop become smaller. The same is true in model yachting insofar as the rudder is concerned. Any movement over 25 degrees from dead center will not make the model turn any faster. Excessive movement, as in model aircraft, will actually act as a brake and hamper the turn.

There is one thing to watch out for

when installing the rudder control: You must make sure that when you push the stick on the transmitter to port (to the left) or to starboard (to the right) that the rudder moves in the same direction so the boat turns to port when the stick is turned to port and visa-versa. Otherwise you are in for big trouble! It can be hard to remember which way to push the stick for a given reaction of the boat.

Continued on page 46



"Northwind" ski boat being produced by Ed and Charles Fisher. Fiberglass hull, for 40 to 60 racing. Ed holds most N.A.M.B.A. ski boat records. See "Workbench" col. for more details.



Dumas ski boat kits have been revised to include new bottom design. Photo, R. Veenema.



CONTROL-LINE

By Dick Mathis

● As I write this there has not been time for my three readers (*Four. I read it too! ED.*) out there to react to my first column, so I don't know what you think of the way it's going, although I really like it personally. Modesty aside, it will be a big help if I can hear from a few of you about what you would like to see here (requests for a new columnist are not allowed!)

One bit of news that should interest the combat fans is that M & P Enterprises (my company) just completed arrangements to kit Howard Rush's "Nemesis" national champion combat design. Should be ready in about a month after this column appears. To see Howard's bomb go, especially in his talented hands, is a real jolly. Reminds one of the good old days when you could go to any contest around here and see Riley Wooten ("Voodoo", "Snecker", "Vampire") and Carl Berryman ("Big Iron", "Twister") put their reputations on the line against each other. That was combat! No wild, uncontrolled stuff for them . . . they were like chess players, only playing at over 100 mph, and you could really see the cool strategy oozing out of the circle. Both were way over six feet tall . . . which seems to be an advantage since it can get sorta' physical in the center of the ring. Everything else would stop so the battle could be observed to the fullest.

Rumors are that FAI combat will soon acquire World Championship status and we will be selecting a team (possibly in 1973) to go to Europe. I'll keep you posted, but it boggles the mind to consider what a team selection contest



This quickly built stunter was described in last month's "Workbench" column but there wasn't room for the photo. It's John Garabedian's "Trophy Trainer" with foam wing. Uses 40 engine.

for combat would be like . . . it would be rather competitive with such high stakes! (*Congratulations, F.R., you have just made the understatement of the year! Ed.*)

On the subject of World Championship teams, I had a chance to visit with stunt man Bob Giesecke, who is getting ready for the trip to Finland this summer as a U.S. Stunt Team member (for the 4th time). At the last World Championship Bob was runner-up to winner Bill Werwage (USA). This year, he hopes, will be his year and if fantastic airplanes help, he may be right. His new model is another one of his famous modified red "Noblers". It is silly to call it a "Nobler" in a way, because it really shares no dimensions with the original "Nobler" design (it's like comparing a 1937 Volkswagen to the 1972 model). Anyway, the new ship is coming out substantially under 40 ounces, thanks partially to the liberal use of indoor quality (4.0 lbs./cu. ft.) balsa that he picked from a newly arrived wood shipment at our plant. Such light weight is highly prized but rarely attained . . . and

it really makes a difference in the way a ship flies.

But part of the reason for such lightness is the bag of tricks Bob uses to save weight in finishing. A glance at the photo shows his new model with a solid coat of silver Aerogloss being sanded down with 400 grit paper wet. The finished airplane, of course, will be red, white and blue, but there is a valid reason for the silver undercoat. The silver undercoat permits the final color application to be made with half the number of coats that would be necessary normally to cover the natural color of the wood and Japanese tissue underneath. Silver blocks out color underneath better than any other color. In turn, it is the easiest color to cover with another color. Result, a few ounces saved and dollars saved from not having to pour coat after coat on to get a nice color covering. (*This trick has been used for many years when painting full size aircraft, particularly to change colors. ED*)

Try it next time on your ship . . . it's worth it whether it's a Ringmaster or



Bob Giesecke puts finishing touches on his FAI stunter (for World Championships in Finland this summer) before applying colors.



Stan Brock likes "Oriental" design stunter by Dee Rice. Won the 1969 Southwest Championships. Plans were published in M.A.N.

the latest stunt masterpiece. The sequence should go: (1) clear sanding till sanded smooth, (2) one coat of clear sanded smooth, (3) one or two coats of color, no sanding, (4) heavy coat of clear rubbed out. The fourth is necessary only if you are going for a super finish, and it helps to have a dry gun for that.

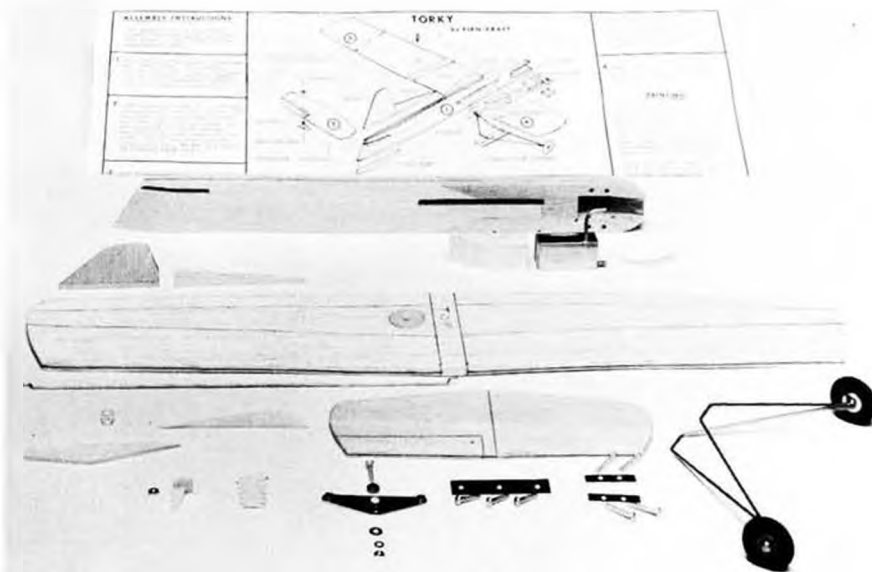
Another neat idea for building big models is Bob's table. It is a 3x5 picnic table covered by a slab of 2 inch foam rubber with a couple of inches overhang. This is all set out in the middle of the room away from everything that can hit your ship as you work on it. The foam rubber doesn't mar the airplane and you no longer have to worry about handling the bulky airplane around your workbench. Since ukie models don't disassemble like free flight and R/C, a table like this is really nice for sanding and painting work.

Another thing Bob does that makes sense is keeping a flight tally for his

ships. He sets up a grid on the wall for each ship and after every flying session he marks off the number of times he flew. This tells him when to clean the filter, when to check the motor mounting screws, when to inspect hinges, and

the approximate condition of his control bushings. He builds one ship a year and puts between 300 and 700 flights on it, so a record keeping system of some sort is essential.

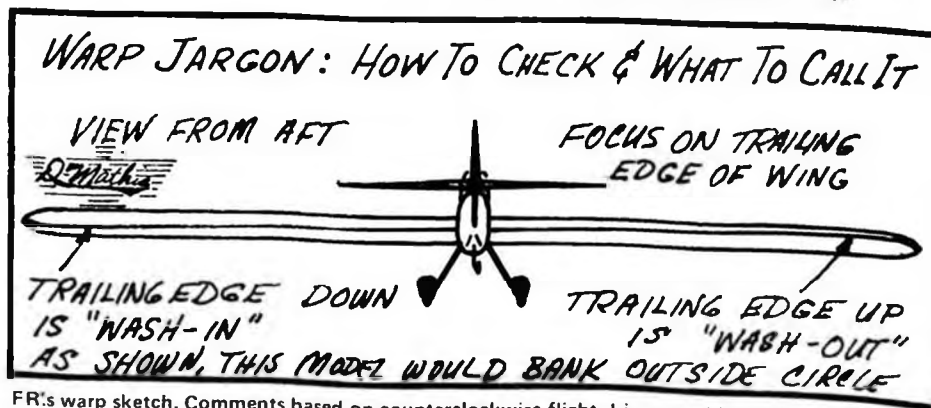
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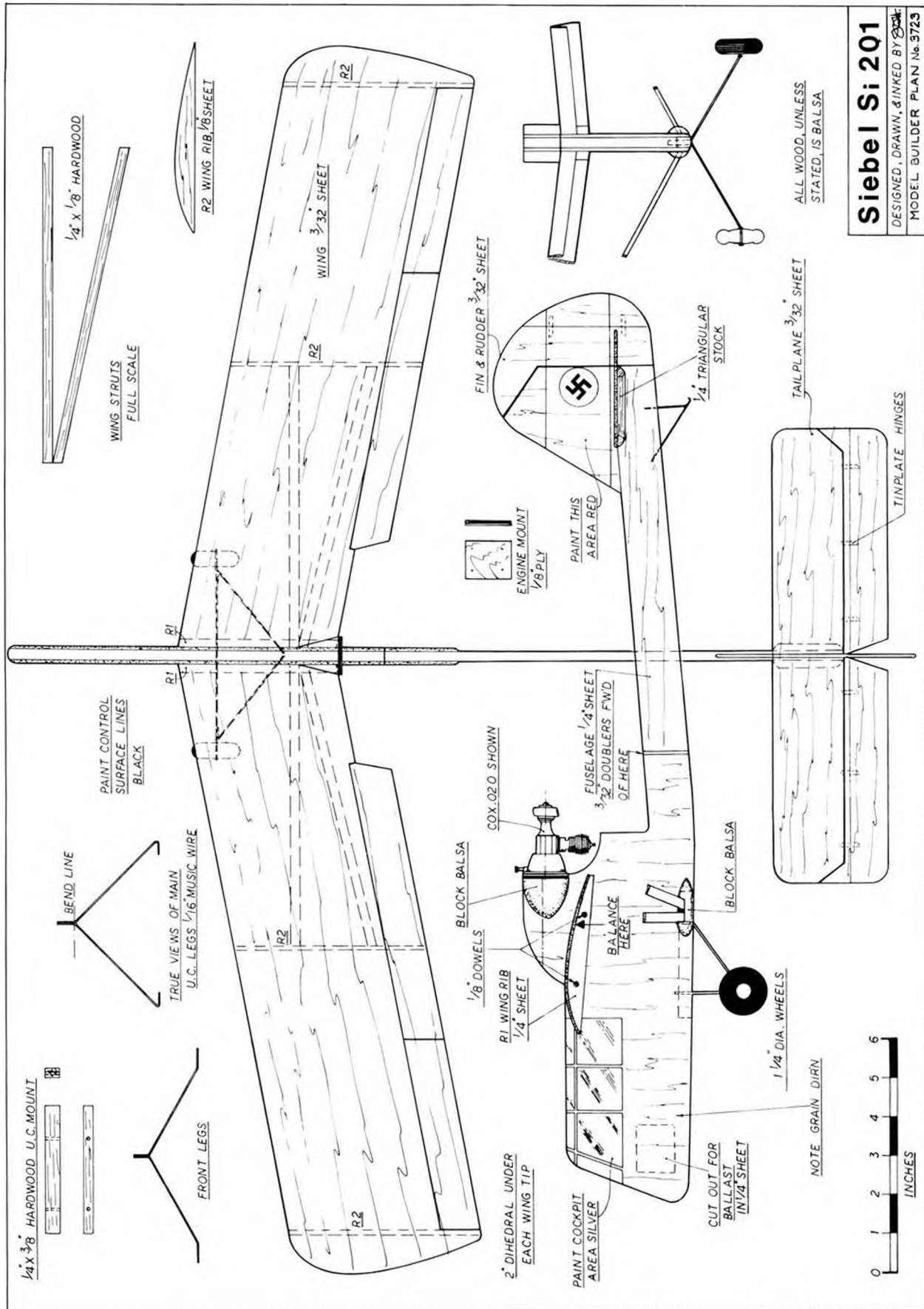
TORKY is 1/2A Proto Profile kit designed and produced by Dale Kirn. Left hand crank permits opposite engine rotation which helps to keep lines tight. No "draggy" rudder is necessary..



Sleek front end of Giesecke's ship. Mufflers are a must. Bob was second to Werwage in 1970.



FR's warp sketch. Comments based on counterclockwise flight. Lines would go off to left.



Siebel Si 201



OK. Apologies for that trick hint about this plane not serving in WW II. It didn't, true, but only because it was turned down in a design competition!

PHOTOS BY AUTHOR

By Jack Headley

● The Siebel Si 201, the subject of our free flight model, was a design which never really got off the ground, if you'll pardon the pun. It was designed to a specification that was quite common before World War II, that of an "Army Cooperation" aircraft. There were three contenders produced to meet this particular Luftwaffe specification, the now well known Fiesler "Storch", the almost unknown Siebel 201, and the even more obscure Bf 163. This later project generally resembled the "Storch" but had a much more sophisticated wing arrangement, with flaps, slats, and even a variable incidence arrangement. No photographs seem to exist of the Bf 163, and it generally remains a mystery.

However, back to our Siebel. This was quite an unorthodox type, much effort being directed to providing the observer with a splendid view, with little or no obstruction...in fact he even sat in front of the pilot. However, in order to make use of this magnificent observation post, some reasonable flying qualities were desirable, and this is where a note of sadness creeps into our story. At low speeds the Siebel's flying characteristics were found to be not too good, and at the other end of the speed scale, tail flutter occurred, no doubt due to too much flexibility in the tail boom. It was also discovered that the aircraft had an exceedingly small permissible C.G. travel, so at this stage the design

was abandoned. I don't know what the German equivalent of "Well, back to the old drawing board" is, but if anyone had said it then I'm sure it wouldn't have got much of a laugh.

Luckily, we don't have to concern ourselves with things like C.G. travel on our models...the C.G. stays firmly in the place that makes the model fly best. Similarly, things like tail flutter can be fixed by sticking a bit more balsa here and there, and so a design which was a failure in full size can be made into quite a successful flying model.

Our all sheet model is very easy to construct, and is reasonably crashproof. The following construction notes will be of some help to the prospective builder.

Begin construction with the fuselage, which starts out as a 1/4 inch sheet of balsa 4 inches wide. Find a good strong piece of wood for this purpose. Mark and cut out the basic outline, the ballast hole, and the notch for the undercarriage block, then cement on the small extra piece for the engine nacelle. Next cement the 3/32 inch sheet doubling pieces on both sides of the fuselage and part way up the tail boom, but don't as yet cover up both sides of the ballast hole. Add the 1/4 inch triangular stock for the tailplane mounting, and the two small blocks on each side of the engine nacelle.

While all this is drying the undercarriage can be built. Drill two holes in

a piece of 1/4 x 3/8 inch hardwood, bend the legs from 1/16 inch music wire and solder together at the wheel and the outboard ends. Jam these inboard ends into the holes in the hardwood strip, with a good coating of epoxy. The wheels should not be added until after the paint job is applied.

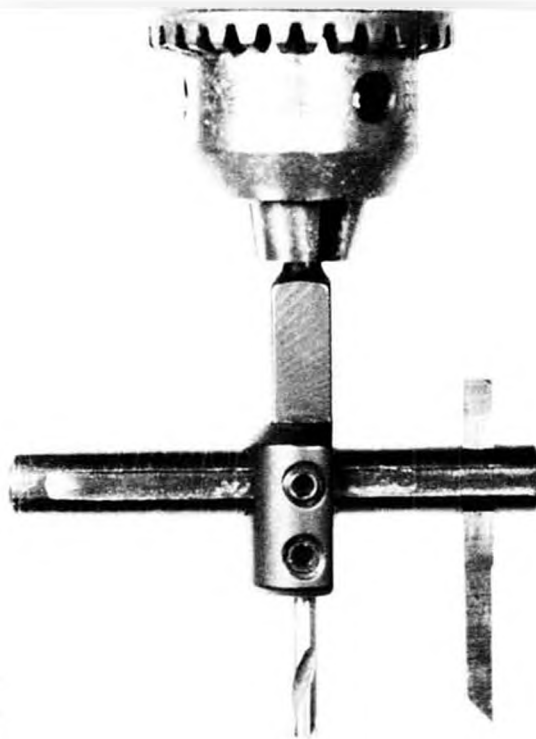
Drill the locating holes for the wing dowels, then cement these firmly into place. Make the engine mount, which is shown drilled for the Cox .020 Pee Wee. We suggest that you use this engine as it runs O.K. backwards (in fact mine usually prefers to run this way). Mount the engine on this plywood plate, then cut holes in the nacelle block to accept the mounting screws and nuts. Apply cement liberally to the plywood and all around the nuts, and glue into place on the nacelle. Put this on one side to dry, and we can begin the wing construction.

Cut out the required ribs, and carefully drill the two root ribs for the wing panels from 3/32 inch sheet, which should be reasonably hard but bendable. Pin down the wing ribs to the plan, and then cement the wing panels into place. If the wing panels won't bend too easily, wipe the top surfaces with a damp sponge, then bend to shape. Note that the root rib should be angled to allow for the wing dihedral. The wing struts are made from 1/4 x 1/8 inch hardwood, and should be made slightly oversize initially, then cut to

Continued on page 45



We showed you how to "spin" out a set of wire wheels in the December issue. Now, here's the tire. Hope you weren't holding your breath.



This is the primary gimmick for producing balsa tires, the Pawood Circle Cutter. Use of a drill press is just about a must. Keep it sharp.

FREE FLIGHT ... SPORT & SCALE

Our newest department gets off to a rolling start . . . showing how to make balsa tires for those light weight spider wheels for vintage scale ships. Other ideas will probably come to you as you see the tool in use.

TIRE PHOTOS BY JOHN VAN VIEGAN

By Fernando Ramos

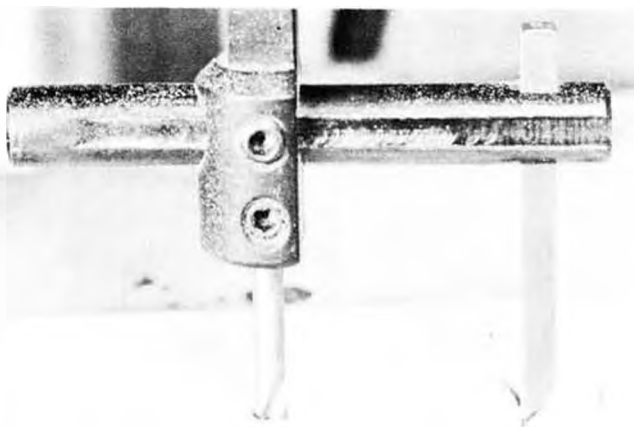
● F/F Flying Scale is one of the most gratifying forms of modeling. Whether the source of power is gas, rubber, or CO₂, there is nothing more rewarding than to see a model of a real aircraft flying overhead entirely on its own.

Even though we see very little coverage in model magazines regarding F/F Scale (*You forgot to say "until now", Fernando! ED*), there is a tremendous amount of interest and activity going

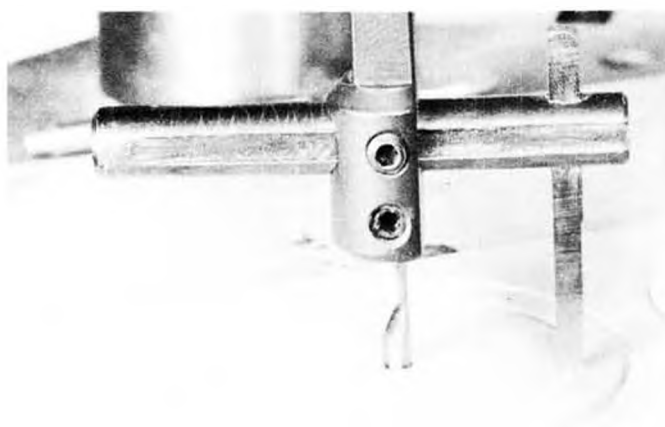
on. Many scale modelers are "loners", simply because they are located in very small towns where model activity is non-existent. Others in metropolitan areas are in a similar situation because they aren't aware that many clubs are now adding F/F Scale to their contests. This doesn't mean that one has to be contest oriented to enjoy flying scale, but contests do help to bring modelers with a common interest together.

Of course, F/F Scale is more than just flying a model of a real airplane, because it usually involves careful research of the parent aircraft so that the model will be an exact or near exact replica. To many scale modelers, this is the most fun part of the entire project, while others prefer the actual construction, creating innovations that will make their model appear more authentic.

It is the intention of this column to



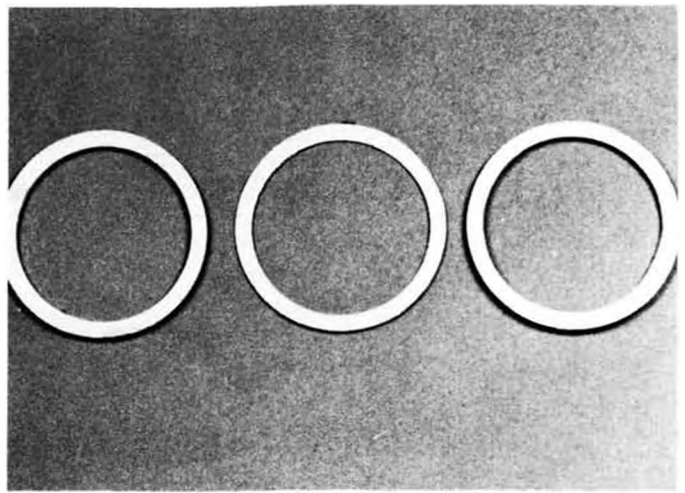
The first cut almost all the way through. Note that the chamfer is set to the outside this time. Tool must be real sharp for smooth cut.



For the second cut, the knife is turned around 180 degrees so the chamfer is to the inside. Set tool according to tire size.



The center disc was cut completely through with the Pawood tool. Now a sharp model knife removes the "square" tire from the stock.



These balsa tires are 2-3/4" in diameter. The center one is a 1/32" ply ring to reinforce the tire. Now glue them together and sand.

cover all aspects of F/F Flying Scale in rubber, gas, and CO₂; constructional ideas, "How To" items, keeping a contest calendar for those clubs sponsoring F/F Flying Scale, and covering any of your local club's Flying Scale activities. Another goal will be to bring together all present scale modelers and hopefully add many, many more to this outstanding branch of the hobby.

Our first "How-To" deals with the making of balsa tires, which goes along as a follow up to the spoked wheel article by Don Typond in the December issue of MB. There have been several articles done in the past showing how to make spoked wheels, but none have gone into the making of the tire. I think we all agree that a good looking tire is almost as important as the wheel. The method described here will make you a pair of "round" tires ranging in size from 7/8 to 4 inches diameter in a matter of minutes, without the use of a

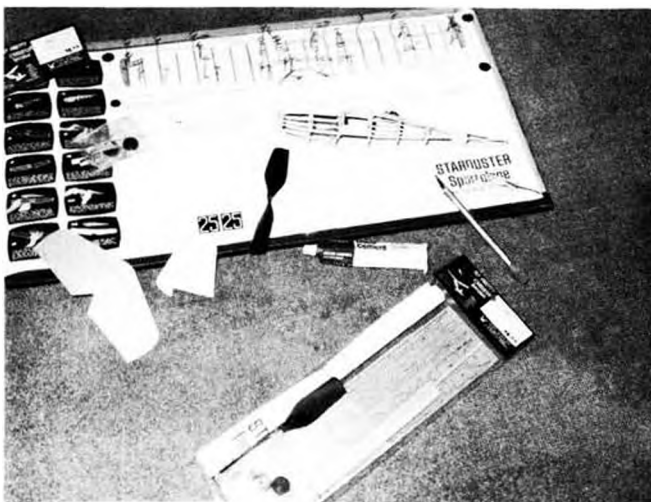
lathe. Smaller diameter wheels are usually for indoor/outdoor rubber models, whereas the larger diameter wheels are suitable for both outdoor rubber and gas models. For the large rubber or gas models, the tires should have one or more inner laminations of 1/32 inch plywood, depending on the size and weight of the model. It is much easier to cut out two inner laminations from 1/32 inch plywood than it is to cut one from 1/16 inch ply. Laminating the plywood centers with the grain cross-wise will give additional strength to the tires.

All that is required to make these "quickie" tires is a Pawood Circle Cutter. This tool can be obtained at any good hardware store for a nominal price, and comes in several adjustable sizes. For most models, the 7/8—4 inch size is more than adequate. It is best used with a drill press; however, a hand drill will work, particularly if you can control its speed and hold it steady.

The photographs show the necessary steps for cutting the tires from balsa stock. The total thickness, of course, depends on the size and vintage of the wheel being used. After the tires have been cut out, glued and dried, just sand them round.

I have found that the best and easiest finish to use is Floquil model railroad paint. Use either "Grimy Black" or "Engine Black," and brush on one coat. Let the paint dry thoroughly, then sand tires smooth. Apply one more coat and you won't believe how rubber-like they appear. All that's left is slip them on those spoked wheels you've already made!

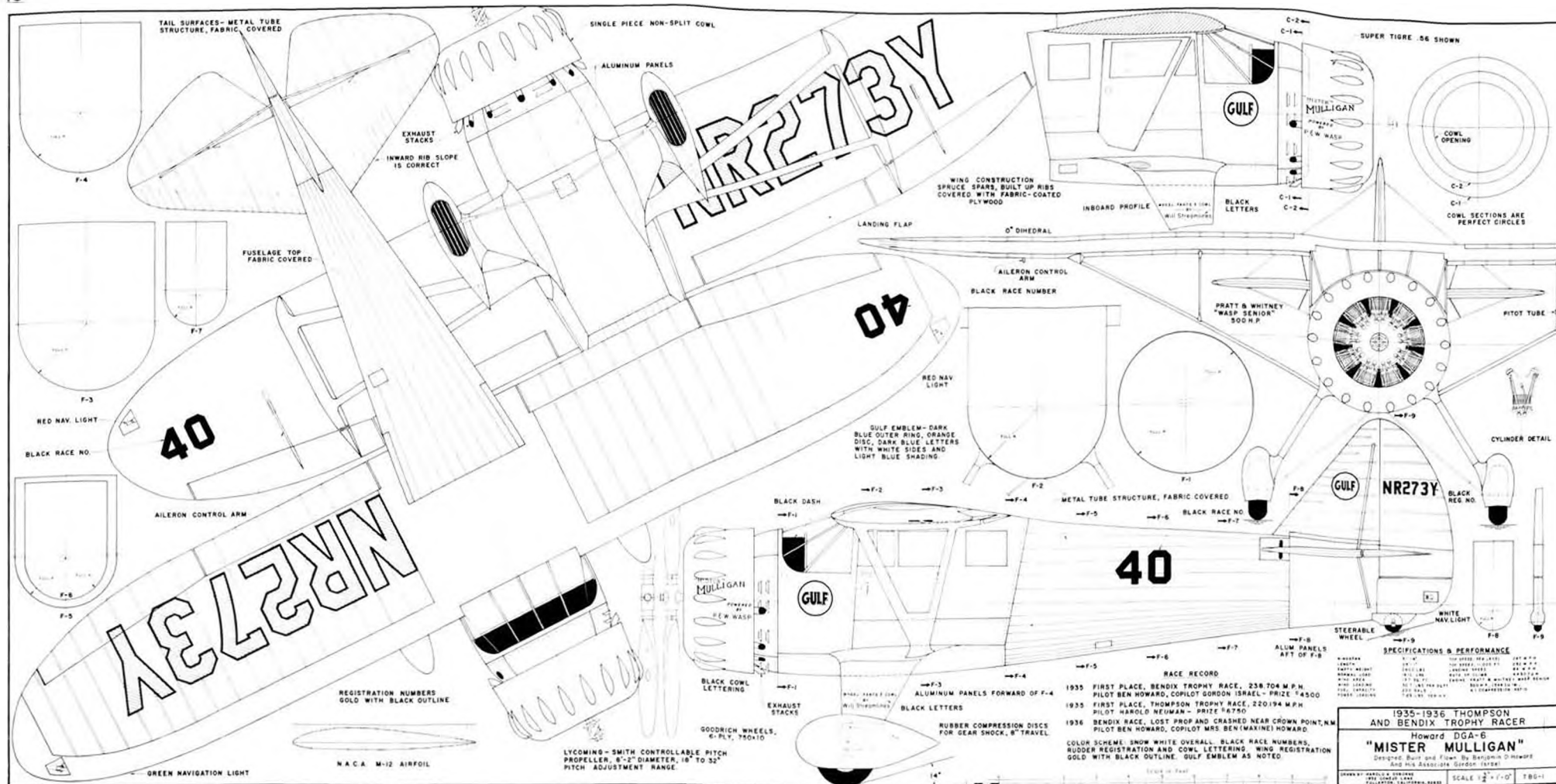
One last comment. This circle cutter may also be used for making cowls for radial engined aircraft, the principle being the same. Maybe you can come up with some other innovations for this great little tool. If so, drop us a line so that we may pass it on to others. ●



The Tern Aero Starduster under construction by Don Butman. Photo instructions are a great help to the beginning model builder.



Don found that he had to "reorient" his fingers as he switched back and forth from building a Stafford P-51 doing the Starduster.



SCALE VIEWS

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HOWARD DGA 6
"Mister Mulligan"

Peanut..... Continued from page 27

traditional fashion, with two sides built over the plan, assembled into a box with cross braces and formers, and then one thirty-second sheet balsa cockpit combing, stringers, and cowl panels of thicker sheet with a block balsa nose. The bottom of the engine cowl is made of three-sixteenth thick balsa, the sides of one eighth, and the top of one thirty-second. Note the curious angular shape of the nose block and use a block with the grain parallel to the thrust line. This simplifies making the square hole in the nose block for the nose plug. Carve and sand the engine cowl and nose plug to the correct contour. For lightness, the stringers are cut from one thirty-second sheet by one sixteenth wide and these are installed on edge.

Sand the entire fuselage structure for lightness and to remove any rough edges prior to covering.

The tail outlines and the wing tips are laminated using one sixteenth by one thirty-second pieces. Make one eighth thick balsa forms to the shape of the inside of the surface outline. Wax the edges of these forms so glue won't stick to them. A common color crayon is satisfactory for this waxing and has the advantage that the color indicates complete waxing. Thin out some white glue with about two parts water to one part of glue. Use this to glue three laminations together and wet the layer that is to be outside. Then using masking tape to hold the laminations to the form, wrap laminations around the outline. The secret to avoiding kinks as the laminations are bent around the outlines is

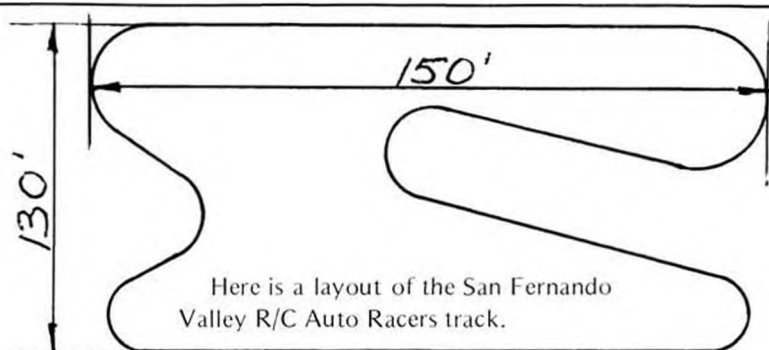
to maintain a slight amount of tension at all times during the wrapping operation. Let these dry, preferably over night.

If the laminating method looks like too much trouble, the outlines can be cut out of one sixteenth thick sheet balsa and they will be strong enough if they are kept about one eighth of an inch wide.

The tail structure is made over the plan using sticks one sixteenth thick by the width shown. When dry these are removed from the plan and one thirty second square pieces are added on the top and bottom of the ribs after which the tail structure is sanded to an airfoil section before covering.

The wings are conventional multi-spar structures with ribs cut from one thirty second sheet balsa. Leading and trailing edges are one sixteenth by one eighth and the spars are one sixteenth

Continued



R/C Cars..... Continued from page 21

new track was held February 20th. A total of 20 entries were divided into 3 classes, Novice, Amateur, and Expert. The Novice class ran three heats, the Amateurs two heats. The best time of one heat determined the winner. The experts ran two heats with both times combined counting as the winner. The following were the winners in each class:

Amateur: 1) Nehi Hurlbut, 2) Brian Husting, 3) Dean Brown. Novice: 1) Kevin Bowles, 2) Morris Buen, 3) Stan Pearlman. Expert: 1) Dick Norsikian, 2) Jene Hustings, 3) Glen Stone.

From the looks of some of the Amateur Drivers, the Experts are going to have some added competition very shortly. The Southern California area has some real competitive drivers. It will be interesting to see how they shape up with the drivers in other parts of the country at the Nationals.

The Orange County Racers and the All American Racers have their races on the first and fourth Sunday of each month, respectively, at the Briggs Cun-

ningham Museum in Orange County. The Professional Car Club holds their race on the 2nd Sunday at Throp Raceway in Pomona. That should be enough races to satisfy everyone in the Southern California area.

Starting in March there is going to be a series of races called the Southern California R/C Car Championships. These affairs will be held by the club's mentioned above on their regular race dates. The series will consist of eight races out of which six will count toward the championship. There will be 3 classes, Novice, Amateur, and Expert. A point system has been worked out so that a driver, who may be advanced to a higher class, will be able to take a percentage of his points with him. The dates of the races are as follows:

March 26 Cunningham
May 14 Pomona
June 4 Cunningham
July 16 Valley
August 27 Cunningham
October 8 Pomona
November 5 Cunningham
December 17 Valley

come fly with us

EAST COAST SOARING SOCIETY

ECSS members attended a series of six soaring contests that were open to all AMA members. Members of the ECSS were included in a percentage point system that led to the final ECSS championship at the close of the 1971 season. The ECSS has sponsored 10 contests since its beginning in 1970. Contests were held in four states this season, many more states and contests are contemplated for the 1972 season.

R/C Clubs that expressed an interest in sponsoring a contest under the ECSS program received a free booklet containing complete information for conducting successful soaring contest for as little as \$5, to as many as 100 contestants. This booklet contains useful data on personnel needed, equipment required, frequency control for a maximum number of rounds per day, timer and contestant briefing, advertising, and many other bits of useful information to guide them when planning their first soaring contest or possibly the biggest contest yet.

Members of the ECSS receive a monthly Newsletter that contains articles on official business of the Society, keeping the membership current on contest rules and regulations, proposed and passed amendments to their Constitution and By-Laws, ECSS proposals to the AMA, FAI and CIAM, and minutes of the 9-Member Board of Director's meetings.

On the lighter side of things, passed ECSS Newsletters contained approximately 100 pictures of sailplanes from all over the United States. Also, twelve separate articles on contest winning glider designs, including 3-view drawings of each winning model. Other articles reported in the various ECSS Newsletters were: Before and after reports on contests, maps, reports on products that became available during the past season, a complete membership roster, articles on soaring clubs, where they fly, and how to join the ECSS. The ECSS Newsletters published interesting technical articles on thermals, winches, aerodynamics, towing gliders with a powered airplane, construction articles on hand-operated winches, parachutes for retrieving towlines, wings with fiberglass shaft spars, up to the second news on AMA, FAI and CIAM proposals, rulings and meetings, and many other items of interest to the soaring enthusiast.

The East Coast Soaring Society plans to and will be bigger and better in the coming season. Come soar with us or just keep current in "what's happening" in R/C soaring this year by joining the ECSS. For additional information, a free copy of the ECSS NEWSLETTER and an application blank, forward your request to: THE EAST COAST SOARING SOCIETY, 9410 N. Penfield Road, Ellicott City, Maryland 21043. Attention: Treas. 71

new!! WRIGHT J-5 "WHIRLWIND" Scale Model Engine Kit

Early in its development the J-5 gained world-wide fame as the powerplant of Charles Lindbergh's "Spirit of St. Louis" transatlantic monoplane.

Other historic aircraft powered by "Whirlwinds" included:

Bellanca "COLUMBIA" (N.Y. to Germany)

Fokker Tri-Motor "AMERICA" (N.Y. to France)

Stinson-Detroit "PRIDE OF DETROIT" (around the world)

Early Ford Tri-motors and military planes.

The Williams Brothers kit representing more than a year of research and development consists of over 150 parts. Molded in two colors of plastic, each kit contains 9 cylinders, crankcase and accessories, including two magnetos, carburetor, oil pump, fuel pump, carburetor air heater, and a display mount.

Engine may be placed on stand, or installed in scale model aircraft.



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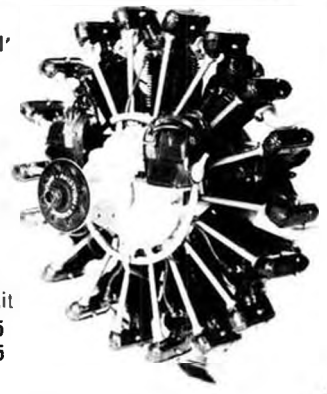
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square. The ribs nearest the tips are thinned down a bit to match the thickness shown in the front view and the upper wing center section ribs are shortened and recontoured for the wing cut-out. This model is a little more complicated than the average Peanut and it has more ribs than necessary from a structural stand point. Every other rib can be omitted for simplification, if desired. On the other hand, it may be questioned as to why it doesn't have scale rib spacing. The reason for the specific spacing shown on the model is that the edges of the red wing panels are located on a rib which simplifies the covering and the wing struts are also lined up with a rib, as indicated by the small "x's", on the wing plan. The landing gear wire extends through the lower wing, so two pieces of balsa are placed between the next-to-center ribs after the center rib is slotted to accept them.

Cut the spars to allow the correct amount of dihedral to be blocked up under the wing tips and cement the dihedral joints. Then sand the wing to remove all rough spots and shape the leading edge to a half round section and the trailing edges to a triangular section.

Start the covering of the model using red tissue for the areas that are to be red and then going on to the yellow for the rest of the covering. Use Japanese tissue. After covering, water shrink the tissue using only a fogged on spray of water. When dry, give all the parts a single coat of thin dope. Then cut the trim from black tissue, and using thin dope, install the big numbers and the fuselage striping. The control outlines and the small lettering is done with a thin felt pen. The white crosses are made from white decal sheet, or in lieu of this, from thin bond paper.

Install the fore and aft wire cabane struts. This is a ticklish job and will take a little trial and error effort to make certain that the wing is aligned in the proper position. It should end up parallel to the bottom wing in the top, front, and side views. Cement the wings in place and then make the strut fairings so the cabane struts become an "N". Make and install the interplane struts at the "x's" shown in the wing plan. Cut away the last upright of the fuselage to allow the installation of the horizontal tail and put it in place cementing only the very back part to the fuselage. This will allow tail incidence adjustments by shimming the leading edge of the tail if necessary. Cement the vertical tail in place making sure that it is straight. Check the surfaces for warps and remove them at this time, using heat if necessary.

Install the main landing gear wire by slitting the wing tissue and sliding the wire up in the slit between the balsa braces. Cut out the main landing gear fairings from three thirty-second sheet balsa and sand to a streamlined section. Cover with yellow tissue and cement in place. Make a tail wheel from hard balsa and cement it in place. Make windshields from thin plastic and cement them in place. At this point the fuselage can be given another coat of dope, but resist the temptation to dope the surfaces again unless you are sure they won't warp.

The model now is complete except for details. There are a large number of minor details that can be added and these can all be found in Profile 222. The model in the photos has the wing flying and landing wires and the tail brace wires made of 8 pound test monofilament fishing leader. This has the

advantage that it can be installed with a little slack and the application of a little heat will shrink them enough to tighten them. Don't overdo the tightening and warp the model, however.

The model should balance level if supported at the tips of the upper wing at the leading edge. Ballast it if necessary. Test glides should be straight and without a tendency to stall. Shim the leading edge of the horizontal tail up or down to achieve this. With the drag of a biplane don't expect too flat a glide, so long as it's smooth and not too fast it will be OK. Adjustments for flight under power should be made by shimming the nose plug to point in the direction the model needs to go. ●

North-South.....

Continued from page 24

round, the same as Saturday, but the goal time was set at 9 minutes with a reduction of points for totals over or under the 9 minute mark. Again the 100 meter diameter circle was required for flight qualification and the scale runway used for bonus landing points. After the first round was completed a very cold North wind necessitated moving the winches 90 degrees. The interim period caused a few of the less stout of heart and those who felt they were out of the running to head for the exits. Those who remained soon wished that they had gone too, as it continued to get colder. All remaining flyers had completed their flights by 3:00 pm and when the final scores were tallied it was found that the North team, perhaps this time with a little help from their North wind, had triumphed again.

Sunday's event winners were Jeff Walters flying a White Trash (Jan. '72 Model Builder) in first; Bill Hinman flying a Monterey, second; and Tom Chris-

tian flying a Cirrus, third. Scale was won by Roland Boucher flying an ASW-17. For the second year, John Baxter was high point man for the winning North team and took home the perpetual Mark's Models Trophy. In addition, this year he was high point overall indi-

WESTERN SOARING COUNCIL: Thirteen R/C soaring clubs, which were represented in a meeting at the mid-January North-South Meet . . . the "war between the state" . . . at Bakersfield, California, supported the formation of The Western Soaring Council. The WSC is planned as a coordinating organization . . . as an inter-club committee . . . to promote better communications and more inter-club activities, and to coordinate schedules for the numerous local and regional R/C soaring contests held in the west each year.

W.C. Whitney, Chairman Pro Tem of the WSC, anticipates the publication of bulletins at appropriate intervals to announce dates scheduled for upcoming contests, and to provide other pertinent information to associated members. Current planning is to provide Council information to affiliated club newsletter editors. According to Whitney, The Western Soaring Council has neither plans nor ambitions to introduce its own publication.

At the January founding meeting, the selection of an inter-club R/C Soaring Champion . . . based on an annual competition program encompassing major regional soaring contests . . . was discussed. Details as yet, however, are not firm.

Clubs and individuals interested in participating in the WSC should contact W.C. Whitney, 6009 Oakdale Ave., Woodland Hills, California, 91364. Return postage is requested with any communication.

vidual winner. Members of the winning North team, along with John, were Tom Christian, George Steiner, Stu Horton and Jeff Watson. The also-ran South team members included Mark Smith, Brian Stevens, Bill Watson, Le Gray and Rod Smith. Final point score was 8946 for the North and 8844 for the South.

All told it was a good contest, the site is great for soaring meets, the weather could have been a little better, but I know all who attended are looking forward to next year's resumption of the battle. ●

Siebel..... Continued from page 39 the correct length on final assembly.

While the wing panels are drying it's a good idea to remove the engine from the nacelle, which is where we left it, and this will prevent it getting clogged up with sawdust, which is definitely a no-no! Now to the tail assembly. The various pieces are cut from lighter weight 3/32 inch sheet, which above all should be free from warps. After a good sanding cement them into place. Note that a small rudder tab is required, and also an elevator. These items are attached with hinges made from scraps of tinplate.

The wings should now be dry enough to be cemented into place on the fuselage, using the two locating dowels, then the wing struts can be cut to their final length and cemented down. Two small balsa blocks fit over the struts at the fuselage end to provide additional anchorage.

Now for the balancing. Put the engine, prop, and wheels into place temporarily, then add lead to the ballast hole until the C.G. comes out as indicated on the plans. Since the addition of the final finish usually moves the C.G. back some, it is best to balance the plane nose-heavy at this time to compensate. When the correct balance is obtained cement the remaining piece of 3/32 inch over this cavity, and this completes the construction.

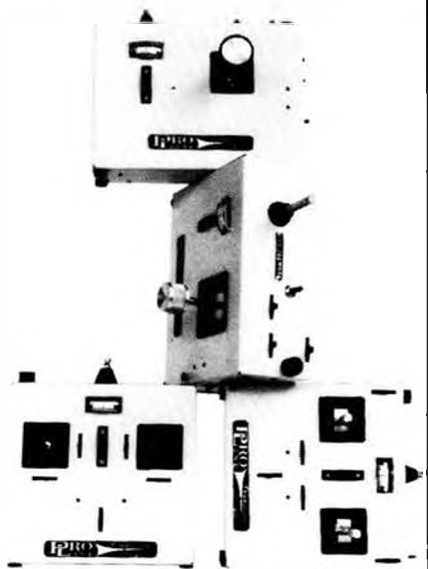
Sand well all over, rounding off the corners of the fuselage, and the wings then apply the desired finish. Our prototype used a standard Luftwaffe camouflage of around 1938 vintage.

Flying the model should present no problems, assuming that you've first checked and corrected any warps that have crept in. Check again that the C.G. is where it should be, then try a low powered flight. If this goes O.K. then try a little more power, but remember that this is supposed to be a slow flying observation aircraft, not an interceptor, so stay with low power, and just let the model putter around the flying field, it's much more realistic this way. ●

C/L..... Continued from page 37

The coming thing is mufflers on our engines. They are already required in England, and in FAI stunt, and in some U.S. towns, but it is inevitable that they will be required on all AMA ukie classes. The reason, of course, is noise, and quite

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a few sport flyers have started using mufflers voluntarily to avoid losing flying fields. Problem is, a lot of engines don't seem to do too well with mufflers, or, more specifically, with certain brands of mufflers. One is the old favorite Fox Stunt .35 which overheats, according to reports I have. The Fox in Giesecke's "Nobler", for example, had to be modified especially for running with the muffler. I would like to hear from you if you have had some experience with mufflers so we can start reporting solutions for the problems. My experience with mufflers is limited to my Great Skywriting Experiment where I took a McCoy 40 with muffler and rigged up a pressurized diesel oil injector right at the exhaust stack. The idea was that the diesel oil, which burns very smokey, would burn in the muffler chamber and leave a trail of smoke for exhibition flying. I had two tanks, one for glow fuel and one for diesel oil, with pressure lines going everywhere. The result was less than sensational since the resulting smoke trail was only visible against clouds and too faint against blue sky. Plus, have you ever tried to get three ounces of diesel oil off your airplane? It even got inside the leadout holes!

This month's boring but important beginner's tip is something that some experts should be more careful about too. Warps are one of the ukie flyer's biggest headaches. Bad ones that cause the lines to go slack in wind or maneuvers can be checked and corrected in a couple of minutes. The best way to check for wing warps is from behind the airplane, looking directly down the fuselage at the edge of the wing trailing edge. (See drawing) Warps, if they are there, show up best from this angle. The wing should not be warped (twisted) at

all. If you detect any, just turn the kitchen stove on (an open burner gas stove is best) full bore and get with it. *(A safer method, until you're used to working over an open flame, is to put on the tea-kettle, full of water, get a good head of steam going, and pass the twisted surface back and forth through the steam until it softens up. ED)* Take the offending wing panel and work it back and forth over the stove about six to ten inches away from the flame while twisting it the opposite direction from the warp. Ten or twenty seconds is long enough to soften the dope and glue and you should be able to feel it relaxing as it heats up. Now pull it away into cool air and hold the new twist in for about a minute. Re-check the wing to see if it is now straight. If it is, let it sit for about 30 minutes and re-check. You will learn from experience how much to over-warp in order to get it to cool straight. This method should not be used on freshly doped surfaces since it will overstretch the covering resulting in permanent wrinkles. However, it works very well on heavily doped wings (more stuff to soften and set) or on cured, lightly doped ones. It is perfect for MonoKote wings, and MonoKote really holds a set well.

Warps can cause a lot of funny things to happen, but one that a lot of people don't catch is the combat ship with both tips warped the same way. It will stay out on the lines fine, but it will turn way tighter one way and hardly at all the other. For example, if both tip trailing edges bow up, it will turn inside like crazy and imitate a brick when you give it down.

A trailing-edge-down warp on the outside wing tip (and/or trailing-edge-up on inside tip) is always good for slack

lines, although the reverse warps would be good for a trainer since they would keep it out on the lines . . . just don't fly it upside down! ●

free-flight..... *Continued from page 31* fuselages are in. Reliable simple airplanes are in; theoretical, complex airplanes are out, unless they win, in which case they are very in. Long tows upwind are in as are circular tows. Russian towhooks with catapult launching feature are also in, but if there is any unreliability, they are out. Outrigger turbs and triangular patches are in but depending on surface spars for turbulation is out. Hegi glider winches are in. The GF-7 is going to be in just like the CH-407 is now. The GF-6 is on its way out and will join the B-7457d2, which is out, and the 6409 which is way out.

Wakefields in general are in. Short motor runs are in, but large diameter low pitch props are out. Wire hubs are out. Auto rudders are in, as are auto stabs. Winding tubes are in, as well as any system of winding without the prop. Lurking downwind, holding a wound motor, and piggybacking is in. Being a hero by picking your own lift exclusively and finishing at the bottom of the score sheet is out. Flapper power ships are in, folding wing power ships are in *(they're not complex! Ed.)* and small power ships are in. Big gas ships designed for 20 sec VTO and 5 minute max are out because 10 second engine run and 3 minute max is in. Fiberglass props are in. Wood props, plastic props, and nylon props are out. Electric starters are in, hand starting is out.

Tissue and silk are in and have been for ages. Banana oil is in and clear aircraft dope is in. Epoxy is out unless it is on all sheet, then it is very in. Seelig timers are in. Kielkraft fuse is in.

Tactical flying is in, piggybacking is in, anything that gets you a max is in. Getting a non-max is out. Using a mylar strip is in, using a thermal detector is in, using your senses is in, but most of all, using your head is very in. Telling everyone you are flying just for fun after making a bad flight is out. Making any excuse is out, crying over spilled milk is out, going off and sulking is out, getting a bad flight is out, and if it is due to bad trim it is very out.

Wearing white leather athletic shoes with stripes is in, except at Ft. Devins

and Galeville where boots are in. But in any case, black and white sneakers and tennis shoes are out. Club shirts or jackets are in, but club uniforms are out. Plain USA team sweatsuits or the like would be very in, but gaudy USA team shirts are out.

Last but not least, wearing cut-off farmer brown's, granny sun glasses, and a confederate army hat to the United States Free Flight Championships is out unless you are from Snider's Swamp, then it's in, because people from Snider's swamp are far out.

TIMER SITUATION

Tatone Timers are in very short supply. We phoned John Tatone for a first hand report. He is now hoping for delivery by the first of May. Seems it was necessary to locate another manufacturer. John does have a stock of parts for most repairs.

Recently some of the shops have been carrying the Graupner fuel cut-off timer. We bought two and were very disappointed. Heavy fuel leaks occur because of a faulty valve design. We removed the valve and mounted a pinch-off. It worked for the first and second tests but on the third run the main spring broke. The hobby shop owner refunded our money and returned eighteen units to the jobber.

Seelig timers are available from Doug Galbreath, 707 Second Street, Davis, California 95616. The Seelig is the timer for all serious FAI work and could be used for large AMA gas ships. Doug delivers timers as he receives shipments from Europe. Waiting times vary from two weeks to three months.

If anyone knows of a source for good timers, let the Model Builder know so we can help pass the word. NATIONAL FREE FLIGHT SOCIETY

The NFFS has undergone a substantial change-over in personnel. In particular, the digest supplies, plans and membership have become separate positions, with new people handling these duties. The Membership and Subscription Manager is Ron Evans at 83 Blake Street, New Haven, Conn. 06511. The new NFFS membership rate is \$4.00 per year. George Xenakis of Houston, Texas is the new editor. Join and support your free flight society.

CONDITIONING RUBBER MOTORS

Ed Dolby of FAI Model Supplies offers the following tried and true

methods for rubber lube and breaking in Pirelli rubber (Ed won the Wakefield, Coupe and Unlimited Rubber events at the 1972 Southwestern Regional Championships)

RUBBER LUBE: Surgical jelly and glycerin, mixed in about equal parts, and thinned with a very small amount of water to suit. Johnson & Johnson makes a KY Sterile Lubricant in tubes, which is known as surgical jelly. It is available in drug stores. This mixture is water soluble, and has very little odor.

ALTERNATE METHOD: As paste soft soap is now almost impossible to buy, the alternate is Tincture of Green Soap. Get the kind with the lowest alcohol content. Pour 8 oz. in an old clean pan over low to medium heat and boil off almost all of the alcohol. Try for a very heavy liquid that will just pour. To this add 1-1/2 oz. of glycerin, and 3/4 oz. of castor oil. Keep this over a low heat and add water until it gets only as thin as liquid cooking oil. When cooled, the solution should be as thick as castor oil. You may have to add a slight amount of water to get this, but it is better to have it too heavy as you can always thin it out. If the lube is too thick it won't penetrate the pores of the rubber, and if too thin, will mess up your fuselage. This solution will easily wash off.

BREAKING IN MOTORS: We will deal with the "Stretch" method of breaking in your Pirelli motors, as this is almost the accepted standard today. First, you must have a real good solid post or base to anchor to. At the hardware store you can easily obtain a clothes line hook of 1/4 or 5/16 inch thickness. Be sure to select one that is smooth so as not to damage your motor. For the other end a 12 inch piece of old broomhandle is usually easy to find. Make sure it is also smooth. Before stretching make sure you have washed the motors in mild hand soap, rinsing once, then dried. Apply a liberal amount of lube. When you have finished stretching you will be surprised at how much of the lube gets absorbed in the pores. First, stretch slowly to about 4 to 5 times original length (It may help if you mark off the distance.) Hold for about a minute; then back up until you are 6-7 times length. Hold for about 2 minutes. A 16 strand 40 gram motor may not quite get to the 7 times, but fewer strands will present no problem.

Ed Dolby and Bill Roseberry are busy expanding the FAI Model Supply product line. Their new 24 page catalog is available by writing the FAI Model Supply, 1112 W. Mission Lane, Phoenix, Arizona 85021 ●

In the lee..... Continued from page 35

So, the control must be like driving a car or riding a bike; when you pull the control in a given direction the model turns in the same direction. Let your reflexes that have been trained from driving a car work for you in model yachting like they do when you are behind the wheel of a car!

(Editor's Note: The most difficulty in steering occurs when the boat is heading in a direction other than straight away from the skipper, and lefts and rights are somewhat confusing. Until you get the hang of it, and orientation is no longer a problem, many wrong turns will be made. A trick used by many airplane R/Cers . . . where reactions must be quicker than in sailing . . . is to swing the body around so that the top of the transmitter [when held face-up] points in the direction of the model's travel. In this manner, right on the transmitter is right on the model . . . er pawdon me . . . stahboard!)

SAIL CONTROL: Over the years various methods have been used to control the action of the sails. Some methods were (and some still are) real Rube Goldbergs (you're giving away your age, Ben!), quite complicated to make and didn't work worth a darn! Sheets (the line from the winch to the spar) were constantly fouling up!

The simple system now used by most sailors employs a swinging arm to pull the sheets in. Figures 2 and 3 show how this system works. Details of traveling chain systems or drum systems will not be shown . . . nor are they recommended, and the novice is advised to stay away from them!

Figure 2 is based upon the system used by Vortex and Figure 3 is the system used by the author.

The system shown in Figure 2 can be used in boats that have a wide beam only. The system shown in figure 3 can be used in any boat, including those having a narrow beam.

To hook the winch to the spar, sheets are made out of 40 pound test squidding line (or similar line) and there is the old



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fisherman's precaution that must be taken: knots must hold when wet, so a bowline instead of a reefing (square) knot is a must! (Forgotten how? Try your nearest Boy Scout! Ed.) Also, since the line is under tension when it is being hauled in, metal eyelets must be used to avoid wear. These are used on the sail control arm and where the line passes thru the deck.

Again a similarity between model aircraft work and model yachting: There must be no binds in the system and everything must work free and easy without a chance of a hang-up!

It was mentioned under controlling the boat that a two stick transmitter was preferred. The reason is that you can put the sail control on a separate stick. For, a good many times you will be sailing where a slight amount of control must be given to the stick controlling the rudder to hold the boat on course. When the sails and rudder are controlled from the same stick, you can lose the fine trim of the rudder that you may be holding by sheer accident. So it is wise to use separate control sticks to avoid this possibility.

Again it is wise to use natural reac-

tions insofar as the direction the stick controlling the sails are concerned. The author rigs his unit so the sheets are pulled in when the control is pulled towards his body (towards the bottom of the transmitter) and let out when pushed away from his body (towards the top of the transmitter). Reason: As the stick is pulled towards your body, you get the same reaction as if you were actually pulling the sheet towards your body and visa-versa!

(EDITOR'S NOTE: The two-stick system for sailing is fine if you happen to own a Mode I transmitter. However, most radio systems on the market are Mode II, because this is the choice of the majority of fliers. On Mode II, throttle is on the left stick, which means that unless you care to operate the rudder with your left hand, you will find yourself with a ratched, non-neutralizing sail control!)

On most transmitters, modifying the sticks to have self-neutralizing spring action on both sides, in the forward and back direction, is fairly simple and can be done by the owner. If you're not sure, check with the manufacturer.)

INSTALLING THE CONTROLS IN

THE BOAT . . . Remember the old ignition days of free-flight when the motor, coil, batteries, etc were put on a crutch? The author has found that this is the really simple way to install R/C gear in a boat. Figure 4 gives the details of this type of arrangement.

It has been found that the sail winch needs to be fastened securely in place — and the crutch system serves admirably!

POWER PACK: Lantern batteries and motorcycle batteries have been used to furnish power to the sail control winch. But lantern batteries lose their power fast and motorcycle batteries can spill acid inside a hull with disastrous effects, so the best power pack is made from nicads. The author uses, and recommends, that eight 'C' size nickel cadmium batteries be wired in series to give a 10V power pack. Such a pack can be charged to 6 to 10 volts and last for a full day's sailing with the servos available on the market.

SERVO: For sail control winch . . .

Servos are available from the manufacturers of model yachting equipment. But, don't expect to find them at your local hobby shop! Most model yacht manufacturers deal by direct sales. A list of manufacturers is given below:

Vortex Model Engineering,
210 E. Ortega Street,
Santa Barbara, California 93101

R/C Model Sail Yachts,
P.O.Box 3134,
Burbank, California 91504

Dumas Boats,
P.O.Box 6093,
Tucson, Arizona 85716

Ben A. Hogensen,
Design Consultant,
P.O.Box 127
Woodlyn, Pennsylvania 19094
(3 types of servos offered)

All of the above manufacturers sell their products by direct sales except Dumas boats.

BOATS . . . KITS . . . BARE HULLS

The author is the Secretary-Treasurer of the American Model Yachting Association, and a letter to him will bring a reply regarding what is available in the model yachting hobby. A long list of manufacturers of AMYA approved boats will be furnished at no cost except a self addressed stamped envelope!

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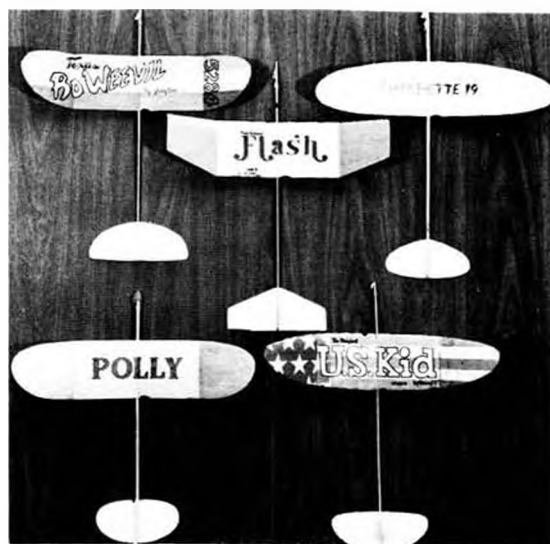
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BOOKS ON MODEL YACHTING:

Two books may or may not be on your library's shelves since the authors have died and the books are no longer published. These books are: "Model Sailing Craft" by Daniels and Tucker, and "Build a Winning Model Yacht" by Thomas Moore. These are excellent reference material for the theory of sailing craft.

There is also a book, Model Racing Yachts by Priest and Lewis, that is available from Model Allied Publications, 13-35 Bridge Street, Hempel Hempsted, Herts, England.

All of the above books are for Braine Gear or Vane sailing . . . but a lot of valuable information can be gleaned from them that will be useful.

A new book, Handbook for Model Yacht Design, is being written by the author at the present time and will be available soon. This book will carry the information on model yacht design, forward to include R/C operation, and the basic differences in design that occur due to the method of controlling the direction of the yacht on the water. ●

Pylon.....Continued from page 15
and of course FAI as an international event, is almost unlimited if the officers within the NMPRA all approach our problems from the right standpoint.

The NMPRA the last couple of years has, unfortunately, been very much on the downhill slide. This is certainly no one person's fault, or group of persons per se. The one thing that, quite obviously, must be had in any nationwide

organization, is communication. Unfortunately, in our hobby, like in many different aspects of life, the guys who do the most complaining when they talk with other modelers do not take the time to sit down and write a letter to the people who could do something about it. This is evidenced by the opinion polls and similar type of questionnaires that have been sent out in the past and have received a very low response. Another good example is the actual number of the 40,000 members of the AMA that vote. They certainly make it as easy for you as they possibly can. All you have to do is take time out to put the check marks down and stuff it in an envelope and mail it.

MB — At the same time that you send in your membership application.

Faber — Right, you couldn't make it much easier, but yet at that time they can't be bothered or they forget. But they are the same ones who complain loudly and bitterly, "Why doesn't somebody do something," when actually they themselves should do something by sitting down and explaining their viewpoint and then sending it to the people who can do something about it.

MB — The NMPRA this year has developed a new communications system through the new newsletter. Do you feel that this could be the instrument that will solve many of our problems?

Faber — Yes, I think it could if it's used properly. Bob Stockwell, editor of the newsletter, is fully cognizant of my strong desires to make it a nationwide organ with information and content of

interest to all of the race pilots in the U.S. In a limited number of pages this is sometimes a little difficult to do. We do not want to have the stigma that everything is totally Southern California oriented. Bob has stressed the fact that for us to be able to print anything, be it viewpoints or contest reports, from any place else in the country other than Southern California, he's going to need that input to start with. If he doesn't get it, how can he write about it.

MB — So, each NMPRA member does have a responsibility in contributing to the communications within the organization.

Faber — That's right, they do. Part of my campaign letter (of course, now I don't know if I'm too awful happy about going out and campaigning for this thankless job or not), but one of my campaign promises was that I would answer letters even if they did differ from my own opinion. Let's face it, in our hobby, I think the most opinionated of all the various people involved are the R/C flyers and worse in that category are the competition flyers and the absolute epitome of single mindedness, and a certain amount of egotism, are the race pilots, and we have to deal with them. Unfortunately, the thinking does not run along the same lines. Even within a locale, people have widely different opinions; however, I believe that we have a real enthused corps of officers who are totally willing to dedicate time and effort to do something within their own areas, and of course me on a national basis. My average time since I took

office, and since we got the committees started, has been four committee meetings a week, answering correspondence on weekends and of course the necessary phone calls. I have sometimes spent 20 hours a day on NMPRA business alone. I don't get a dime for this job and have gotten not too awfully much but criticism in return. This I expected when I took the job because I knew that the viewpoints did vary from locale to locale. Still, in all, I get absolutely no compensation whatsoever, except the "prestige of office", which I guess is the most laughable term of all, because all that really means is work, worry, headaches and time.

MB — Your moment of glory then will be when the next president takes over and all the programs you have started will have finally taken shape.

Faber — Exactly. That's the time that you shine the most. It will be with a sigh of relief on the part of the whole family that we'll say, "Oh boy, we can put our own pieces back together again". The chore that I accepted for this year was one of building cohesiveness back into the organization to make every member feel that they are part of an organization, rather than what has happened in the past when the membership has felt ignored. The few who did write to state their opinions or saw where things could be improved, in many cases, did not receive any answers at all. This year we cannot afford to miss the guy who is sitting far removed from other race pilots and hobby shops, where you can pick up the latest information. We can't afford not to listen to his opinions and gripes too. So to get this cohesiveness back into the NMPRA, the most

important aspect is communication, and that means two ways. Not just in me sitting laboriously writing a column every month as to what I'm doing and what we're planning to do but also the response back from those newsletters such as, "Hey, you guys are dead wrong as usual" or that one day when the whole week is going to be full of Sundays that I get a letter back that says I did something right for a change.

I think that one of the strongest things that we have done, due to a lot of people's effort, has been the committees which we established. They have dedicated much time and effort to come up with major nationwide programs that will stimulate interest . . . such as an equitable points system so that a true champion can be established every year . . . and an incentive program to get the pilots, who have not been in the field as long as some of us, to attend the races and improve themselves, to gain the necessary experience in order to get a certificate and get recognition for the experience gained. These programs, along with the race procedure and safety programs, are of primary importance.

In addition to this is the Promotion and Publicity committee, which is working extremely hard to gain further recognition for the hobby and to establish better bonds with other R/C modelers and the aviation minded public. Toward this end, we hope to come up with a racing book this year. It will be a tremendous task, with probably around 65 to 100 pages. It will include the history of Goodyear racing as it started in 1947 and how its R/C equivalent got started. With pictures to illustrate, we are already doing research back to where, how, and

who started the NMPRA. There will be pictures from the early days of racing and how it has grown to its present exciting dimensions and how it can continue to grow drastically over the next few years, if handled correctly.

The book will also have a section with tips, hints, and kinks from various recognized experts in particular fields, and a section explaining to the average R/C'er how the pylon birds differ from the average Sunday or sport machines and pattern birds. It will have one complete section which will be a listing, as complete as we can possibly make it, of all manufacturers who make anything that is connected with R/C Pylon.

MB — This is one feature which I know many flyers have requested the model magazines to do. Modelers hear about products but don't know where to obtain them.

Faber — Those of us in the metropolitan areas, where hobby shops are in the neighborhood, so to speak, have a big advantage. Information is available on products advertised in national magazines but an awful lot of racing products are being made that are not nationally advertised. For the guy who is a little too far away to swing by the hobby shop a few times a week to see what's new, this section will be of particular interest.

There is the question of how such a book will be produced. Since the NMPRA treasury does not have, by any means, such funds available, the whole project will be financed by advertisers, who are already being contacted by a letter from me and Terry Prather, who is chairman of the committee. This will be followed up by a letter from the publisher of our book, who is working very close to us in coming up with the various aspects of production and distribution.

We took one additional step, because the book is a long term project and there's an awful lot of research to be done. Some of the advertising funds will be diverted into a low cost brochure, approximately 5-1/2 by 8-1/2 inches in size, containing about eight pages full of pictures and words directed at the layman, the guys that come out to watch a race but do not know too much about it and want to know what's happening. These brochures will be handed out to spectators at these races and will be made available at trade shows as a give away kind of thing. We are

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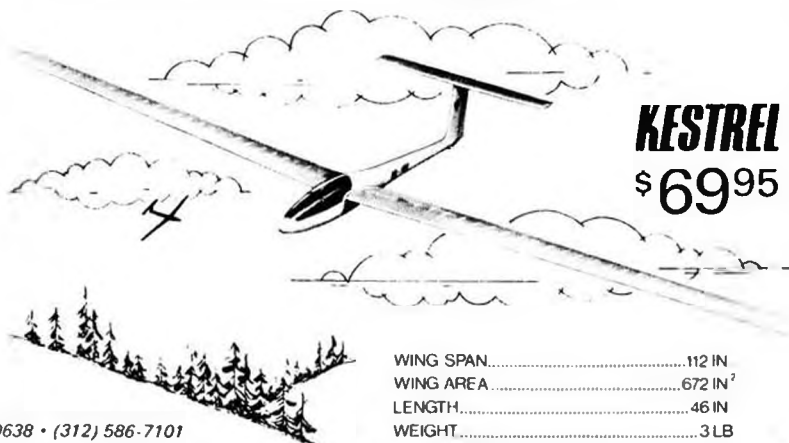
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trying very hard to make this brochure interesting on a nationwide basis and not totally dedicated to a local area. It will be tried in Southern California first with a race schedule inserted. This will stimulate the guy who comes out to a race to make a special effort to come out to the next one if he knows when and where. Because of the financial aspect, the brochure will be out in limited quantity. Some of the other vice-presidents to whom I have mentioned this project have expressed great interest in it and think that possibly by some additional very low entrance fee at contests they would be able to offset additional production costs by buying these brochures, not at any profit to us, but just to cover the expenses of it.

MB — From all you have said, it appears that 1972 will be NMPRA's biggest year, the year that we either rise or fall. It seems now that we are on our way up and that the sky is the limit. I think that you and all the NMPRA officers should be congratulated for the tremendous effort you are putting into the organization.

Faber — I thank you kindly for those words. They're the first words of praise we've had. Yes, I think that if everyone pitches in, if we do get the response from the racers, if they express an interest that is not totally and wholly local in viewpoint, then the sky is the limit.

We are presently getting very responsive communications from our parent organization, the AMA. This is now working to the point where you might say we're singing off the same sheet of music. Both headquarters in Washington and myself are taking great pains to clue each other in on what I think is the most exciting aspect of radio controlled competition flying.

MB — The first international competition in FAI Pylon occurred last year at the Doylestown World Championships. This, and the international meet in England this year, seem to ensure the success of FAI Pylon. How do you foresee the future of international pylon racing?
Faber — To cover the news aspect of it first, AMA has just received a letter from SMAE (the British equivalent of AMA) which stated that all their financial problems have been solved. The suggestions that had been voiced at one time, that there be some way of limiting the number of entries so that one country would not take total dominance over the meet, has been thrown out the window. We, the pylon flyers in the U.S. are invited to England on August 25-28 with open arms, and they are hoping that as many of us who can possibly make it will get there.

What I'm shooting for, what NMPRA is shooting for, is the elevation of pylon racing to a World Championship status. To do this we must, of course, show a sufficient interest in the event within this country and the only way to do that is by encouraging participation. The only way we can encourage participation is in turn by scheduling FAI races. A World Championship event in this category would result in a National competition in the event and a selection of the top three flyers, who would then become the United States team which would go to the next World Championships, wherever that may be. This would mean that part of the AMA funds would be used to help with the expenses of those contestants.

There's been a lot of criticism from, strangely enough, just a very few people, but they are very loud in their criticism of some of our viewpoints concerning

FAI over Formula II. Even though we're pushing very strongly for FAI in order to be able to race against other nations, this does not mean that we're kicking under the table or trying to suppress any local Formula II races, where such interest is very strong. But I feel that strongly recommending increased interest in FAI can only result in advancement in engines, in mufflers and in aircraft design, all of which are advantageous right back to us. If we try to fly in FAI against pilots from the rest of the world who are wholly specialized in the event and we in this country only do it once in a while, we're going to get whooped. I, for one, do not particularly like to see the U.S. get whooped in anything, including pylon racing.

* * *
Part II Next Month
* * *

K&B 40R TEST REPORT: K&B Manufacturing recently completed two pre-production engines of their new .40 rear rotor for pylon racing. Bench tests indicated that the engine was far superior in terms of power output compared to the Series '71 K&B 40 RR, but for a true test of the engine, they installed it in John Brodbeck's Stafford Minnow and had Bob Smith put it through its paces on a pylon course. The results turned out to be fantastic. Twice Bob flew the ten laps in the time of 1:26.4, without any cuts!

Needless to say, John Brodbeck and Roger Theobald, who did most of the design and production work on the engine, were elated. They went back to the K&B factory and started to incorporate the modifications that had been made to these engines into the production model. Two weeks later they were ready to test the first production engine

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which was not hand worked in any way. Using the same aircraft on the same course, which I swear on a Kraft transmitter was exact, Bob's first flight with this engine was a 1:24.5. On the second flight, Bob flew inside the No. 3 by a foot once and the No. 1 pylon by a foot once and turned a fantastic 1:22.9. An extra good Lee Custom Series '71 K&B 40 was then flown in the plane and, flying the tightest course of the day, Bob turned a 1:30.2. This gave a pretty good indication of how good the new engine is. The most noticeable difference between the engines was how well the plane accelerated. The best first lap time for the old engine was around 14 seconds. The best time with the new engine was 11.3 seconds.

I don't think there will be many pilots who will be able to turn times like these, at least for a while. I was calling for Bob, and flying at those speeds is a new ballgame. A pilot can't make any corrections when lining up for the No. 1 and No. 2 pylons or else he'll fly far beyond the pylon or cut it. I begin to get a little scared when I think of a rookie pilot flying a plane capable of those speeds.

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K&B will have 100 of these engines ready this month. All of them have already been sold through retail outlets so most pilots won't be able to get one of these engines until the second production run becomes available in either August or September. ●

classroom.....Continued from page 26
(fin) with a greater movement when the dihedral is low.

"Power thrust can also be used to balance or counter the aileron drag in a turn. However, power thrust will only operate while power is on. Also, the effort will vary with power, a right thrust will oppose the drag of the left aileron, etc. And here, again, rudder setting, fixed fin and fuselage side areas have to be considered. A large, boxy fuselage is not very cooperative to side thrust.

"Why bother using rudder in combination with ailerons? (If ailerons are being used). Well, the turn developed by ailerons alone starts with a skid which is in a direction opposite to the turn you want. And then, throughout the circling maneuver, the aircraft will be in a continuous skidding position. Besides creating unnecessary drag, it

may not look clean and smooth and judges may think so too.

"There is more to this circling business, but for the moment only the importance of rudder or side areas in relation to dihedral and ailerons is stressed. Rudder and fixed fin areas are very critical and we should know when to add or subtract them for the best possible overall aircraft design and performance." ●

Yankee Gull...Continued from page 12

spars as noted. Take care to make good scarf . . . angled . . . joints, and orient splices as shown. Use straight edge for alignment and pin down to building board while glue dries completely.

Cut ribs as necessary for the version you're building. Where ribs are laminated . . . such as A-1 to A-2 and C-1 to C-2 . . . the easiest way is to cut the plywood rib, laminate balsa stock to it, and then trim to the ply outline. Rib B goes on after panels are otherwise complete and final sanded. Plan your work so as to stack cut and stack drill whenever possible. This can be accomplished by progressively modifying Template I to match rib cutting order specified on drawings. Same with Template II.

Make appropriate splices . . . taking care for good fit . . . and pin to building board the 1/4 x 1/2 leading edge backup strip, the 1/16 x 1-1/2 bottom trailing edge sheet, the main spar and, if used, the secondary spar. Be sure to make bevel at aft edge of trailing edge sheet, per drawing, before pinning down. Position and glue Ribs D thru F in place.

Cut 1/4 OD wing wire tubes to length. These MUST extend 1/4 inch beyond root Rib B after wing is completed, so don't cut too short. Check fit of tubes in holes of Ribs C-1. Should be an easy, slip fit. If too tight, use a round file, twisting carefully to enlarge holes for proper clearance. Do it now . . . not after ribs are glued in place.

Position per drawing and glue Ribs C-1 and C-3 in place. Note that 1/16 shim is required under Ribs C at this stage in lieu of bottom root sheeting that will be added later. Use dihedral template and carefully position the root rib, Rib C-1/C-2 laminate, and glue. Check and re-check angle until glue sets firm. This step fixes the wing dihedral and is quite important.

When construction to this point is dry, remove all pins in structure from

wing tip Rib F inward towards root for 24 inches. Prepare 1/8 sheet wing tip washout shims. Locate one shim at the extreme aft edge of the bottom trailing edge sheet so that the trailing edge at tip Rib F is elevated 1/2 inch above the building surface. Pin shim to building board and bottom trailing edge sheet to shim. Re-pin leading edge backup strip flat to board. Use the second shim under the forward edge of the bottom trailing edge sheet to help support the structure during subsequent work. Do not force too lightly . . . just barely touch the bottom of the bottom trailing edge sheet . . . and remember it should not go in quite as far as the shim at the aft edge. Pin this second shim to the board but NOT to the structure. The balance of wing construction will be accomplished with the structure "jigged" this way so that washout "warp" will be built-in.

Splice and glue 1/4 x 1/2 leading edge in place. Fit wing wire tubes in place . . . flush with outboard surface of outboard Rib C-1 . . . and epoxy. Add wing wire stop plates.

Position 1/8 x 1/4 spruce turbulator spars and glue in place. Orient splices as noted on drawing. These spars should be flush with top of ribs. Recut any rib notches if necessary . . . or "suspend" spar in slot. But get 'em and keep 'em flush.

Cut and glue 1/16 x 1/4 trailing edge webbing. Top must be flush with top of ribs before top trailing edge sheet can be added. So trim now or later as necessary.

Add 1/8 square diagonal bracing, over full panel span, as noted. These braces are important for torsional rigidity. Don't omit.

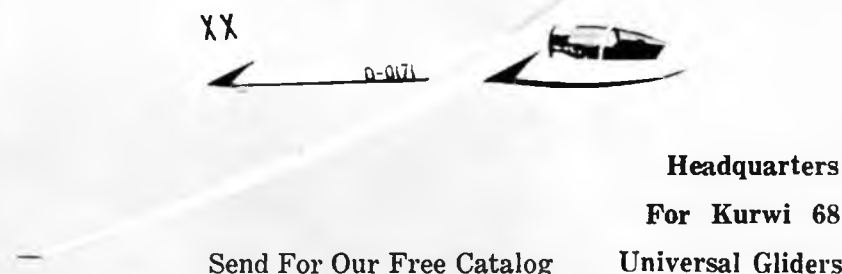
Glue 1/8 x 1/2 and 1/8 x 3/8 x 3/8 plywood backup plates to Rib C-1/C-2 laminate. These are required to anchor wing hooks securely in root rib.

Add top trailing edge sheet. Next, add 1/16 sheet at root over top of Ribs C-1 to C-3. Glue 1/16 x 1/8 x 3 balsa cap strips to top of each turbulator spar, running from top root sheeting at Rib C-3 to Rib D. Trim and sand cap strips to straight taper down flush with top of spars at Rib D. Since root sheeting goes over the top of turbulator spars, these cap strips are needed to make a smooth transition for covering material from sheeting to the Rib D

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contour.

Remove wing panel from building board. Re-glue all joints. Cut and glue 1/16 lower root sheeting to bottom of Ribs C-1 to C-3. Note that bottom sheeting is flush with and butts to either side of main spar and, if used, secondary spar.

Prepare wing tip block by laminating 1/8 sheet to 1 inch triangular stock per drawing. Glue this sub-assembly to Rib F. Trim to match Rib F contours.

Carve and sand panel to final finish. Add Rib B and Tip Plate.

Screw main wing hook in place. The forward auxiliary wing hook is usually only required on the longer span versions to hold wings snug to fuselage during launch acceleration. It may be added later, if experience proves it necessary. Pilot hole was drilled during rib fabrication.

FUSELAGE: Cut side panels from good medium stock. If 4-foot lengths are not available, splice as shown on drawing. Be sure sides are identical or you're liable to have a funny flying sailplane. Mark position of bulkheads. Glue 1/8 x 1/4 spruce stringers in place. Glue the two horizontal grain doublers in place on side panels . . . use contact cement or epoxy. One doubler goes from Bulkhead 1 to Bulkhead 3, and the other from Bulkhead 4 to 5.

Cut out fin base plate and 1/16 plywood stabilizer anchor plate and glue together. Add 4-40 T-Nut to anchor plate . . . or epoxy a 4-40 Hex-Nut in

place. Cut out skid base plate. Cut out all balsa and plywood bulkheads.

The fuselage is assembled upside down directly over drawings.

Secure fin base plate assembly in position over drawing . . . inverted, with nut side up. Position one side panel assembly inverted over drawing so that alignment point for wing leading edge . . . forward face of Bulkhead 4 . . . is exactly positioned per drawing. Pin solid to keep this index point, and glue aft end of panel to fin base plate. Repeat with opposite panel, again taking care to get wing leading edge index point right on . . . so to speak. Any error or misalignment in this step can cause major offset in the wings and poor flying qualities. Glue second panel to fin base plate. Now, if the tail end of the panels don't come out quite even, fix it later with a saw . . . but don't mess around with the index points for the wing.

Starting at tail, glue Bulkhead 9 working forward thru 6. Masking tape is handy to hold sides snug into bulkheads, and fast drying epoxy works great here. Let set to hard cure. Add tail skid base plate.

Pin Bulkhead 4 in place, temporarily, and glue in Bulkhead 5. Let cure.

Very carefully, glue in Bulkhead 4. Before it sets up hard, pull forward end of fuselage together to Bulkhead 1. Tape, pin or whatever to hold together and to hold alignment over drawings while Bulkhead 4 sets up. Add balance

of bulkheads using a small carpenter's square or draftsman's triangle to check squareness and alignment. Keep it as true as possible. Leave it pinned down while working on the bottom.

Cut bottom center 3/4 x 2 balsa block to side contour. If you plan to use a wheel, cut a 1 x 2-1/4 slot at the aft end. Epoxy block in place on the fuselage. Add 1 inch triangular stock to either side of bottom center block, between plates. When all is ready, drop wheel assembly into slots and lock in with a drop of epoxy or glue down each slot to axle. Glue is adequate to hold weight of wheel assembly in slot . . . and that's all it takes. Build a box around the wheel . . . of course before the fuselage is completed and sealed up . . . out of 1/8 sheet to keep dirt and moisture out of interior. Paint inside of box with epoxy.

Add 1/16 sheet to bottom of fuselage from aft of bottom blocks to Bulkhead 6. Use scrap underneath as necessary to support butt joint at end of blocks.

Trim and sand top of side panels preparatory for center section assembly and the 1/16 sheet decking.

Refer to construction notes on drawings which describe center section detail. This step is really quite simple, but it's worth repeating that time and care should be taken to obtain a perfect fit of parts . . . particularly to get a square end fit on the main cross brace and the Rib A laminates. Don't hurry . . . let fast drying epoxy do your rushing in this stage.

Do not cover top of center section yet . . . not until push rod casings are installed. And we're not quite ready for them yet.

Next comes the fin. Make the necessary marks to get it true on center line of fuselage. The thing mounts directly onto the fin base plate. It's a butt joint with no bracing. Works fine. In case of a "rough" . . . goes inverted . . . landing, the fin may get knocked off, but that's a quick fix . . . and it won't take half of the aft end of the fuselage with it. Brace it if you want. But not on my sailplane.

To get the fin perpendicular to the fuselage . . . and wings . . . a small bubble level, a short hunk of string, a straight pin and a small fishing weight are needed. Here's how it works. Set the bubble level across the ribs of the just-

finished center section. Get the fuselage level, then brace and block to secure it in this level position. Tie one end of the string around the pin and the other end to the weight. Push the pin into the center of the fin trailing edge, up near the top. Attach the fin to the fuselage with epoxy . . . keeping the bubble level centered. Pin to hold true alignment on fuselage. Now, pin, hold or whatever so that weighted string falls directly down center of fin trailing edge. Let set until dry. It'll be true.

Might as well put stabilizer mounting saddles on now . . . while the fuselage is still tied down and level. The saddles are the 1/16 x 1/2 x 2 plywood pieces that the stabilizer sits on. Use the 4-40 stabilizer mounting screw and pull the stabilizer down snug against the saddle pieces . . . don't glue yet. Check stabilizer with bubble level. Trim fuselage as necessary until saddle pieces set level and support the stabilizer is a level position relative to the fuselage/wing and perpendicular to the fin. Make sure these saddles are square with the fuselage center line, too. When all is satisfactory, epoxy in place.

Add 1/16 aft top deck sheet from Bulkhead 6 to 9. Use one piece, grain fore and aft . . . naturally . . . with a cutout to go around fin. Cut elliptical exit hole for rudder push rod casing. Mount and secure elevator and rudder push rod casings.

Cover top of center section with 1/16 sheet, grain spanwise. Carve canopy fairing block and mount as shown on drawings to top of center section. Secure canopy fairing face plate to forward surface of block and Bulkhead 4 as shown.

Carefully cut hatch base plate away from fuselage. Add canopy molding string. Attach with glue or cement. Make glue fillet forward of string.

The next logical step in the construction sequence is to apply a layer of resin impregnated fiberglass over the bottom forward section of the fuselage . . . from the nose tip to a couple inches aft of the wing leading edge. This layup completely encases the fuselage structure, adds only about an ounce of weight . . . which you'll need as ballast anyhow . . . and makes the whole mess highly resistant to damage. It's about the cheapest insurance for field servability you can get. Suggest a review of the discussion and "how to" talk in the February

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issue. Nuff said.

After the "nose job" is finished, epoxy the 1/8 plywood nose skid in place. Drill holes at angle indicated for tow hook tubes. Scar tube exterior, and epoxy in place. Note: Squeeze tube ends closed before inserting in drilled holes so that epoxy won't flow into end block tubes. Let cure then file smooth to skid.

CANOPY: The canopy can be made by bending a flat piece of acetate sheet around and attaching it to the hatch base sides and the hatch block. However, it's a much easier task if the plastic has a pre-set "curl" in it. That way it has a natural urge to stay next to the hatch assembly rather than trying to spring away. You can either use a cylindrical object . . . such as a tall tomato juice can . . . as a form, or just roll the plastic sheet up into a tube that's about 2 to 3 inches in diameter. Use masking tape to hold plastic to can . . . or to itself if you decide to roll your own. Now, stand the whole works up on a piece of aluminum foil in a 200 degree oven for 5 minutes. Take it out and let it cool . . . and it's curled. Cut and trim as necessary for a good, professional fit and attach with contact cement. Masking tape is your best tool while fitting canopy. Can be used to hold in place . . . but maybe more important . . . to mark exactly where you want to cut. Try it.

An internal hook on the under side of the hatch base . . . and one on the floor of the fuselage equipment compartment . . . with a couple small rubber bands, makes a neat and easy way to attach the hatch to the fuselage. Locate hooks after you know exactly where radio gear will sit.

COVERING AND FINISH: Your

choice. Super MonoKote recommended.

ASSEMBLY: How to put the thing together is pretty obvious, but there might be a question or two about the wings. The first thing you may wonder about is, yes, the wing wires DO NOT attach to the fuselage. They "float" free in the wing tubes, and the fuselage just sorta hangs on 'em. That's the reason the wing tubes must extend beyond the root ribs . . . because they plug into Rib A in the fuselage center section. The holes in Ribs A may need to be slightly enlarged for a slip fit. If so, do so . . . but take it easy. Material is quick to take away, but very slow to put back.

To mount the wing, locate wing wires through fuselage, and slip on one panel. Make three loops in a No. 62 rubber band, fit it over main wing hook, and pull through fuselage. You'll need a special wire tool for this . . . and a small screwdriver is handy when transferring the rubber band from the wire tool to the second wing hook. Slip the other panel on wires, bring up to near fuselage, and fit rubber band over its hook. Tension should be quite tight between the two panels. On the long-winged versions, a 1/4 diameter x 1-1/4 long tension spring is similarly stretched between the forward auxiliary wing hooks. No, this operation doesn't really require 13 hands and 4 knees, but they might help until you get the knack. Have patience.

Incidentally, you'll notice that in rough air you can hear the wing wires rattling on occasion as the wings "load" and "unload". But that's okay . . . it causes no problems . . . and those wires ain't gonna break. That's for sure.

The stabilizer goes on with a single machine screw. Be sure it's not so long as to cause interference with the elevator push rod. A coat of dried rubber cement on the aft stabilizer saddle will resist movement and still let the horizontal tail rotate if it hits something.

FLIGHT TRIM: The first step here should occur before covering . . . so hope you're reading the complete article before starting to build. Assemble all components. Ballast nose to get a reasonable balance. Push a heavy pin into fuselage, on top center line, at trailing edge of center section. Push another one in at leading edge. Tie heavy twine around pins, so as to make a "sling" or "bridle". Now, lifting the

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whole works by the twine "bridle", check for balance about the fore and aft center line. Chances are that one wing will be heavier than the other. On a 12-foot span, a full ounce of weight may be needed to get the wings to balance properly. Maybe more. Whatever is needed, do it. Those big thick tip blocks will hide lots of ballast. Bury it in the block. You don't want it flying off loose in a "hard landing".

Now, cover and finish . . . like a coupla paragraphs back. If you use other than plastic film covering, recheck balance after final finish. Correct as necessary. Shouldn't be much now.

With all gear, push rods, canopy, wheel and everything else installed and assembled, check CG position. Again, make a "bridle" of heavy twine, but this time tie ends to 2 small brads . . . little nails about 1/2 inch or so long. Pull the wings away from the fuselage far enough to push brads into the 1/16 hole on either side of center section that represent the 30 per cent point of wing chord. It's noted on plans . . . should be the second in a series of four holes . . . 3 inches back from leading edge.

Add ballast in nose . . . undoubtedly . . . until balance is achieved and craft hangs level when suspended by twine bridle. Use various sized fishing weights so that you can adjust by 1/2 ounce increments. When you're satisfied by balance, remove ballast, weigh and record the amount required for a 30 percent CG.

Repeat this balancing act, but this time set pins in the 35 percent holes. Again, record ballast required. Put these notes in your field kit for future reference. Re-balance at 30 percent in first flights.

Check total assembly for alignment. Get it right. Check for warps. Correct as necessary. Check washout at wing tips by measuring from a flat surface . . . such as a dining room table. Washout in both wings MUST be the same . . . about 1/2 inch, or maybe a little less. If washout is not correct . . . and similar . . . warp wings as necessary to get it right.

Check control surface movement . . . and centers. Go for maximum rudder throw . . . at least 1-1/2 inches either side of center. About 1/2 inch up and down on elevator should be okay. Is up, up? Right, right?

Note that to this point, all pre-flight checks are made before loading the car for the field. Don't hurry. Look at it this way; you've spent numerous hours and several bucks on your Yankee Gull, so why take a chance on blowing it now? . . . by hurrying . . . or even skipping the last, and perhaps most important steps. There'll be thermals next week, too. And, it's always better to be as relaxed as possible . . . certainly not all in a dither . . . when you're out for first test flight. Besides you'll enjoy it more. Take your time in pre-flight, and the first flights will probably be a breeze.

And so . . . to the field.

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FLIGHT TESTING: If there happens to be a crowd around . . . and, at times, that can mean one particular guy . . . and it bothers you, shut the whole operation down. It ain't worth it. Wait till you can have most of the world on your side.

If you know how to test glide . . . and I'm not being funny . . . fine. I've seen dozens of brand new and beautiful sailplanes literally worn out . . . and sometimes actually destroyed . . . by improper hand glides. They never had a chance. A real shame. Some guys just don't know how . . . or are not physically capable of performing a safe and meaningful glide test. There's no honor involved . . . just one of those things. So if you can, fine . . . and want to, great. Otherwise, let's hook up and go on the winch or Hi-Start. Chances are very good that you'll have an easy first flight IF you really did it right in the pre-flight stage.

For first flight, CG should be at 30 percent . . . tow hook should be in forward position. We want to avoid anything that would cause an extreme nose up or stally flight. With this set up, climb out on tow will probably be rather shallow . . . and don't fight to get the nose up for a steeper climb cause it might stall and snap. That we don't need. As long as it's safe, don't push it. Take a moderate tow . . . tomorrow we set records.

With the 30 percent CG, flight speed will be a bit on the fast side. That's fine . . . a little back pressure on the stick will flair out the landing, and you'll have good airflow over the surfaces for control.

If the first flight wasn't too rough, try another with the same trim. If it was a bit too hairy, don't repeat without changing trim to help the problem. If your Gull is like the ones around here, your next flight should be with a 1/16

shim slipped in between the aft stabilizer saddle and the stabilizer. Better? If so, fly again with this new trim. Probably still requires back pressure on the stick, so replace the 1/16 shim with a 1/8 shim. Incidentally, these shims should be of plywood, 1/2 inch wide and 2 inches long.

A few flights with this setting and you should be starting to sweat less . . . and enjoying it more. So now, let's start monkeying around with the CG . . . 1/2 ounce out at a time . . . working back towards the 35 percent CG balance. Check your notes . . . that you made at home . . . and keep track of what you have removed. Make several flights with each change. Don't go beyond the 35 percent point . . . until you're completely familiar with the bird, in different flying conditions. Then go easy if you must go at all. The further aft the CG, the squirrelier it'll get. And you may like it, but you're on your own.

And that's about the size of it. If you build the "1440", notice how the wings spot lift for you. The one that's in the bumpy, lifting air sorta flaps up and down as if pointing and trying to say, "Hey, Dummy, over this way a little." And you know, it's usually right.

If you decide to build a Yankee Gull, hope you enjoy it. Let me hear from you . . . as long as it's your nickel. And you keep in mind the time zones. Try 213/340-8620. ●

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