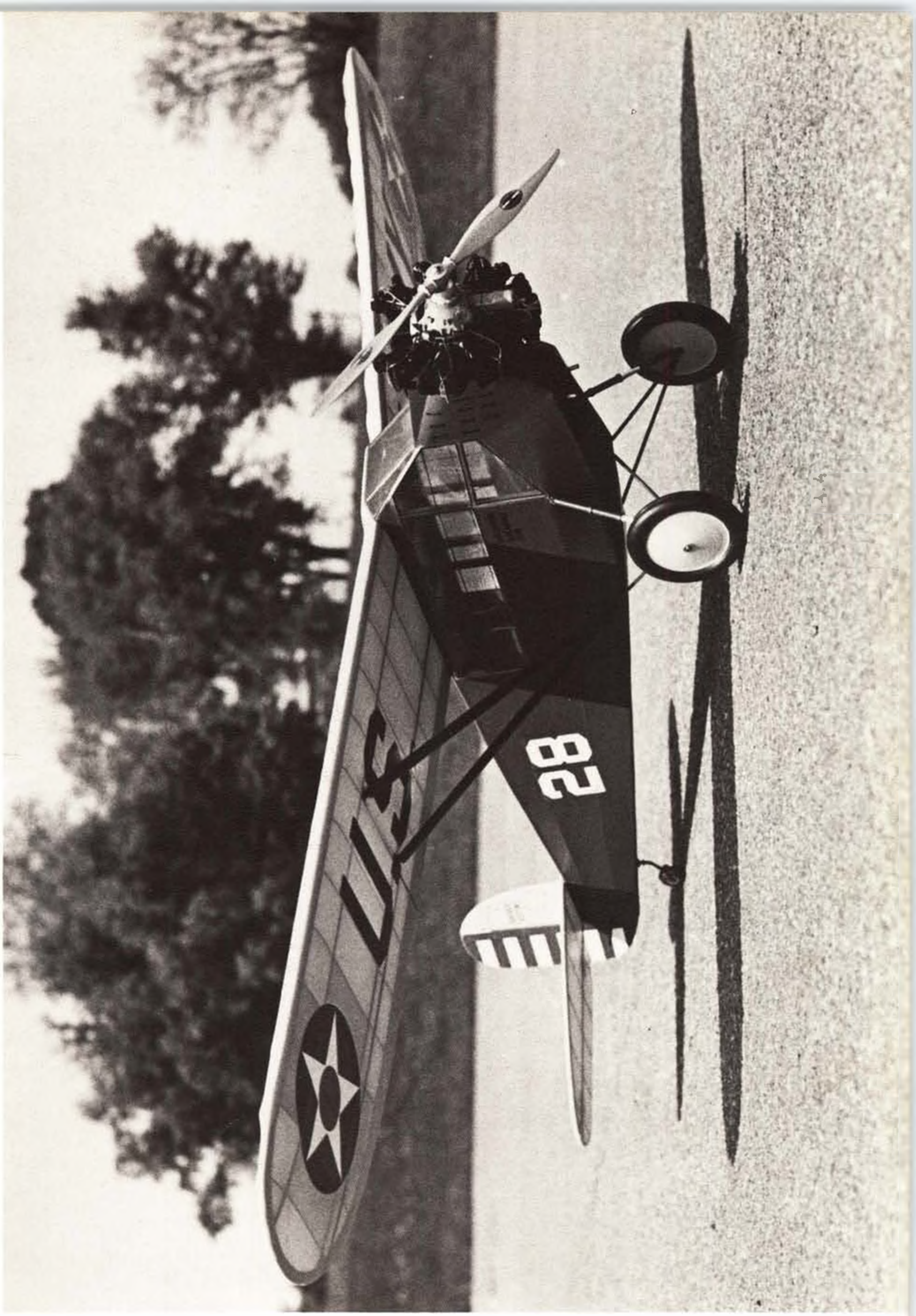
The MODEL BUILDER



JULY 1972

65 cents

volume 2, number 9

CARL GOLDBERG

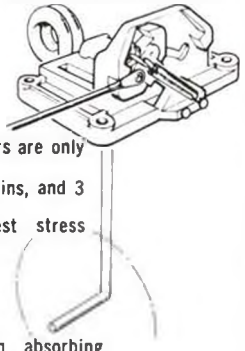
THE BEST ACCESSORIES YOU CAN BUY!

PROVEN IN PERFORMANCE

USED BY THE EXPERTS!

NEW! CG RETRACT GEAR

FORGET THE LOW PRICE. When you want dependable retract performance, find out why the leaders use CG Retracts. People like Terry Prather (current FAI record 1:48), Jack Stafford, Nick Ziroli, Pete Reed, Garry Korpi, Bud Atkinson, and many others use Carl Goldberg Retracts.



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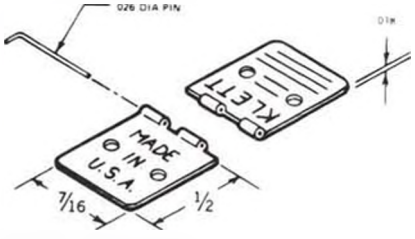
LIGHTEST—Nose Gear, 2 Mains, and 3 Struts, only 6 oz.
BROADEST BASED for best stress distribution.

TOUGH—Rugged vibration absorbing nylon moldings. Large bearing surfaces.
SHORTEST TANK COMPARTMENT—Nose Gear needs only 5½" to 6".
SIMPLEST—Main Gear has only 3 molded parts.
EASY—Installation or Strut Removal. Low actuating force—one retract servo can easily actuate all three units.
Pair of Main Gear Retracts—**$ 9.95**
Set of Nose Gear & 2 Mains—**$19.95**



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Designed and Manufactured by Roy Klett, Originator of the World-Famous RK Hinges!
An exclusive with Carl Goldberg, here is an extremely strong smaller hinge constructed with exceptional care and attention to detail. So thin that all you need is a knife slit. Top quality, yet only cost **$1.95** for 15 and **$1.10** for 7.

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- Tiny 45° shoulder snaps through arm, prevents accidental opening. So unique it's Patent Pending!
- One-piece design—no separate pieces that might come apart.
- Proven tough nylon molding—takes tremendous stress, prevents metal electrical noise.
- Self-friction fit on threads—no need of a nut to prevent change of adjustment or vibration wear on threads.

When you want a SAFE link . . . ask for SNAP-LINK!
Snap-Link, Regular, with rod } 29¢ each
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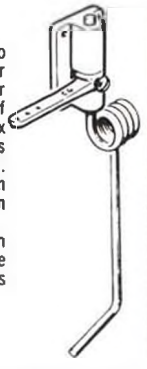
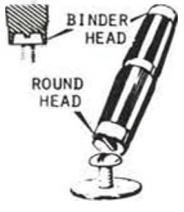
Snap-Link or Mini-Snap, less rod 2 for **40¢**

STEERABLE NOSE GEAR
Versatile—steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel—won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat.
Complete steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers—**$2.50**.





NOW from Roy Klett the NEW KLETT SAFETY DRIVER SOCKETS DOWN ONTO SCREW HEAD—CAN'T SLIP OFF AND DAMAGE YOUR WING!
One end takes Round Head Screws, other end takes Binder Head.
KLETT SAFETY DRIVER
Large for ¼" Nylon Screws } 98¢ each.
Small for #10 Nylon Screws }

NEW—MAJOR R/C FITTINGS SETS
Here's the economical way to buy the major fittings for your multi-ship. In one set, you get all the horns, links, keepers, bellcranks, or strip aileron linkage, and hinge material—and at a saving.
R/C Fittings Set No. 1 for ship with standard ailerons—**$3.50**
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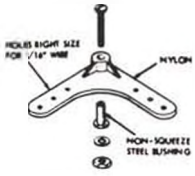
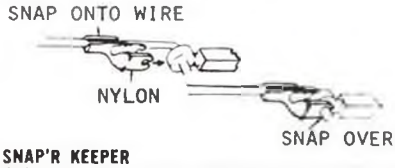
NYLON BEARING
One-piece design mounts to firewall without alignment problems. Includes blind nuts, screws and washers—**75¢**.

CONTROL HORNS
Our new horns have the upright part rising from the center of the base for maximum stability. Holes are right size for 1/16" wire; nut plate for simplest mounting. Long horns or short horns, with screws—**50¢** for 2.



AILERON BELLCRANK
Bellcrank has steel bushing of proper size, so crank can be screwed firmly in place without binding. No electrical noise—all metal parts are screwed tightly together—**50¢** for 2.

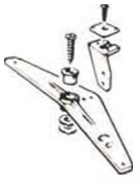


SNAP'R KEEPER
Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire ¾4 to ¾4" diameter—**50¢** for 4.

NYLON STEERING ARM
Hardened steel collar and screw—**75¢**.

REPLACEMENT FOAM WINGS, ETC.
To go with your own design fuselage. Proven efficient Ranger 42 foam wing gets you in the air quickly—**$3.95**. Stab and vertical fin, set **$1.95**. Assembled Ranger 42 fuselage, plus bearers, nosegear, etc., **$8.95**.

NYLON REINFORCING TAPE
This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2½" wide x 5 ft.—**50¢**. ¾" wide x 5 ft.—**25¢**.



½A BELLCRANK and HORN
Made of nylon, this new set provides smooth ½A control line operation. Easy on dacron lines, too —**25¢**.

SHEET METAL SCREWS
Like wood screws, but better. Sharp, clean, full-depth threads, hard and strong. Excellent for mounting servos, etc. Includes washers—#2 x 5/16—**30¢** for 10; #4 x 3/8—**30¢** for 8.

P.S. For best service, see your dealer for items you want. If not available, write direct; add 35¢ per item (75¢ outside U.S.). Minimum order $1.

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I am sending 20¢ for 8 pg. Illustrated Catalog with, "Recommendations in Starting in R/C," Basic Explanation of R/C Equipment and Radio Control Definitions.

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A TWIN THAT'S EVERYTHING A TWIN IS SUPPOSED TO BE.

The Northfield-Ross 60-Twin: Compact. Lightweight. Powerful.

And—most important of all—so vibration-free that it cannot possibly cause radio failure.

It's the first twin-cylinder engine that actually performs the way a twin-cylinder engine *should* perform.

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And, incidentally, the Northfield-Ross 60-Twin has two big relatives that will give you even more vibration-free power: the Rosspower 4 cylinder (1.2 cu. in.) and the Rosspower 6 cylinder (1.8 cu. in.).

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VALUE TO $40.00
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WINGSPAN: 69"
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KIT RC-29

For .45 to .60 cu. in. ENGINES
WINGSPAN: 67"

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Plywood Skin $42.95
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SPECIAL! Kit Comes Complete With Tuf-Steel R/C Links and Rods

- Full Length Fuselage Sides
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- Selected Die-Cut SIG Balsa and Plywood
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DESIGNED FOR AMA AND FAI AEROBATIC COMPETITION
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A contest proven design. Flies the stunt pattern without yaw, pitch or oscillation. Precise response for difficult 4 point rolls and knife edge flight.

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El Camino

Designed by
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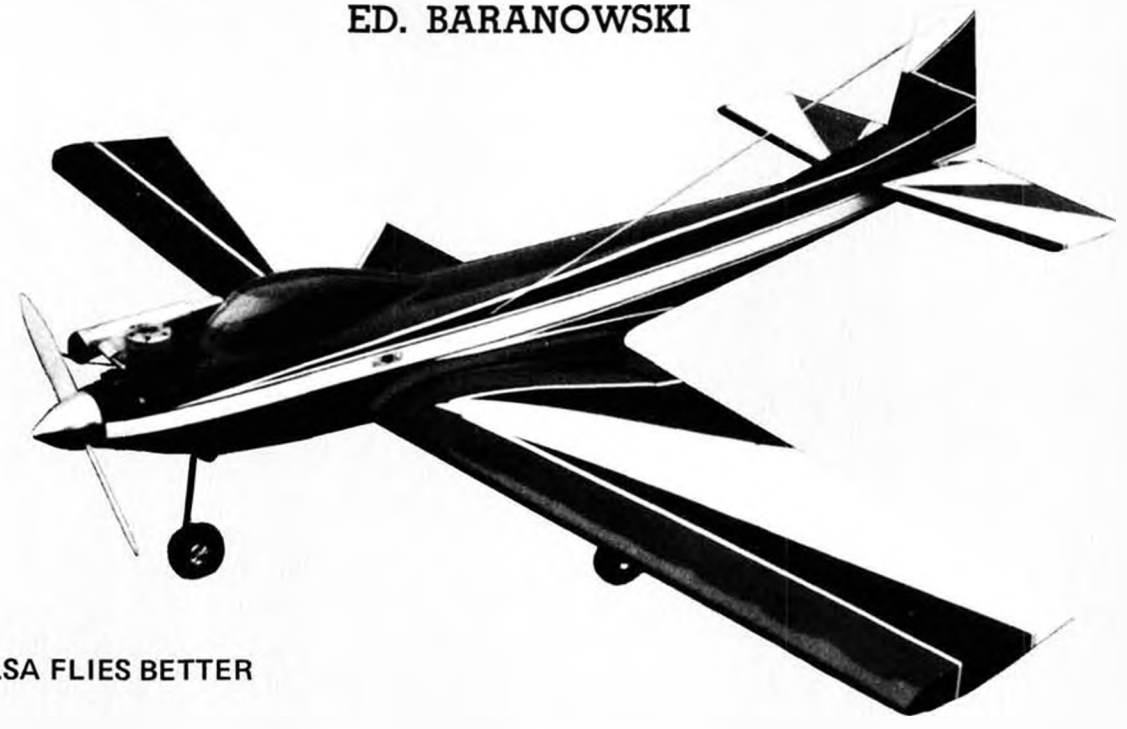

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SPECIFICATIONS

- Wing Span 58"
- Wing Area 625 Sq. In.
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- Flying Weight 6 lbs.

KIT $49.95

WING KIT $19.95

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The MODEL BUILDER

JULY

1972

volume 2, number 9

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SCALE VIEWS

CONSTRUCTION

Cover: One inch to the foot scale model of the Fairchild 51, built by Col. Hurst G. Bowers, McLean, Va., and featured as a construction article in this issue. Plane is suitable, with little alte ation, or R/C or free flight. (See page 9) Photo by John Preston.

The Travelair returns! Originally published in MAN seven years ago, when this picture was taken, the plans are available again through MB. It flies great and does beautiful side-slips! See page 39.

from Bill Northrop's workbench . . .

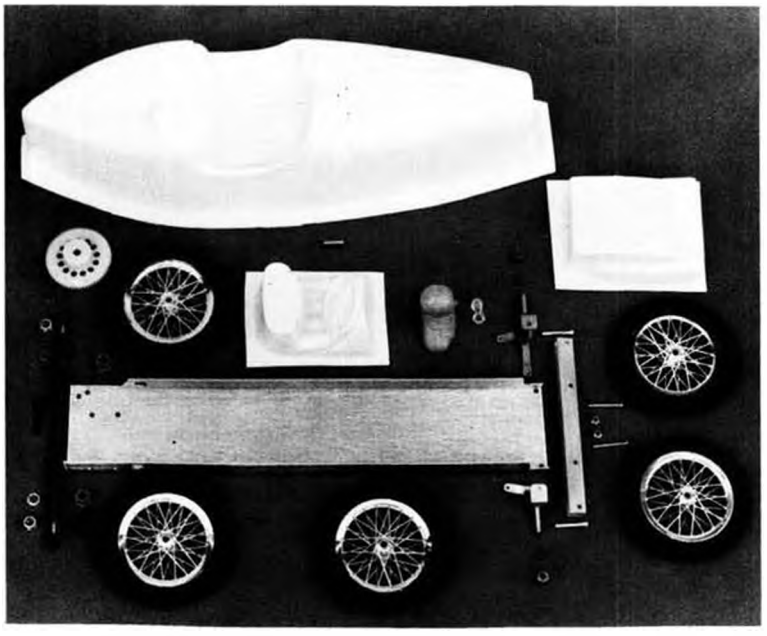
● We had an interesting phone conversation just a few days ago. It came under the "I think your magazine is great, but . . ." category. Actually, our reader was quite satisfied with MB, and in the "but" area of his comments, he felt we were coming closest to what he wanted to see.

The reader's concern was for the beginner in modeling (Note: That is *"beginner,"* not Junior. There is no age limit on beginners in modeling). He felt, and it's probably so, that the guy who's just getting started buys a magazine *primarily* to find out *how* to build models. He couldn't care less about news of what happens at contests and who won what trophy, or to read in a construction article that "the building of this model is straightforward!" He really wants to know *how* you "stick stringer A to former B," *how* you "shape the nose in typical fashion from a couple of balsa blocks and hollow to 1/8 inch thick," and so on into the night.

We told our caller that it would be physically and practically impossible to write every construction article for the beginner. It would be like the math professor in college starting every lecture in calculus by reviewing the multiplication table. And though we are trying to have a higher percentage of how-to in our articles, the very basic fundamentals of modeling would almost have to be repeated monthly in order to help all the new modelers who are continually joining our hobby.

One answer to this problem is a book of basics that would be continually available. The best example of such a source of information, in our estimation, is a book written and illustrated by Harper & Row. The title is "Beginners Guide to Building and Flying Model Airplanes," and the current price is $6.95 ($5.00 through AMA). For what it's worth, Bob reports that the book is the one most stolen from the Boston Library. That's class!

Bob is a long-time modeler, a painter and illustrator, and writer. His experience in writing books for young readers



Type 37A Bugatti kit by C & F Mfg. To 1/8 scale, the car is designed around the Cox-Jerobee power package, has surprising performance.

The 1927 Grand Prix Delage also offered by C & F. (Are you looking at the car, son?) Price of kits, $34.95. See text for more information.

has sharpened his ability to explain model building basics so that any age reader will get the message. In our opinion, every good hobby shop should carry and promote this book. It will help business now and in the future.

But getting back to our telephone conversation . . . our caller went on to describe the plight of a teen-age modeler who was having all kinds of problems putting a Goldberg R/C Skylane 62 together, and all of a sudden . . . POW! . . . the core of the whole problem socked us right between the eyes! No wonder there is a "Junior problem," No wonder the same names keep showing up at contest year after year with almost tiresome regularity. No wonder there are so many complaints about kits that won't "shake together," and no wonder so many models that may eventually get built, never fly . . . THE ELEMENTARY GRADES HAVE DISSAPPEARED FROM THE SCHOOL OF MODELING!

"Now what did he mean by that?"

"I don't know . . . why don't you ask him?"

"OK, I will . . . What did you mean by that?"

What we're trying to say is that the beginning modeler today has no opportunity to learn the basics of the craft before he thrusts himself into a construction project. We couldn't help but wonder how many airplanes that teenager built before he became bogged down in the Skylane. Our thoughts went back to our own early modeling days.

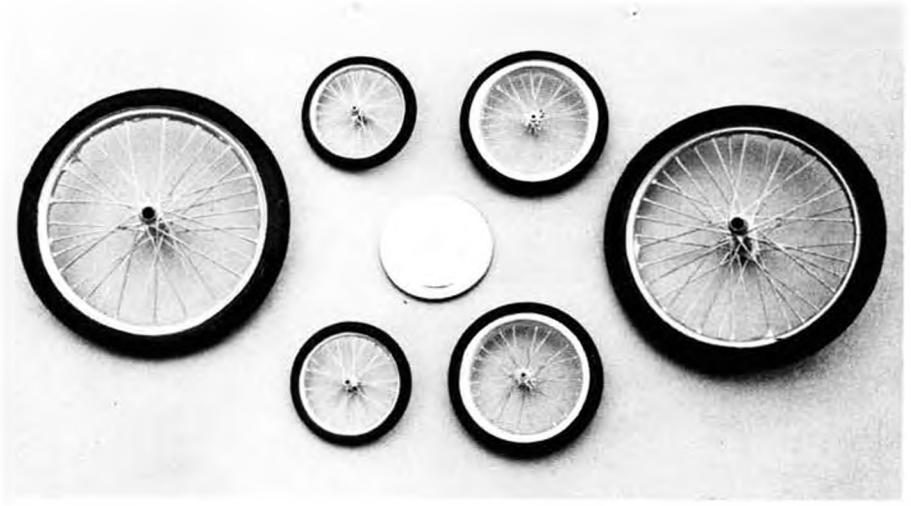
We started on solid models . . .

"What's he mean by 'solid' models?"

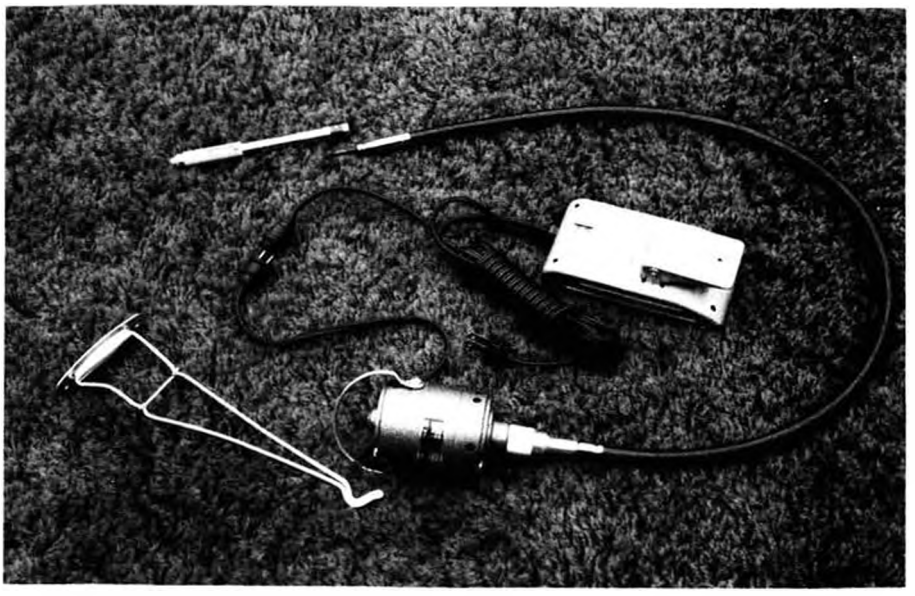
"I don't know. Maybe it means they're COOL, or BOSS, or RIGHT ON . . . you know . . . SOLID, man!"

. . . Of course, the solids have now been replaced by plastics, and so the lowest elementary grade has gone from modeling. From these you learned to trace outlines from the plans (Some even came with the parts printed! But they cost more . . . maybe even 25 cents!), how to cut balsa in the right direction so the wood won't split, how to use a double edge razor blade without drawing blood, how to break the blade in half and break off a corner to get a sharp point, how to sandpaper, how to check cross sections. And we discovered a modeler's most important tool . . . the straight pin, and learned his most important attitude . . . patience.

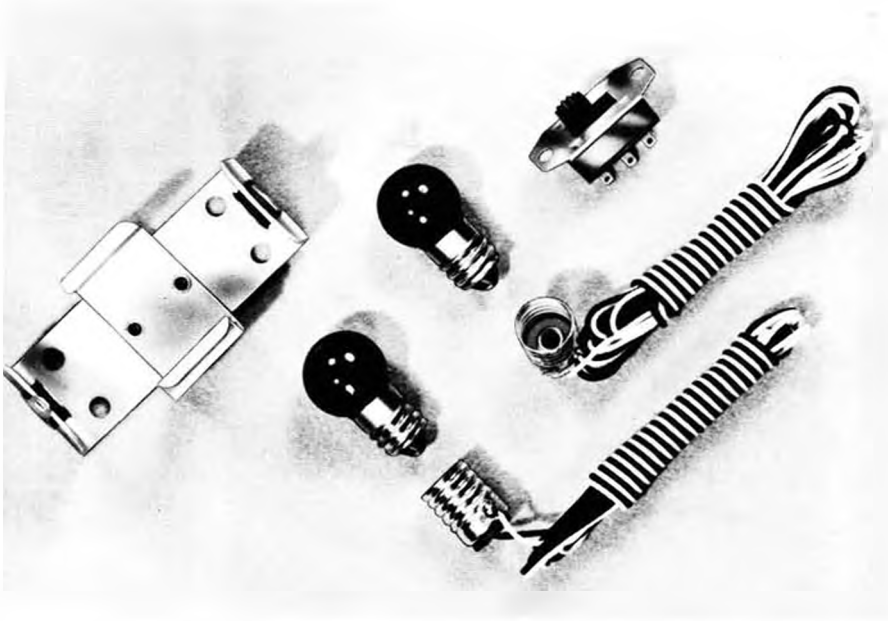
Next came the Megow and Comet rubber powered scale models . . . the first introduction to "stick and tissue."



Beautiful spider web constructed thread and dacron spoked wheels by F.H. Wheels. There are 31 diameter and tire sizes available, from 1/2 inch to 2-1/2 inch. Very light but extremely tough.



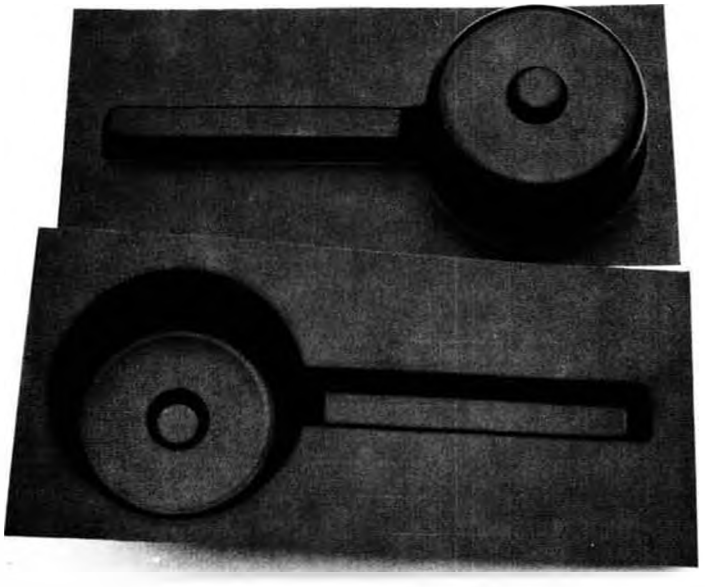
Pfingst flexible cable power tool being marketed by Brave Products. Drives 1/8 inch bits at speeds up to 14,000 rpm. High torque, 1/15 HP motor, foot controlled rheostat.



Flashing Firefly kit being produced by Paul Harvey Products. . .Yup, it's him! Should be great for moonlight free-flighting or the dawn and twilight R/C patrol!

Amazing! An American muffler for an American engine! This one by K & B especially for the Veco .19 R/C "Series 71." Allows higher performance from engine than other "silencers."

Astro Flight's Hi-Start, featuring durable, cloth braid covered exercise cord. Drag cloth, spool of stranded nylon cord, and kit for making handy storage reel also included. Price is $29.95



"No Mam, they're not measuring spoons. They're retractible landing gear wells of molded styrene plastic for model airplanes, by JCM Specialties. . .It's your cake, lady. . .Go ahead if you want to!"

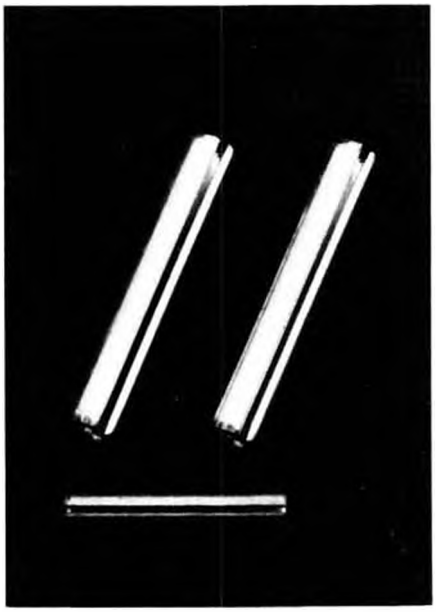
It's amazing, but we never could bring ourselves to take even the worst result of our efforts and "set the tail on fire and throw it out the attic window."

The "discovery" of shrinking tissue with water came about one day when test gliding a Fairchild 22 of about 24 inch wingspan in the back yard. A sudden summer rain storm came up and begore we could get inside, a raindrop landed between two ribs on the wing. Minutes later we had one smooth bay in the covering, and minutes after that we added one drop of water in the middle of each of the remaining bays . . . and minutes after *that* we probably had our first warp!

Oh boy! We've strayed again!

Anyhow, it was about three or four years before we had our first gas model . . . Maxwell Basset's "Miss Philadelphia," kitted by Scientific, and a Baby Cyclone engine. By comparison, it could be today's Goldberg Skylane 62 and a K & B 40. But the main point is that we were ready for it. Nobody had to explain the instructions, nobody had to help us understand the plans, and nobody had to tell us how to build, cover, finish, and assemble that big, kite-like monster.

The only other nearby modeler lived on the opposite side of town, and to visit and work with him, we used to hitch the tailskid to the luggage rack on our bicycle and trailer the fuselage right down the main street on it's big M & M airwheels! He was building Comet's six foot Curtiss Robin, designed by (who else) Carl Goldberg and powered by a Gwinn Aero. (We still have the faint imprint of its hot cylinder head on our left forearm to prove it, too!)



Couplers for 5/32 landing gear wires by JCM Specialties. Dubro pushrod coupler for size.

OK, so where do we go from here? Do we start a one-sided correspondence school in elementary modeling? Do we start a long series of articles explaining the real, low-down basics of this craft? (By the way, isn't it about time the words "skill" and "craft" were but back into the description of our hobby?) Do we get down to the nitty gritty of how and where to use pins, how to cut balsa with razor or hobby knife, how to select the sandpaper to use, how to select and apply glue, how to apply tissue paper . . . bamboo paper (whaaat?) . . . silkspan . . . silk, how to use dope (Cool it Dad, you know what we mean!), how to carve props, how to carve and hollow out nose blocks, how to bend wire . . . Well some of you know . . . it can go on and on.

We'd like to hear from you; the modelers, the beginners, the manufacturers, distributors, dealers . . . do we open up that old elementary school and educate some modelers for the future, or do we just say to hell with it and go flying . . . well . . . *you* go flying . . . we're stuck with this darn MODEL BUILDER rag!

OVER THE COUNTER

JCM Specialties, Box 181, Medinah, Ill. 60157, is offering high impact styrene molded wheel wells for retract landing gear airplanes. Available in four sizes (actual well diameters are 2-1/2, 2-3/4, 3, and 3-1/4 inches) at 98 cents/a pair, these will not only present a neat appearance, but if thoroughly epoxied in place, should strengthen this area that would otherwise be weakened by the cut-out. Strut well is 6 inches long, measured from wheel well center, and can be trimmed for shorter gears.

Another product by JCM should come in handy for gear retracts. These are 5/32 inch I.D. by 1-1/2 inch long soldering couplers for adjusting length of landing gear wire. The couplers are split, pretinned, and sell for 39 cents a pair. Since the wheel presents an off-center force that would want to twist the strut loose in the coupler, we'd suggest filing a fairly large flat area in both pieces of wire before soldering in place.

* * *

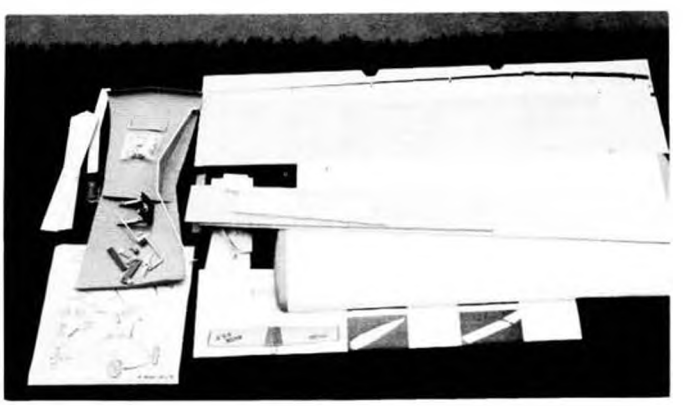
Fulton Hungerford, who amazed so many nationals modelers with his finely detailed *indoor* rubber powered Ford Tri-motor is now producing and marketing beautiful light weight "wire" spoke wheels. We use quotes because the wire is really silk or dacron, depending on the wheel size. The wheels are made as described by Don Typond in our December 1971 issue . . . spider web fashionfrom one continuous thread.

Actually, each spoke in a wire wheel, when properly made, is under tension, so the fact that wheels are made with silk or dacron spokes does not mean they're weak. The smallest silk spoke wheels are claimed to be able to support 3 pounds static load, yet weigh less than one gram.

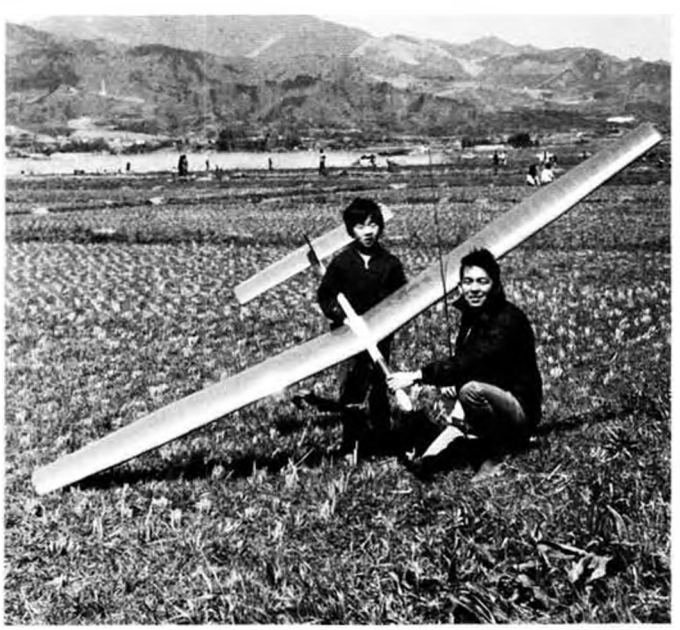
The silk wheels are available in 16 sizes, consisting of 9 diameters, some in

Continued on page 55

The Hawk 460 by World Engines features a combination of foam, plywood, and balsa construction. Span is 52 inches. For 19 to 40 engines

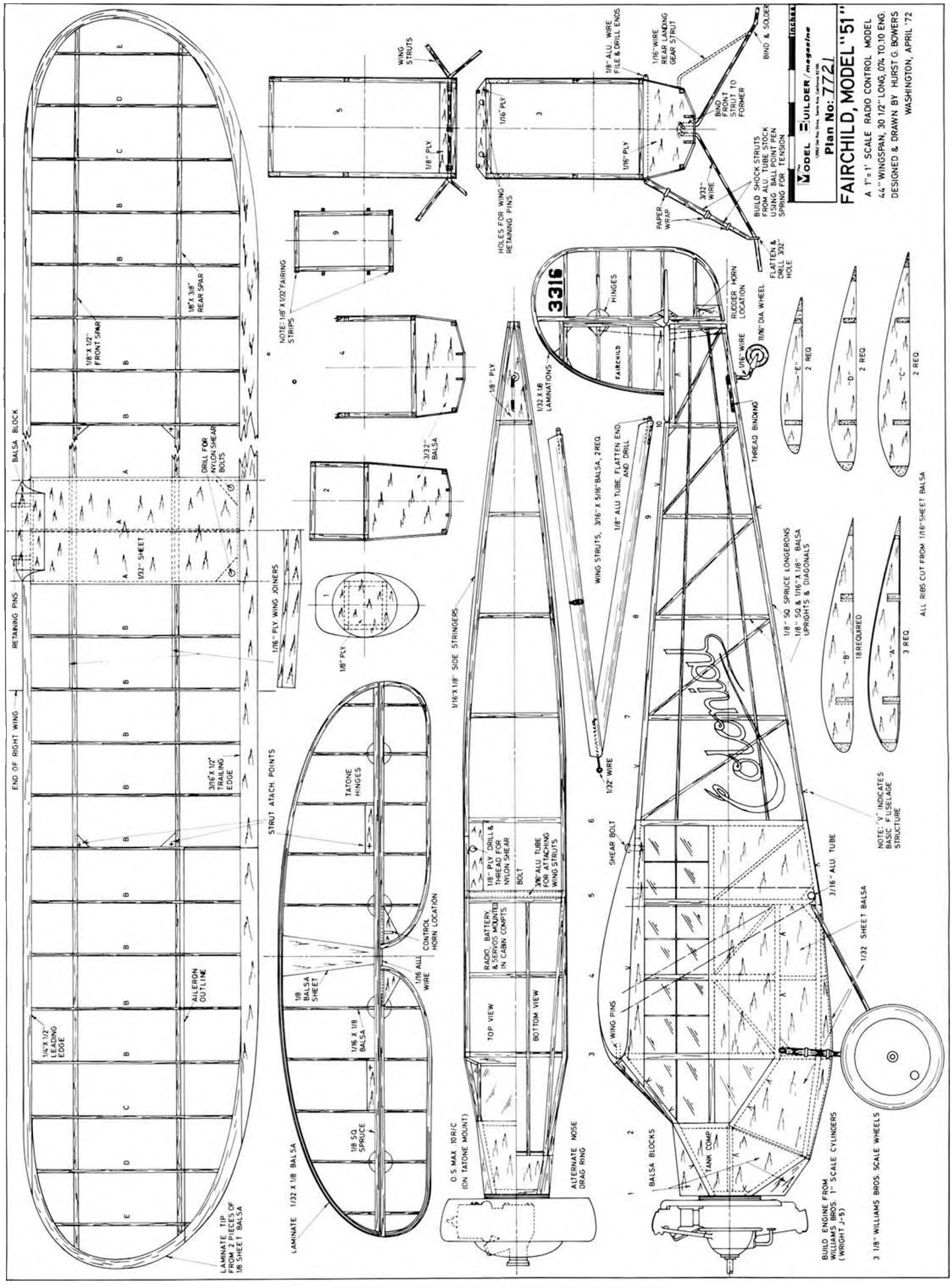


The Pilot "Box Fly" from World Engines. Hard sheet plastic covered foam wings, foam stab, ply fuselage. REM trainer for 19 to 25 power.



Our good friend from Japan, Yoshiro Sato and his son, Bob, who is eight years old. Both Yoshiro and Bob fly Albatrosses, designed and built by Yoshiro. This is Hiratsuka, site of first Japan thermal contest.

Latest contributor to join MB, Bill Hannan, holds a curiously familier design. He subs for Walt Mooney in this issue, and next month will move into "Hannan's Hangar." Bill has a bottomless pit of aeronautica.



FULL SIZE PLANS AVAILABLE—SEE PAGE 56

A perfect example of the statement, "Glamour is not in beauty alone," the Fairchild 51 was just another boxy monoplane, and a perfect example of the simple, functional aircraft that dominated the "Classic Era" of the 1920's and 1930's in America. And a beautiful modeling subject too!

PHOTOS BY JOHN PRESTON

FAIRCHILD 51

By Col. Hurst Bowers. Just an old cabin monoplane, but when American aviation was making its mark in the "Classic Era," this ship always happened to be around. It's a triple-threat model too. With little alteration to the plans it can be built for radio control, free flight rubber, or free flight gas.

● That famous statement of Winston Churchill that never have so many owed so much to so few, could be paraphrased to apply to the boxy old Fairchild Model 51. Its pioneer work with air mail operations, early domestic scheduled airline service, route surveys of Latin America's future air ways, photographic work, bush flying, and a host of other tasks, made possible what we consider routine in civil aviation today.

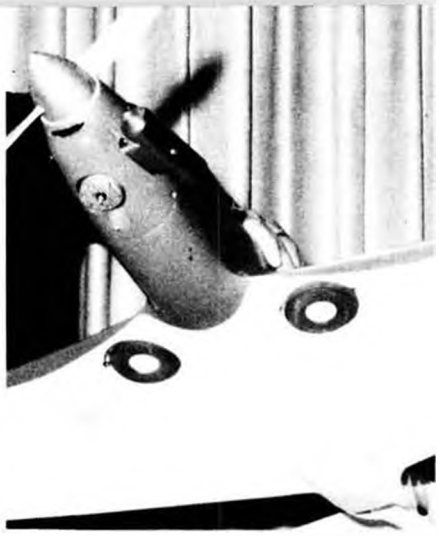
For years I have seen this aircraft pictured in its various roles in pioneer aviation and its only noteworthy characteristic was simply a lack of any prominent feature. It was just one of those old cabin monoplanes which were so prevalent during the late 1920's and 1930's, but there was something different. Its lack of flamboyance made accurate identification difficult and locating drawings was almost an impossible task, but I acquired such a fascination with this ancient machine that I resolved to model it. After all, here incorporated into one basic airplane was one of the most perfect examples of "Aeronautica Americana" to be found.

I started with a J. Triggs painting done for the Phillips 66 Historical Aviation series, which features a Fairchild

Continued on page 54

The author, and designer of the model Fairchild, Col. Hurst G. Bowers of McLean, Va. Fear not, that metal prop returns to its job as a letter opener when it's time to fly. Power is Cox .09 "J-5."

Wow! Look at that Francis resin/K & B Super-Poxy finish. The Stafford P-51 doesn't have to stay home on "Sunday flying" days, either. Bob says it's a ball to fly under any circumstances.



With Goldberg retracts in the "up" position, and gear doors closed, a smooth under side.

PRODUCT$ IN U$E

STAFFORD P-51 with GOLDBERG RETRACTS

By Bob Upton

● Jack Stafford and his motley crew have been in the kit business for nine years and he and his staff draw on some hundred odd years of modeling and forty years of aerospace engineering experience. Thus, a great deal of "know-how" finds its way into the Stafford line of kits. I, personally, have been flying Stafford models since Jack launched himself into the Formula I kit manufacturing business, which dates back to the Midget Mustang of many years ago. I have probably built as many Formula I racers as anyone, having gone through at least ten to twelve Stafford Midget Mustangs and half again as many Minnows. So, I guess you can say that I am some kind of authority on Jack's kits.

I acquired a P-51 kit with Goldberg retracts just after the '71 Nats, having been duly impressed with the manner in which Jack's personal prototype flew in the Nats FAI races. His model was not only fast, it was beautiful; and any modeler worth his salt can't help but be turned on by the classic lines of the P-51.

Upon first inspection of the goodies in the box, I couldn't help but be very pleased with the wood selection. Knowing Jack as well as I do, I can attest to the fact that he is very fussy when it comes to buying balsa wood for his kits. My P-51 kit is certainly an example of his personal standards. In addition to all of the balsa wood necessary to assemble the model, the kit includes foam wing cores, a molded canopy, a plastic formed nose cowl, and also a pair of aileron torque rod assemblies, complete with nylon torque rod guides. Most of the basic hardware is also included to build the model. My P-51 included the Goldberg retracts and I would highly recommend buying the kit with the retract landing gear included, since the gear is not that difficult to install. Each full wing panel comes in two sections to accommodate the forward sweep of the leading edge which is, of course, classic P-51. The small inboard leading edge section is interfitted with the main wing panel to complete the foam wing panel assembly. If the retract gear version is purchased, then the forward leading edge section has been precut to accommodate the landing gear. I might add, incidently, that this is a very well designed installation and I had no trouble whatever in installing the retracts. The instructions, of course, should be read beforehand!

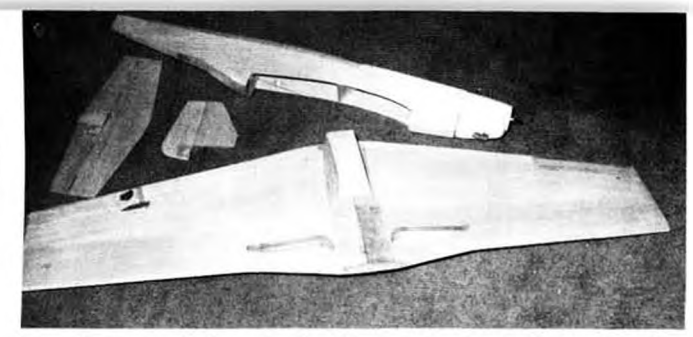
With regard to instructions, Jack has gone to a great deal of trouble to provide a step-by-step instruction manual with the kit. I can state at the outset, that if one follows the procedures outlined by Jack, one can't really go wrong. The instruction manual provided is probably the most complete set of instructions I have ever seen in any kit. Jack has found through experience that you can't really take anything for granted when trying to instruct someone to build your creation.

A good friend and long time associate, Don Butman, was contact, and he ultimately constructed the fuselage of the P-51. I assembled the wing, including all of the hardware for the re-

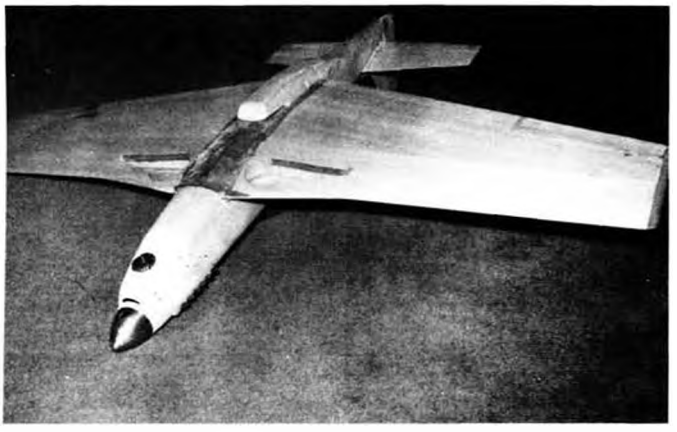
With K & B Front rotor mounted the ship is all ready for pattern and sport flying. Molded cowl.

Now we're ready to race! Interchangeability is easy. Only one extra needle valve hole reqd.

Well known Southern California R/C'er and pylon racer, Bob Upton, with his Stafford P-51. Kit may be purchased with Goldberg retracts included.



All ready to be suited up, the ship displays its all balsa finish. Note the tremendous size of the fuselage opening. Wing is balsa covered foam core.



No matter what the angle, even a model of the P-51 has beautiful, clean, functional lines. Undoubtedly, it's the most modeled plane of the year.

tract landing gear, etc., in one six-to-seven-hour weekend period. As I said before, if the instructions are followed to the letter, the wing falls into place very nicely. Don had similar comments on the fusleage, in that he had no trouble whatever in putting the pieces together, per instructions.

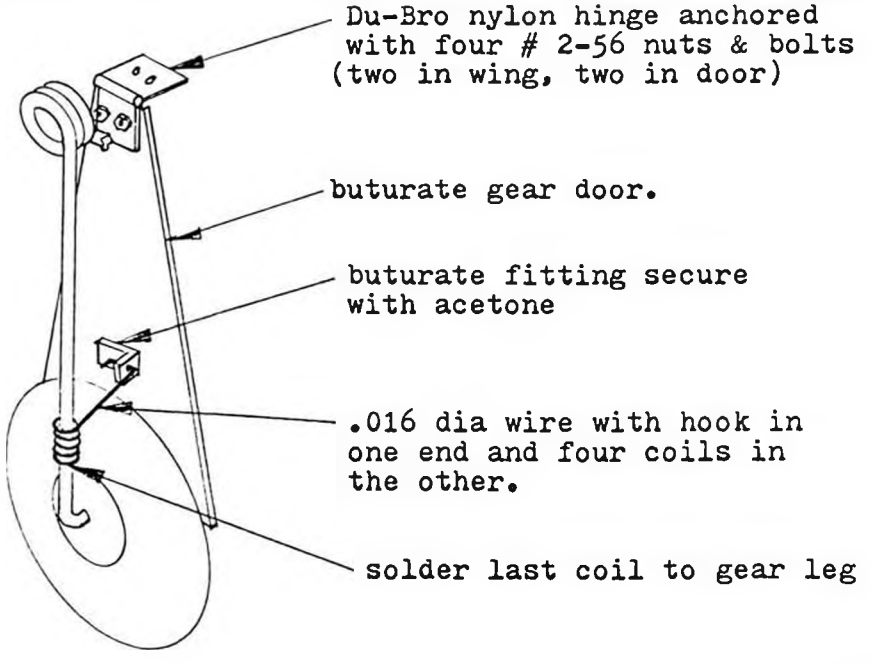
Frankly, when it comes to molded plastic parts, I have been skeptical. However, after seeing the final outcome of the plastic nose section attached to the balsa wood fuselage, I can say without reservation that it fits beautifully and there is no way to detect that it is a plastic cowl; it flows very nicely into the lines of the balsa wood fuselage.

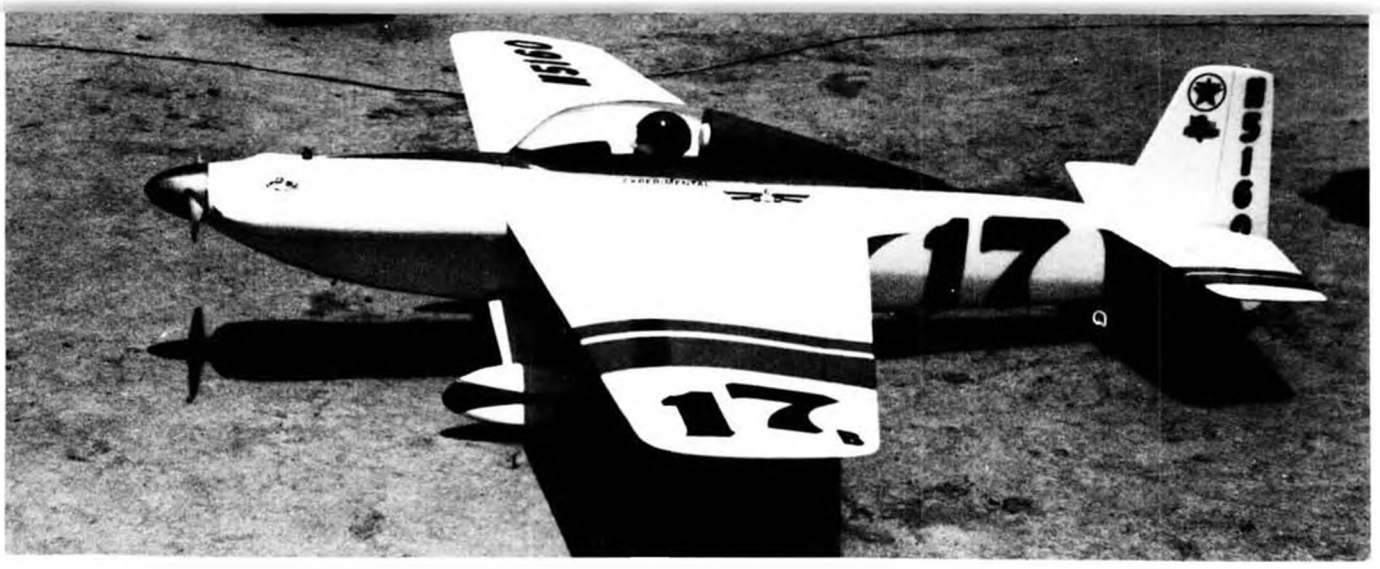
Wing and fuselage were finally constructed, sanded to shape, and mated. Lo and behold, it finally takes on the shape and character of the P-51! I set mine up to accommodate both the K&B rear rotor racing engine *and* the front rotor sport K & B engine. This required that two engine mounts be drilled and tapped, one for each; the mounts being interchangeable in the cowl. The only deviation required is that the cylinder head opening in the removable cowl must be slightly elongated fore and aft to accommodate both engines, since the sport engine is slightly aft of the rear rotor racing engine. By splitting the cowl along a longitudinal line intersecting the needle valve for the front rotor, it was only necessary to file a small 1/8 inch hole to accept the shaft of the needle valve for the front rotor engine. Thus, when the rear rotor engine is installed, there is only a small hole visible on one side of the cowl that provides any hint that a second engine could be installed.

Final fitting and installation of the Goldberg retract landing gear required most of an evening to assure a nice fit in the wheel wells, etc. You will find that the retract system fits exactly flush with the bottom of the wing. The mounted gear thus provides a very clean installation. Both retractible landing gears and servo are aligned and mounted within the wing prior to final finishing of the model. The landing gear, engine, and associated hardware are then removed from the model in preparation for finishing. I coated my P-51 with two to three coats of Francis resin, sanded between coats. This filling procedure is highly recommended in that it is light in weight and sands very easily. All major fillets, of course, were applied with Sig Epoxylite before the resin was brushed on.

The model was finished with the new K&B "Super-Poxy" paint which I per-

Continued on page 51





Sharp looking ST powered mid wing Cosmic Wind Minnow flown by Roger Owen. Ship was built by Phil Breitling.

PHOTOS BY CHUCK SMITH

pylon

By Chuck Smith

● Southern California's 1972 racing season got under way April 22-23 at Whittier Narrows with the San Gabriel Valley R/C League's traditional Formula I season opener. The contest got off to an unfortunate start when the current AMA handicap rules were not followed and the two scale judges accidently used two completely different systems. This resulted in half of the aircraft being judged one way and the other half another way, which understandably left every pilot completely confused. After this incident however, the contest progressed very smoothly and the 55 entries flew eight exciting rounds of racing.

After a full day of racing on Saturday, six pilots had all firsts in their races. They were narrowed down on Sunday, however, and the result of the contest was determined in the heat race between Bob Smith and Larry Leonard on Sunday morning, which Bob easily won after Larry cut the No. 2 pylon. This put Larry in a tie with Bror Faber for second, which resulted in a very close fly-off that saw Bror's Midget Mustang being nosed out by Larry's Miss DARA. Bror had been forced to use his back-up aircraft, the Mustang, when his Miss Dallas was damaged on a landing earlier in the day. The fastest time of the contest, 1:32.9. was flown by Joe Vartanian in his fly-off with Lee Frey for fourth place.

Whit Stockwell and Jim Jensen were knocked out of competition at the same instant on Sunday after Whit had beaten Jim in a hotly contested race. Whit pulled his Shark up after receiving the checkered flag but as he reached the number one pylon, Jim's Pitts Pellet became a Sidewinder missile and shot up underneath, and through, Whit's plane. Both models, unfortunately, were destroyed.

One interesting aspect of the contest was that all contestants raced with last year's engines. None of the new K & B's or HP's showed up.

The following weekend, 24 pilots showed up at Los Alamitos, NAS for the BIRD's FAI races. It was obvious from this contest that some pilots have put a lot of preparation into FAI in anticipation of this summer's FAI meet in England. Garry Korpi scored the fastest time ever for FAI with a fantastic 1:42.2. Garry flew a K & K Miss FAI with Rom-Air retracts. Garry's speed, however, was equally matched by Joe Foster's impressive Francis Products P-39 and Joe nosed out Garry in their fly-off for first place. Joe's P-39 has Rom-Air retractible tricycle gear

Joe Foster's P-39, by Francis Products. Rom-Air retracts. Note extremely small nose wheel and skinny main wheels, needed for flush fit in wing.Good to see something to challenge the P-51's.

B/S Racing Associates Jeff Bertken holds Miss Dara, Lee Custom K & B. Bob Smith kneeling.

RESULTS
WHITTIER NARROWS, CA. APRIL 22-23

	NAME	AIRCRAFT	ENGINE	TIME
1.	Bob Smith	Miss DARA	K & B	1:33.4
2.	Larry Leonard	Miss DARA	K & B	1:38.9
3.	Nupen/Faber	Dallas/Mustang	Tigre	1:38.0
4.	Joe Vartanian	Miss Dallas	Tigre	1:32.9
5.	Lee Frey	Miss Dallas	Tigre	1:33.4
6.	Ed Hotelling	Ballerina	K & B	1:41.6
7.	Terry Prather	Minnow	Tigre	1:33.0
8.	Jack Hertenstein	Shoestring	Tigre	1:38.6
9.	Bob Bleadon	Miss DARA	K & B	1:42.1
10.	Jack Stafford	Midget Mustang	K & B	1:37.5
11.	Clarence Neufield	Minnow	K & B	1:41.4
12.	Dan McCan	Miss DARA	K & B	1:34.5
13.	Mike Bridges	Pitts Pellet	Tigre	1:35.5
14.	Chuck Smith	Miss DARA	K & B	1:40.1
15.	Kent Nogy	Miss DARA	K & B	1:43.0

and still weighed only 5 lbs. 7 oz. The plane was fast dispite its 2-1/2 inch spinner. Joe originally had only nose-wheel steering on the P-39 but soon discovered this didn't provide sufficient ground control and was forced to add a movable rudder.

Bob Smith squeezed the last bit of speed from his non-retractible gear, two year old Miss B.S., and placed third with a time of 1:44.0. Bob was using the same plane and Lee Custom K & B that he flew at Sunnyvale in 1970 when he did a 1:39.0 without a muffler. The time at the BIRD's contest show that the new improved (noisier) mufflers are allowing the FAI planes to come closer to their unmuffled potential. Four out of the top five finishers used Mac-Allister mufflers, which are available from Mac's Products, 8020 18th Ave., Sacremento, Ca. 95826, for $12.95.

Jeff Bertken, the West Coast FAI Champ, seems to become possessed each time he flies FAI. He was battling for the top position right up to the eighth, and last, round. He finished fourth. Larry Leonard, who received a tremendous lifting of his spirits from his second place showing the previous weekend, built his FAI racer in the five days preceding the contest and placed fifth.

Race horse starts were tried for the first time at this meet and were very successful. Only three plane heats were flown so that there was enough spacing (approx. 20 ft.) between the aircraft on the starting line for them all to be released at once. This made the start of the races much more interesting in that there was a drag race each time to the number one pylon.

Bob Bleadon received the Hound dog award from Whit Stockwell for his performance on Sunday. He began the day by shearing the flag off the top of the number two pylon and tearing out his left landing gear in the process. After a beautiful Bob Hoover-type landing and a frantic effort to repair his landing gear, Bob got his Miss B.S. ready for the next heat. All this was to no avail, however, when on the first lap of this race he flew through the number two pylon, this time wiping out the entire aircraft *and* pylon. Joe Martin repeated this trick later in the afternoon, with the same result.

Flyer Garry Korpi (left) and engine man/partner Luke Roy. Ship is K & K Miss FAI.

Because of the fantastic times at this meet, we checked the measurements of the course. Unfortunately, the number one pylon was about four feet short. This is only a difference of 80 feet for a race, or a total difference in time of less than one second, so the times were still legitimate.

The next weekend, May 6-7, saw 58 pilots attend the Valley Flyers Formula I races at Mile Square in Fountain Valley, Ca. I was Contest Director for this meet and next month I'll have a full report on the operation of this contest. The B/S Racing Associates, Bob Smith pilot, again had a perfect score through seven rounds and placed first with their Miss DARA and the new Schneurle K & B. Larry Leonard flew the same combination to second place. Bob and Larry again raced each other but this time there were two other top pilots in their heat to add more excitement to the race. They finished in the same order they took off: Bob Smith, 1:32.0; Larry Leonard, 1:35.7; Roger Owens, 1:36.5; Joe Vartanian, 1:38.9. Larry still had top time of the meet, however, when he turned a 1:30.5 later in the day.

The third and fourth place finishers,

Larry Leonard (left) and Bob Bleadon model the latest in Pylon head gear. Miss Dara.

Fitting motor mount to ply firewall. Note the traced outline and location mark. CB mount.

Back of firewall, showing 6-32 blind nuts and ram air duct. Looks like somebody we know.

"Do you suffer from a stuffed up nose?" Ram air duct in place. Wms. Bros. makes molded one.

Dan McCan and John Brodbeck, completed the sweep by the new K & B Kent Nogy, who placed fifth with a '71 K & B, is progressing at a fantastic rate. He moved up to 15th at the first race to 8th in the second to 5th in the third! Even with this progress, he still received the Valley Flyers Gool Bowl award for May. It seems he was doing 70 mph on the Ventura Freeway on his way to the Whittier Narrows contest when he looked into his rear view mirror just in time to see his transmitter tumbling on the road behind him and sliding underneath a truck. It was at this time he remembered that he had placed the transmitter on top of his car and forgotten about it while packing. He risked his life retrieveing it from the number two lane and amazingly, it still worked. The edges of the case were badly marred but he flew it in this condition the entire contest. I'm sure that he's one of the first to crash test a Kraft transmitter.

Southern California's 1971 Champion, Terry Prather, has developed a bad case of the cuts so far this year. His ST powered Minnow is faster than ever, but the two cuts he received trying to catch the giant killers, Tom Tusing at Whittier and Bob Bleadon, who turned a 1:32.8, at Mile Square, kept Terry out of the money. Terry's name does not appear in the results of the FAI contest because he did not compete that weekend.

Prather Products (1660 Revena Ave., Wilmington, Ca. 90744) is now producing a very useful "All In One" starting battery, plug and battery tester. After personal experience with this new

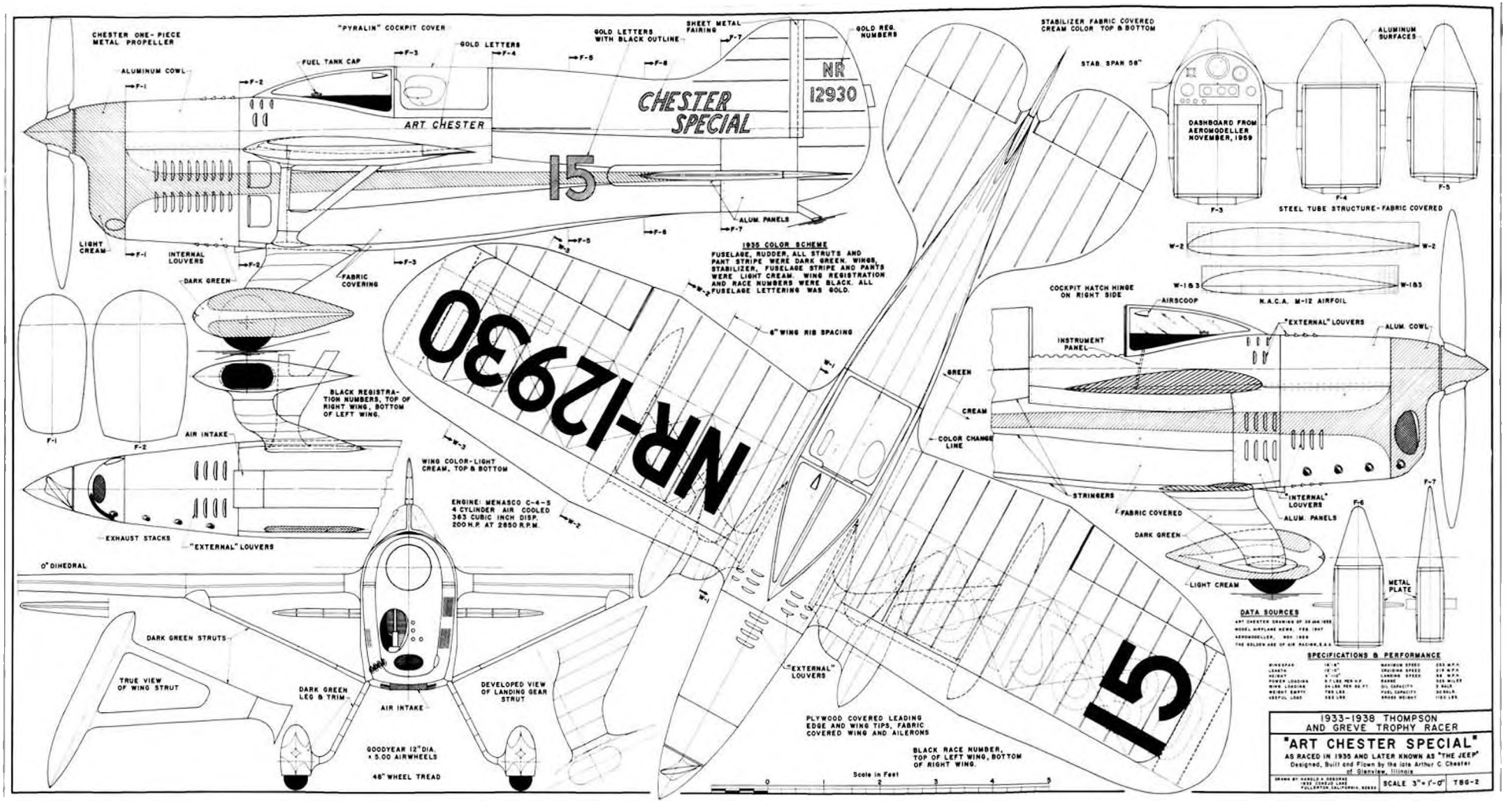
Continued on page 44

RESULTS
FAI, LOS ALAMITOS, CA. APRIL 29-30

	NAME	AIRCRAFT	ENGINE	MUFFLER	RETRACTS	TIME
1.	Joe Foster	P-39	'71 K & B	Mac's	Rom-Air	1:44.0
2.	Korpi/Roy	Miss FAI	'71 K & B	Mac's	Rom-Air	1:42.2
3.	Bob Smith	Miss B.S.	'71 K & B	Silence Air	- - - - - - - -	1:44.0
4.	Jeff Bertken	Miss B.S.	'71 K & B	Mac's	Goldberg	1:50.2
5.	Larry Leonard	Miss B.S.	'71 K & B	Mac's	- - - - - - - -	1:48.0
6.	Jack Hertenstein	Shoestring	Tigre	Orig.	- - - - - - - -	1:51.2
7.	Whit Stockwell	Mustang	Tigre	KO	Goldberg	1:47.6
8.	Kent Nogy	Miss B.S.	'71 K & B	Mac's	- - - - - - - -	1:58.0
9.	Chuck Smith	Miss B.S.	'71 K & B	Semco	- - - - - - - -	1:51.9
10.	Joe Stream	Mustang	OWA	Orig.	Goldberg	1:57.0

Use of 1/32 inch ply spacer assists in proper location of engine firewall. Ensures spinner clearance without excessive gap.

With everything bolted together and spinner taped in place, the firewall is ready to be epoxied in its exact location. Neat as a pin!



SCALE VIEWS

Available for the first time . . . . Enlarged scale drawings for modeling.
The above drawing is an exact reduced sample of the large drawing.

ART CHESTER'S "JEEP"

HAROLD A. OSBORNE
1932 CONEJO LANE
FULLERTON, CA 92633

AT SCALE 3" = 1'-0", 50" WING SPAN, 568 SQ. IN. WING AREA, PLAN SIZE 3-1/2' by 7'. $3.50 PER COPY

Shoestring designed by Fred Reese and kitted by House of Balsa, Long Beach, California. Scheduled for release end of July, $32.95.

PYLON/4

By Fred Reese

This month we present two sets of rules for Quarter Midgets. Both represent the efforts of many active Q.M. pylon fliers and their attempts to develop a unified set of rules for national competition.

The QMPL (Quarter Midget Pylon League) rules are basically those of the "Mentor Group," the MARCS Club of Ohio, sparkplugged by Bob Penko and Ed Nobora. These rules have been put to use, with variations, by many R/C clubs around the country over the past few years and the comments and criticisms have been compiled, analyzed and fed back into the regulations, bringing them up to date with current thinking.

The second set of rules are of more recent origin, but because of the accelerated development, typical of rules coming from the year 'round flying weather of Southern California, have had an equal amount of usage. These rules come from the Quarter Midget Racing Club, based in the Los Angeles-Orange County area.

It should be pointed out that the QMRC rules not only have support in the California area, but also, as a result of a direct mailing survey of active groups throughout the U.S.A. (not the survey taken by MB in the May issue), including many who have used the QMPL rules, certain portions of the QMRC rules are preferred.

One thing is apparent: Both sets of rules are excellent and are not *that* far apart from each other. Wearing the hat of the R/C Contest Board Chairman, our comment would be that QMers have done a great deal toward establishing a workable set of rules within the last year, and this will make it possible for the Board to satisfy the majority when the event comes up for adoption by the AMA.

Since the two sets of rules are so similar, we'll just outline them as one set, pointing out the differences where they occur. It's safe to say that this combination pretty nearly represents the final, nationally accepted rules that will be adopted by AMA.

AIRCRAFT REQUIREMENTS

Model must be stand-off scale (semi scale QMRC) (recognizable replica) version of a propeller driven aircraft which has competed in closed course (or cross country-QMRC) racing. No deltas or tailless aircraft. No retracts.

ENGINE(QMRC)

Stock with manufacturer's original carburetor. Engine must be available in U.S. as the R/C version in quantities greater than 1000. No diesels.

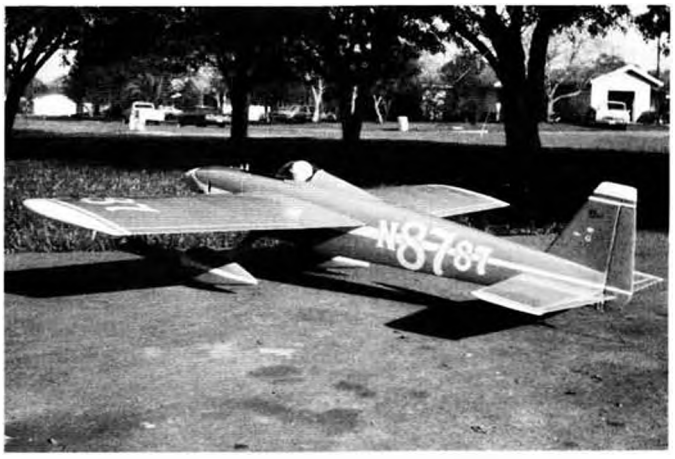
ENGINE (QMPL)

Same as above, but 500 minimum and cost limited to $40.00 advertised price. Carburetor specified separately.

Joe Zdankiewicz's QM P-51 wasn't quite wide enough. A little tape, a Bank Americard, and a large dose of Yankee ingenuity made it all legal. Who'da thunk it!

QM Minnow from Hobby World kit, built by Carl Smith, Knoxville, Tenn. Heath radio.

Brad Sheperd, spark plug for Quarter Midget racing down in Victoria Texas, with his fleet of racers, two Pogo's and a Shoestring.



Another shot of Brad's Pogo. He says the color is sort of a "Gold Ochre." QM'ers in the area are switching to the QMRC rules.

CARBURETOR (QMPL)

Servo operated throttle capable of varying engine RPM, commercially available in quantities over 500, not necessarilly same make as engine.

PROPELLER (QMRC only)

Stock. One blade may be modified for the purpose of balancing.

FUEL

Commercially available fuel having not over 15 percent nitro. Brand shall be specified in contest announcement and shall be supplied by host club.

FUSELAGE

Must be 2-3/4 inches wide (within chord area - QMPL) and 5 inches deep (not necessarilly) at widest point - QMPL).

WING

Area, including projection through fuselage, 300 sq. in. minimum. Minimum thickness at high point of chord to be 7/8 inch at root (side of fuselage, not including fillet) for monoplane, 5/8 inch for biplane. On biplane with different size wings, smaller wing must have at least 2/3 area of larger wing and minimum thickness of 1/2 inch. Thickness must taper in a straight line to the tip. (One exception. CD's should allow Art Chester "Jeeps" having 7/8 inch thickness at point of greatest chord!)

QMPL has proposed an overall 10 percent wing thickness rule, to begin Jan. 1973. This would simplify design problems (such as Chester's Jeep and biplanes in general) and with several 10 percent gauges, would be no problem to check at a contest (nit pickers can *always* find something wrong!). However, the proposal would also create a serious problem.

The popularity and survival of any event is directly dependent on participation, and most modelers build from kits. One important thought which all AMA Contest Boards must keep in mind when changing rules is the effect the changes will have on the model industry. Arbitrary changes may seem minor to modelers, but in many instances, could create a pile of obsolete merchandise for a manufacturer, his distributors, and hobby dealers everywhere! Consideration of the industry when rules changes are made should not be looked upon as a "sell out" by the rule makers. It's just common sense.

The "10 percent vs. 7/8" argument has kept several QM kit manufacturers on the fence, and thus created a scarcity of kits at a time when they're most needed by the modelers who wish to participate and thus help the sport to grow.

The final outcome could very well be determined by the manufacturers themselves. If no unified agreement makes itself obvious to the AMA Contest Board members when they vote on the rules in the summer of 1973, it could be that they will make their decision based on what the industry has chosen.

FLIGHT PROCEDURE (QMRC) Fig. 1

Starting positions are determind by a draw. Allow 1-1/2 minutes to start engines. All engines are reduced to idle and the helper releases the model for 10 seconds. If during the 10 seconds the

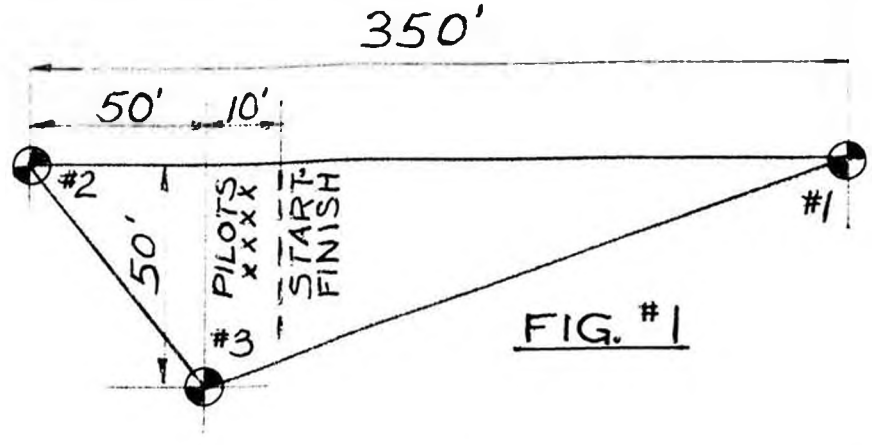


FIG. #1

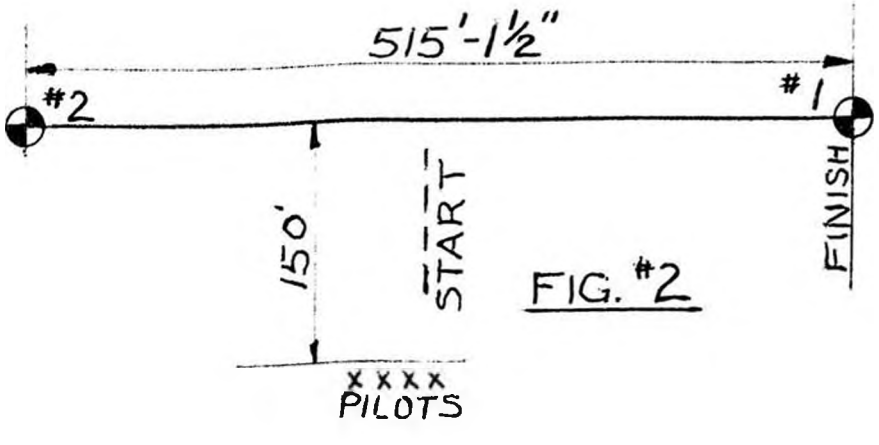
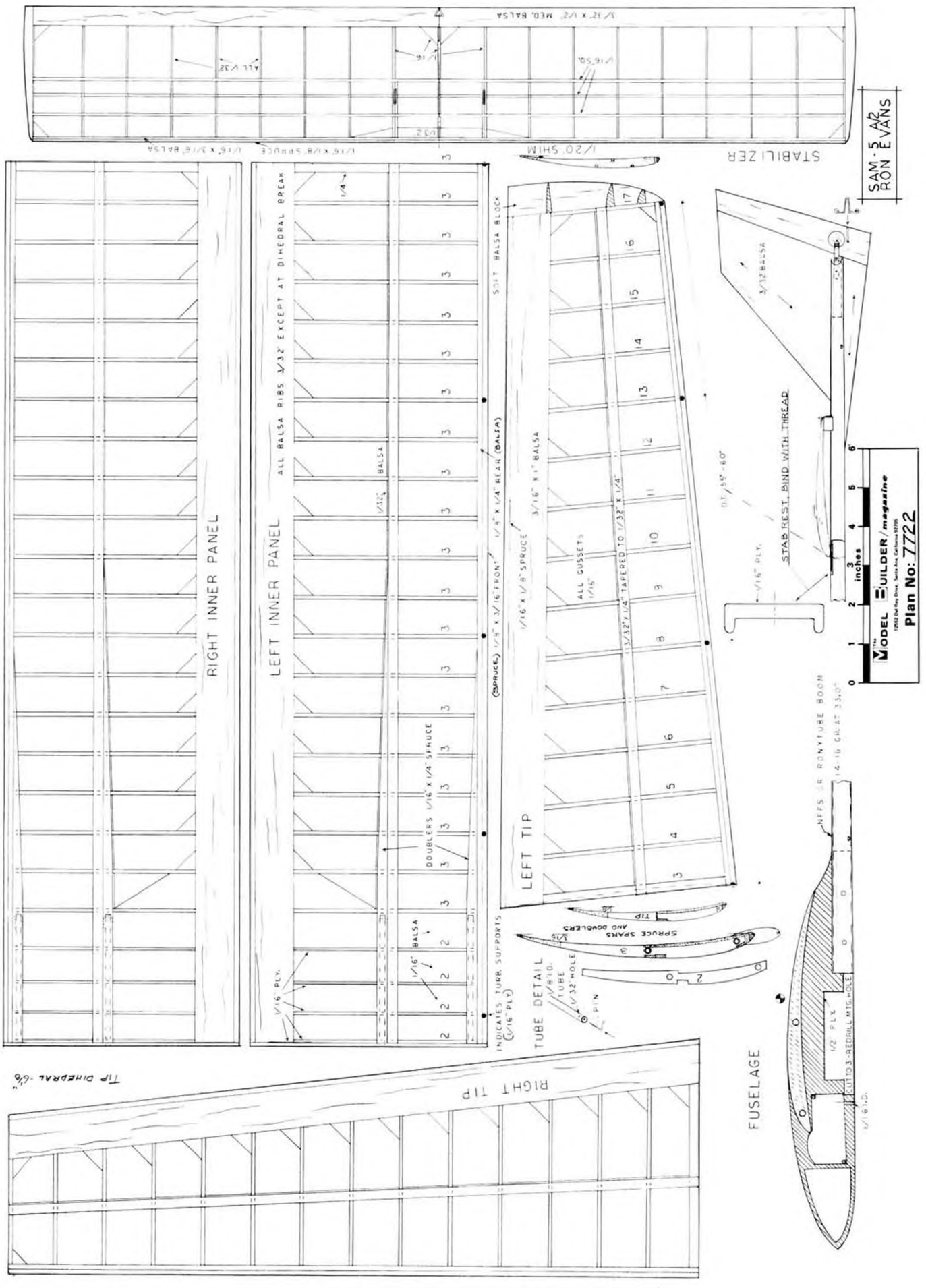
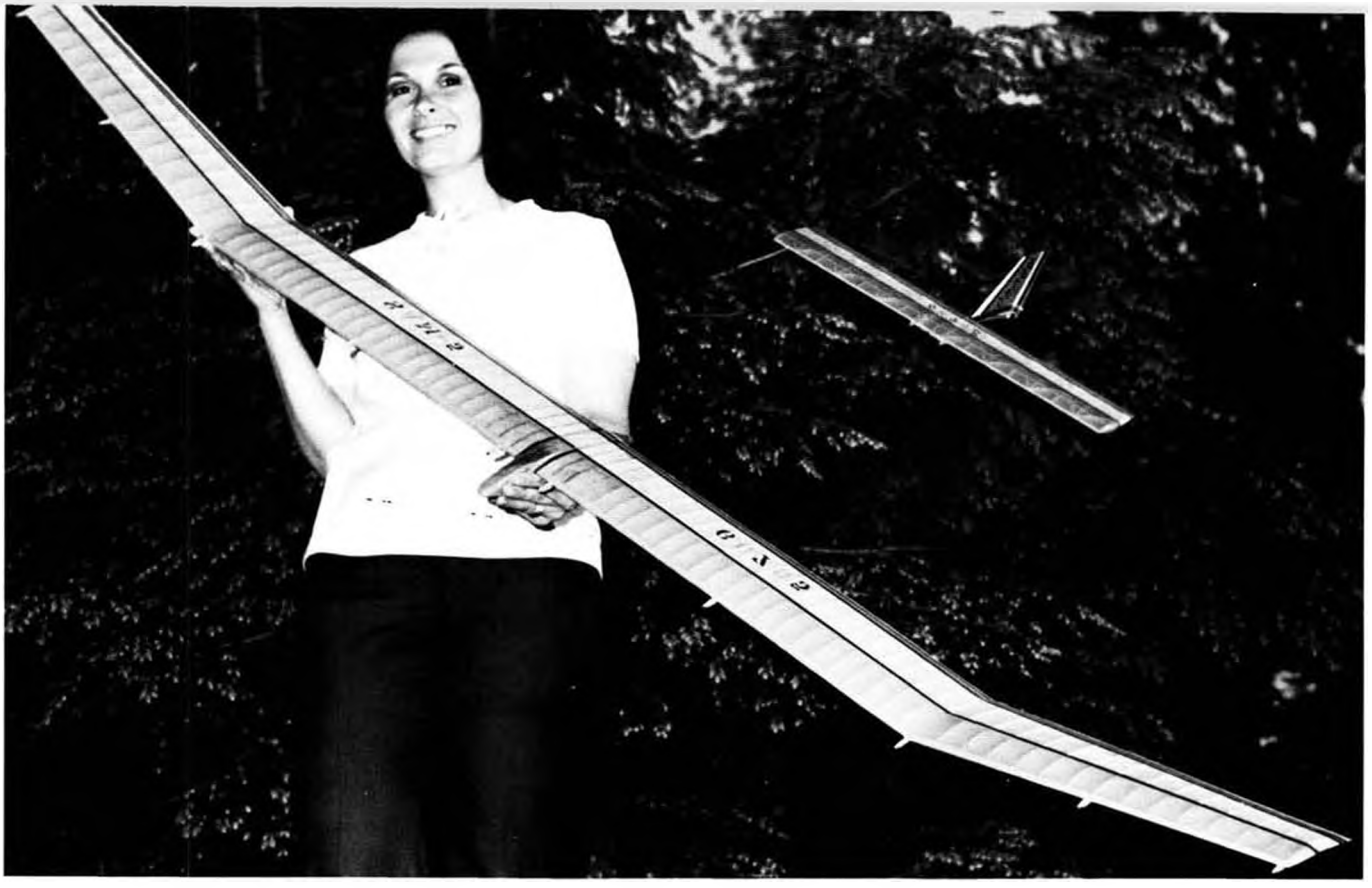


FIG. #2

Continued on page 52



FULL SIZE PLANS AVAILABLE–SEE PAGE 56



Does this look a bit familier? Both Sams were in the March/April issue Free Flight section. One is Ron's plane, the other his wife. Need any help?

SAM-5

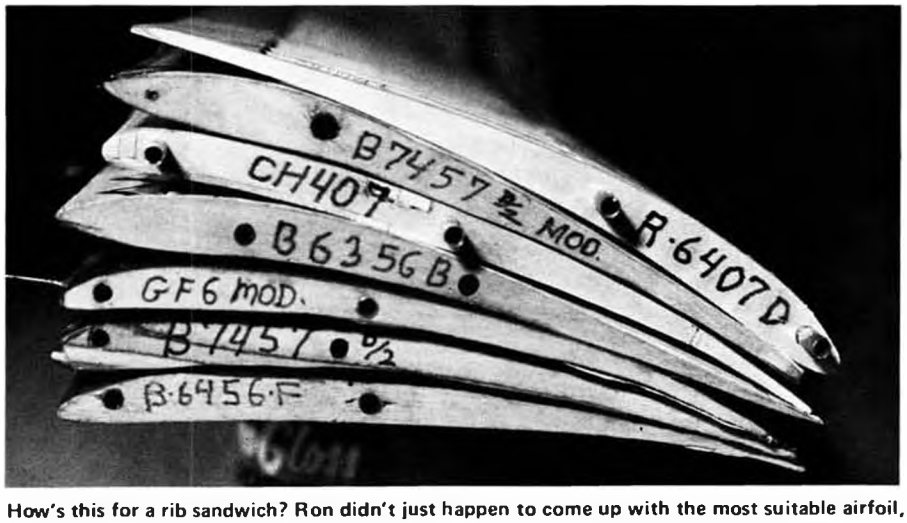
This contest winning A/2 is the current peak result of a long line of development aircraft. The brief outline of the experiments involved is worth the time to read even if you don't intend to build the model.

By Ron Evans

PHOTOS BY JOHN PETCHLER

● The SAM 5 as presented here is a development of the "SAM" series which started it's life in 1969. Since that time there have been 11 "SAMS" built by this writer, and 4 or 5 others by local flyers. The number of changes is hard to pin down, since components have been switched, separate wings built for the same fuselage, different rudder locations and sizes on the same boom, and so on. The greatest number of changes have been to the wing and stabilizer airfoils.

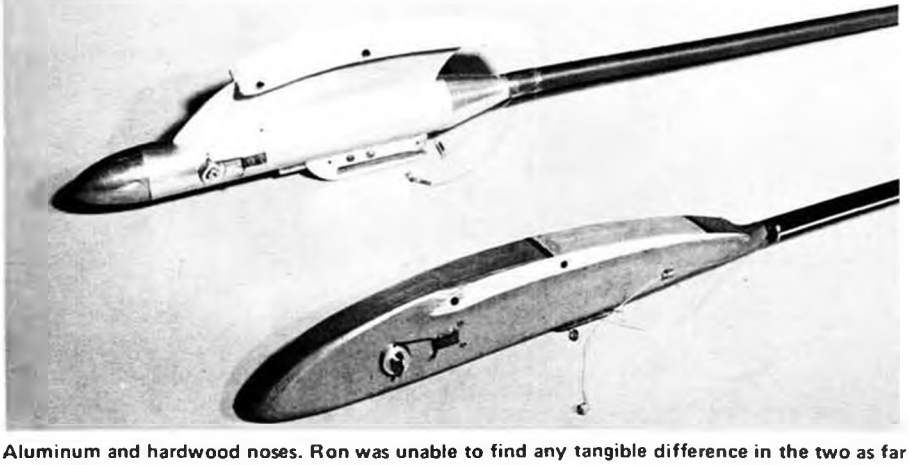
I was fortunate enough to have received a great deal of help in regard to new theories, airfoils, and trimming suggestions from several sources, notably Vic Nippert and Hugh Langevin. The primary aim throughout all the changes was to evolve a stable, strong, consistant airplane. "Dead Air" time was not given too high a priority, although a lower limit of 2:30 was considered minimum. All the airfoils to date have reached or exceeded the minimum limit (some just barely) except the Ritz 6407D, at 2:25. The main considerations were; good tow stability and thermalling ability. Ease of construction has not been of any great concern. My feeling is that anyone who desires an easy-to-construct glider ought to fly Hand Launch Glider. Nordic Glider is one of the 3 World Championship events, and as with anything of "Olympic" caliber, "You get what you pay for."



How's this for a rib sandwich? Ron didn't just happen to come up with the most suitable airfoil, he had to try a few! At least by now he must have a pretty good idea how to build wings.

It probably would take up more space than it is worth to detail *all* the changes, trials, and tests here. I will simply explain briefly *why* I have presented this particular model to represent the best of the series. The rear fin was tested against both front fins (4 of them) and T-tails (2), and shows the best tow control, and no discernable advantage *or* disadvantage in the glide. A good towing model is hard to argue with. The GF 6 wing section has the best non-thermal duration of all the sections to date, excells in light lift (the

Author-designer Ron Evans (left) and Bob Lipori preparing SAM for a test flight. Glued on thread turbulators were used here but were not as effective as outrigger type shown on plans .



Aluminum and hardwood noses. Ron was unable to find any tangible difference in the two as far as performance was concerned, and wood version is easier to construct , so build it of wood!

B 6456 F is the only other section to consider for light thermals of the airfoils tested), and can be flown in very windy weather with good results. The Ritz 6407 D can handle bumpy or turbulent weather a bit better than the GF 6, but loses points in both light lift and no lift conditions. The CH 407 has not been tested well enough to recommend it, but early tests indicate it may give the GF 6 a run for the money, in any weather, provided it is matched with the proper stab section. It was not responsive with a flat bottom stab, but now is flying well with the "Osprey" stab shown on the plans. The Osprey stab section, incidentally, was the best match for the GF 6, from a sampling of 5 different stab airfoils. The pylon/shoulder wing mounting question has not been answered to my satisfaction; they certainly do not have a significent effect on either the tow or glide, so I have presented the nose that is more within the reach of the average modeler. The aluminum nose/pylon requires access to a machine shop to duplicate, and has no real drag reduction, all things considered.

Construction: The place to start is by obtaining all the balsa wood, hardwoods and miscellaneous small items like autorudder stops, towhook, tubing, etc. By doing this and also prefabricating the laminated parts (Wing L.E. & T.E., planking, etc.) you will save a great deal of time. Cut *all* wing ribs to shape, making only the normal spar notches . . . leave the doubler notches for later. Tack cement 8 ply blanks together with a non-penetrating glue such as Testors, saw to shape (again, no doubler notches) and drill 5/32 inch holes for tubes. Split them apart with an X-acto blade.

The tip ribs are formed by the stack method . . . that is by pinning together 13 pieces of 3/32 x 5 x 3/4 inch balsa, with the root template at one end and the tip template at the other. Carve to the shape indicated by laying a straight edge across both templates. Repeat for opposite wing. When this is done, separate and number each rib with felt tip pen. Carve the (prelaminated, I hope) trailing edges to shape, and attach to plan, shimming to undercamber. Also pin (over, not through) the leading edges to board.

Epoxy all wing ribs into place, including dihedral break ribs. Add upper spars and T.E. gussetts.

When this is dry, lay wings across the board in the assembled (flight) position, and epoxy the 1/8 inch I.D. wing wire tubes in place. Use the utmost care in aligning the wings, so that there is no warp, sweep, or dihedral. About half way through the opoxy hardening process, rotate the tubes 180 degrees to distrute the adhesive evenly. When *completely* cured, insert pin retainers through tubes, and bend to lock into place.

Now is the time to enlarge the notches for the tapered doublers, first with a Zona saw, then with an emery board glued to a scrap piece of spar stock. Where the doublers are a snug fit, epoxy all four into place. Bevel the 1/4 inch dihedral break wing ribs, and add dihedral, using HobbyPoxy Quick-Fix. Lower sheet planking is next (the 1/16 x 1/4 inch spruce spar should be glued to the planking first) using masking tape, hair clips, and as few pins as possible. Now all the details, such as vertical webbs, center-section fill-in, wingtips, and so on. The wings should weigh between 58 and 65 grams each at this point. For final sanding, you will find a contoured sanding block easier and more accurate than any other method. It need only be a few scrap blocks (3) of balsa sawed to the lower camber shape with sandpaper tacked or glued

Continued on page 42

Russell and Billy Hartill with A/2 Nordics. The Hartills are all active FAI enthusiasts. Scene is Sepulveda Basin.

FREE FLIGHT

PHOTOS BY GEORGE BAHRMAN

by Mel Schmidt

The "Golden Arm of HLG," Bill Blanchard. Ship is Polly, kitted by M&P. Note DT.

THE THERMAL ADVANTAGE

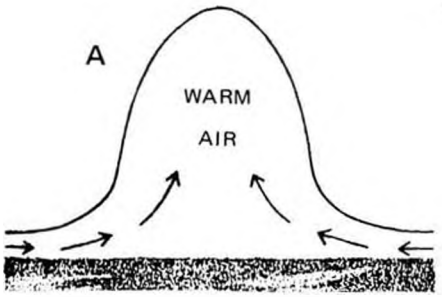
● Obtaining free flight duration and performance depends on the flyer's ability to consistently place a plane in a thermal and then for the plane to survive and remain in the thermal until D/Ting. The power climb or the towline *only* provides a means of starting the flight. And judging flight performance on calm air flight times alone is surely misleading. After all, the only environment for which the free flight is intended is the thermal, and ideally, this is where it will be every flight. Let's take a look at what a thermal is and then how to use it.

(Information for the following discussion, along with the illustrations, was taken from "The Soaring Flight of Bird's," by Clarence D. Cone, Jr., Scientific American, April, 1962)

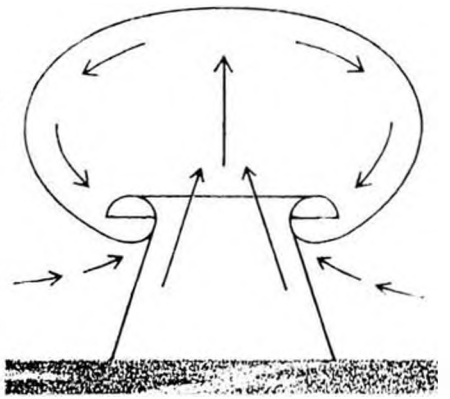
The surface temperature of the earth rises as it absorbs energy from the sun. The air layer next to the ground is warmed and becomes less dense than the cooler air above it. As this layer becomes warmer its equilibrium becomes unstable. Finally some triggering action, such as local overheating, upsets the equilibrium of the layer and the warm air begins to penetrate the colder air above.

This initial bubble grows rapidly as air from the warm layer flows into it. As the warm air layer becomes exhausted, cool air settles in and pinches off the bubble, which then begins to rise and float along with the wind in the manner of a free balloon. This thermal bubble may contain from a few cubic feet to many millions of cubic feet of warm, buoyant air. As the bubble rises, a sheer layer develops at the discontinuity in velocity that marks the boundary between the buoyant mass and the relatively still outside air. This layer of turbulent air reacts on itself and ultimately coils up into a single large vortex ring; a torus of revolving air that, if it were visible, would look like a giant smoke ring. Soon all the warm air becomes concentrated in this ring and rotates in concentric circles around its circular axis. We call this a thermal shell.

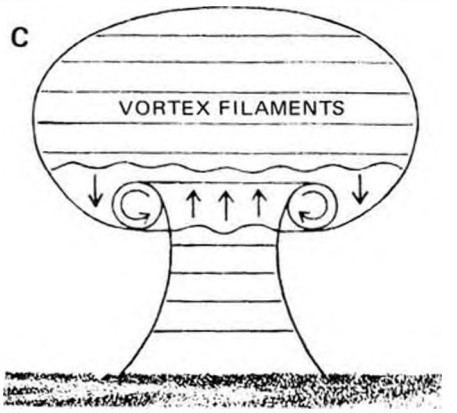
To soar in a thermal shell, an airplane model must circle within the central updraft on a path such that its sinking velocity precisely equals the upward velocity (with respect to the vortex ring) of the air through which it glides. The plane thus maintains a constant altitude in relation to the vortex ring. With respect to the ground the plane gets a "free ride" upward as the



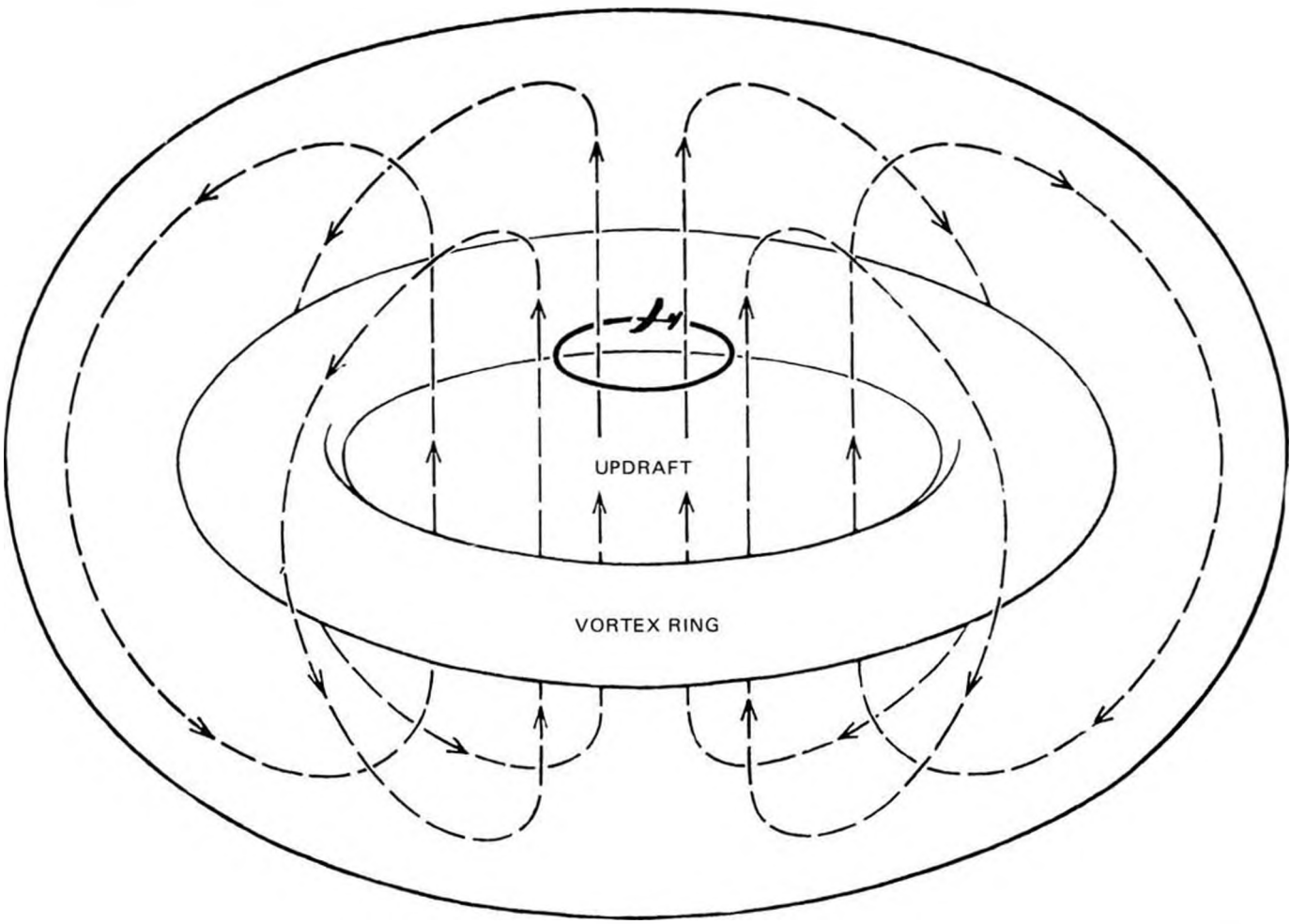
Development of a thermal shell begins with the rising of an area of warm air.



The air parcel, warmer than the surrounding air, rises further and begins to form a bubble.



Turbulence develops at surface of bubble, form forms twisting filaments.

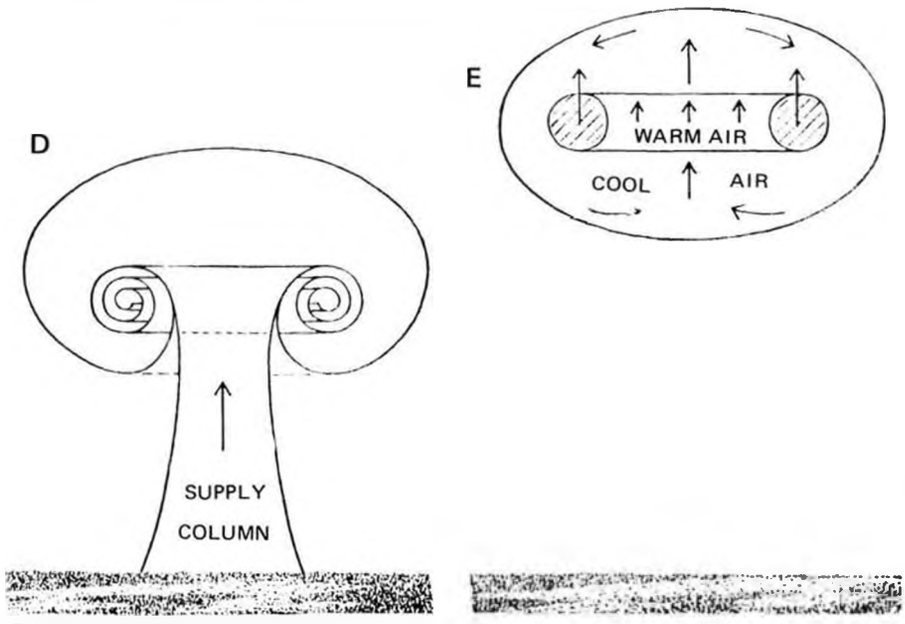


The final thermal shell, developed through the above steps. It's composed of a vortex ring (torus) around which a current of cooler air circulates in closed streamlines (broken lines). The thermaling plane should fly in a radius of circle that gives it a aerodynamic sinking velocity exactly equal to the velocity of the updraft. With this equilibrium established, the plane will rise with the thermal shell.

entire system rises through the air. The circular flight path within the thermal shell imposes an aerodynamic requirement on the plane. It must bank so that a portion of the lift force can provide the force needed to pull it around the turn. The lift required for circular flight is therefore greater than that required for flight in a straight line.

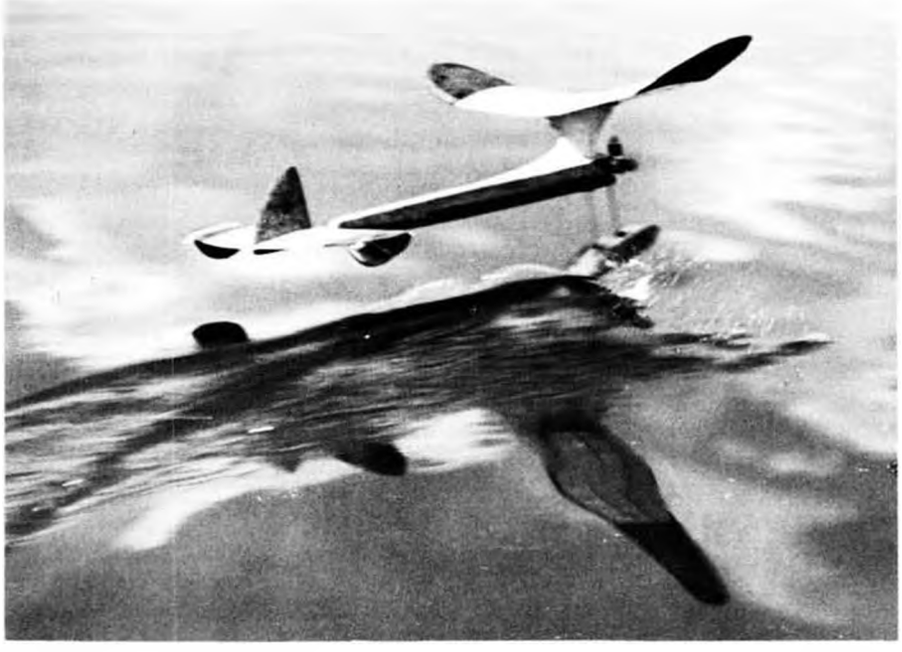
The relationship between the weight and aerodynamic characteristics of the plane, on the one hand, and the radius of the thermal shell and the strength of its updraft on the other, determine whether or not a particular plane can soar within a particular thermal. Observation shows that if the plane can establish an equilibrium flight path in a rising thermal it will continue to climb with the thermal. However the plane may rise or descend to a level in the thermal shell where its position is unstable. For example, if the glide turn were too tight it may go downward into weaker regions of the updraft and through the bottom of the shell. Another example is the plane with a low wing loading which rises very fast only to climb up to the weaker regions of the thermal shell and then come down in the downdraft on the outer edges of the shell. Obtaining equilibrium within the thermal shell depends directly on the shell and the aerodynamic characteristics of the plane. A plane can be too heavy or too light for a given thermal.

The ability of the thermal to support flight bears a definite relation to the presence and intensity of sunshine. As the sun rises in the morning, planes can begin to thermal in the exact order of their wing loading. And the hour at



Filaments coil into a toroidal vortex ring much like a smoke ring.

Buoyant mass of warm air is eventually pinch-off at ground by cool air and floats away.



A step back in time. Ed Kelly's Civvy Boy 31, .045 Baby Spifire, on floats at Alondra Park, Cal., spring of 1950! He's father of last month's cover boy, Jim.

which planes begin to thermal in the morning is much earlier during the summer than it is in winter.

At our flying fields in Taft and Elsinore, California, the earth is sand. Hills surround both sites to form natural air harbors. Mornings are normally calm, and as the sand and surface air warms, thermal bubbles are formed, followed by wind gusts and thermal shells. During the hot months, often the supply columns *(dust devils)* of the thermal bubbles are visible as loose particals rise. Thermal bubbles fed by such visible supply columns tend to be very large and strong, often carrying planes on long and very high flights. And rows of parked cars often trigger smaller thermal bubbles which are sufficient in size and strength to sustain 'coupes' and hand hand launch gliders in flight. But these are special conditions normally found only in desert conditions.

Study the thermal condition at your field. Are there roads, hills or buildings which are hot spots for triggering bubbles? You may be able to time the interval between thermal bubbles pinching off. If you can detect the thermal you can fly with the thermal shell.

So called thermal detectors are of use in noting a temperature rise. And Mylar strip, at times, will clearly indicate rising air. The use of multiple Mylar streamers placed to cover an area, along with a temperature sensor, appears to be one of the better thermal detection systems. We recently placed a gas filled balloon at 200 feet altitude with Mylar streamers every twenty five feet. There was a very noticeable difference in streamer action along the 200 foot height. Much study and experimenting needs to be done. Let us know of your findings.

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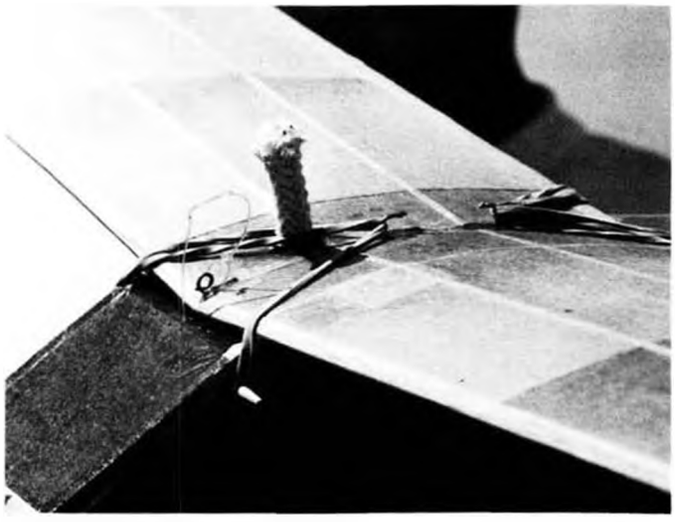


There's more than one way to DT! This arrangement by John Ferrer on a Marlow Eng. "Sprite" sport rubber job. Hope that snuffer works.

Texan 550 and 800 by Jim Scarborough. Jim won Grand Championship at 1971 USFF Champs, and is currently president of SHOC club.

Yoshiro Sato's son, eight year old Bob, is on the controls as Albatross I goes up for a four minute flight at Japan's first R/C thermal soaring event.

R/C SOARING

By Le Gray

Our Japanese correspondent, Yoshiro Sato, presents an on-the-spot report of Japan's first thermal soaring contest for R/C gliders. The style is great! Then Le Gray presents the first in a series of full size soaring aircraft suitable for modeling in R/C.

A report on the first All-Japan Thermal Soaring Contest, by Yoshiro Sato. Photos by Yoshiro Sato and Mrs. Noda.

● If cherry flowers
Had never come into this world,
The hearts of men
Would have kept their tranquil freedom
Even at the brilliant height of Spring

An old Japanese poem

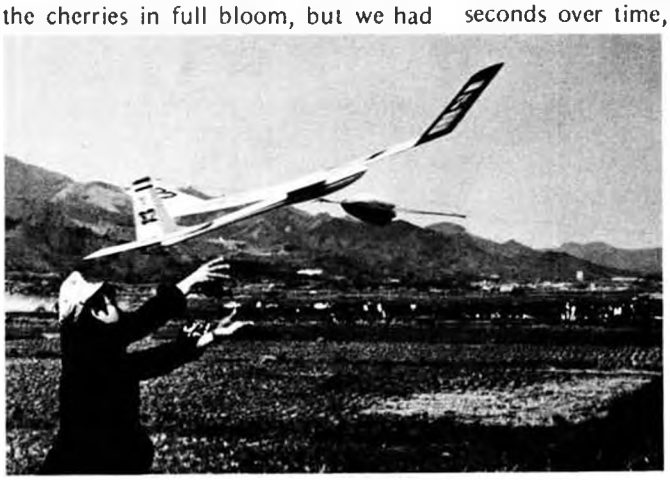
In early April, we could have seen the cherries in full bloom, but we had no time to look at them. We were very afraid of the wind and the rain, just like the cherry trees.

On April 2nd, we had a nice day; the wind speed was 13-23 feet/sec. The contest field was Hiratsuka, 20 miles southeast of Tokyo. The starting time was set at 9 AM, but the contest actually started at 10:30.

CD Mr. Isobe gave us some instructions and ground rules. The rule called for a 5-minute duration and a circle 25m diameter for a spot landing. If we flew 30 seconds over time, we would lose all the points, but less than 30 seconds over time, the points would be reduced one point per second. In addition, overtime flights could not get a spot landing bonus. The bonus was 50 points.

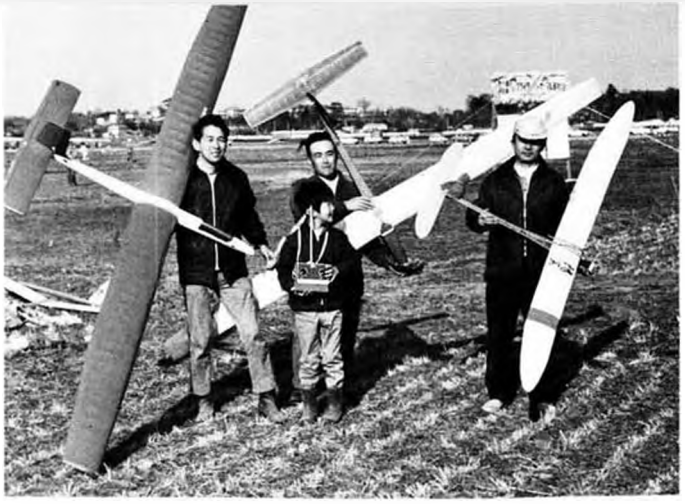
On a 5-minute flight or less, we could get one point per second. I think there was too much precision, but a rule is a rule.

Even though this was Japan's first thermal soaring contest, there were 51 entrants. Many people did not know how to tow their own gliders, as a result, they could not communicate with the tower (launcher). One man was holding a glider. Suddenly the tower ran and ran, but the radio switch was not



Kazumi Matsui (not Isao Matsui who competed in Doylestown) launches from dry rice paddie field in Hiratsuka, Japan.

Friend of Yoshiro's, Mr. Furukawa and his own design Atlas Romeo. He was only 5 seconds off, but missed the spot landing.



Yoshiro Sato, little Bob Sato, Kazunari Ozamoto, and Hirotaro Noda (left to right). That transmitter case sure looks familier.

The Albatross and a buzzard play tag. Note the difference in aspect ratio and tail moment arm!

The Sisu, an excellent scale subject. El Mirage, 1962 U.S. Nationals. Note canopy cooler.

on. Then the holder of the plane ran and ran with the tower, still with the plane in his hand. Another person did not even have a tow line. After a while, he borrowed one.

One entrant bought a shock cord from Germany, but the cord was too strong for his ship. He had to adjust the force according to the wind speed. Two people pulled the cord, then the glider started; after a few seconds, we could not see the ship . . . the fuselage flew like a rocket, of course, but the wings flew in another direction.

The wind direction changed several times, so contestants had to set 300-m tow cord again. Some people used an instant lift. That method does not give a big advantage, but the rules called for only a 5-minute duration, so Mr. Matsui succeeded in capturing 4th place with this technique. I took an electric winch, but the place was a dry rice paddy, so I could not run over it with my car; too, the wind direction changed several times, so I did not use the winch.

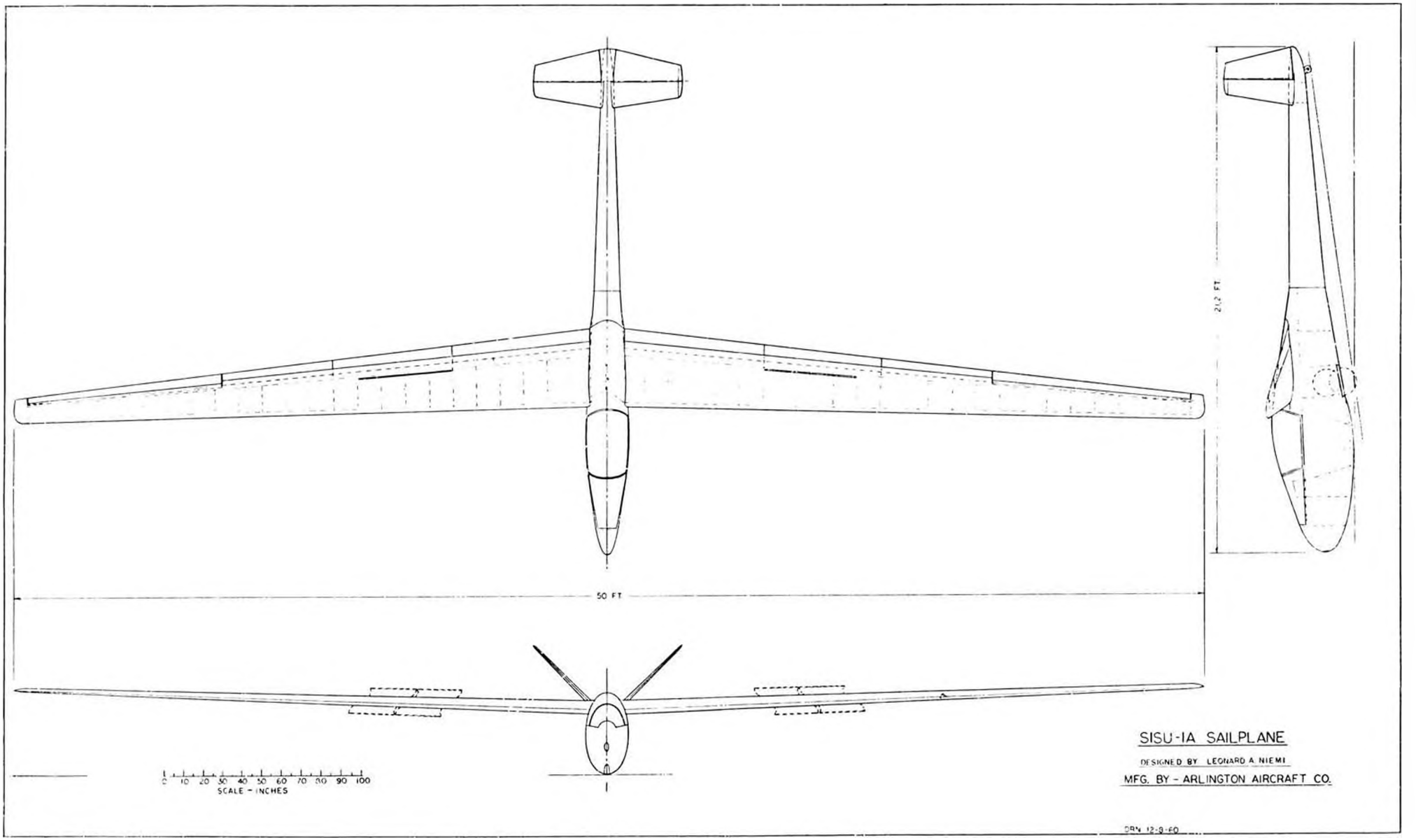
By lunch time only 10 or 15 people had flown their ships. The first schedule was for 2 rounds, but we decided to have only one round of flights.

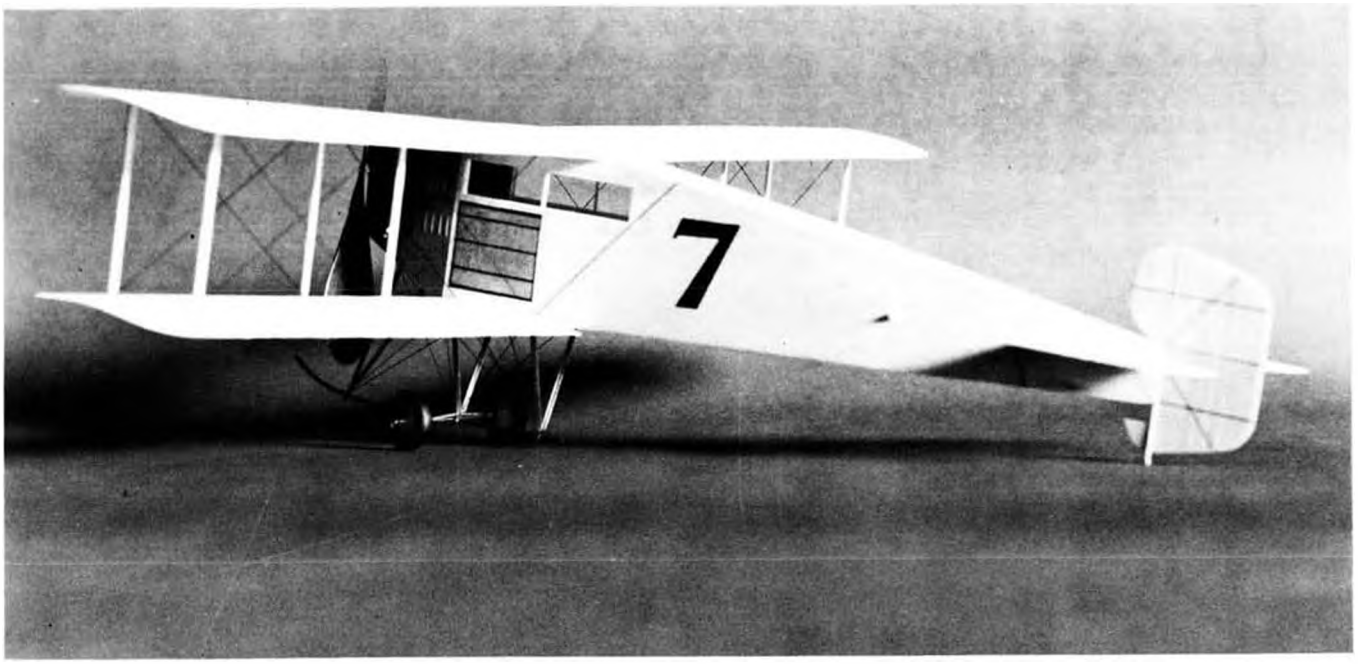
In my flight, Mr. Harada towed my Albatross 2. It climbed and climbed, then released tow line by means of down servo operation (there was a mechanism on the hook). There was no thermal, but I could fly long enough - 5 minutes. I wanted a 40 minute, 59 second flight and a spot landing. Mr. Noda counted the time. For the first one or two minutes the time passed slowly, but the last 30 seconds passed very fast. As

Continued on page 48

First place winner at Japan's first R/C thermal soaring contest, with trophy. Mr. Inoue. Glider is the Piviere, built from Italian kit.

Second place in contest went to Mr. Mizorogi, who runs the Sagami R/C Shop. All of his ships are named Playboy(?).


50 FT
21.2 FT
0 10 20 30 40 50 60 70 80 90 100
SCALE - INCHES
SISU-1A SAILPLANE
DESIGNED BY LEONARD A. NIEMI
MFG. BY - ARLINGTON AIRCRAFT CO.
DRN 12-9-60



PHOTOS BY BILL HANNAN

1912 AVRO "G"

By Bill Hannan

While the cat's away, the mice fly! The manager of "Hannan's Hangar," a new series starting next month, fills in for the Missing Mooney. Only a little bigger than a Peanut, the Avro G is an indoor/outdoor model.

● Walt Mooney is a tough act to follow, but we'll do our best to fill in while he is out of town on business, as we are as anxious as the rest of you to keep the tiny models flying!

This model originally appeared in the English magazine Aeromodeller, and is being reprinted thanks to the kind cooperation of Editor R.G. Moulton. As originally designed, this model was intended for the all-sheet wood class of indoor flying scale models, which were being flown at both Wilmington and Sepulveda, Calif. The model has also been flown outside under relatively calm conditions, and with slight "beefing up" would make a fine aircraft for the new Bill Brown CO_2 powerplant.

During our years of flying scale models, we have found that there are two basic categories of competitors. One is the endurance fiend, who sort of likes scale models, the other type is the authenticity-at-any-price buff, who hopes that his overweight museum piece may somehow manage to fly, "because the real one did". Our little Avro is intended to fit somewhere between these extremes in thinking.

The full-size Avro "G" was entered in the Military Trials of 1912, and was the only entry with an enclosed cabin. Well, almost enclosed. According to the Dec. 19, 1912 issue of THE AEROPLANE, "The windows are not covered at all, but the only wind felt is the side draught when banking in a turn." The "G" also had the unique distinction of being the first aircraft in which a letter was typed, while airborne. Perhaps of greater importance, the Avro, being flown at the time by Lt. Wilfred Park, R.N., became the first aircraft to successfully recover from a true spin.

The "G" was fitted with a four-cylinder 60 h.p. Green engine, which provided a maximum speed of approximately 62 mph, and in spite of having excellent fuel economy, was considered underpowered.

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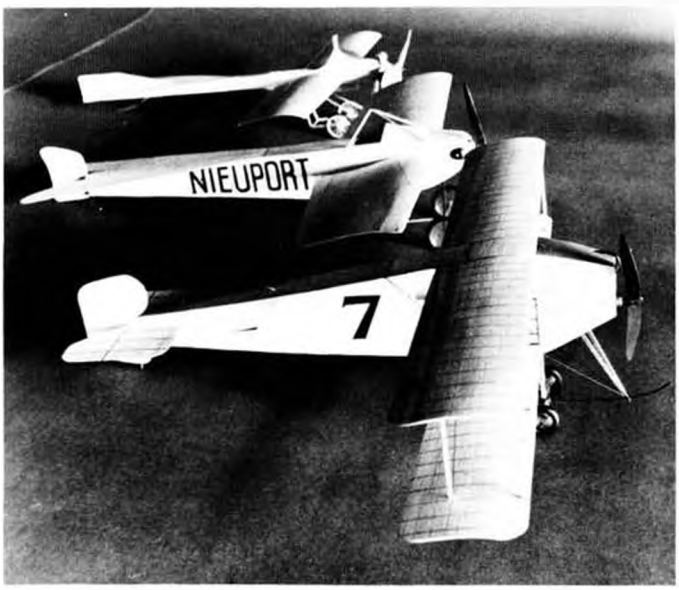
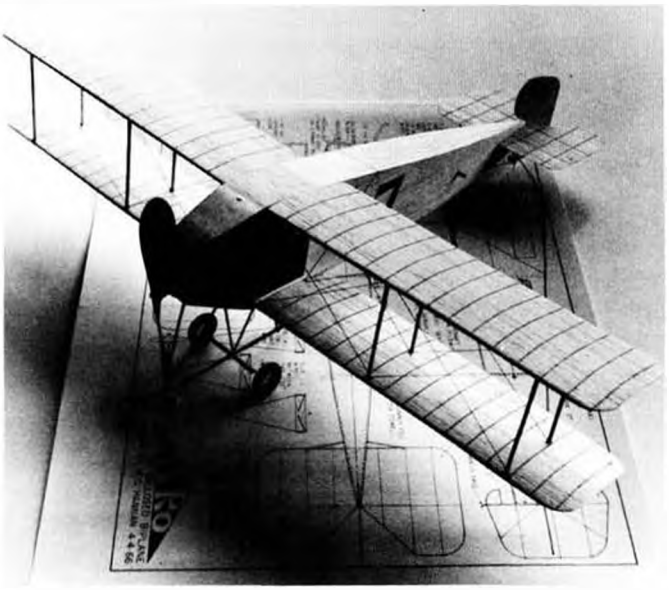
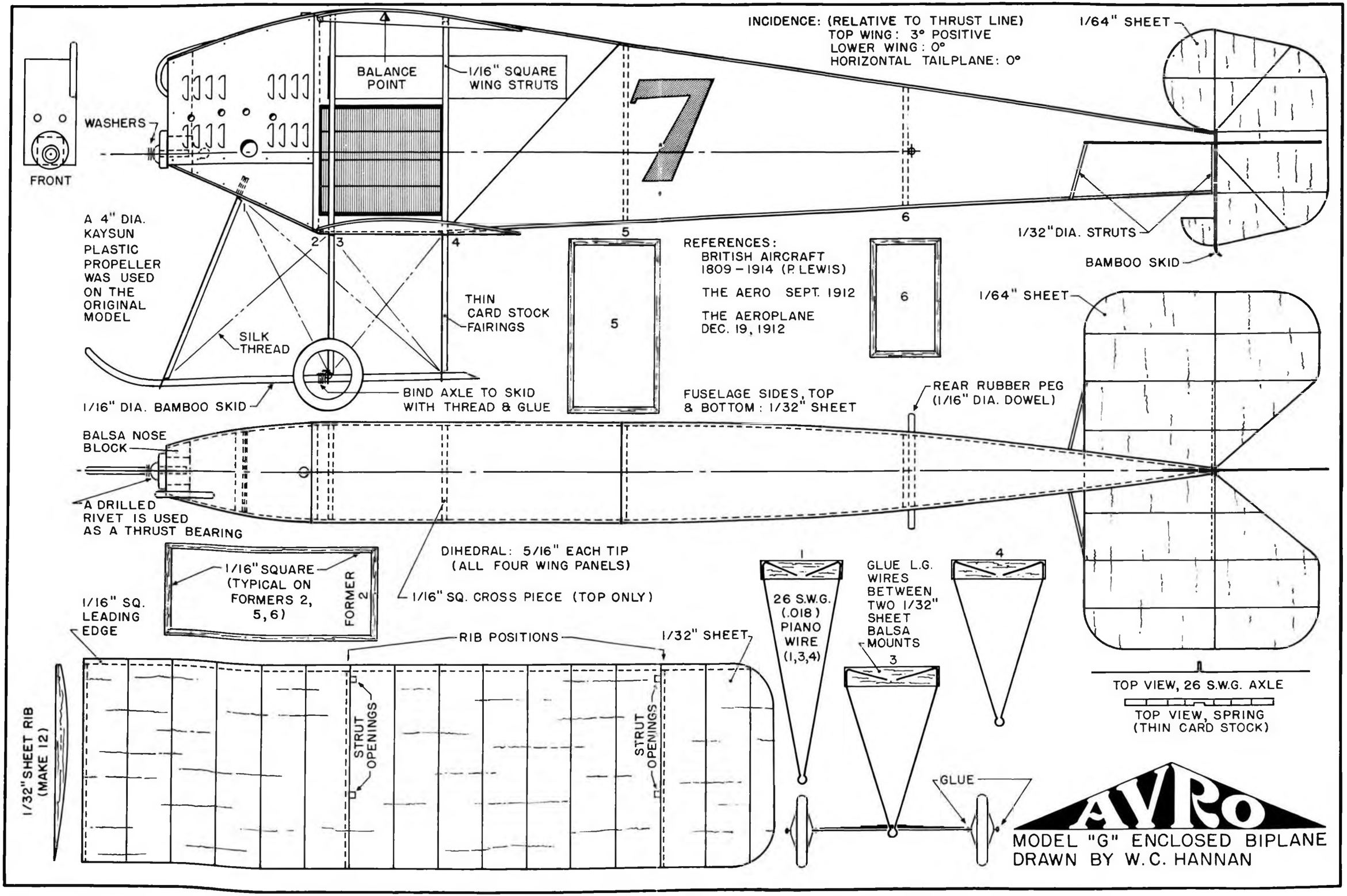


Maybe they didn't need to know where they were going back in 1912 but you gotta admit there isn't a heck of a lot of forward visibility!



Typical of Bill Hannan's work, the Avro G is neat, tastefully detailed, and is definitely obscure! Natural finish saves weight.



DRAWINGS CONTINUED ON P. 505

DRAWINGS CONTINUED FROM P. 500

JULY 1972 Vol 2 No 9

PHOTOS BY FERNANDO RAMOS

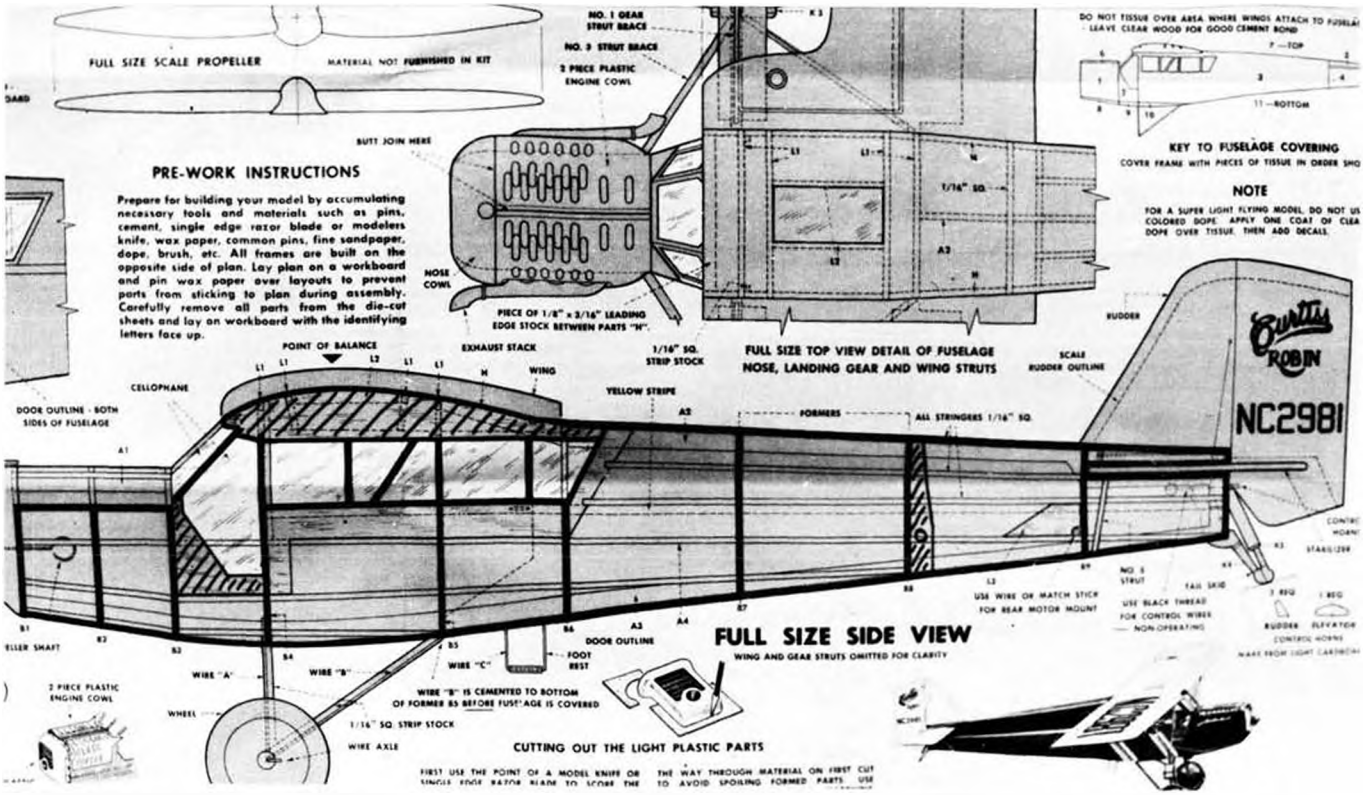


Photo shows modifications made to Guillow plans for construction of lighter fuselage. There's no built-in downthrust, that's distortion in camera.

FREE FLIGHT ... SPORT & SCALE

This month we begin an investigation of ways to modify kit rubber scale models in order to improve flight performance. It can all be summed up in three words . . ."Make it light!!" By Fernando Ramos

● The next few articles will be dealing with the simple conversion of a Guillow model, as a beginner's project. In order to bring more beginners into flying scale, the logical starting point is with a rubber-powered model. Rubber power has a lot of advantages; the biggest of course, is the overall low cost, and for one just starting in the hobby, this has to be a prime consideration.

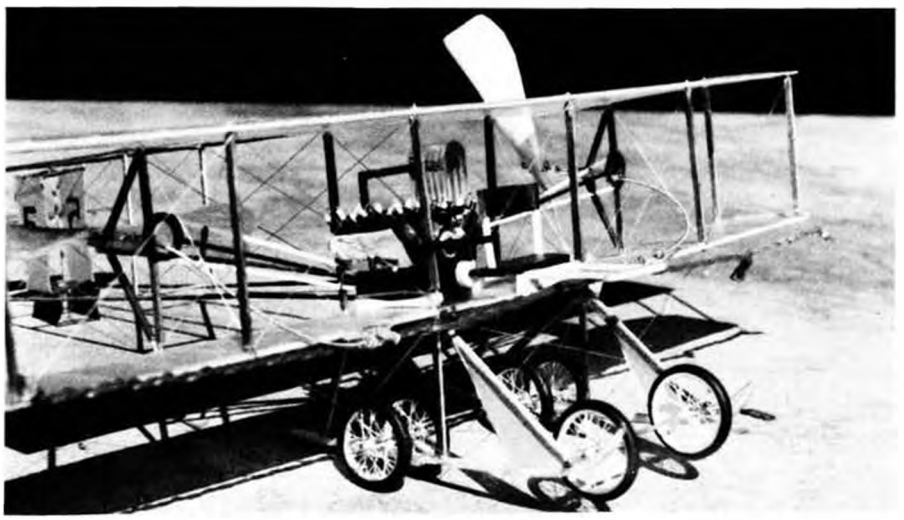
The aim of this project is to show how to modify a standard, available kit into a light, forty-five second plus, flying scale model. The subject chosen for this project is Guillow's Curtiss Robin. (Unfortunately, the Robin has been discontinued, but it is very typical for modifying purposes.) The Robin, which is an excellent airplane to model, has been much maligned. By this we mean that it has been built in every non-scale configuration imaginable, and often one will refer to a Curtiss Robin model meaning a "ghost" scale or non-scale type model. Regardless, it is still a favorite of mine, and quite suited as a beginner's project.

The idea here is to change the structure typical of a Guillow kit into the more traditional way of building flying models; that is, to eliminate the center crutch with bulkheads attached and substitute the conventional box-like structure. This of course, does away with a tremendous amount of weight, which will in turn give better duration.

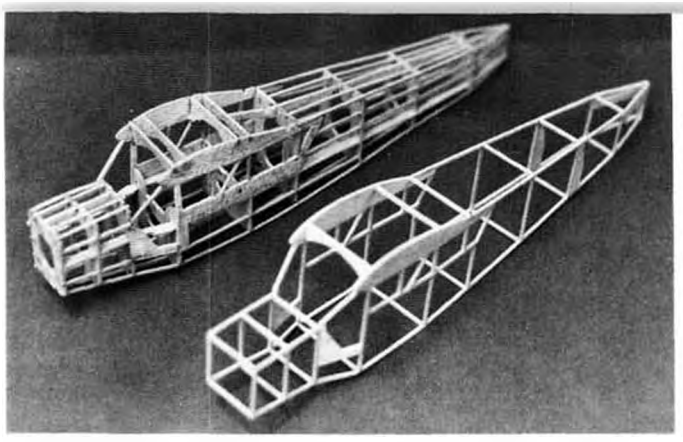
The first step is to study the plans carefully to see how the basic fuselage structure can be built up in conventional manner. See the photo.

The heavy outlines indicate the 1/16 inch square structure, and the slashed

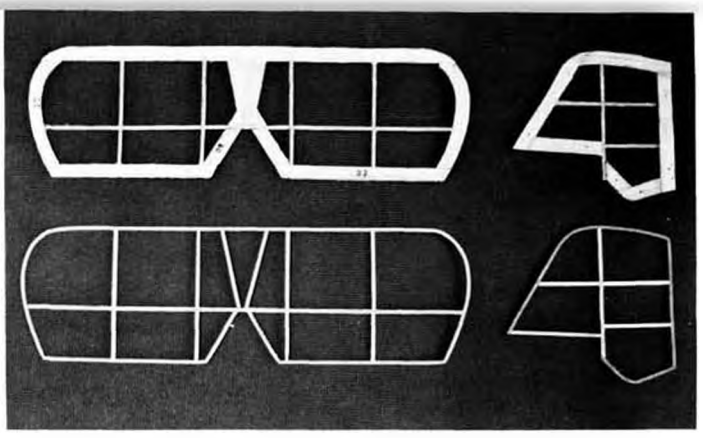
Well known model aerodynamicist, Frank Zaic, examines Bill Hannan's Peanut Pilatius Porter.



Who else but Fulton Hungerford, the wire wheel man, would tackle such a project as this early Wright biplane. Note the flex cable prop drives and location of rubber power. Fantastic!



The kit built Curtiss Robin fuselage and the modified box built version. It's easy to see that a lot of weight has been saved!



Again, the weight saving in the modified tail sections are pretty obvious. The lamination method was used for the outline.

lines show where 1/16 inch sheet balsa should be used. In essence, you are taking the outlines of the airplane's profile (with exception of the upper front end) and building it up. Please note the rear most section of the fuselage to see how a slot affair is made to accommodate the stab when the fuselage is completed and covered. Once you have the basic outlines figured, begin by building two identical sides over the plans, one on top of the other. When they are dry, remove from the plans and carefully cut away any excess glue from the joints. It is a good idea to use glues such as Sig-Bond or Franklin's Titebond. You'll find that no pregluing is necessary, and clean, strong joints are possible. Take a sanding block with about 320 grit paper and sand both fuselage sides very carefully; also the top and bottom longerons.

Before separating the two sides, note that the fuselage has four separate breaks, looking at the top view. Two are in the area of the front windshield, another just in front of the door hinge line, and one at the rear of fuselage. Take a sharp razor blade and cut halfway through the longerons on each fuselage side where these breaks should be, except the one at station B3. This one will be done later. Also at this time, locate the rear motor peg and mark this by driving a straight pin all the way through both sides.

Once this has been accomplished, use a double edge razor blade (broken in half to give one half a sharp point . . . (be careful!) and separate the two fuselage halves at each joint, except the tail post. Spread the two sides carefully and cut the top and bottom longeron from the inside, at station B3. This is necessary since the break is different than the other three. Doing one fuselage side at a time, carefully make the bends at the breaks according to the top plan view. This will give you the classic Curtiss Robin fuselage look.

The framing of the fuselage is next. The width of the fuselage is determined by both the partial top plan view and by looking at the bulkhead drawings on the plan. With a little study, the width is easily determined. The easiest way to begin is to measure and cut the cross pieces at B6 and glue in place. When the glue is dry enough to hold things together, pin the bottom of the fuselage to your work surface and place a right triangle against the frame, and let dry. Once one bay has been done this way, the others will follow suit. It is recommended that at stations B4 and B5 a 1/16 x 3/16 inch balsa brace be placed on edge on each side for some required strength.

Glue former halves B1, B2 and B3 together, or cut out ones using templates provided on plans. When the bulkheads have dried, cut just the portion you need and glue in place. Add the stringers on these formers. Make some triangular gussets and place them on either side of the front most breaks in the fuselage. Parts L1 and L2 can be added at this time.

Now would be a good time to bend and install the main landing gear wire. I use only the main gear wire. Finally, take a small rat-tail file and drill out holes for rear motor peg. The fuselage is now structurally complete.

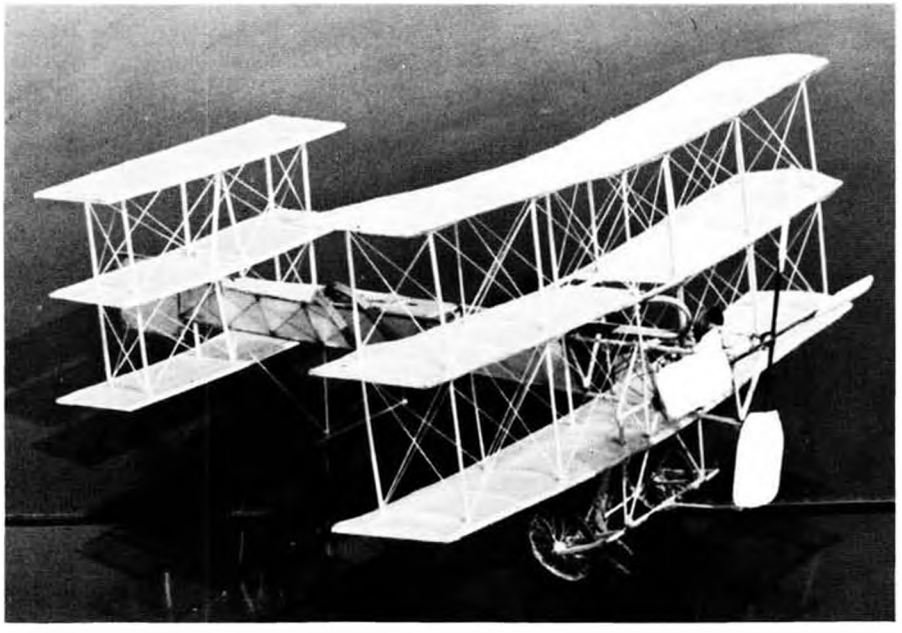
The stabilizer and rudder are next, and in spite of the square-like corners of each, they are best done by the lamination method described in the March/April MODEL BUILDER. This still is by far the quickest and strongest as well as the most realistic way of doing the job.

Let's see what weight comparison there is between the two methods used so far. The kit fuselage, using kit wood and parts, weighs 12.0 grams. The fuselage built in the conventional manner weighs 2.4 grams. The kit stabilizer weighs 2.2 gram, the laminate one, .8 grams. The kit rudder weighs .7 grams, the laminated rudder, .3 grams. So far, a saving of 11.4 grams. And as stated before, every little bit helps.

Next month we'll tackle the wings and finish all of the construction necessary.

(The following suggestion, in a letter

Continued on page 55



How to get lots of lifting area in a 13 inch span limit! Bill Stroman's 1909 Avro No.1 Triplane. Let's not hear any more complaints about having to build a mere two wings for a biplane!!

PHOTOS BY JIM SUNDAY

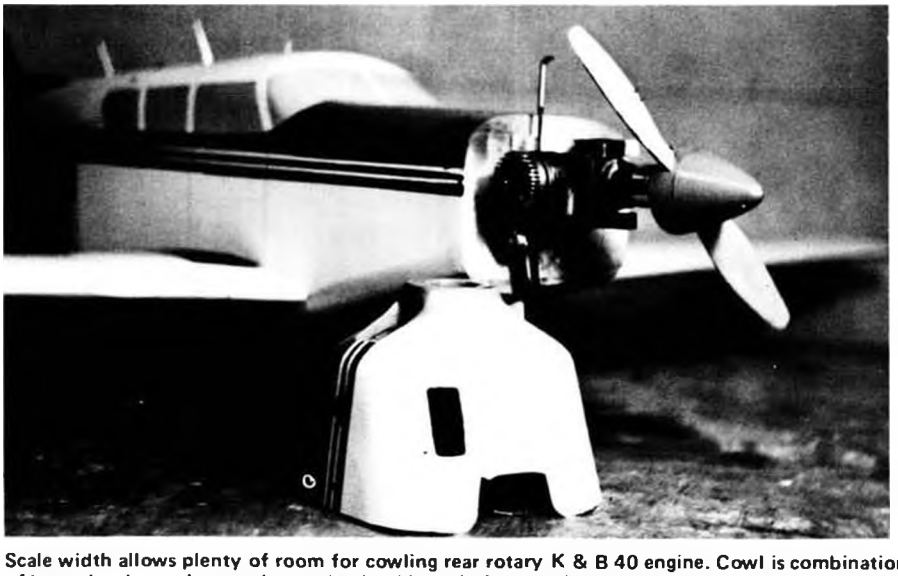
COMANCHE "C"

A stand-off scale model for .40 cu. in. engines, the Comanche "C" will hold its own in most any sport or not-too-serious pattern event. Accent is on quick and easy building. **By Jim Sunday**

● I built the Piper Comanche "C" to satisfy two needs. The first was to have a good stunter that looked like a real plane, and the second was to have a scale plane for the 1st Annual Pioneer FAI Scale Contest.

I did not want to take the time to do a scale job on heavy interior detail and I felt a good flying model would get better points than the loss of performance was worth due to the added weight of detail. As it turned out I feel I was right. At the contest, the plane out flew all of the competition and was only beaten by a plane that was an exact replica of the owner's full size job. I don't have nearly the time and effort invested in my plane as the fellow who rightly beat me, so I can enjoy flying my plane every day.

This is a plane that can do the entire AMA pattern including all the snap maneuvers. From straight and level flight it can do 1/2, 3/4 or full snap and stay right on heading. My model has a S/T 40 rear rotor ringed engine for power. At 5-3/4 lbs. and 505 sq. in. it moves right along, but even with good stunt capabilities, it will land slow.



Scale width allows plenty of room for cowling rear rotary K & B 40 engine. Cowl is combination of bent aluminum sheet and carved balsa. Veco shaft extension is used to keep engine enclosed.

The full size Comanche"C" was first made available in the spring of 1969 and featured the new extended prop shaft for a cleaner front end and improved performance. A color scheme is available at your friendly local Piper dealer. A good friend of mine, Jack Ulstad, my "friendly local," supplied me with a factory print and a sales brochure. If you have no local dealer . . . heaven forbid . . . you can write to Piper Aircraft Corp., Loch Haven, Pa., 17745 for literature, and maybe you can con them out of the "Owner's Handbook" part No. 753-774. The hand book has a three-view and a beautiful color picture in it.

Now to the work bench, as the big boys say. As you have noted, the fuselage is essentially a box designed to be built from stock standard size lumber. Cut out the three bulkheads, the side sheets and the ply doublers. Apply a coat of Wilhold liquid contact cement to the proper sides of the doublers and the fuselage. When dry, press them together . . . the doubler and the side. Don't forget to make a right and left side with the doubler on the inside. Install the bulkheads and tape the whole

The Comanche just a split second before touchdown. Main wheels are almost on the deck, while nose gear is still high in proper fashion.

The author/designer, Jim Sunday, San Jose, Cal. Jim is proprietor of hobby shop in Mountain View. Sticker on tail says "I Fly Sundays!"

mess together and let dry overnight. Put in the triangle pieces all over and do a good job on the back of the fire wall. You can now get an idea of the width of this thing. Now glue on all the blocks. Don't worry if the top block doesn't come all the way to the edge. Most of it gets ground off anyway.

The stab and fin, rudder and elevator are sheet balsa and are no problem.

The cowl is not difficult but does take time. I believe the easiest way is to install the engine first with all the holes in it filled with rags, or taped over . . . or both. Install the Veco shaft extension and cut a balsa block to the outline shown on the plan for the front of the cowl. Draw a line around the outside of the block about 1/4 to 3/8 inch in from the back. This line will be where the aluminum sheet will mate with the balsa block.

Using a piece of paper or lightweight aluminum, wrap around the front of the plane, including the cowl, and draw a rough outline to the approximate depth of the finished cowl. If you are satisfied with the shape, use the template and make the finished sheet. I made mine of .007 inch aluminum and used No. 2 sheet metal screws to fasten the ends together on the bottom.

Now with an accurate idea of how the whole thing fits together, get out the epoxy. I did mine with Hobbypoxy Formula II. The new 5 minute Devcon might be better for the initial assembly and later (say, 5 minutes) use Hobbypoxy II to fuel proof and harden the inside and outside of the cowl. What a job! It's more trouble to describe it than it is to do it.

The wing I used was a goam core and it is finished in the conventional way. A built up wing is shown for those who prefer it.

I used Hobbypoxy paint throughout. My favorite method of finishing is to first give the entire model a heavy coat of Hobbypoxy clear and let it dry overnight. Then after a light wet sanding with 220 wet-or-dry paper, I give the model a heavy coat of Hobbypoxy Stuff thinned to brushing consistency, about like heavy cream. Let dry overnight. Now I really start to sand. With 220 wet-or-dry, I sand off all the H/P Stuff that will come without going through the H/P clear. Now it is ready for color. I normally put on two good coats of Hobbypoxy color, but on the Comanche I used three light coats . . . takes longer but it looks good. The red and black are also H/P. Bright red H/P is usually hard to make cover, but over the white it is great.

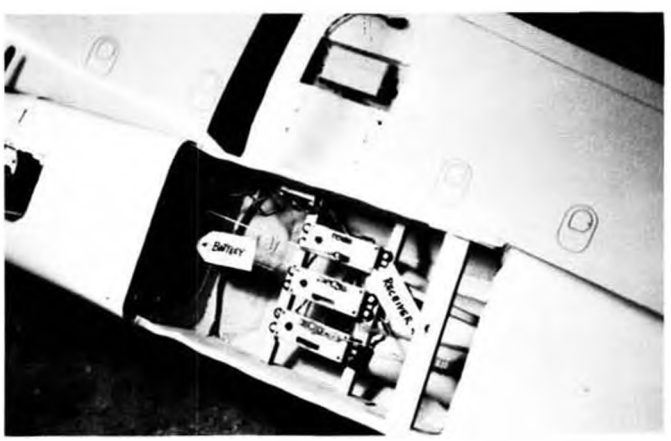
The numbers on the model are, of course, the same as in the Piper brochure, but after the contest I had to add the "I Fly Sunday's" decal. Now it's a company plane. (Jim is proprietor of a Hobby shop in Mt. View, California).

The plane is about 3 years old and has been flown with a Kraft KP6 ever since its beginning.

Another thought for the guy who is a tinkerer or a real scale buff is retractible gear. The small light weight MK gear from Royal Products or Goldberg units would be great for the Comanche and you have lots of room for the mechanics. I had a Mooney with about the same size wing with retract gear and it was great. A low pass with the gear up . . . pure beauty!

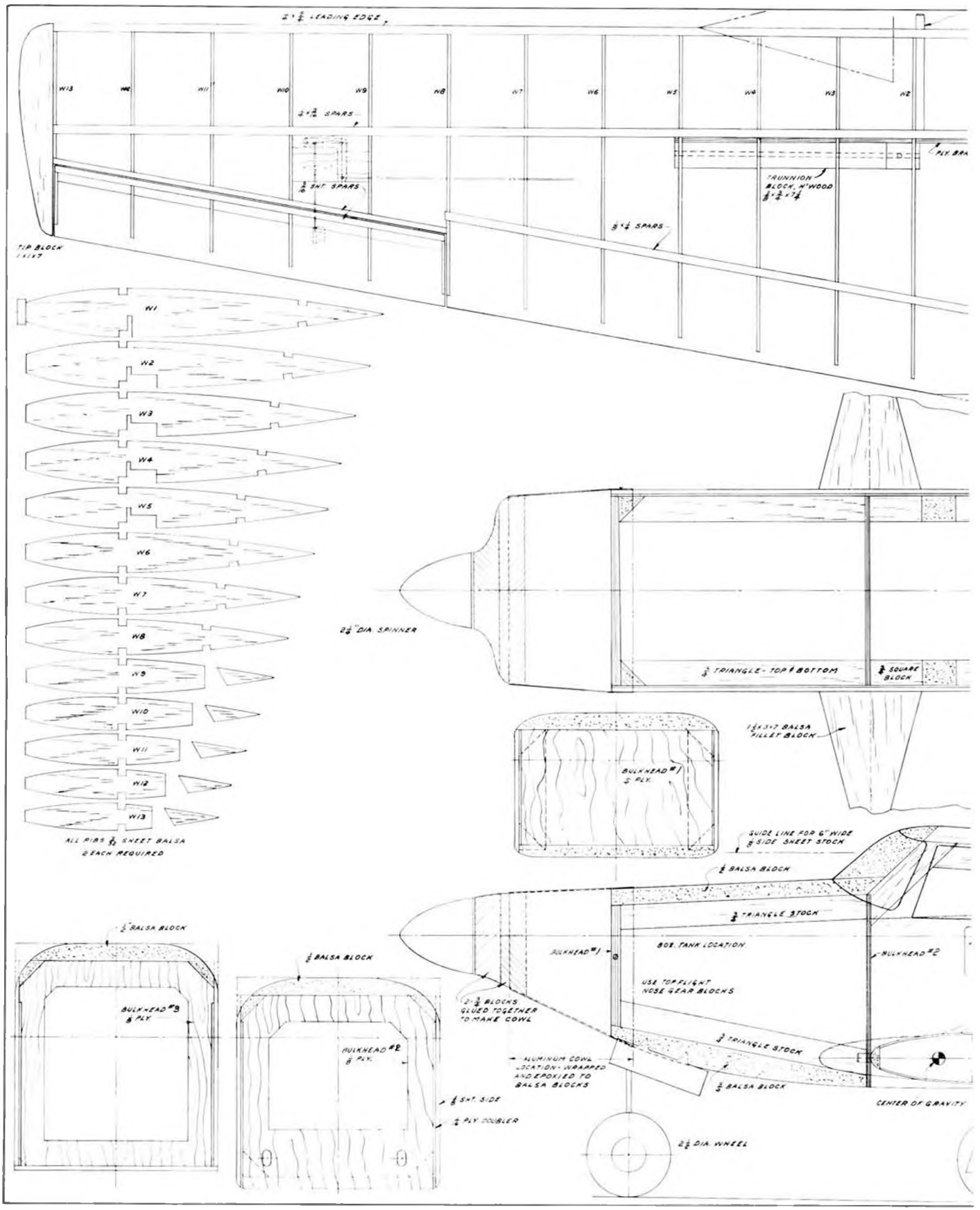
Good luck and may your Comanche fly as well as mine.

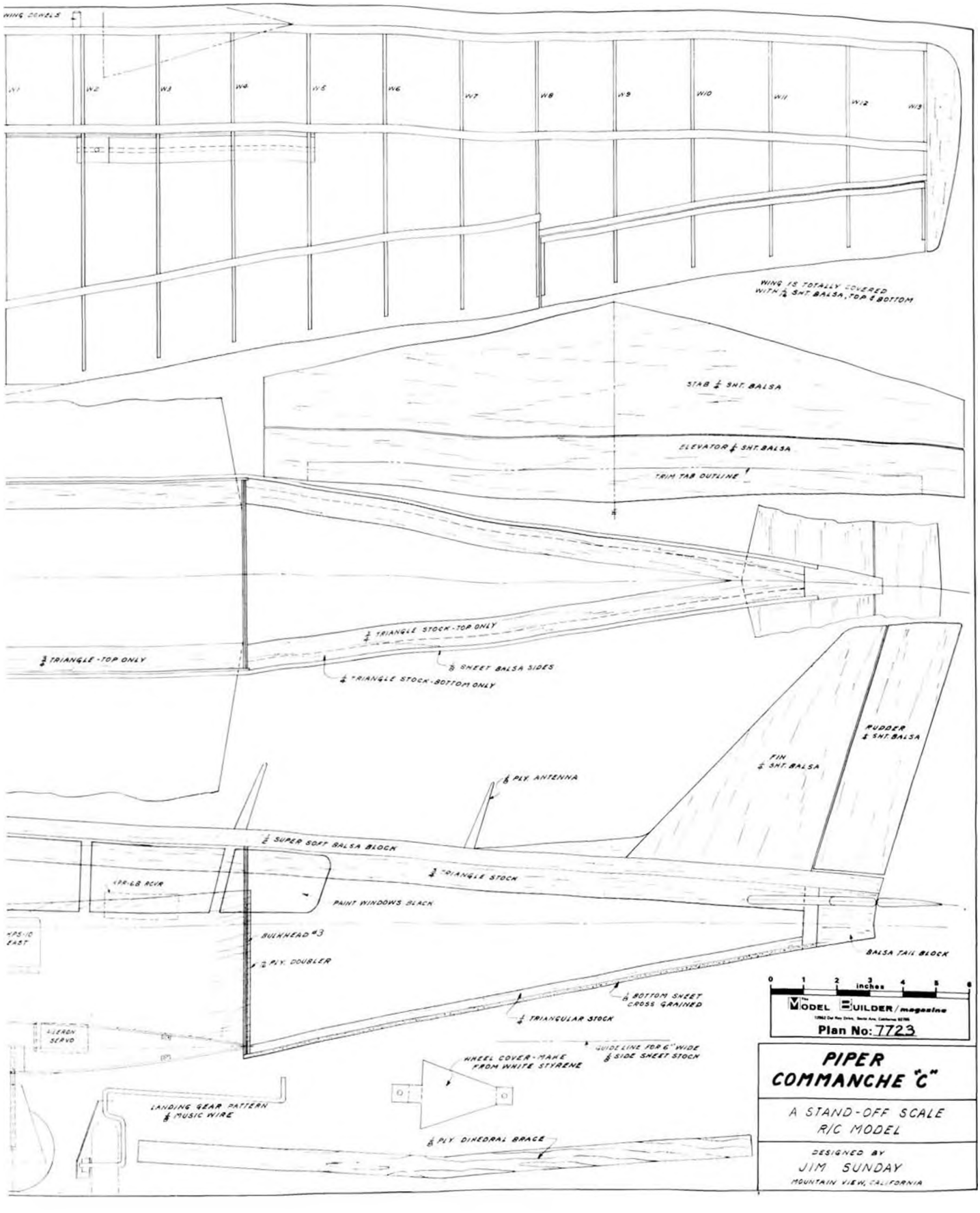
● PLANS ON NEXT TWO PAGES ●



"In a canyon, in a cavern. . . ." Plenty of elbow room for radio installation here! Receiver is located behind servos.

Profile shot of Comanche reveals long nose and need for shaft extension. Jim used foam wing, but plans show it built up. It's your choice.


LEADING EDGE
W13
W12
W11
W10
W9
W8
W7
W6
W5
W4
W3
W2
SPARS
SHT. SPARS
TRUNNION BLOCK, H'WOOD
SPARS
TIP BLOCK
W1
W2
W3
W4
W5
W6
W7
W8
W9
W10
W11
W12
W13
ALL RIBS SHEET BALSA
2 EACH REQUIRED
DIA. SPINNER
TRIANGLE - TOP & BOTTOM
SQUARE BLOCK
BULKHEAD #1
PLY.
BALSA FILLET BLOCK
GUIDE LINE FOR 6" WIDE SIDE SHEET STOCK
BALSA BLOCK
TRIANGLE STOCK
BULKHEAD #1
BOT. TANK LOCATION
BULKHEAD #2
USE TOP FLIGHT NOSE GEAR BLOCKS
BLOCKS GLUED TOGETHER TO MAKE COWL
TRIANGLE STOCK
ALUMINUM COWL LOCATION - WRAPPED AND EPOXIED TO BALSA BLOCKS
BALSA BLOCK
CENTER OF GRAVITY
DIA. WHEEL
BALSA BLOCK
BULKHEAD #3
PLY.
BALSA BLOCK
BULKHEAD #2
PLY.
SHT. SIDE
PLY DOUBLER



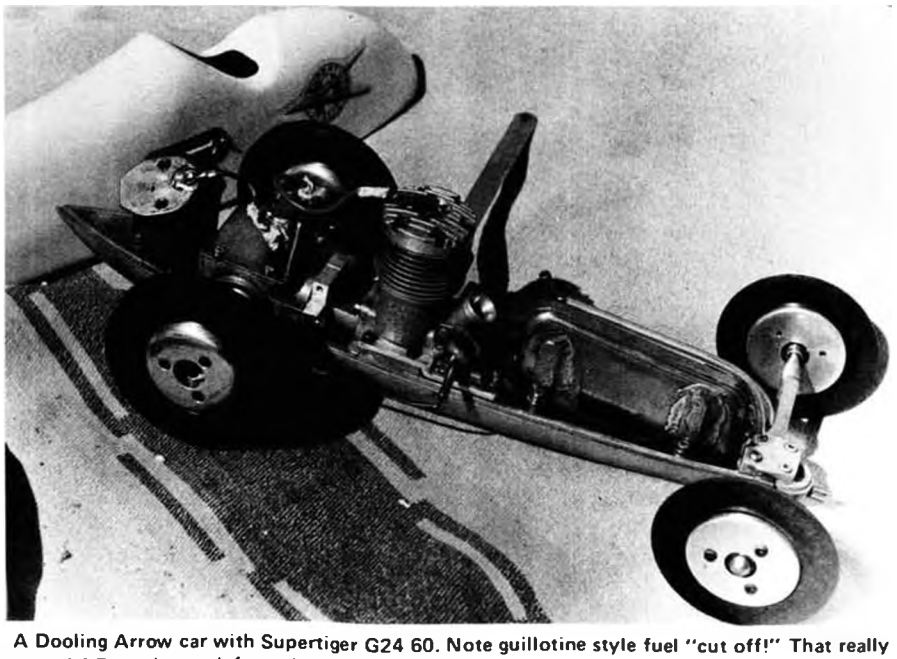
FULL SIZE PLANS AVAILABLE—SEE PAGE 56

PHOTOS BY TED MACIAG

"I wish I was a race car . . ." Her name is Debbie Eterie and she is holding an Arrow . She has nothing to do with car racing, but who cares?

TETHERED RACERS !

The "Tethered Terrors" are making a come-back, though many enthusiasts will tell you they never really left. Our author tells us how to remove the moth balls and tune up for another go. By Ted Maciag.



A Dooling Arrow car with Supertiger G24 60. Note guillotine style fuel "cut off!" That really stops it! Batteries are left on during the entire run.

● For those of you who were astounded upon reading in the May issue of The MODEL BUILDER that the old tether cars are still being run, here is another startling piece of news . . . the American Miniature Race Car Association nationals will be held August 24, 25, and 26, 1972, at the Whittier Narrows track in South El Monte, Calif.

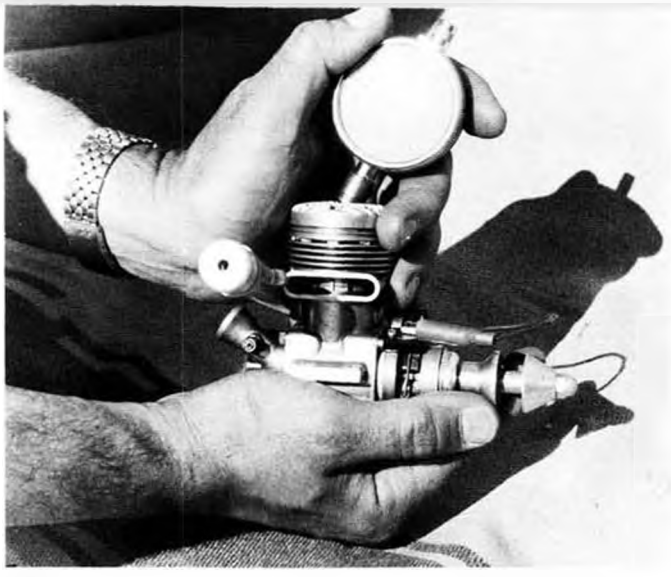
Apparantly a lot of modelers have old cars sitting around the basement that haven't been run in many years. Instead of using the cars as mantle pieces at best, or boat anchors at worst, why not get out and run them? If you are near an active track the people there will be more than happy to help you get that old car running again.

It is a good idea to go over the car thoroughly before you take it to the track. The following suggestions apply to both old and modern cars and also to anyone who is flying airplanes in an event where engine performance counts . . . which when you come to think of it, is any gas powered event, be it car, boat or plane. This is not intended to be a complete text book on winning races, but merely a few points to consider when working on a car to put it in running condition.

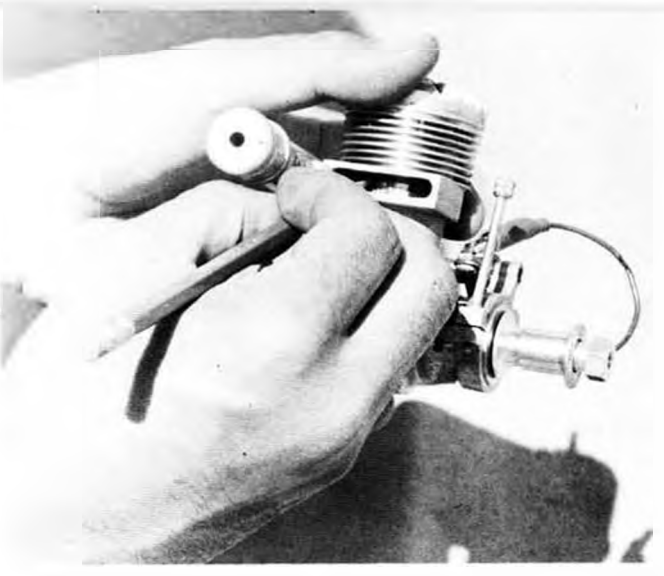
The first and most important part is cleanliness! If the car is old and hasn't been run in many years, a complete disassembly is in order. Clean each part as it is put back together, paying particular attention to the bearings. I use lacquer thinner for a solvent because it is cheap and readily available. If the bearings are rough when turned by hand, replace them. A bad bearing can knock 10 mph or more off the top speed of an otherwise good running car.

If the car doesn't warrant a complete tear-down, the entire unit should still be washed out with solvent. Bearings should be washed from the clean side out, where possible. That is don't drive the dirt through the races and retainers and risk a chance of leaving some inside to cause drag and wear. A pipe cleaner is a handy gadget to use for cleaning out bolt holes in the pan. Dirt there can hasten stripping of the threads and cause considerable trouble. Allen head screws and Locktite will help keep the car together through many races.

For a car that has been sitting even for a few years, three things have to be replaced. The fuel tank is subjected to much more strain from vibration and the corrosion of the hot fuels that are used. If the tank looks good, at least take off an end cap and clean the entire tank. Check for leaks in the time honored method of plugging all holes



Timing a Dooling with a special fitting and a dial gauge. The timing light is hooked to the exhaust.



Marking the piston of a Hornet with a soft pencil for timing purposes. Text gives detailed instructions on this ignition engine check.

but one and blowing through that hole while holding the tank under water. Bubbles indicate a leak. Be sure to clean out all soldering flux inside and out *before* the leak test. Sometimes the flux can cover a hole in the tank that will show up later, not to mention what the flux could do to an engine. If you need a new tank, the best bet is to copy the one in the car. If you have no old tank for a pattern, make one as long as the chassis will permit and as tall as you can fit under the body. The tank should be wide enough to hold 5-6 oz. of fuel.

Newer cars have a panhandle bridle that needs little attention, other than checking for cracks and securing mounting screws. The older wire bridles should be replaced with new ones made with 3/32 inch, or larger, piano wire. This is a must . . . wire is cheap compared to the price of a car or even a broken ankle if a car should come loose at top speed. Make sure that there are no sharp bends in the wire. The car should hang level from the bridle, since this affects the tracking of the car, and the fuel flow as the car picks up speed. Suspend the car by a line so that it hangs over the work bench. With a square, make sure that the car hangs level or slightly outward, one degree or less. Do this with the batteries in place, if the car uses them, but with no fuel in the tank. Ti Tires, both front and rear, should be checked for cracks by bending them almost double and looking carefully for cracks, especially where they have been clamped to the hubs. If there are any cracks discard the tires. A small crack could mean the tire will sling off at top speed and could destroy the entire car or at least bend an axle. Most people leave the tires loose on the hubs until the day of the race so the hubs won't cut into them. New tires are available for most cars; see the addresses later in this article.

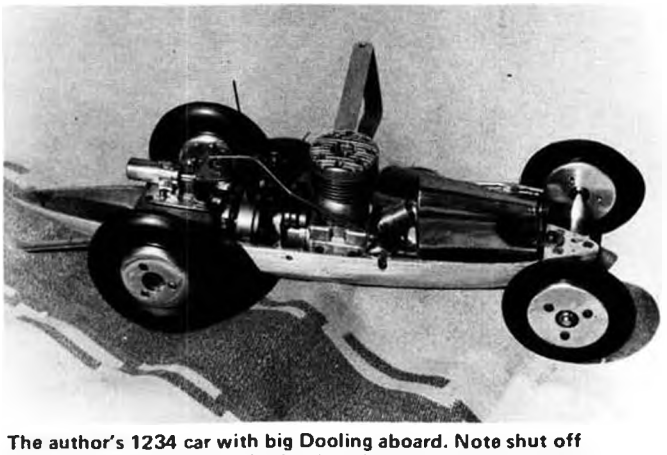
Next on the tune-up list is the ignition system. If you have a battery system, check everything for loose or broken connections and resolder or replace any bad wires. Replace the condensor with an ordinary automotive one, to eliminate one more source of trouble.

It is important that the shut-off be working properly so that you can stop the car when the time comes. Whether your car has ignition or fuel shut-off, or both, make sure that it is working properly before you take your car to the track.

A new battery pack should be made. Use as many cells as the car will hold, usually 4 to 6. The new penlight size nickle cadmiums are excellent and are paid for in the first few recharges. Solder all connections on the batteries, the spring clips on some battery boxes won't maintain good contact. A series, parallel arrangement for 3 or 4.5 volts is normally used. Wrap the batteries with electrical tape to hold them together and to insulate them from the car. Timing the points varies as to the engines used. Later in this article I have an easy way to time the Hornet 60, which is found in a lot of cars.

A word here must be injected about safety. A car running on a standard 35 foot cable at 150 mph pulls about 40 G's. That amounts to about 240 lbs with a 6 lb car. Lines, bridle, and centerpost must be in excellent condition to withstand this. If there is an old abandoned track in your area, by all means try to get it in shape again, but remem-

Continued on page 53



The author's 1234 car with big Dooling aboard. Note shut off switch lever sticking up. This is tripped with stick as car goes by.

Author's 1234 car with the "lid on." It shows scars of many races. Note pan handle for line attachment.

CONTROL-LINE

By Dick Mathis

This month, "Fast Richard's Almanac" plays host to Goodyear specialist Matt Smith. The revealing discussion takes us from prop nut to elevator horn, so pay attention and keep note paper and pencil handy.

● Seems there is a trend toward Goodyear team racing all around the U.S. It's still wide open as manufacturer's spew out a fascinating variety of hot new engines (wait 'till you see the new Super Tigre 15 at eighty bills) and flyers find out modifying .15's is a different bag from hopping up the old .40 for Rat. But the .15's are hotter for their displacement than any other size and they respond extremely well to trueing up the bearing, fitting the piston, and modifying the heads to accept Cox inserts or completely changing the heads. Talk to the local free flight boys about how they make their .15's run and chances are you'll pick up a few RPM's.

The kit manufacturer's haven't responded well at all to Goodyear, but that should change soon. A really top quality Goodyear kit would be worth 10 bucks but no one wants to risk that sort of price for an airplane that small. The retarded mentality of the industry equates price with wingspan, so a C-speed kit theoretically should cost less than a combat job since it's wingspan is less.

Anyway, one of the many local (Dallas) Goodyear freaks is Matt Smith, who experiments constantly and has a few thoughts on the topic, which I asked him to jot down . . .

"Last weekend Rick Merriman and I cut out a pair of foam wings for 15 powered Goodyear racers. It seems that Goodyear has gone a little past the once simple all balsa kit type. We have been experimenting with speed pans, magnesium engine cruches, and foam and aluminum skinned wings.

"The initial supremacy of Super Tigre .15's is being threatened by the likes of Rossi, Kosmic, and TWA. Everyone is anxious to try the new K & B, too. I really don't think these new developments are going to hurt the sport of Goodyear racing. Everyone is just going to have to work a little harder to keep up with the pack, and it all adds interest.

"Don't fret if your Tigre .15 won't keep up with the Rossi's and new K & B's; just build FAI Combat planes and fly harder.

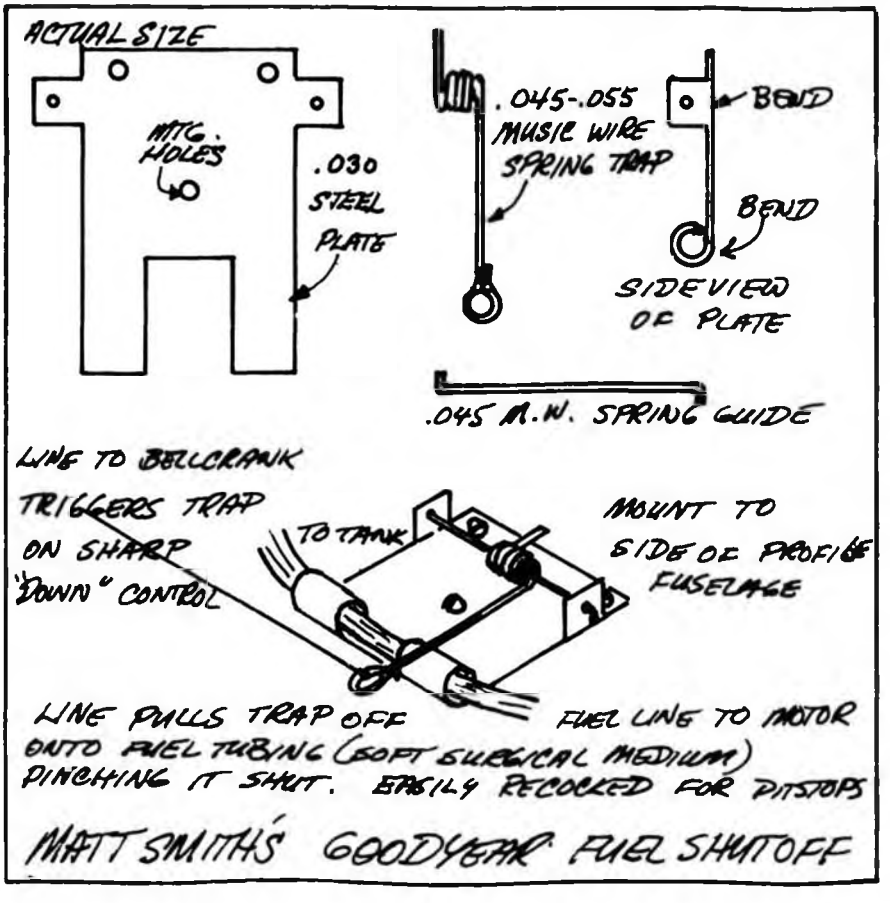
"Meanwhile, back to Goodyear . . . after a couple of years of Goodyear flying, the plane that works best for us is the lightest plane that we can keep together. We try to keep the plane between 16 and 18 oz., ready to fly, and run the C.G. about 1-1/4 to 1-1/2 inches back from the leading edge. Contrary to some, we run everything zero-zero with no engine turn out and no tip weight and we haven't had any of them coming at us lately on the takeoff.

"The fuel we normally run is about 50 percent nitro, much more nitro than this and we lose a plug every time we start the engine. After all, if you have to change a plug on the pit stop, the race is over for you in most cases. Whatever you do . . . set up the engine and fuel to run 160 laps.

"April 23 we timed Roger Paschal's Rossi at an honest 100 MPH in traffic. The week before Roger had timed 1971 National Rat Race Champ Ron Esman's Goodyear at 106 MPH consistently with good pit stops. The competition is rapidly shaping up for this year's NATs. It should be a very interesting season in the Goodyear circle.

"Currently we are working on a low wing "Little Ton." It has magnesium motor mounts with a cheek cowl that is completely fiberglassed. The foam wing

Continued on page 44



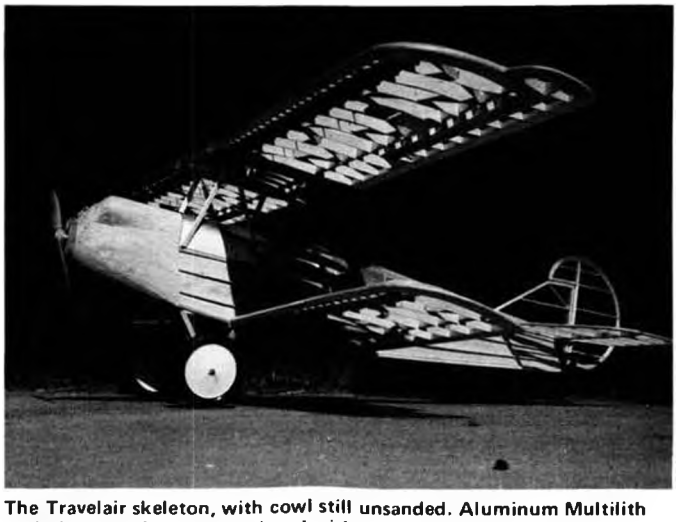
TRAVELAIR "2000"

Classic airplanes, especially the two wing type, never die. Long after MAN had discontinued plans for the T-Air we were getting requests for them. . . .So, here we go again, the "Wichita Fokker!" By Bill Northrop

● As announced in the February issue, permission has been obtained from MAN's Walt Schroder to reissue plans for the Travelair 2000, which we designed at 2 inches to the foot and had published in the November, 1965 issue of M.A.N.

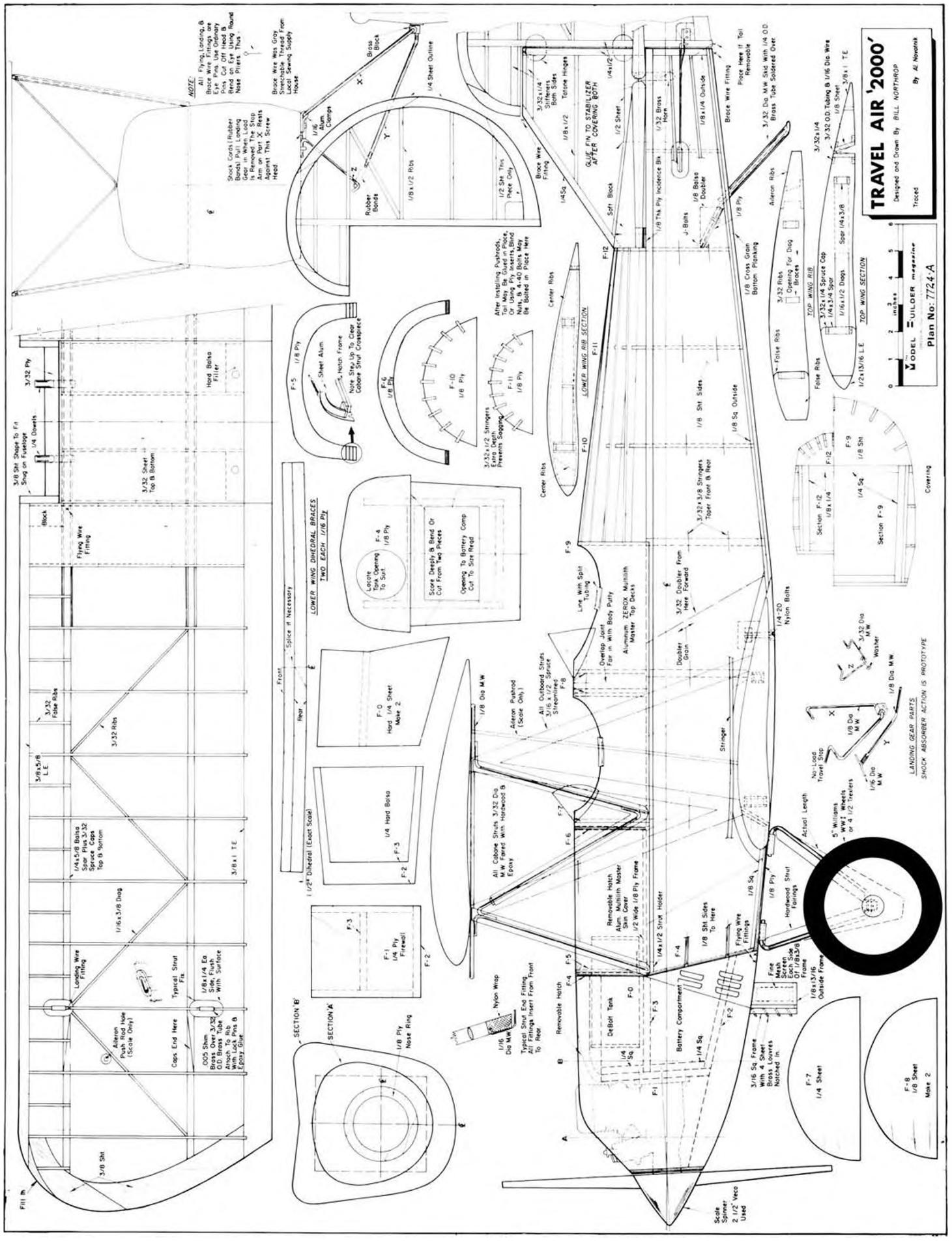
At the time we announced reissue, we had not checked the plans over in several years, and naturally figured that some updating was in order. Actually, outside of a few suggested changes, we'll leave other modifications up to the builder. After all, what self-respecting modeler would build someone else's de-

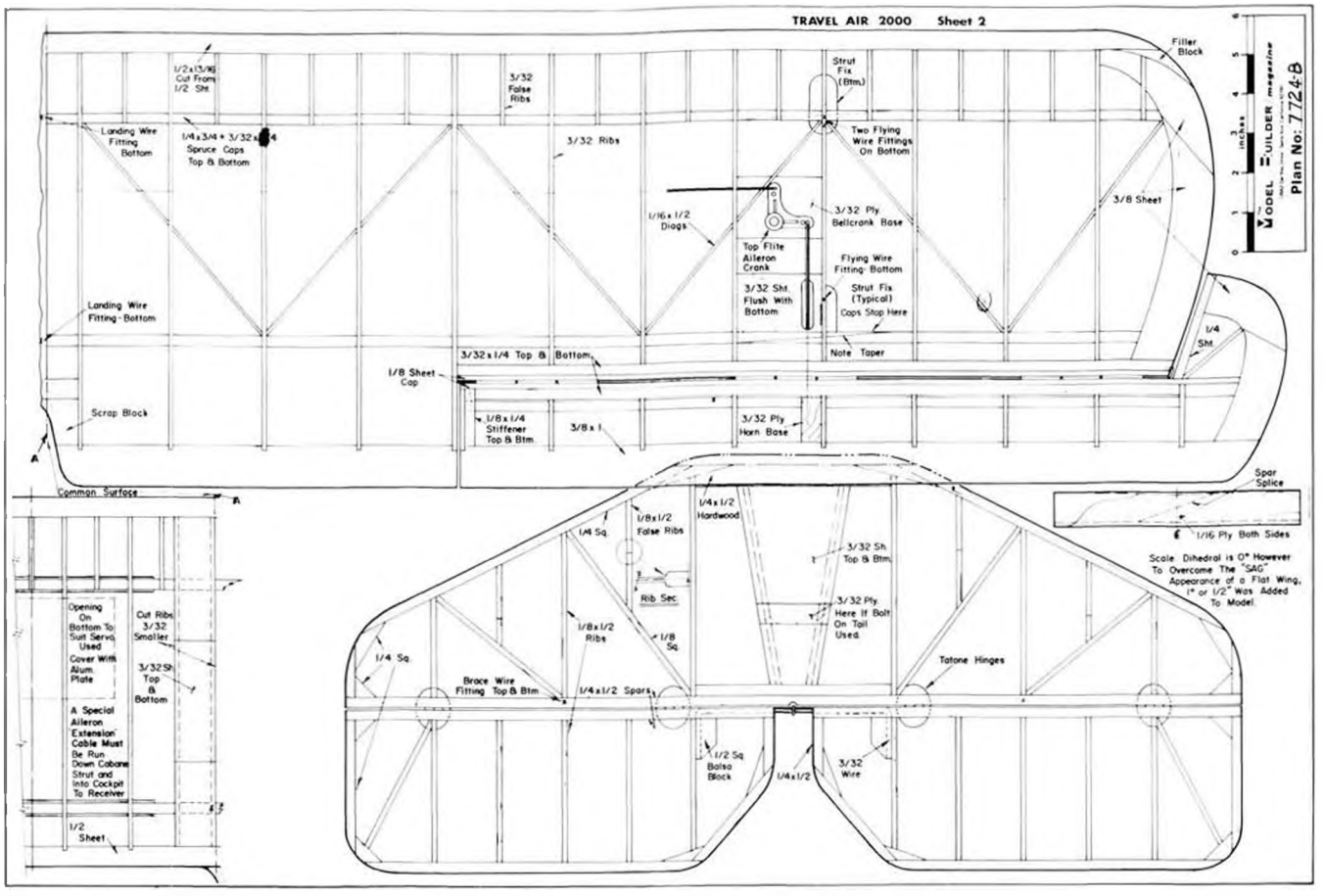
PHOTOS BY BILL NORTHROP



The Travelair skeleton, with cowl still unsanded. Aluminum Multilith cockpit cover should be replaced with standard balsa sheeting.

Yogi Bear is going up for an aerial view of "Jellystone Park." We'd suggest revising that top wing lashup. Who wants rubber bands?!


TRAVEL AIR '2000'
Designed and Drawn By BILL NORTHROP
By Al Nowinski
Traced
MODEL BUILDER magazine
Plan No: 7724-A
TOP WING RIB
TOP WING SECTION
LOWER WING RIB SECTION
LOWER WING DIHEDRAL BRACES TWO EACH 1/16 Ply
SECTION 'A'
SECTION 'B'
LANDING GEAR PARTS
SHOCK ABSORBER ACTION IS PROTOTYPE
NOTE: All Flying, Landing, & Brace Wire Fittings are Eye Pins. Use Ordinary Pins. Cut Off Head & Bend an Eye Using Round Nose Pliers. Thus:
Brace Wire Was Gray Stretchable Thread From Local Sewing Supply House
Shock Cords (Rubber Bands) Hold Landing Gear in When Load Is Removed. The Stop Arm on Part 'X' Rests Against This Screw Head
After Installing Pushrods, Tail May Be Glued in Place, Or Use Nylon Screws and Nuts, & 4-40 Bolts May Be Bolted in Place Here
GLUE FIN TO STABILIZER AFTER COVERING BOTH
Brace Wire Fitting
Pilot Here If Tail Removable
Aileron Ribs
False Ribs
Center Ribs
Soft Block
Rubber Bands
Brass Block
Brass Horn
Tatone Hinges
Hard Balsa Filler
Flying Wire Fitting
Landing Wire Fitting
Aileron Push Rod Hole (Scale Only)
Caps End Here
Typical Strut Fit
Aileron Pushrod (Scale Only)
All Outboard Struts 3/16 Dia Spruce Streamlined
All Cabane Struts 3/32 Dia M/W Faired With Hardwood & Epoxy
Removable Hatch Alum. Multilith Master Skin Cover
Overlap Joint Flair in With Body Putty
Aluminum ZEROX Multilith Master Top Decks
Line With Split Tubing
Stringer
Battery Compartment
Nylon Wrap
Typical Strut End Fitting All Fittings Insert From Front To Rear
Nose Ring
Fine Screen Each Side Of 1/8x3/8 Frame
Flying Wire Fittings
Hardwood Strut Fairings
Actual Length
No Load Travel Stop
5" Williams WW1 Wheels or 4 1/2 Treaders
Scale Spinner 2 1/2" Veco Used
Fill In
Covering



sign without making some improvements?

First of all, the plans incorporate changes dictated by flight testing. No need to alter the force set-up. It works. Balance point is at Bulkhead F-6. A flat bottom airfoil might improve inverted performance, but the plane looks very realistic upside down with the tail hanging down at about 8 to 10 degrees. Airfoil is scale, but a little thicker to accommodate spars.

Structurally, the most needed change is from the Zerox Multilith aluminum sheet cockpit cover to sheet balsa planking. The aluminum was too flimsey and not available to everyone. Also, the removable section between F-5 and F-6 is not needed since the fuselage opening under the one piece bottom wing provides access to radio gear.

The scale sprung landing gear caused difficulty if you didn't maintain proper rubber tension. If you fly from a rough field, it would be better to make "Y" a single piece going from one wheel to the other. Bind with rubber where it comes close to "Z." Ground handling would improve by substituting a tail wheel for the skid. However, if you're a purist, rottsa ruck!

Incidentally, the plans were scaled from Joe Nieto drawings of the T-Air published in the February 1953 issue of M.A.N. If you don't have access to those, many of Nieto's scale drawings are on file at the Smithsonian, and the Travelair can be obtained for $2.00. Write to Fiscal Division, Section M, Smithsonian Institute, Washington, D.C. 20560. ●

The Travelair is a fun plane to fly. Very realistic in the air, it does square loops, side slips, very slow rolls (the only kind), and oh boy, the snaps!

SAM-5.....*Continued from page 20*

on. Blocks for rib stations 2, 10, and 17 (tip) will be sufficient for a neat job. Sand wing to a smooth finish and pre-dope all contact surfaces with 2 coats of 50/50 dope/thinner (skip this portion if using MonoKote or Solarfilm) and sand again.

If using tissue, may I suggest the following procedure: Cover all surfaces with a layer of tissue, water shrink, and apply two coats of 50/50 dope. Sand surface lightly, then apply a second layer of tissue, cross-grain, over the open structure only. This will go on quite easily (no wrinkles) if you apply it as if there were no previous cover, that is by sticking it to each rib on the lower surface, *not* doping through to the first layer on open areas; and then water-shrinking the second layer. Put two more coats of dope over everything, add AMA numbers, decals, etc, one last coat of dope, and sand lightly. A final waterproofer of 50/50 HobbyPoxy clear paint/thinner over entire wing will assure you of a stable surface in any weather. Rub down with Dupont Polishing Compound when thoroughly cured. Scrape away tissue at locations marked, and glue turbulator supports in place with a fast drying cement such as Testors. If a support breaks off at a contest (likely), use the wing wires to align it back in place, the thread should bisect a line that touches the lowest point of both the L.E. and T.E. The thread itself is elastic thread (Sewing department of any department store) knotted at both ends of a 30 inch (no stretch) piece. Make up several sets and replace about every 2 - 3 weeks, *on both sides*, if one gets ravelled. Never replace or tighten only one.

Obtain a fibreglass boom for the fuselage that is as light as the one indicated, or sand a heavier one to weight. Carve a 1/2 inch diameter hardwood dowel to a slight taper and epoxy into the front of the boom as shown. Cut the nose core from 1/2 inch ply or basswood, making all cutouts indicated. Do the same with the 3/32 inch ply sides. Laminate the core, using masking tape, C-clamps, and a flat surface. When dry, pour about 3-1/2 ounces of Cerrobend or solder into the ballast compartment, but do not glue the access hatch in place yet. Add fibreglass boom, using tape to hold it *straight* while drying. Fill in areas around boom with balsa as indicated. The FAI Supply towhook must be screwed in place at this time, but just insert the carraige bar, leaving the actual towhook off for the time being. Again, fill in with scrap. Epoxy shoulder ribs, using slow-drying epoxy, and drill tube holes before it hardens. Check alignment with wing attached. When everything is dry, rough sand to contour shown, using power sander. Apply two coats of Hobbypoxy "Stuff" mixed 50/50 with HP thinner, using a brush. Sand between coats, which will be every 24 hours. Either color dope or cover with tissue to suit your taste.

Laminate the stabilizer L.E. right over plans. Plane T.E. to shape, and pin (over, not through) to board, shimming as noted. Cut ribs from very light 4 - 6 pound C-grain, 1/32 inch balsa, and epoxy in place. Add false ribs next. Epoxy upper spars in place, and when dry, remove from board and add lower spar. Return to board. Glue in tips, gussetts, and other details. When dry, sand, apply two coats of 50/50 dope thinner, sand again, and cover with Jap tissue. These coats of 50/50 dope will be sufficient for finishing, or one coat of dope and one coat of 50/50 HobbyPoxy clear paint/thinner. Add D.T. hooks. Final weight should be 7 - 8 grams.

Cut out three rudder laminations shown. Remove striker disc material (if you don't have X-acto disc cutter shown, these can be made square) and replace with 1/32 inch ply. Laminate

and clamp to a flat surface. Slit 3/32 inch balsa fin to accept hinges (Sig nylon hinge material, .010) roughen hinges, and epoxy in place. Attach rudder and sand everything to an airfoil shape.

Slot boom to accept rudder and glue in place.

Tap FAI Supply Auto Rudder stops, cut in half, and epoxy in place. Cover rudder with Japanese tissue, add hooks, and finish per stab. Epoxy stab rest on boom, and bind with thread.

FINAL ASSEMBLY: Hook up A/R line (.008 *braided* U-control cable), D.T, line (12 lb. monofilament, timer/start bushing, and install Seelig timer. The 80 lb. Mono "pin" should shut off the timer cleanly, and hold A/R in neutral position. Check C.G. and ballast accordingly. At this point model should weigh between 13 - 14 ozs. Add ballast to the C.G. to bring the total weight to 14.46 ozs.

The method of trimming a model with this section is slightly different than that usually used. One of the reasons for this is the outrigger turbulator, which has a profound effect upon the model's handling, if used correctly. The model will not tolerate having the incidence "stretched" (stab raised higher than optimum) as will other sections, notably the B7457D/2 and B 6456 F. When you have reached glide trim, you will know it, as the model will stall out of the sky with only a slight increase in incidence from the optimum. Hand glide to obtain a *very* slow glide, with the model making 1/16 - 1/8 turn before landing. It may take 20 hand glides to get this, but it's worth it in terms of time saved by line trimming.

Place towhook in location shown for trimming in normal weather (5-10 MPH winds) and start tow trim using a full length line and no anti-fall off. If the wings warped to provide any wash-in, make the model turn in the direction of the wash-in, provided it is present in the inner panel only (outer panels will probably wash out slightly by themselves) and it does not exceed 1/16 inch at the dihedral break. If more than this is present, remove to 1/16 inch.

A/R should be set slightly against the glide turn (actually countering the wash-in). The tow should be straight for the first 50 degrees or so, after which the plane will probably weave somewhat to the top of the line. Release the model and watch the glide. Make adjustments to obtain a circle of about 100 - 125 foot diameter, correct the tow as needed, but leave the hook where it is if the model behaves as described. It is supposed to weave slightly, but only at the top of the line. If it veers more to one side than the other, use tow rudder adjustment. If it still won't return to neutral, move the hook forward.

You will find the model rises quite quickly on the line, and in winds in excess of 15 MPH it will not be necessary to move at all after getting the model up, it can be "kited" from a fixed posi-

BILL OF MATERIALS

SHEET	WEIGHT OF SHEET	TYPE WOOD	INTENDED USE
(2) 3/32 x 3 x 36	13-15 gr. each	"C" grain contest	wing ribs, rudder
(1) 1/32 x 3 x 36	4.6 gram	"C" grain contest	stab ribs, webbs
(2) 1/16 x 3 x 36	8-10 gr. each	"A" grain contest	center panel (s) planking gussetts
(1) 1/16 x 3 x 36	7-8.5 gram	"A" grain contest very light	tip panel(s) planking gussetts
(2) 3/16 x 1 x 36	12-14 gr. each	"A" grain contest grainy	center panel(s) - T.E.
(1) 3/16 x 1 x 36	10-12 gr. each	"A" grain contest	tip panel(s) - T.E.
(2) 1/8 x 1/4 x 36	4.0 gr. each	"A" grain contest stringy	center panel(s) - L.E. rear lam.
(1) 1/8 x 1/4 x 36	3.5 gr. each	"A" grain contest stringy	tip panel(s) - L.E. rear lam.
(1) 1/16 x 1/8 x 36	1 gr. each	"A" grain contest stringy	stab L.E. rear lamination
(3) 1/16 x 1/12 x 3/16	1/3 gr. each	"A" grain contest very stringy	stab spars
(1) 3/32 x 1/2 x 36	2-3 grams	"A" grain contest medium	stab T.E.
(1) 3/4 x 3/4 x 12	light!	Punk!	wing tip blocks, stab tips

tion. When kiting, you will find it handy to hold a short length of line in your free hand, to pay out and take in slack as the model adjusts itself to varing wind speeds. In lift, the model will shoot from it's 60 degree kit position to the top of the line, and veer slightly towards the glide side (this is thanks to the stab tilt). Let the slack out, pull the winch down to waist height, and whip it up and away (downwind) from you to clear the line in strong lift. This motion looks like you are throwing your reel at your retreiver . . . warn him.

Once the trim is set properly, install the antifall-off wire, and get acquainted with the model: Tow for as long as you can, as often as you can. ●

FIND THERMALS!!

Note: Full size drawings include an 8-1/2 x 11 plate showing fuselage and rudder details.

C/L.....*Continued from page 38*

is covered with 1/64 inch plywood. The powerplant is a full piped TWA. We are using the 29 "B" tank designed by Bill Wiesneski for B Speed, with a quick fill. We are also using both a fuel switch and a fuel cut off. We will use the "up" line to richen the engine after it gets off the ground on the lean setting, and the "down" line to shut off the engine and put the fuel switch back on lean. This particular engine doesn't use a pressure set up, but runs on suction best, which is surprising.

"Last spring we tried unsuccessfully to get a piped Rossi to run on a Goodyear plane. The engine started well, but wouldn't consistently stay on the pipe. I think this was due to not having a fuel switch, but when the pipe was on it went like blazes.

"An off the record thought . . . Is it legal in Goodyear to run on R/C carburetor and not shut off the engine when landing, just fill the tank, reset the carb, and go? . . . very interesting.

"Let us also get out of the rut on plane design. There are at least 12 new planes on the full size Goodyear circuit. You can easily build the "Thunderchicken;" just build a Rivets fuselage and install a full size Shoestring wing for a truely unique airplane. There are several new modified full/size Cassutts; most notable of these being Jim Wilson's "Plum Crazy," and John Jenning's plane. Both of these planes have tapered wings and bear little resemblance to a stock Cassutt Racer. Jim Wilson and John Jenning's planes are based in Dallas.

"After our last contest I gave some serious thought to making life a little safer for the Goodyear pit crew. It is my personal opinion that we should wear some kind of protective headgear (this could also be used in Rat and Combat). We have never had an accident, but we don't want to count the close calls."

The contest season is here as I write and it's more fun to fly than write . . . so let's go!!! *(Gee, wish I could do that! Ed.)* ●

pylon.....*Continued from page 14*

item, I can strongly recommend it. We use the Tatone battery charger to recharge it's nickle cadmium battery each time the starting battery's integral voltmeter indicates it's low. The most useful feature of this starting battery is its ammeter, which indicates when the battery clip is making proper contact with the glow plug and whether the glowplug is dead or the engine is flooded. At $29.95, the "All In One" is not an essential part of every pylon racer's field box, but those who use it will virtually eliminate the guessing game out on the starting line over whether or not their engines will start.

Along this same line, Penford Plastics Corp., 320 Curtis St., Delaware, Ohio 43015, has announced the Vari-Glow starting unit. This item is powered by tapping four volts off a 12 volt battery used for electric starter. The Vari-Glow uses a voltmeter to indicate whether a glow plug is good or the engine is flooded. It is equipped with a rheostat to increase the voltage to a flooded engine in order to clear it. I do not have the exact price of this unit at this time,

RESULTS
VALLEY FLYERS FORMULA I, MAY 6-7

	NAME	AIRCRAFT	ENGINE	TIME
1.	Bob Smith	Miss DARA	'72 K & B	1:32.0
2.	Larry Leonard	Miss DARA	'72 K & B	1:30.5
3.	Dan McCan	Miss DARA	'72 K & B	1:34.2
4.	John Brodbeck	Minnow	'72 K & B	1:38.0
5.	Kent Nogy	Miss DARA	'71 K & B	1:42.0
6.	Terry Prather	Minnow	Tigre	1:32.7
7.	Ed Hotelling	Shark	'72 K & B	1:37.5
8.	Jay Replogle	Minnow	'71 K & B	1:41.1
9.	Ron Neff	Minnow	'71 K & B	1:44.1
10.	Bob Bleadon	Miss DARA	'72 K & B	1:32.8
11.	Jack Hertenstein	Shoestring	Tigre	1:39.0
12.	Doug Spreng	Minnow	'71 K & B	1:46.2
13.	Nupen/Faber	Mustang	Tigre	1:44.2
14.	Ron Russell	DeNight	'71 K & B	1:44.8

but it should be approximately $20.

* * *

Pylon racing pilots seem to be equally divided in their preference for balsa and fiberglass aircraft. The popularity of fiberglass is probably due to the time it saves in construction. A fiberglass fuselage, however, still presents some construction techniques which are sometimes difficult for a rookie to master. This month we'll discuss one of these methods; mounting the engine to the fuselage.

The first step in the construction of most Formula I and FAI aircraft is the choice of a motor mount. The best mounts available today are the machined aluminum mounts produced by Garry Korpi, P.O. Box 239, Milpitas, Ca. 95035, for $14.00 and by C.B. Enterprises, 15713 Via Represa, San Lorenzo, Ca. 94580, for $12.95. Both of these mounts provide the most solid base possible, which is extremely important for getting the maximum rpm's from our powerful 40's and for keeping the vibration transmitted to the rest of the airframe down to a minimum.

The square backed Tatone mount comes close to the standards set by the Korpi and CB mounts. At $5.00, it is probably the most popular mount. I have also had good success in my FAI ship with the standard $3.00 heat treated Tatone mount. The Kraft-Hayes engine mount, fine for sport and pattern, is unsuitable for pylon racing. The choice of a motor mount is usually a compromise between how serious a competitor is and his financial resources.

The motor mount must be drilled and tapped for mounting the engine. The Tatone mounts can be ordered with the mounting holes pre-drilled for your specific engine. Tatone drills these holes at the end of the mounting beams. We have never ordered them this way because we like to attach the engine as far back on the mount as possible. The closer the engine is mounted to the backplate of the mount the more solid the installation will be.

We have a friendly argument going with several engine experts over the merits of attaching the engine to the mount with 4-40 or 6-32 bolts. We use 1/2 inch 6-32 Allen-head bolts, which are much cheaper when obtained from a surplus store. The larger head of the 6-32 bolt allows them to be tightened more and the hexagonal socket does not wear down as quickly as the 4-40 bolt. Several of our flying buddies learned this lesson at our last contest when they switched over to 4-40 bolts and promptly had them vibrate loose. We use the shorter length bolts so that the engine can be removed and replaced quickly. We learned our lesson here by spending several frustrating hours repeatedly removing engines that used 1 inch bolts. Most engine mounting lugs are drilled for 4-40 bolts, so they must be enlarged to 1/8 inch diameter for the 6-32 bolts.

Drilling and tapping of engine mount is always a pain in the neck. We use the I-M Products engine mounting template to get the correct spacing of the holes. We have yet to find a successful method for solidly attaching this template to the mount while the holes are drilled, however.

Drilling these holes vertically through the mount is very difficult without a drill press. I have yet to get four perfect holes in one mount. A 7/64 inch drill should be used for 6-32 threads. Tapping these holes should be done slowly and patiently. There is nothing that will stop a night's work faster than a broken tap below the surface of the mount. Using a tap wrench and plenty of 3-in-1 oil, we turn the tap into the hole until it begins to bind. We then remove the tap and clean all the metal chips from it and then continue screwing it into the hole. This process is usually repeated two or three times until the entire hole is tapped. All the metal chips in the hole should be flushed out with a solvent. Never use excessive force while turning the tap. If the tap does break of †?%*!! and can't be removed, you can either have it melted out by a tap removing outfit or drill a new set of holes in the mount.

The firewall must be installed by the modeler in most fiberglass fuselages. Fuselages come with the right cheek cowl either molded in as part of the fuselage or molded separately. The first step with either type is to approximate where the front face of the firewall will be located when installed. This is done by putting the engine in its mount and then measuring the distance from the front of the engine to the backplate of the mount. This distance is then marked on the fuselage. If the cheek cowl is molded into the fuselage, the cowl should then be cut out using a razor saw. The fiberglass should be cut 1/4 inch forward of the mark on the fuselage, along the bottom of the cheek cowl, and down the center of the top of the fuselage. If the right cheek cowl is molded separately, it should be mount-

ed to the fuselage to correspond to the position of the left cheek cowl. The outline of the cowl should be marked on the fuselage and the cowl then removed. A Dremel attachment No. 115 should be used in a Dremel Tool or a 1/4 inch drill to cut out a hole for the engine inside the outline of the cowl and firewall.

The approximate shape of the firewall should then be cut from plywood. We have found 1/4 inch ply to be insufficient, and now use either 3/8 inch ply or laminate two pieces of 1/4 inch ply together with epoxy. The engine should then be bolted to its mount inside the fuselage. Using the hub from a broken prop (if you don't have one now, you soon will), mount the spinner to the engine. Make a spacer ring from 1/32 inch ply of slightly smaller diameter than the spinner. Place this spacer between the spinner and the fuselage, then carefully align the spinner with the fuselage and tape this mount-engine-spinner assembly in place. The firewall must then be shaped so that it can be slipped through the opening for the wing and fit flush against the back of the engine mount without distorting the fuselage. This can sometimes be a slow process, so have patience.

When the firewall is properly fitted, rotate the engine so that it is at the correct angle to fit inside the cheek cowl. Mark as much of the outline of the engine mount as possible onto the firewall. Draw a line on the mount to correspond to a line on the firewall so that the mount can later be mounted to the firewall at the correct angle. (See photo)

Remove the spinner from the engine and take the firewall and mount out of the fuselage. Align the mount on the firewall and mark the position of the mounting holes. Drill these holes out for 6-32 bolts. Enlarge the holes in the back of the firewall for the large 6-32 blind nuts, such as those distributed by Sig. Do not use the small Du-Bro blind nuts. Now drill two 1/2 inch holes in the firewall, one directly behind where the carburator will be and the other in the area of the left cheek cowl. Either a commercial duct may be used to connect these two holes or else one may be carved from balsa. The hole for the engine pushrod should also be drilled at this time.

The inside of the fiberglass fuselage should be sanded in the area of the firewall with medium grit sandpaper to insure that a good bond will be formed in this area. The firewall should then be slipped into the fuselage. Coat the back of the engine mount with silicon rubber and bolt it tightly to the firewall. We had several mounts vibrate loose before we learned this trick. The silicon rubber allows the mount to be removed relatively easy if necessary, but still make it virtually impossible for the mount to vibrate loose. Now bolt the engine in place and tape the spinner and spacer to the fuselage as before.

Cut up two inch squares of heavy fiberglass, mix up a batch of epoxy or polyester resin, depending upon what the fuselage is made from, and fiberglass the back of the firewall to the fuselage. About 1/2 inch of the fiberglass should be bonded to the firewall and the rest to the fuselage. The cloth should be saturated with the epoxy or resin before it is laid in place.

When this has set up, the engine and spinner should be removed from the fuselage and the front of the firewall then fiberglassed to the fuselage, using the same method. The entire front of the firewall should be coated with epoxy or resin to fuel proof it, and all the excess epoxy or resin wiped off the mount.

If this method is followed correctly, a very solid engine installation will be obtained with a perfectly fitting spinner. It is important that the spinner be tightened down all the way when it is taped in place during the installation of the firewall. The backplate of every spinner will bend to different degrees when tightened. This could later cause binding against the fuselage if the spinner is not properly tightened during this assembly. ●

Avro G..... *Continued from page 27*

Construction of the model is quite simple, and the drawings should be nearly self-explanatory. Of particular importance is the selection of light sheet balsa. The model's strength is based upon its configuration, not upon rugged (read heavy) materials!

The fuselage formers are constructed picture-frame style from fairly hard 1/16 inch square, which may be pinned to the board while drying. Meanwhile, the body sides may be cut to shape from 1/32 inch sheet. Be certain that they are exactly alike, so that everything will line up correctly. It is well to cut the slot for the stabilizer through both sides at once, for accuracy. Cement the aft end of the fuselage sides together, and add the formers working

from the rear forward. After the basic structure has dried, bend the wire landing gear legs to size, add the hard balsa "sandwich" mounts, and glue securely into the fuselage. By threading the bamboo skid through the "eyes" in the landing gear legs while the glue is still wet; it will be simple to line everything up properly.

Speaking of that bamboo skid, it occurs to me that some of you may not be familiar with the material. Often, bamboo can be obtained from ornamental place mats. Another source is chop sticks (although they are rapidly being replaced with the plastic variety, it seems.) At any rate, bamboo is worth the bother to find, as it is almost as rugged as music wire, with much less weight. The original model has survived several severe "dorks" thanks to the sturdy bamboo skid. It is easier to scrape the bamboo to round section, rather than carve, as you might balsa wood, and a single edge razor will do the job. The curve is imparted over a hot soldering iron, being careful not to char the wood. Frankly, the operation is about like trying to stretch-mold canopies, and usually takes me two or three tries.

Returning to the fuselage, cover the top and bottom with 1/32 inch sheet, which is applied oversize, then trimmed flush when dry.

After the fuselage is assembled, it should be given a careful overall block sanding, to further reduce weight, especially in the non-stressed area aft of the rear rubber peg. Note that the bamboo tail skid is fastened to the rear of the fuselage ALONGSIDE of the rudder, where it may flex under landing loads, without disturbing the delicate rudder. (On the real "G," the metal-shod lower rudder was actually used as a tail skid).

The tailplanes are simply cut and sanded to shape from 1/64 inch sheet balsa. If you haven't any of this precious stuff, make your own by block sanding 1/32 inch sheet . . . in one direction only, and away from you, to avoid buckling the balsa. Also, turn the sheet over every few strokes, to avoid distortion which may be brought about by sanding only one side.

The wing panels are all the same shape and should be cut from 1/32 inch sheet. Glue hard 1/16 inch square balsa strips on the underside of each leading edge and weight them down flat while they dry. The curve of the wings is slight, so the ribs can be added without the need of moistening, doping or such. Be certain that the finished wings are not warped.

The various "rib lines," etc., are drawn on the balsa with a thinmarking or ball-point pen, before the model is assembled, and the figure 7's are cut from black tissue and clear doped to the fuselage sides. The dummy radiators are drawn in ink on tracing paper and glued to both sides of the fuselage. The cowling is covered with aluminum-painted paper or thin aluminum foil which lends a realistic effect with very little weight. The louvres and other details are simulated by embossing them with a stylus (an empty ball-point would do) before attaching the paper or foil to the fuselage with contact cement.

Mark the exact position of the wing roots on the fuselage sides. Note that only the upper wing has 3^{o} incidence, relative to the thrust line, and that all four wing panels should have 5/16 inch dihedral as measured at their tips. The wing struts pass through openings in the lower wing panels and glue alongside the wing ribs. No openings are needed on the upper panels, as the struts simply glue against the underside, alongside the ribs.

Glue the tailplanes and their struts in position, and check their alignment carefully.

The model may be rigged with silk thread, which in addition to its great strength, is much smoother in appearance than cotton thread.

Be certain that the finished model is free from warps. The prototype required additional ballast in the nose, a bit of left rudder, plus some down and right thrust, and slight wash-in of the lower left wing in order to fly in left circles under the 23 ft. ceiling at Sepulveda Junior High School. Power is provided by a single loop of 1/8 inch brown rubber, or 3/32 inch Pirelli, about 12 inches long. If more power is needed to make the model climb, shorten the loop. Our model employed a 4 inch diameter Kaysun plastic prop, but performance could be improved with a hand-carved balsa one.

If you decide to install a CO_2 engine, make a firewall of 1/32 inch plywood and mount the engine with 00-90 model railroad screws, which will permit easy thrust adjustment. Remember that the large end of the fuel tank must be lower than the outlet end. ●

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free flight..... *Continued from page 23*

FREE FLIGHTERS, YOU SHOULD BELONG TO: N.F.F.S!

The National Free Flight Society (Pete Sotich , President, Bob Meuser, Editor, Ex. Director Harvey Broderson, and a full slate of Officers all over the U;S.) is a big going Club for Free Flighters. It has a most excellent publication, covering all aspects of Free Flight, with pictures and plans of the best. If you have something good to publish, write to Bob Meuser, 4200 Gregory St., Oakland, Calif., 94619. If you want to join the Society, send $4.00 to Ron Evans, 23 Blake St., New

Haven, Conn., 06511. You can't go wrong with this solid organization, and you will be associated with the best in Free Flight.

Jack Shafer, new NFFS Supplies Director is stockpiling many excellent goodies for the free flight fanatics. They have a copy of the Cox 7 x 3-1/2, and the Meisnest 7-4, which is actually two different props of the same size made by the Meisnest crew in Germany. Any of these props cost $1.50 each. The very latest thing is Nordic FG tailbooms.

There is also a big variety of plans, AND THE SYPOSIUMS. The SYMPO Papers are absolutely great. The latest word is that there will be some reprints available soon. Why don't we all write in and show our interest. Don't hesitate to send your money along. The price is $3.50 to NFFS members, $4.50 to nonmembers. Why don't you enlist at the same time, if you aren't already a member?

SUPPLIES: Jack Shafer, P.O. Box 322; Dallas, Oregon 97338. A NFFS price list and order form are available by dropping a letter to Jack Shafer. ●

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soaring..... *Continued from page 25*

a result, I flew 5 minutes, 2 seconds.

Some Cirrus planes joined. One of them placed 3rd, but was broken. A couple of Cumulus competed, but neither one was successful. We could see some Cirrus, Cumulus and Piviere planes and some made from Japanese kits, but almost all of the planes competing were original ships. I was glad to see that many people used their own ideas in making their gliders.

This contest was the first such contest for thermal glider enthusiasts; also, the CD and his staff did not have any experience in staging such a meet. As a result, the contest did not go smoothly, but we all enjoyed it very much anyway.

RESULTS

1st	Mr. Inoue	342 points
2nd	Mr. Mizorogi	341 points
3rd	Mr. Koizumi	341 points
4th	Mr. Matsui	334 points
5th	Mr. Sakuraba	326 points

I have heard that the 3rd Summer Annual Soaring Summer Nats will be held at Miller Meadow Park near Chicago this summer. My little son and I will join the contest. We will bring a big bag to put the big trophy in. I am looking forward to seeing all American counterparts. ••

THIRD ANNUAL SOARING NATS

"Competition improves the breed." That statement is so succinct and obvious that it must be attributable to some great mind. It's just that we don't know who's.

Be that as it may, the R/C Soaring Nationals Contest Board, (not an AMA board) in recognition of such statement, conducted an intensive survey of active competition pilots. The question? "What are your preferences for the 1072 Soaring Nationals?"

Neil Liptak, well known R/C sailplane designer and spark-plug . . . you're pardoning the expression . . . in the Silent Order of Aeromodelling by Radio (SOAR), tabulated the results. The inputs represent a healthy cross-section of soaring sportsmen's thinking, and are indicitive of future trends.

The box scores tallied like this:

	YES	NO	TOTAL
1) A two day event	49	66	115
2) A three day event	67	49	116
3) Longer than three days	14	100	114

The '72 Soaring Nats should be held

1) During the AMA NATS	69	39	108
2) After the AMA NATS	25	78	103
3) Before the AMA NATS	37	67	104

Competition Classes should be

1) One combined Jr/Sr/Open Class	39	73	112
2) A Separate Jr. Class	84	34	118
3) Two classes based on wingspan	70	47	117
4) A separate Scale Category	98	19	117

The preference for launching methods was a runaway in favor of power winches, with "high-start" coming in second. A few of the more athletic souls . . . or those who are friends of raw-meat eaters . . . voted for hand tow.

The ballots were distributed to all ECSS and LSF members, and to Soaring Nationals competitors from prior years. Some 400 in all . . . with many duplications, of course. Many guys are members of both ECSS and LSF . . . and many flew at last years event. They got three ballots.

The 121 respondents . . . not all expressed opinions on all points . . . identified themselves as members of

AMA only	6
AMA/ECSS	31
AMA/LSF	55
AMA/ECSS/LSF	29

Total AMA, 121; total ECSS, 60; total LSF, 84.

The three-day outing will be run in accordance with the new AMA Provisional rules for Radio Control Sailplanes as published in the 1972 Rule Book. Dan Pruss and his Contest Board . . . Dave Burt, Dennis Hall and Neil Liptak . . . have set a competition program that will top prior nationals and match any R/C sailplane contest ever held. Competition Tasks will include Precision, Duration and Speed.

The 1972 R/C Soaring Nationals is

planned and scheduled consistent with the Board's survey results:

1) a three-day event
2) during the NATS
3) two classes based on wingspan, with combined Jr/Sr/Open (a 2 out of 3 decision)
4) a separate scale category
5) electric winch launch systems

To be staged again this year at beautiful Miller Meadow . . . an expanse of green America at its best and near Chicago, the SOAR sponsored annual will be the first major three-day R/C soaring championship held in the U.S. Dates are Sunday, Monday and Tuesday, 23, 24 and 25 July. For full details, contact Mr. R/C Soaring Nats, Dan Pruss, Box 49D, Plainfield, Ill., 60544. Call 815/436-2649.••

R/C SCALE SOARING

The AMA 1972 Model Aircraft Regulations include R/C Scale Sailplane Rules (Provisional). This first-time recognition for sailplanes defines official criteria for judging and scoring, and establishes a new class of challenging but practical competition.

The rules for scale R/C sailplanes are interwoven with existing regulations for R/C Scale as outlined in Section 24 of the manual, and the Unified Scale Judging Regulations, Section 25. The main variances provided in the new sailplane rules are as necessary for applicability . . . or not . . . to non-powered flight, and to strengthen emphasis on flying. The provisional rules provide flying competition for scale sailplanes utilizing "normal" contest flight tasks. In fact, scale events to date have been conducted in conjunction with other soaring competitions, and with scale flights included in the open category flight tasks. This concept, rather than the classic scale demonstration flights, is comparable to requiring powered scale models of racing aircraft to compete in the pylon event, or scale fighters to combat in Pattern. Interesting.

Scale sailplanes (R/C) earn flight points in exactly the same manner as open class, non-scale, models, whatever the task. Also, additional points for flight demonstration of scale features must be earned during the competition flight rounds. Challenging? You better believe it. No "shelf" models here. But the whole idea is immanently practical and realistic . . . both in concept and function. Further, a respectable score does not demand a sailplane of museum quality. Here's a scale event that, once understood and appreciated, should create widespread interest and, more importantly, participation.

Let's take a couple of examples. First, Mr. Whitegloves and his Gootenplanti 12XL. . . which he has retreived from the Smithsonian to enter in our competition . . . earns maximum scale fidelity and scale operation points. He flys pretty good, too, scoring at the 75 per cent level in each of two flight tasks. Total points (400) Scale Judging plus 110 Scale Operations x (1500 Flight Points/10 x 2 Rounds) equals 38,250. Creditable, indeed.

Number Two man in our imaginery flight roster isn't the master builder that Mr. Whitegloves is, though he is quite a craftsman. Number Two's Scale fidelity and operation points average out at 75 percent of possible, but he wins . . . or is highest scoring scale pilot . . . in both flight tasks. Total points (300 Scale Judging plus 82.5 Scale Operations) x (2000 Flight Points /10 x 2 Rounds) equals 38,250. A tie score.

Now there's one thing for sure. It's going to be a snowy day in Helsinki, Texas when maximum scale fidelity and scale operation points are earned. If for no other reason, what single full-scale sailplane incorporates all the features needed to reach a full 110 points for Scale Operations? Check the rules. But there will always be a winner in the flight task. Scale flights are scored only against other scale flights . . . even if flown in open competition rounds. It's all relative, anyhow.

What does all this tell ya? Put the emphasis on flying. In the real world, scale fidelity and operation points earned by models in any major contest will probably result in a fairly tight "pack." The guy who takes home the big hardware will be the one who has a flying model that is also "scale."

It's a natural tendency of man to think in terms of the familiar. When it's time to plan a scale sailplane project, first thoughts go to the modern glass configurations. But these are so similar, one to another, that ya sorta need a program to tell the players. Second thoughts might conjure up visions of the few "classics" that are well known . . . Bowlus "Baby Albatross," "Minimoa," or one of the Primarys. Not much of a selection? Then you're not up on your soaring lore.

There are literally hundreds of sailplane designs . . . modern, classic and antique. Just as with powered craft, many times the older and/or less known configurations are the most interesting. Quite often, the older designs were little more than large model airplanes,

and so offer structures which are most suitable for reproduction in the conventional modeling materials. Data is sometimes difficult to come by, but perserverance will out.

As interest develops, it will become more and more common to see scale R/C sailplanes competing in open class competition rather than just scale class, per se. Scale configurations are often quite practical in open competition . . . and are certainly feasible for sport flying. This is especially true if a reasonable approach is taken to scale detail, and the thing literally is not loaded down with heavy accoutrements. Scale sailplanes, of course, are most likely to record creditable contest scores if the flight tasks are not highly specialized . . . such as those which are beneficial to overgrown Nordics. What this all says is that scale sailplanes . . . much more than their powered counterparts . . . are practical, functional, workable, have reasonable longevity, and are just plain fun, when the emphasis is on flying rather than display.

Instead of the stereotyped and rather trite term, "Flying Scale" . . . or the negative and second-rate sounding "Stand-Off Scale" . . . maybe we should use a unique and positive description such as "Soaring Scale". Why not?

Some of the prototype designs from aviation's Golden Era . . . which I guess means the 1930's . . . are of particular interest. In those distant and pioneering days, the chore was to stay in the air . . . not speed/distance as the current mode . . . and sailplanes were real "floaters" in comparison to today's glass bombs. Fine. Just what we need for model work . . . lotsa wing area with simple, lightweight structure. Start checking. You will be pleasantly surprised. And while you're at it, might review some of the comments about selection of a scale size that were pitched in the January '72 issue of Northrop's Pride. Some interesting . . . well, we think so . . . points in favor of 1/5th scale, for example.

But not all "goodies" are "oldies." And just to prove it, take a look at the American "Sisu."

The Sisu is modern by most any standard except date of registration, but probably few R/C soaring sportsmen would recognize it on the field. Basically a super-slick, requiring either fiberglass or rather complex balsa fuselage structure, the Sisu is different from the run-of-the-mills. It offers modern styling and features such as retractible gear, swept-forward, high aspect ratio wing, and a V-tail.

The Sisu is just one example of a full scale glider that is suitable for modeling. The important thing is to stir a little fire . . . get some of that tired blood moving . . . and get this R/C Soaring Scale thing off the ground, so to speak. We'll be presenting other three-views and data from time to time, but can never cover them all. Why not a bit of research yourself? Some fabulous designs that have never been done.

How about a Polish canard? Honest.

Scale events are an established part of the annual LSF Tournaments, the S.O.A.R. promoted Soaring Nationals, and the Western R/C Soaring Championships. Undoubtedly, many major regional and local contests also consider scale. But what enterprising club or association is going to pick-up on the opportunity to get famous, and forever be identified as sponsor of *the* national R/C scale soaring event . . . like a Silent Rhineback?

Let's hear from ya.

SISU

Leonard A. Niemi began the design in 1952, and the Sisu 1 took to the air in 1958. Subsequently, 10 ships were produced under the firm name of Arlington Aircraft. The Sisu project was a fantastic technical success, but hardly a winner in the cold world of cash, and in 1965 the company was dissolved. But the project was a personal sort of thing, resulting from the efforts, devotion and dedication of individuals whose greatest interest was promoting American technology in the science and sport of soaring . . . not personal gain.

Aerodynamically, the Sisu is a direct product of the research papers on low speed aerodynamics generated by the late Dr. August Raspet at Mississippi State College. The wing utilizes a laminar flow airfoil, and has a swept forward planform to delay tip stall. This concept does not produce the drag penalty associated with controlling tip stall with wing twist . . . wash-out. Large span slotted slaps were used to allow the highly loaded, high speed ship to be flown slow enough to climb in small diameter circles.

To cut down on performance-reducing air turbulence drag, all control surface hinge lines and all joints in the canopy and removable fairings were sealed. Every rivet and structural seam was filled and smoothed. A retractable landing gear and V-tail configuration further reduced drag . . . to the benefit of soaring performance.

The basic airframe was relatively thick aluminum . . . intended to prevent

skin buckles which would tend to crack the super-fine surface finish required for maximum aerodynamic efficiency. Fairings and leading edges were molded of reinforced fiberglass laminates.

Meticulous attention to details resulted in a sailplane of exceptional high speed capability combined with the ability to fly effectively at low speeds. The Sisu was the mount for three different pilots in capturing the U.S. National Soaring Championships . . . John Ryan, 1962 . . . Dean Svec, 1965 . . . A. J. Smith, 1967. Al Parker racked up three world records with a Sisu, including the only recently topped free-distance mark of 647.17 miles from Odessa, Texas to Kimball, Nebraska.

In its prime . . . about a decade ago . . . the Sisu may well have been the finest performing sailplane in the world. Certainly, it was a prophecy to today's breed of exotic essays. Reportedly, 9 are still active and represent potent competition. Parker's distance record setter is now in the Air Museum of the Smithsonian Institution.

SPECIFICATIONS

Span	50 ft.
Area	108.3 sq. ft.
Aspect Ratio	23:1
Root Chord (at CL Fuselage)	40 inc.
Tip Chord	12 in.
Wing Section (Root and Tip)	NACA 633-418
Dihedral	2 degrees
Overall Length	21.2 ft.
Max. Width (Fuselage)	22.6 in.
Max. Height (Fuselage)	40.8 in.
Empty Weight (Structure)	493 lbs.
Empty Weight (Equipped)	546 lbs.
Flying Weight (Maximum)	765 lbs.
Wing Loading (Maximum)	7.1 psf

PERFORMANCE*

Min. Sinking Speed	2.2 fps at 55 mph
Max. Glide Ratio	37:1 at 57 mph
Stall Speed - flaps up	49 mph
flaps down	37 mph

*Measured by Mississippi State College in June 1963 at 730 lbs. gross weight, Ship No. 2, N1100Z, Parker's July 31, 1964 record breaker.

FLIGHT ENVELOPE

Never Exceed Speed	127 mph
Rough Air Cruise	119 mph max.
Maneuver	119 mph max.
Flaps Down	93 mph max.
Auto or Winch Tow	93 mph max.

prods. in use.. *Continued from page 11*

sonally recommend. One coat of K&B primer was applied to the model and sanded with 360 wet or dry sandpaper. The model was then sprayed with one coat of white K&B epoxy paint which covers amazingly well. The trim colors were then applied to the white base coat. The entire model, when finished, looks like a hand-rubbed paint job, when, in fact, it wasn't even touched with rubbing compound.

Finally comes the time for the radio installation. There is, incidently, ample room in the vast cavern provided by the wide center section chord of the wing to install most any kind of radio equipment in the model.

The overall weight of my 51 with everything installed, less fuel of course, was just under six pounds. Now, I am not known for light airplanes! (Jack's prototype P-51 came in at around 5 1/2 lbs.) I am, however, proud of the fact that the model came out under six pounds; this is a major accomplishment for me.

(Stafford's comment: "Hacker!")

The landing gear doors are fussy to attach but add a very nice touch, indeed. Not only does it look aesthetically good, it is very clean aerodynamically when the gear is tucked up in the wells. The gear legs are completely covered by the landing gear doors. Finally, the exhaust stacks were added to the front end of the model which, as Jack states, really makes the P-51 *look* like a P-51.

The model was tested in ideal weather (Manufacturer's comment: "Ten to fifteen knots and gusty is 'Ideal'?) and it flew right off the boards, as they say, the only requirement being a touch of down elevator, ("Three turns, Dum-Dum warped the elevators!" - Manufacturer's comment) and the airplane really grooves. During the initial test flight, it was determined that the model will turn on a dime ("Bob's comment at the time was 'Oh, Sh--oot', or something"-Manufacturer's comment) which is typical of all of Stafford's racing machines. In addition, I was delighted to learn that it looks like it could be a very fine competition machine, as well; the model being very quick on its feet. I haven't, to date, flown the model with the K&B sport engine installed but I look forward to the day I do. I really want to see how this model will perform under aerobatic conditions.

In the meantime, it's strictly a racing

machine as we have several races coming up in the Southern California district and I plan to be in the middle of most of them. The model is a delight to fly.

The Goldberg retracts worked as predicted and I can say that they are, so far, the most trouble-free retract landing gears that I have used to date.

A close friend, Jim Oddino, has been using a set of Goldberg retracts (including the steerable nosewheel) in his latest competition stunt machine for sometime now and he is very enthusiastic about the reliability and workability of the landing gear system manufactured by the well known and respected Carl Goldberg.

In conclusion, I can say that the P-51 model in the Jack Stafford line of very fine kits is, in my opinion, his best effort to date, with the possible exception of his fine Formula I Minnow, which is by now a classic in Formula I circles, and I highly recommend the Stafford P-51 to any modeler, whether he be a sport flyer or competitor.

I have asked Jack Stafford to comment, in his own words, on the Goldberg retract landing gear, since he, undoubtedly, has more experience with it than anyone. His other comments, laced liberally throughout my dissertation, were, of course, unsolicited! That will teach me *not* to allow a manufacturer to edit my work. (Should have sneaked off in the dark of the night to test fly my machine!!)

•• Solicited and unsolicited manufacturer's comments: (by Jack Stafford)

HEY! This is fun! This is the first time I ever had a chance to nitpick on a writeup of one of my airplanes. Actually, all I did was add a few nasty comments and attempt to fix the grammer. The spelling I didn't touch, as mine is worse than Bob's.

We've finally got the big Dutchman brainwashed! His P-51 is a beautiful bird and under six pounds, to boot. All we have to do now is steal his can of "white lightening" to get that last half pound extra out of his models and we can stop calling him "super hacker."

Now, to the Goldberg retracts. We have been racing with the same set of gears for over a year now, and the mechanisms are best described as "beautiful." Absolutely no maintenance has been required at all, and there are no signs of wear, or increased sloppiness. I'm frankly amazed because of the terrific pounding of the racing 40's and my somewhat less than gentle landings under race conditions.

The gear struts, themselves, are a bit of a problem. Because of the very nature of the coil spring in the strut, hysteresis is always present. In other words, the neutral position of the coil varies depending on which way the gear was flexed the last time you landed. The landing characteristics of the P-51 probably aggravate this condition more than most models because the gear bends aft on a hot wheel landing, and forward on a full stall landing. I've talked to Carl Goldberg about changing the gear mount to a torsion bar type to eliminate the problem but we haven't had time to work out a solution as yet. So, a word to the wise, cycle the gear after every flight to make sure the gear still fits the wells. By the way, all other gears that use a coil spring have similar problems.

My own personal problems with the P-51 have all been with the wheel doors. The original double Monokote hinge concept worked great for several months, then all of a sudden I was tearing them off every time I landed. We tried several other configurations with the same lousy results. Finally, the system in the sketch was developed and it works quite well.

I have one more hint I would like to pass on to the guys racing with inverted engines like the P-51 installation. With a full tank of fuel, the racing 40's have a nasty habit of flooding, caused by fuel siphoning back into the engine through the pressure port on the crankcase, even with the needle valve closed. Just carrying the model from the pits to the start line seems to load the engine well. So, after you get to the start line, close the needle valve, pull the glow plug, and crank the engine a good one with the electric starter. Reinstall the plug, and when the man sez, "You have two minutes!", open the needle, hook up the plug, and crank the starter in short bursts. Guaranteed to work - well, most of the time.

Keep your nose up in the turns . . . Jack. ●

pylon/4..... *Continued from page 17*

airplane moves or the engine quits, the flyer gets a zero for the heat. The helper again restrains the model, the throttles are advanced and the planes are then flagged off at one second intervals. Maximum of 4 planes per heat. QMRC flys 5 or 6 rounds and everyone flys against everyone (frequencies permitting). Aircraft must go around pylons. Cuts are recorded but not called. There are no make ups. If a flyer cuts a pylon, he can receive a maximum of one point for that heat. Two cuts give a zero. There is only one judge at No. 1 and the lap counters record cuts on No. 2 and No. 3. Points are given: 4 for first, 3 for second, 2 for third and one for fourth. A 1/2 point is deducted if the engine quits before the wheels touch the ground. The person with the most points accumulated at the end of the contest is the winner.

FLIGHT PROCEDURE (QMPL) Fig. 2

Pylon judges for the No. 1 and No. 2 pylons will be positioned at a safe distance from the pylon in line with the corresponding pylon and use an appropriate method to signal a missed pylon to the flyer in question.

A maximum of 4 planes per heat will be allowed.

Engine must be started a maximum of 1-1/2 minutes after the signal to start engines is given.

All laps are to be flown counter clockwise with turns to the left. Every attempt should be made to go around the pylons, however, unintentional cuts to the right or left of the pylon does not constitute a cut. Planes must go *past* the pylon, however.

If a pylon is cut, that lap will not be counted. Three pylon cuts constitute disqualification of that flight.

All planes will be flagged off at the same time in a "race Horse" start.

Times of best 2 flights, averaged, determines place.

Major differences in flight procedure are scoring system, course layout, and course size. Strangely enough, in each case, the QMPL version promotes just what nobody seems to want . . . the high speed missile.

QMPL says the winner is based on the two fasted flights. This could mean a go-for-broke model, which needs to finish only two heats. QMRC calls for the well tested and established point system as used in Formula I and II, FAI, and Sport Pylon. To win, both the pilot and his plane have to be consistant, and in many cases the winner is by no means the fasted plane that manages to get in two lucky ones.

As for the course layout and size, note the similarity to auto racing, where the big oval with long straights promotes the specialist, high top speed "things", as compared to the smaller courses, where slower, more manuverable cars are required. Matched together on the long course, the big bombs would come out on top every time, but on the smaller layout, the slower but more maneuverable cars would make idiots of the big ones.

The same applies to the Quarter Midgets. To prevent the specialist, the professional, or what ever you want to call him, from moving in and taking over, keep the course small. Of course, if that so-called pro also happens to be the better flyer, you're in deep yogurt anyhow!

By the way, it's interesting to note that the young upstart may have something to tell the old man! Several prominent Formula I and FAI flyers are discussing the merits of applying the QM idle and/or landing-with-power-on requirements to their own rules. ●

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race cars..... *Continued from page 37*

ber the loads imposed by a car running in so small a circle. An .055 solid stainless steel wire is normally used for a tether.

In preparing for any speed event make sure everything is in perfect condition and securely mounted before taking the model out of the workshop. Lack of parts is no excuse for leaving a car idle. Everything needed for running, and even new cars are available from several sources. Here is a list of suppliers and the parts that they stock;

Ed Turnross, 271 Walker Dr., Mountain View, Ca. 94040: New Papina car kit. This car is somewhat out of date but an excellent bargain for beginners.

Craig Asher, 786 Frontier Ct. Cinn. Ohio 45240: New Super Tigre powered car complete, ready to run.

Model Power Co., 931 Minerva Ave., Columbus, Ohio 43229: New Yellow Jacket engines and new parts for Dooling 61's. The Yellow Jacket 60 would make an excellent boat engine.

Franny's Chrome Speciality Products, 513 Vesta Place, Hyde Park, Reading, Pa., 19605: Franny stocks tanks, tires, car parts, and parts for most all of the currently used racing engines, including Doolings.

American Miniature Racing Car Association, Sec/Treas. Mrs. Martie Fairabend, 53166 Franklin Drive, Utica, Mich. 48087. This is the national governing body for miniature car racing in the U.S. (tether cars that is). Membership is only $6 per year which includes the monthly bulletin.

UNCLE TEDDY'S HELPFUL HINTS ON OBSURE ITEMS DEPARTMENT

Ever wonder about the actual compression ratio of your hot engines? Here is the way to find out. Purchase a 1cc Tuberculin syringe from the drug store. This is no stranger than a bachelor buying 10 baby pacifiers at once. Remove the plug and run the piston to top dead center, then fill the syringe with 1cc of light oil. Squirt the oil into the plug hole until it comes to the bottom of the glug hole, then note how much oil was used. Then, with the following formula, calculate the actual compression ratio:

$$C.R. = \frac{D + O}{D}, \text{ where}$$

D = actual displacement, in cc's
O = oil used, in cc's

For example, a Dooling 61, which is 10cc displacement, may take exactly 1cc of oil.

$$\frac{10cc + 1cc}{10cc} = 11.1 \text{ to } 1 \text{ compression ratio}$$

The next trick is an easy way to time a Hornet 60, which is an excellent engine with power comparable to some modern 60's. First of all, the point gap should be set at .006 inches. Put the timing light across the points after all other wires have been removed from the terminal. Now rotate the engine to t.d.c. (top dead center) and with a soft lead pencil, make a mark on the piston at the top of the exhaust port. Rotate the flywheel backwards until the mark is at the bottom of the port. The timing light should just go out as the mark is at the bottom of the port. Clamp the points down and check it again, rotating the engine forward this time. As the mark appears in the exhaust port the timing

light should go out. If this seems confusing, read it step by step while doing it to the engine. It's really not as bad as it sounds. When the points are set right, don't mess with them.

If you're running the engine with a prop, a good healthy flip is necessary to prevent backfiring. A properly set up ignition engine is *not* hard to start if everything is in good working order.

COME TO THE NATIONALS

We expect to see a lot of new faces at the Nationals this year. Our races are usually quite a sight with, people such as Dick McCoy or Bill Wisnieski walking around in the pits and cars straining to the breaking point in an effort to squeeze out the last mile per hour for a win. ●

fairchild..... *Continued from page 9*

51 in the livery of Colonial air service plodding along over the Mohawk Valley. From there I found a gold mine of data in *The Antiquer*, a magazine published by the Antique Airplane Association, and in *U.S. Civil Aircraft* (Vol. 4) by Joseph Juptner, Shortly afterward I located a "real live machine" in storage which I was permitted to study and photograph. Armed with this material I was able to develop the drawings accompanying this article, which are a scale of 1 inch equals 1 foot, giving the model a 44 inch wingspan. Although 100% accuracy is not claimed, the drawings are reasonably accurate and certainly adequate for stand off scale. Although my model is powered with a Cox .09 and stressed for radio, it is sufficiently light to be flown in free flight scale, and with a few minor weight saving changes here and there, it could even be flown on rubber power. How's that for versatility? Just like the prototype.

Now let's get underway and start putting pins into the workboard. The construction is quite conventional, so I will not burden you with how to connect stringer x to upright y. Instead, I will only touch on the areas where a brief explanation is necessary. First, study the drawings and note that the basic fuselage frame to be constructed on the plan is outlined with small "v" marks. The bottom third of the fuselage under the cabin is formed by the formers, as shown on the cross section views of stations 2,3, and 4. Covered with hard 1/32 inch sheet balsa, this makes a clean and very strong structure as well as being quite light. You will note that the longerons are 1/8 square spruce. This is the secret of the weight and strength of this model. Although you may substitute balsa here, my recommendation is to find some good SIG spruce and use it . . . you'll like it.

The landing gear is simple and functional, as well as being scale. I made the shock struts from telescopic aluminum tubing with small ballpoint pen springs inside, and strips of paper to represent collars on the outside. This, along with the Williams Brothers 3-1/8 inch Old Time Scale wheels goes to make the landing gear highly accurate. And while speaking of Williams Brothers, use their 1 inch scale Wright J-5 cylinders to make up an engine to camouflage the power plant you use. Here is where the ingenuity of the builder comes to play, but with a little time and effort you can produce a real masterpiece. If you can't spare the time, just hide your engine behind a thrust plate under a drag ring, and you will still have a scale version, for some owners did add these innovations.

The wing and tail are conventional and should present no problems. I built my tail outlines from 1/8 inch reed purchased in the basket weaving department at the local craft shop. You younger builders won't be familiar with this material, but at one time, reed or bamboo was the standard stock for curved wingtips, tail outlines, etc. I would recommend the laminated balsa method which I have shown on the plans, however, as reed will not retain its form nearly as well, and has a greater tendency to warp.

You may use anything from Japanese tissue to the new press-on, heat shrink materials for covering, but I used silk, for it just seemed the thing to use on a model of this vintage and construction. Pick any color combination and chances are it was used on a prototype. I used the old Army Air Corps olive drab and yellow for I understand several of these Fairchilds were used as military transports. I have been unable to verify this but I like the old Army colors so much I used them anyway. The Colonial version was all silver with black lettering, numbers and details. This was also true of the version used by PANAGRA, except the lettering and numbers were green.

For R/C flying, any of the new light proportional gear is excellent, but I am using 3 channels off the reliable old Controlaire by World Engines. This model would also fly well on pulse rudder if kept light and powered with a good .049 engine. What ever you use, it will be a slow stable replica of this obscure, but outstanding aircraft. ●

scale f/f..... *Continued from page 31*

to The MODEL BUILDER from Bill Hall, Los Angeles, would seem appropriate here. WCN)

"There is one thing I'd like to see in ALL construction articles and is rare. NEVER tell builders to use wax paper to cover plans when building. I've had wax soaked glue joints come apart on rubber models . . . God helps power jobs and rough landing free flight.

"There are too many good plastic wraps available now. I prefer Handi-wrap currently and it seems impervious to all glues and solvents I've used. I even use it between the sides when building one fuselage side on top of the other. I've learned these tricks the hard way: (1) Avoid pinning side No. 1 strips at a glue joint if possible. (2) Only remove those pins at the joints prior to starting side No. 2. Then apply Handi-wrap over No. 1, forcing it down over the pins until it lays flat. Now replace model pins and proceed to build No. 2. When dry and removed from plans, I never have sliced fingers or structure cuts and damage as a result of separating glued together sides with a thin razor blade. Try it . . . you'll like it, especially on frail peanut scale and the like." ●

workbench..... *Continued from page 7*

two widths, ranging from 1/2 x 1/16 inch up to 1-1/2 x 1/4 inch, all costing $3.85 a pair. Tires are balsa wood, bearings of teflon. The dacron spoked wheels are available in 16 sizes, consisting of 8 diameters, two widths each, ranging from 1-5/8 x 3/16 up to 2-1/2 x 3/8 inch, costing from $6.50 to $8.25. These wheels have brass bearings, balsa tires and rims, and silicone rubber treads. See your dealer or write to F.H. Wheels, 1770 Lilac Circle, Titusville, Fla. 32780.

* * *

Brave Products, 79 Adirondack Ave., Spotswood, New Jersey 08884, has taken on the hobby dealership of a fine line of flexible cable power tools manufactured by Pfingst (that's pronounced Pfingst) & Co. Inc. The tools are primarily for dental technicians and the jewelry industry and feature high rpm combined with plenty of torque. The smallest unit, IMP-55 sells for just under $50, and includes a 1/15 HP hanging motor, 39 inch flexible shaft, 6-step foot operated rheostat, duplex spring connection, and hangpiece. Unit will take all 1/8 inch shaft Dremel tool bits. Speed range is 4,000 to 14,000 rpm.

Having read Ken Willard's latest column in Girlie Modeler concerning TV interference from an earlier make Dremel hand tool, we operated the Pfingst unit while plugged into the same wall outlet as our ever faithful Heath GR-681 color TV. It was noted that Mr. Humphrey, who was debating with Mr. McGovern about the relative merits of holding the next AMA Nationals at Los Alamitos, didn't even bat an eye as our foot hit the variable speed rheostat.

"Good Morning, Paul . . ."

Our modeler whose hobby is broadcasting the news, Paul Harvey, has now decided to take a shot at marketing some products. The first offering from Paul Harvey Products, Inc., P.O.Box 77, River Forest, Illinois 60305, is "Firefly Lights." As the name implies, this is a flashing light kit for flying at dusk or after dark, depending on your ability.

The set consists of all items required to rig flashing red and green navigation lights on the wing tips of your airplane. All that's needed is a "C" battery to get things going. The set is available direct for $8.90.

* * *

Designed especially for the Veco 19 R/C "Series 71" engine, K & B Mfg., has introduced a very effective muffler to retail for $6.95. Consisting of three parts, the unit tones down exhaust noise yet maintains a higher power output than other mufflers when used with this engine. We're glad to see the American engine manufacturers doing something about the noise problem that can no longer be overlooked.

The 1927 Grand Prix winning Delage race car is C & F Manufacturing's second offering in 1/8 scale classic car kits for R/C or display. The Delage, as with the previously introduced Type 37A Bugatti, sells for $34.95, and includes aluminum chassis, steel rear axle, steerage front suspension, bull gear, five tough molded wire wheels with simulated rubber tires, vacuum formed car body, and vacuum formed driver body with steering wheel.

Both kits, available by writing direct to the company at 1047 Cheyenne St., Costa Mesa, Ca. 92626, are designed around the Jerobee power unit, consisting of Cox .049 engine with tank, centrifugal clutch, and recoil starter.

* * *

Astro-Start is the name given to a Hi-Start unit put out by Astro Flight, Inc.,2301 Cheryl Pl., Los Angeles, Ca., 90049. The set includes a spool of 75 pound test nylon cord (about 536 feet long), feet of 3/16 inch diameter, cloth braid covered exercise cord, a bright flourescent orange drag cloth, and all parts and hardware to construct a handy storage reel. List price is $29.95.

We've seen various hi-start units available for consumer purchase, but the only type we'd recommend are those using cloth braid covered rubber. Any free-flight rubber flier can tell you how long a fully exposed rubber surgical tube or solid strand will last, lying out in the sun and dirt for a few hours of soaring! Our own hi-start, purchased from Ray Smith almost five years ago, is similar to the Astro Flight unit and still going strong after many, many launches and long hours in the sun. ●

ANNOUNCING THE MODELERS ARE CREATIVE PEOPLE CONTEST

Ever since we introduced Super Monokote a few years ago, we've found that modelers use Super Monokote for a lot of things other than covering their models.

And, some of them have taken the time to write and tell us about their creative efforts with Super Monokote.

FOR INSTANCE

One modeler wrote that he improved the looks of his kitchen 100% by covering the front of his dishwasher and refrigerator with Piper Yellow Super Monokote.

A modeler's wife said her cats always left footprints on the windowsills and all the washing was gradually wearing the paint away... So, she borrowed some of her husband's clear Super Monokote and now just wipes the footprints away with a damp sponge.

Another clever fan said that after he covered his model with Super Monokote, he actually made a bikini for his wife.

Several modelers have created wall designs, paintings and "stained" glass with Super Monokote. One particular artist-modeler did a painting of his TOP FLITE Contender and "Monokoted" the finish on the canvas just as he had done on his model.

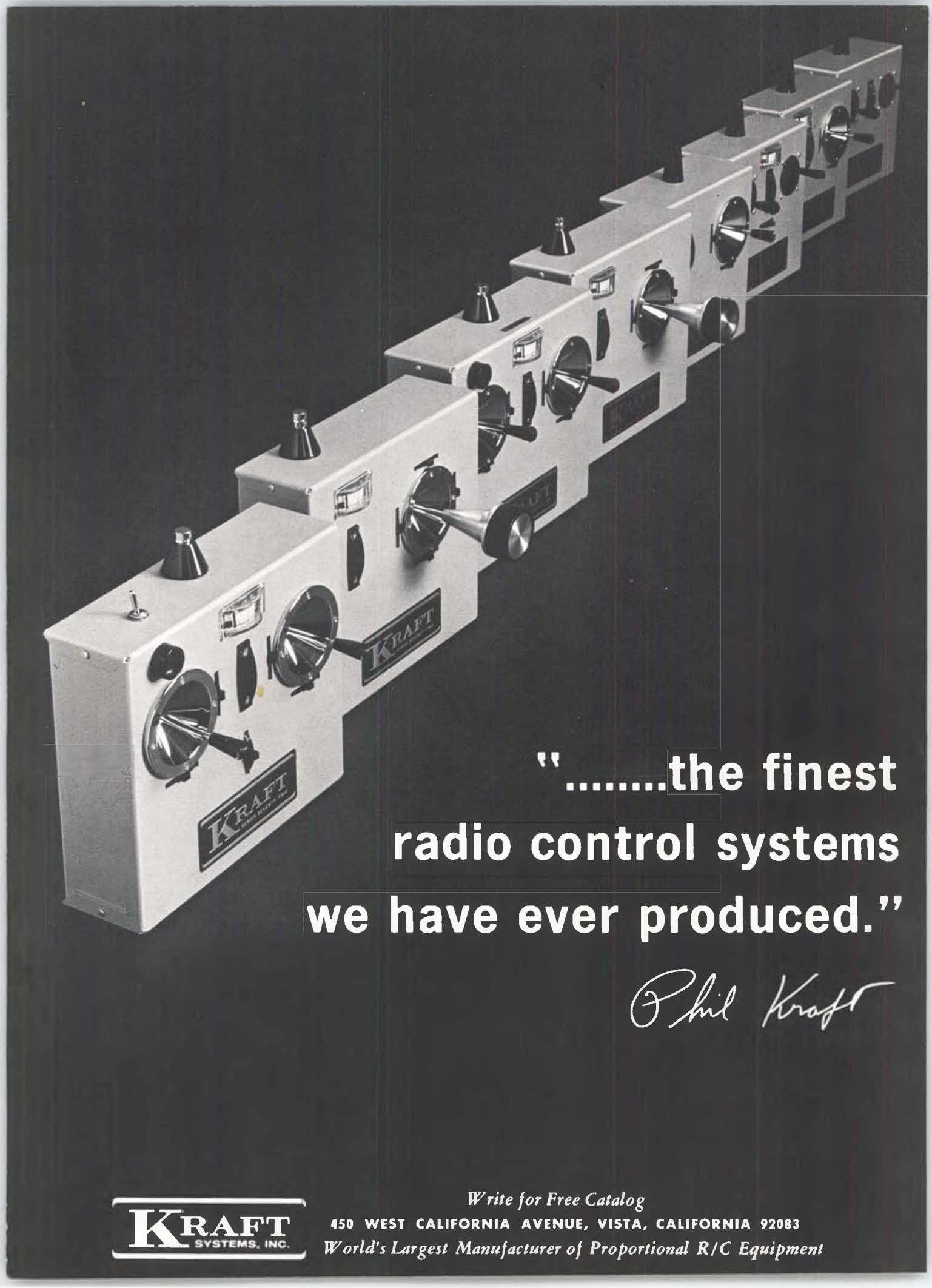
Now, we'd like to find out what others are doing with Super Monokote. So, if you've ever used Super Monokote for anything other than putting a beautiful glasslike finish on your model... OR if you have a great idea for something you're *going* to do, tell us about it.

50 PRIZES

1st PRIZE—12" SONY Portable Color TV
2nd PRIZE—9" SONY Portable Black & White TV
3rd-5th PRIZE—Cassette Tape Recorder
6th-10th PRIZE—25 ft. Roll of Super Monokote
11th-25th PRIZE—Two 6 ft. Rolls of Super Monokote
26th-50th PRIZE—6 ft. Roll of Super Monokote

Entries will be judged by Promotions International, Inc., on the basis of originality. Judges' decisions will be final and winners will be notified by mail. Entries must be postmarked by August 31, 1972 and mailed to:

TOP FLITE MODELS, INC., DEPT. MB 2635 S. WABASH AVE., CHICAGO, ILLINOIS 60616



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