The Model Builder

JULY 1973

volume 3, number 20

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New E-Z LINKS not only save you money, but are made of spring steel and have quality threads that work smoothly without galling. The rod hardness is just right, too — not too soft.

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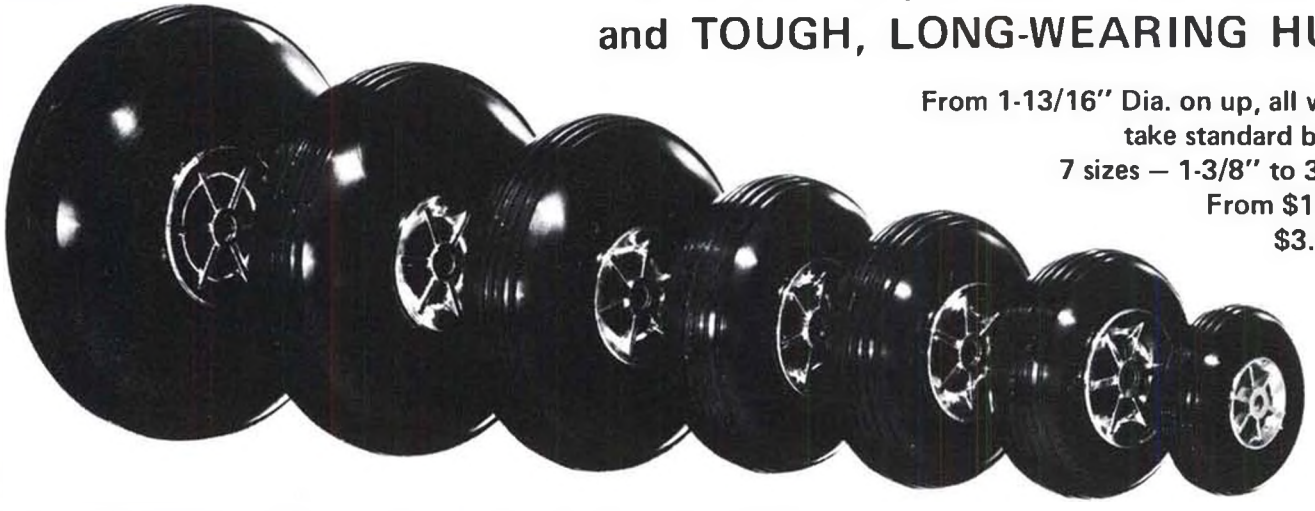

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NYLON

NEW!

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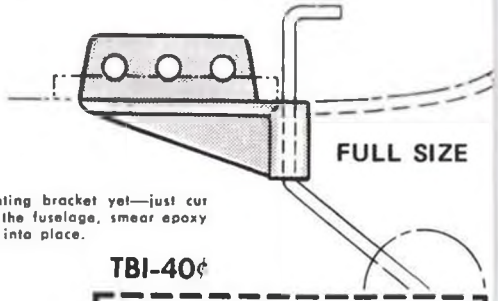
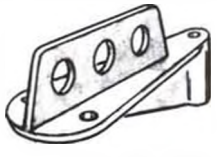


The simplest tailwheel mounting bracket yet—just cut a slot in the rear bottom of the fuselage, smear epoxy on the glue fin, and slide it into place.



TBI-40¢

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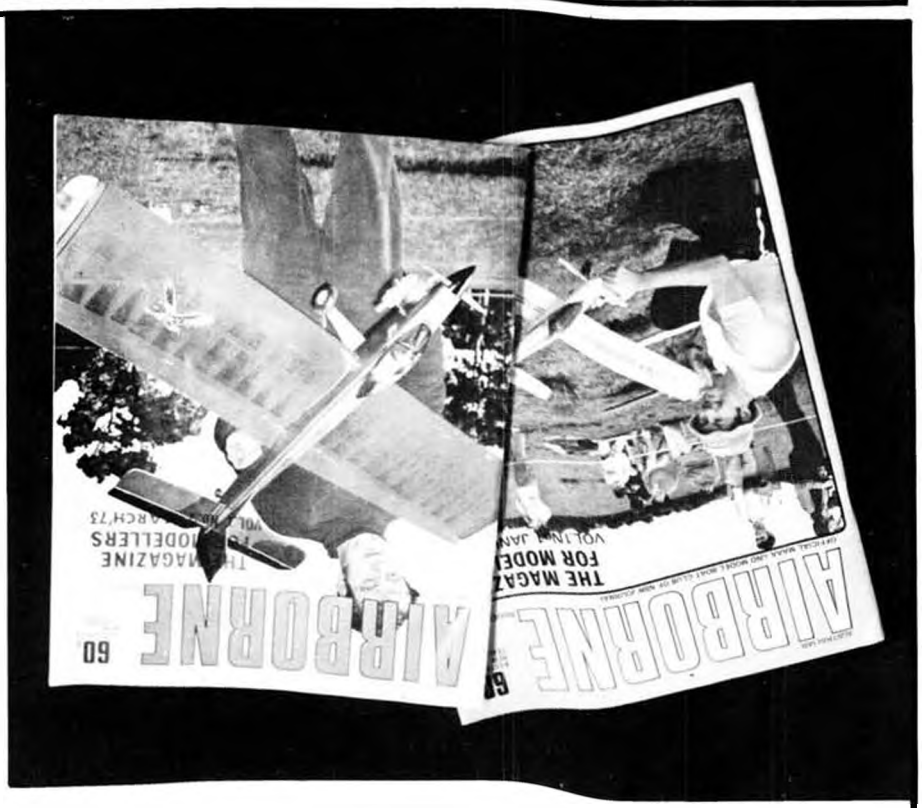

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• • •

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The MODEL BUILDER

JULY

1973

volume 3, number 20

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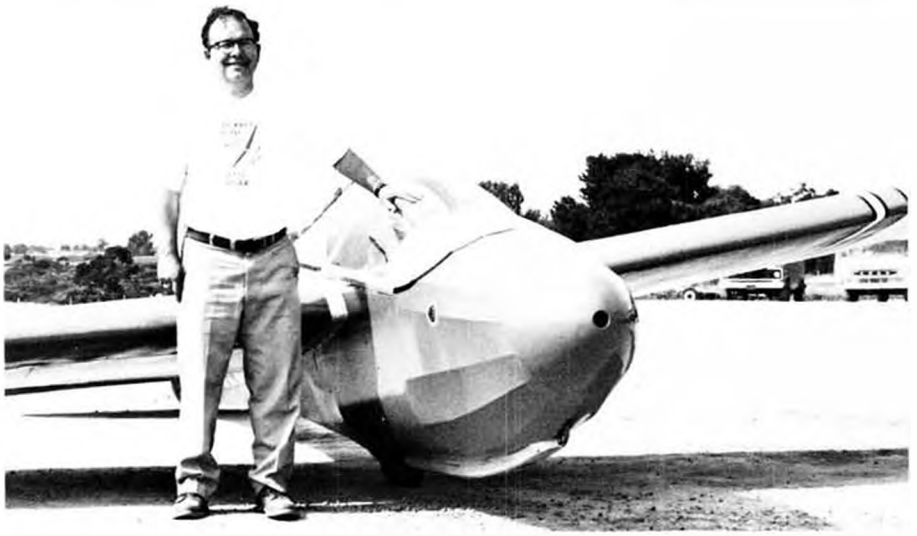
CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Happy July 4th! Contrived as it may appear, this month's cover photo was only coincidentally apropos. We didn't know Otto Bernhardt's Lanzo (Description on page 37) was going to be red, white, and blue until his son Phil brought it to our office . . . and on that day, Jo Ann (Joby) Jones, our Subscription Manage , just happened to be earing the out it you see. Voila! Photo by Bill Northrop.



Just to show you that he flies something else besides Peanut Scale, here's Walt Mooney with his not-so-Peanut Scale Schweizer 1-26 glider at Torrey Pines. Walt has been a glider pilot for many years, and has appeared on the TV program "Thrillseekers," doing his thing with the 1-26.

from Bill Northrop's workbench . . .

TURNED-OFF SCALE

● It's amazing what can go on right under your nose, completely unnoticed, if your attention becomes concentrated in other areas.

We've been aware that stand-off scale interest and activity has increased tremendously in the past five or so years, yet, because of our preoccupation with launching this magazine, and concentration on matters in other R/C categories, as Contest Board Chairman, we had not even once taken a cursory glance at the Sport Scale rules that had become provisionally accepted by AMA. Even during the past six months, when we started noting an increasing number of negative comments, many from knowledgeable modelers, we continued to ignore the situation.

Recently, we were copied in by AMA Headquarters on a letter addressed to the Scale Contest Board from Dave Platt and Joe Hancock, now partners in Dave Platt Models, and the subject was along the same line as others we had seen regarding the wrong direction Sport, or Stand-Off, Scale was taking.

Well, Dave and Joe's letter got us off the proverbial butt, and we finally read through the provisional rules . . . All we can say is, "Egads! Somebody blew it!

Our "Mystery Contributor" of the month was obviously exposed to the model airplane hobby at quite an early age. Can you tell us who it is? First correct answer gets one-year subscription.

Whatever happened to the idea that we needed an event in which you could fly a model that looked like a real airplane . . . period? Sport flyers, the nation's majority, proved over the years that they wanted an event for real looking airplanes . . . not museum pieces that you shoved into the air at risk of life and limb and only on very special occasions in order to prove that they were "flying" scale models . . . not

Continued on page 45

Flying the required pattern 25 feet off the deck (doing Figure 8 here), we managed a 3rd place and Best Scale Achievement at the '65 Nats with this 7-1/2' span Gipsy Moth. By today's standards, the Gipsy would only be suitable for Stand-Off Scale . . . See text. Bill Coons photo.

OVER THE COUNTER

● Among dyed-in-the-silkspan Model Builders, the mention of a plastic scale shelf model may cause about as much excitement as someone saying "Cross my heart and hope to die" after giving sworn testimony at the Watergate investigation . . . however . . . and be that as it may . . . Williams Brothers, manufacturers of many molded nylon and plastic accessories for flying model type models, is embarking on its first venture in the plastic display kit world.

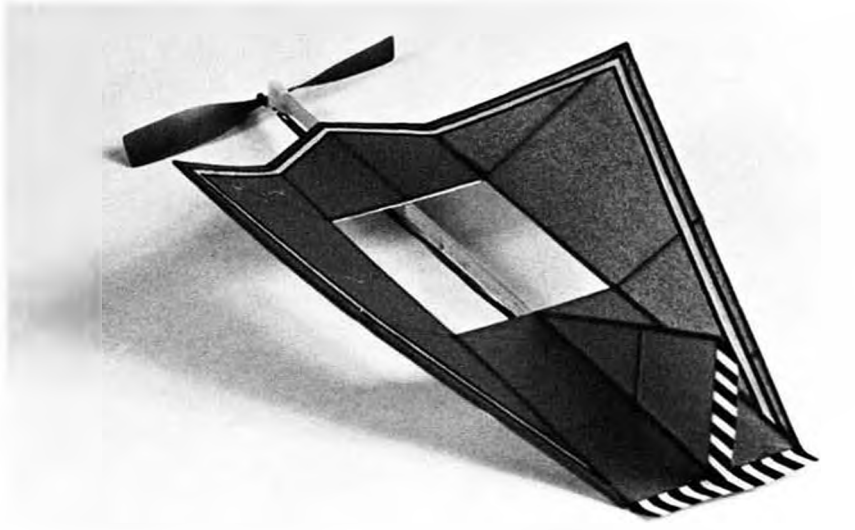
Following more than a year's effort in research and tooling, the company is releasing the first of what is hoped to be a long line of 1/72 scale models of some very classic aircraft. The initial subject chosen is the Boeing 247, first really modern airliner, which came out in the early 1930's.

In keeping with the typically high Wms. Bros. standards, the $4.95 kit features two types of windshields, soft landing gear tires, clear plastic display stand, and extra parts for duplicating Col. Roscoe Turner's racer or a 1933 United Airliner (long-range fuel tanks or seats). Landing gear may be installed retracted or with struts extended or compressed. Excellent decals for either ship are included, and are of the thin film type manufactured by Krasel Industries Inc.

* * *

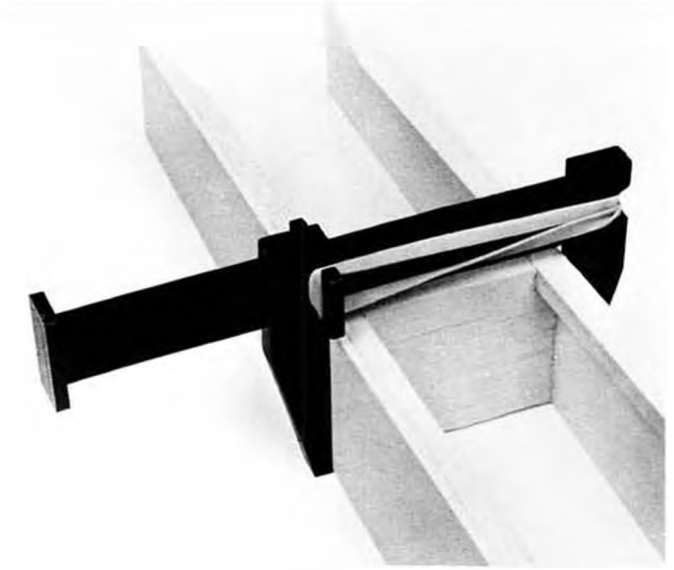
The Six Shooter manual fuel pump by Southern R/C Products, Inc. is a great idea based on a very simple and fool proof principal. Anybody who's ever

Williams Brothers first plastic display model kit is this 1/72 scale Boeing 247 transport. To be first of a series, this model sells for $4.95



"Look out, Unlimited Rubber! Here comes the STRINGLESS WONDER!" Designed by Bill Hannan, it has been kitted by Peck-Polymers to sell for $1.75. A real good flyer.

"Designer's Kit" for small rubber powered models includes props, washers, thrust buttons and prop shafts, $1.54 value for $1.25.



Great new clamps for model building by Kraft Systems are molded from glass filled nylon. Clamping power is supplied by rubber bands, and can therefore be varied according to the work load. Large ones are 98 cents each, small ones are $1.29 a pair.

milked a cow will pretty well understand it . . . except it's not too easy to put the milk back in a cow the same way it came out, whereas with the Six Shooter you can return fuel to the can from the plane's fuel tank!

The Six Shooter is designed primarily to be strapped to the top edge of a gallon fuel can (strap and most of the necessary tubing is included). Turning the crank produces a travelling squeeze action on a length of special tubing inside the pump body, which pulls out and transports about 6/10 ounce of fuel from can to aircraft tank (thus the name Six Shooter). The pump sells for $9.95, and it's nice to use 'cause it means one less set of batteries to have to remember to charge.

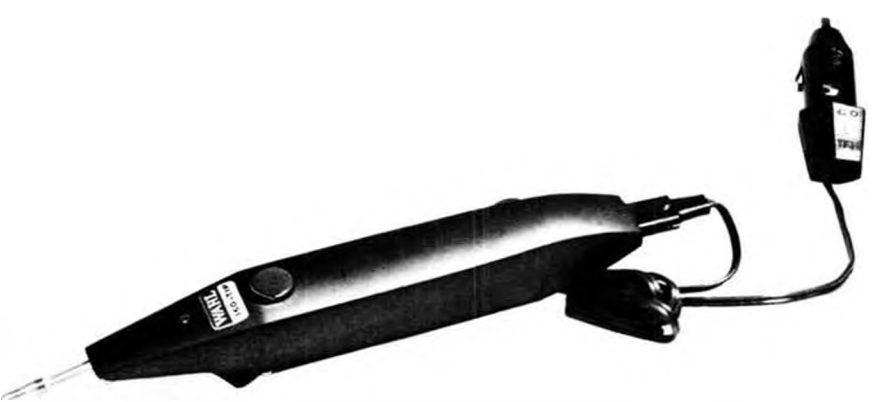
Six Shooter manual fuel pump by Southern R/C Products.

* * *

Kraft Systems, Vista, California, continues to expand its line of accessories with two sizes of molded, glass-reinforced nylon building clamps. Clamping pressure is supplied by rubber bands, and can be varied according to the job being done. Two sizes are available, costing

Continued on page 57

Great new cordless soldering iron by Wahl. To be marketed by Model Builder Products.



Wahl cordless iron may be kept charged on 110 VAC base or by use of the car cigarette lighter unit shown. Tip heat reaches 700° almost instantly. Price is $18.95. See ad on page 59.

Newest sailplane kit by Astro Flight is already building up an impressive list of contest wins. Orbit Compact is ideal companion.

PRODUCT$ IN U$E

ASTRO FLIGHT'S AS-W17, AND ORBIT'S 3-CHANNEL COMPACT. By Kirk Hansen.

●Toward the end of last summer, I got the urge to build a scale sailplane. After checking the model market, I found that there are very few complete scale glider kits, most being only partial kits. I finally chose the Astro-Flight AS-W17, not only because it is nice looking and easily adaptable for scale, but also, with its 132" wing span, it should carry any extra scale goodies I should want to add.

The model's fiberglass fuselage is very close to scale, but, like most scale model sailplanes, the wing and tail chord has been increased. In addition to the 'glass fuselage, the kit contains die-cut ribs, machine-cut sheet tail surfaces, all strip wood and plywood, and a complete hardware package.

Construction is quite simple, with only the wing needing to be built up. The 3/32 inch leading edge sheeting, generous spars, and vertical webbing form a sturdy "D" tube type wing structure. Ribs are 3/32 sheet, and the trailing edge is standard, pre-shaped balsa stock.

Wing attachment is accomplished with a 1/4-inch main supporting bar and a 3/32-inch aligning pin.

The tail surfaces are 3/16-inch solid sheet and only require planing and sanding prior to covering. The wings and tail on this plane were covered with Monokote and the fuselage was done in white K&B Superpoxy.

This model is easy to fly; stable, yet quite maneuverable for a plane its size. It should be a good contest plane for me, as soon as I learn to hit the spot!

My AS-W17 weighed 3 lbs., 6 oz. with three servos and a retract gear. This gives me an 8.4 oz. per foot wing loading.

The radio used is an Orbit Compact 3-channel. Weight of this system with two servos is 8.3 oz. and with the small battery pack it is 6.5 oz. Orbit has an excellent quality control which assures you a good, working system every time. Many tests are performed on each and every part of the system to make sure it works and works right. I feel this is an excellent radio system . . . the servos are tight, the stick is smooth and the range is more than adequate. Hopefully, you'll hear more about me and this combo at some of the contests coming up in 1973. ●

Kirk Hansen with his AS-W17 in front of The Model Builder office. Span is 132 inches.

John Petchler launching his Wakefield called, what else, "Petchler's Plane." It says so in 3" letters on bottom of wing. Evans photo.

FREE FLIGHT

By RON EVANS

FLASH REPORT on the N.F.F.S. Championships at Taft, California, Memorial Day Weekend, 1973, with over 700 entries.

GRAND CHAMPION - Randy Bunch, a Senior from Phoenix Arizona.

Open Sweepsteaks - Bob Hunter
Senior Sweeps - Jim Haught
Junior Sweeps - Jim Kelley

OCIE RANDALL MEMORIAL TROPHY, for highest time in any gas event. - Randy Wieler - (41:55)

Team Trophy - Miraculous Muthas

1/2A Gas - Tom Hutchinson
1/2A Gas Jnr - Dave Sbur
A Gas - Bob Vinson
A Gas Jnr - Randy Weiler, 41:55*
B Gas - Bruce Hannah
C Gas - Marty Thompson (Sr.), 37:13*
B/C Jnr - Tom Scully
D Gas - Randy Bunch
Night Flying - Bill Hunter
FAI Power - Ed Carroll
Wakefield - Bob Tymchek
Unlimited - Bob White
Unlim. Jnr - Tom Reagan
Coupe d'Hiver - Bob White
A/2 Nordic - Walt Ghio
A/1 Nordic - Bob Critchlow, 25:37*
A/1 Jnr. - Kirk VanNest
H.L.G. - Bill Blanchard
H.L.G. Jnr. - Greg Xenakis, 8:16*
Rocket - Bill Booth
Payload - K. C. Hornbeck
A Old Timer - Larry Boyer
B Old Timer - Larry Clark
C Old Timer - Gene Wallock
.02 Replica - Gene Wallock
30 Second Antique - Greg Rasmussen
O. T. Rubber - Ernst Johnson
Scale Gas - R. G. Brickner
Scale Rubber - Hal Cover

*Times shown represent new National records for the events.

Hardy Broderson, the NFFS Executive Director, also established a new record time for removal of one, each, back window from the truck belonging to Overall CD Al Vela. The entire window was removed in a matter of seconds by Hardy's Class D "X Cubed," which found Al's truck in its glide path. Because of the plane's rugged, "Hardly Anyspar" construction, it only suffered a broken prop!

More contest details next month, along with photos.

●ARE YOU A FAIR WEATHER FLIER? . . . Do you find yourself standing around at windy contests, drinking coffee and watching others fly? Or letting rain stop you from putting in your flights? Flying in bad weather doesn't take any special talents, but lots of intestinal fortitude and a

Ron Britzke, Newburg, New York, with record setting ROW ship, a Galaxie with floats.

PHOTOS BY RON EVANS, DICK PAUL, BOB LIPORI

John Petchler's Wakefield uses front end assembly sold by Murry Stringer, New Zealand. Prop stop actuates auto-rudder. Ron Evans, with additional beard, holding.

Ed Cattey puts . . . er . . . everything into hand launch of M & P kitted "Flash." Flies well.

common-sense approach to equipment will help.

The first rule is to keep yourself and your model DRY. Nothing dampens the spirit like soggy clothes and saggy tissue. An inexpensive (about $10) rainsuit from any sporting goods store will pay for itself many times over, as will a pair of decent *waterproof* boots. Poly sheets of large size (sold to cover floors while painting, very modest price) can be used to protect the model before launch, or, in some events it is possible to "fly out of the trunk" by waiting in the car 'til the air seems right. Warm cars with heaters going full-blast can dry the wettest models, but now is the time to check your "anti-warp" structure!

"In and Out" co-author Ron Felix, the East's best-kept secret, holding Henry Struck's Coupe while the latter cranks in some winds. Looks like a pretty spacious field for the crowded East.

Some time back a group of Easterners spent long hours designing the ultimate "Rain Plane," and while that particular ship never was built, some of the ideas were filtered into our more normal building practices. These include the use of all-epoxy for warp-proof joints, and either epoxy paint (clear) for a finish, or in some cases, mylar covering on the flying surfaces. Buried timers seem like a good idea, but in practice, are complicated to build and maintain. Dethermalizer and auto-surface lines should be made of some material that *does not* change length with varied weather conditions, but such a material has yet to be found. String or towline sops up water like a sponge, steel line cannot be used for any installation requiring sharp bends, and monofilament shrinks with temperature changes. Mono

Continued on page 56

A pretty famous modeler, Hank Struck, with his A/2 "Catfoot" at Galeville. Bottom fins are a little rare these days.

Bob Hatschek preparing his A/2 at Galeville. Circling and catapult hook is his design and product. Ship has aluminum nose.

The full size "Little Toot" that took three trophies the first year it appeared at the Experimental Aircraft Association Fly-In, 1957.

LITTLE · TOOT

This is really getting it directly from the horse's mouth! Who could be a better authority on the scale accuracy of a model than the designer of the original full size aircraft? Model "Toot" meets Peanut rules, and features same rib spacing, etc., as the full scale ship. Three-views on page 28. By GEORGE MEYER.

● This is an accurate peanut scale model of Little Toot with all rib spacing, etc., the same as my full scale aircraft. Weight can be cut and flying improved by eliminating half of the ribs and fuselage bulkheads and substituting 1/16 x 1/32 stringers from back of the cockpit to the tail post, spacing them approximately 1/4 inch apart, tapering the spacing to the tail post. This will still be accurate scale since the full scale Little Toot can be built with a metal monocoque or tube and stringer construction. In fact, most of the full scale aircraft are of the tube and stringer type.

My model is powered with an old Buzz CO_2 engine I have had for many years. The Brown CO_2 is the same size and can be used, or 4 strands of 3/32 rubber as shown on the plans.

The only deviation from scale is in the tail surfaces, which had a symmetrical airfoil on the full scale, but I built the model surfaces of flat 1/16 thick, which is more common for peanut scale models.

The model is built in the conventional manner, with a box made of light 1/16 square balsa; the bulkheads added and then covered with light weight 1/32 balsa sheet. Give the 1/32 sheet a thinned (50-50) coat of dope on the inside to keep it from getting bony after the covering is installed.

The plans show two types of engine cowling. The solid lines are to the scale of the big aircraft using the 125 to 200 hp engine as now installed on the full scale ship. The dotted lines are of the original 90 hp version and Arlo Schroeders Hawk Pshaw (the most beautiful Little Toot built so far). There

When it comes to scale detailing, you can't do better than to own the plane you're modeling! Note the similarity in this photo to the one above. Note CO_2 fill nozzle under fuselage.

George Meyer and his "Little Toot", one of the most famous of homebuilt biplane designs. George has been a modeler for many years, and in fact, built a model of the "Toot" before the full size one was even started. The model actually helped in finalizing the working drawings.

are also two-cockpit types shown . . . the open with headrest as Little Toot originally, and the full canopy type as Little Toot is now.

The nose cowling is carved from balsa blocks, the center one first, then the cheek cowls and the carburetor air scoop. After it is completely carved, glued and properly faired in, hollow the whole thing out with a Dremel motor tool. Use a cutter until you get it down to about 3/16 inch thick and then use a course 1/2 inch ball grinder and cut the thickness of the cowling to approximately 1/16 inch. The ball grinding wheel cuts balsa very fast and smooth and is easy to control.

The wing and tail surface outlines are built up using two pieces of 1/16 x 1/32 railroad stock soaked in water and then glued with Titebond thinned 50-50 with water, then wrapped around cardboard forms as previously explained in past issues of The Model Builder.

The wing ribs are of the sliced type, from 1/32 balsa sheet. Assemble the wings by pinning the outlines on the plans, glue in the top half of the ribs, then turn the wing over, add the 1/32 thick spars, and then put in the lower half of the ribs. Clip the trailing edge of the main ribs to form the ribs used in the tip sections of the wings. Put the dihedral in the lower wings as shown on the plans; the upper wing remains flat. As you probably already know, the sweepback in the upper wing gives the same effect as dihedral, plus helping the directional stability of the model.

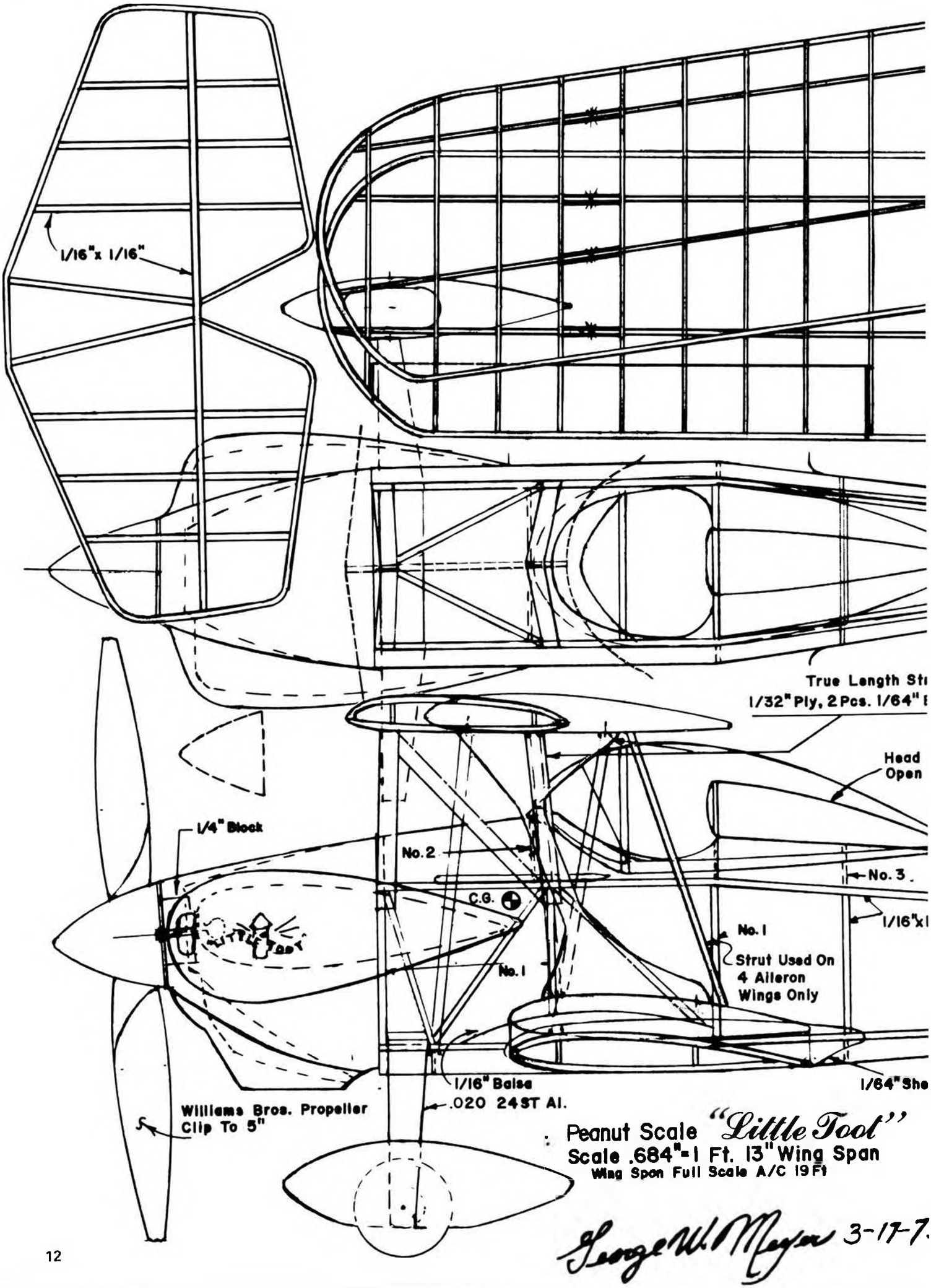
The tail surfaces are built up of light weight 1/16 square balsa, within the laminated outlines.

Cover the wings and tail surfaces with light weight Japanese tissue. Decorate them with colored tissue or decal paper. My plane is white trimmed with red.

Cut away the lower planking on the fuselage to the wing saddle section of the lower longerons and install the wings. Make fairings on the lower wings of 1/64 sheet balsa and use dope and balsa dust around the leading edge

Continued on page 51

Little ship has exellent proportions for flying scale . . . Peanut or otherwise. Since drawings are to exact scale and follow full size construction, they could be blown up for R/C scale.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Wings Only
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.020 24ST Al.
Williams Bros. Propeller
Clip To 5"
Peanut Scale "Little Toot"
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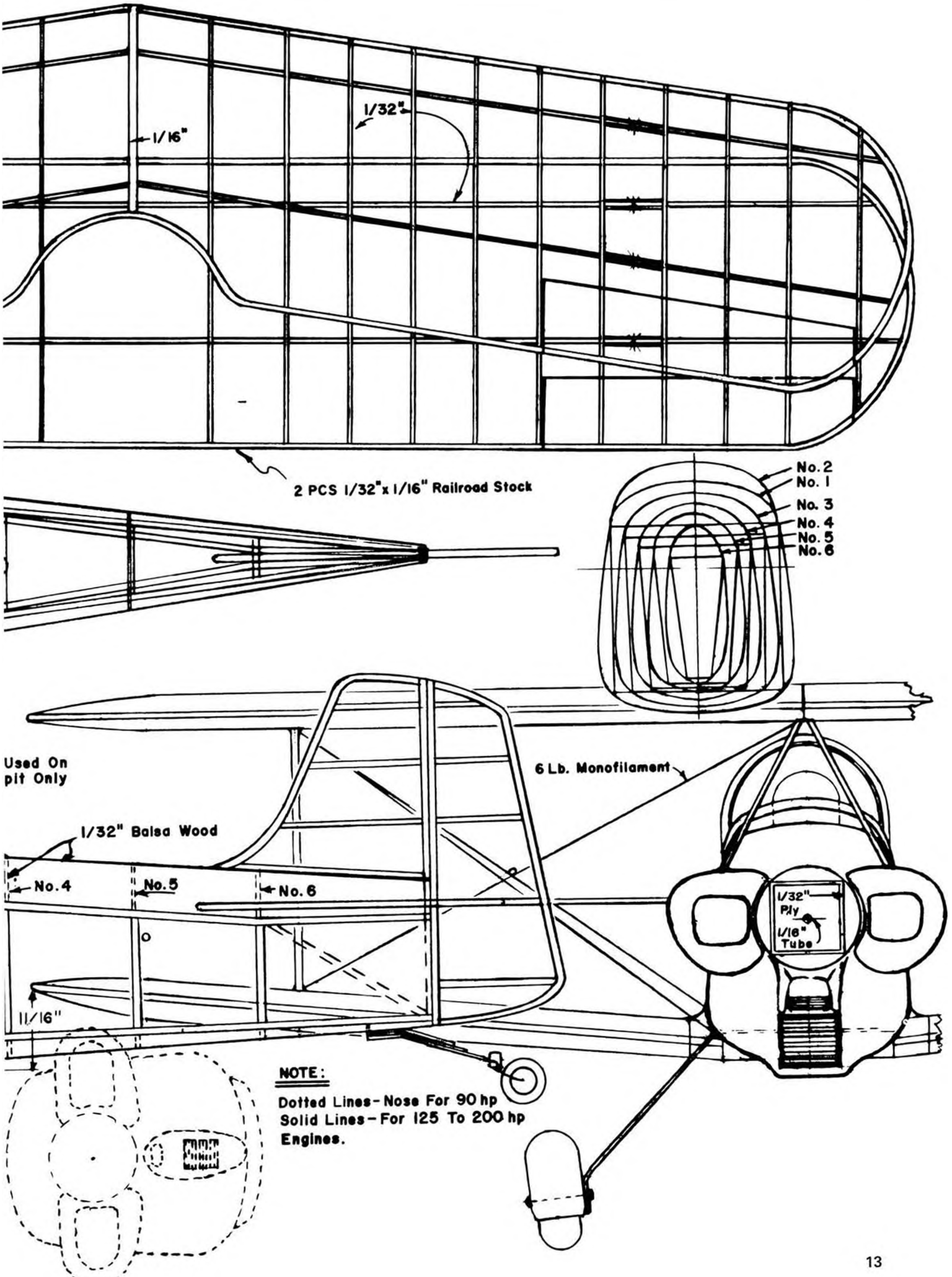
Wing Span Full Scale A/C 19 Ft
George W. Meyer 3-17-7


1/32"
1/16"
2 PCS 1/32" x 1/16" Railroad Stock
No. 2
No. 1
No. 3
No. 4
No. 5
No. 6
Used On
pit Only
6 Lb. Monofilament
1/32" Balsa Wood
No. 4
No. 5
No. 6
1/32"
Ply
1/16"
Tube
11/16"
NOTE:
Dotted Lines - Nose For 90 hp
Solid Lines - For 125 To 200 hp
Engines.

Planes lined up for judging at Mile Square, Fountain Valley, California, May 5 and 6, 1973. There were 75 entries for this first-of-the-season race.

PYLON

By TOM CHRISTOPHER

PHOTOS BY TOM CHRISTOPHER

●The Formula I racing season has started with a new record by Kent Nogy. Kent set a blistering mark of one minute twenty-two and one tenth seconds during the kick-off race held May 5 and 6, 1973 at Mile Square, Fountain Valley, Calif.

If the first race of the season is any indication of things to come, this should be a most exciting year for our sport. A new innovation was used during this first contest in that two classes of racing were established . . . Expert and Standard Classes will be used in the Southern California area this year. The Expert class includes competitors who consistently turn times of 1:40 and below. One may establish himself as an expert almost at any time he feels as though he is one! On the other hand, a judging committee may rule that a person should move from the Standard to Expert Class if he decides to "reside" in the Standard Class too long.

FORMULA I RESULTS – MILE SQUARE MAY 5 AND 6, 1973

(EXPERT)

1. Kent Nogy (New record – 1:22.1), 2. Whit Stockwell, 3. Chuck Smith, 4. Jeff Bertkin, 5. Lee Frey.

(STANDARD CLASS)

1. Jack Lee (Best time 1:37), 2. John Powell, 3. Louie Zeinnecker, 4. Tony Brown.

John Garabidian and the San Gabriel group hosted the opening contest and utilized Boy Scouts as helpers for the event. There were a few complaints during the contest as there will always be at any race of this magnitude (75 entries). We thoroughly enjoyed the event and thought that due to the technical inspection and the use of optional hard hats this was probably the best example of safety awareness to date!

At this point, we would have to say that at this one particular race, Kent Nogy was in a class all by himself! Kent is not only an excellent pilot, he is a true gentleman in every sense of the word. He was probably not more than two feet from the groove during his record setting heat. Kent flew his K&B powered Minnow like it was on a rail for ten of the most beautiful repetitious laps that we have seen! Congratulations Kent!! The biggest smile of the meet was worn

New rising star in the Pylon Racing game . . . goes by the name of Cliff Weirick. Looks very studious in those glasses. Somebody ought to sign him up to write a column!

Dale Yaney came in first out of 24 at QM races in San Diego, April 15. Stafford P-51, K & B.

Terry Prather's stable for 1973; shoulder wing Miss Cosmic Wind, and Minnow. Both are powered by George Aldrich custom S.T. 40's.

Tom Christopher's Ole Tiger Formula I. Get this! The ship was flakey in handling until after he painted on the leading edge trim! A small but effective turbulator.

by the owner and builder of the winning aircraft, Johnny Brodbeck.

This event also convinced us that there is a definite need for a new committee! We would like to see a Professional Standards Committee established to handle competitors who cannot control their emotions in a sportsmanlike manner. We realize that in any racing event, there are times when our emotions get the best of us. Frankly, it happens to all of us. However, if one cannot contain languages to suitable decible levels, he should be dealt with by this committee! Nuff said!!

The Standard Class was won by Jack Lee with a best time of 1:37. Jack had some super help in his Dad, Clarence Lee. Jack flew a smooth race and Clarence had him right on the pylons for the entire event! Looks like a real winning combination to us!!!

We received information from Tom Pownal, Sec. for the Florida Miniature Pylon Racing Assoc. concerning their racing schedule and race results. Sounds as though they really have their activities well organized. This organization runs basically two types of racing. Formula I and Ugly Stik. We like the idea of the Stik races due to the versatility of the design . . . and almost everybody has one. Rules concerning the Stik event include a handicap system and provide competitors an equal chance of winning, whether one is Expert or Standard, so to speak.

RACE RESULTS – FMPRA UGLY STIK – TAMPA, FLA. 4-8-73

1. Wild Bill Williamson, 2. Jim Maki, 3. Ed Dorman, 4. Mike Duncan (Fastest time 2:14).

The 1973 racing season got off to a good start in the Pacific Northwest Sunday, April 29, courtesy of the Mount Rainier R/C Society. The First race was run by C.D. Bruce Gale.

There was a large turnout for this area, with 15 entered in FAI and 9 in Formula I.

RACE RESULTS MRRCS PYLON 4-29-73

FAI

1. John Schuy, P-40Q, ST 40, (Best time 1:54), 2. Bob Root, Firecracker, HP 40, 3. Larry Sperberg, P-51, K&B 40.

FORMULA I

1. Jim Booker, Miss DATA, GMA Custom HP 40, 1:41, 2. John Schuy, Love, K&B 40, 3. Nelson Eddy, Midget Mustang, K&B 40, 4. Rod Awe, Shushonik, HP 40.

Bob Root tells us that there is much racing activity in the Washington area

Continued on page 48

Chuck Brown, San Diego, with his scratch-built Firecracker. K & B power.

One, two, three at Mile Square (l to r): Kent Nogy, first, with new record time of 1:22.1 . . . Whit Stockwell, second; Chuck Smith, third.

Ed Heath, founder of the Heath Company, demonstrating the hands-off capability of his Super Parasol

THE HEATHKIT STORY

The history of the Heath Company has almost made a complete circle. It started with full scale aviation and is now producing radio control systems for model aircraft. Here's the story of what happened in between.

● The name Heathkit should be well known to every R/C hobbyist. Heath Company is the world's largest manufacturer of kit-form R/C equipment, and of electronic kits in general. In addition to its line of radio control electronics, there are Heathkit color television sets, service instruments, stereo components, automotive tune-up instruments, even garage door openers and electronic organs. All in all, more than 350 kits of all kinds fill the 1973 Heathkit Catalog.

What the R/C enthusiast may not know however, is that Heath Company's involvement with flying and flyers goes back to the beginnings of aviation as a popular sport. As a matter of fact, Edward Bayard Heath was a pioneer in a time when young men, all across America, followed the exploits of Eddie Rickenbacker the way today's kids chase after the latest rock band. Young Ed Heath grew up with aviation in the early 1900's. And by 1918 he had opened the Heath Aeroplane Company in Chicago.

The first years were devoted to buying and refitting surplus World War I planes for resale, but Ed Heath dreamed of producing a simple, low-cost personal aircraft that virtually anyone could fly. In 1926, the company introduced the Heath Parasol, a stable, high-wing single-seat monoplane powered by a modified Henderson 4-cylinder motorcycle engine. But looking back, perhaps the most prophetic aspect of this early product was Heath's plan to make the Parasol available to the greatest number of people possible. He offered the aircraft in various stages of completion . . . For $99 you received a set of full-size plans. Several hundred dollars more purchased an uncovered frame and wings. A finished plane, less engine, was $699. Ready-to-fly, a new Parasol cost $999.

But Ed Heath did not have the market to himself. Other small, low-cost planes like the Curtiss, Bual "Pup," Church "Midwing" and others competed

Heathkit Electronic Centers stock complete company line and offer service on all items. Centers are located in many parts of country.

Heath receivers have been in airplanes longer than you think! Can you identify this cabin?

for their place in the sky. Then in the early '30's, low-wing all-metal designs were seen on the horizon. Furthermore, new government regulations were making it harder to produce kit-form aircraft at any substantial savings. So Heath began work on a mid-wing craft, the Heath Baby Bullet, which quickly made its mark in racing circles. In 1931, during a test flight of another new design, Ed Heath was killed. After the loss of this visionary leader, the company moved from Chicago to Niles, Michigan, where it quietly went bankrupt in 1935.

Another ambitious young aviator took over leadership of Heath Company during the late 1930's. For $300, Howard Anthony purchased the floundering operation and moved what was left of it 20 miles to the eastern shores of Lake Michigan at Benton Harbor, Michigan. Anthony began producing a line of accessories for small planes. At first, there were tailwheels, windshields, skis and inspection covers. Then, as airport traffic increased, Anthony had a compact radio receiver designed to his specifications. The resulting Heath MA-4 saw wide use because of its initial low cost and simple installation procedure.

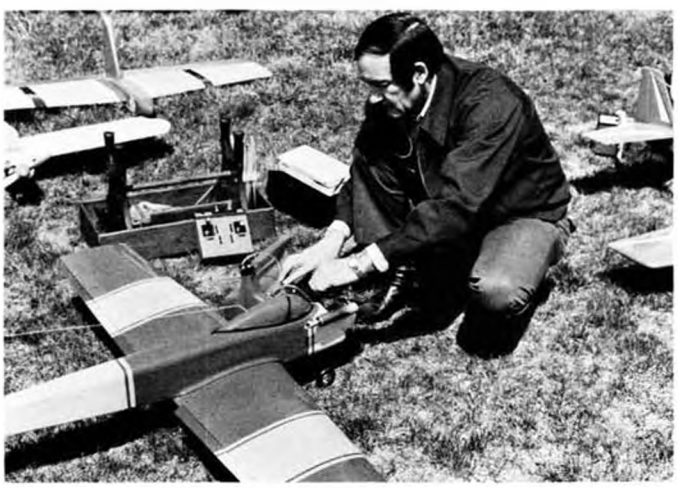
The Second World War saw Heath busily engaged in manufacturing floats and windshields for light observation planes, air filters, direction finding loop antennas for Civil Air Patrol and War Training Service, as well as skids for CG-4A Cargo Gliders. But with the end of the war, Heath Company shrank from more than 125 employees to less than 10.

With borrowed money, Howard Anthony bought surplus materials. First, aircraft parts, which included some aircraft radio equipment, and then electronic parts of all kinds. Soon he

Continued on page 52

Component parts are stored in this computor-controlled warehouse prior to being packed into kits. We saw this in person, and it's so huge it's kinda frightening. You could get lost for days!

R/C engineers (l to r) Mike Gaishin, Garry Covert, and Chief Engineer Larry Grover at the Heath R/C field. Interesting looking fuel container/pump in the center foreground. . .Hmmm.



The guy responsible for bringing R/C to Heath . . . and vice-versa, was Bill Hannah, now Manager of Product Planning. Many years an R/Cer.

Claude Meyer, standing, is Product Line Manager for R/C. Checking out a new 8-channel xmitter are Rod Braham and Garry Covert.

Stand-Off Scale ships waiting to fly at the 4th Annual Eastern North Carolina R/C Meet, Burlington, N. C. Winner was the PT-17, built and flown by Charles Buchannan, Kinston, North Carolina. Photo by Hobie Steele.

RADIO CONTROL REPORT

By FRANK SCHWARTZ

N. C. PHOTOS BY HOBIE STEELE

FLORIDA PHOTOS BY RON KIRN, TV 12

I wonder how the weather has been for you the past winter months? Down here in Tennessee we have had our share of rain . . . fine for staying home and building but it hasn't helped the flying any.

However, the situation looks better. There is a contest scheduled almost every weekend right on through the summer and all are within driving distance. Just wish I could make them all. That sound funny? Contests . . . and this is supposed to be a column for the sport flyer? Possibly . . . in fact, if you will examine the entries at most of the big contests, as well as the small local ones, you will find that the largest number of entries are Class A and B flyers, not the C and D flyers. What this means is that more and more sport flyers are trying their hand at a little fun contest work. Since there are thousands more sport flyer types than the so-called Professional Pattern Man, it only stands to reason that sooner or later they will tire of just Sunday Flying and want to compete a little. At least to try it is worth the time and effort, provided the Sharks and Pros stay in Class C and D.

Which brings me to a subject that is a pet peeve of mine and should, perhaps, be worthy of airing. First, maybe I should say that I've flown in some Nats. I competed but didn't scare any of the Pros at all. I've worked in Pylon and Pattern for the past two Nats and have generally a good idea of what is going on. The problem as I see it . . . and there is a problem . . . is the short shrift (look that one up) that the Class A and B flyers get at the Nationals. Supposedly it is for ALL AMA members, but obviously one group gets far more than it's fair share of time. Usually R/C Pattern is divided into C Pattern, and A and B. After a disproportionate amount of time is spent on Formula I and FAI pylon (screams from the Pylon sharks at this point!), the remainder of the week is devoted to Class C (or D flyers). At best, they will get six flights to qualify for a flyoff. Then on Sunday,

Bill Atkinson (left), Chmn of N.E. Florida Flying Model Council, congratulates Rhett Miller of Tallahassee, Fla. on placing 1st in D Expert at 1973 Rebel Rally. Watch out, Rhett's only 15!

Some of the helicopter contestants at the Burlington, N.C. meet. Winner of this first time event was Grady Howard, with his Hughes 300. Other contestants, with DuBro 505s (l to r): Dr. Lyle Pepino, Michael Jones, both from Greensboro, N.C., and Ken Boone, Raleigh, N.C.

when every one else is packing up, the Class A and B flyers, who have waited all week for their chance, get a measly (and at best count) three flights with tired out judges and about as much attention from all concerned as trash in the gutter. Strange as it seems, the Class A flyers are the majority throughout the country . . . not the C and D flyers . . . yet at the Nats they get a fraction of the time given to others and are treated as step-children. Small wonder so few make the Nats! *(The question is, Frank, which came first; the small time allotment or the small number of A and B registrants? wcn)*

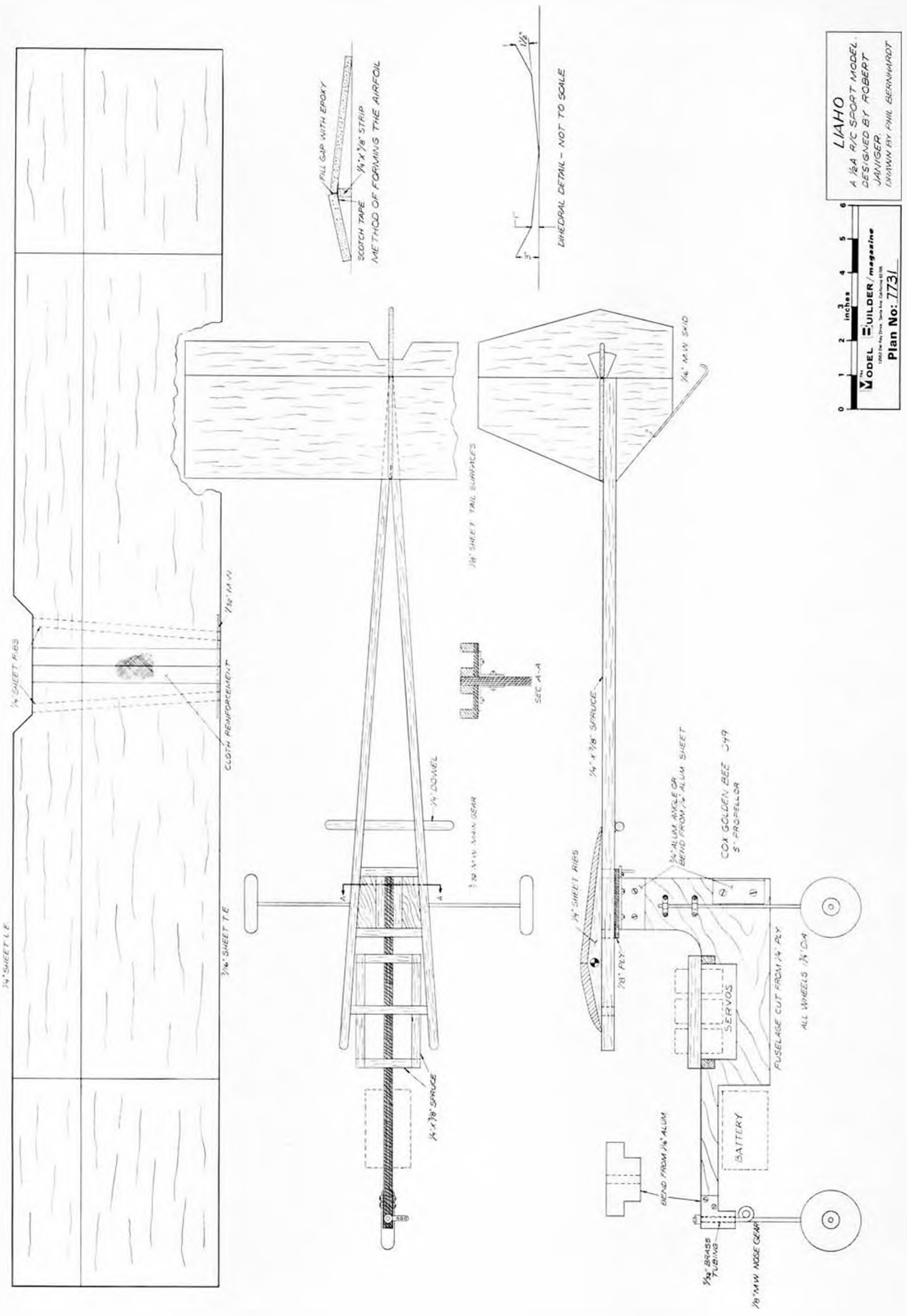
Last year I proposed, during the setting up of the events, that Class A and B flyers be sandwiched right in among the "big boys" and be given as many chances to fly as the others. Answers came back, "It would take too much time," and "What are you, some kind of anarchist?" If this situation needs remedy . . . it can only be done by the members making their desires known to the District VP's, who should, if the VP's are doing their jobs, pass this along to HQ. I'll be working in Pattern again this year . . . Wonder how the Class A and B flyers will like their short half day of flying at the Nats? At least from all indications that's what it's going to be again this year. Comments? Send 'em to AMA VP's, please.

Getting down to spare parts, I received a very nice parts package from

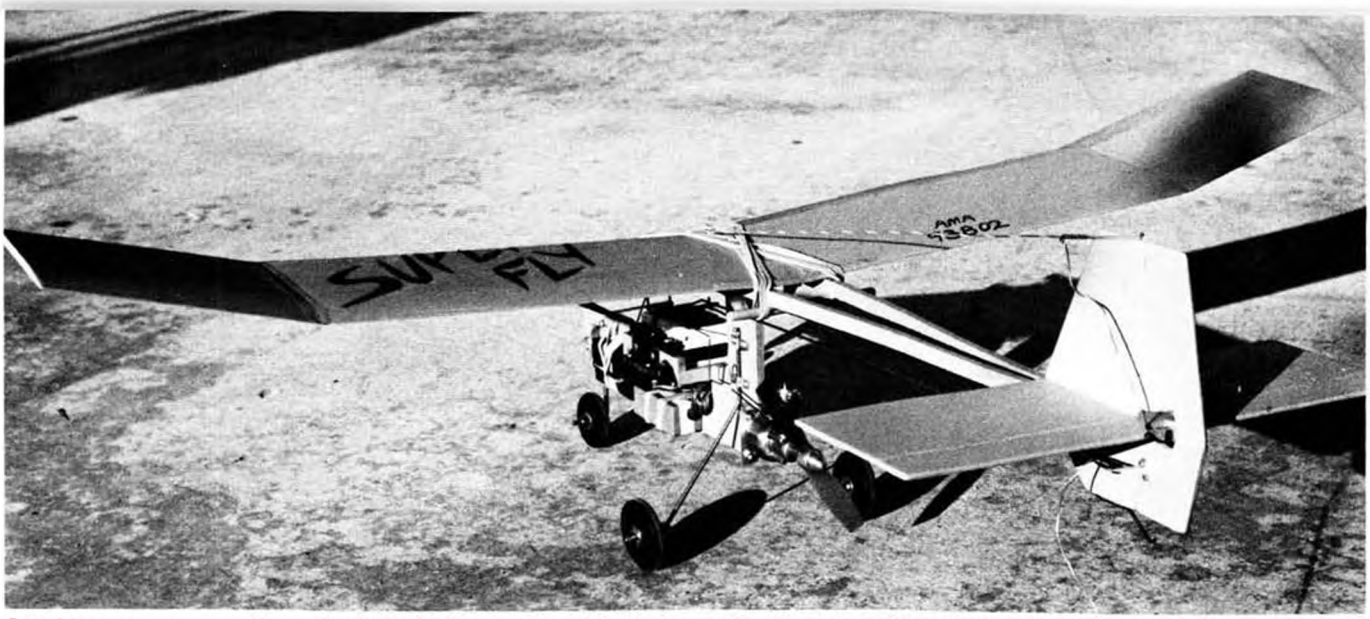
Continued on page 58

Formula I racers lined up for judging at the Burlington, N.C. meet. Winner of event was Irving Fundeburk of Charlotte with his Kraft controlled Stafford Minnow.

Winner of Stand-Off Scale at the Rebel Rally in Jacksonville, Florida, was Bill Bonee, shown here with his Harold Krier Great Lakes 2T-1 Special.


LIAHO
A ½A R/C SPORT MODEL
DESIGNED BY ROBERT JANIGER.
DRAWN BY PHIL BERNHARDT
MODEL BUILDER/magazine
Plan No: 773L
FILL GAP WITH EPOXY
SCOTCH TAPE
⅛"x⅛" STRIP
METHOD OF FORMING THE AIRFOIL
DIHEDRAL DETAIL - NOT TO SCALE
¼" SHEET RIBS
⅛" M.W.
CLOTH REINFORCEMENT
⅛" SHEET L.E.
1/16" SHEET T.E.
⅛" SHEET TAIL SURFACES
SEC. A-A
¼" DOWEL
⅛" M.W. MAIN GEAR
¼"x⅛" SPRUCE
⅛" M.W. SKID
¼" SHEET RIBS
¼"x⅛" SPRUCE
¼" ALUM. ANGLE OR BEND FROM ⅛" ALUM. SHEET
COX GOLDEN BEE .049
5" PROPELLOR
⅛" PLY
SERVOS
BATTERY
FUSELAGE CUT FROM ¼" PLY
ALL WHEELS 1¾" DIA.
BEND FROM ⅛" ALUM.
3/32" BRASS TUBING
⅛" M.W. NOSE GEAR

PHOTOS BY MICHAEL ANDERSON



One thing sure . . . you can't say that LIAHO is just another 3-wheeled look-alike! It can be built in a few evenings . . . without plastic yet!

L.I.A.H.O.

TEXT BY BILL NORTHROP

Literally a flying showcase for radio control systems, this inside-out, .049 powered model can be completely assembled in just a few evenings. What does LIAHO mean? See the text. By ROBERT JANIGER

● How many times have you attended a trade show and seen a carefully constructed mock-up of an airplane, designed primarily for the purpose of displaying a radio control system? The receiver, battery pack and servos are all invariably mounted in plain sight so that you can see the whole airborned package . . and for the benefit and amazement of the uninitiated, all of the linkage is exposed so that its operation may be watched.

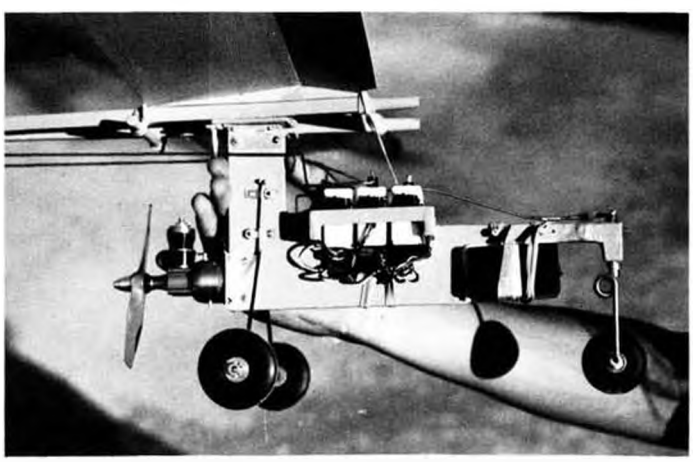
And how many times have you jokingly remarked to whomever it may concern, "very nice . . . but it'll never fly!"?

Well, ladies and gentlemen, as of now, the shoe is on the other foot - - - or should we say, the wheel is on the other strut . . . for in the LIAHO we have a *flying* R/C showcase.

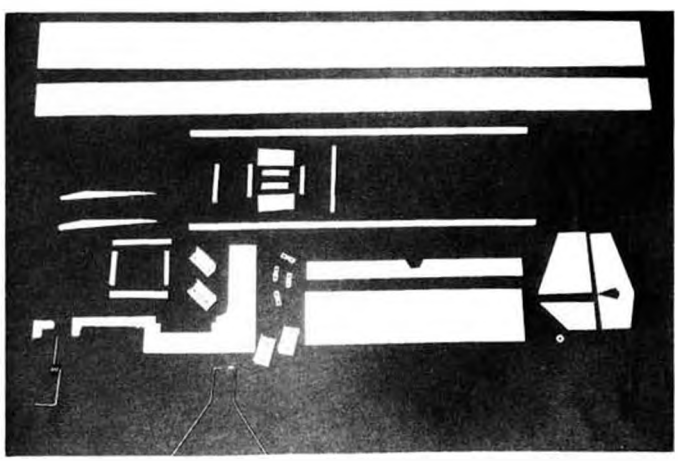
Actually, the original intent in creating the LIAHO was not to display R/C gear, but rather, to come up with . . . here comes that phrase again . . . a quick and dirty model that could be built and become airborne in the least amount of time. The result is somewhat reminiscent of the Breezy Jr., a currently popular homebuilt which is often seen at fly-ins. The Breezy is a trike-geared, high-wing monoplane, pusher configuration which is usually built from a pair of existing lightplane wings, simple tube-framed and canvas covered tail surfaces, and an uncovered, welded steel tubing fuselage. The pilot and passenger seats, instruments, controls, et al, sit out in the open . . . ahead of the wing . . . on top of the fuselage framework, rather than within. The name Breezy is hardly inappropriate.

In spite of first appearances, LIAHO is not a beginner's airplane to fly. With a wing loading in the neighborhood of 17-3/4 oz. /sq. ft.,the flight speed is relatively high, and control reactions are quick, though precise. The two prototypes have been flying with Cox .049 Golden Bee's, using Hot Fuel and 5 x 3 props . . . with which performance is adequate. A Tee Dee .049 or .051 with left-hand pusher prop would make it a more lively machine.

Takeoffs can be made very realistic, since LIAHO will rotate on the main gear before flying speed is reached. Shooting touch-and-go's from the local parking lot could make you late for dinner most any evening. If this particular



Fuselage pod (?) is a piece of 5-7 ply plywood, to which most everything is attached. Vary servo cut-out to suit your radio. Simple.



This picture of all the parts pretty well tells the story of the simplicity of construction. With 5-minute epoxy, one evening could do it.

maneuver is your bag, we'd recommend raising the thrust/line as much as possible since it's easy to tick the prop during rotation.

Those with 2-channel radios, "brick" style or no, should enjoy LIAHO. Just forget the throttle . . . flights only average 3 to 4 minutes anyhow. On the other end of the ledger, using 4 channels and including ailerons (on the inboard panels only . . . or forget the polyhedral and run "strips" all the way out) would not be difficult . . . And one could always take advantage of 48 inch sheet stock and go for more wing span (also a little more tail area), thus reducing wing loading . . . and flying speed . . . Or simply enlarge the whole thing by 1-1/3 and tack on an .09 . . . etc., etc.

Oh . . . By the way . . . That word LIAHO. The designer, Bob Janiger had originally named his creation the "Mosquito", and the second prototype "Super Fly". However, almost at first glance, ye editor came up with LIAHO, and Bob was quick to agree . . . LIAHO is the initials for "Let It All Hang Out!"

CONSTRUCTION

LIAHO is simple to build, and with all materials handy, shouldn't take more than a couple of evenings . . . depending on the finish to be used.

FUSELAGE

When cutting out the main 1/4 inch plywood crutch, determine the size and shape of your servo tray installation before making the cut in that area. Note that the crutch extends to the top edge of the spruce booms. Be sure to smear epoxy in the areas shown on the plans for extra reinforcing.

The wing and motor mount brackets may be bent from sheet aluminum obtained at your hobby shop or you can use 3/4 inch aluminum angle, which is available from many hardware or building supply shops.

An alternate to drilling a hole for the brass tube nose gear bearing would be to epoxy the tube to the front of the fuselage crutch and then wrap the sheet aluminum cap around the tube, filling all gaps with epoxy.

In order to maintain proper alignment the tail-boom framework should be built over the top view. Five-minute epoxy is used throughout the construction.

TAIL SURFACES

Cut 'em out, sand 'em, hinge 'em, and stick 'em in place . . . straight, that is.

WING

This'll be about the fastest building balsa wing for an R/C model that you've

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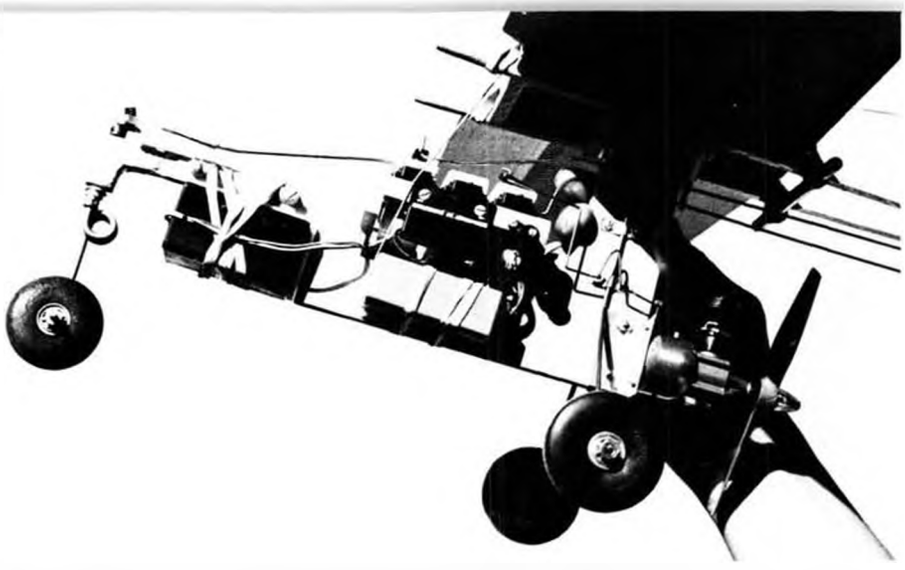
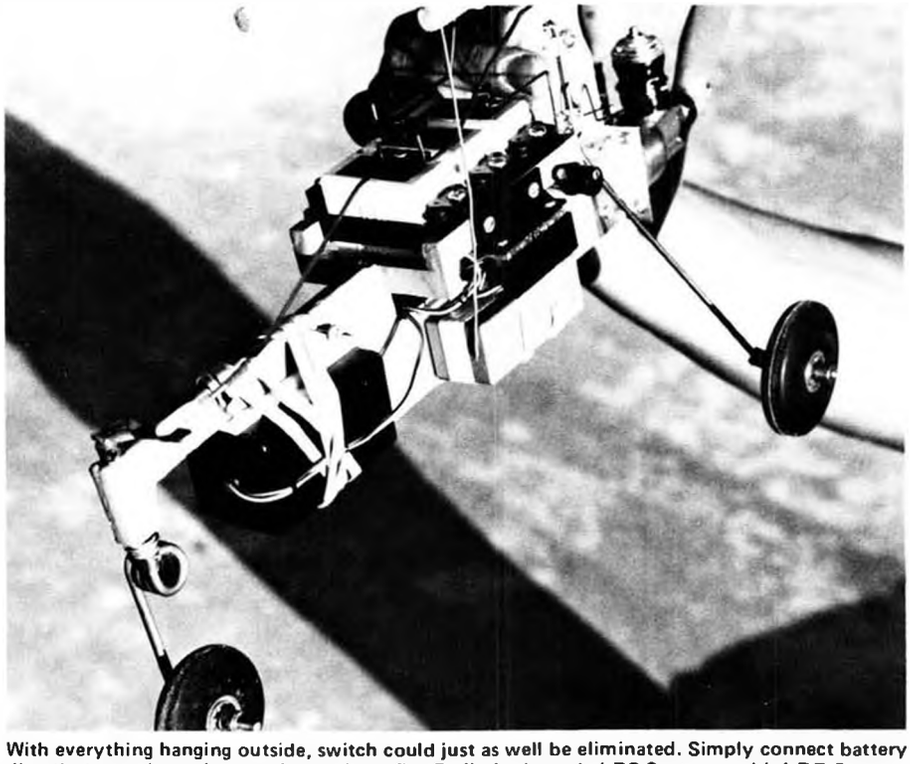
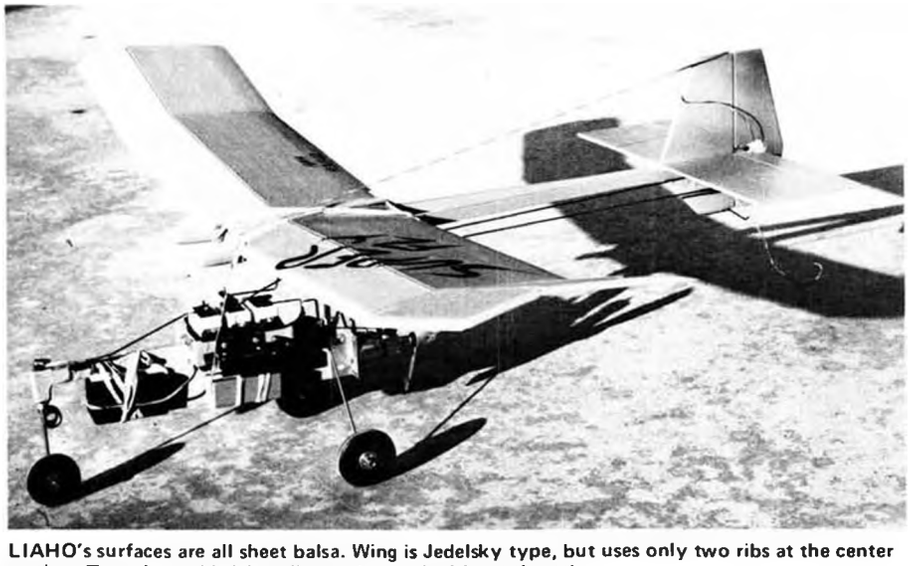


With pusher arrangement, fuel or exhaust is not likely to get into radio gear, unless engine happens to start up backwards! Note music wire pushrod guides made from control horns.



With everything hanging outside, switch could just as well be eliminated. Simply connect battery directly to receiver when you're ready to fly. Radio is air-cooled RS Systems, with LDR-2 servos.



LIAHO's surfaces are all sheet balsa. Wing is Jedelsky type, but uses only two ribs at the center section. Two-channel brick radio can be used without throttle.

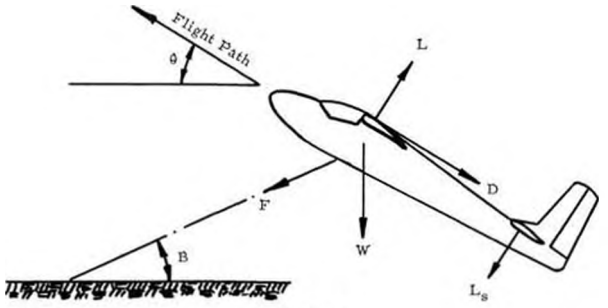


Figure 1

L is the lifting force of the wing

D is the drag force of the sailplane

W is the gross weight of the sailplane including the towline

F is the tension in the towline

Ls is the force operating on the stabilizer to maintain the flight path

θ is the angle between the flight path of the sailplane and the horizontal

B is the angle between the ground anchor point of the towline (turnaround ring, winch etc.) and the sailplane

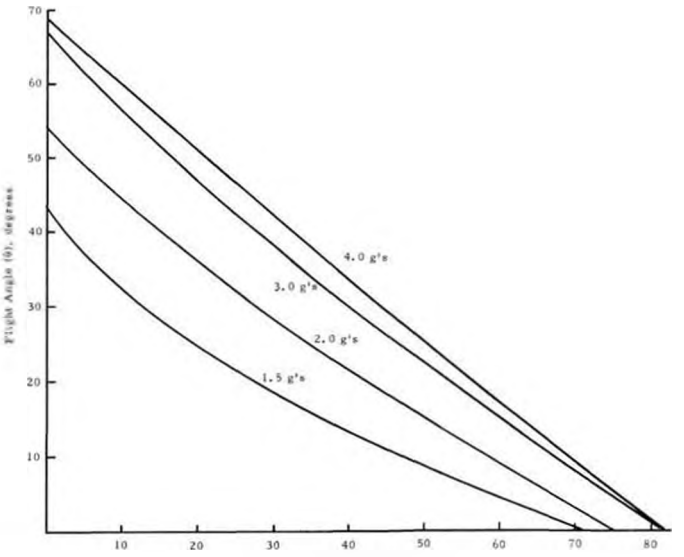


Figure 2

R/C SOARING

By LE GRAY

Le Gray has invited a guest writer to give us a quite thorough and revealing analysis of the trials and tribulations involved in winch and hi-start launching of R/C gliders. By BILL LAWRENCE LSF/050

Everyone has an old flying buddy who always seems to keep his sailplane up longer, is the first to find "green air," and gets a higher launch off the towline. This higher launch no doubt plays a large part in staying up longer and finding "green air," since maximizing the altitude at launch increases the probability of finding a thermal.

The nature of thermals, recognition of these natural elevators during flight, and flying techniques of entering and staying in thermals has been discussed in this column. So let's take a deeper look at some of the factors involved in the towline launching of an R/C sailplane.

At best, the physics of sailplane launch by a ground-based system can be rather involved. To simplify this discussion, let's assume that all launches are made in zero wind conditions. This is hardly realistic, but any variances caused by wind would not affect the various examples presented here.

Rather than using absolute data, the relationships of factors are presented wherever possible so that the concepts can be readily applied to any sailplane. Also it is assumed that the sailplane is in steady slight. In this way, flight accelerations are considered negligible and all forces acting on the sailplane are in equilibrium.*

In Figure 1 it can be seen that the lift force (L) must always balance the downward force which arises from the sailplane's weight, the drag, and the towline tension or "pull" (F). Consequently, during launch L/W is greater than 1, but it is equilibrium flight (i.e., no accelerations).

In practice, the towline will sag so that the towline angle (B) will be a few degrees less than a theoretical straight line from the sailplane to the ground. The downward force of the stabilizer (Ls) enables the pilot of a full-scale sailplane to maintain the flight path. However, this force is not considered in this article; it is negligible because most models use C.G. towhooks.

It should be noted that to obtain maximum altitude, the sailplane must

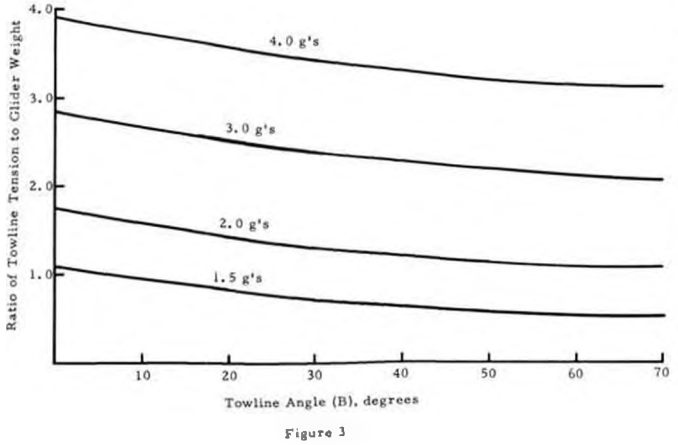


Figure 3

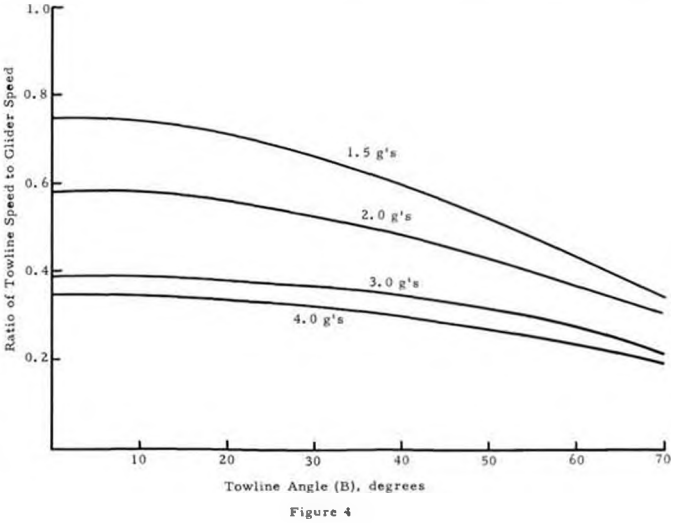
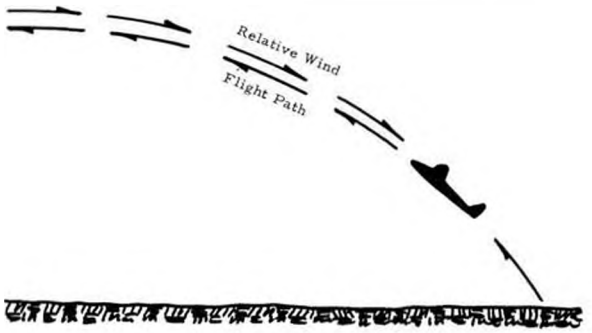
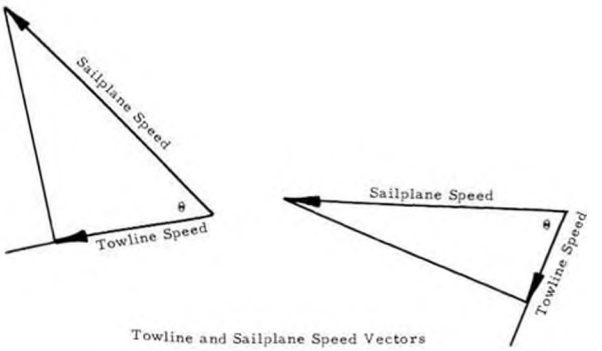


Figure 4



Climb Flight Path and Relative Wind

Figure 5



Towline and Sailplane Speed Vectors

Figure 6

be climbing at the steepest possible flight angle, without stalling, as is consistent with structural integrity. During the climb, g loading will vary with the flight path angle (θ) and towline angle. The g loads imposed on the sailplane by these angles can range from zero to destructive force, and almost infinite combination occur on every launch. The challenge to the pilot is to optimize launch altitude while keeping the potentially destructive factors within safe limits.

Figure 2 illustrates the relationship of forces on the sailplane at any point in the flight path. This diagram shows the flight path angle as a function of the towline angle for g loadings of 1.5, 2.0, 3.0, and 4.0.

For example, if a pilot flys his sailplane to maintain a 3.0 g loading from takeoff to towline release, his flight angle will be approximately 67 degrees immediately after takeoff. He then must gradually reduce the flight angle to 37 degrees while the towline angle reduces to 30 degrees, further reduce the flight angle to approximately 26 degrees as the towline reaches 45 degrees, and fly the sailplane off the top in near-level flight when the towline is at approximately 70 to 80 degrees to the ground.

Some pilots may think that the secret to maximum launch altitude is a steep climb angle . . . but they have no knowledge of flight loads. If a pilot decides to hold a constant (assumed to be conservative) 30 degree flight angle from takeoff to towline release, the loading on his sailplane will pass through the 4.0 g level at a towline angle of only 45 degrees (Figure 2). After that, it's only a couple of seconds before one of two things happen. Either the wings are going to pull off, or if he's lucky, the sailplane will stall, whip over into a dive, and lose a lot of altitude before recovery.

The greater the flight angle during launch (which provides higher release altitude) the greater the g loading. Notice in Figure 2 that there is a considerable difference between the flight angles which increase the g loading from 1.5 to 2.0, or from 2.0 to 3.0. However, only a slightly steeper angle of flight increases the loading from 3.0 to 4.0 g's. Also notice that the g loading curves converge at high values of the towline angle. When the towline angle reaches 70 to 80 degrees, a small change in flight path angle results in a large change in g loading. As the normal towline release point is approached, a small movement of the controls or a sudden gust of wind may be all that is needed to fold a sailplane's wings for a rapid and unceremonious descent.

Figure 3 shows the ratio of towline tension to the sailplane weight as a function of the towline angle for g loadings of 1.5, 2.0, 3.0, and 4.0.

Assume that a sailplane weighing 3.5 pounds is flown by a Model Builder-reading . . . and therefore skillful . . . pilot, to climb at a constant 3 g load throughout the launch. The towline tension required to provide such loading would be approximately 9.8 (2.8 x 3.5) pounds at the initial launch flight angle of 67 degrees (Figure 2). The required tension would reduce to approximately 8.2 (2.35 x 3.5) pounds when the towline angle reached 30 degrees. When the towline angle was 70 degrees, only 7.4 (2.1 x 3.5) pounds towline tension is required to load the sailplane to 3.0 g's. Modern winch systems can easily provide these kinds of forces.

The values plotted in Figure 3 are applicable to any sailplane (as is Figure 2), since they are independent of weight. In Figure 3, the forces or tension in the towline are highest at the start of the tow when the sailplane is pulled up into its most extreme flight angle (Figure 2). The tension necessary for a specified g loading decreases continually during the launch in a non-

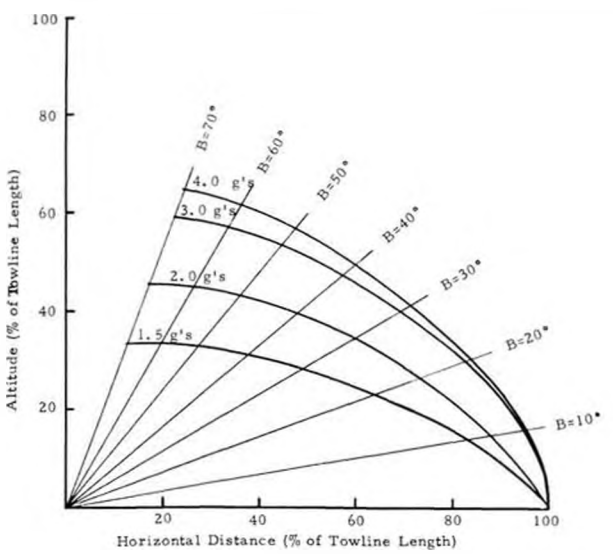


Figure 7

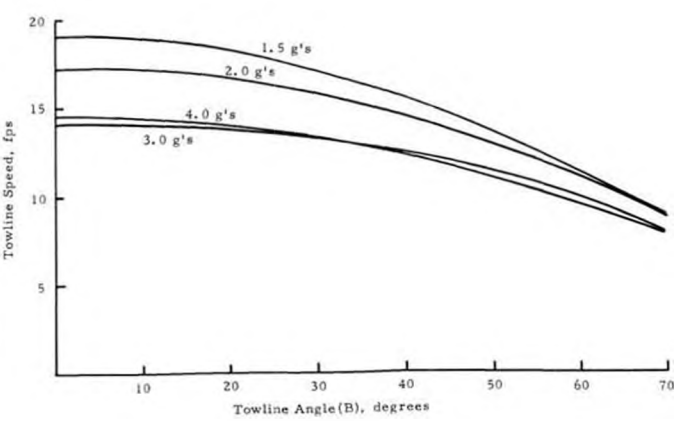


Figure 8

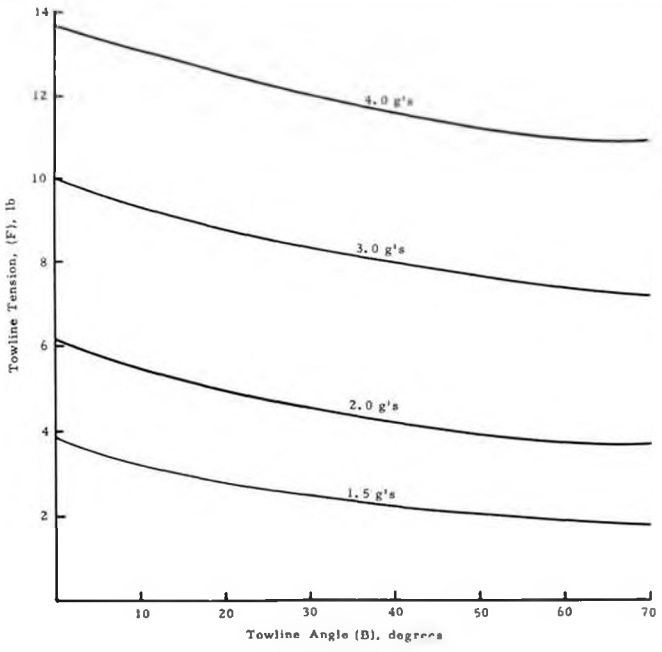


Figure 9

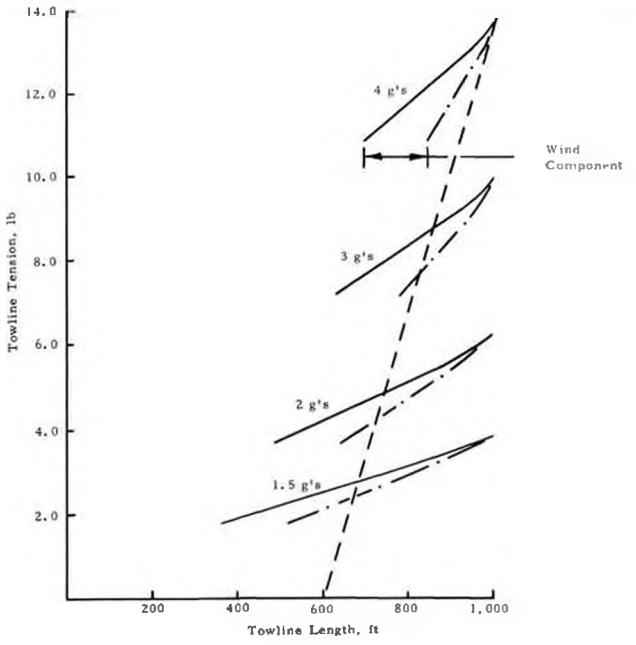


Figure 11

linear fashion, and reaches a minimum value at high towline angles.

Recall that at high towline angles, 70 to 80 degrees, the g loading changes rapidly with only small changes in flight. At a towline angle of 70 degrees, increasing the flight angle from approximately 0.5 to 9 degrees increases the loading from 1.5 to 4.0 g's (Figure 2). This increase in g loading increases the towline tension ratio from approximately 0.5 to 3.1, a factor of 6 (Figure 3).

A 3.5 pound sailplane under a 4.0 g load supports the equivalent of 14 pounds. If the towline angle is 70 degrees, the sailplane is carrying almost 11 pounds as downward towline pull. Since little altitude is gained in the final portion of the launch, the hazards in trying for the last few feet of height overshadow the rewards.

Figure 4 shows the ratio of towline speed to sailplane speed as a function of g loading. Note that for optimum launch, the flight angle should be varied to maintain the maximum desired g loading so that a constant, minimum speed is held throughout the climb. The minimum acceptable speed is determined by the sailplane's stall speed.

Sailplane speed is air speed with reference to the relative wind, not the horizontal air speed. Under launch conditions, the relative wind as it is seen by the sailplane is not horizontal, but rather is parallel to the longitudinal centerline of the fuselage. Actually, the relative wind is tangent to the arch described by the climb path of the sailplane (Figure 5).

As shown in Figure 4, the ratio of towline speed to sailplane speed decreases as g loading increases. The reason is that the flight path angle increases with g loading for a given towline angle (Figure 2), and the towline speed to sailplane speed ratio decreases as the sum of flight path angle and towline angle increases. The simple vector diagrams in Figure 6 illustrate this.

Figure 7 shows the flight path expressed as a percentage of the original towline length. As expected, the altitude increases with g loading, which is directly related to the flight path angle (Figure 2). A 4.0 g flight path results in a launch altitude of approximately 65 percent of the original towline length. A 1.5 g path provides only approximately 33 percent. Also, approximately 90 percent of the final launch altitude is achieved as the towline angle reaches 45 to 50 degrees. Therefore, it is not advantageous to continue the launch beyond 70 degrees or so. If at high towline angles the towline is still being reeled in at a rapid rate, altitude is being reeled in, too.

Now to get an idea of the forces and speeds developed in the launch of an R/C sailplane, consider a conventional "Melmac" Cirrus that weighs 3.5 pounds, including a couple of ounces for towline weight. The normal flying speed would be approximately 17 mph (25 fps). Assuming that the stalling speed at a loading of 1 g is 75 percent of normal flying speed, the

Continued on page 54

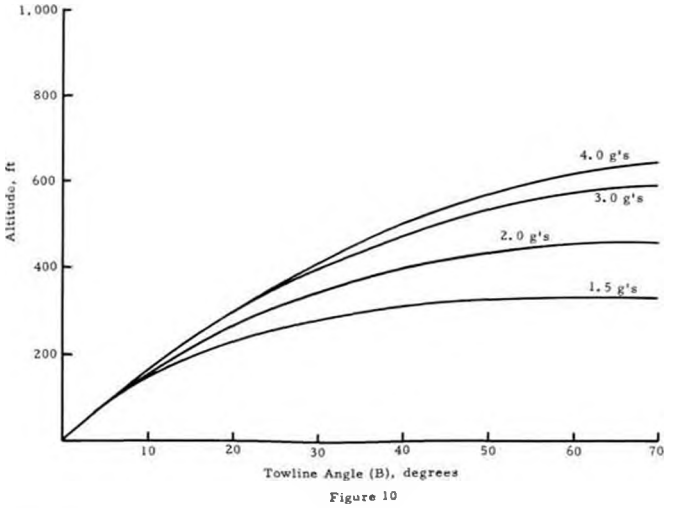


Figure 10

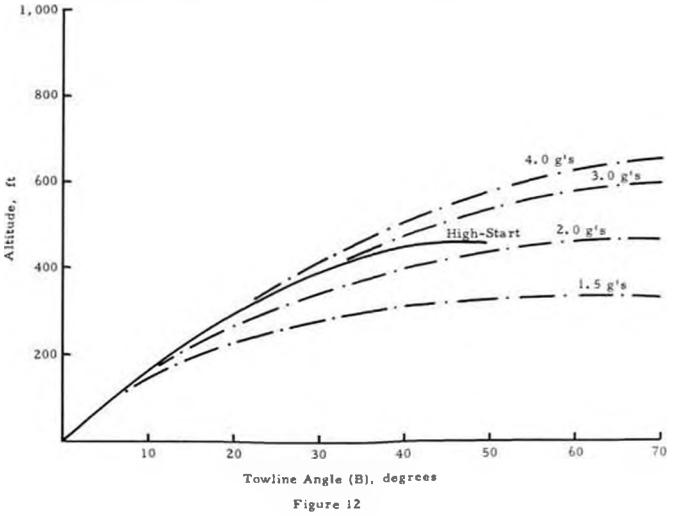


Figure 12

Half a Peanut is better than none! Bill Watson's little Pitts has profile fuselage, clay spinner for ballast!

FREE FLIGHT SCALE

By FERNANDO RAMOS

● For the first time in years, the Flightmasters held an Indoor Flying Scale Contest at the Air Marine Facility, Blimp Hangar No. 2 in Santa Ana, California, April 8, 1973 (site of 1967 indoor Nats). The events featured were Peanut and AMA Indoor Scale (both of these had a separate biplane or multiplane class) and CO_2. Those contestants who were new to the Blimp Hangar were in for a real experience. It is not often one can fly indoors and have a ceiling of 197 feet. Even though there were a few helicopters hangared, there was more than sufficient room.

The contest was scheduled for nine-o'clock in the morning, and nearly everyone who would be flying was there waiting to get officially entered so that flying could get started. The contest from the onset was one of absolute fun, with competition strictly low-key. There were over 80 models counted with about 46 qualifying for the prizes after the contest was over. Peanut led in number of entries with 26, which included the multiplane class. There were 14 entries in open rubber and 6 in CO_2.

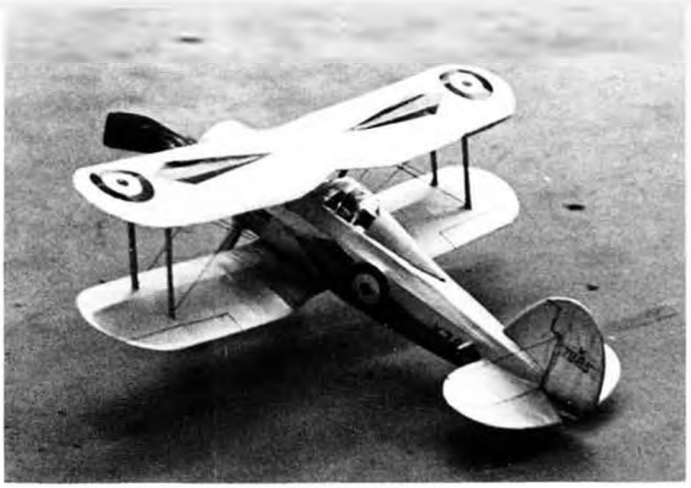
Also, for the first time in years, there was a separate event for biplanes (I know that it should be called "multiplane," but seldom do you ever see a tripe or even a quad competing in a contest.), since they are usually handicapped by the additional weight and drag. It is really a pleasure to compete in a class with biplanes only! Personally, there is no prettier sight than a scale biplane in the air.

Surprisingly, most everyone entered had previously test flown all of their models. This is most unusual, as many of you will agree, especially since this was really a fun contest. Officials were kept busy recording all flights. In CO_2, Bill Krecek had a Westland Widgeon

"I knew the Old Man must be good for something!" Bill Stroman winds DH-6 peanut for son, Ray.

Clarence Mather holds Nesmith Cougar for Col. Randolph. Plane turned in 3-1/2 minute flights, but had little scale value.

PHOTOS BY FERNANDO RAMOS AND EDITOR



Bill Roger's beautiful Peanut Gloster Gladiator.

Jim Wright's F. W. Stosser flew well in Open Rubber.

Ye Olde Chief Cook and Bottle Washer gets the low-down from Clarence Mather on his PT-19. Fudo Takagi is at right.

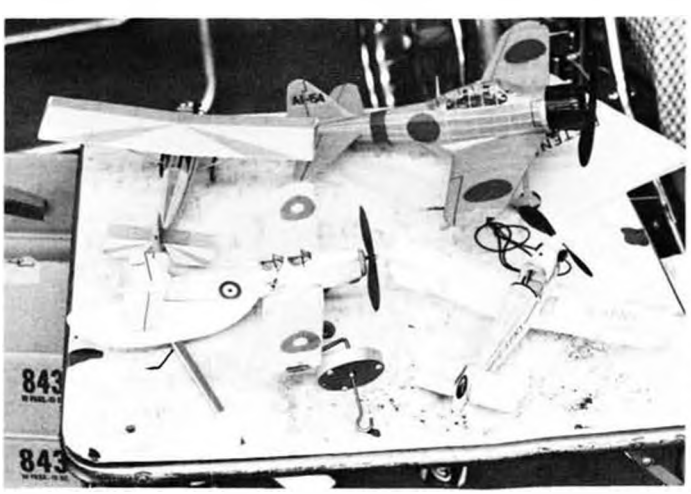
Bill Hannan holds Scale Viewer Hal Osborne's S. S. Scale Curtiss Robin (Somewhat Semi Scale, that is). It's a great flyer!

that was consistently turning in two minutes of realistic flying. He also had the misfortune of hitting every helicopter around, at one time or another, including an abrupt landing on one of the tail rotors. Fortunately, the model was not damaged. Others in this category that were outstanding were Kingsly Kau's Blackburn and Bill Warner's Eastbourne. Both of these models were of the pre-WWI type. One model that was not flown officially, a most unusual subject, was a Waterman Aeromobile by Bill Watson. This flying wing configuration flew extremely well.

Those who may be wondering how large a model can be successfully flown with the Brown CO_2 engine might be interested in John Lueken's Aristocrat. John took the Peanut plan of this model and doubled it. This, of course, gives a wingspan of 26 inches. The model flew very well with good long flights. The criteria for CO_2 was not duration, but rather, the same rules as for gas were used . . . realism of flight. This seems to be the best way to handle this particular category.

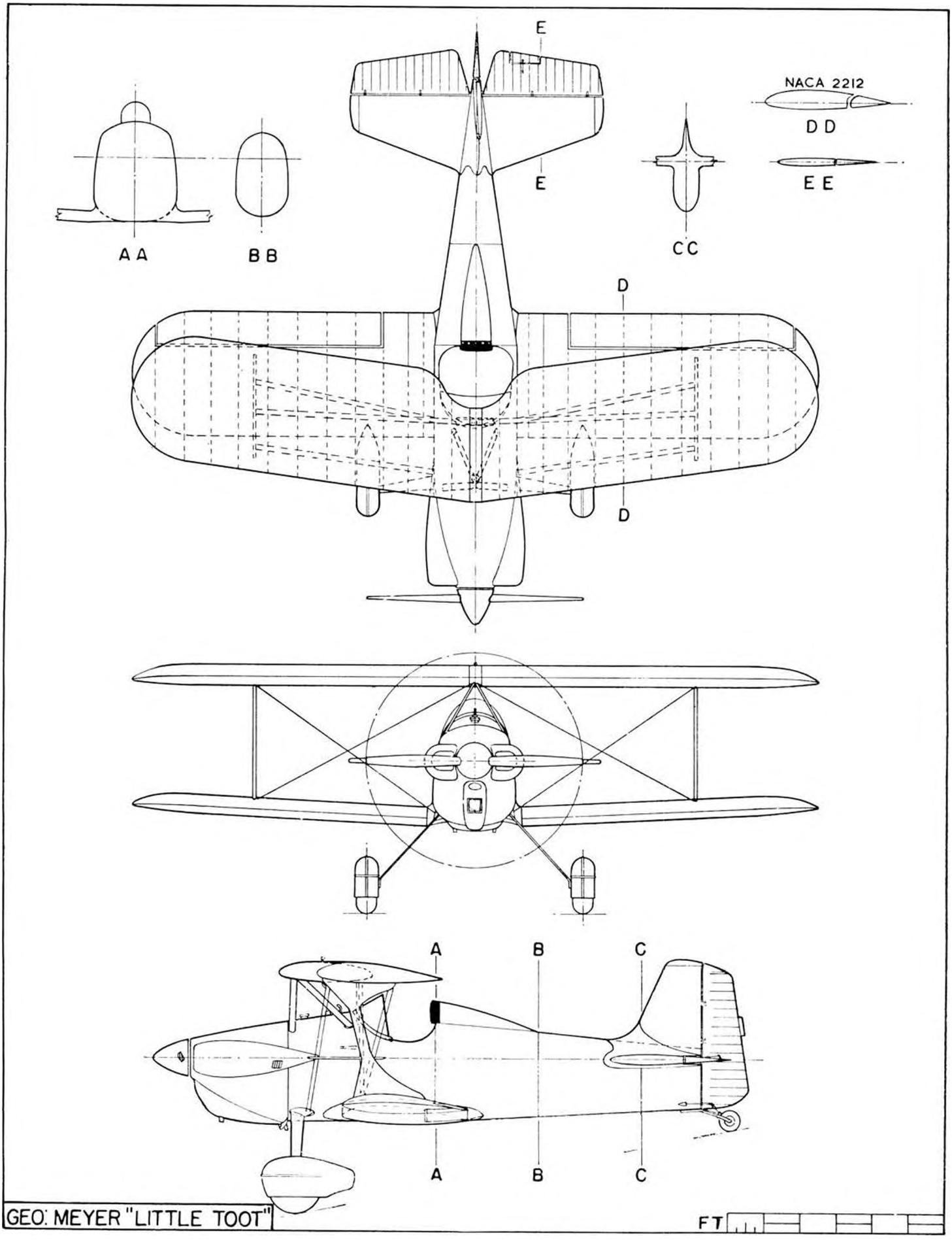
In open rubber there were several outstanding models, including a F.W. Stosser built by Jim Wright. Clarence Mather had his reliable PT-19, as well as a new model of a P-39. Both of these flew in excess of one minute. I saw his PT-19 do 2 minutes and 18 seconds here in the Blimp Hangar many years ago. Since duration is not the main factor any longer, Clarence didn't have to really crank in the winds. Bob Peck, of Peck-Polymers, had a Japanese Zero that was flawless in workmanship to add to the other WWII aircraft. With all of the running around I was doing, I didn't get a chance to see this

Continued on page 53

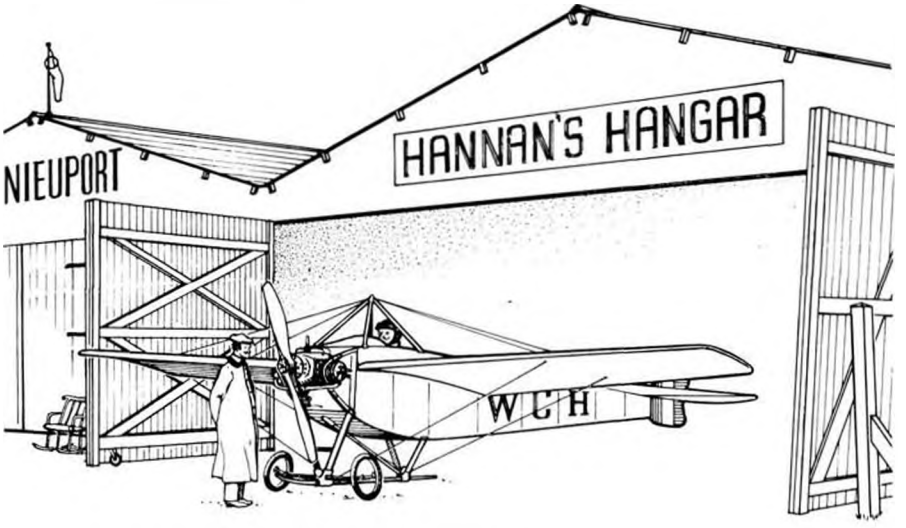


Peck-Polymers Bob Peck's "flight deck." Zero is non-peanut rubber job that Bob developed for a book to be published in Canada.

Doug Mooney launching a Stahlwerke (MB Dec. '72) in open rubber.



Drawing courtesy of Aeromodeller magazine.



. . . . being a potpourri of items aeronautical

Mother Nature's wind tunnel getting some use. Builder of the test section, Paul Block, watches as Bruce Carmichael (l) and Bill Hannan check some lift factors.

PILOTS MAN YOUR PLANES!

● Quite a bit has been written during the past few years by various individuals interested in seeing more models equipped with pilots. Dave Jones wrote such a convincing article on the subject that it caused the Flightmasters to require pilots in their "Jumbo" (over 48" span) rubber-powered models, and the pilots themselves were actually judged and awarded points. And, there can be no doubt about it, model aircraft, especially the open cockpit variety, do look rather strange without pilots aboard. This lack is particularly noticeable in flight photographs. The World Championships for RC scale models really drove this point home forcibly, where the large size of the otherwise fantastically realistic aircraft made the absence of occupants painfully obvious. Dick Castle, editor of the San Diego Orbiteer's newsletter, long an advocate of pilots in scale models, goes one better, by giving each a name. For example, his WWI DH 9 is piloted by one Strafer-Smythe, of the Royal Flying Corps. SS is carved from styrofoam, as his companion in the rear pit. (Sorry, I didn't catch his name.)

Some of the members of the Flying Aces Club in Connecticut "people" their models with characters from the old Phineas Pinkham stories written by Joe Archibald and published in the much lamented Flying Aces magazine.

* * *

THE FUTILITY FACTOR

According to Doug Fronius, "No model design is ever a complete failure, it can always serve as a bad example!"

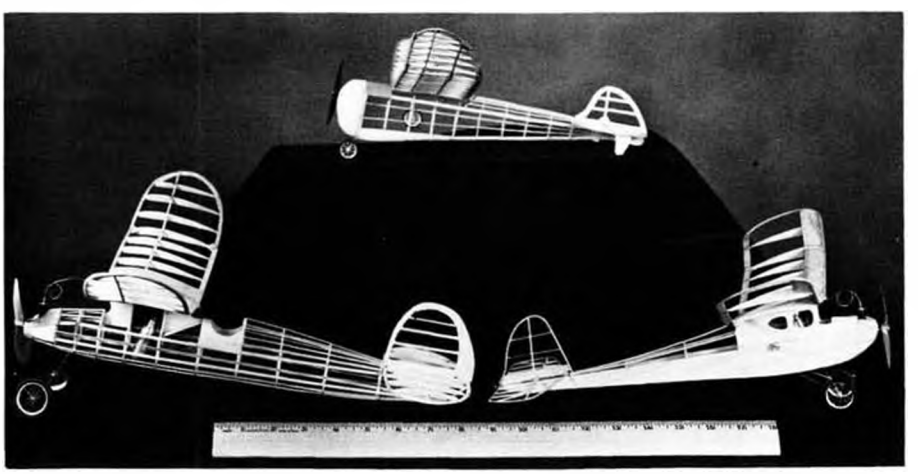
* * *

READER'S OCCUPATIONS DEPT.

Our mention of the variety of jobs represented in our audience brought forth some additions: Seems we also have at least one barrister in our ranks, in the person of Dennis O. Norman,

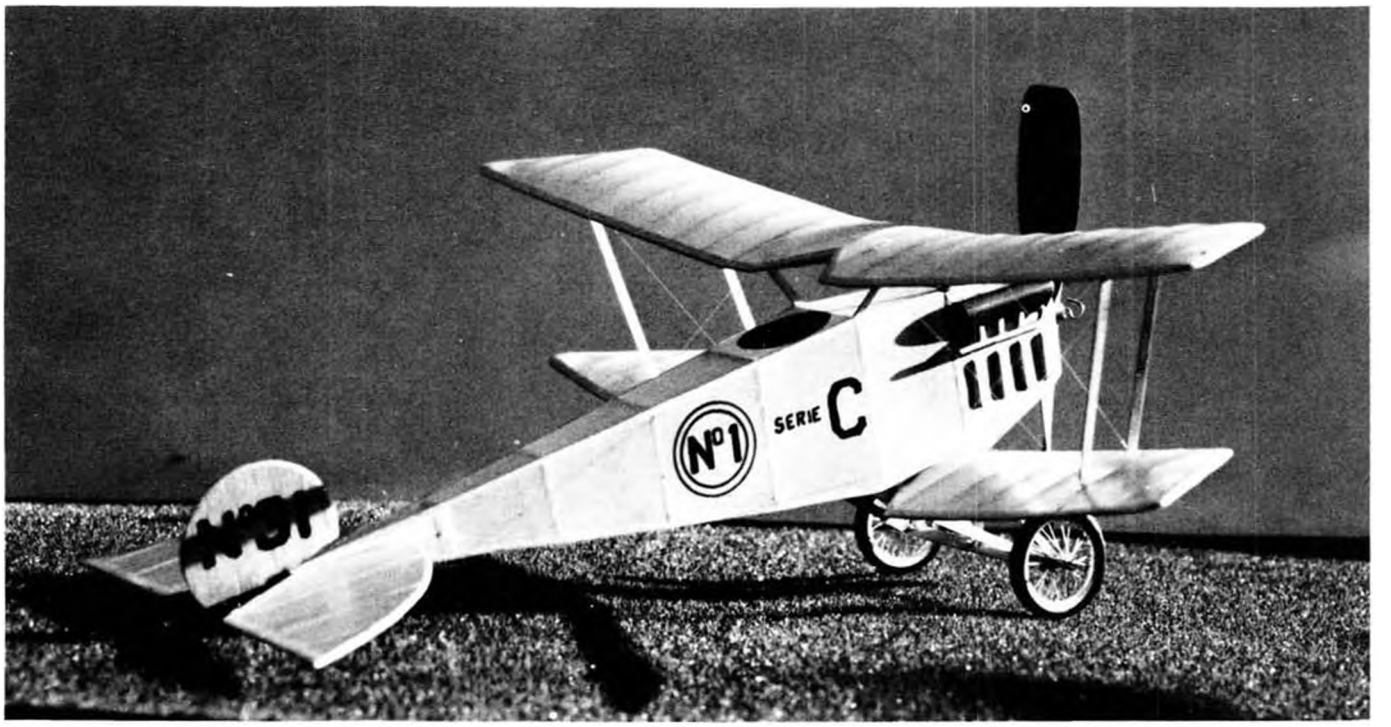
Continued on page 50

Indoor rubber scale Westland Widgeon by Kingsley Kau now resides in Russ-Craft Model Museum. Curator Russ Barrera is a real plane snatcher!



Trio of miniature CO_2 powered Old Timers being kitted by Ed Toner. Each kit includes printed wood by Peck-Polymers and a set of FH Wheels. Recognize the designs?

Bill Watson's butterfly-size ornithopter, flown in Santa Ana blimp hangar. Note thimble.



Peanut-of-the-Month is this little known Mexican fighter plane from World War I, the Microplano Veloz. How about that?

PHOTOS BY FUDO TAKAGI

PEANUT GALLERY

MICROPLANO VELOZ by WALT MOONEY

Three-views are nice to have, but in the case of a rare bird, one sometimes must resort to a little calculated fudging in order to produce a set of building plans. Being a fudger from way back, Walt had no difficulties.

● Several months ago I purchased a copy of the 1919 issue of Janes All the Worlds Aircraft. Like I always do when I get another source of 3-views, I went through it to see if there were any interesting designs for a model or two.

Hola! Que Tal? There was a real interesting airplane. A biplane fighter designed and built in Mexico during the last year of WW I. Now I'd never seen a Mexican biplane from this era, so it immediately took my eye. It was a very simple aircraft to model, with a different configuration, while still retaining that vintage look.

Unfortunately there was no 3-view . . but wait a minute! There were good photos, one of them an exact side view, and another of the airplane uncovered, showing lots of detail and all the cross sections. The others give a good look at the wing and tail planform. Also, all the important dimensions are there.

Sooooo, in the best tradition of military intelligence, and with a great deal more to go on than one usually gets for that type of job (many years ago I did a little of this aircraft evaluation for real), I developed the 3-view and the Peanut Scale version shown here. Intentional deviations (also called "premeditated inaccuracies") from scale include the addition of dihedral and an enlarged horizontal tail.

The model is quite easy to build. Its fuselage is simply a square box structure without formers or stringers. The wings are built using a leading and a trailing

Plane's rather angular lines are sharply contrasted by the circular rudder. Walt found that said rudder had to be increased in size to eliminate Dutch roll. See text.

edge and ribs between. The horizontal tail is conventional and the vertical is made from sheet. The nose is filled with balsa sheet on the sides and bottom and the top nose uses a thicker piece carved to shape.

It is really the details of this model that make it different and therefore interesting. For instance, the tailskid is made of three pieces as a tripod with its apex towards the ground. The wings have no stagger, that is, they are directly above one another. There are only two interplane struts on each side but the front strut is nearer the fuselage than the rear one. The lower wing leading and trailing edge is actually below the body. The vertical tail is a circular disc with a notch in it to clear the fuselage.

All the struts on the model were cut out of 1/64 inch thick plywood. Hard 1/32 inch sheet will also do, but the Sig plywood works great. The front cabane strut is a "W" in front view. This was assembled over the plans before attaching it to the upper wing. The forward landing gear struts are attached to the lower wing structure and the rear ones are cemented to the fuselage bottom longerons just behind the wing.

The wire landing gear is made to lay just along the outside of the forward gear struts. It is not bonded to the struts and is therefore free to flex in a hard landing. Hungerford (FH) wheels were used because they look so good.

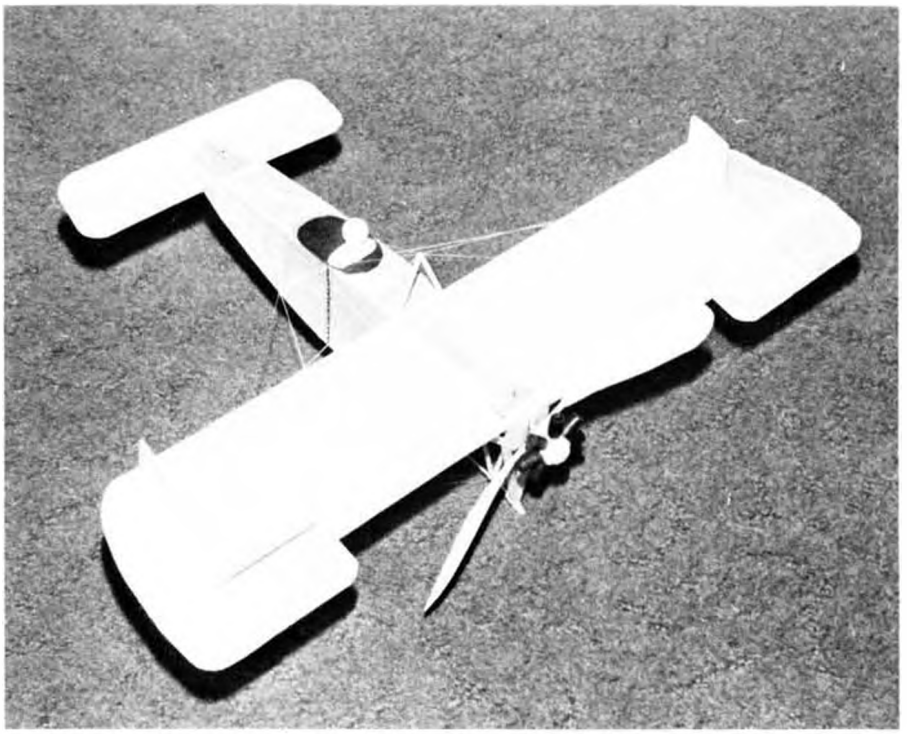
Engine details make the front end worthwhile. Make up the valve covers from scrap balsa. Make the exhaust stacks from aluminum tubing. If the tubing you have is brittle, and kinks or cracks when you try to bend it, anneal it (make it soft so it bends easier). To do this, first light a candle. Now, run the tubing through the candle flame until the tube is completely covered with soot. Let it cool . . . wipe off the soot with a tissue, and proceed to bending. This annealing technique really works, I learned it from watching an experienced metalsmith as he used this technique to a much larger scale in order to form the first aluminum cowl for the prototype Helio Courier, 23 years ago. He used an acetylene torch to soot up the panels and anneal them whenever they got work-hardened by his forming tools.

The propeller used is one of the North Pacific plastic ones, cut to size, and a Peck-Polymers nylon thrust bearing is used in the nose block.

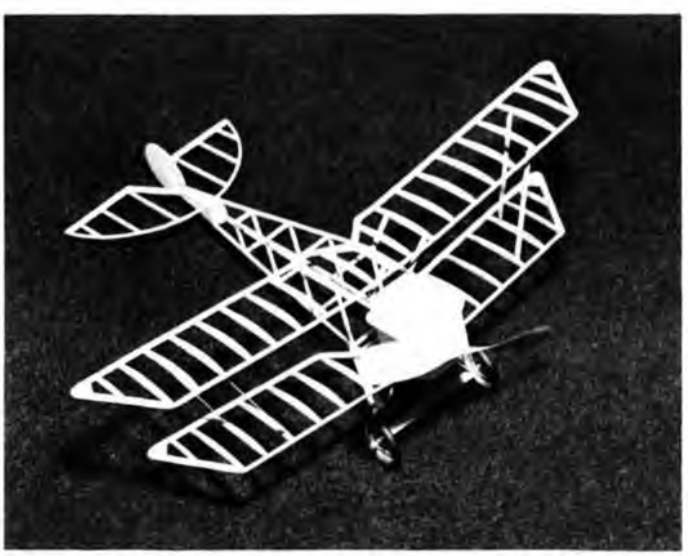
Wings built like my model have a tendency to bow up as the dope shrinks. If this offends you, add a 1/16 inch square spar notched into the top surface of the wings. If your model wallows in flight, consider making a larger vertical tail.

(Bill: The vertical tail has been enlarged from the plans by 1/8 inch in diameter. It is still a little too small. Model Dutch rolls some. I would recommend a rudder 1/4 inch in diameter larger than shown on the plans.)

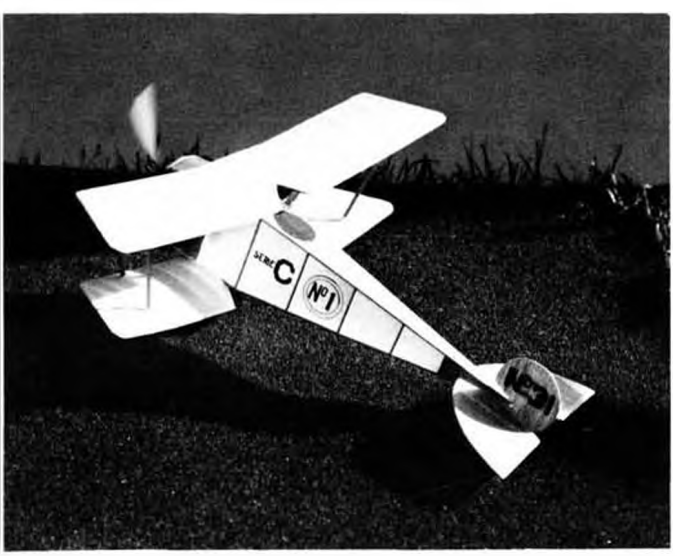
As for the numbers, don't ask me why the fuselage has a No. 1 and the tail has a No. 31. That's what the photos of the real plane show, so I put it on the model. "And that's the truth!" BBrrazzzzzzzzzzt!!!! ●



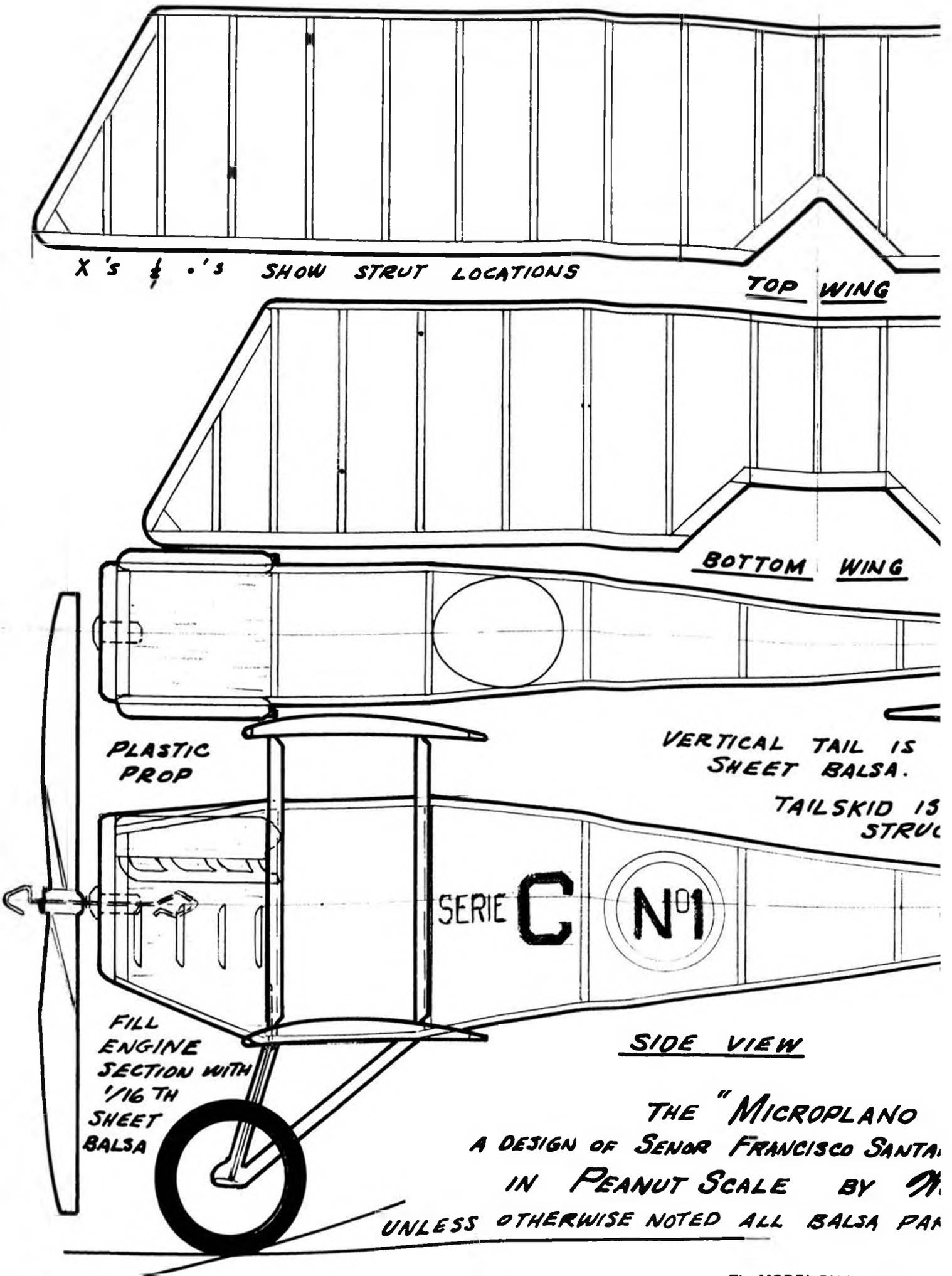
Interesting Bleriot canard built by Bill Young, Bakersfield, California. We'll be presenting the construction article on this great flying Peanut in a near future issue.



Bones of the Veloz display the easy construction resulting from its squarish lines. You may want to add a spar to top surfaces of wings.



Walt has no explanation for the difference in numbers on the rudder and the fuselage side. Maybe the painter got tired , just left off the 3.


X's & ·'s SHOW STRUT LOCATIONS
TOP WING
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VERTICAL TAIL IS SHEET BALSA.
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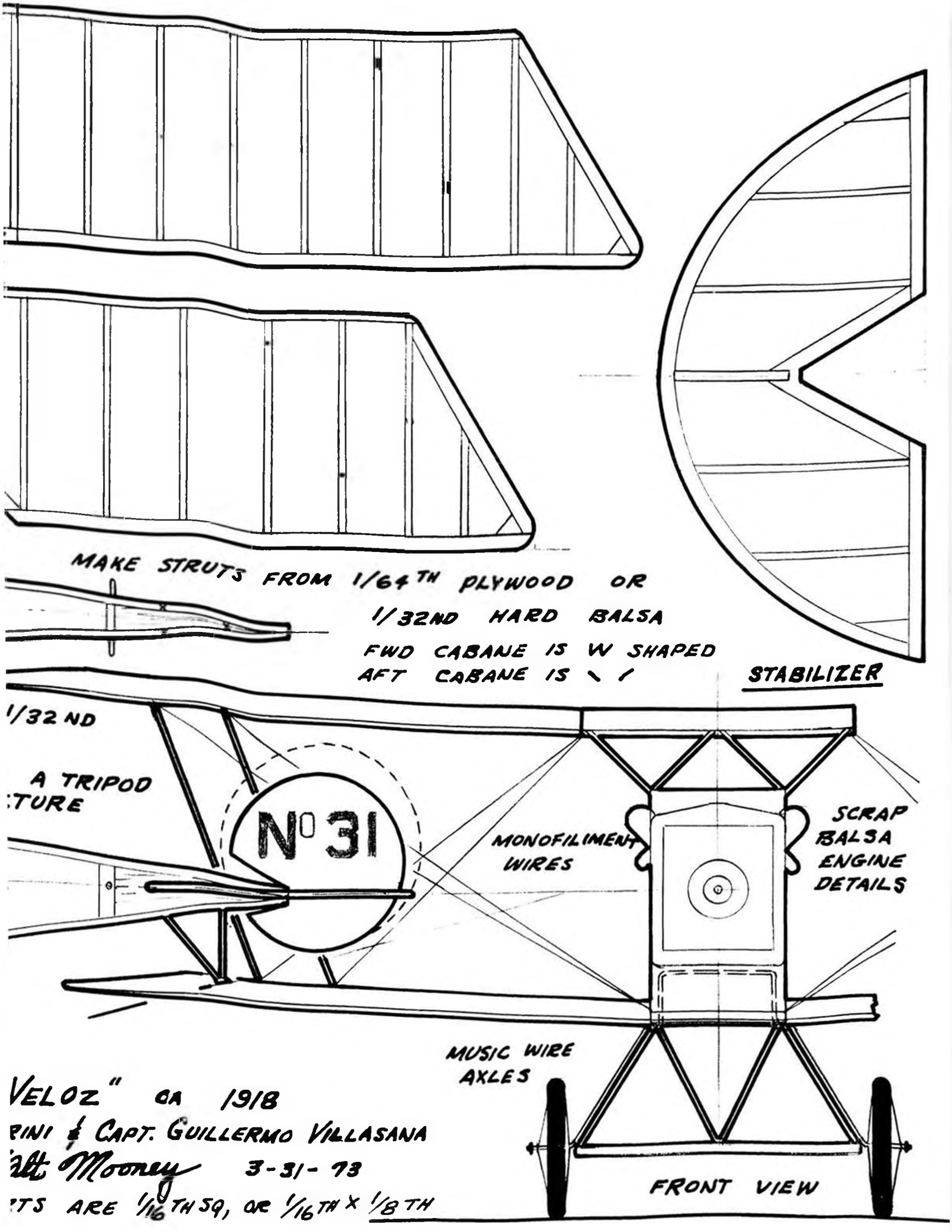
FILL ENGINE SECTION WITH 1/16 TH SHEET BALSA
SIDE VIEW
THE "MICROPLANO
A DESIGN OF SENOR FRANCISCO SANTA
IN PEANUT SCALE BY
UNLESS OTHERWISE NOTED ALL BALSA PA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1/32ND HARD BALSA
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SCRAP
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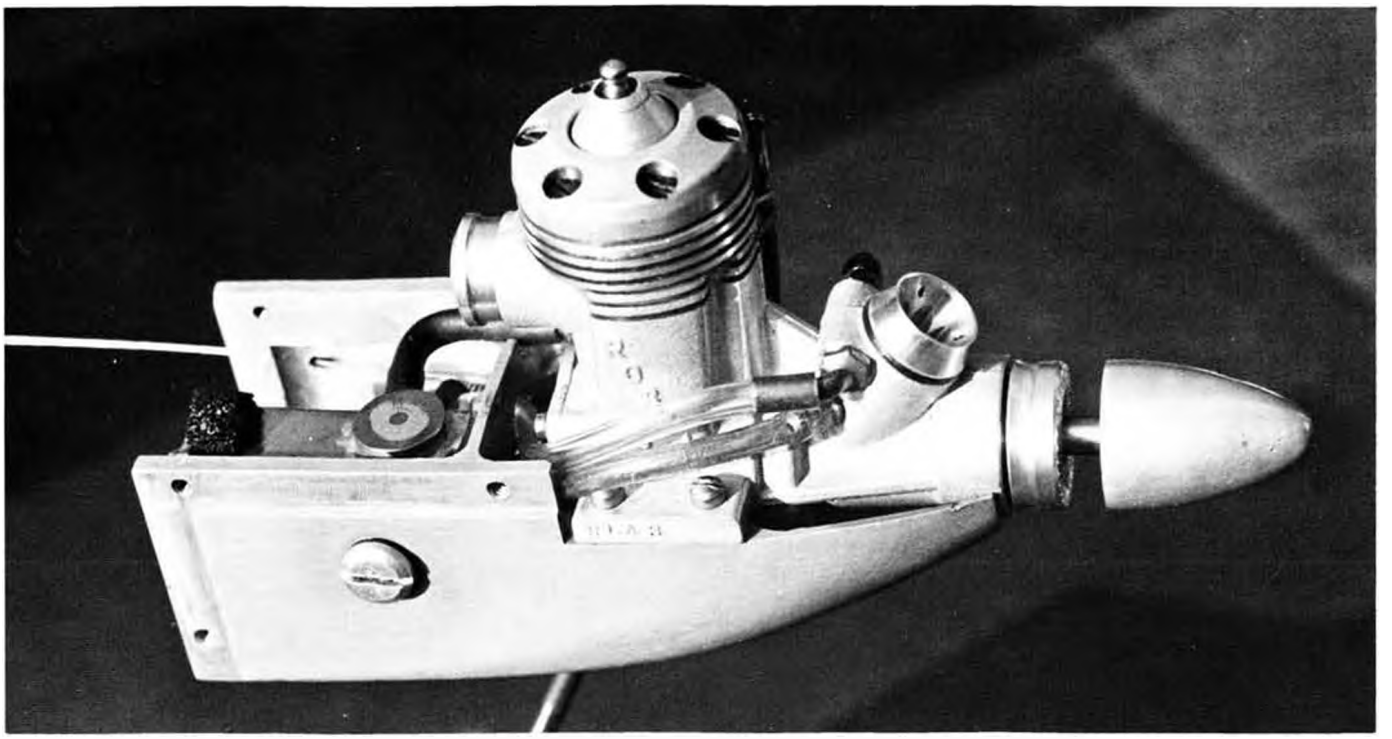
DETAILS
MUSIC WIRE
AXLES
FRONT VIEW
VELOZ" CA 1918
RINI & CAPT. GUILLERMO VILLASANA
Walt Mooney 3-31-73
TS ARE 1/16TH SQ, OR 1/16TH X 1/8TH

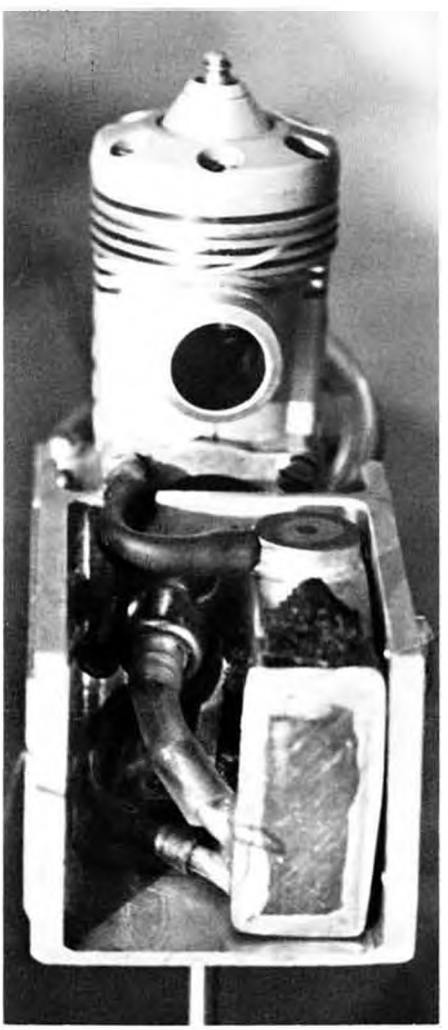


Anderson front end, housing "Rossi-Anderson .15" and special tank. Mount is machined from magnesium bar stock.

ENGINE PHOTOS BY ROBERT MARTIN

F/FAI

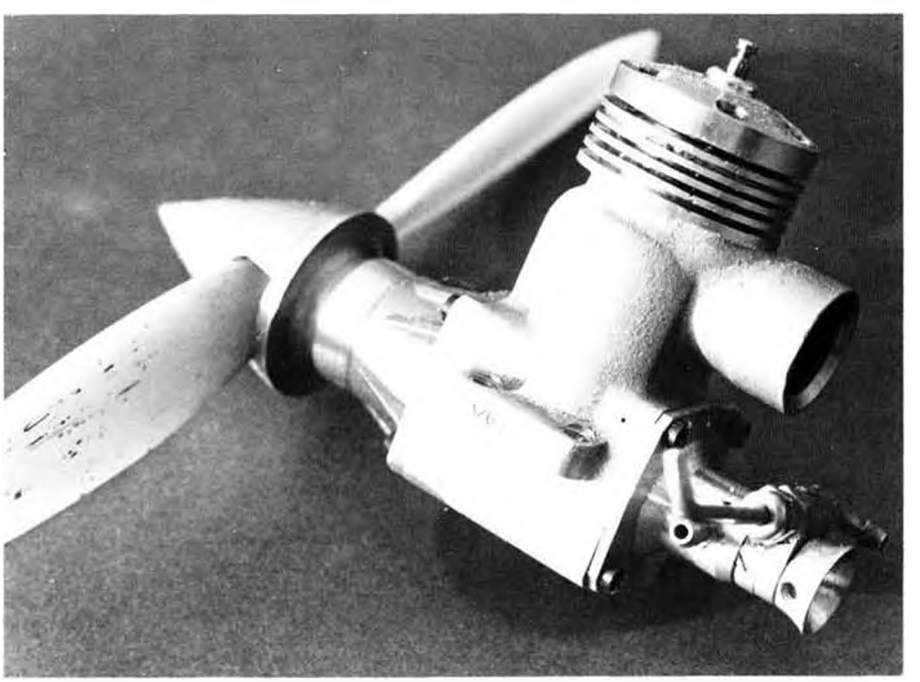
By
AL VELA



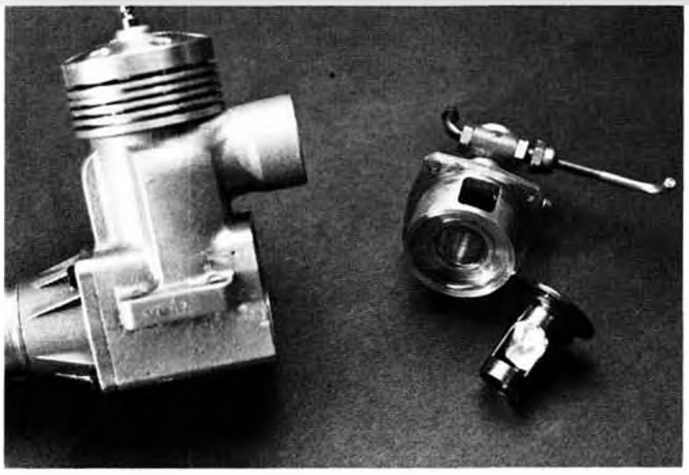
Rear view of Anderson mount shown at top of page.

● Everything was not bad last year back in Caddo Mills . . . you see old friends, talk a lot, and also meet nice people.

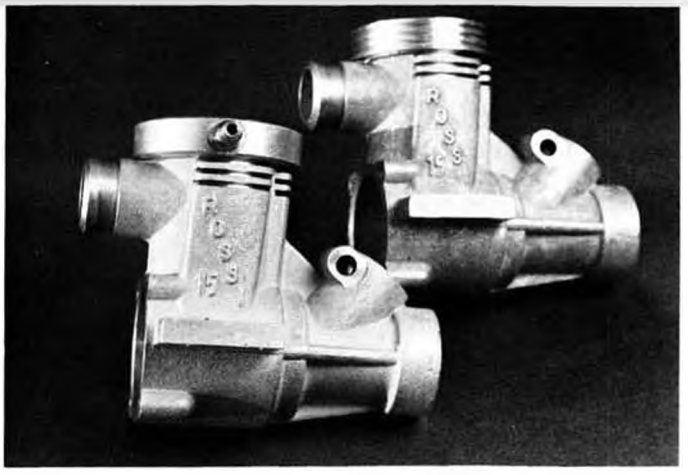
Well, this is what it was like to me, as this time I had the opportunity of getting to know R. L. "Doc" Anderson, that fine gentleman from Sylvania, Ohio. Yes, the same one who is the elder half of the Anderson father-and-son FAI F/F power team of Doc and Rol. They have been in almost every fly-off that I can



Vela conversion. T.W.A. housing. Rossi rod, piston, and sleeve. Drum valve in place of original disc rotor. Timing remains tha same as original Rossi. Sleeve rotor drum is retarded 6°.



Vela T.W.A. Rossi. Backplate for housing drum rotor.



Anderson conversion of water-cooled Rossi .15 to air-cooled type.

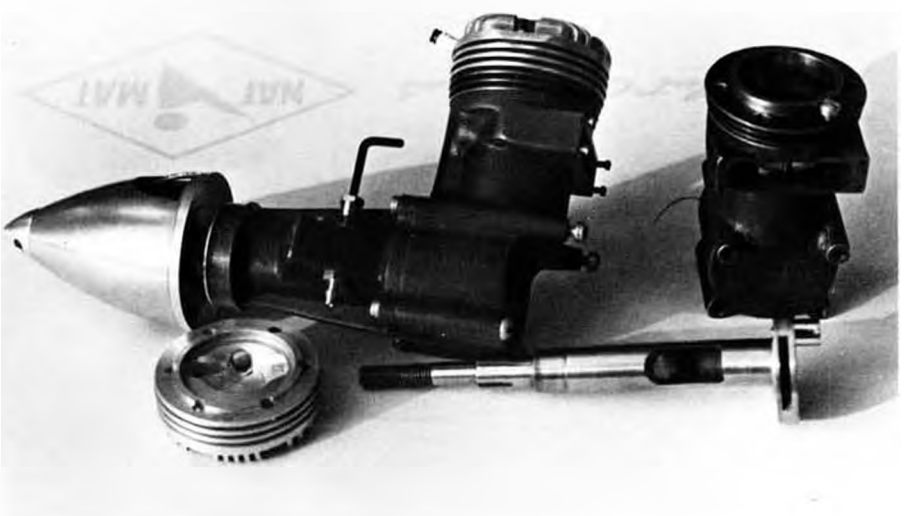
remember since the first centralized team selection affair in Chicago.

It is not my intention to describe the Andersons' fine performance in the last two fly-offs, as most everyone competing for the team positions was aware of this. But rather, we'd like to tell about the behind-the-scenes work by Doc in preparing the team for competition.

Doc is the finest craftsman and Rossi engine reworker that I know. The quality of machining and the extra performance he gets from a standard Rossi is outstanding. His special chroming of sleeves is something you have to see to believe, and I am certain it is the best ever.

This skill of Doc's was not acquired overnight. His experience was gained in full scale racing and commercial aviation. He is retired now, but has worked and held high positions for big organizations such as Champion Spark Plug. He's holder of FAA Aircraft and Power Plant License No. 6490, issued back in 1928. He was also one of the experts who set up engines for men such as Jerry Mack, James Bede, and Conrad. He's holder of 6 U.S. patents used extensively in DC-3's and DC-4's.

Enough royalties came out of his patents to put his son Rol through college for an engineering degree. Doc is also a member of the Automotive Engineers for the past 25 years.

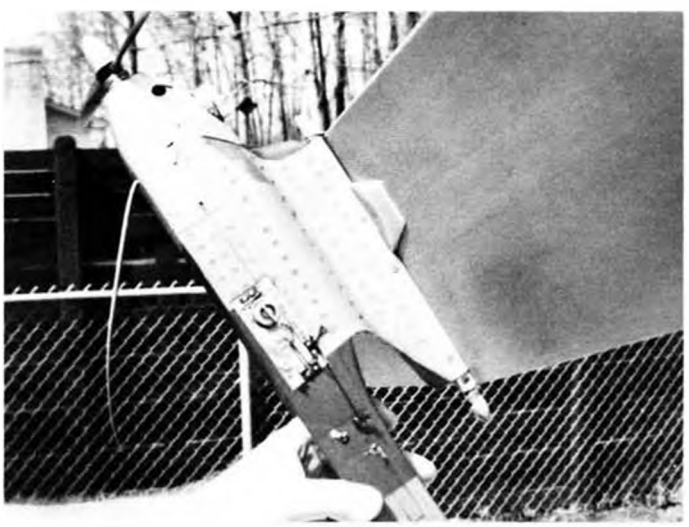


"Doc" Anderson spark ignition .49-.60, designed, built, and flown back in 1947. These are very rare collector's items.

Looking at samples of his reworking, one can easily figure the tremendous amount of time involved, yet he also manages to go out and make flight tests (using his son as pilot) on everything he creates in the workshop. Besides modeling, Doc also finds time to catch some elusive "lunkers" and a seasonal hunt for game in the Ohio countryside.

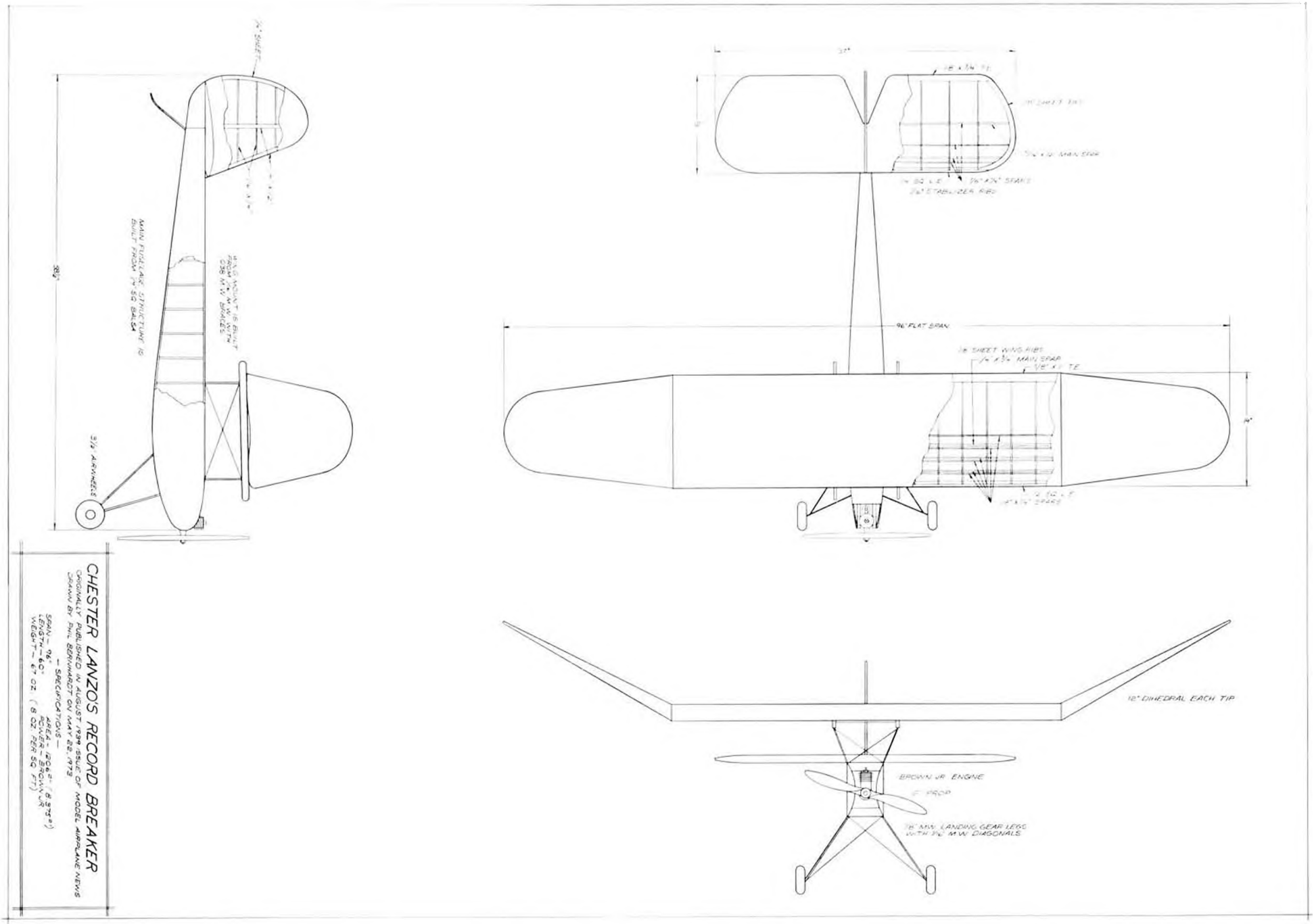
To take the nickname "Doc" literally, it is suggested that if you have a "sick" and "ailing" Rossi engine, send it to Doc's hospital for an effective cure.

Continued on page 61

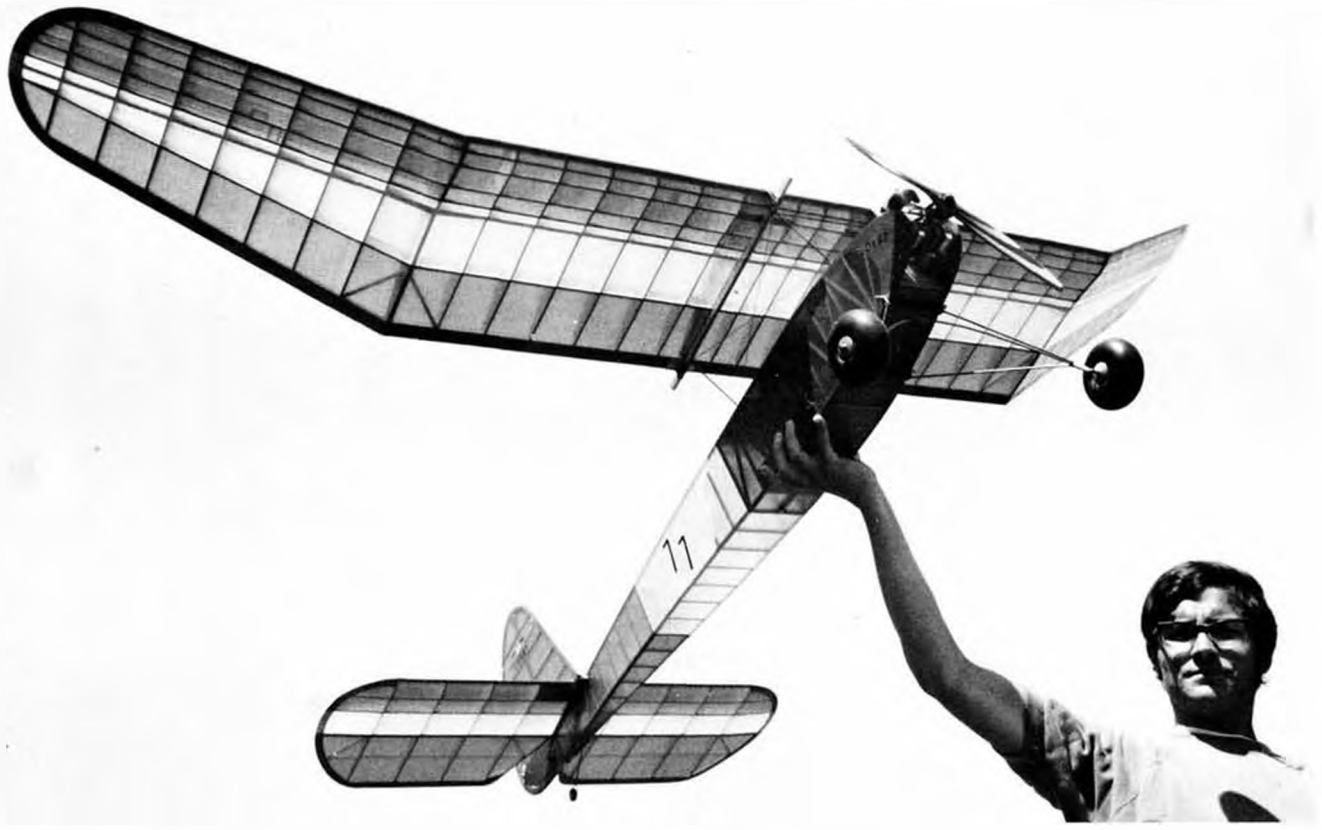


Business end of Rol Anderson's "Odin I", FAI ship for 1975 team competitions. Exhaust carried out through tunnel in pylon.

Rol and "Doc" Anderson, a formidable father and son FAI team. Doesn't Rol remind you of Paul del Gatto?



COMPLETE FULL SIZE CONSTRUCTION DRAWINGS AVAILABLE — SEE PAGE 64



Otto Bernhardt's son Phil holds the Lanzo aloft for a through-the-covering shot. Otto added extra verticals and cross-pieces in the fuselage. Lanzo was one of the earliest to use multi-spar construction in wings and tails. The turbulator effect really pays off.

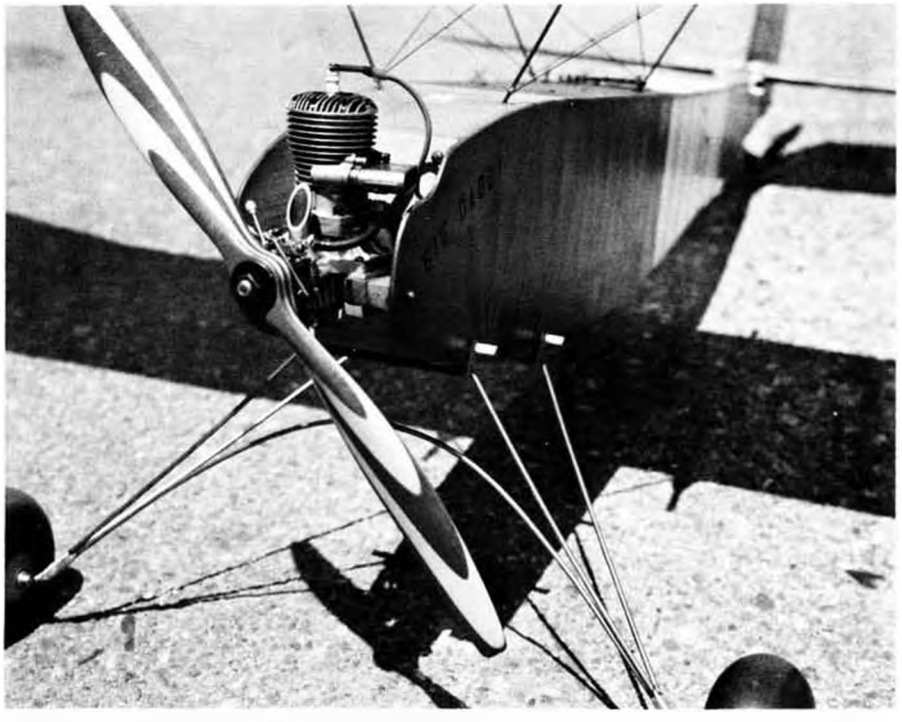
PLUG SPARKS

Two-for-one! Our Old Timer of the Month is also the Star on the Cover! It's Chet Lanzo's "Record Breaker." Build one and enter Texaco and 30 Second Antique. It's a Ball! (Ahem . . . Lots of room for a radio, too.)

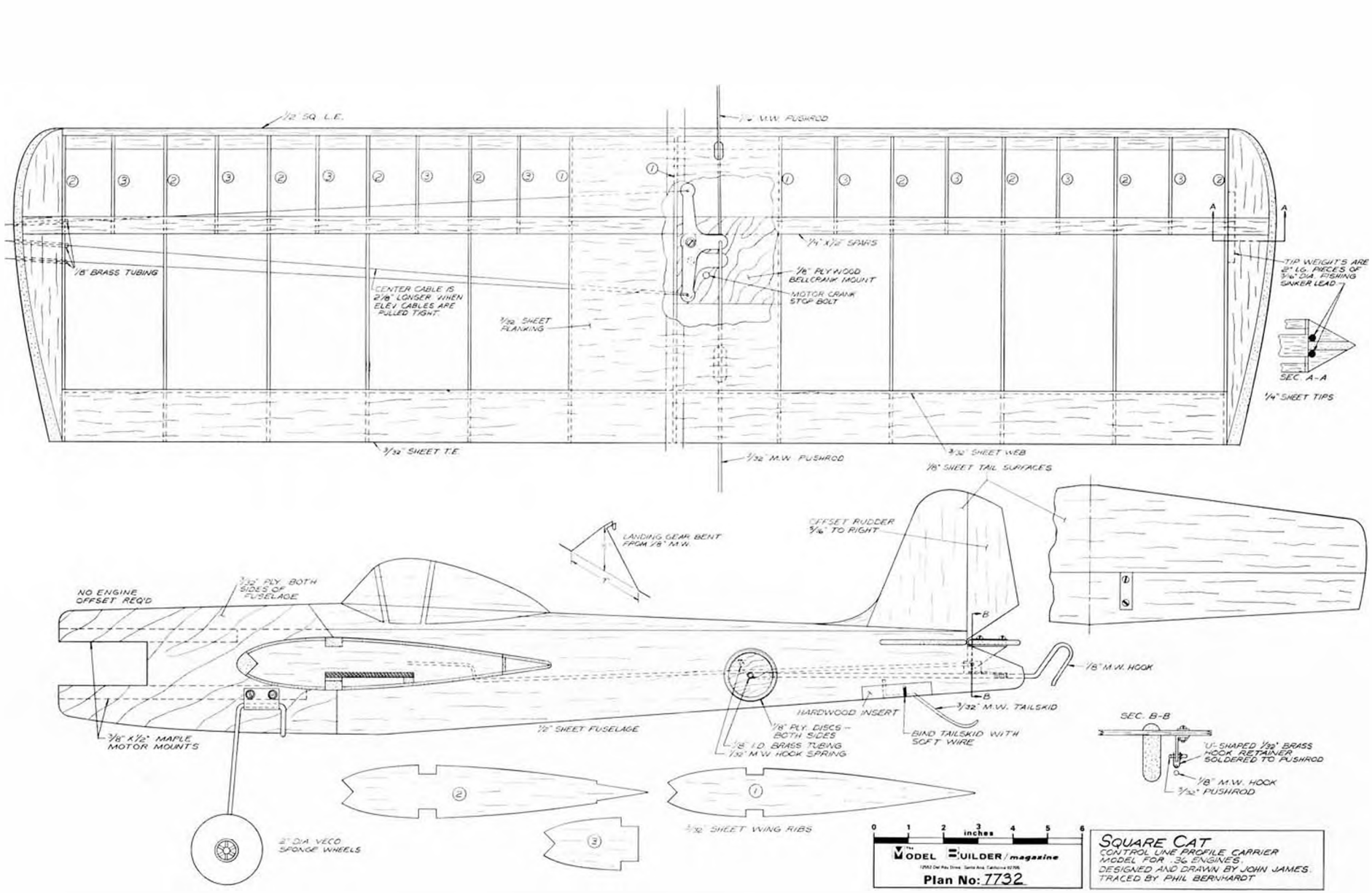
●This pretty well known model, originally designed by Chet Lanzo, apparently never had a name. When published in the August 1939 issue of M.A.N., the headline simply said,"A Record Breaking Gas Model." And that's what it was. It held the world's record for duration and weight lifting. It's been called the Lanzo "Record Breaker" ever since.

Otto Bernhardt, Gardena, California, and a SCIF (So. Cal. Ignition Flyers) member, built this version of the Lanzo about 5 years ago. The ship is covered with silk and finished with 10 coats of thinned clear nitrate, plasticized with T. C. P.

The Anderson Spitfire .65 ignition engine swings a 16 x 6 prop which Otto carved from a laminated blank of white cedar and mahogany. The ship at one time carried a pressure actuated altitude limiting device (no, not for 400 feet) which would deflect a rudder tab, putting the plane in a tight spiral. With a 1-3/8 ounce fuel allowance for the Texaco event, the model would otherwise soon be out of sight overhead! ●



Otto used a spreader bar for more flexiblity in the landing gear than would be had in the original. A beautiful carving job on that prop!



FULL SIZE DRAWINGS AVAILABLE – SEE PAGE 64

John James, Jr. and three "Square Cats," all powered by plain bearing Fox 36X engines. Simple, uncluttered design makes it a good one for beginners in Carrier.

SQUARE CAT

By JOHN JAMES

A great airplane for the beginner in Carrier, the Square Cat will actually do many of the things that are only claimed by some much fancier designs. Build one and start bringing home the hardware!

● The Square Cat design is an attempt to come up with an airplane that will be stable enough and simple enough for the beginner to fly in the carrier events.

Most of the current designs being offered in plans and magazines are getting a little too complicated, in my estimation, for a junior to build and compete with. Not without a lot of Dad's help, that is.

This plane doesn't have flaps, ailerons, kick-over rudder, or movable leadouts, but it's proven its contest ability and stability by helping my 12-year-old son build and fly successfully in his first year of competition flying.

Build the plane as shown, save the gadgets for the big boys, and I'm sure you will be pleased by the flight characteristics and winning capabilities of a plane that's as simple as you can make it.

Several of the design considerations and reasons for them follow.

First of all, the longer inboard wing and lots of wing weight will actually make the model roll *away* from you as you kick in the high throttle when the plane is stalled. After seeing the opposite happen too many times in Class I and II, as well as profile carrier, this will be greatly appreciated.

The nose area of the model is quite large in comparison with contemporary profiles. The reason for this is to protect the engine and carburetor. The difference in drag on a profile model is negligible.

The only changes I've made since the original is to build the elevator in one piece (simpler), make a fatter wing, and add half-ribs in the wing. This didn't affect the high speed one bit, and made flying in a semi-stalled condition a lot easier, as the old wing stalled quite suddenly.

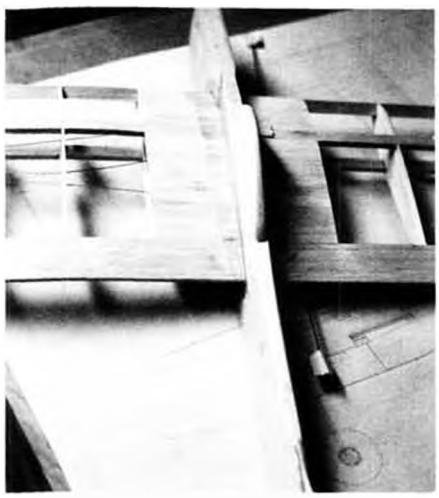
The times that we have attained so far are 28 seconds for high speed and 94 seconds for low. These times are with Sig "Peter Chinn's contest fuel" and a 9-7 Tornado nylon prop. A Fox 36X R/C plain bearing is the engine we used and these are stock engines. These engines are competitive as far as performance is concerned, but if you have great disdain for monkeying around with carb settings, I would suggest the McCoy 35 R/C with the Perry carb. I've been a Fox man since I could tell the difference, but that carb isn't anything for a beginner to be messin' around with!

Right now you're going to hear about profile planes that will do 20-21 seconds on high speed and 3-1/2 hours on the low end. I would like to say right here and now that these planes are mighty hard to find on contest

Newest "Square Cat" ready for the season's competitions.

John Jr. and brother Randy holding the loot from the first year of competition.

Shims hold wing in position for epoxying.



First fillet of 5-minute epoxy applied.

Remove shims and pour in Hobbypoxy No. 2.

day. Build the Square Cat as shown, and if your high end is around the 30-second mark and the low end is anywhere above 60 seconds, you'll make a lot of honest people out of those who say they have the super plane and the new top secret gadget.

BUILDING

The plane follows standard profile model construction. If you've got a Flight Streak or Ringmaster under your belt, the structure will be no problem. If you are careful, and buy a straight piece of 3-inch wide by 1/2-inch thick balsa, you can make the fuselage out of it by laying the edge along the line on the plans that runs aft from the top of the motor mounts, cut the bottom section out, and then use what's left to make the top piece and canopy.

Start the wing by cutting a piece of 3 by 3/32 balsa down the middle with as straight a cut as possible. Pin one trailing edge piece down on the plans and lay one of the wing spars over the plans. Carefully put the wing ribs on the spar, omitting the half rib for now. When all ribs are on the spar, use the other spar under the first one as a shim and prop up the spar and rib assembly with the rib trailing edges on the 3/32-inch trailing edge piece. Pin this assembly to the work table and glue only the spar and trailing edge at this time. Cut out the trailing edge web pieces now and fit them between all the ribs and glue them in place. Make sure they fit well and are glued all around. When this assembly has dried, place the top trailing edge sheet in place and check for total contact with rib and web surfaces. When assured of this, glue the top trailing edge piece to the wing assembly, and pin the whole thing down to the work bench.

Be sure now that the trailing edge is straight, 'cause when this assembly dries, any warp you have built into the wing by now is there for keeps. You could substitute a solid balsa trailing edge for this assembly, but the weight and warp-resistance will not be in your favor if you do. When this is dry, pull the pins from the table and lay the spar flat on the table and put the top spar and leading edge in the ribs and glue in place. Make sure that the trailing edge is parallel to the table at this time. Next, install the tips, half ribs, bottom sheeting, bell crank, and lead out assembly. Install pushrods to the bell crank and glue the top sheeting in place.

Now get out the sanding block and sand the radius in the leading edge and champfer the tips and generally go over the whole wing structure for bumps and glue balls at this time. When done sanding you should have a complete wing assembly. Add the wing tip weight and you're ready to install it in the fuselage.

When installing the wing in any profile model I have developed a trick that might help you get a stronger joint.

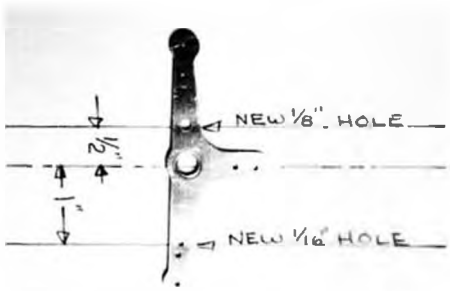
1. Cut hole in fuselage approximately 1/32 to 1/16 larger than the finished wing size when installed in fuselage.

2. Install wing and place temporary balsa shims in crack to align wing. Make

Continued on page 56

About 3/4 down elevator will release hook.

Spring forces hook down and holds it in position to catch deck lines.



Drill 3" Perfect bellcrank as shown.

Throttle rig complete and ready to assemble.

Close-up of the engine installation.

This is the plane that started control line flying in the U.S.! Oba St. Clair, designed and built the plane, flew it for the first time on July 5, 1937. The twin Forster 99 engine (1.98 cu. in.!) swung a hand carved 18 x 5 prop. The ship weighed 14 pounds, had an 8 foot span wing with 16 inch chord. It flew on 24 lb. silk lines 50 feet long, and had elevator, aileron, rudder, and throttle controls! More on this later.

Control line

By DALE KIRN

Occasional contributor, Dale Kirn, moves in as permanent columnist with this issue. His accomplishments in C/L are too long to list. He has a lot of knowledge to impart, so pay attention and ask questions.

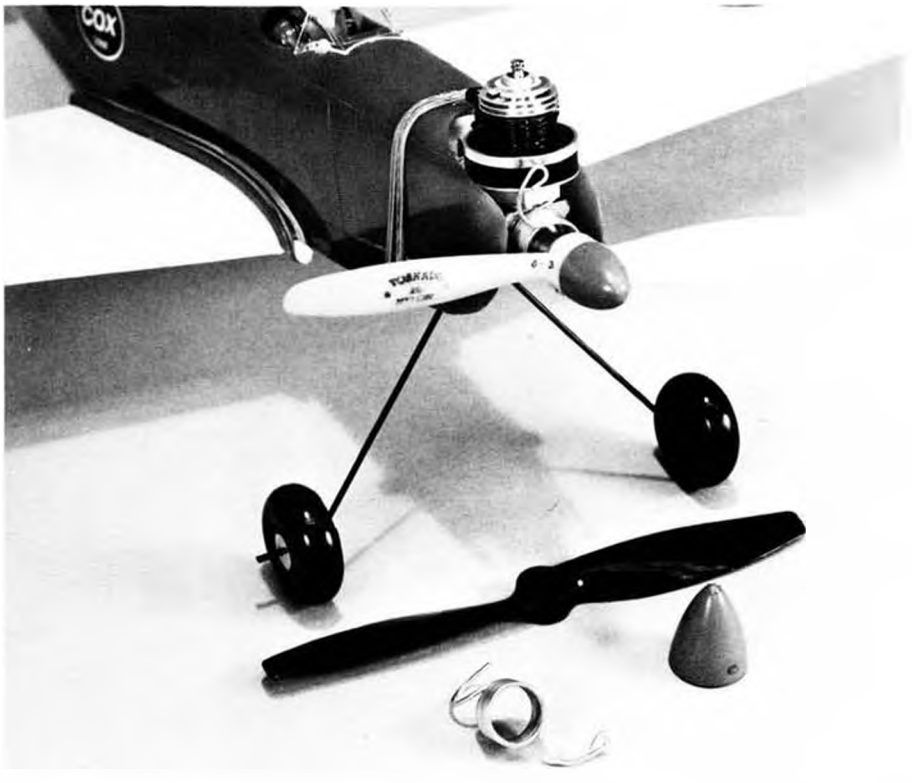
● Check the new addition to the heading for this column. A genuine Stanzel Mono-Line handle!! It may come as a surprise to some of you, but not every control line flyer uses two-line systems to fly with. There are seven AMA speed events which are dominated by mono-line planes. Two lines are required only for FAI speed (.15 cu. in.) and 1/2A Proto (profile).

A large percentage of the mono-line speed planes today do not use the Stanzel control units. Instead, they use a "Torque unit" which is a direct linkage (no worm gear and bellcrank arrangement) from the control unit to the elevator horn.

At some future time we will discuss the various types of control units, both one-line and two-line, that have evolved since the late 1930's. There were at least four different ones for two-line, and five different mono-line control units. How many do you recall?

LOS ALAMITOS NAS SPEED MEET

On May 6th, the Speed Flying, Anyone? club held a contest at Los Alamitos NAS. Forty-one speed planes were



Want a good contol line trainer, that can take a lot of beating, is quiet, and really flies properly? Try the Cox PT-19. It's designed to come apart under stress, has Q-Z engine, is decent size.

(l to r) Joe and Victor Stanzel, inventors of the Mono-line control system, which was patented in 1950. Controls were made for every type of control-line flying. Seven AMA speed events are dominated by mono-line planes.

entered! Junior participation accounted for 21 planes, of which 13 were in the 1/2A events.

Every class of speed was represented . . . from 1/2A to Jet. Fastest 1/2A plane was Jim Wade's proto which turned a very respectable 93 mph (proto time). Donny Rhoades (Phoenix, Arizona area) had the fastest jet speed . . . 162 mph. He has only been flying jet a few weeks and is doing real good.

Several new faces and planes were at this meet. Apparently, this club is responsible for getting speed interest going again in the Southern California area.

Fastest 1/2A Proto (profile) was 84 mph by John Westbrook. Second and Third place were 82 and 80 mph. Real good times for this Junior event. Trophies and useful 1/2A merchandise awards (glow heads, props, etc.) were given out to the Junior winners . . . down to 8th place!

Winners in the Senior/open group had a choice on awards. Either a gallon of nitro or a rechargeable starter battery with charger. Believe this will set a trend for speed awards. Trophies don't seem to turn the Open flyers on any more.

MAKING PLASTIC PLANES WORK

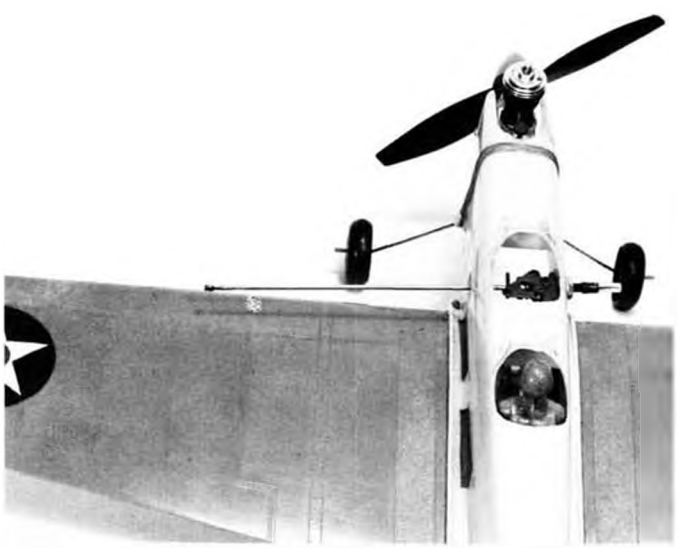
Clubs that are teaching youngsters how to fly may want to try what the Anaheim Model Airplane Club does. They use a Cox PT-19 plastic plane that has been fitted with a muffler, left hand prop, and starter spring. The quiet engine has been a real asset to both the instructor and the student. And the left hand prop really helps in windy weather. A Cox 4-1/2 x 4 left hand prop was used for most flights. The Grish 6-3 left hand (Grish calls'em "pushers") prop works quite well also.

Another worthwhile suggestion for getting better flying with a plastic ready-to-fly plane is to use metal lines (.008 - .010 x 35'). The lines supplied with the Cox planes stretch in flight and will throw the handle adjustment off considerably. Many a plane is crashed because of this. If you insist on using string lines, it's suggested you get *two* spools of string and use only the first portion of each spool. Even though the lines will stretch, they both will stretch the same amount. If you use only one spool, the last half of the string will stretch more since it is wound tighter on the spool. The heavier a plastic plane is, the worse the string line stretching condition will be in flight

WANTED: PICTURES/COMMENTS

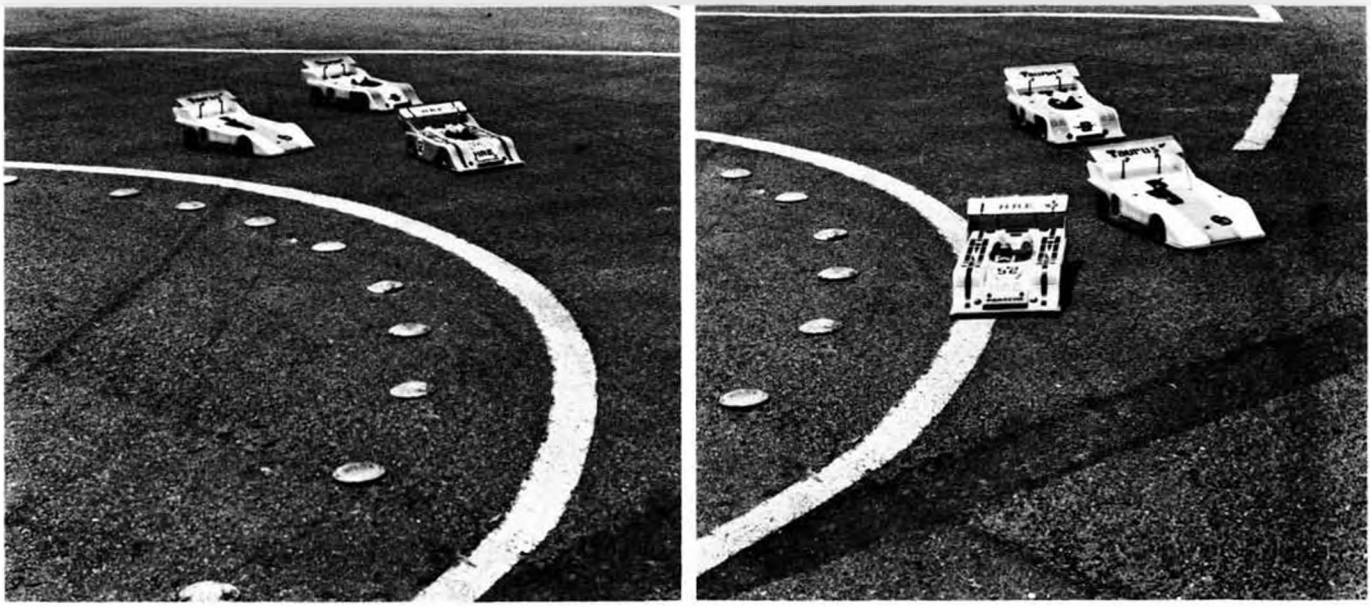
My contact with the control line activity in the U. S. is limited primarily to 1/2A events. If you would like to see representation of your particular interest, please write me about it. We'll print as many pictures as we can. They must be black and white and minimum size of 3 by 5 inch.

Write to: Dale Kirn, 283 N. Spruce Dr., Anaheim, Calif. 92805. ●



Cox PT-19 with a 1/2A Stanzel Mono-line control unit installed. It is flown on 45 feet of .016 line.

First 1/2A speed plane to set record over 100 mph. Mark now stands at 122. Clem-Beasley-Kirn speed team used Cox .049 Thermal Hopper.



The shortest distance between two points is still a straight line . . . even when the points are on a curvey race course. After reading the article by Chuck Hallum, see if you can figure out which car is in the best position in the three photos.

R/C AUTO NEWS

By CHUCK HALLUM

There's more "how-to" than the building of R/C race cars . . . it's also nice to know how to drive them properly. The 1972 National and Southern California Champion gives us some inside tips and introduces a game that graphically illustrates the points he is making.

● Each R/C car enthusiast must develop his own driving style, but there are some basic techniques which normally apply to any driver.

Two items are presented to teach, or point out, the important factors which give fast, consistent, lap times. First, I have presented comments which have allowed me to obtain quick lap times at most tracks even though I may not have the fastest car. Secondly, a game is used to illustrate the effects of different driving techniques so that you can "see" the proper "line" to take in order to get around the track rapidly. As with most games, there is a lot to be learned if you only take the time.

Now let's get on with it . . .

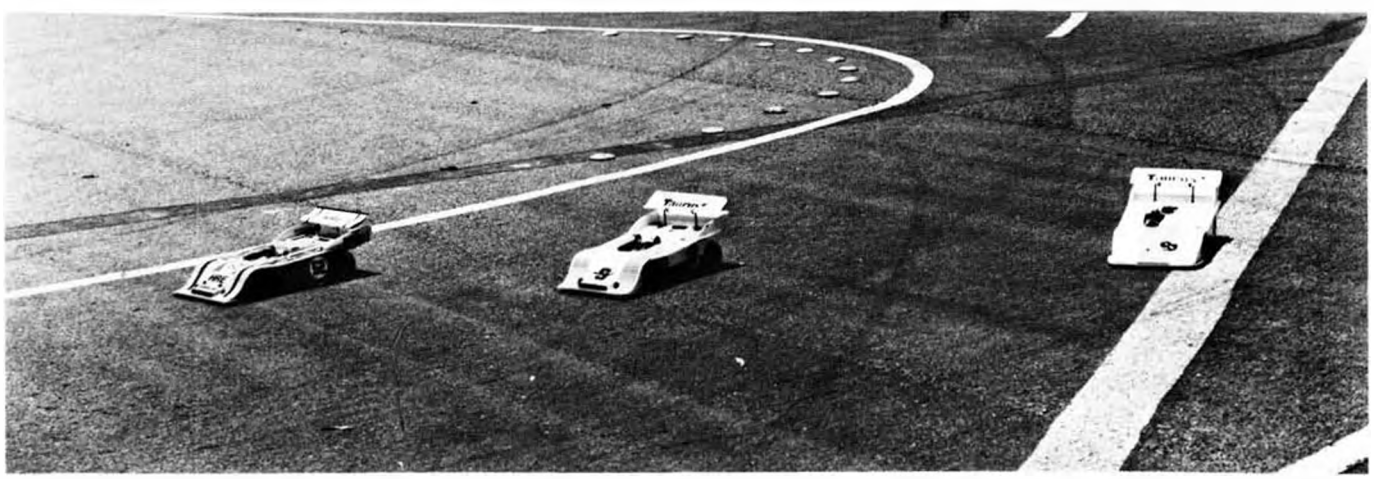
DRIVING TECHNIQUE COMMENTS

It is very difficult to drive R/C cars on the verge of uncontrollability, because we are not in the car. Usually we are driving well below this speed. Consequently, the quick way around the track is the shortest way. If you overshoot a corner by 10 feet you really lose 20 feet because you have to come back. Typical tracks have 5 or 6 corners and are maybe 500-600 feet in total length. If you overshoot 2 or 3 of the corners by only 10 feet you have travelled 50 or 60 feet further than you need to. Your lap times will be about 10% slower, or your car would have to be 10% faster to get the same lap time as you would get if you cut each corner correctly.

Next time you're out racing, spend some time watching the other fellows drive. Pick out a reasonably tight corner and observe several cars going through the corner. On the cars that overshoot, just count off the time that it takes to get back where they belong. Not only is there a little distance, but this is where the car is going the slowest.

So anyway, Rule One is "Do Not Overshoot Corners." If you have goofed and slowed too early . . . just give a little throttle and motor around the inside of the corner. You'll be amazed at the little amount of time you have sacrificed. If you braked late, attempt to get back on the proper line by the smoothest and shortest distance differential route possible at a slightly slow and safe speed.

On slow corners, the Do-Not-Overshoot-Corners rule even applies when there are "Botts dots" on the inside of the corner, and the choice is to overshoot or hit the dots. As the car speed increases, it is best not to hit the dots since the car will really get out of shape and possibly spin out,



In case you don't happen to know, those "Botts dot" referred to in Chucks article are the round discs that act as lane dividers on most of the streets and freeways in California. Many other parts of the country don't have them, and it's a shame, they really do a great job!

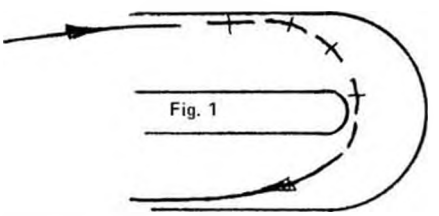
causing a great loss of time. If there is a problem, separate the corners into fast and slow. Tend to overshoot the faster corners a little (if necessary) and cut the slow corner a little close (if necessary).

Now let's get "set up" for the corners ahead of time. As usual, there are exceptions to the rules. On some corners it is faster to be on the outside of the corner initially because you can begin to accelerate in the direction of the turn exit sooner. The time to get into the corner (to set up) is a little slower but the exit is so much faster that you really make up time. A problem here is that when you get in front of a car before these corners you must take the fast way into the corner and the slower way around the corner so you don't get "T boned" in the side. I can catch a car quite rapidly but only pull away slowly 'til I get driving room.

To describe "setting up" for a corner we have to look at different situations; low speed – large direction change (90°-180°), high speed – small change (45°), high speed – large change (180°).

Note there is no low speed small direction change because you would really be moving out at full throttle.

On the low speed, large angular change corner, it is normally best to start the corner on the extreme outside, brake to the middle (apex) of the corner, or slightly beyond, and then begin to accelerate. Hold off on the acceleration a little because this is where most R/C cars are touchy. Figure 1 illustrates the general idea for a low speed, large direction-change corner.



Symbols for Figures 1 thru 6:
Full throttle
Braking
Part throttle

On high speed, small direction-change corners you should again start on the outside and finish on the outside so that the corner has been "smoothed" out. In general the "smoothing" process is the thing that we are trying to do. Side traction and smoothness are essentially synonymous. Figure 2 shows the high speed, low angle corner.

Now for the high speed, large angular change corner. In this type corner, you usually start on the outside, kill a little speed with full turn steering, then hang right on the inside line by throttle control. I'm assuming your car has high speed understeer. In any case, stay close to the inside 'til the finish of the corner. Figure 3 shows the high speed, large angular change corner line. After the corner you can drift to the outside.

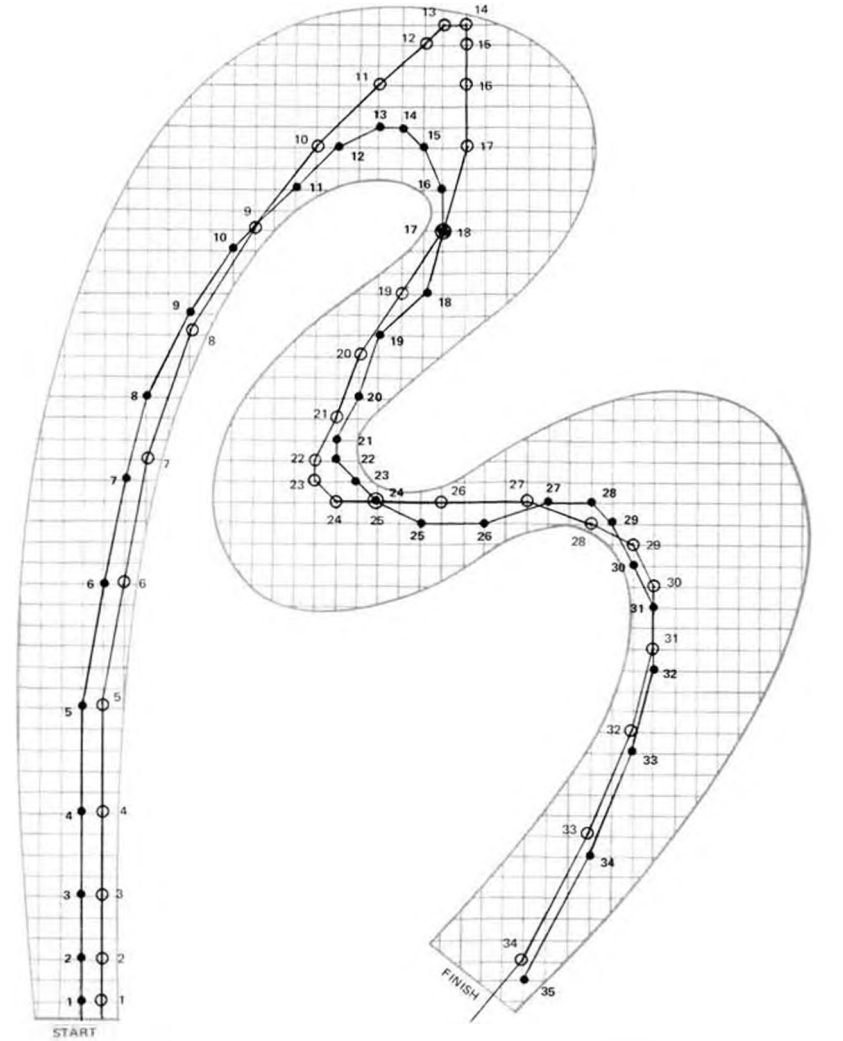
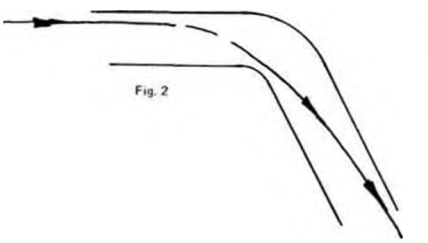
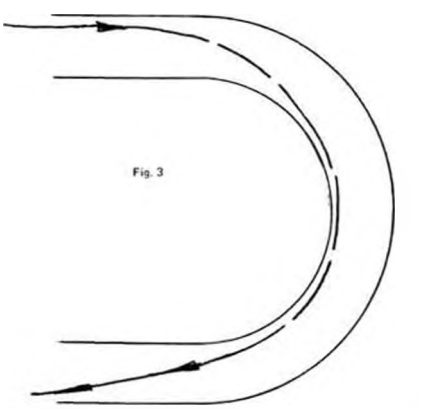
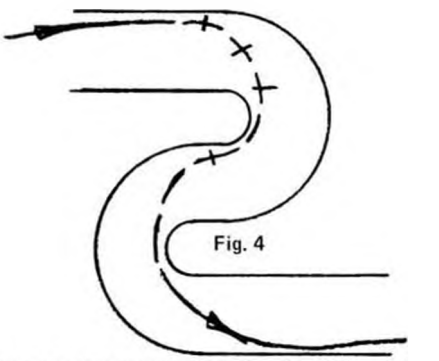


Fig. 7, The Road Race Game. Each move can only vary by one square (in either direction) more or less than the previous move. It's a thinker's game, because you really have to plan ahead. Get yourself a pad of grid paper and have at it. It grows on you. Experiment with various layouts.





A real road race track puts a couple of these corners together so let's have a look at some combinations. Two slow speed corners and the line I would normally take is shown in Figure 4. As you can see I recommend braking hard in the first corner so that you are really



Continued on page 48

Workbench . . . *Continued from page 4*
stilted, look-alike variations on a very old theme, Ed Kazmirski's Taurus . . . but good, stable, every-weekend models that can be recognized as P-40's, J-3 Cubs, P-51's, Great Lakes Trainers, Spitfires, Ryan ST's, et al, from a distance or close up.

The whole idea was proved by the popularity of the annual Rhinebeck affair. Bring your Nieuport, Fokker, Sopwith, Albatross, Gotha, or what have you, and bring it to fly. Who cares if the cockpit is completely devoid of instruments, or that the color scheme doesn't match a particular airplane on the afternoon of June 25, 1916 following a leaflet drop over the enemy lines during which time three bullets were fired through the left lower wing?

It seems that somewhere between the successful approach at Rhinebeck and the provisional rules now appearing in the AMA Rulebook, something went wrong. In our opinion, the idea behind Stand-Off or Sport Scale was that you bring a model to fly at a contest and your final standing would be based on how well you and your model could fly, and the only other thing you had to do was bring proof that the model you entered was a scale model of a real airplane . . . just in case somebody didn't recognize it. In other words, it would simply mean that once you showed your FCC and AMA licenses, paid your entry fee, and had your model recognized as a scale Whatchamacallit-83, you were ready to fly for points.

Now then, there's nothing wrong with adding a little incentive in the way of bonus points for Accuracy-of-Outline, Craftsmanship, and Finish, Color, and Markings . . . just in case it's felt that the average modeler doesn't have enough pride to want to do the best he can to make his model realistic anyway, *but let's not make it potentially worth more than his maximum possible flying score!*

To further compound the felony, the contestant can substitute optional flight maneuvers with retract gear and other scale operations to the extent that the flight need only consist of Takeoff, Figure Eight, Fly-Past(!), Traffic Pattern, and Landing. (Isn't it beginning to sound an awful lot like AMA scale?) The amount of detail, working or otherwise, that the modeler adds to his Sport Scale model should be strictly according to his own desires and should not affect his score. If he wants credit for such stuff, let him enter AMA Scale . . . Keep Sport Scale for the majority modelers who can not, or will not, add details that

Continued on page 62

The Great Age of Sail . . . Lives Again in these Authentic Scale Model Kits

THEY'RE EASY TO BUILD

We know it seems unbelievable, but it's true. New techniques in the heretofore difficult rigging installation and ratline making, are simplified so that almost anyone can produce a craftsman-like job. Density selected prime balsa wood is a real pleasure to work with, and the step-by-step plan is simple and complete.

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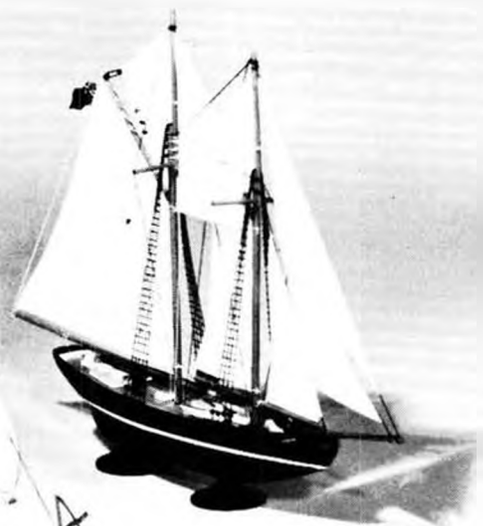
THEY'RE COMPLETE*

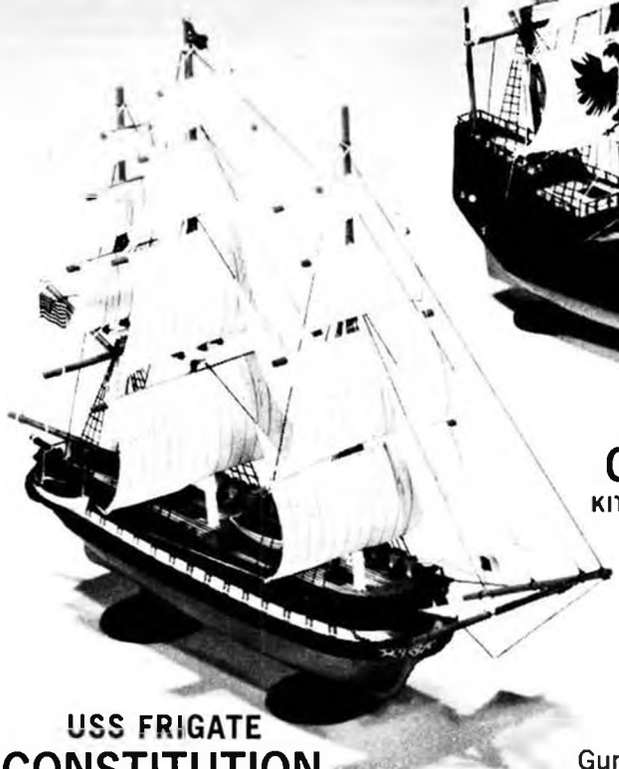
With machine carved hulls, that require only a little trimming and sanding. Kits include many finely detailed cast metal fittings (as required for each kit) such as: Cannon, Life Boats, Windlass, Anchors, Steering Wheel - Wheel House, Water Cask, Lights, Stern Castles, Figure head, etc. Brass Chain, Black and Tan rigging line, Printed Cloth Sails, Decals, Display Pedestals and much more . . .

* Dry Kit, paint and cement not included.



SCHOONER
BLUE NOSE
KIT G3 — Length 11¼"

SPANISH
GALLEON
KIT G1 — Length 10"



USS FRIGATE
CONSTITUTION
KIT G2 — Length 11"

THEY'RE UNIQUE

Because such amazing detail and authenticity is achieved in kits that are relatively easy to build. Plans include full size, as well as assembly drawings for each step of the way. Authentic color scheme shows on full color kit box lid.

THEY'RE HISTORIC

Plying the Spanish Main, the Galleons carried the treasures of the New World back to Spain. Outfitted with cannon they were used both as merchant men and warships . . . The Blazing Guns of the *Constitution* helped to establish our Nation. Now enshrined in Boston Harbor, it is the oldest commissioned vessel in the U.S. Navy . . . Built by Angus L. Walters the *Bluenose* was one of the finest Schooners to take the water. It came to world-wide fame racing against the *Gertrude L. Thebaud*. *Bluenose* captured the hearts of U.S. and Canada to such an extent, that today it is on the back of every Canadian Dime.

THEY'RE ONLY

6.95 ea.

- CARVED WOOD HULLS
- CLOTH SAILS
- CAST METAL FITTINGS

AND THEY'RE AT YOUR DEALERS NOW

GET OVER AND SEE THEM . . . BUY ALL THREE!

You don't have to STAND OFF *to admire this*

CITABRIA

SPECIAL THANKS

The beautiful Citabria is manufactured by one of the oldest and respected names in American Aviation, The Bellanca Corporation, who so graciously provided us with the plans, photos and details of the full size aircraft. With this illustrious lineage, it is not surprising that the Citabria is just about unbeatable as a fun plane. Primary trainer, or for Aerobatics.

CITABRIA IS FOR YOU

If you're a Sport Flier, if you have a feeling for Scale, if you love R/C*, then this is your ship. It's a beautiful machine that builds easy — goes together fast — plenty of room for any equipment — rugged for hard use — flies great — and is just about the right size.

Span 54" Area 415 sq. in. Length 36" For Engines .23 to .35 Scale: 1.61" Equals 12.0"

ABOUT THE KIT ITSELF

This kit is a real joy . . . Balsa Wood is the finest grade, density-selected and sanded to micrometer tolerance; as is the imported Finland Birch Plywood. Every part is numbered to insure fast and accurate assembly as shown on the easy step-by-step plans.

* Can be flown Control Line too—instructions on plan

THE FUSELAGE

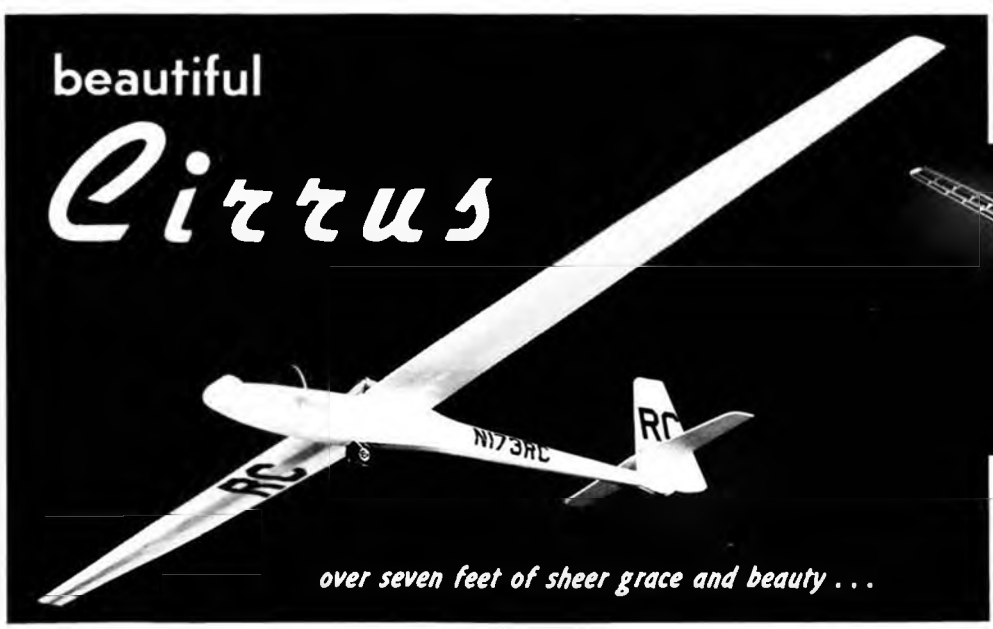
Fuselage sides are die cut full length. Cabin sides and inner doublers are plywood as are the firewall and landing gear bulkheads. It's easily assembled with die cut balsa bulkheads, nose block, formed music wire landing gear, custom dural engine mounts, etc. Cowling and wheel pants are rugged plastic.

WING AND TAIL SURFACES

Complete wing is built on work bench without having to remove it — so it's flat and warp-free. Parts are die cut and carved. Balsa sheet cover makes for tough wing. Wing is installed like it ought to be -- with dowel pins and nylon screw in wood nut-block. No unsightly rubber bands to deteriorate, break or slip. Rudder and Stab are die cut sheet for simplicity and no warp. Included is all the linkage hardware: pushrods, aileron and elevator horns, bellcranks, clevis, connectors, etc., plus giant authentic decals, plastic windows, etc., etc.

beautiful

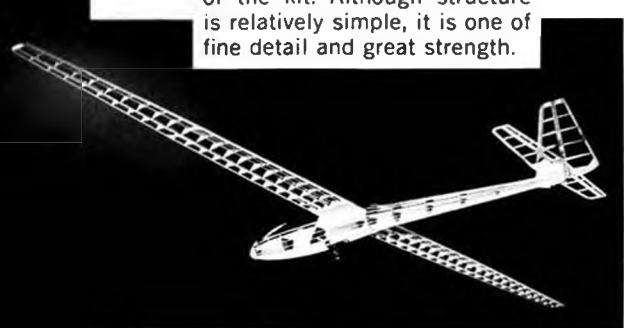
Cirrus



over seven feet of sheer grace and beauty . . .

STRUCTURE

Frame Photo reveals the excellence of the design engineering of the kit. Although structure is relatively simple, it is one of fine detail and great strength.



SPAN: 87 1/16"
LENGTH: 37 3/4"
WEIGHT: 12 oz.
SCALE: 1.5" Equals 12.0"

KIT E7
10.95

GREAT FLIGHT PERFORMANCE

A real soaring machine is this model Cirrus. Eiffel 400 soaring wing section seeks out and takes full advantage of every thermal current. Can be flown Tow Line - Free Flight, Single Channel or pulse R/C for Slope and Thermal Soaring. Large Cockpit area provides ample room for R/C Equipment.

A FINE KIT

Top quality Balsa used throughout. All parts accurately die cut and numbered to insure fast accurate assembly, as shown on the detailed plan. Also included are shaped trailing edges, finished nose cone, giant clear canopy, authentic decals, full size plans with step-by-step drawings and instructions, etc.

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If no dealer available, direct orders accepted—with 10% additional charge for handling and shipping (60¢ minimum in U.S., $1.25 minimum outside U.S.)

- ☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 25¢ enclosed.
- ☐ "Secrets of Model Airplane Building" including design, construction, covering, finishing, flying, adjusting, control systems, etc. 25¢ enclosed.
- ☐ "Secrets of Control Line and Carrier Flying" including preflight, soloing, stunting, Carrier rules and regulations, Carrier flying hints and control line installation instructions. 25¢ enclosed.

No checks. Only U.S. money orders or currency accepted.

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THE HOBBY INDUSTRY OF AMERICA PROMOTES ACHIEVEMENT

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Sterling MODELS INC.
PHILA., PA. 19144, USA

R/C Pylon . . *Continued from page 15* with many new faces appearing on their racing scene. Sounds great!! *(Wonder if Nelson Eddy can belt out a chorus of "Indian Love Call" while he's rounding the pylons? WCN)*

Now lets talk Quarter Midgets for a while!

The San Diego Drones hosted QM races 4-15-73, with twenty-four entries and beautiful weather. Dale Yaney put it all together and won top honors at the event with a Stafford QM P-51 powered by K&B. Dale is a very consistent flyer and seemed to have everything going his way at this event.

RACE RESULTS, SAN DIEGO, CALIF. 4-15-73

1. Dale Yaney, Stafford P-51 K&B, 2. Jim Rogers, Stafford P-51, K&B, 3. Ron Dickson, Stafford, P-51, K&B, 4. Tom Christopher, Stafford P-51, K&B (1:23).

RACE RESULTS, MILE SQUARE, FOUNTAIN VALLEY, CALIF. 4-29-73

1. Steve Sice, Minnow, K&B, 2. Lou Governale, DARA, K&B, 3. Tony Dipadova, Shoestring, K&B.

This race was won by twelve year old Steve Sica of San Diego, Calif. Steve flew a scratch built, K&B powered Minnow to his first overall victory in QM racing. Needless to say, this is really a shot in the arm for QM racing. Steve has a great deal of backing in that his father, Adolph Sica and his mom (who is really the Pit Boss!!!) are also accomplished modelers themselves! Need we say more! Congratulations to the SICA RACING TEAM – Well Done!! Second place went to Lou Governale with one of the best flying airplanes at the meet. Lou has a beautiful, scratch-built Miss DARA that goes! Third place was captured by Tony Dipadova, one of the most improved flyers of the circuit. Tony used his House of Balsa Shoestring, K&B powered.

The QMRC is still using the short course of 378 foot straightaways and 100 feet between No. 2 and No. 3 pylons. They feel that this course is more suitable due to the fact that flagmen do not have to be used on No. 1 . . . only pylon judges.

As we go to press, there still isn't a suitable method available to properly measure a QM engine to determine whether it is stock. What is Stock? What is a reworked engine? Only the Manufacturer knows!!! To date, accurate specification sheets aren't available! We doubt if they ever will be!

We still contend that as long as the engine will idle for 10 seconds, all wheels free rolling, 15% nitro, stock(?) props and engine running upon touchdown, Lets Race! THE IDLE RULE IS WHAT MAKES QM RACING !!!!! ●

LIAHO . . . . . *Continued from page 22* ever tackled. If it hurts your pride to fill a big gap with epoxy rather than beveling the two wing sheets, go ahead . . . we'll wait . . . Hmmmmmmmm mmmmmmm. OK?

If you have no pride, or you're in a hurry . . . or both, simply run a piece of masking tape the full length of the underside of the butt (?) joint, lay it over a jig-strip of 1/4 by 3/8 (see? If you read all the instructions first, you'd save yourself the expense of buying a jig-strip. You build the wing *before* building the fuselage, and use one of the strips of 1/4 x 3/8 spruce tail-boom stock for a jig!) and pour in the epoxy. If you're using 5-minute stuff, you better do it in small batches.

Once the epoxy is cured, you cut the wing in four pieces, bevel for dihedral, and glue the panels together . . . same as you'd assemble a hand-launch glider wing. Reinforce the center dihedral joint with a strip of linen smeared with

epoxy.

Don't bypass that piece of reinforcing wire on the trailing edge. It won't take those hold-down rubber bands too long to chew through the wing at that point.

FINISH

The prototype was sanded smooth with No. 320 wet-or-dry then given 5 sprayed coats of dope mixed 60% dope-40% thinner and sanded between each coat. Though the flying surfaces could be monokoted, the fuselage and booms could not, so you might as well pass on this one and do the whole thing in dope.

EQUIPMENT MOUNTING

Being an "inside out" type of model, radio installation is a relative snap. Servos should be wood-screw mounted directly to the spruce frame, or indirectly mounted with a servo tray. Battery pack and receiver are double-stick form taped in place PLUS rubber banding. A D&R switch mount provides the best method of installing this item.

The photos tell most of the story. Control horns mounted on the wing saddle act as fairleads for the 1/16 music wire pushrods for rudder and elevator. Use 1/32 wire, with a kink for length adjustment, in a direct shot from throttle servo to baffle.

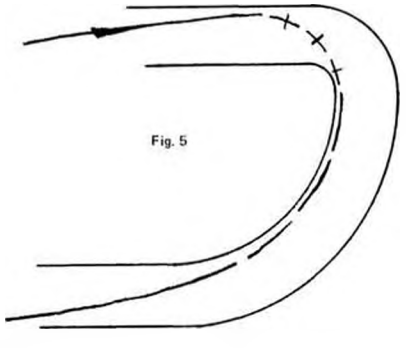
FLYING

We talked about this in the beginning. Also note that contrary to the usual, rudder becomes more effective with a snitch of up elevator.

If you hand-launch, keep in mind that the prop is *behind* the holding area. Like the name says, it's *all* hanging out, so git your mitt outa there quick! ●

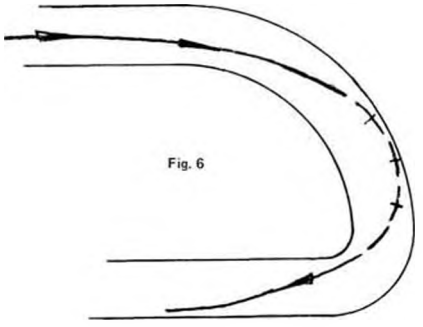
R/C Cars . . . . *Continued from page 44*

set up best for the second, or last, corner. A slow speed corner before a high speed corner is shown in Figure 5.



Start on the outside, going to the inside at the start of the high speed corner and hug that inside line. For the slow speed corner after the high speed corner, Figure 6, drift to the outside during the latter part of the high speed corner so that the slower corner can be taken correctly.

In general it seems best to favor the proper entrance and exit of the last corner. Normally this means that your final exit speed is the greatest.



Your initial speed into the following chute or straight is good enough to get you past many cars.

Now let's look at the practical problem of getting your car around the track. I am going to talk only about the very simplest adjustments to make during race practice. The car itself will be the subject of another much larger article to be prepared later this year.

After driving your car on the track awhile, sit back and think a little about what your car is doing. Are there some simple changes you can make? The typical R/C car has low speed power oversteer and high speed understeer. Where the car has power oversteer, a decrease in torque (change gearing, milder fuel, or richer engine) will improve the rear tire side force capability. An increase in aerodynamic down force (front or rear) will improve (front or rear) side force capability. On tires without power delivery, the front wheels or rear wheels when coasting, anything increasing the ratio of down force to weight carried by that wheel will increase cornering force. Hence at high speed, less weight on the front improves front bite when there is aerodynamic force. At low speed a certain weight should be on the front wheels to pull the locked rear end around. Consequently less front weight can give more low speed understeer. More front weight and/or narrower tires decrease traction and give understeer. The same decrease in traction applies for the rear wheels when coasting. Also harder tires normally decrease traction, except track conditions and rubber compounds affect this parameter.

After making your minor changes, get back out on the track and practice. Hopefully you've made the right adjustments and the car is working about right. Try to establish your brake

points, turning locations and the places to begin acceleration. I use trees, light standards and lines or marks on the track as references. On one track my reference point for braking and turning on two corners is a light standard which is over 100 yards away, but I can sure pick it out. With practice you should be able to hit each corner pretty well without missing by more than a couple of feet. If you're short of a corner just use a little throttle to get back on line. If you overshoot a little get back on line smoothly with a little extra brake. After you pass those other cars in the race don't forget to take that slightly different line (which is slower) to protect against getting "T-boned."

THE ROAD RACE GAME

The road race game has some very simple rules and is fun for everyone to play. Use it as a party game, or whatever. But while you're playing the game, learn at the same time. When I first played this game, I noticed that you could make the same mistakes as on R/C road race tracks. To do well you have to plan ahead, not overshoot corners, and brake and accelerate at the right times. The correct line in the game is quite similar to the correct line of an R/C car or a real car. You can even see the effects of different car characteristics by changing the rules of the game.

Let's take a look at the Road Race Game which is a good simulation of car racing in general. The game is played on graph paper on which a road race course is drawn. The tracks should be drawn wide enough for several competitors. You can draw tracks of any length and shape, but include strongly curved (slow) corners to make the game interesting. Each contestant should use a different colored pencil or a different symbol. Lots can be drawn to decide starting position and order.

Figure 7 shows a sample game. Two cars are used although four could compete on the track drawn. When it's his turn, a player simply moves his car ahead along the track to a new grid point, subject to the following three rules:

1. The new grid point and the straight line segment joining it to the preceding grid point must be entirely within the track.
2. No two cars may simultaneously occupy the same grid point. In other words no collisions are allowed. For instance consider move 22 in Figure 7. The second player, X, would prefer to go to the point taken by 0 on his 22nd move, but the no collision rule prevented it.
3. Acceleration and deceleration are simulated in the following ingenious way. Assume that your previous move was K units vertically and M units horizontally and that your present move is K' vertically and M' horizontally. The absolute difference between K and K' must be either 0 or 1, and the absolute difference between M and M' must be 0 or 1. In effect, a car can maintain its speed in either direction or it can change its speed by only one unit distance per move. The first move, following this rule, is one unit horizontally or vertically, or both.

The first car to cross the finish line wins. A car that collides with another car or leaves the track is out of the race. In the sample game, X slows too late to make the first turn efficiently. He narrowly avoids a crash and the bad turn forces him to fall behind in the middle of the race. He takes the final curve properly and goes on to win by crossing the finish line one move ahead of 0.

The competitors in the sample game each make mistakes, but these mistakes illustrate errors in driving technique. Play the game a few times and you'll see the driving technique rules in action. "Do not overshoot corners" is dramatically illustrated in the game if you goof up and don't brake properly. Setting up properly for various corners can also be seen. Also you'll find out that a trailing car can get in your way in entries to corners to force you off line.

After a game is over, you can look back at how you took various corners and where you initiated braking or acceleration. Your mistakes are easily spotted. As you play more games, your game driving technique should improve as you learn to brake, turn and accelerate properly. Try to carry some of your learned driving habits from the game to the R/C road race track.

The rules of the game can be changed slightly to simulate different car characteristics. Draw a little longer and larger track (or use smaller grid paper) and accelerate at a maximum change of 2, but brake at 3 units per move. Accelerate at 3 units and brake at 2 units. These are various possibilities. Pretty soon you will find the types of things that make a car easier to drive well. In order to make the start more even, I have found a staggered start helpful, allow each successive player to start one grid line (in the basic game) further down the track.

Later on this year I will have another article which will go into the details of car adjustments and their effects on car handling. With these adjustments you should be able to get your car to handle better in every speed regime and pick up considerable lap time. Each time you improve your car you will find a new problem area and more things to do to make your car faster.

I hope that the tips that I have

given and the road race game will allow you to improve your driving technique. One of the hardest things to do is pass people while on the brake or while motoring on the inside line — but learn to use your will power.

Good luck in your racing. ●

Hangar . . . . . *Continued from page 29* who has been aeromodeling for more than 25 years.

By far the most unusual calling heard from so far is that of "Dinosaur Doctor" (actually paleontologist). Mal Heaton, last month's cover photographer, is among the members of this rare group. He feels that his model building background helped develop skills and patience very important to his profession. So it can be noted there are many different ways to finance one's balsa wood!

* * *

A NEW SCALE FOR MODELS?

Bill Brown, of Brown Junior fame, is a staunch advocate of the Metric system of measurement. He recently forwarded a copy of a publication from the METRIC ASSOCIATION, which is a national, non-profit organization promoting the use of metric units of measure. Available at low cost are metric rulers, metersticks, measuring tapes, thermometers, bumper stickers and lapel pins. Interested readers may contact:

METRIC ASSOCIATION, INC.
20004 Ash Street
Waukegan, Illinois 60085

Bill Brown suggests that it might be interesting to originate a METRIC PEANUT SCALE class, as a means of gaining familiarity with the system. After all, Filati (ex Pirelli) rubber has always been sized in that manner.

* * *

HOW'S THAT AGAIN?

This unique message to rubber-power modelers was gleaned from the 1937 MODEL AERONAUTICS YEARBOOK, by Frank Zaic: "Since lube messes up the handkerchief considerably, it is much better to wear white athletic cotton socks for cleaning your hands whenever they get dirty."

* * *

CONGRATULATIONS are in order to Mr. & Mrs. Mark Smith, of Mark's Models, who recently "launched" a new junior glider guider.

* * *

INNKEEPER, WINE FOR ALL MY FRIENDS!

Dr. Morton Grosser reports that an outstanding quality half-hard brass wire, which makes perfect adjustable joints on model control surfaces, can be found securing the corks in certain French white wines.

* * *

EVERY ONE A GEM

Believe it or not, some of our mail contains favorable comments on the "corn" sections of this column, so this month, we decided to unload a larger-than-usual amount upon you:

Russ Barrera came through with a little item purportedly the Royal Flying Corps monthly safety report of December, 1917, from which we have extracted the following:

The pilot of a (Farman) Shorthorn, with over 7 hours of experience, seriously damaged the undercarriage on landing. He failed to land as fast as possible as recommended in the Aviation Pocket Handbook.

A BE-2 stalled and crashed during an artillery exercise. The pilot had been struck on the head by the semaphore of his observer who was signalling to the gunners!

Major W.D. Courcey-Warney damaged his Nieuport Scout extensively when it failed to become airborne. After exhaustive and extensive inquiries and lengthy discussions with the Meteorological Officer and Astronomer Royal, the Court came to the conclusion that the pilot unfortunately was authorized to fly his aircraft on a day when there was absolutely no lift in the air, and could not be held responsible for the accident!

* * *

Joe Carter favored us with a copy of the National Airlines publication *ALOFT,* which featured an article by Steven Elliot entitled "CLASSICS FROM THE CLASSROOM." This is a collection of aviation misinformation extracted from the writings of elementary school children over a period of years. Of the many "gems" presented, we particularly enjoyed the following: Question: On his first flight, how long was Wilbur Wright in the air? Answer: I'm not sure. Five feet something, with his shoes on.

Or, how about this one: "Charles Lindbergh was the first to fly to Paris. He did it by the airplane method."

Stick around folks, they get worse (or better, depending upon your point of view): "A visa is a passport permitting an airplane to leave the country. For round trips, you need a visa versa."

Since you've probably had more than enough, we'll sign off with this one: "So far, planes have only been able to fly in circles of no more than 360 degrees. This could be the next big breakthrough in air travel." *(Just one more? Passenger: "How high is this plane?" Stewardess: "Thirty six thousand feet." Passenger: "Thank you, and how wide is it?"* ●

Toot . . . . . . *Continued from page 11* of the wing. Cut a slot in the sheeting in the back section of the fuselage and install the stabilizer. Now install the fin and rudder.

The landing gear is .020-24st aluminum bent as shown in the front view of the model. Drill a few 1/8 inch holes in the center of the landing gear to epoxy it to the 1/16 hard sheet installed

in the front of the fuselage between the lower longerons. Drill the legs of the landing gear and install a straight pin with a washer soldered on the outboard side to make the axle rigid to the landing gear. Be sure to install the gear in the fuselage before the axles are installed or you won't be able to thread the gear thru the slots in the fuselage.

The wheels are built up of plywood with balsa sheet on both sides and a length of 1/16 aluminum tube for a bearing, all sanded to correct shape. Wheels can be made on a Mattel Vac-U-Form over a hardwood block, turned on a lathe to correct wheel shape. The wheel pants are made on a Vac-U-Form over a matched pair of blocks. The tail wheel is a slice of 3/8 inch dowel. The tail spring is 1/32 music wire between 1/8 inch strips of bond paper to simulate the flat springs of the big airplane.

Rig the wings with 6 lb. monofilament spinning line.

I gave the fuselage, fin and rudder a light coat of white dope to color the bare balsa wood, then trimmed it in red as used on the big airplane.

The model is very stable, as is the original full scale aircraft. First glide and adjust by bending the tail surfaces or adding clay as needed. Then hand wind with a couple of hundred turns and try it under power. If you happen to have a new Brown CO_2 engine, this is ideal power for this model. Even with the old engine I am using it is no problem to get a one-minute run with enough power to fly the model nicely.

So get with it and build a true scale Little Toot and have yourself a ball. ●

Heathkit . . . . *Continued from page 17* had several warehouses full and marketing the useful parts in often ingenious ways restored the company's economic health. These immediate post-war years saw the company shift its emphasis from aviation to electronics.

The experience of building some electronic test instruments during and after the war, both to satisfy his personal curiosity and for profit, boosted Mr. Anthony's insight. With all the surplus parts on hand, he saw a good chance to package an oscilloscope kit. Thus, a small advertisement in a popular magazine in the summer of 1947 offered a 5-inch oscilloscope in kit form for $39.50. This O-1 was the first Heathkit. The initial success encouraged rapid development of two additional basic test instruments; the B-1 Vacuum Tube Voltmeter and the G-1 Signal Generator. These, too, were well received, and a steady development of kits followed. When suitable surplus parts ran out, new parts replaced them, and soon the kits consisted of all new materials, bought especially for the purpose.

Heath Company was in the kit business to stay. And as the product line expanded, so did the company's expertise at showing people how to build kits. Spartan, three-page instructions, giving a schematic diagram, parts list and assembly and testing information, gradually developed into today's Heathkit Assembly Manual, recognized around the world as the most comprehensive and lucid set of kit instructions ever devised. Prepared specifically for every Heathkit product, the Assembly Manual breaks down complex building procedures into steps so simple even a beginner can assemble an exotic piece of electronic hardware. With larger kits, computer designed flow charts are included to permit the owner to perform advanced maintenance and troubleshooting operations.

It was not until late 1968, 15 years after Howard Anthony's death (strangely enough also caused by an airplane crash), that Heath Company again became involved in aviation. This time it was on the R/C modeling level under the leadership of Bill Hannah, a Product Line Manager and active R/C modeler who felt that people interested in building a flying model might just welcome the opportunity to build the electronics necessary to fly it. So Hannah, who at the time was restoring his personal Heath Parasol in his spare time, began formulating a plan to offer a high quality RC system at a substantial kit-form savings. After researching the market, he went to Kraft Systems with the proposal that Heath and Kraft collaborate on producing an R/C System in kit form. What followed was the Heathkit GD-47 System, complete with dual-stick 5-channel transmitter, receiver, battery pack and servos, and selling for $219.95, some $200 less than the assembled units would cost.

On the basis of this amazing first success, Heath began assigning and recruiting engineering talent to its fledgling R/C group.

By the summer of 1969, the GD-47 was replaced by the famous Heathkit GD-19 System, still one of the most popular pieces of R/C equipment on the market. Kraft plastic parts were

retained, but the solid-state transmitter circuitry, a new smaller receiver, new servo electronics and battery packs were the products of Heath's growing R/C engineering section. In the spring of 1970 came the Heathkit Spectre R/C car and the GD-47 3-channel rig. In 1972, the GD-405 8-channel system was added.

Today, the Heathkit line of R/C electronics includes single and dual-stick 8-channel systems, standard, miniature and sub-miniature servos, plus popular accessory items such as the Heathkit Thumb Tach and Servo Simulator. For the sc ing pilot, the company recently introduced a new 3-channel system that can be converted to 4-channel with a simple modification kit. And the ideas are still coming.

Heath is a mail-order business, but a sister company operates retail Heathkit Electronic Centers in almost every major U.S. metropolitan area. Each of these Centers stocks a complete line of Heathkit R/C equipment and has at least one full-time technician who is schooled in R/C electronics.

Bill Hannah, now Product Planning Manager for all Heathkit products, still is an active participant in the R/C hobby and uses the new Heath R/C flying field located on land directly across the road from the 380,000 sq. ft. headquarters and plant facility in St. Joseph, Michigan.

"Because of Heath's position as the world's largest manufacturer of all kinds of electronic kits it can give the R/C hobbyist certain advantages in terms of quality and service that very few in this industry can match," Hannah points out. "The fact that Heath also is the largest producer of kit-form R/C gear, I would think, indicates that the modeling fraternity recognizes those advantages."

Claude Meyer, the present Product Line Manager for R/C, stresses the company's total involvement with the customer as a reason for continued success. "Heath has grown at a fantastic rate, but some things have not changed since the Howard Anthony days," Meyer says. "Our present customers are still the prime movers in our R&D efforts. Every Heath Company engineer and technician working in R/C has a real commitment to the sport. We make a point of getting to every R/C show and event possible in order to stay in personal touch with the guys who are flying the equipment. We want our customers to feel totally comfortable with us, and not the least bit reluctant to call or write with questions and suggestions." ●

Scale F/F . . . . *Continued from page 27*

one fly. Joe Baily was flying a modified Keil Kraft Stinson that also displayed great craftmanship.

In the biplane class, Kingsly Kau was flying a condenser paper-covered Sopwith Tabloid he designed many years ago. The plan was originally available through Obscure Aircraft, but is presently sold through Hannan Graphics. Kingsly has won many contests with this beautiful model and this time was no exception. However, midway through the contest the Tabloid collided with another model and was forcibly retired. Dick Castle, editor of the San Diego's Orbiteers's Newsletter, who is another biplane fan, had a well-detailed Tiger Moth fuilt from a Tern kit. Bill Hannan was flying an all sheet Avro G which was featured in an earlier copy of *MB*.

There is no question that Peanut scale has gained unbelievable popularity. This can probably be attributed to the simplicity of construction and the ease of flying. Cost is another possible factor, since it is quite negligible in comparison to some of the other modeling forms. Another tribute to Peanut's success is the conversion of several R/C'ers, who have discovered how much fun flying can be without the usual $$$! In particular, it is gratifying to see men like Larry and Granger Williams of William's Bros. depart from their usual art form and compete with the scale-free flighters.

An interesting model in Peanut was that of Lt. Col. Randolph, a Nesmith Cougar. The model was built like a microfilm job, except that it was covered with Microlite. The model was so light that I'm sure that it wouldn't even budge a light postal scale. The model posted an average of 233 seconds per flight but had a minus 1 for scale. This could lead into quite a discussion as to whether or not there should be a rules change in order to eliminate the "ghost" scale models. However, I don't want to dwell on the subject other than to say that Peanut should be a fun event and not be ruined by a lot of complex or unnecessary rules.

Jill Peck, Bob Peck's daughter, was the only girl entered and she has to be congratulated. Jill, in a field of tough competition including Lt.Col. Randolph, Clarence Mather, Bill Hannan, Bill Warner, et al, took 5th place overall.

She has been well-tutored in the building and flying of Peanut scale. She was flying one of Dad's kits, a Miles M-18.

In the biplane class, Bill Rogers was flying a Gloster Gladiator which was complete with paint job and all, a very difficult subject to build. The model flew quite well. George Hume had an all sheet Bristol Scout, and I entered a Bücker Jungmeister and a Bellanca Tractor, both of which were featured in *MB*.

This contest was extremely successful, if for no other reason than to bring together some of the finest modelers in the hobby, with flying as just a bonus. The Flightmasters are planning another Indoor Scale Contest later on in the year. Once the date is confirmed it will be published in this column. The Marine Corps should be commended for making this type of activity possible.

On the news front, Peck-Polymers has a couple of new items of interest. One is called a Designers Kit for Small Rubber-Powered Models. This includes four nylon thrust bearings, one dozen brass thrust washers, four prop shafts (two different lengths), two 4-inch props, and two 5-inch props. It is a $1.54 value for $1.25. The other new product is a departure from the usual scale Peanut models and is called the Stringless Wonder. This model was designed by Bill Hannan and it is really an outstanding flyer. It is kind-of a rubber powered kite *(stringless, get it?)*, ideal for beginner and group projects. The kit is complete with free-wheeling prop assembly, quality balsa, Japanese tissue, clay, rubber motor, plans, and instructions. It retails for $1.75. ●

R/C Soaring . . *Continued from page 25*

stall speed would be approximately 13 mph (19 fps). The g loading on tow varies as the square of the air speed. The following table gives the estimated stalling speed at various g loadings.

g load	Stall Speed mph	fps
1.0	12.9	19.0
1.5	15.8	23.3
2.0	18.3	26.9
3.0	22.4	32.9
4.0	25.9	38.0

In the following examples, for safety, the sailplane's air speed is maintained at 10 percent above stall speed.

Figure 8 gives towline speed as a function of towline angle. The towline speeds decrease with an increasing load up to 3 g's, because the towline-to-sailplane speed ratio (Figure 4) decreases faster than the stalling speed increases. However, at 4 g's this trend is reversed and the towline speeds must increase for the higher g loading.

If the 3.5 pound Cirrus is on the 1.5 g flight path, the stall speed is 15.8 mph (23.3 fps). To provide this air speed, the initial towline speed (Figure 8) is 19 fps with a 10 percent safety factor and zero wind conditions.

For a 3.0 g launch, stall speed is 32.9 fps and towline speed with the safety factor is 14 fps. But for a 4 g path, with a corresponding stall speed of 38.0 fps, the initial towline speed is 14.5 fps. Notice in Figure 8 that the 3 and 4 g paths cross at the towline angle of approximately 35 degrees and again at approximately 68 degrees. This has to do with towline and flight path angles versus the square of the air speed to support the specified load. This affects the actual towline speed, though not the ratio of towline to sailplane speed as presented in Figure 4.

Figure 9 shows the towline tension for the 3.5 pound Cirrus. The force ranges from 3.8 pounds for a 1.5 g launch at liftoff to 13.7 pounds for a 4.0 g launch. With a 1,000 foot towline, the corresponding altitudes are 330, 460, 590, and 640, respectively, for 1.5, 2.0, 3.0, and 4.0 g launch flight paths (Figure 10).

The data of Figures 9 and 10 were replotted to show towline tension and length during tow. Figure 11 shows the tension in the towline as a function of towline length during launch. As indicated, there is a slight curvature at the start of launch for each g loading, but the projections are essentially straight lines.

For the 3.5 pound Cirrus, a 3.0 g launch requires a towline tension of 10 pounds at the outset when the line length is 1,000 feet and the towline angle is less than 5 degrees. When the towline has been retracted to a length of 800 feet, the towline angle is approximately 30 degrees (Figure 7) and the towline tension (Figure 3) is 8.4 pounds.

As the sailplane approaches release altitude, the towline length is reduced to approximately 600 feet and the

towline angle is 70 to 80 degrees. To maintain the desired 3.0 g launch path, towline tension must be approximately 7 pounds.

The factors and forces discussed so far have been relevant to the sailplane vehicle and the towline power requirements, but they have not been dependent on a specific power supply. Two power systems are commonly in use, winch and high-start. It might be interesting to see whether one system has any performance advantages over the other.

When operated by an experienced pilot, a modern winch system offers the flexibility to satisfy any of the specified launch programs. Adequate power is available in most units. But how does the simpler and more economical high-start system perform?

A high-start system consists of line and exerciser cord or surgical tubing. In operation, the assembly is stretched within its elastic limit to a predetermined load. Consequently, its linear relationship between force and length is the type required (Figure 11).

For example, consider a typical high-start system using 400 feet of line and 200 feet of elastic that experiences a tension of 14 pounds at 200 percent elongation. Thus, when the high-start assembly is stretched to 1,000 feet, it will have a force-to-length relationship as shown by the dashed line in Figure 11. At a length of 600 feet, the elastic is relaxed and offers no tension. When stretched to 1,000 feet, 14 pounds of force are available. This force decreases linearly from 14 to 0 pounds as the line retracts from 1,000 to 600 feet.

This force-to-length relationship will not provide the g loadings to achieve maximum altitude under no-wind conditions. The optimum performance of this system will not deliver a 4.0 g path for a 3.5 pound sailplane. In a no-wind situation, the sailplane can't be flown in a climb steep enough to maintain any higher loading since the air speed will fall below the stall speed. The towline speed is the source of airspeed. A longer length of elastic having a lower spring constant could be used, but the power curves (Figure 11) cannot be met.

However, these power curves can be met with modern winch systems by using either pulsing or voltage adjustment to regulate speed. Running the winch at a constant speed until the towline angle is approximately 30 degrees and then slowing gradually will almost duplicate the proper speed sequence (Figure 4). The speeds and tensions shown in Figures 6 and 7 are within the capability of the LSF Tournament Winch.

For comparison, the high-start launch is shown in Figure 12 with the constant g load launches represented in Figures 10 and 11. The altitude-towline angle path falls between the 4 and 3 g paths for the first 20 degrees. After that, the altitude gain decreases very rapidly and parallels the 1.5 g launch path. The loading is 1.5 g's at a towline angle of 40 degrees, and release for these no-wind conditions should occur at approximately 45 degrees. To stay on the line longer would result in a loss of altitude.

Usually there is some wind which improves the situation. A wind has about the same effect on altitude as having a longer towline; for the same g loading, a higher altitude will be achieved and the towline speed can be reduced. In other words, the towline speed no longer supplies all the airspeed for lift. If the wind is equal to the flying speed of the sailplane, towline speed isn't necessary. Most competition pilots have flown under conditions in which the wind was strong enough that line could actually be reeled out.

As shown in Figure 11, all the g loading curves will shorten and steepen as a result of wind. Consequently, the 1.5, 2.0, 3.0, and 4.0 g force-to-length curves will align more closely with the dashed line.

The preceding discussion explains the forces and their effects present during the launch of R/C sailplanes. But how can this knowledge be used to obtain higher launch altitudes?

An R/C sailplane pilot has only visual reference to his sailplane's performance. He can see altitude, attitude, and ground speed. During launch, his view and potential for proper interpretation are limited. From his vantage point, the sailplane has a unique profile at unusual angles with no direct longitudinal reference. Then, during climb-out, the sailplane rapidly becomes a diminishing silhouette.

Vertical speed and g loading are two characteristics that can be used to optimize climb during launch. Vertical speed is almost a negative indicator. If the sailplane stalls, the speed is too slow. Often, reduced directional stability will be an early warning of approaching stall speed, which indicates that corrective action should be taken. G loading can be judged best by interpretation of wing flexure.

An experienced pilot, using a winch system for launch, often can hear the launch translated to the winch motor as it slows under imposed loads.

Other than practice, perhaps the most significant requirement of the pilot is sensitivity. With knowledge of launch and flight mechanics, he must develop an awareness of the interacting forces, how they can be visualized, and the limitations of his sailplane.

The winch system is more difficult to use due to the multiple skills involved, whereas a high-start system only requires that the pilot maintain air speed. But under similar wind conditions, winch launch potential will always exceed that of the high-start system. . . . honest . . .

**Lipstein, Norman J., "Winch Towing Fundamentals,"* Soaring, *6-8, July-August 1954.* ●

Square Cat . . . *Continued from page 40*
sure these don't stick out from under fuse on one side.

3. Use 5-minute epoxy and popsicle sticks to make a fillet around the wing-to-body joint on the side that doesn't have the shims protruding from under the fuse. Make sure not to lose your alignment. Don't try to force the epoxy into the crack but try to make sure the crack is sealed all the way around on one side of the body only.

4. Let epoxy set up and then pull shims out. You'll now have a big crack all around the wing joint. Hang the model by the wing tip with the crack side up and fill joint with Hobbypoxy Formula II glue. Clean all the excess off with a balsa scraper. If the 5-minute epoxy fillet doesn't have a hole in it, and the glue doesn't run out of the crack, you'll have an indestructable joint. Finish up with a 5-minute epoxy fillet on the remaining side.

The hook set up is as simple as possible. Note that the little spring that drops the hook also holds it in position to catch the carrier strings.

The gas tank I used was a Veco 2 oz. wedge, which is satisfactory. Or use a homemade square tank with the fuel pickup in the bottom outside corner. If you can find one, a Veco or Perfect 2 oz. square tank will work fine.

FLYING

Set up the hook so it drops when you have about 3/4 of your down elevator deflection. Make it easy on yourself to drop it, as you shouldn't use any extreme control function until you are done with the high speed flight.

Take off as smooth and as low as you can, then climb gradually to the 20-foot maximum altitude. The climb should take 3/4 to 1 lap. Hold this altitude for the duration of the high speed flight.

If you are new, just take off and fly as smooth and as level a course as is possible for you. The key item as to whether you decide to fly the high course or the low one is smoothness. Practice smooth, straight-ahead takeoffs. Don't try to jerk the plane off the deck as soon as it's released. This will lose you 1 to 3 seconds on your high end.

For low speed, all I can say is practice both in the wind and on calm days. This is the only way you can know what to expect when the model comes downwind and loses lots of lift. You'll develop the knack and reaction time necessary to counteract this only through practice in flying in the wind.

For landing, be sure you are lined up with the deck. Have your helper watch the plane during the low speed flight to make sure you're aligned with the deck.

Well, that's about all there is to a Square Cat. Why the name? Well, it's sort of a square-winged Bearcat, which adds up to Square Cat. Again, build this one as shown. Don't worry about the lack of gadgets. Practice and you'll be in the trophy line too. ●

Free-Flight . . . *Continued from page 9*
is about the best if it is used with small springs at each end, but this is not always possible. Steel line (U-control cable) is next, with string being a poor third choice. Stout (about 30-40 lb.) waterproof squidding line works pretty well under most conditions, but does tend to fray with sharp bends. In a "hidden" installation, this can be disaster! It goes without saying that the tissue holes should be patched as soon as possible in wet weather, lest you begin to ship water downwind.

Rain is not the only form of bad weather we are occasionally faced with. Most fliers would list "Windy" as one of the least-favored contest conditions . . . As Tom Hutchinson has rightly pointed out, reams of articles have been published regarding ultimate "Dead air" designs, but little attention has been given to the common condition of flying in the wind. My personal feelings on the matter are (assuming

the site is of adequate size for the conditions) that flying in the wind is *easier* than flying in the calm. This is particularly true in the Nordic events, where upwind tows are limited by either the site size or physical endurance. Thermals seem to be more obvious in the wind, usually preceded by a slight lull and warming spell . . . But this feeling is countered by the knowledge that tactical flying is easier in calm weather, when you have more time to perceive what upwind models are doing. Chases are longer in windy weather, but if you can't *bear* to chase a model at all, perhaps R.C. is the answer . . . It's all relative.

INS AND OUTS, 1973 . . . Ron Felix and Ron Evans (Reprinted from Conn-Tact)

In our continuing effort to make the readers of Conn-Tact the most well-informed and chic' modelers in the world, we proudly present the updated and current list of that which is "in," and sadly, that which is "out."

Wakefield: Still in, but not just any Wakefield. Short-coupled with big stabs (62-65 sq. in.). Matching wing airfoils to aspect ratio is very in. Vilim Kmoch is in. As a matter of fact, any Wake flier with a "K" in his name is in. Rolled balsa tube booms are out. Diamond booms are in. Fourteen strands are in, pushing 16 strands out. Large diameter, low pitch props are out. Wire hubs are back in . . . after a short tour of being out. Any simple, reliable front end is in. Right/right patterns are very in, leaving right/left left out . . . Right? Tatone timers are back in (this is the year of comebacks), but only on Wakes. Plug in wings are, predictably, in.

Nordic: Generally still in, but fading. Can be very in if the model sports triangular patch turbs (they are the farthest in there is) on a B-6356 B wing. That section pushes the CH 407 (last year's most in section) out, the GF 6 very out, and the B-7457 D/2 so far out it may be in. All-sheeted wings are still in, but finishing them with epoxy paint is now out, as polyurethane clear is in. Circling tow is still in, but Russian hooks are not . . . Offset hooks are way to go. Having a Russian hook but using it only to catapult is great one-upmanship, not to mention in. Lepp gliders are in, as a matter of fact any glider designed by a flier with an "L" in his name is in. *Gliders* with L's in the name are out, however. *(OK, Wonny, does that mean gwiders are in? WCN)* Long upwind tows are now out, as is *any* thermal detection technique which reveals lift to the opposition. Black fuselages are in, as are black wingtips. Red and/or white is very out. Front fins are in, rear fins out. Sub fins break.

FAI Power: Basically out. Folding wings (intentionally) are in, but flappers are out. Not as far out as ordinary VIT and A/R Power ships, however. Winning with one of these models can make *you* in, since nothing is more in than winning. Sheeted models are out, egg-crate construction is in. Box fuselages are very in, but tubes are out. Buried timers are out. Overruns are out . . . But maxing on 4 seconds is in. Fiberglass props are still in, but only if homemade . . . commercial props of any material are out. Canards are generally in. Wood struts on two-piece wings are in, nylon bolts are out. "V" dihedral is out, out, out! Ray Monks' or any homemade timers are in.

Other events . . . Jetex: In, as long as the fuse isn't out. Coupe: In, but only if it's overweight. Half-A Gas: Out. A Gas: Out. B Gas: Out. C Gas: Out. D Gas: In. OHLG: In. IHLG: Out. Sleek Streek . . . Far in. Unlimited Rubber . . . Out to lunch. A/1 Glider: In, but the AMA is working on it.

Equipment: Adidas and Pumas are in, but $2.99 "Track" shoes are out. Rock and Roll shoes are in, but multi-colored jobs with big heels are out. Barbarbella folding bikes are in, but motorcycles are out. Truckin' to Taft in your Honda Civic is super-in, especially if you fly D gas or sweeps. Model Boxes is in, but throwing the wings into the trunk is out. Model boxes with less than 40 club decals applied are out. Rain planes are in. AMA is far out. Star-dusters are, believe it or not, in. Sig balsa is in, but any type of spruce is out. Obeche is in, as is bamboo. Plywood of less than 5 laminations is out. Metal of any type is out, except as is absolutely necessary. FAI Kits are in.

Last but not least, Model Builder is in, but Ins and Outs are out! CONTRIBUTIONS . . . WE NEED 'EM! ●

Counter . . . . . *Continued from page 7*

$1.29 a pair for the small, and 98 cents each for the large.

Don't underestimate the usefulness of these gadgets. We've been using similar ones, no longer made, for many years, and consider them one of our most valuable workbench tools. Sticks, rubber bands, masking tape and pins can be precarious at best when stubborn

parts refuse to stay together for glueing. Once you use these clamps, you'll wonder how you managed without 'em!

* * *

Peck Polymers, La Mesa, California, has introduced two new items; one a kit for Bill Hannan's "Stringless Wonder," literally a rubber powered stick-and-tissue kite, and the other, a "Designers Kit" consisting of props, thrust buttons, etc. for small rubber powered models. For a complete description, see Fernando Ramos' F/F Scale column this month. We've seen that "Stringless Wonder" fly and consider it much more of a threat to take over Unlimited Rubber than the "Sleek Streek," as suggested by Ron Evans.

* * *

Most modelers, particularly R/C'ers, have found it necessary at one time or another, to make a field repair involving a broken solder joint or connection. When that time came it was usually a choice of either heading down the road in search of a 110 VAC iron . . . and an outlet to match, or borrowing a 12-volt iron from that one-in-every-club modeler who always brings everything but the kitchen sink in his field box . . . or calling it a day.

As of now, that problem has been solved, and it's only a side benefit of owning one of the new cordless (modern terminology for "rechargeable battery powered") soldering irons by Wahl Clipper Corp., long-time leading manufacturer of electric (and now cordless) hair clippers.

The Wahl cordless soldering iron is only 8 inches long, including tip, and weighs 6 ounces. In use, you merely pick it up, press the button, say the words, "For my next soldering connection . . .," and you're ready to go with over 700°F tip heat. Don't make the mistake of holding the tip as you press the button, it's QUICK!

The unit comes complete with a recharging stand (sorta like the battery powered electric toothbrushes), or with a 12-volt auto charger plug to fit your car's cigarette lighter outlet (might as well use it for something since you gave up smoking, right?). The fine tip, which comes with the iron is .070 diameter (just over 1/16 inch). The isolated tip construction eliminates electrical leakage and the need for grounding . . . can't damage electronic components. Price of the iron with charging stand is a very reasonable $19.95. With auto charging plug and cable, the price is $18.95. Auto charging assembly may be had separately for $4.95.

The iron will solder around 100 to 150 connections (depends on wire size, number of wires joined, etc.) without charging, but in normal use, returning it to the stand or charging cord between jobs, it just goes on indefinitely. In heavy production use, two units, used alternately, could keep up a pretty steady pace. At home, the added uses go on and on: During electric blackouts, on the roof to make TV antenna lead connections, etc. Without the tip, the built-in work light serves fine as a flashlight! A larger tip, over 1/8 inch thick is also available for heavier work.

Upon discovering that Wahl does not have a marketing outlet in our hobby, we contacted the company and have gained authorization to sell the iron on a strictly retail basis. We are this convinced of the iron's desirability to modelers. For further purchasing information, see our ad on page 59. Irons are available now. ●

R/C . . . . . *Continued from page 19*

Kraft Systems. It sells for $1.95 and consists of two short control horns, two long horns, each with back plates and screws, a pair of very nice aileron bellcranks with machined brass bushings and screws to mount, two 1/4 x 20 wing mount screws, antenna end clips to tie your rubber band to (the rubber band you attached to the rudder with a straight pin), a holder for your frequency flag that clips on your transmitter antenna, a flying stab bellcrank, a whole bunch of bushings from 1/16 on up, and Lord knows what else. My guess is it's the best buy of 1973 in fittings, and should be on your dealer's shelves when you read this.

Latest items from Kraft are some terrific modeling clamps, which are pictured and described in "Over The Counter." Every MODEL BUILDER should have several.

Sad news is that most imported engine prices went up again. Kinda hard to realize that one popular .60 size engine lists for around 95 bucks plus. The imported engines are fine machinery, no doubt about it, but look twice at the Fox engines . . . the prices are low and the quality is high. They're made in the U.S.A. as well, and parts are easy to get when you need them. Also, Veco is made in U.S.A., and priced reasonably too.

Ah, yes, it is the little things in life that always grab you. Ever buy a different brand of radio and find all the little fittings you have in your spares box won't fit the servo output shaft? Maddening! I used to have some Kraft KPS-9 servos and the fittings from them didn't fit the KPS-10's I got with a new Kraft. Then I traded and got a Pro-Line with KPS-11 servo mechanics, and they had a six sided shaft and none of the spare KPS-10 fittings I bought would fit. Then I got a Kraft with KPS-12's and they are still different and the wheels and arms that are rattling around in the spare parts drawer are of no use. Not only that, the Blue Max wheels and fittings that I had picked up don't fit any of the Kraft servos . . . then some of the Citizen-Ship servos that I have in my Antic have different output shaft sizes from all these and the Hobby Lobby 5 servos were different still. I changed the Hobby Lobby 5 cases to D&R mechanics and found the output shafts on their servos are still a different size. *(Sounds like the plot to one of those marital mixup soap operas. wcn).* Wonder if any manufacturer has enough nerve to say; "We are going to standardize our servo output shaft size to XX inch. We invite the rest of the industry to do the modellers a service and join us in using this size." I wonder . . .

While on the subject of servos, I am sure those of you who have installed retracts have come across the problem of finding a servo with enough brute power to lift them when you need it. If you use the compressed air type, you only have to switch a valve. However, if you use Pro-Line's, or Violett's, or Goldbergs, or some of the others, I'm sure at one time or another you have stripped the gears in your retract servo . . . it even happens with one popular style servo that is supposed to be used for retracts. Now it looks like Carl Goldberg is on the right track. He has just announced a servo for retracts only. The prototype that he sent me to try put out six pounds, yet when I grabbed the output wheel and stalled it to a dead stop, it did not strip the gears. On opening it up, we saw that he used graduated thickness in his gears. Those next to the motor are thinnest and then they get thicker at each step toward the final output, where the load is. Actually these or any others could be made even more powerful by using more gears, so instead of having retraction in two seconds you could get it in six or ten with power to spare. How-

ever, take a look at the Goldberg servo and the unique switch to actuate it using high and low throttle trims. I'm quite impressed with this servo and am anxious for the production models to hit the hobby shop.

You must remember that what ever I may write concerning competition or other matters is strictly my opinion. In the past, especially in my Bulletins for the Middle Tennessee Radio Control Society, I frequently touched on some rather dangerous ground. More often than not I editorialized on areas that I felt needed airing and offered the column to those who might feel differently than I did. Space is not always available in MB for running arguments, so I can only editorialize lightly on subjects that I think should be considered. I certainly would not be foolish enough to assume that everyone who reads my column might agree with me. Occasionally, in the past, I stirred up a hornet's nest. Usually it was an irate manufacturer who took exception to my criticism (personal criticism, you understand) of his product. While writing a Club Bulletin I felt that if a product was really bad, or truly needed revision I didn't hesitate to say so. Twice I was threatened with law suits. This can really take the starch out of an aggressive newsletter editor. Writing for a magazine that has national distribution is a different matter. A writer can't bite the advertising hand that feeds the magazine, so to speak, and it is often better manners to leave an item alone rather than point the finger at it and say, "bad, really bad." All is not bleak, however, since R/C has reached the level that exceptional equipment, engines and kits are readily available and more and more magazine product reports are honest enough to be critical of faults . . . and most often result in the manufacturer being able to correct a defect before the product is distributed.

(Editor's Note: To carry the discussion a little further, Frank is now in a safer position than he was while doing his newsletter . . . which incidentally was great and was the reason for our asking him to do this column. By being in a safer position, we mean that no matter what Frank may write now, it is **our** *responsibility to determine what will actually appear in print . . . Frank is off the hook, so to speak.*

The magazine's policy regarding product reviews will continue as before. Where we have had no direct experience with a product we will make it clear that we're only quoting the manufacturer's claims. If we run into something bad, we'll contact the manufacturer and point out our findings. If no action is taken to correct the fault, we will refuse to make any mention of the product, **unless** *it is to correct an earlier positive comment on our part.*

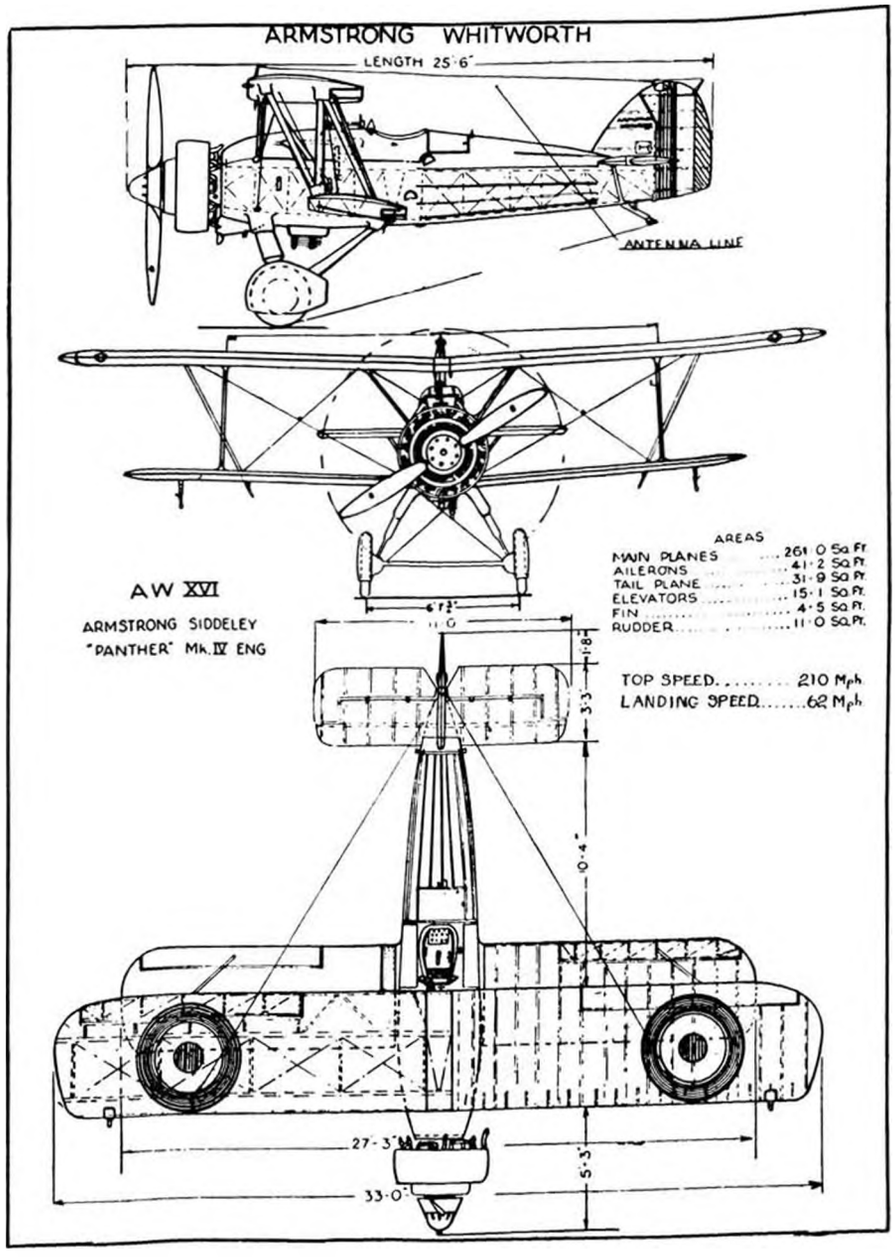
We don't feel it is proper for a publication to set itself up as judge and jury, or to pretend to be the final authority. The only reliable, accurate and deserved "seal of approval" should come from those who use the products . . . after all, who else is in a better position to know? Back to Frank.)

Nevertheless, if you have read this far, let me leave you with an idea that has been a pet of mine for a long time. I've spoken of it to many "influential people" and written of it in the Club Bulletin. Everyone always said it was "just great" and then apparently forgot the whole thing.

Basically, the idea is based on the following: Achievement and/or reward is always a prime motivation for people to move up in any endeavor they might tackle. There must be some reward for undertaking a task. Perhaps it should be so in modelling. Let us suppose that in R/C we had the following pattern levels, or classes: Master, Expert, Standard, and Novice. Each AMA R/C flyer would be classed as one of these. Once started out in R/C, you naturally want to advance, and the move upward in each class could be determined by the number of years in R/C as well as points earned in contests. From my point of view, at least, it would solve some very critical problems. For example, no R/C'er could enter the Nationals unless he had at least an Expert rating. Consistent contest wins and accumulation of points, from year to year, would be the means that a flyer achieved this level. Then there are the small number of flyers who really should be con-

sidered Masters. Only these flyers should be permitted, for example, to compete for team selection for the Internationals. There are many flyers who are presently flying in D expert who are forced to compete with flyers such as Whitley, Chidgey and Page, and so forth, and are totally outclassed. There is no incentive to enter a contest in which four or five of these Master flyers enter.

In most other competitive sports, there are levels of achievement, which those who engage in it, seek to reach. They do it by working for it. My feeling is that the present method of self-declaration of A, B, and C or D flight status is totally outmoded and should be replaced. Not only would it help in interest in competition but it would give each flyer something to reach for. That should give everyone something to think about . . . so until next month . . . keep flying!●



**F/FAI . . . . . ** *Continued from page 35*

I guarantee you he'll give you more than your money's worth of treatment: R. L. "Doc" Anderson, 4804 Janet, Sylvania, Ohio 43560.

Rol's FAI ship in the photos is the "ODIN" I, one of a series being prepared for the 1975 team effort.

WING: Span 64-1/2 inches, chord 7-1/2 inches, projected area 450 sq. in., R-86 airfoil (Rol's own flat bottom section with 8.6% maximum height at 35% point) all sheet, tissue covered, 6.17 oz.

STAB: Span 24 inches, chord 5 inches, 7% thick flat bottom airfoil, 1.6 oz.

FUSELAGE: Magnesium pan machined from bar stock. Pan houses engine

and tank. Aluminum cowling. Pylon of 1/32 magnesium, wood filled center, with magnesium lined exhaust tunnel exiting at rear of pylon. Silk covered remainder. Weight 29.22 oz. for a total of 26.45 ounces or 750 grams.

"ODIN" II will be windy weather version with 445 sq. in. wing (span 60 inches, chord 8-1/4 inches), is now under construction. ODIN III, on the board, will be calm air and fly-off model with 470 sq. in. wing (76 inch span).

Power for ODIN's will be reworked Rossi 15's turning special Anderson 7 x 2.5 FAI prop at 25,500 rpm static.

COMMENT

We haven't heard much concerning, the preparation of our U.S. FAI power team members with respect to their approach to the coming World Championship fly-off's. My hopes are that they are working on something, as I am sure they are aware of the seriousness of this part of the competition.

As far as news from other countries . . . I see that both East and West German teams have special models for the fly-off. Their approach is high aspect ratio models trimmed for short runs, (4 - 6 secs.). Denmark, headed by Tom Koster, is planning the controversial "flapper" approach in a new design improved by Koster. Sweden is staying with the conventional design such as the one used by World Champion Hagel. No need for drastic changes as this model was proven in the same air. Monk's of Great Britain is also doing something.

Now my question is, if the Europeans are so concerned about the fly-off, having the field and weather on their side, how is it that our own team keeps so quiet! Is it that they have a secret set up? Or is it that they plan to use the same approach that put them on the team in Texas? If my first guess is the reason for the silence, it better be good! But if the second is what their approach will be, I can predict that their optimums will not be the same after the fly-off in Austria.●

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workbench . . . *Continued from page 45*

are superfluous when it comes to recognition of their aircraft's identity.

To allow non-flying points to come near, equal, or exceed flying points in Sport Scale, will turn the event off deader than a mackerel. It's a shame too, because it has the potential of being the event most actively enjoyed by the most modelers.

Trying not to be like the politician who has lots of complaints, but no solutions, we offer the following suggestions for Sport Scale. First, it needs an objective, one that sets the tone of the event . . . Like f'rinstance: "The objective of Sport Scale is to promote the use of scale models in R/C flying competition." Simple as that. Then, the objective should be backed up with logical proportioning of point values, i.e., 100 maximum points for 10 flight maneuvers . . . with no scale operations substituted . . . 5 required and 5 optional . . . all flying maneuvers. An additional maximum of 10 points should be awarded for overall scale flight characteristics. Finally, 10 maximum points each should be awarded for Accuracy of Outline, Craftsmanship and Finish, Color and Markings, and 10 points for an original design. The latter would be a flat 10, whereas the others would score 0 to 10. Final ratio, 110 points max for flying and 40 points maximum for scale and appearance . . . enough to keep everybody honest without making them work too hard at it.

One more thing . . . when it comes to static scoring of Sport Scale models, think in terms of "Stand *Way* Off Scale," just in case somebody enters an AMA Scale "Museum Piece." You wouldn't want the rivets, stitches, worn paint, instruments, and exhaust stains to cloud your judgement.

THINGS TO DO

Speaking of R/C Scale, the PARCS (Pennsylvania Ave. Radio Control Society), Brooklyn, N.Y., will be holding its 4th Annual East Coast R/C Scale Championships on Sunday, September 30, 1973, in Riis Park (Parking Lot) Rockaway, N.Y. Both AMA and Provisional Sport Scale will be contested. First place winners in each category will receive $50 and cash prizes will also be awarded through 5th place. For further information, contact Joe D'Amico, CD, (212) 251-1680, 9224 Rost Place, Brooklyn, N.Y. 11236.

NATS UNOFFICIAL INDOOR SCALE

Not much time to prepare for this, but some unofficial indoor scale events will be taking place at the Nationals.

On Sunday, Aug. 5, Richard Jones Armory in Chicago, the Detroit Cloudbusters will hold a Peanut Scale event under AMA Provisional rules, for the Golden Peanut Trophy, several runner-up trophies, and Best Junior. In addition, there is a Bill Hannan Award for Best Antique Peanut.

The M.I.A.M.A. Club of Miami, Florida is also keeping the Navy Scale event alive, in memory of the 25 years of Navy sponsorship. There will be trophies for 1st and 2nd in Open, and

a 1st for Junior/Senior. This is indoor rubber scale to AMA rules and planes must be Navy aircraft from any nation.

Both events will be flown from 3:00 PM to 9:00 PM, same day, according to M.I.A.M.A.'s Doc Martin, who gave us this indoor info, and all models must be turned in by 10 AM for scale judging.

Earlier on the same day, the Chicago Aeronuts are also putting on an unofficial Penny Plane event. Sounds like a long and busy day in the Armory.

PEA POD ONE MORE TIME

If the volume of letters and plans ordered are any indication, Tom Protheroe's 36-600 Pea Pod R/C Sailboat (April '73 MB) really caught the fancy of a heck of a lot of Model Builders. In fact, one large school district in a north-central state requested (and received) permission to include the boat in their Junior and Senior Highschool shop classes . . . Bird houses and knick-knack shelves can get a little boring.

One question received in several letters expressed concern over the waterproof qualities of regular lumber yard Luan mahogany. None of this stuff is apt to be waterproof, any more than silk would be until you put on enough coats of dope. Treated in accordance with Tom's instructions in the Pea Pod article (sealed with resin on the outside and varnish or thinned resin inside), the hull should last for years, depending on the care it receives. Tom points out that the early Santa Barbaras, first built in 1964, had Luan mahogany decks, and they still look good today.

GOOD SHOW, L.M. COX MFG. CO.!

Due to the generosity of the L.M. Cox Mfg. Co., and especially due to the tenacity and dogged determination of Bill Seltzer, president of the firm, West Coast Nats officials and about 56 registered Nats contestants will be flying to and from the 1973 AMA Nationals in Oshkosh, Wisconsin, aboard a chartered United Airlines 707!

Nats officials, more than 30 in number, who will travel at no charge, will include R/C Pattern and Scale flight judges, static scale judges, backbone members of the R/C Pylon crew, and the entire C/L Speed crew! The contestant seats are costing only $132 round trip, and are being alloted on a priority basis; Juniors first, then Seniors, then Open. By the way, all applications and moneys had to be in AMA Headquarters by June 15, just as this issue was being mailed, so don't jump for the phone if you're seeing this for the first time.

We referred to the tenacity and dogged determination of L. M. Cox president, Bill Seltzer, in chartering this trip . . . What started out to be a supposedly simple matter of forking over the dough to charter a plane, turned into an Alfred Hitchcock style nightmare of red tape, anti-discrimination, anti-price fixing, and just plain you-can't get-there-from-here type negativeness.

With various officials of United Airlines, the CAB, and the FAA jumping up and down on him, there were times when Seltzer could have very graciously said, "Sorry folks, it just can't be done." But the more resistance he got, the more determined he became. When the smoke finally cleared, Bill came out on top, conceding only the primary desire to charge varied prices for the different AMA contestant age categories (could we say the "Brass" is discriminating against the Juniors?).

Thanks, L.M. Cox Mfg. Co.! . . . Thanks, Bill Seltzer!!

MYSTERY PHOTO

Last month's old photo of a regular or frequent contributor was correctly identified as our R/C Editor, Frank Schwartz. Wouldn't it be nice to weigh that much again, Frank?

The first letter to come in with the correct identification was from Joe Marquand, Carlsbad, CA., who wins a year's subscription to MODEL BUILDER (OK, together now, "B I G D E A L !")●

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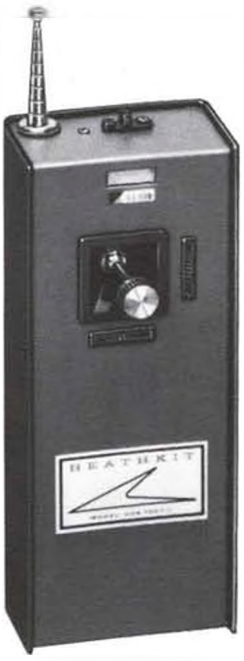

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