

MODEL BUILDER



DECEMBER 1973

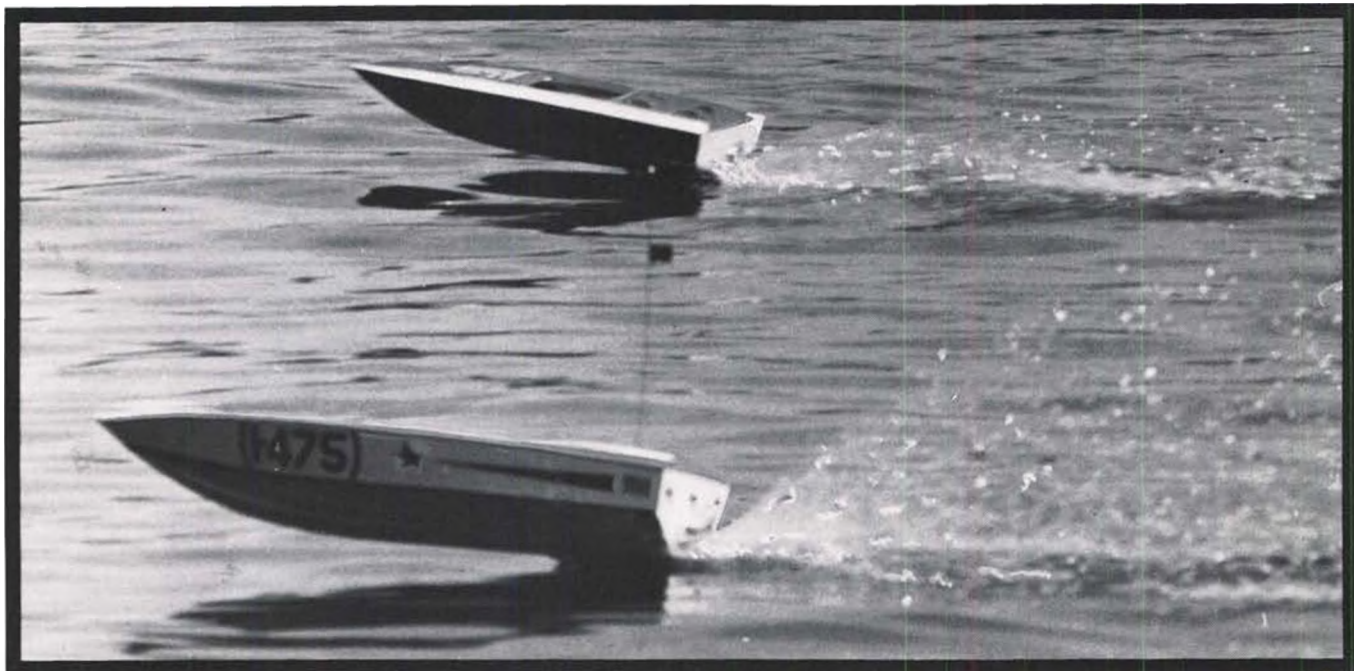
volume 3, number 25

ONE DOLLAR



NEW! DUMAS DEEP VEES

The new class that's got class... a great new way to enjoy RCboating



The three new Dumas Deep Vees are the fun answer for the new RC model boater. They're easy to build, easy to drive . . . and real easy riders when it comes to rough water.

It's easy to see why they're the fastest growing class with serious RC model boat competitors, too. In The First International Hennessy Cognac Miniature Grand Prix, Dumas boats swept to victory with 1st Place Overall, 1-2-3 in .20, 2-3-4 in .40, 1-2 in .60 and the .60 Scale Award.

Dumas Deep Vees are living up to their "for show or go" reputation. They win on speed, endurance and realism.

Dumas Deep Vee 60's
point the way in Hennessy Cognac
Miniature Grand Prix.



Dumas Deep Vee 40

Kit DV-40F \$49.95 (glass)
Kit DV-20F \$39.95 (glass)



Dumas Deep Vee 60

Kit DV-60 \$39.95 (wood)
Kit DV-60F \$59.95 (glass)



Pit crews are kept busy at Miniature Grand Prix with fixin', fuelin' and fun.

Be sure you're ready for the coming season of deep vee racing including the big Hennessy Races now being scheduled. See your hobby shop right away and get your Dumas 20, 40 or 60. If he can't get your boat, write direct to Dumas, adding 10% for postage and handling.

***dumas
boats***

Dumas Products, Inc.
790 South Park Avenue
Tucson, Arizona 85719



CARL GOLDBERG

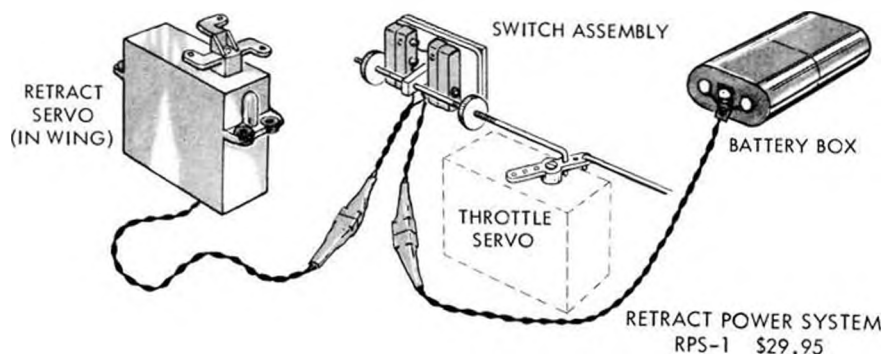
NEW! RETRACT POWER SYSTEM FOR 4-CHANNEL FLYERS!

At last! A way for 4-channel flyers to easily get into retracts! Our new Power System is ready to go - just add 2 penlite cells, mount the switch assembly on the side of the fuselage or on the throttle servo, connect the retracts and that's it! When throttle and trim levers are both moved all the way up or all the way down, the retracts will do the same!

Heart of the system is a small, powerful servo, geared down for heavy work, and with thick strong output gears. Transit time under load is about 3 seconds. Easily handles tri-gear retracts with power in reserve.

System comes wired up with plug connectors and needs only batteries. 2 nickel cads may be used, or penlite dry cells which are good for many hundreds of retract cycles when using a balanced system such as CG Retracts.

POWERFUL NEW SERVO, SPECIAL SWITCHING SYSTEM AND 2-CELL BATTERY PACK—WIRED UP READY TO INSTALL. LIGHT! COMPACT!



FLIGHT PROCEDURE 1. Take off using throttle stick fully advanced in normal manner. After take off, advance trim lever to limit, and gears will retract.

2. Leaving trim at maximum, perform flight maneuvers as usual, retarding and advancing main throttle stick as desired. Even with full retard, gears will remain retracted.

3. On preparing to land, first bring trim to full retard. When ready, retard throttle stick fully and hold for 3 seconds so gears will extend and lock. If necessary to add throttle to lengthen approach, gears will remain extended.

Complete system weight with batteries (not furnished) - 3 oz.



Joe Bridi and his new Super Kaos; a beautiful paint job topped off with DJ Multi-Stripe.

Packard Photography

5 COLORS - RED, WHITE,
BLACK, GOLD, DARK BLUE

KENT NOGY DON DEWEY JOE BRIDI LARRY LEONARD BOB VIOLETT **DJ's MULTI-STRIPE**

It's an instant hit! When the famous modelers named above tested DJ's Multi-Stripe and liked it, the word got around. Now modelers everywhere are finding DJ's Multi-Stripe fulfills its promises. It bonds permanently and sticks like paint. Very thin, with a special expensive adhesive, the final fuelproof bonding takes place in sunlight. There's no other tape like it! No more shrinking, lifting, and getting dirty. For the striping tape that solves these problems, ask your dealer for the one and only - DJ's Multi-Stripe. Exclusively marketed by Carl Goldberg Models.

4 SIZES

- 1/16" Wide, 36 Feet Long - \$1.98
- 3/32" Wide, 36 Feet Long - 2.69
- 1/8" Wide, 36 Feet Long - 2.69
- 1/4" Wide, 36 Feet Long - 3.69

CARL GOLDBERG MODELS INC.
4736 WEST CHICAGO AVENUE • CHICAGO, ILLINOIS 60651

Carl Goldberg Models Inc.
4736 W. Chicago Ave., Chicago, IL 60651
I am sending 25¢ for 8 pg. Illustrated Catalog with, "Recommendations in Starting in R/C." Basic Explanation of R/C Equipment and Radio Control Definitions.

Name _____
Address _____
City _____
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THE CHOICE IS (almost)* YOURS IN 1974



* A statement in AMA's Monthly Mailing for August, 1973, is slightly misleading. It implies that a subscription to AAM, as part of 1974 dues for Open members, is only \$4.00 extra. **THIS IS NOT TRUE.** The subscription is actually \$6.00 extra... **EXACTLY THE SAME AS OUR SPECIAL CHRISTMAS OFFER TO AMA MEMBERS!**

In truth, the basic dues for Open membership is \$10.00, but then you are *required* to make a *mandatory choice* of paying \$2.00 extra for AMA News, or paying \$6.00 extra for AAM. In other words, you are *obligated* to pay at least \$12.00... the other \$4.00 is the *difference* to get the magazine, *not the special subscription rate implied.*

NOW YOU CAN RENEW YOUR MEMBERSHIP WITH AMA (or join for the first time) AND RECEIVE A ONE YEAR SUBSCRIPTION to MODEL BUILDER (Starting with the January, 1974 issue) for the SPECIAL, LOW, CHRISTMAS SEASON RATE of \$6.00, which is a 40% DISCOUNT off the new subscription rate.

Remember, starting in 1974, Open AMA members are *no longer required* to take AAM as part of their dues. So, as a SPECIAL CHRISTMAS OFFER to ALL new and renewing AMA members, MODEL BUILDER is making this convenient package deal available.

Simply fill out the form below (If you are renewing, use the form you are receiving from AMA), and attach a check for the total amount required. That amount will be \$6.00 plus whatever you have indicated on your AMA renewal form, or the one below. Send the whole ball of wax to us, NOT TO AMA. We'll enter your subscription, or if you're already a subscriber (Bless you!), we'll *add* it on to your existing one, and *immediately* forward your membership form and payment on to AMA. Be sure you mail it to us *on or before* January 14, 1974!

AND . . . "YOU AIN'T HEARD NUTHIN' YET" . . . as a SPECIAL CHRISTMAS BONUS, new and renewing members may purchase *additional subscriptions* (as many as you want) at the same special price (and until Jan. 14, 1974) for friends on your Christmas list. How's *that* for a good deal!? Use the extra address forms provided, and *please print* . . . some of you write worse than doctors!!

Now then . . . ya say ya don't want to join or renew with AMA? . . . come on now, ya really should . . . but, tell ya what we're gonna do, just to show there's no hard feelings. We'll *still* give you a CHRISTMAS SPECIAL DEAL! Through Jan. 14, 1974, you may purchase your own *and* gift subscriptions at 20% off of the regular rate, or only \$8.00 each. Just fill out the form below, bypassing the added information required only for AMA membership.

Paying dues through your AMA Chartered club? Include club Charter No. on form below, and enclose check for subscription only.

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<p>FOR THOSE 19 OR OVER BY JULY 1, 1974 Open</p> <p>Includes all membership and competition privileges—and</p> <p><input type="checkbox"/> monthly AMA News (required) \$12.00</p> <p><input type="checkbox"/> Add difference for AAM 4.00</p> <p><input type="checkbox"/> Add extra for MODEL BUILDER 6.00</p> <p><input type="checkbox"/> New <input type="checkbox"/> Renewal (number _____) TOTAL \$.....</p>	<p>FOR THOSE NOT 19 BY JULY 1, 1974</p> <p>FILL IN DATE OF BIRTH Mo _____ Day _____ Yr. _____</p> <p><input type="checkbox"/> JUNIOR OR SENIOR—No magazine \$ 3.00</p> <p><input type="checkbox"/> Add for monthly AMA News (OPTIONAL) \$ 2.00</p> <p><input type="checkbox"/> Add extra for MODEL BUILDER 6.00</p> <p><input type="checkbox"/> Add extra for AAM 6.00</p> <p style="text-align: right;">TOTAL \$.....</p>
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volume 3, number 25

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Cover: A beautiful Illinois sod farm provides the background for our cover photograph of Niel Liptak and his Quasoar II, the subject of this month's feature construction article. Niel's 12 foot span, V-tail R/C sailplane is built on a fiberglass fuselage (available from Hartman Fiberglass R/C), has a 3-piece sheet balsa covered wing, and is equipped with spoilers and air brakes.



We'd like you to meet John Tucker, editor of "Chopper Chatter," our new column on R/C helicopters. See "Workbench" for more info. This pic taken in Guadalajara, where John was demonstrating his Kavan Jet Ranger to Mexican R/Cers. German Veco, Orbit radio, 11 pounds.

from Bill Northrop's workbench . . .

THAT AMA/MB OFFER

It seems we overlooked an important point in our combination subscription deal with AMA memberships. There are hundreds of AMA Charter clubs throughout the country, and many of them handle membership renewal of club members through the club officers in order to be sure of 100% AMA membership within the club.

Bob Wargo of Parma, Ohio brought this to our attention, and wanted to know how he could take advantage of our offer while renewing with AMA through his club. Two ways to handle it, Bob: First, if club officers are willing, have them send us a list of names and addresses of club members who want an MB subscription, include the club Charter Number, and of course, attach a check amounting to \$6.00 times the number of names on the list. Second, if club officers prefer that you handle it yourself, just send us your subscription order individually and include your AMA number and club Charter number.

ASK A SILLY QUESTION . . .

This month we have launched a new feature department in MODEL BUILDER, "Chopper Chatter," and with it, we are the first all-modeling magazine in this country to give this fast-rising (no pun intended . . . much!) facet of the R/C hobby a permanent place of its own. Heading up this new department is a gentleman by the name of John Tucker.

While talking over plans for the format of our new helicopter section with John, the thought occurred that we should introduce him to the modeling public by including a bit of his aeronautical background. The fact that he is currently Director of Operations and Chief Pilot for Air-California led us to suspect that there might be an interesting story, but WOW . . . what a Pandora's Box we opened!

John started modeling in the early thirty's in Ottumwa, Iowa, and still remembers a young guy from Comet Model Company who stopped by the model shop he had opened in his uncle's furniture store to help him select and order materials . . . Carl Goldberg!

In 1937, John entered his Megow Quaker Flash in a contest, crashed, repaired the ship, and went on to win 1st place. The prize was a free flying lesson! On that first lesson, in a Taylor Cub, the owner/instructor spotted a natural flyer, and soon had John shooting landings! Naturally, he completed his lessons, became a pilot, and went to work for the instructor at his airport.

After finishing college, John came back to the airport and took over its operation for the owner, who went to train pilots for the coming of WW II. With the coming of the fracas at Pearl Harbor, John first became a troop glider pilot trainer, and then was sent to Kelly Field, where he taught U.S. Cadets, ATC, Chinese Cadets, and WASP . . . Woman's Auxiliary Service Pilots (he married one!).

Seeking a little more action, John signed up with Claire Chennault's China National Aviation Corps, and as a member of the Flying Tigers, flew C-46s and C-47s over "The Hump" for two years.

Following the war, and a short spell at operating a flight school, John became executive pilot for the Mayor of Brownsville, Texas (The potato king of America) and was head of the Mayor's fleet of 6 Noorduyt Norseman aircraft. Being a good friend of Lyndon Johnson, the Mayor often had John fly both of them, along with others, on hunting parties into Mexico. He says some of the late-night poker games were unbelievable, with the stakes reaching astronomical sums. In one game, the Mayor's complete airline; Noorduyt Norsemen, John Tucker, and all, were in the pot!

From Brownsville, John became as-

sociated with PSA, where he was a captain for 13 years. Seven years ago, he joined Air-California. As you can well imagine, his stories could fill a book . . . and it would never get dull!

As for modeling, John never really gave it up, and in recent years, owned a hobby shop in San Diego, where he now resides. He has been in R/C since the raw beginning, built and flew Walt Good's famous TTPW system and has been an Orbit radio operator since the earliest single and reed sets built by Orbit's founder, Bob Dunham.

John has been building and flying R/C helicopters since he first saw Dieter

Continued on page 70



The little guy on the right, holding an AT-6, is our Mystery Modeler for December. Photo was taken in 1939. Know who it is?

OVER THE COUNTER

● Orbit Electronics has joined the packaged R/C accessory field with several new products.

Nylon wing bolts, 1/4 X 20 size, have a full size slot with a protective ring which prevents the screwdriver from slipping out and punching a large hole in the finish.

Polypropylene hinges have 6 pre-drilled holes in each leaf which help to lock them in place when installed with epoxy.

Finally, Orbit offers an entirely new item which should become extremely popular with R/C'ers. Called a servo link, it is attached to the servo output arm or wheel. A 1/16 inch wire pushrod end is merely slipped into a hole on the link, adjusted for center and proper travel, and locked in place with an Allen-head set screw . . . No more 90 degree or "Z" bends, hold-on clamps, or turning clevises in inaccessible locations.

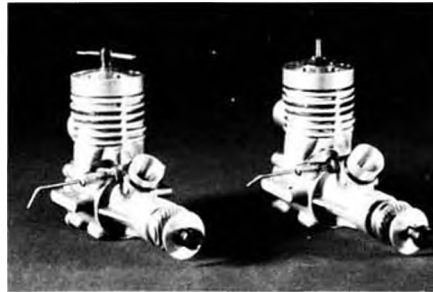
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Fliteglas Models, P.O. Box 98851, Des Moines, Washington 98188, has a new .15 to .30 powered R/C trainer that is also a stand-off scale Cessna O-1E Bird-Dog. For 3-channel radio, the Bird-Dog is a complete, semi-finished kit, including; fiberglass fuselage in olive drab gel-coat with motor mounts, bulkhead, and landing gear block pre-installed, and foam wings precovered in 1/16 sheet balsa.

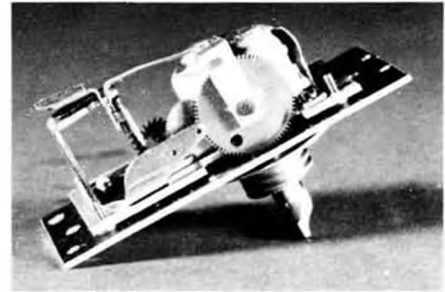
The Bird-Dog is a kitchen table type construction job, needing a minimum of tools. Building consists of joining the wing halves, attaching tail surfaces, installing engine, and equipping with radio. Span is 52 inches, price \$49.95.



Fliteglas Models' new Cessna O-1E Bird-Dog is a combination stand-off scale and trainer. Has fiberglass fuse in olive-drab gel coat and foam wings precovered with 1/16 balsa. \$49.95.



Czech MVVS diesel and glow .15s engines are being imported by Colony Enterprises.

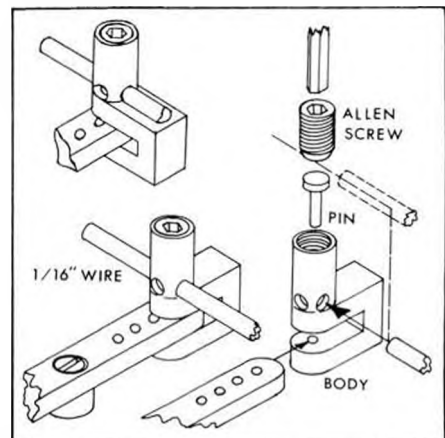
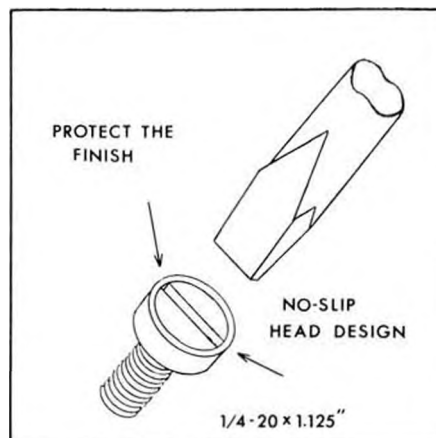
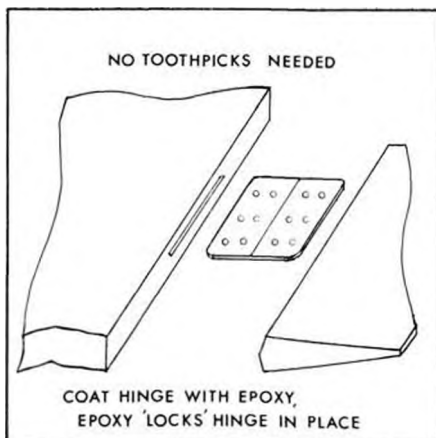


Swiss music box works are basis for this timer built by Ray Monks. A Colony import item.

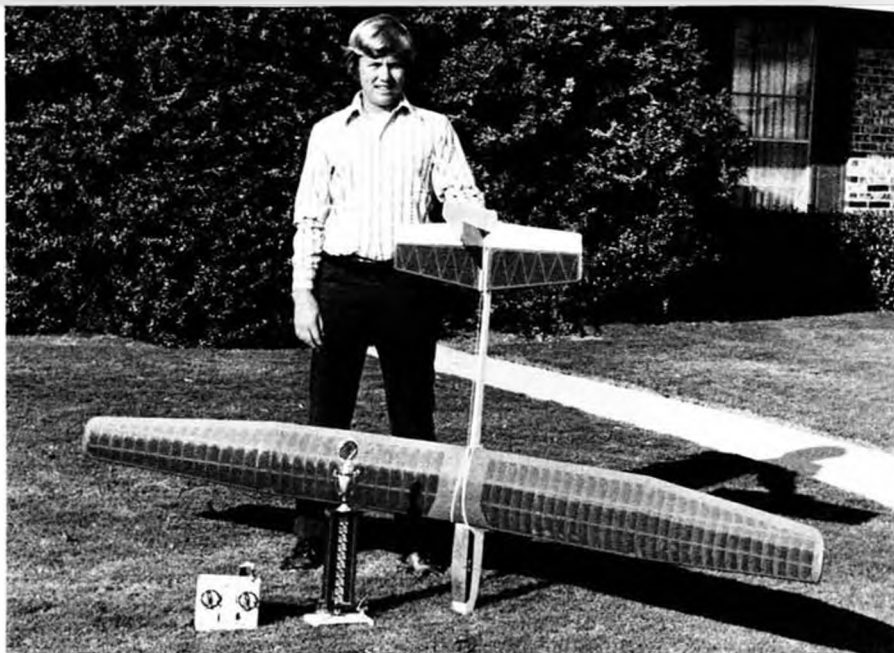
Colony Enterprises, 2337 Ewing St., Los Angeles, California 90039, is a new company that is specializing in the importing of various competition free-flight items from overseas. First offerings include kits for two Nordic A/1's designed by England's Jim Baguley . . . the Asteroid and the Satellite (the latter is no relation to Bill Hunter's bird . . . except for flying reputation). Also available is a 78 inch span A/2 Nordic, the Nova. The A/1's cost \$7.00 (plus 50

cents postage) the A/2 \$20.00 (plus 75 cents postage).

Colony also offers timers designed and assembled by Ray Monks. Units are built around Swiss music-box works and are light and dependable. Unfortunately, the music portion has been removed, so your ship will not climb toward the heavens to the tinkling tunes, "Off We Go . . .," or "The High and The Mighty!" Units are priced at \$20 plus 50 cents postage. *Continued on page 71*



First of series of new accessory items being marketed by Orbit Electronics. Servo link really simplifies matters.



Mark Jones wasn't long in picking up a trophy with his 110 inch version of Frank Zaic's new R/C "Floater." Great to see the JASCO name back with us again. Ship features all ply fuselage.

PRODUCT\$ IN U\$E

The JASCO "FLOATER," R/C SAILPLANE.
By Jimmy Lee Jones.

● The fact that my fourteen year old son, Mark, and I are avid R/C Sailplane enthusiasts is well known to anyone visiting the Dallas-Fort Worth area. My love for this phase of modeling dates back to 1951 when I lost a Jasco Thermic "C" towline glider in a thermal. This was my first "rising air" experience and the little Thermic "C" disappearing directly overhead after a 21 minute flight was a thrill I shall never forget.

This was not the first Frank Zaic kit

I constructed, nor the last, but the thing I have never forgotten is that Frank's ships always flew and were second to none in engineering. Frank's latest R/C Sailplane kit, "The Floater 110," is no exception.

Frank mailed the prototype kit to me this summer and, due to pressing business obligations, I asked Mark to build the kit. He had absolutely no difficulty building the ship and it flew "right off the board."

The fuselage is constructed almost en-

tirely of 1/16 inch plywood and is of the pod and boom design. This may turn some of the scale sailplane buffs off, but the design is clean and quite pretty in the air. It is very light, immensely strong, and easy to build due to Frank's engineering and well-detailed plans.

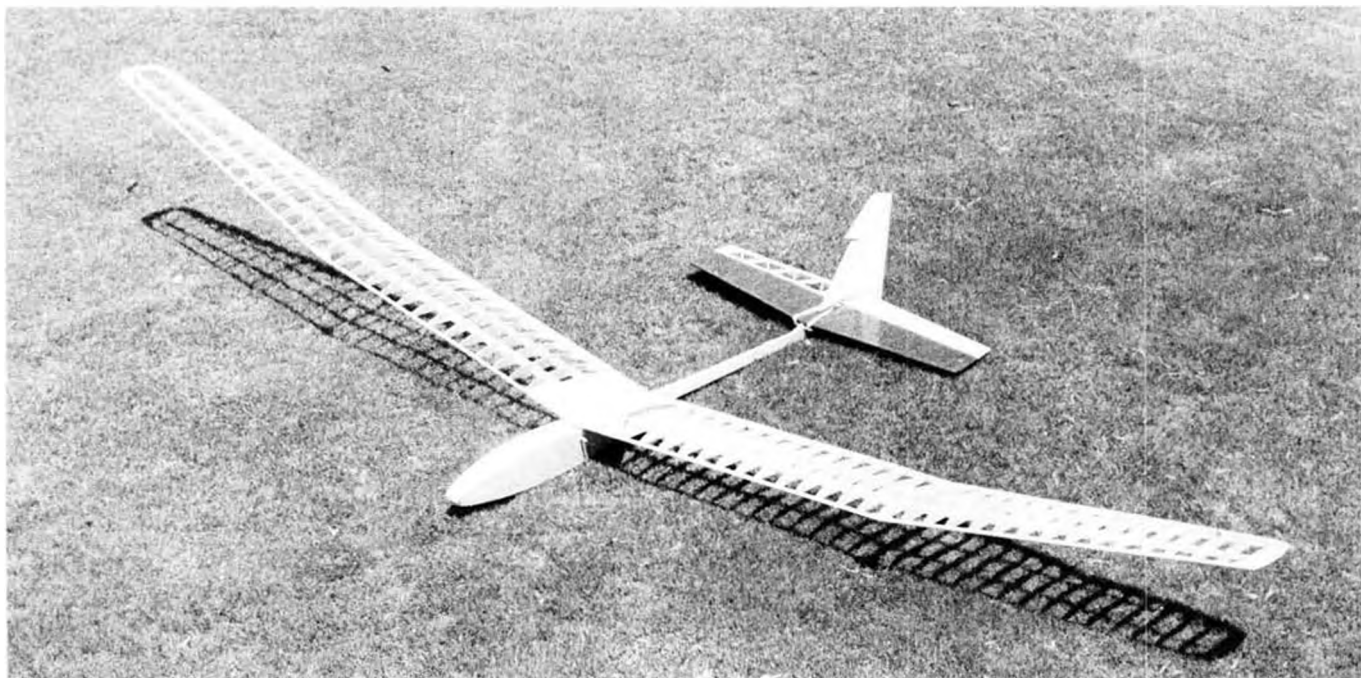
The fuselage is intended to be used with wings from 88 through 130 inch span without any change in rudder or elevator area. Mark constructed the 110 inch wing in this instance and it turned out to be a perfect combination for thermal or light slope lift flying.

The boom is constructed of 1/4 inch square spruce and 1/16 inch plywood with Golden Rods or Nyrods run through the boom to operate the control surfaces, which are of conventional construction. Any of the small servo or brick radio systems will fit in the pod with room to spare.

The wing airfoil is a flat bottomed 6409 and penetrates well, with almost the same lift as the undercambered version. The spars are solid spruce and exhibit amazing flexibility. The general construction is identical to Frank's earlier G-99 and Thermic 100 wing kits, but is faster in that the main spars are not constructed of balsa and spruce laminations.

Don't worry about high wing flex on strong launches . . . these wings will take it!! Also, they are not short on performance as they enabled me to complete my LSF level IV requirements with a 71 minute thermal flight on a less than ideal day.

PS: Mark won first place today in a local fifteen minute precision-duration event (Task IIA) with a perfect score of 1200 points, so we can also recommend the Floater 110 as a good competition sailplane. ●



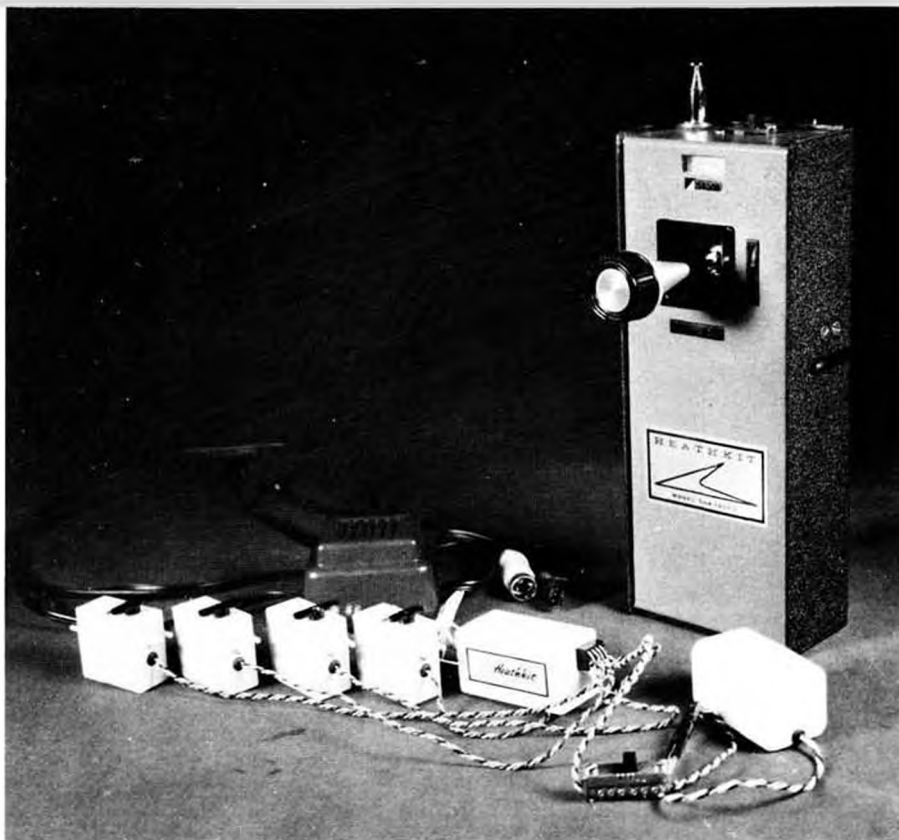
JASCO "Floater" kit includes parts for building 88, 99, or 110 inch wing. Spruce spars are rugged, yet allow flexibility. Light tail surfaces help to avoid carrying dead load ballast in nose. Boom is 1/4 inch spruce with 1/16 ply sides.

● With the introduction of its GDA-1057 series of kits early this year, the Heath Company entered the highly competitive economy priced market for radio control systems. The GDA-1057, as a 3 channel system, complete with transmitter, receiver, two standard servos, and rechargeable nickel-cadmium packs for both Tx and Rx, sells for only \$139.95. From this low, get-your-foot-in-the-door price, the purchaser has several options which permit him to expand the system to 4 channels, and/or to use miniature or sub-miniature servos.

At the time of purchase, or whenever the builder wishes, a 4th channel conversion kit (GDA-1057-4) may be obtained for \$19.95. The major components in this kit are parts to convert the single transmitter stick from 2-axis to 3-axis. The rest of it consists of a few odd transistors, capacitors, and resistors which are soldered into existing vacant holes on the Tx and Rx encoder and decoder circuit boards.

The only other step-up from the basic price of the GDA-1057 is in the servos. For an additional \$10.00 (\$149.95), the system may be purchased with two miniature (GDA-405-44) or two sub-miniature (GDA-505-44) servos. All servos are Kraft mechanics (cases, gears, pins, output shafts, and output arms or wheels) while the electronics are by Heath Company. The miniature corresponds to the Kraft KPS-11, the sub-miniature to the KPS-12 and the standard to the earlier and somewhat larger KPS-10. The Heath servos sell separately for \$24.95 (mini and sub-mini) and \$19.95 (standard).

Incidentally, all prices mentioned above are factory catalog list, to which shipping charges are added. Radios may also be purchased through Heath Company outlet stores located in major cities throughout the country. Prices in the stores are slightly higher than those in the catalog, on all items. The outlet stores also have repair and service departments where trained technicians



Completed Heath GDA-1057 test rig on 53.3 MHz. Transmitter design is great for left handed R/Cers, and with hand strap, is particularly easy to hold while hand-launching aircraft.

PRODUCTS\$ IN USE\$

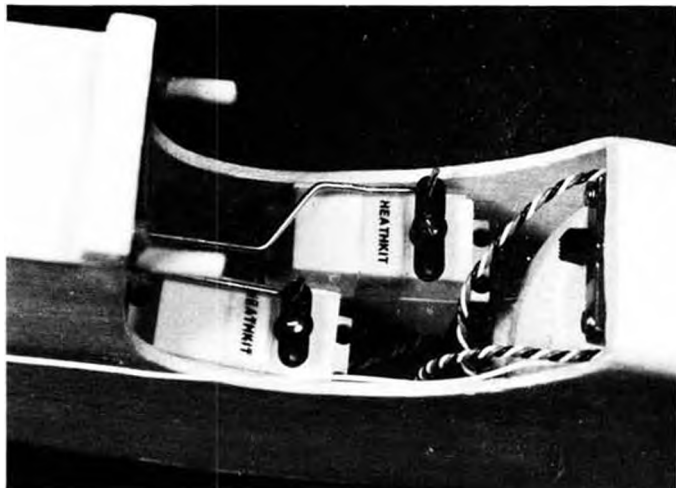
HEATH COMPANY GDA-1057 R/C SYSTEM.
By Bill Northrop.

help with any problems that may develop during or after construction.

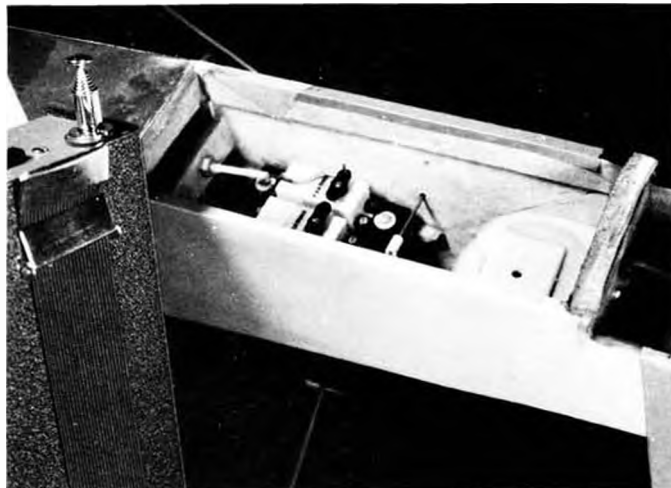
Having known about the Heath Company since almost the beginning of its existence in the electronic kit field, it is easy for us to overlook the fact that some readers may not realize what's behind the name "Heathkit." A complete story on the Heath Company was published in the July, 1973 issue of MODEL BUILDER, but suffice it here to say that this is the largest producer of top quality electronic kits . . . probably in the world. Electronics appear

in many items connected with today's everyday life, so the initial image of radios and related test equipment in kit form hardly begins to cover the scope of items available from Heath. There are color and black-and-white TV sets; stereo, FM, AM, short wave receivers and amplifiers; electric organs; tape and record players; garage door operators; depth sounders; radar ovens; automobile testing equipment; guitar amplifiers; intercoms; burglar alarms; and a complete line of ham radio equipment. The com-

Continued on page 56



Servos are double-stick taped to sides of SW Sailplanes' Baby Bowlus. Switch is wedged in foam. Blurred "Heathkit" due to 2 servo tapes.



Servos (Kraft KPS-12 mechanics) fit in Orbit PS-4 tray! Shown here in editor's old "Square Hare" design. Veco 19 power, all sheet const.



QUASOAR II

By NIEL LIPTAK

A high performance, new generation sailplane, featuring all sheet balsa covered wings, all flying ruddervators, spoilers, air brakes, and retracting wheel. Fiberglass fuselage available, or build up your own.

● Ah . . . the fact that you have gotten to the text portion of the Quasoar II's article illustrates two things: Number one, you have very good literary taste based on a very well educated design eye. And second, you are giving some thought to building a Quasoar II. Let's, for the moment, investigate further what you would encounter once you constructed a Quasoar II.

First of all, you would discover that constructing long thin wings isn't as hard as you've been told it was. And also, you would discover that there is something about soaring that is hard to describe, but involves the same challenge as flying a perfect pattern or turning a 1:20 in pylon.

After you have mastered the techniques of soaring with your Quasoar II, you decide to enter your first soaring contest. It seems that most contests are at least a 5 hour drive from anywhere, so you carefully outline a checklist. This is because if you forget those precious wing wires, you'd never make it back before the awards are passed out.

Well, you've made it through Phase One. All checked into the motel nearest the contest site. The eerie red glow of your battery charger, pumping up your radio system for tomorrow's conquest, creates an enlarged silhouette of the Quasoar II's fuselage. A few quick mental measurements of the silhouette and you realize that the span for your brainstorm would be in the neighborhood of 38 feet in full scale.

Oh, one more thing before you shove off to dreamland, and that is, what time to wake up. Let's see . . . the contest starts at 9:00 a.m., registration is at 8:00 a.m., and with breakfast and all . . . how about a wake-up call for 4:30 a.m., just to be on the safe side? After all, you're not nervous, and you can use the extra time to watch the Sermonet before you go to breakfast.

You finally get to the field. So what if you are the first one there; the C.D. is always looking for someone to help set up the winches. The registration line is starting to form, so you insert your body at the end of the line . . . which

quickly becomes the middle.

Now you get down to business. The interrogation begins; first your name and address, the registrar asks frequency, A.M.A. number and F.C.C. number . . . and then to name the sailplane . . . to which you reply at the top of your voice, "Quasoar II!"

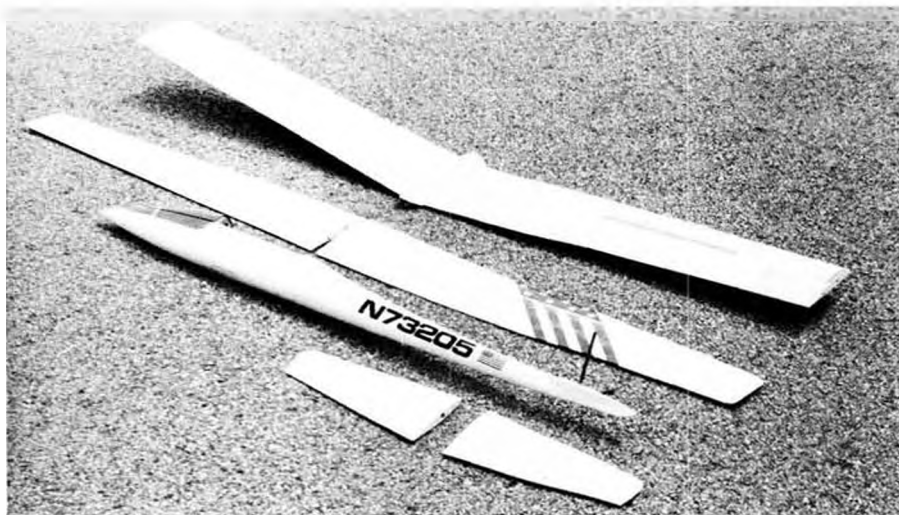
Now to the hard part . . . wing span and wing loading. Let's see . . . 16 oz. to the pound divided by wing-span . . . or is that area, or maybe the square root of the elevator area?

Now that the registration is out of the way, you can retire to the pit area and assemble your machine. This is where the real fun begins. As you bolt the wing on, a spectator's eye is caught by your prowess in assembling your craft. He stops to engage in sincere conversation. After all, he too has an unending quest for knowledge. His first question is, "How do you get those things up?" To that you desperately search for one sentence to describe a Hi-Start, winch and hand tow.

Now the contest is about to begin . . .



Author/designer/cover boy Niel Liptak hooks up the Quasoar's flying V-tail. Uses Todi link.



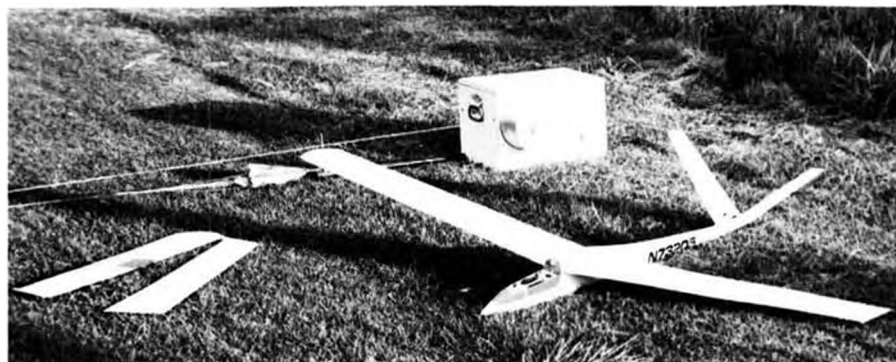
The Quasoar breaks down (intentionally) to Honda car size pieces. Three piece wing allows for rugged center-section construction. Good way to go on 12 foot and greater spans.



What a flying site! A little easier to get, too, when you don't threaten to disrupt the peace and quiet with engines. Beautiful lines of the Quasoar show up well in this photo.



All-moving ruddervators plug into sturdy, 5/32 pivot rods. No slop a necessity!



You were probably already thinking about this! Given a good, strong slope wind, leave off the outer panels and change the name to Quaspeed!

but not before the pilot's brief. This is where all pilots gather around the C.D. and discuss the weather, size of the landing zone, and the rotten breakfast they had that just may effect their second round of flying. The brief breaks up and you head back over to the pit area. You almost get back to your lawn chair when your name is blurted over the P.A. system. Oh no! This is it! Your palms begin to sweat as you get your transmitter out of impound and find a timer. Before you know it, your Quasoar II is firmly attached to the towline and you're on your way to your first official contest flight of your career. As the ring gracefully slides off the towhook, you nervously mutter "time." To that command, the distinctive click of the stop watch is clearly recognized.

You realize that to stay up for 10 minutes, lift is going to play a very vital role so with this in mind, you start the search.

No lift and about 9 minutes to go, your altitude is less than 100 feet, but wait! What was that? A wingtip moved. You start to circle. Perspiration slowly trickles down your forehead. Each circle you ascend a few more inches. Finally, you hear your timer say 8:30, a tingle of accomplishment races down your spine as you prepare to descend upon the landing zone. Final looks good, and 10 seconds to go, 5 seconds, 3, 2, 1 as the spot comes up to caress the bottom of your Quasoar's fuselage. A perfect score, you're ecstatic with excitement. You skip tra la, tra la . . . into the spot to retrieve your ship before it falls prey to some poor unfor-

tunate, who struggled for a 3 min. and 12 second flight.

Ah, but one perfect flight won't win you a contest. You need 2 more, count 'em. On your next attempt you launch into a boomer, so getting a max is no sweat. But on your third flight, that sinking spell hits you again. Now you know what it's like to be the Captain of the Titanic, you'll take anything. As a last attempt to stay aloft, you try to pick up some slope lift off of a discarded pack of cigarettes. You barely clear that barbed wire fence on the way to the spot but you make it, not a max, but not too bad. It should keep you in the top 50 anyway.

Your flights are over. Now to the awards. The presentation starts at third place, then to second place, and finally to first place. That's you, you've done it! You won first place! Boy, will the guys at work be proud of you. Just don't tell them you traveled 300 miles each way and spent about half a week's wages just to participate in group therapy for a bunch of toy airplane nuts. After all, they never tell you about their gold ball budget!

Well, there you have it. Maybe a little distorted in spots, but an idea of what the ole contest circuit is like. Hope you enjoyed it; now down to the serious stuff.

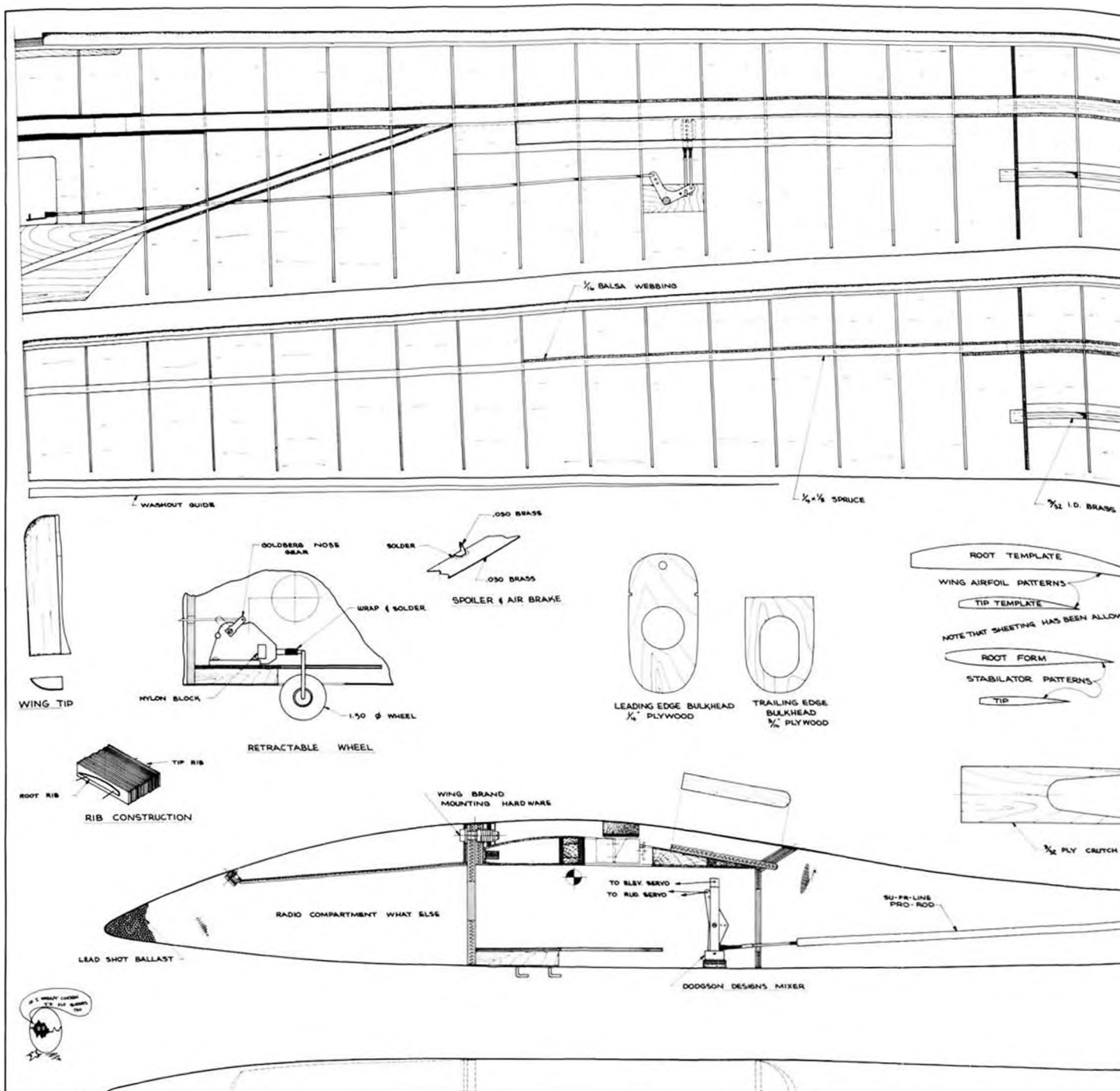
FUSELAGE

The fuselage, as you can see, is of fiberglass. This is available from Hartman Fiberglass R/C, Argenta, Ill. 62501, for a price of \$20.00. A very high quality of workmanship is displayed in all Hartman products, so I'm sure you won't be disappointed with the fuselage.

The fuselage comes in two halves and must be joined together. This is no major task, but requires the use of fiberglass tape (furnished) and resin. First of all, using masking tape, fasten the two halves together about every two inches or so around the entire circumference of the seam. Now mix some resin, about an ounce should be more than enough,



Spoilers and air brakes extended. Very useful control, once you get on to the knack of using it. They're made of stock K & S brass strips, direct from the hobby shop. Note retract wheel.



and apply it on the seam. First do an exposed segment, then peel off the tape and apply it over the portion just resined, then do the segment previously covered by the tape. Continue this pro-

cess all the way around until you are back where you started.

While the resin is setting up, sight down the seam and check to see if it's straight and true. If not, twist the fusc-

lage until it is straight. Let the resin completely dry before removing tape.

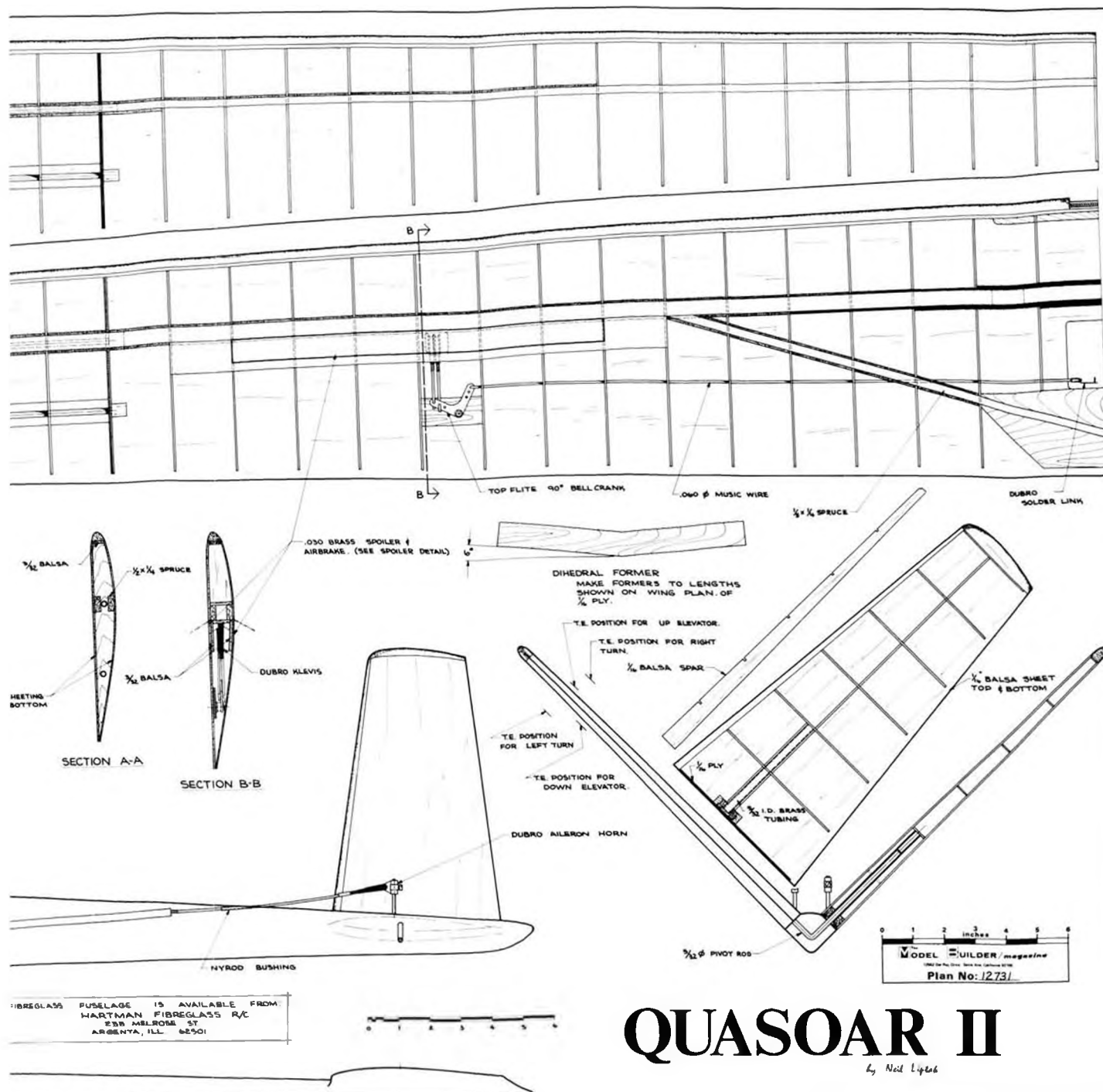
You now need to lay fiberglass tape over the inside seam. If not already done, cut out the wing section of the



How's this for accessibility? Servos are mounted on a slide. Todd "Mixer" is in rear compartment. Hartman Fiberglass fuselage.



Goldberg nose gear retract unit is adapted for single wheel operation. For spot landing events, retract gear, put on double-stick tape skid!



Note: Full size plans will have some further revisions and additions that were being made while this issue was going to press.

FULL SIZE PLANS AVAILABLE – SEE PAGE 72

fuselage in order to attain access to the inside of the fuselage. Now cut a length of tape that will reach the entire length of the bottom and lay it over the seam. Now mix up some resin and pour it over the seam, tilting the fuselage so the resin saturates the entire length of tape. Repeat this process on the top seam after bottom has dried. Insert right angle wire for butterfly tail pivot and mount securely.

The bulkheads are installed after the wing is complete. That way you can custom fit the wing to its mounting. More on that later.

The retractable wheel, shown as an option on the plans, was incorporated in the prototype. However, it is not

used too much, since it does require a smooth field to insure against damage. But it looks neat and satisfies my weird taste.

WING

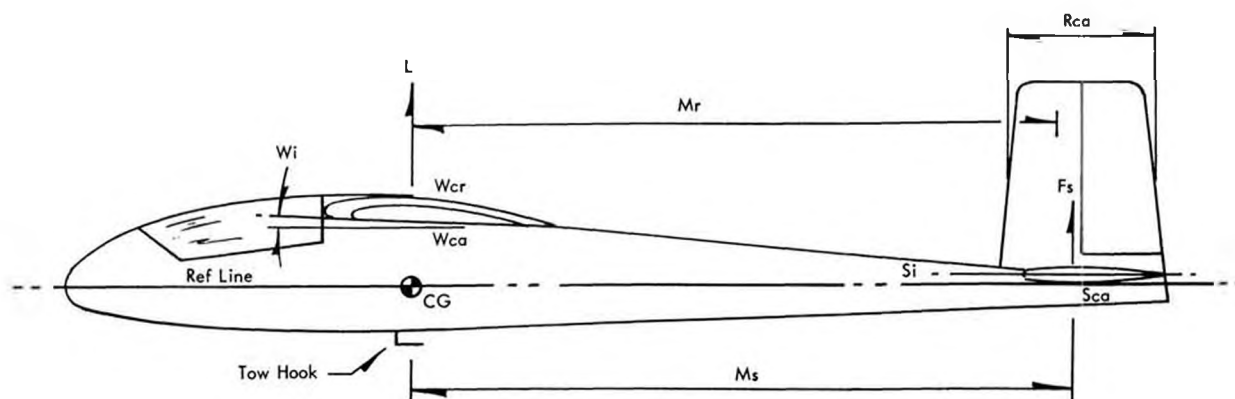
Ah yes . . . the wing, a very vital unit of the soaring bird. First of all, make the ribs as shown on the plans. You will have to go through this rib making process twice . . . once for each half. Even though the wing is in three pieces, it is built one half at a time. Here is how it's done:

Lay the bottom sheeting out for the entire wing half. Glue the bottom spar to the sheeting and cut out the air brake opening. Now lay the 3/32 balsa sheet over the air brake slot. Placement of the

ribs is next. Remember, this is the entire half we are building. When you get to the joint half way out the panel, insert the brass tube. Insert the tubes full length and cut them in half after the ribs have dried. By using this method, you insure that the tip panel will line up perfectly with the center section.

Before the top sheeting is glued down, install all linkage for the spoiler/air brake. Also insert the spoiler back-up sheet as shown on plans. Oh yes, a word about the washout. You can go right ahead and build the tip panels on a flat board. Just before gluing on the top sheet, slide the washout shim into place. After the top sheeting has dried,

Continued on page 65



FORCE ARRANGEMENT

b	wing span	Ms	stabilizer moment (tail moment)	Sr	rudder area
CG	center of gravity	Rca	rudder average chord	Ss	stabilizer area
CRu	rudder volume coefficient	Ref	reference	Wca	wing average chord
CTu	tail volume coefficient	S	wing area	Wcr	wing root chord
Fs	stabilizer force	Sca	stabilizer average chord	Wct	wing tip chord
L	center of lift	Scr	stabilizer chord	Wi	wing angle of incidence
Mr	rudder moment	Si	stabilizer angle of incidence	AR	aspect ratio

R/C SOARING

By LE GRAY

R/C sailplane design for amateur brain surgeons . . . or, how to design an R/C sailplane in 5,000 words or more . . . or, original sailplane designs are many splintered things . . . or, (thank Heavens, no more room!)

● It's a fact. R/C soaring is enjoying one of the most phenomenal rates of growth of any sport since that bit with the apple some years back. But growth per se isn't necessarily good.

Growth means people . . . means money . . . means commercial interest. That's good. But as a result, there are so many excellent sailplane kits now available . . . and more coming . . . that incentive to produce original designs is dwindling. That's bad. Oh, there's junk on the shelves, too, but the point is that good kits are available for many configurations, sizes and prices.

So why spend the bother, time and energy to create another sailplane? Because new, imaginative designs are needed to maintain the vitality, growth and advancement of the sport.

Most advances in the R/C sailplane art come from individuals. Just a few active guys can design, build and develop more good sailplanes in one flying season than the world's manufacturers can tool, kit and market in several years. It would be a real shame if individual design talent were lost due to the availability of good kits or good magazine designs.

Chances are that most R/C soaring sportsmen hanker to create at one time or another. And well they should. It's an expression of the inner-man . . . a three-dimensional art form. There's a lot of untapped talent standing around the field, and not all of it is mazda-mouthing accounts of "how great am I" or "how great is that which I have

created." Some quiet guys are smart, too . . . Honest.

So what does it take to be a designer of R/C sailplanes? Some clown might answer "an overactive ego." Ignore him. What it really takes is desire . . . and that's probably the most important factor. Now just why such desire exists can be a very personal thing. It might even be in the interest of science. Who cares as long as it provides a personal satisfaction?

Other than desire, sailplane design takes a little bit of talent with pencil and paper, but hardly beyond the doodling level. Professional quality, engineering drawings aren't required.

How about a knowledge of aerodynamic theory . . . higher math . . . all that stuff? It can add to the fun, if you enjoy it. Certainly scientific concepts should not be ignored. The serious R/C sailplane designer will consider and evaluate every piece of data and rational theory available to him. But, if you are not so inclined . . . perhaps preferring action to analysis . . . you needn't wallow in EBS ("E" for esoteric, the rest is up to you). As a very wise man once said, "There's something fascinating about science. One gets such wholesale returns of conjecture out of such a trifling investment of fact."

There's plenty of time to get smart. Ya can't tell, the technical approach might become your thing. Later. Don't sweat it. The sailplane will understand and react appropriately to all laws of aerodynamics and physics whether you

have the picture or not.

Very few first designs will be world beaters. Maybe even none. Might even be a dog or two in the lot. The important thing is that if it's yours, it's yours . . . pride and joy. Who ever heard of a mother who had an ugly child? Well, as a matter of fact, I know one guy back in Texas . . . but that's another story.

Most any sportsman who has successfully built and flown two or three kit sailplanes, has completed third-grade calculus, and spends a lot of time in the library staring at magazine plans, has enough basics to step up to the challenge. The one essential element is an adequate command of the English language so as to convincingly provide all sorts of esoteric reasons for various design features . . . or mistakes. The more esoterica the better. If just a hint of accent can be developed in the pronunciation of scientific terms, so much the better. German is particularly potent. Italian is next. British is passe. Always remember that very few souls will argue with authoritative sounds. Validity be damned. To be adequate, a designer's verbal diatribe must be confusing and preferably unintelligible.

So, the first step in "Sailplane Design for Fun and Profit" is to develop the language barrier. Secondly, a piece of tracing paper is needed. This is used to lay over plans of an existing design . . . and trace. It's quick, too. Lots of successful designers anxiously await each new issue of the various model magazines to see what they're going to design

next. Actually, there's little reason to not utilize the force arrangement of a proven configuration if you're so inclined. Whatever example you choose to follow probably isn't unique anyhow. Besides, it's most expeditious . . . and it's your magazine.

Note how casually the term "force arrangement" was dropped into the preceding paragraph. Sounds real neat, but actually it's just a little of that EBS jazz that means "all parts in their places."

There are three primary elements to be considered in the fuselage sideview . . . or rather, there is a triad of interdependent aerodynamic and/or mass balance parameters which are critical to pitch stability (*Really! wcn*). These are center of lift (L), center of gravity (CG), and stabilizer force (Fs). Get these three things arranged properly, with appropriate relative values, and you're on your way as a designer.

If you decide to wing-it and to not copy Harley Michaelis' latest beauty, a more careful review of these three elements might be in order. So, spread out your tracing paper, and lay out (draw) a longitudinal reference (ref) line. Now this is simply a straight line running across the paper from left to right or from right to left depending upon whether you're in the Northern or Southern hemisphere. The ref line is sometimes called a "center line," but usually isn't, or even a "thrust line," which is obviously incorrect . . . or you got in the wrong classroom. If you really want to make like a professional, don't draw the ref line a solid (—), or as a center line (- - - - -), but break it every six or eight inches with two short dashes (- - - - -).

Unless you're devoted to sub-miniature sailplanes, the ref line oughta be about 48 inches, give or take. The fuselage length on a conventional design will usually be about 35 to 50 per cent of wing span, with the larger spans carrying relatively shorter fuselages. At this point, you won't know the exact length that the fuselage will be unless you're designing to a specific envelope (dimension). Make all your layout lines fairly light so they can be changed around as needed.

Now that the ref line is set, indicate a CG position by drawing a ⊙ on the ref line at about a third of its length in from the left end. That is, put the CG at about one-third of what may become the overall nose-to-tail dimension. The nose always goes to the left side of the paper. Professionalism.

The force skeleton now consists of a ref line and an arbitrary CG position. Next step is to indicate the center of lift (L). Now really, we're not interested in the actual center of lift. All we care about is the point where the lift component intersects the horizontal ref line under level flight conditions. For design



Dr. Walt Good (rt.) seems to have blended well into the German scenery during his stay there. In this photo by Helmut Lohman, he talks to Harald Neckar, who is W. German aerobatic R/C sailplane champ. Neckar is also top pattern pilot. See R/C W/C report on page 20.

purposes, this could hardly be easier. It sets right on, or immediately above the CG.

It should be noted that what is discussed as CG and L . . . with locations on the reference line . . . are not true positions. Or at least are not necessarily true positions. Only by the strangest coincidence would either or both of these elements actually fall on the ref line. But we don't care right now. We're only interested in their relative horizontal positions, and not their vertical displacement above or below an arbitrary line. So, to keep things relaxed, we'll use the notations CG and L just as if we knew what we were doing. Gotta keep that EBS factor up. (*In this application, it's the Balance Point . . . not the CG . . . but Center of Gravity has more EBS appeal. wcn*)

Another thing. For simplicity, assume that the center of lift (L) occurs at the 25 per cent point of average wing chord (Wca). Note that this "average chord" is not necessarily the "root chord," which is the section shown in fuselage side-view plans.

Now comes location of the horizontal stabilizer . . . which includes the fixed stabilizer and the movable elevator. Again, we're only interested in horizontal position for the development of our force arrangement . . . or our "force model" if you want to zap an Old Flying Buddy with fancy words. Indicate stabilizer force (Fs) . . . a short arrow pointing vertically will be fine . . . over towards the right side of the paper. The Fs should be about twice the distance from the CG as is the nose . . . that is, the other two-thirds of the approximate overall nose-to-tail dimension. This distance . . . from CG (or L) to Fs . . . is referred to as the horizontal stabilizer moment arm or, simply, tail moment, and is noted as Ms. And that, Fred, must be where the women's lib movement got the Ms bit. S'pose? As the design layout or force model devel-

ops, the Ms will probably shift . . . oh, let's hurry right by that one . . . but for now, the two-thirds of overall length is a good start point. By indicating Fs at Ms distance from the CG, it helps the designer remember which end the tail goes on . . . And that it does go on. Incidentally, stabilizer force (Fs) is assumed to act at the 25 per cent point of stabilizer average chord.

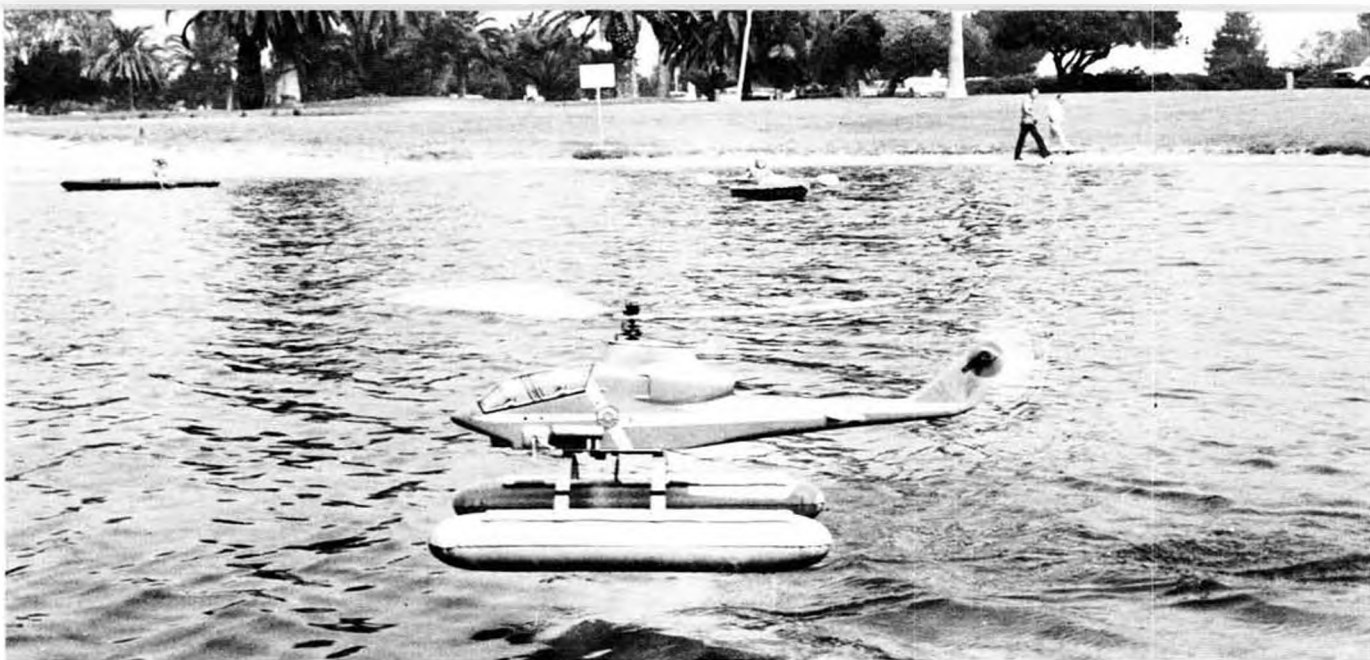
Next, some math . . . Well, ya can't expect to avoid all the heady stuff if you get involved in a technical field. A computer will help . . . a slide rule is nice. Otherwise, find a 12-year old kid who has had "twelves" and can do long division. Wing area (S) and average wing chord (Wca) must be calculated.

Wing span (b) is at the designer's discretion . . . depending on what he can load into his wife's second car. Or some other scientific reason. Ask your 12-year old Math Major how to figure area and he'll probably smart back with some Mickey Mouse answer such as "height times width." Since he's not an aerodynamicist, he won't understand that his schoolboy arithmetic is inadequate. What is needed is a formula that considers wing span (b) and average wing chord (Wca).

For a non-tapered wing, the answer is obvious. Whatever wing chord you got is average. For a straight-taper wing, the Wca length is going to be mid-way between the wing chord root (Wcr) length and the wing chord tip (Wct) length, and it's going to happen halfway out on the semi-span (wing half). Mathematically, this can be written: $Wca = (Wcr + Wct)/2$. If you specify a wing plan form other than no taper or straight taper, you're a smart-alec and can figure your own Wca!

For talking purposes, assume that the design under consideration to be a straight taper wing of 10-foot (120-in.) span, with a Wcr of 10-in. and a Wct of 6-in. The Wca is $(10 + 6)/2 = 8$ inches.

Continued on page 50



John Tucker's Kalt Huey Cobra equipped with Model Helicopters new floats, hovers over the water at Mission Bay, San Diego, California.

CHOPPER CHATTER

By JOHN TUCKER



The opener of a new department completely dedicated to model helicopters. This column to be the focal point for new items and kits, hints and kinks, activity reports, and whatever. Join the fun!

● At the local R/C flying site, you can see novice and expert alike, doing their special "thing" . . . Pylon racing, Precision, Scale and sailplanes . . . with an occasional land-sailer or race car thrown in for good measure. Well, my special thing is R/C helicopters and how to keep the darned "things" in the air.

After seeing some photos of Dieter Schluter flying his Sikorsky S.58 helicopter at the first International R/C Helicopter contest, in Harsewinkel, W. Germany, in 1968, for a record total of about 5 seconds, I knew this was for me, and started collecting ideas and laying awake until the wee hours of the morning dreaming up ideas on how to "get-off-the-ground" with my own special design. Fortunately, very soon thereafter, Du-Bro Products came out with their "Whirleybird," and almost simultaneously, Schluter was producing parts and pieces for his Huey Cobra. Actual construction was started immediately with a vengeance, and the time spent in this phase of the hobby was probably the most gratifying in my years of R/C modeling. Learning to fly was something else though . . . many times I would almost give up the challenge, but that necessity for achieving the status of "chopper pilot" and the elation of seeing my labors wildly flopping about the backyard managed to keep me going. Many gallons of fuel later, I wouldn't consider any other hobby . . . it was that great!

Since that time, manufacturers have produced several excellent R/C helicopter kits, and the number of R/C chopper pilots is growing at an unprecedented rate. Admittedly, kit prices are rather steep, however, with the growth of the hobby, they will continue to become less expensive as production increases and new ideas are forthcoming.

All of which brings us right to the point of this column: Model builders often need help, particularly with rotary wing machines. Nothing is more frustrating than spending long months of build-

ing your "bird" and then discover it's a little (?) difficult to fly. And that sudden quiet when your pride and joy thuds into the ground, after a mechanical (?) failure, is not conducive to the longevity of the hobby. There *are* many bugs in building and flying R/C helicopters, but problem areas can be anticipated in advance and articles published to help the beginner over the questionable spots. For these reasons, Model Builder Magazine will report on new products for helicopters, pass on hints and kinks, offer new ideas and con-



"Chopper Chatter" editor's Bell Huey Cobra, built from scratch. Model Helicopter's fiberglass fuselage, Schluter mechanics, O.S. Max .80, Orbit radio. Ship weighs 15 pounds!

PHOTOS BY JOHN TUCKER



Close-up of float installation, showing adaptor brackets. Floats are vinyl.

struction articles, and present timely information concerning contests, rules and the activities of helicopter oriented clubs. But . . . we'll need your help too! Any ideas or photographs you may have will be welcome, since you, the builder, are the ones who are doing the experimenting and the developing of worthwhile ideas. Your input will be needed to bridge the knowledge gap in this field. Keep us posted of your personal flying activities and your club affiliations. Your questions, when of general interest to other builders, will be given consideration in this column, so send 'em in.

FLOAT-FLYIN'

One facet of the hobby that has never received too much interest is water operations; perhaps we have been too concerned over the possibility of dunking that new receiver on a bad landing . . . and we know how frequent that is! Personally, I have had little desire to fly an R/C aircraft on floats since the time I sank a pair of pontoons back in 1939. They had been originally installed on a giant Cleveland Stinson Reliant, with a single channel Walt Good radio, but the ship was about 5 lbs. too heavy to get off the water, so I put the radio in the pontoons . . . mounted a Brown Jr. on a pylon and dropped the world's first R/C catamaran in the lake at the local country club. My first and only run was a disaster . . . the pontoons hit a rock, disintegrated, and the whole thing rolled over and sank in 3 feet of water!

Well, about two weeks ago, Model Helicopters, Inc., of Tustin, California, sent me a pair of vinyl floats to test on one of my choppers. They appeared to be well designed, very light weight, and of sufficient size to handle even the large Huey Cobra. Although they come in different colors, my pair was bright red . . . and a perfect color match for my little "Kalt" Cobra. Saturday morning was spent figuring out a way to mount them without having the cross braces interfere with the starter belt. The answer was to eliminate the cross braces entirely and bend simple aluminum brackets so as to attach each float independently on the regular gear braces. Longitudinal strength is provided by slipping two lengths of 1/2 inch dowel or aluminum tubing through the four pairs of loops on each float. Extra care



The Kalt Cobra, imported by Aristocraft, is powered by an ST .51, though a .45 is sufficient. Water test flights were made at the Model Yacht Basin, Mission Bay, San Diego, California.

was taken to be sure the C.G. of the floats was exactly matched to the C.G. of the Kalt so that the "inflight" and "floating" balance was harmonious.

Later in the afternoon, my son and I departed for the San Diego Model Yacht Basin for test hops. To my great surprise, I found no glitches in the installation and the flights were spectacular! It took a while to realize that when a helicopter floats on the water, there is

little friction to counteract the torque of the main rotor and the fuselage rotated in the opposite direction. Very little time was required to discover how much power was needed to maintain directional control while taxiing. A fair breeze was blowing over the basin so it was necessary to taxi backwards occasionally because of the positive weather-vaneing effect. Vertical lift-offs were

Continued on page 66



A bunch of the "funny airplanes with the propeller on top" at a local chopper "fly-in." Nate Rambo's original design is in the foreground, next to Charlie Gilbert's original.



Graupner's new Bell 212 Twin-Jet, first seen here at last year's Toledo show.



This 34 pound, Monokote covered DC-9 was on display during the R/C World Championships in Gorizia, Italy.

RADIO CONTROL REPORT

FRANK
SCHWARTZ

● Probably the majority of our R/C readers belong to clubs. More often than not, the club is a dire necessity for the flyers, because through it a flying field is obtained and the members work to preserve and keep the club and the flying site intact. This is usually the bonding agent that keeps the club alive and working. Be they contest flyers or Sunday flyers, the common need for a good field brings them all together.

It is remarkable what the difference can be when a situation exists (as in my town!) where the field is furnished and maintained by the city, and the flyers don't have to lift a finger to keep up the field . . . they consider it their right to use it and fly there; and even the encroachments of a polo field and little league ball diamonds seem to be beneath notice. Probably this unusual situation is the main reason that the club has such difficulty in getting members to come to meetings . . . or even to show any interest. Wonderful to have

such a flying field! I hope they know how lucky they are. I read club newsletters from around the country and it restores my faith in the ingenuity of the modellers to see how much time and effort . . . real hard work . . . is put out by some clubs just to hang onto a rough field and keep the grass cut, and such. More power to them . . . it is also apparent that their R/C clubs are strong and active. Perhaps it is just human nature not to appreciate anything until you lose it or don't have it.

By now you would think that there would be offered to the R/C'er the "all-round all-purpose trainer kit" . . . but such a thing doesn't exist. Still the kits come out labelled "Trainer . . . use a .15 . . . will do the full pattern with .40 size engines and up" and such as that. Obviously, to those who know, a trainer shouldn't be capable of sizzling performance. It should make up in stability what the pilot lacks in ability. I often get letters from modellers asking



Dick Penrod, who took all of our R/C W/C photos is flanked by the Giezendanner brothers, Emil (left) and Bruno, of Switzerland.

what is the best trainer and it is still a hard answer to give. Many models, at least in my opinion, that are supposedly trainers are squirrely (hard to handle) or too difficult to build for the beginner.



Warren Hitchcox and wife/coolie Shirley. He helped Canadian team to 5th place. He's MAAC President.



Feliciano Prat, Mexico, had the dubious honor of placing 78th, last. He was unfortunate in having a total crash late in the contest.



In the October, all-Nats issue, we only had room for the plans to Brad Shepherd's "Super Doubler." This photo shows the completed plane, a great all around performer. Fox .40 engine.



Top view of Super Doubler shows unusually large stab. Some paint job!



New 40-3/4 inch span "Whizzard" by Ace Radio Control. Foam wing with reinforced trailing edge. Tee Dee .049 power is plenty for one or two channel operation.

I wish the manufacturers of kits would only label those kits as trainers that are exactly that. Unfortunately many beginning modellers refuse to try the easy flying "goat" and end up with a plane that is more than they can handle. Advice to beginners: please build something like Top Flite's Headmaster, Goldberg's Falcon 56, Sig's "Trainer," and the like. You'll be happier and you will have an airplane you can handle and learn to fly.

Some interesting items have come across my desk this month. A new kit is always interesting and the Whizzard by Ace R/C looks particularly good. Features a foam wing with a reinforced trailing edge, 40 3/4 inch span and 240 sq. inch area. Fuselage is balsa built up, of course. With a good .049 Tee Dee,

Ace claims it will give exceptionally good performance and with their two channel Commander you can wring it out, yet with their single channel (rudder only) system you can make it a tame ship and it will be good for beginners. Price is \$17.95.

Incidentally, Ace's rudder-only pulse systems are selling at a very fast clip, and because of volume parts purchasing they have been able to reduce, yes that's right, reduce the price on all their package systems by \$10.00. In this day of constantly rising prices, that's really something! You can write to Ace R/C at 203 W. 19th St. Higginsville, Mo. 64037 for more information . . .

Some very interesting building material most of us can use is called Pro-Foam, and is available from Model



M. X. Carey's Galloping John, one of MB editor's many biplane designs. This one has OS .15 engine and OR 3 Ch. radio.

Materials Company of 119 Mariposa, Waukegan, Ill. 60085. This material appears to be a urethane type foam and nothing, repeat, nothing will attack it. You can dope it, use resin or epoxy on it, or any kind of paint. It is easy to shape, and right away I saw the opportunity to take a rather dull knife and form a nice cowl that I needed. A coat of resin on the inside and outside, and then dope, and there you have it. It is available in all sorts of sizes and you can make fuselages and wings quite easily. This Pro-Foam is not soft like the styrofoam you are used to, and it has endless uses and applications. Write them for prices and sizes and I think they have samples, too.

Finally comes a nifty little gadget

Continued on page 71

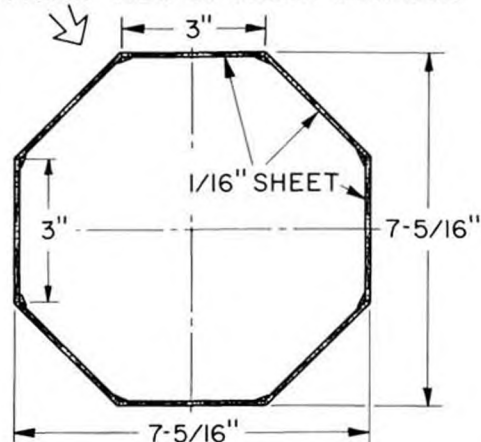


Norway's Poju (Pie-oh) Stephansen flew this ship in Doylestown and Gorizia. High fuselage profile nice for knife-edge maneuvers.



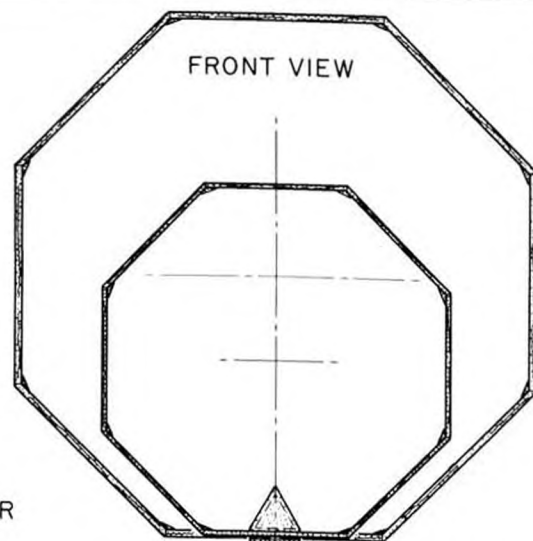
Seems as though everyone is flying some version or another of Matt's Super Star. This is Denmark's Ole Harder, T/M Svend Fishlein (left).

FRONT VIEW OF FRONT OCTAGON



NOTE: THIS DRAWING IS ONE-QUARTER ACTUAL SIZE. FOR FULL SIZE, MULTIPLY ANY DIRECT MEASUREMENT BY FOUR.

FRONT VIEW

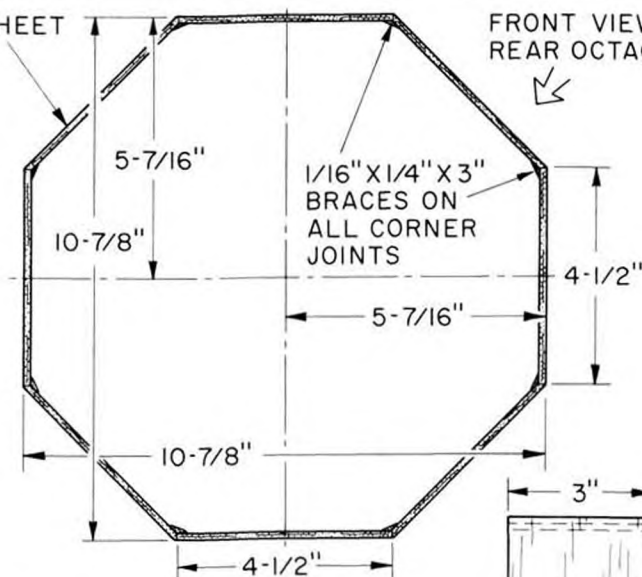


1/8" PLY FIREWALL

SCRAP Balsa FILLET

3/32" SHEET

FRONT VIEW OF REAR OCTAGON



FRONT OCTAGON AND ENGINE POD HELD ONTO FUSELAGE WITH RUBBER BANDS, REAR OCTAGON GLUED ON.

1° POSITIVE INCIDENCE IN FRONT OCTAGON

1/32" X 1" X 36" FUSELAGE SIDES

3/32" SQ. DIAGONAL BRACES

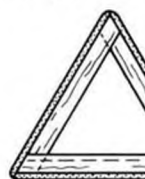
SIDE VIEW

1/16" DOUBLERS (CROSS-GRAINED) ON BOTTOM ONLY--FRONT AND REAR ENDS AND AT ENGINE POD.

DOWELS

3/32" SQ.

FRONT AND REAR END FAIRINGS ARE SOFT Balsa, NOTCHED 1/4" INTO FUSELAGE



FULL SIZE CROSS SECTION OF FUSELAGE

TAPER CORNERS AFTER ADDING 3/32" SQ. DIAGONAL BRACES

.010-.049 ENGINE

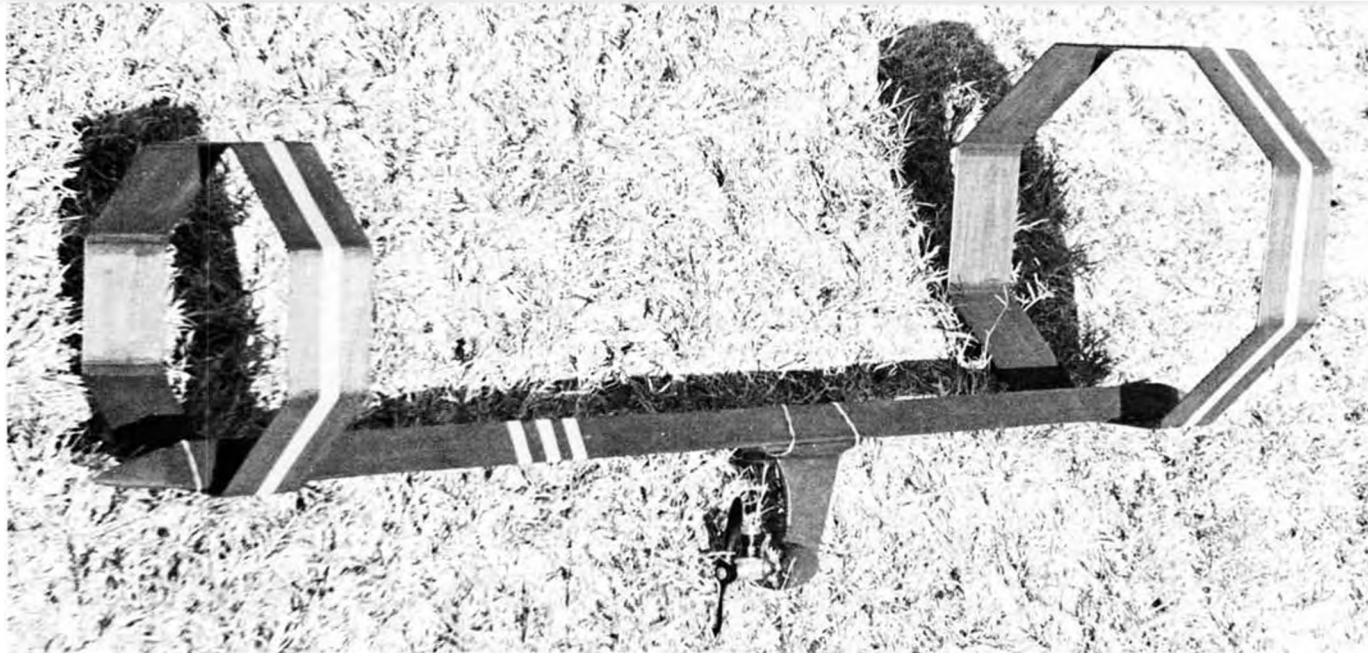
TRIPLED 1/16" SHEET, CROSS-GRAINED

1/16" PLY CORE, 1/16" SHEET SIDES (LIGHTENING HOLES IN PLY ONLY)

SCRAP Balsa POD

DIRECTION OF FLIGHT

DRAWN BY TED TAYLOR
INKED BY PAUL PLECAN



In case you're wondering, it goes from right to left! Take one of these along the next time you go flying, and shake up the troops a little.

OCTAGON

By TED MACIAG.

The author/designer calls it the "I can't believe it flies flyer." Call it what you will, it does fly, and is also extremely easy to trim. Build it directly from the dimensioned plans. No full size ones needed.

● When an experienced modeler holds an airplane in his hand for the first test glide he can almost *feel* whether or not it will fly. The first time I held one of these "I can't believe it flies" flyers I thought, "It can't possibly fly," and then, thinking thus, I launched it and watched to my amazement as it floated clear across the front lawn!

The strangest thing is how uncritical it is to trim. The CG range is broad, and it doesn't really stall but merely floats straight down when the CG is too far aft. Too far forward and it just flies faster. Another nice feature is that it will not loop no matter how much power is used. A strange sort of Immelman is the closest that it will come to a loop.

This design lends itself to any number of variations. A suitable size could be made for any engine from an .010,

which will fly this one, to a large Dyna-Jet version . . . which I plan to build someday.

Weight makes little difference, since this is not a duration model . . . added weight just means a bit more flying speed. Because of its stability, this could be a good design for free flight rubber or gas speed.

To further show the versatility of this design, I made one out of .020 aluminum to fly as a kite in our 50 MPH Texas breezes. It flew well except for one small problem . . . If the bridle isn't exactly right, it will dive upwind right at the guy holding the string . . . rather unnerving.

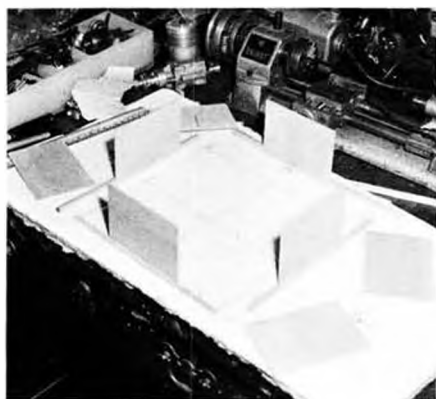
So if you want to build something weird that flies well with little or no trimming, read on.

I will cover building of the hoops since they are not one of your run-of-the-mill free flight wings. First cut the 3/32 X 3 X 36 into eight equal pieces 4-1/2 inches long. With 1/4 in. sq. lay out a square 10-7/8 ins. on a side (inside measurement) on your building board, pin these down securely. Next, mark the exact center of each side of the square and center of four of the 3/32 sheet pieces. Line up these pieces along the center lines, one to a side, then bevel the edges 45 degrees on the other four pieces. This will allow them to fit diagonally across the corners of the square jig and form a neat octagon. Next cut eight pieces 1/4 X 3 inches from the 1/16 sheet and glue securely in place at each corner. When this is dry

remove the octagon from the jig and add some extra glue on all joints for strength. The smaller front octagon (Oh, did I forget to say that it flies small end forward?) is built the same way but with a 7-5/16 square jig. The front octagon uses 1/16 X 2 X 3 sides and the same type corner braces as the big one.

The fuselage is 1/32 sheet braced with 3/32 square, and with stiffeners

Continued on page 61



Building a . . . er, wing, is quite easy, as you can see. Climb is something else. It refuses to loop.



Author/designer Ted Maciag tries a test glide. Should make a great F/F speed model.



The victorious, and obviously happy team from Japan. No. 25, Yoshiki Takahashi tied for 6th place. Tsugutaka Yoshioka, center, is new World Champion. No. 71, Tetsuji Okomura, placed 9th. Team was well rehearsed by Ritsuri Honda, judge at the 1971 championships.

R/C AEROBATIC WORLD CHAMPIONSHIPS... 1973

Japan picked up all the marbles in Gorizia, Italy, scene of the 1973 R/C Aerobatic World Championships. All photos by DICK PENROD, story courtesy of Radio Control Models and Electronics, Great Britain.



Champ Yoshioka with his Saber Liner. Japanese Digicon 6 radio. Enya 60 III had bored out, pressure regulated carb, used 45% nitro.



Second place U.S. team, standing (l to r): Martin, Whitley, Chidgey (Mngr.), Page, Mechs (l to r): Nelson, Keck, and Bridi.



Designer of the fabulous Super Star, Wolfgang Matt, Liechtenstein, placed 2nd. Note vertical whip antenna.



Hanno Pretner, Austria's ace flyer, was 3rd. His father, Hans, is at left. Hanno's Super Star variant featured drag-flaps.



West Germany's Harald Neckar was in second place before the flyoff, finished 4th.



Top American in Gorizia was Norm Page with his Mach I, Ross engine, Pro-Line radio.



Canada's Phil Soden tied for 6th place along with Japan's Takahashi.

● The 8th World Radio Control Championships for aerobatics (F.A.I. Class F3A) was a cliff-hanger to the end. It was also the largest ever of the series which began, in Switzerland, in 1960, this time drawing 78 competitors from 27 countries. Newcomers were Israel, Portugal and Spain.

'Sunny Italy' certainly lived up to its name for at least the first three days of the event, thereafter clouding over — at times very dark indeed.

Practice day is always the time to study the flying form and to seek out interesting model design innovations, of which there were an interesting crop this time. Talking point of the meeting was certainly Bruno Giezendanner's (winner at Bremen 1969 and Doylestown 1971) innovative new design which

featured a variable geometry wing. The model, called *Salumandre*, uses a shoulder wing position, with mainwheels in the fuselage, retracting backwards through 90 degrees into the fuselage sides, while the noseleg unit operates as normal. Wings are extended during take-off and for some maneuvers, but are swept back for the rolls, slow, four-point and triple, the improvement of which, was the object of this very complicated exercise. In view of the disastrous effect on these maneuvers during the four rounds of contest flying, however, it is difficult to see that the exercise achieved anything except to cost Bruno points. On the other hand, it is equally difficult to accept that such an experienced flier, twice world champion, would throw away the chance of

a hat-trick by using an unsatisfactory model, and we can only conclude that Bruno was unable to use whatever advantage the design had to offer, and that his flying was very much 'off.' His scores certainly prove the latter point. Naturally there was a great deal of discussion as to whether variable geometry is legal according to F.A.I. rules, but Bruno Giezendanner was nevertheless allowed to fly. The *Salumandre* had one other 'new' feature — an all-flying tail-plane, and was not alone since several other models also used this layout, including one of the eventual leaders, Harald Neckar of West Germany.

Neckar, in fact, was one of those who impressed us during practice flying, together with the Japanese, all of whose models were very fast indeed. It quickly



Yoshiki Takahashi and his Super Star variant shared 6th with Soden. Sankyo (you're welcome) radio and Enya 60 in his Cinnamon.



Second highest U.S. team member was Jim Whitley, in 8th. Daddy Rabbit X powered by Ross, Pro-Line (what else?) radio.



Putting all of Japanese team in top ten, Tetsuji Okumura placed 9th. OS 60 FGP and Digicon.



Gustav Cappuyns, Belgium, placed 10th.



"How you 'spect to win without a bloody Super Star!" Mike Birch, 11th, Capricorn.



Jim Martin, 3rd member of U.S. team, placed 11th in tie with Mike Birch of England. Banshee, as usual, put on a good show.



West German team placed 4th, with Harald Neckar, second from left finishing 4th individually.



Twice Champion Bruno Giezendanner with his variable sweep wing job. He placed 28th.



Bruno's "Salamandre" held by his pretty bride, Yvonne. Ship still has bugs.



Bottom view of Salamandre shows position of retracted gear. Maybe next time . . .

became apparent that the engine has become a much more important component in the aerobatic model 'system.' All the American team members were using prototypes of a new Lou Ross designed .60 motor which, with muffler, was surprisingly quiet.

British team members Mike Birch, Dave Hardaker and Dennis Hammant had settled in well, making flights early in the day which for practice and subsequent competition days began at 7

a.m. — a daunting prospect for judges!

Two flight lines were to be used for the competition, each competitor flying twice for each set of five judges.

From the total of four flights, each competitor's poorest score would then be dropped and the remainder totalled to select five finalists for a two-round sudden death fly-off which would determine the final positions for the top five. The fly-off, on a single flight line, was to be judged by a full panel of ten

judges, all of whose scores would count (no deletion of highest and lowest scores). Team results were to be calculated on the basis of the four full rounds of competition.

ROUND ONE

Thursday was a bad one for many of the top 'names.' Bruno Giezendanner, the champion, was in trouble with the variable geometry *Salamandre* with three rolls which were so barrelled that the model exited going almost vertically down — he claimed interference and aborted the flight . . . and his brother Emil also had no luck when the noseleg of his *Marabu* collapsed on take-off. Norman Page, leader of the U.S.A. team, ran out of time, and Wolfgang Matt, the Super Star designer, 2nd at Doylestown, almost scraped a wing tip on take-off.

Our team leader, Mike Birch, made no such mistakes with a good flight which, for a time, put him in 2nd place, and the 'Lunch-time scoreboard' still listed him as 3rd, proving that the 'Feltham Flash' was well in there. Dave Hardaker did not fare so well, and Dennis Hammant suffered an engine flame-out at the Cuban Eight which left him well down. One of the very pleasant surprises of Round One was the flying of Phil Soden who, as many contest fliers in this country may recall, emigrated to Canada from the Birmingham area a couple of years ago. Our loss is



The host team in Gorizia, Italy (l to r): Roberto Bacchi (Mngr.), Benito Bertolani (20th), Ruggero Pasqualini (13th), and our friend Graziano Pagni (23rd). Team placed 6th.



Naphtali Horowitz was the first contestant ever to be entered by Israel. He placed 70th.



Constantine Papaspyrou was the only contestant representing the country of Greece. Nice looking ship. Note underchambered tips.



Jiri Havel, champion of Czechoslovakia, was 49th, just above teammate Michaelovik. That checkerboard striping sure is popular!



Portugal's only team member, placing 72nd, was Mendes de Almeida. His ship is Ron Chidgey's Tiger Tail design.

certainly Canada's gain for Phil won himself a place in the Canadian team and certainly justified his selection when, at the end of the first round he was sitting pretty at joint 2nd place with Yoshioka of Japan, behind Hanno Pretner of Austria. Positions of the top 15 at the end of Round One were:

1.	Pretner	4055
2.	Soden	3765
2.	Yoshioka	3765
4.	Kristensen	3745
5.	Matt	3685
6.	Yoshiki	3660
7.	Okumura	3650

8.	Birch	3600
9.	Bertolani	3565
9.	Cappuyns	3565
11.	Whitley	3550
12.	Martin	3535
13.	Matke	3525
14.	Pasqualini	3465
15.	Weixelhaumer	3460

With two flight lines in operation, however, first round scores tell a rather distorted story. In **Round Two** we watched Dave Hardaker make a good clean flight, although he almost lost his motor which sagged momentarily in the outside loops and he finished the flight

with only a single second to spare on the stop watch! Birch's performance in this round was also nice to watch — precise and deliberate with liberal use of throttle. He must have lost points for commencing his rolling maneuvers late (a common fault throughout the championship) and for a slightly diving straight inverted flight, but it was good enough to draw in a better score than his first flight. Dennis Hammant's cup of gall overflowed this round when he experienced a second consecutive engine cut although he at least managed to get

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Another Super Star! This one was flown by England's Dave Hardaker to 17th place. More checkerboard striping, too!



Luxemburg's Paul Behm placed 60th with this Super Star variant. The design seems to be the peak for the present FAI pattern.



John Brodbeck, Jr., with K & B (what else?) Minnow made his best time to date at Oxnard, California; 1:23.5.



Don Powell and his caller, on and off the race course, Bobbi Powell. Ship is "El Bandito."

PYLON

By TOM CHRISTOPHER

PHOTOS BY TOM CHRISTOPHER

● At press time, there is quite a bit of concern as to qualification for the upcoming Tournament of Champions event to be held over the Thanksgiving holidays. There is only one more race for points in Formula I, that being only one week away at Whittier Narrows in Southern California. We are sure that this will be some event! Two classes of racing will be held at this premier event, Formula I and FAI Pylon. Prior qualification as to points is required for Formula I, and you will be welcomed with open arms if you have an FAI bird! Qualifications aren't needed in FAI due to the shortage of entries in the event.

During this past season, the engine controversy has gone as we had expected. There is still concern as to having enough engines to go around for everyone! It is really amusing to see a sport controlled by the manufacturers to the extent that ours lends itself. The engine rule is one of many areas that applies to the compromises, rule bending and just plain politics! We may be wrong in our thinking . . . we have been before . . . but it is to our way of thinking that this sport doesn't need the manufacturers nearly as much as the manufacturers need us! We are speaking now in terms of the Racer, Pattern Flier, and Sport Flier. So why make rules up around a manufacturer's timing as to production, how many engines *he* wants to make, and how *he* wants them represented . . . by us!!!

Your Pylon editor participated in Professional Outboard Racing for eleven years and found many of the same



Ron Schorr and his Mis DARA with K & B by Clarence Lee.

problems that we have in Pylon racing occurring quite frequently. One problem area that we didn't have was this hassling over engines. Frankly, we are quite sick of hearing about this and reading about it continuously, much less having to write articles and wasting words on the subject. We would however, like to suggest a solution to the problem. We have a President, Sec/Treasurer, District Vice Presidents and Contest Board members. We have an annual meeting each year at the Nats with District meetings at least once a year. Why not run our rules as to engines, types of aircraft, general rules and so on, one year at a time! At the yearly meeting, decide then what engines, aircraft and specific rules will be used for the coming year. If a manufacturer wants his engine to be used, it will be presented to the Contest Board for approval. This also applies to other areas of our sport. Once the yearly meeting is over, the only time an engine will be approved will be at the next yearly meeting. This will accomplish the following:

1. Make certain that equipment in use will not become obsolete during the current racing season.
2. Eliminate the continuous hassle of compromises as to how many engines will be available and when.



Bob Johannes, Jr. took first place in Standard Class at Whittier Narrows, Sept. 8 & 9.

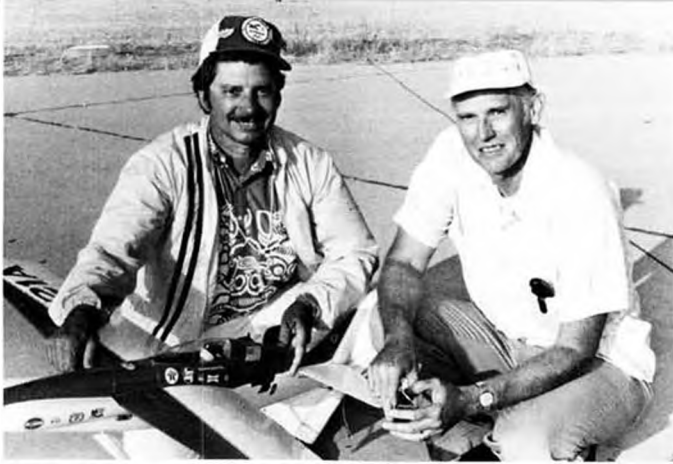
We would want no less than one thousand!

3. Most important of all: Give the racer the confidence that this is the way it will be for *this* racing season without the thought of his equipment being subject to change at the next race!

You are probably saying to yourself, "I thought that was or is the way that it is being done." Don't kid yourself; we



Bud Anders was second in Standard Class at Whittier Narrows. He's half of A&L Distrib.



Bud Anders moved to Expert class with a 1st place win at Oxnard. Must be that shirt . . . or maybe Clarence Lee, his caller.



Father and son team of Al (left) and Terry Prather placed first in Expert Class at Oxnard, Formula I, Oct. 13 & 14.



Smiling Ron Clem, 2nd Place winner in Standard Class at Oxnard. Is that a Northern Virginia R/C club cap he's wearing?



Joe Vartanian points to wire bracket which kept the ST X-40 exhaust pipe in place after two days of racing. Jim Jensen smiles approval.

promise you that this is not the case. If the manufacturer knows what to expect from NMPRA, he has something concrete to go on. At present, this organization is so flexible it hurts! When this happens, the organization starts showing signs of being *unprofessional*! So far, when we speak our minds about this entire subject we are saying only this, "When we make rules or vote on issues or changes, for Heaven's sake, let's at least enforce them!!!!"

The Valley Flyers of Van Nuys, California hosted a very successful race October 13-14 at Oxnard AFB, Oxnard. This was the first time that many of us had seen a more complete race site than the old Mile Square. We all had a weekend of fun and enjoyment with many thrilling races. Terry Prather emerged as overall winner in the Expert Class, flying one of the new Super Tigre X-40 Schnuerle ports in a modified Stafford Minnow. There was a three-way tie for first place in the Standard Class between Bud Anders, Loren McCray, and Ron Clem. Loren McCray had crashed after the last round of flying as the result of a landing mid-air, which left him without an aircraft for the fly-off. Anders and Clem proceeded to the flight line for the fly-off, but during the count down Clem's engine mount came loose from the firewall and the overall win in Standard went to Anders, with a well

deserved victory. This places Anders in the expert class from now on. The guys in Standard are really glad to get rid of Bud!!!

We notice that the times in the Standard Class are starting to approach that of some of the experts. Also, the extremely fast times took its toll in quite a few crashes at the Oxnard event. The safety precautions used by CD Chuck Smith and the Valley Flyers prevented what we are sure would have been one or two serious accidents. It was also good to see Bob Bleadon back in action again. I happen to hear him say that he would have been in there all the way if he could have stopped his caller, Larry Leonard from panicing on him during the race! Ha! Bob is one who has extreme wit and enjoys this sport to the fullest.

We would like to give you a little information on the SUPERTIGRE X-40 Schnuerle. At present, there are four of these engines that are doing quite well in the Southern California area. They belong to Terry Prather, Jim Jensen, Joe Vartanian and Tom Tussing. Terry uses, along with his own fine grooming, the services of George Aldrich in preparing his engine and set-up. We do not know who helps Jim Jensen and Joe Vartanian, but they seem to have a knack of extracting gobs of power from this engine. I talked to Jim and Joe just before



Terry Prather's ST X-40. Leverage of long exhaust pipe causes vibration problems.

the Oxnard race and they showed me a unique way of attaching the rear exhaust of the X-40 so it will stay on during the pounding of a race. It is simple; uses a silicone adhesive "O" ring at the header and a stainless wire cradle with silicone to steady the stack to the fuselage. In the photo, Joe is pointing to this little innovation.

Tom Tussing's father does all the work on Tom's engine and he really gets it to move! The engine has a different torque curve than that of the K&B in that the X-40 accelerates from the start like a shot, comes off the corners good,

Continued on page 67



PHOTOS BY FERNANDO

The "Grey Ghost," by Jack Elem, which he has dubbed "Ill-Eagle."

FREE FLIGHT SCALE

By FERNANDO RAMOS

● The Rockwell International Flightmasters Club has just completed its 24th Annual Scale Contest. This has to be one of the largest F/F Scale competitions anywhere in the country. There were 92 entries!

The contest actually began on a Saturday evening, at R.I.'s Recreation Center, where the models were submitted for scale judging. This really gives the contestant a chance to carefully examine some excellent models and to compare building techniques with other contestants. This year was unusual in that Rockwell International had a hobby show on the same day, and the Flightmasters were a part of that show, with an exquisite display of models.

This year, the annual drew several families from Texas, including Vic Larsen, his son Guy, and George Meyer (designer and builder of the real "Little Toot" biplane). George brought sixteen outstanding models along with him, of which he entered seven. Ed Toner and his wife flew in from New Jersey to be

part of the activity. Ed manufactures those nifty little CO₂ powered old-timer models. Nevada was represented by Bob Haight and his wife.

The events were numerous, including rubber, Peanut, gas, electric, and CO₂. There was also an exhibition event for static models on Saturday evening. Surprisingly, there were 14 entries in CO₂, showing an increased interest in this particular event. Peanut led the field with 32 entries; rubber was just behind with 30. There were 12 gas powered models and only four electric. Unlike the Nats, where CO₂ and electric power can compete against gas models, these are separate events at the annual. The Flightmasters feel that having separate events for these various power forms tends to develop better models, since they are competing only against others of the same type of power.

Saturday night judging usually takes about four hours of hard work, and while this was going on, Bill Warner provided entertainment with his slides



Curtiss Mooney, about to launch his Cub.



Beautiful Curtiss Hawk F6C-3 by George Meyer. One of many ships he brought with him from Corpus Christi, Texas for the annual event.



Bob Haight, Las Vegas, and his Fokker DR-1. Power is the Brown CO₂.



The name of the game is **FLYING** scale, and fly they do. (l to r): George Meyer's rubber powered Sopwith Tabloid, Bill Warner's diesel powered "Miss Los Angeles," Clarence Mather's rubber powered P-51, and Bill Kreck's big rubber powered FW Stosser.

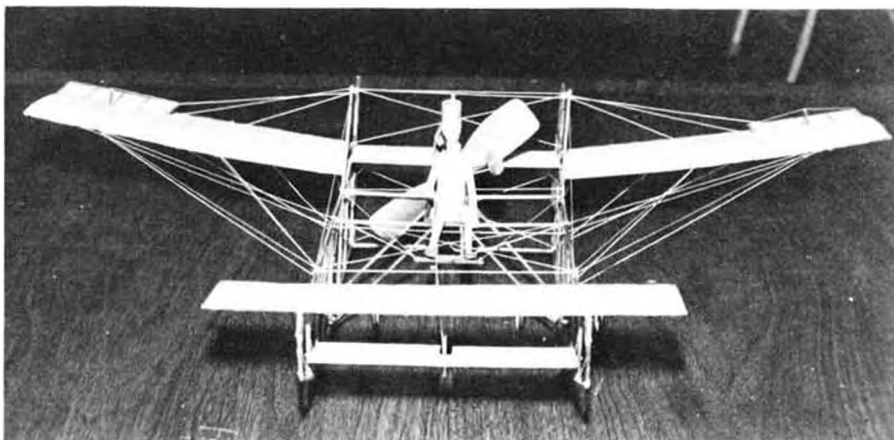
of the Oskosh E.A.A. Fly-in and the '73 Nats.

Flying took place on Sunday morning at the Sepulveda Basin, which is presently about the only flying site for the greater Los Angeles area. It is now going through a renovation which includes paved streets and park sites, among other things to shrink its F/F size. The weather, as it has been in the past, was perfect . . . no wind and plenty of sunshine. Many of the contestants with smaller models made their official flights early in case of a latent wind.

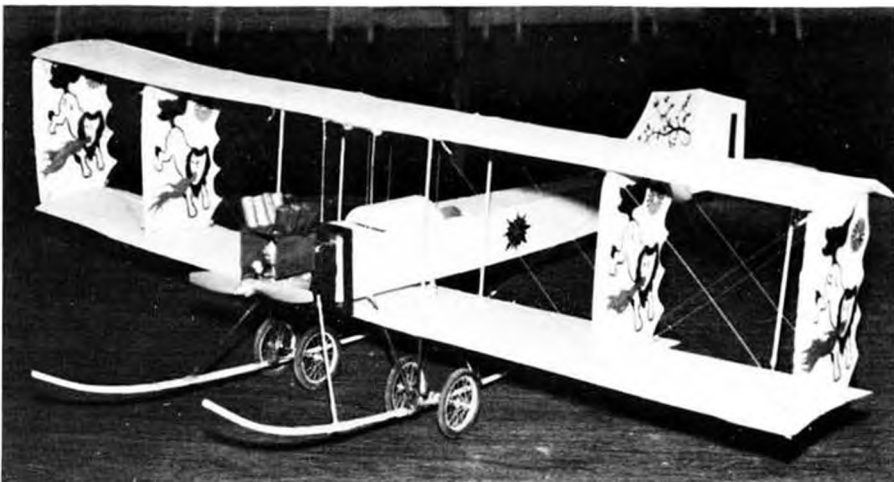
I found it extremely difficult to try and fly a couple of my models and still take pictures and cover all of the activity. I finally gave up trying to compete so that I could do the latter. (Actually this is an excuse, since neither of my models were doing very well. One flew into a truck, knocking off a wing, and the other had a leaky head, which for CO₂, ain't too good.)

Hal Cover started things rolling with an early qualifying flight of his outstanding CO₂ Focke-Wulf TA-152. He started the diminutive engine and released the stretched out version of the F.W. 190 into the breeze. The T.A., with its wide track, made a long, impressive takeoff run, followed by large overhead circles. Then it came in for a near-perfect landing on the tarmac. I'm still amazed at the performance of these Brown CO₂ engines. Some other neat flights in CO₂ were made by Kingsley Kau's ultra-light Blackburn monoplane, and Bob Haight's Kempf Fokker DR-1 flew very realistically with its three plank-like wings. However, the Dreidcker refused to R.O.G. Bill Stroman had another unusual airplane. This time it was the Valkyrie. It was unique in that the CO₂ tank was part of the body of the exposed pilot, and the filler valve became part of his hat. It flew as slow as the real one probably did. Vic Larsen had a highly modified Comet kit of a JN-4 Jenny that was very detailed. Our California air didn't agree with the Texas weaned CO₂ engine, and it was unable to get enough revs to do the job.

Incidentally, Bill Watson has a modified 5 lb. CO₂ fire extinguisher that is really the ticket for loading the little Brown engines. He has had hundreds of fills and the bottle is still two-thirds filled. I hope to have an illustration of this conversion in next month's column.



Bill Stroman's Valkyrie, a rigging nightmare. The CO₂ tank is the pilot's body, and the filler valve is his hat. . . . and it flew, too!



Another Bill Stroman creation, the Yamoto, from "Those Daring Young Men and Their Flying Machines." Has .020 power. Bill must have stock in FH Wheels!



Vic Larsen's CO₂ powered JN-4 was built from a modified Comet kit. Judging of models for the scale fidelity portion, took place the night before the flying at Sepulveda Basin.



George Meyer with his Curtiss Hawk F6C-3. We hope to have this rubber powered job as a near future construction article.



Bill Krecek with his big rubber powered Stosser. The parasol wing and long landing gear make it a natural for rubber flying scale.

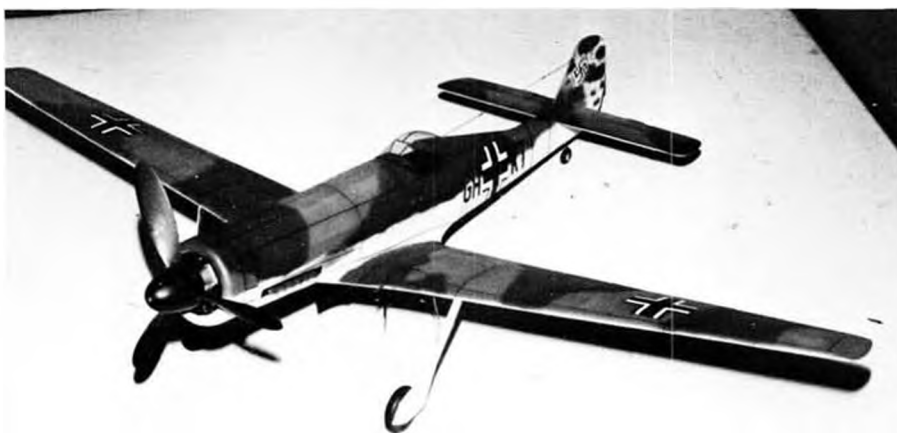
In rubber, Bill Warner's Comet AC-4 led the field with Hal Cover and his Bellanca YO-50 second. It is always interesting to watch Hal wind his models, which normally have a wad of braided rubber that could "do in" the weak-hearted. Clarence Mather, a perennial winner, was 3rd with a P-51 Mustang. He's another that is great to see in action. Much can be learned by carefully observing these outstanding modelers in action.

Following are just a few highlights of some of the other events. One impressive flight made in the gas event was that of Bill Stroman's Yamoto (one of the biplane entries which was featured in the great movie "Those Magnificent Men and their Flying Machines" which had pendulum aileron control. It took off and flew beautifully for its qualifying flight.

Peanut models were in the air so frequently that they looked like a squadron of gnats. Clarence Mather had a Thorp T-18 about ready to fly out of sight when the noseblock slipped out and luckily D.T.'d the model. Otherwise it would have been lost for sure.

Even though there were the fewest entries in electric, one revelation occurred that took me by surprise. All electric power models that I have seen have been around 30 to 36 inches in span and their flights have often been marginal due to weight and size. Yet, there was one entry, Addie Naccarato's Aeronca Chief, which had a 4 foot span. This model flew remarkably well with its gear-whirring motor. Just about the time you figure out what design will work best for electric . . . so you think . . . someone comes along and re-adjusts your thinking. Alas!

One factor which was quite evident at this contest, everyone was having fun. Winning is great, but not necessarily the primary goal. I personally feel that this is why this particular contest is getting more popular every year, and the number of contestants is increasing. It is a time and place that scale modelers can come together and do their thing, with fun as the main objective. Next year it will be the Flightmasters Silver Anniversary, and I'm sure that it will be some contest! Plan now to attend. ●



Hal Cover's beautiful CO₂ powered, stretched Foch-Wulf TA 152. It flew well, for a first place in the event. Plans for this and other WW II scale models coming in a soon-to-be-published book.



Flying Scale editor Fernando Ramos' CO₂ powered DH-2. With gas and alcohol rationing, and inconsistent rubber quality, CO₂, along with electric should have a popular future.



Jack Elem's Cessna Airmaster was modified from a Comet kit. Always a consistent performer . . . the airplane, that is . . . you can never tell about Jack!



The prototype O-25C, s/n 32-181, at Clover Field, Santa Monica, September 16, 1931. A Curtiss Conqueror powered sister of the O-38 (Nov. 1973 MB), it had an earlier model number though it first flew a year after the O-38.

DOUGLAS O-25C

By PETER WESTBURG

● This month's set of drawings is of the Douglas O-25C, a younger sister of the O-38. A follow-on to the O-25A (the O-25B's were three O-25A's for the Militia Bureau), it had an earlier model designation but flew a year after the O-38. The two airplanes were nearly identical except for the power plants and slightly different fairing of the top of the fuselage aft of the rear cockpit.

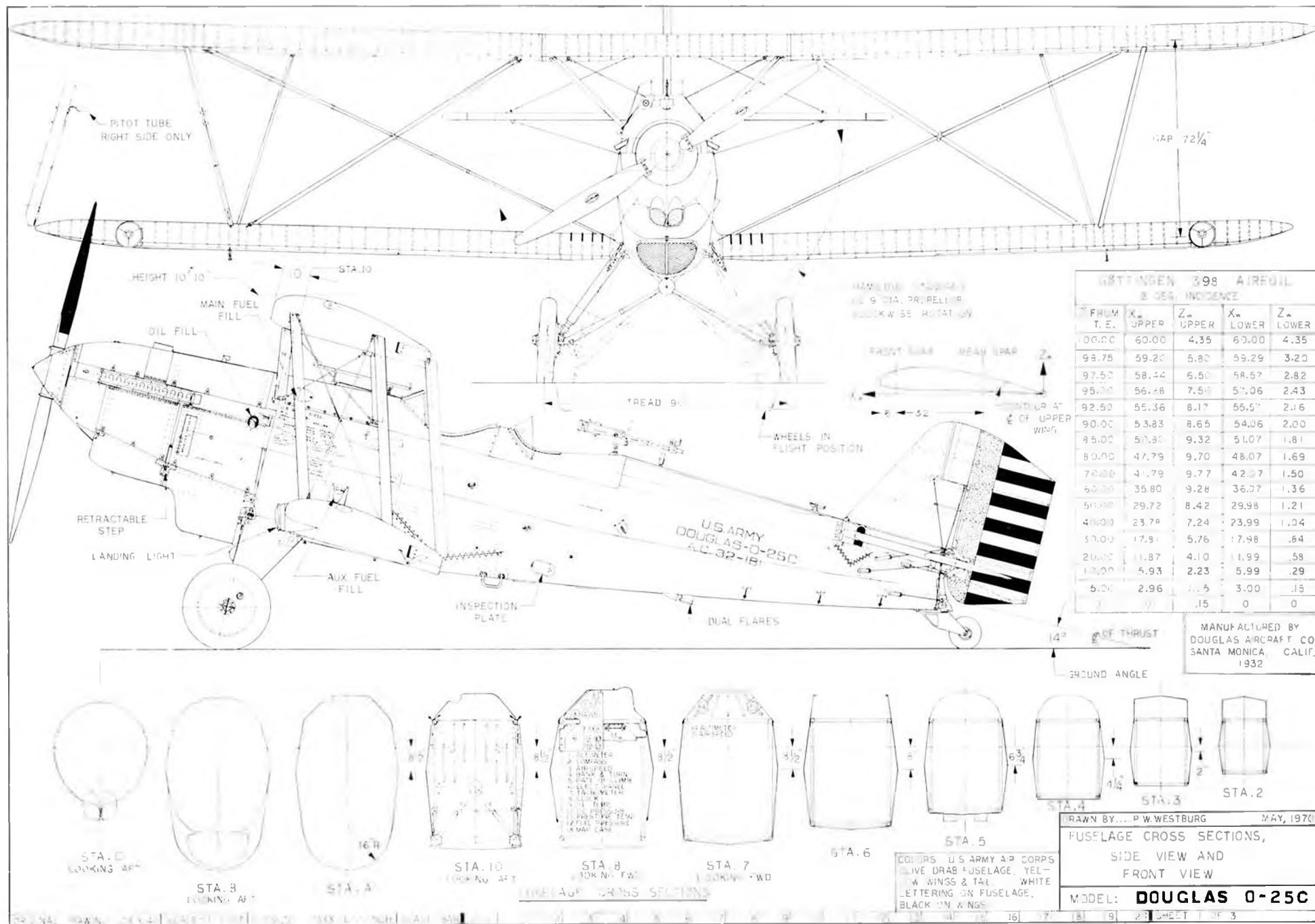
The 600 hp geared Conqueror was installed in a close-fitting cowl similar to that used on the gullwing B-7 bomber; it was later used in a slightly modified form on the O-31 series and on the Y10-43, one of the most beautiful aircraft of all time.

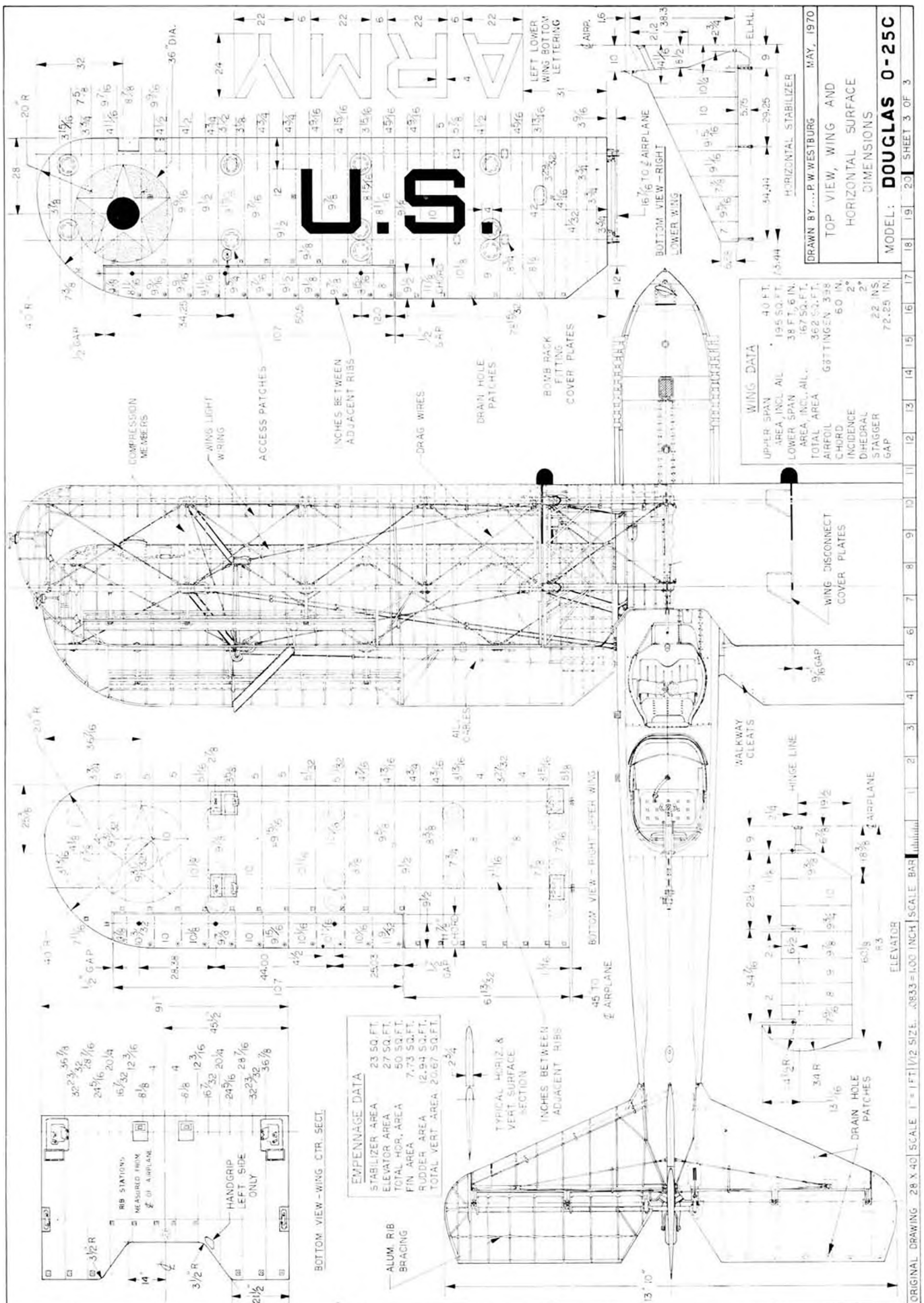
Thirty O-25C's were delivered to the Air Corps in 1932 and they were amongst the four Douglas types that carried the mail in early 1934, when President Roosevelt summarily cancelled all air line mail contracts and ordered the Air Corps to carry the mail. The 91st Observation Squadron flew the mail out of Salt Lake City, using O-25C's in an operation headed by Lt. Colonel "Hap" Arnold. Machine guns were removed, the rear cockpit stripped and made into a bin for the mail sacks, also, the rear windshield was removed and a canvas cover snapped over the opening.

National Guard squadrons flew the O-25C in air tours and at state fairs, putting on some spectacular shows. No one who ever heard the sound will forget the snarl of the short-stacked Conquerors as the O-25C's came in low over



The clean nose, with oil coolers and Prestone radiator underneath, and the high thrust line, make the O-25C an ideal subject for modeling . . . rubber or gas. And, it's a biplane, folks!







the crowds and peeled off in sharp, climbing turns.

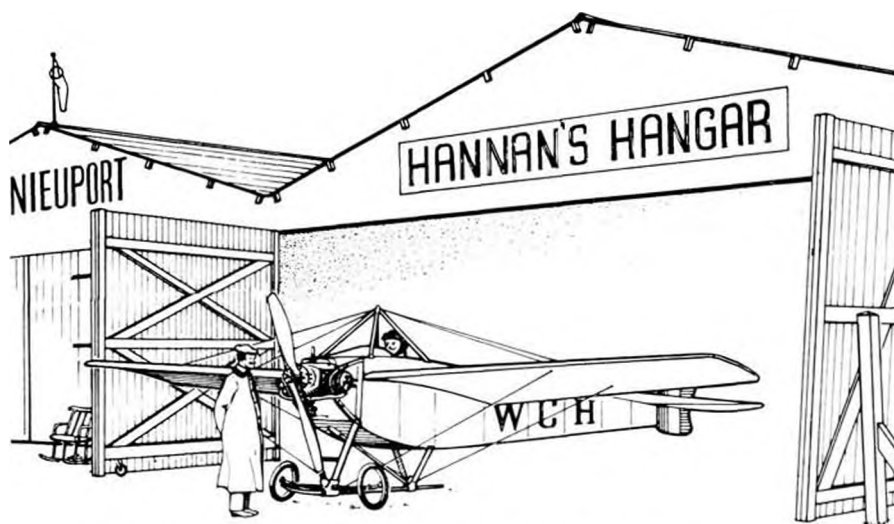
Finish of the O-25C was standard for Air Corps airplanes of the early 1930's, with olive drab fuselages and gear and chrome yellow wings and tail surfaces.

Like the O-38, the O-25C is easy to model and it has the added advantage of a high thrust line and fairings underneath for modelers who go for inverted engines.

Above: Streamlining of in-line engine pays. Though 400 lbs. heavier, the O-25C had top speed of 161, against 150 for the O-38.

Below: Cowling over the pilot's Browning .30 caliber hinged for quick servicing. Note ammo container and shell ejection chute.





... being a catch-all of aeronautical happenings.

PROLIFERATING PEANUTS

According to our mail, it is difficult to stop at building just one Peanut, and some people wind up with a whole squadron of them. Typically, Walt Mooney and his family arrive at a contest with the back of their van FULL of Peanuts. And, during the recent Flightmaster Annual Scale Model event, George Meyer, of "Little Toot" fame, arrived with an even larger armada of the tiny terrors than the Mooney clan.

One of our photos this month depicts yet another passel of Peanuts, as produced by the Lueken family, of Escondido, California. Here is a poem which accompanied the picture:

See the toys.
Are they toys?
No.
They are Peanuts!
Aren't they funny looking Peanuts?
They are not really Peanuts.
They are airplanes.
Do they fly?
Sometimes . . .

SIDE WINDERS

One of the most useful tools to the rubber-power enthusiast is a mechanical winder, which does away with the tiresome and inefficient hand-winding of models. One annoyance, however, is the ease with which they can become lost or damaged, out at the flying field. An obvious partial cure is to paint them with a bright "day-glow" type color in order that they may be more easily seen when dropped in tall grass or weeds. Also, it is certainly a good idea to affix one's name and address, so that positive identification is possible.

Neither of these approaches will prevent damage which can occur if a winder is dropped on a concrete or asphalt surface. Frank Scott suggests attaching a thong, which will permit the winder to be secured to one's belt or belt-loop. Allow sufficient length to permit easy winding. Usually, the winder hook itself can be hooked over a belt loop, and yet, without some sort of safety thong, it may fall off during a high-speed chase



Peanut Scale "Air Force" belongs to the Lueken family, of Escondido, California.

after your model.

Incidentally, if any of you are in need of a new winder, they may be obtained in a choice of two ratios (9/1 and 16/1) from either Marlow Engineering, 6850 Vineland Ave., North Hollywood, California, 91605 or Peck-Polymers, P.O. Box 2498 La Mesa, California, 92041. The price for either type is \$4.49, plus 35 cents postage.

WOMEN'S (ad) LIB

There seem to be at least three different attitudes among modeler's wives. Some encourage their husbands; some tolerate the hobby (after all, hubby might be out chasing the OTHER kinds of models); while the third type actually participate themselves. This latter category is extremely rare and precious, not to mention in very short supply.

Actually, most wives would simply rather not discuss their views on the subject, but happily, there are exceptions, such as Sharon Stroman, who puts it this way:

INCOMPATIBILITY

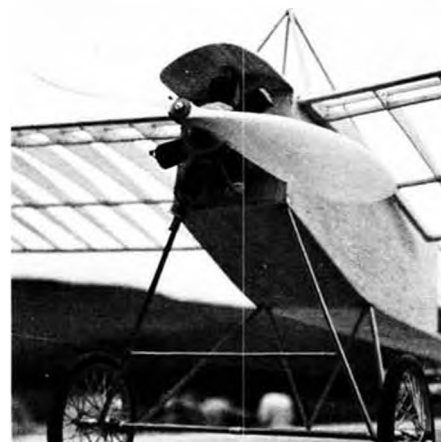
Where did my clothespins go? They are holding a wing together.

My gourmet dinner is ready, and must be eaten now or it will be ruined! Sorry, he has to finish doping his fuselage.

My idea for a vacation is Las Vegas, his is the Nats. *Continued on page 64*



Dave Paine is a firm believer in a "pilot for every plane," and in fact feels it should look like a pilot (MB's editor is still partial to Yogi Bear). Read how Dave made this one.



CO₂ powered Sommer Monoplane, built by Jacques Pouliquen, France. FH spoke wheels.



FOTOS BY FUDO

RAPID PEANUT - SPEED SPITFIRE

By WALT MOONEY. This month we have a hot peanut! Built with the Scale Rubber Speed event in mind, the Speed Spitfire disclosed a need for turbulators. Aerodynamics plays no favorites!

● Perhaps one of the prettiest fighters ever built, the Spitfire was even nicer, in my viewpoint, as converted from the Spitfire I to a special standard (Type 323) for an attempt at the World's speed record. This airplane . . . there was only one Spitfire so converted . . . was specially cleaned up aerodynamically, with a shortened wing, flush riveting, a cleaner canopy and a smooth glossy paint job. It was equipped with a more powerful engine that required the installation of a larger radiator and oil cooler. A special fixed-pitch four bladed propeller was used.

Both Heinkel and Messerschmitt produced airplanes that outstripped the Spitfire's speed capabilities before it had a chance at the record, so no record attempt was made with it. But from my point of view it sure looks nicer than either of the aforementioned aircraft.

This Peanut version was built for the Flightmasters Speed contest and is quite rugged. It was flown with two loops of quarter flat rubber and enough balanc-

ing clay on the nose to put the CG directly above the wheels, in an attempt to hold down the climb. It achieved almost 30 mph, which is almost twice what you can expect if it's flown for duration with one loop of 1/8 or 3/16 rubber. As a speed model it had the glide of a streamlined brick . . . literally straight down.

It was then entered in the Flightmaster's Annual, in the Peanut event. Although it made several qualifying flights, none of them were of much duration, and all the landings were violent to say the least. It was OK during the high powered part of the flight, but as the motor ran down, it would pitch either up or down with an ensuing dive into the ground . . . either later or sooner.

After some thinking, a suspicion that perhaps there were airfoil flow problems were entertained: Suppose the relatively smooth airfoil . . . there are no exposed spars on the original model . . . is suffering from laminar separation as the

model slows down and enters a critical Reynolds Number air flow. If so, turbulators should modify the flow conditions, prevent the separation, and stop the violent changes in downwash over the tail, which cause the pitch up as the model slows down.

A thread turbulator was installed on the top surface of the wing at about the

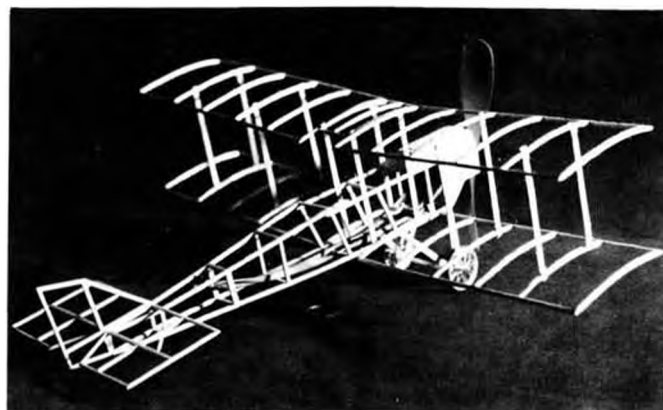
Continued on page 60



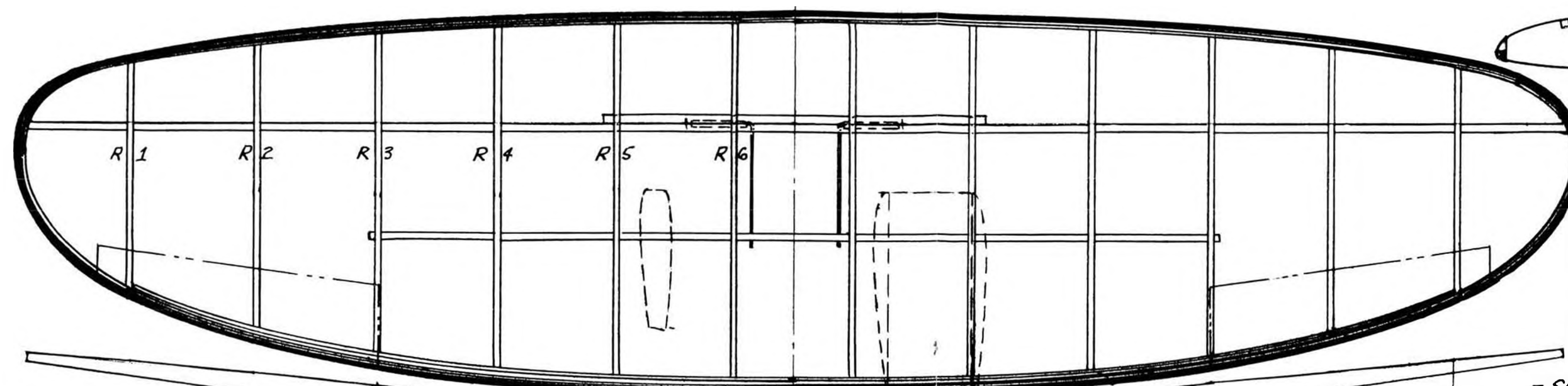
Top view photo shows the pleasing and distinguishing lines of the Spitfire.



This one-off version of the famous fighter was built for one purpose, to establish a speed record. Others exceeded its max, unfortunately.

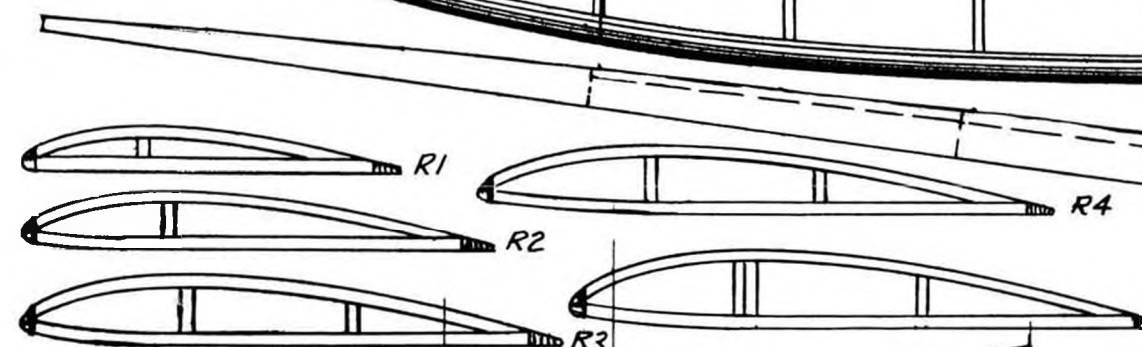


Next month's project is the DH-6. Previously designed as an all-sheet model, this built-up version is lighter, and a better flyer.

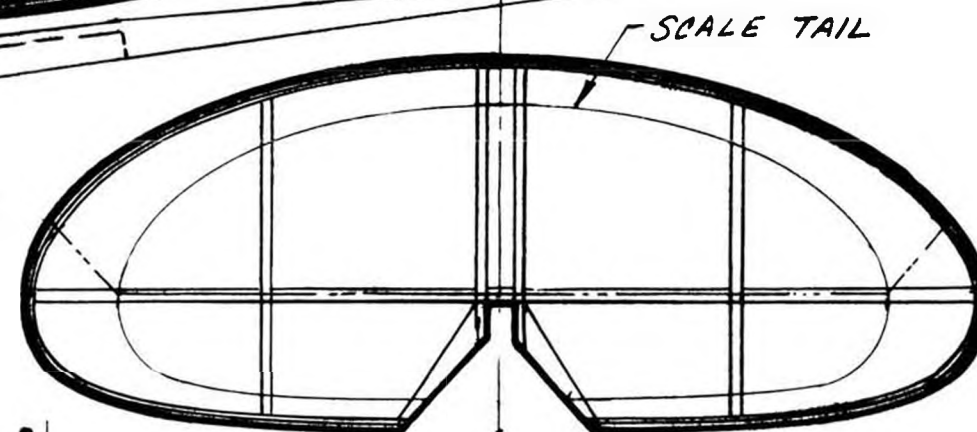


TYPICAL ALTERNATE
RIB AND WING
CONSTRUCTION

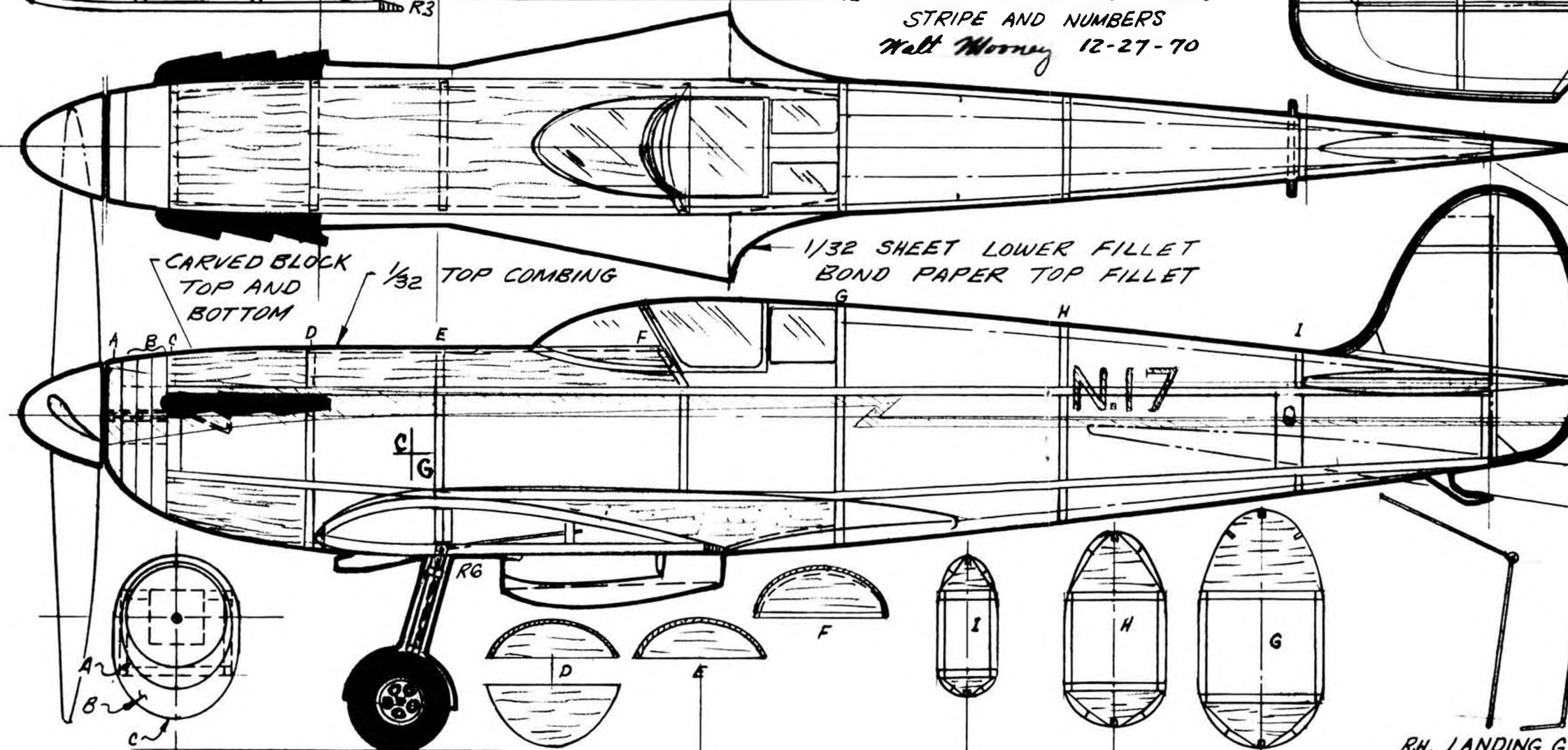
NOTE: • RADIATOR IS
MADE UP OF 3 PIECES
FRONT & BACK LEFT
OPEN FOR AIR PASSAGE
• OIL COOLER, CARBURETOR
AIR INLET, AND EXHAUST
STACKS ARE CARVED
BLOCK Balsa.



PEANUT SCALE
THE SPEED SPITFIRE "1939"
R5 COLOR BLUE WITH GOLD
STRIPE AND NUMBERS
Walt Mornay 12-27-70



SCALE TAIL

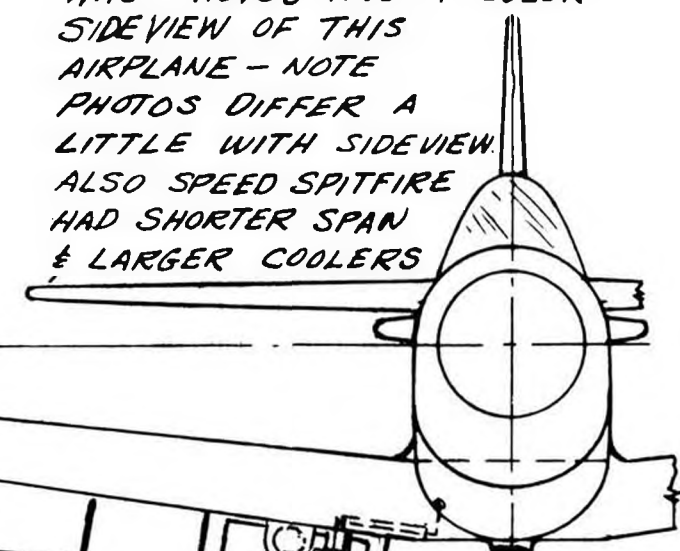


CARVED BLOCK
TOP AND
BOTTOM

1/32 TOP COMBING

1/32 SHEET LOWER FILLET
BOND PAPER TOP FILLET

PROFILE NO. 41 "SPITFIRE I & II"
HAS PHOTOS AND A COLOR
SIDEVIEW OF THIS
AIRPLANE - NOTE
PHOTOS DIFFER A
LITTLE WITH SIDEVIEW.
ALSO SPEED SPITFIRE
HAD SHORTER SPAN
& LARGER COOLERS



RADIATOR IS
ON R.H. SIDE
OIL COOLER IS
ON L.H. SIDE

RH. LANDING GEAR WIRE



Hans Zachhalmel, Austria, 14th in Wakefield.



Tom Koster, Denmark, displays top form while launching his "flapper," with which he placed 6th in the fly-off.

FREE FLIGHT

This month, our Free Flight column takes a pause that we hope, refreshes. Starting with the January issue, Bob Stalick, who should need no introduction to active free fliers, will take over the operation. Meanwhile, review these photos taken by Jack Humphreys at the F/F World Championships.



Petko Stoilov, Bulgaria, eighth in power.



Sin Sang Gel, N. Korea, placed 9th in the power fly-off.



Steen Agner, Denmark, captured third place in the power fly-off.



(l to r): Ron Pollard, G.B. (19th), Mike Thomas, Can. (38th), and Ian Kaynes, G.B. (47th). Ian is editor of well-known Free Flight News.



While watched by greatly concerned time keeper, Japan's Mitsuo Kobori winds Wake. He placed 3rd in fly-off.



Andreas Meczner, from Hungary, placed 7th in power.



Mitsuo Kobori's prop is carved from hardwood.



Gordon McKenzie holds for Jack McGillivray, who placed 20th in Wakefield.



Brian Eggleston, Toronto, Canada, flew this V dihedral power model to 29th place.



Ferit Aksu launches for Idris Aslan, both are from Turkey. Idris was 89th in Nordic A/2.



Kim in Sel, North Korea, launching his Wakefield. He was 40th in the event.



Claude Zimmer of France was 28th with this all sheet balsa power ship.



Italy's Giuseppe Venturoli was 33rd in Wakefield. Note forward location of fin.

NATIONAL FREE FLIGHT SOCIETY NEWS



AMA MEMBERSHIP RENEWAL

Last month I told everybody that when renewing your AMA membership this year be sure and mark the free flight box to indicate your preference. Well, I just received my renewal application and the modeling preference section has been deleted from the form. I don't know if it will do any good but you might do as I did and write "I am a Freeflyter" on the form somewhere. I wrote mine using red ink and large letters! I hope they get the point! (Or use the form with our subscription combination offer on page 2! wcn)

NFFS DIRECTORS REALIGNED

Because of compelling career requirements, Bob Stalick has resigned as Director-At-Large and President of NFFS. Don Krus, Director-At-Large has been appointed President. Mark Valarius, a candidate for Director-At-Large in the most recent election, has been appointed to fill the Director-At-Large position vacated by Bob Stalick.

Bob Stalick has served in many positions in the NFFS, including Executive Director, since its inception, and continues as a member of the NFFS FAI Committee.

NATS NEWS FLASH

I just talked to Frank Ehling at AMA Headquarters and he said that since we talked before they have had three offers for the Nationals.

The first was Lakehurst, Naval Air Station, New Jersey. Frank said that site is at least as good as Chicago. The second and third were San Antonio, Texas and Lake Charles, Louisiana. From the maps they have received both look very promising. John Worth will visit both sites the early part of November, so maybe we will have a NATS site by the next issue.

I don't know if these offers were a result of my requests in this column or not, but three cheers and a max for the people in San Antonio, Lake Charles and Lakehurst.

Frank also said there's a possibility that the next World Championships in R/C, Control Line and Indoor might be held at Lakehurst.

Because of the geographical location I think the Lake Charles or San Antonio sites would be better than Lakehurst, however it will depend on which is the better site. The more centralized site would be better because more people would be able to attend.

ENGINE MODIFICATIONS

Those of you who are active in free flight power competition, both in AMA classes and FAI, have found that more and more winning planes have modified engines. This has been true in FAI power for some time now but it's starting to show up in the AMA classes. Many people have complained that hav-

ing an engine modified is quite expensive. Well, the young man who does my modifications is not expensive and he does super work. My red insert Super Tiger is turning an honest 24,300 on a Bartels 7-3-1/2 prop! There are other people in the upper midwest who will also attest to his abilities. In fact I understand that the notorious Hardly Brokenspar has sent an engine to this young man in an attempt to get his aircraft higher than 7.4 feet off the ground! The young man's name is: John Lorbiecki, North 100, West 15425 Mars Court, Germantown, Wisconsin 53022. Some of his charges are; \$17.00 full modification, \$2.50 Cox insert, \$1.50 modified head to hold insert. He also makes Taylor type front ends for rubber ships. Price \$6.50. ●



Keith Whitney, Salt Lake City, Utah, lights the fire in his Orbiter, which set a Cat. II record of 27 minutes. Model is available in kit form from Competition Models.

NFFS MEMBERSHIP AND RENEWAL APPLICATION

(Make checks payable to; National Free Flight Society)

Mail to;

B.J. Kelch, R.R.4, Box 475,
W. Terre Haute, Ind., 47885

FEES

			1 yr	2 yrs
RESIDENTS OF FOREIGN COUNTRIES			\$4	\$7
U.S. RESIDENTS	Age 19 and up	AMA Members	4	7
		Non-AMA Members	5	9
	Age 15, 16, 17, and 18 (Senior)		2	4
	Age 14 and under (Junior)		1	2
Family membership*			1	2
All members receive NFFS Digest. Family membership fee includes all additional family members, but no additional copies of the Digest. Ages are as of July 1 of current year. Please circle applicable fees.			Name AMA No.	
New Member <input type="checkbox"/>			Address	
Renewal <input type="checkbox"/>			City, State Zip	
Address Change <input type="checkbox"/>			*Please list family members Name	
Current expiration date: Month Year			AMA No.	



PHOTOS BY JEAN ANDREWS

Jean Andrews' A/1 Nordic glider PULL-Q. (towline, get it?) Q. Construction is quite simple, and should make a good project for someone breaking into serious competition. Ship already has a 1st place to its credit.

edge stock to bridge the dihedral breaks. Keep the weight down out here . . . the joints should be string, but it's unnecessary to make them any stronger than the wood structure.

The stabilizer is fairly easy to build. As in A/2's, build it light and plan on strapping it to a piece of 1/4 inch sheet when not in use, to keep it warp-free.

Fuselage construction is begun by wetting two pieces of medium-soft 1/16 inch sheet wood in warm water for a couple of hours. These can be rough-tapered, from 3 inches at one end to 1 1/2 inches at the other before wetting it desired, although we didn't. Form the tapered tubes around a pool cue blank, available from most sporting goods or specialty stores for about three dollars. Wrap them with elastic athletic bandage and allow them to dry thoroughly.

Remove the tubes from the form and

inspect them carefully for signs of splitting, particularly around the small end. Use the better of the two tubes for the full-length fuselage. Trim the seams carefully and cement it along its entire length. Allow this to dry while the other tube is cut off at about the fourteen inch point from the large end. Coat the outside of this short section with epoxy, roll it as tightly as possible around your finger, and insert inside the outer tube until the end is flush with the front of the fuselage tube. Release it and allow it to expand to contact the other tube, helping it with a pencil from the inside, until it contacts the inside of the body tube completely. Now insert 1/8 x 1/2 inch spruce keel, carved to fit the shape of the body, and epoxy it in place. The aluminum or plywood nosepiece and the hardwood side pieces, hollowed to accept trim ballast, complete the front

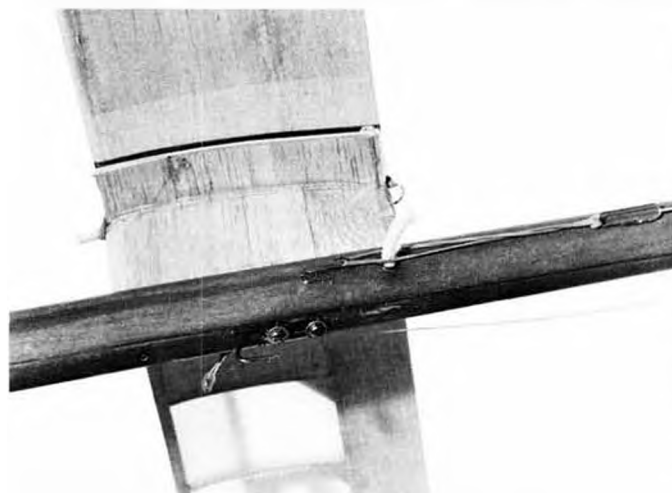
of the body.

Install the stab platform before cutting the slot for the vertical fin. The body tapers to flush against the fin, so stab platform helps hold the proper taper in the body tube forward of the stab.

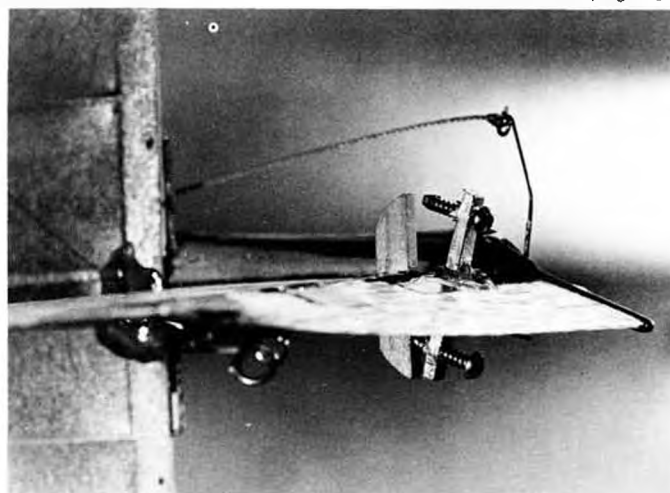
Make up the wing pylon, as shown on the plans, and measure carefully to yield a 1/4 inch higher leading than trailing edge on the wing. When the pylon is installed, this will result in a wing leading edge 3/16 inch higher than the trailing edge.

Finish the fuselage completely, except for the installation of the pylon, by installing the auto-rudder hardware, dethermalizer goodies, and so forth. Install the stab and balance the fuselage assembly, then install the wing pylon with epoxy, with the balance point located as shown on the drawings. With

Continued on page 66



This view of the underside shows the easily made towhook and the DT fuse location. Note hole for auto-rudder pin.

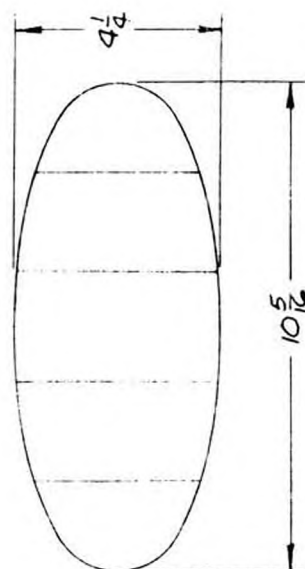
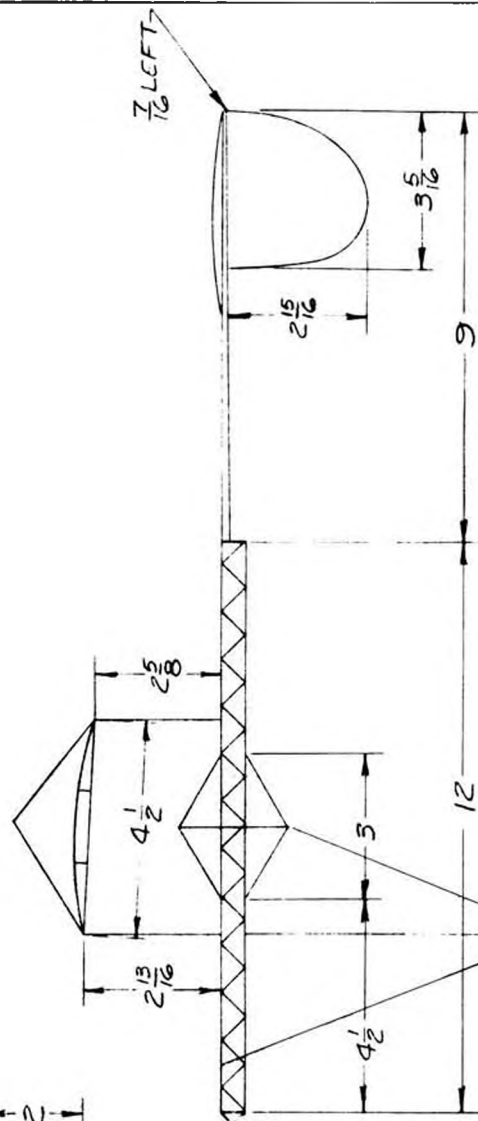
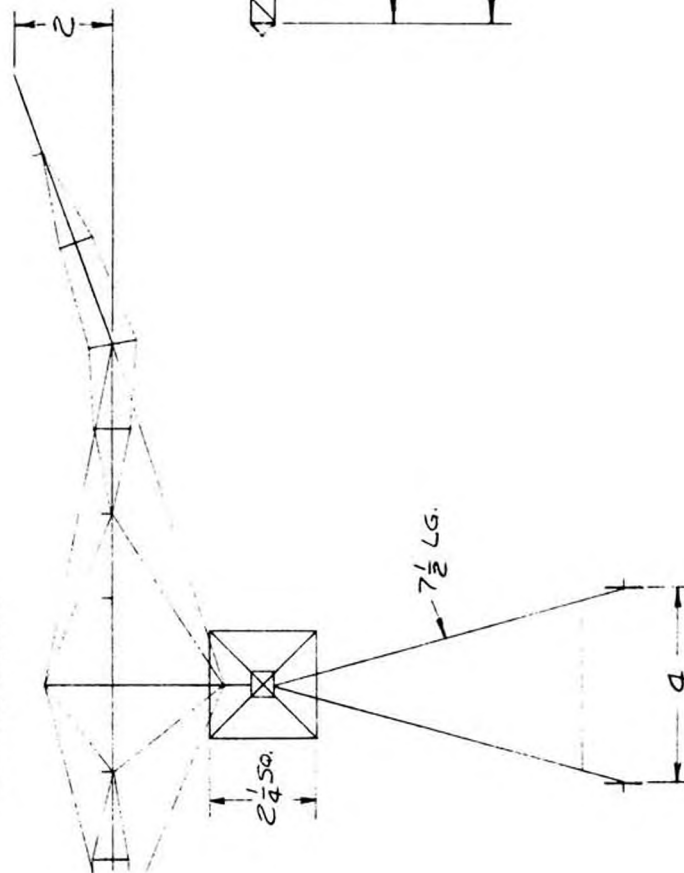
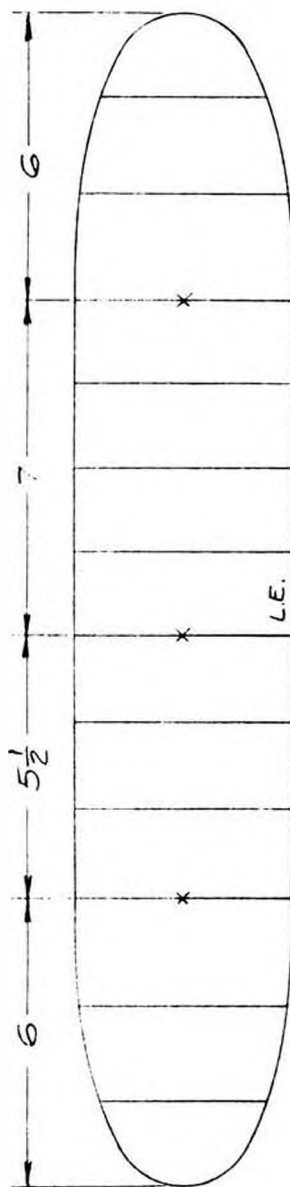


Close-up of tail shows screw-adjusted stops for auto rudder. One is for straight towing, the other for determining the turn radius.

ALL BRACING
0005 TUNGSTEN

23.9 PROJECTED SPAN
99.48 SQ. IN.

X DENOTES
COMPRESSION RIBS



1/2 STAB TILT

CLASS B CAT. II CABIN RECORD
HOLDER, JUNE 18, 1967. DETROIT
COLISEUM 65' CEILING 18:25 MINS.
A. ROKHBAUGH

PROP 15 DIA x 27 P.
SINGLE SPAR
1 5/8 MAX. WIDTH
@ 4 1/4 RAD.
17' LOOP OF 0.040 ARELLI
1575 TURNS FOR RECORD

WGTS
FUSE - .009
WING - .006
PROP ASSY - .004
TAIL ASSY - .005
TOTAL - .024



Instigator of the Las Vegas OT bash was Bob Chambers, of the Flamingo Club. His Sailplane is Orwick powered.



An "Old Ruler" design by Jim Adams, which he calls "Der Fledermaus." Jim must be an opera lover.



PLUG SPARKS

By JOHN POND

● Hey man! Got those, "ya gotta stay home modeling blues?" Is the better half making noises about the lawn needing some trimming, rather than your latest modeling pride and joy? Well, the solution is duck soup. Take her to that glittering Bagdad in the desert, Las Vegas. Never saw a woman who didn't love to pull a "one armed bandit."

Meanwhile, you can leave (not sneak out) for the contest being put on by the Las Vegas Club. This annual affair is quite limited in the number of events, but then, who wants to wear himself out in the 90 degree heat in the dusty desert and miss the evening activities? Besides, you make points with momma like crazy.

Full credit should be given to Bob Chambers, of the Hilton Flamingo Club, for promoting this contest. Held

at the dry lake located outside of Henderson, the meet features the "Old Ruler" and .020 replica events. While we are giving credit, some kudos should go to Jim Adams, who arranged for all modelers to be housed at Motel 6. This enabled the gang to have a joint breakfast, followed by a caravan of cars to the flying site.

As if the wives didn't have it good enough, the original schedule of two days was reduced to one when it was found all contestants had completed their flights in the excellent weather. This left Sunday and Monday available! Now you know why the little woman likes the Vegas bash!

Flying was rather uneventful, with no real outstanding long flights being registered. Matter of fact, none were lost and very few models damaged. That is one advantage about a dry lake bed

... no trees or vegetation. Hard to hit anything that way.

While commenting on the events, the author thought the original intent of the "Old Ruler" event was good, wherein any original design conforming to the 1940 NAA rules was eligible to fly. A loophole in the rules permitted the use of standard designs with slight modifications. In short, using a Comet Clipper, one could now fly in two events, the standard O.T. gas event and the new "Old Ruler" event. Of course, it is to be recognized the designs were allowed to fly to encourage entries in the new event, but outside of the initial designs by Oslan and Adams, no more new designs have made an appearance. It is the writer's opinion the event should be shelved or failing that, the event carried in each old timer contest to alleviate the stigma of a "one-shot" type

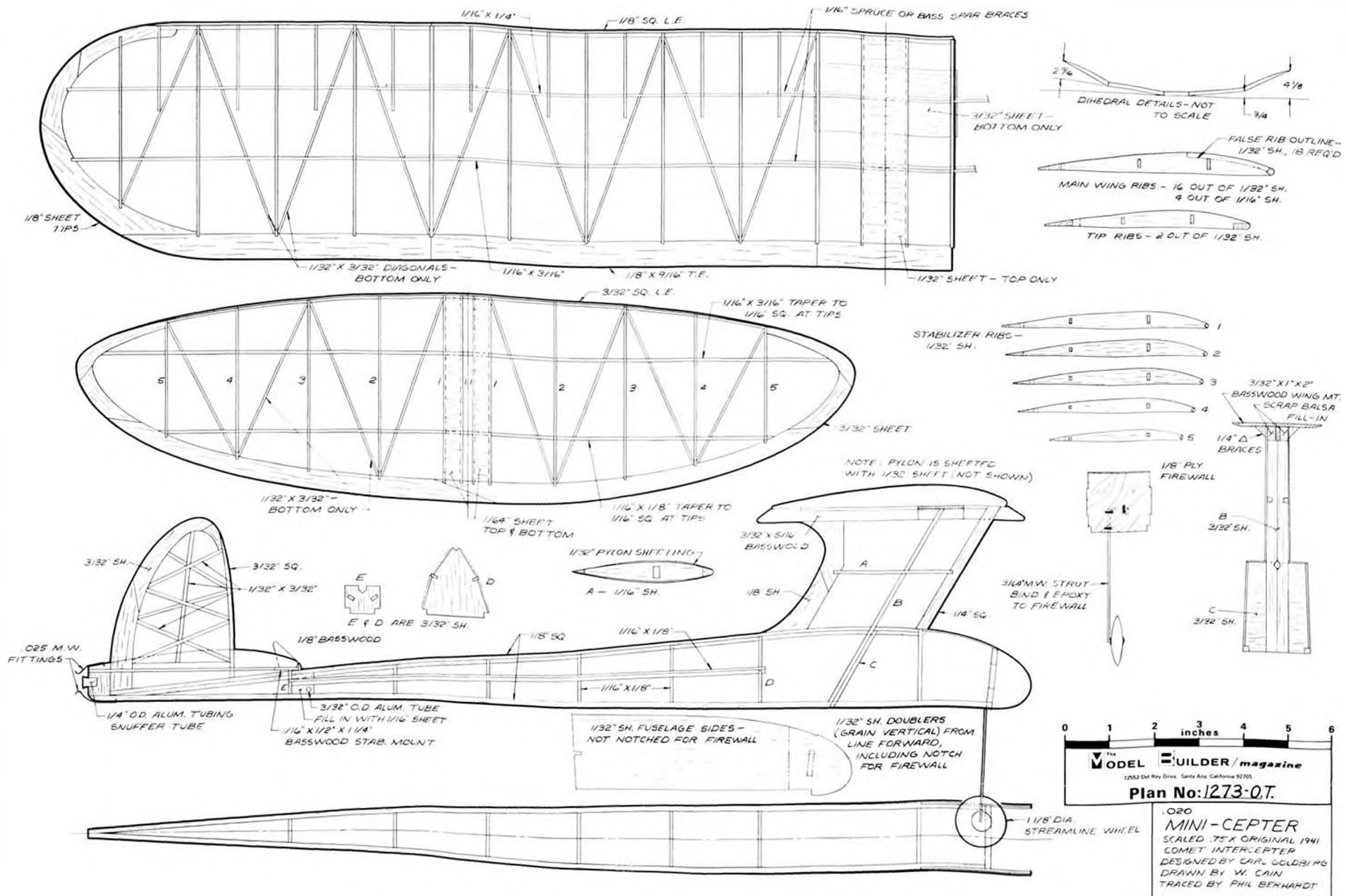


The Barrows Gang fro San Diego. (l to r): Dean Walker, Red Barrows, and Fred Sykes. Ship is Pond's Cabin Playboy.



Here's the way to go to a contest! Dean Walker enjoys a davenport in the middle of the desert! Look at all that flying space.

PHOTOS BY JOHN POND





Old Time Eagles President, Woody Woodman, starts engine on Play-Boy Sr. for Bob Shaw, with transmitter. Woody will CD SAM Nats.



Cox .010 powered Micro-Models "Cavalier" built by Daniel Walton. Famous original design by Ben Shereshaw had 9 foot span.



Bob Oslan and his good looking "Old Ruler" design. New ship built to old rules.

contest model.

Anyway, back to the contest. Dunno who won, but in a fun situation like this, who cares?? The writer has nothing but high praise for this type of meet. Does it ever work wonders on the home front!

CONTESTS

Old timer contests have been coming so thick and fast lately, the writer has been remiss in attending any of the late ones. Hate to make this column sound like a gripe session, but the North-South meet did suffer heavily from lack of publicity. The idea of this meet is simply great, with the Yankees and Rebels having at it. Unfortunately, notices of the meet date did not come out until the week of the contest. Certainly didn't leave much time to plan for attendance.

Continued on page 68



Red Barrows with his OS .15 powered Megow Quaker Flash.

GOLDBERG INTERCEPTOR .020 REPLICAS

Interceptors come in all sizes with Wayne Cain, ranging from Cox .020 power, to .049, to .09 engines. Wayne has been coming to the Nationals for years with his assortment of Interceptors. In short, Cain likes that Carl Goldberg design! Might also mention that Cain is no Johnny-come-lately to the game, having started modeling back in the thirties. He has had a rather varied career in modeling all the way from hobby dealer to salesman. His interest in modeling has never quite subsided.

In reviewing the various models Cain has, the most surprising thing of all is the excellent flying qualities in each model and the close similarity of performance. Matter of fact, the outstanding flight characteristics of the Interceptors led to some rather hilarious high-lights.

Three years ago, Cain was quite taken by the consistency of his models, going so far as to say his model could attain three minute flights all day. The writer, who has seen many a "three minute" model, quickly offered to buy Cain a drink for every official three minute registered, and vice versa when the model failed to produce the desired result.



Wayne Cain at the Nats with a .049 version of the Interceptor. It's competitive with today's.

The writer had to admit it was with considerable trepidation that he placed the bet as he had viewed the unofficial test flights. But wouldn't you know it, just as soon as the contest got going, the first flight was a bummer. A little crest-fallen, Wayne offered the opinion that that flight was a fluke; something that just doesn't happen under normal conditions. On the second flight, panic really set in as the model now hit a granddaddy of a "downer." Wayne was down two drinks. Finally, when all seemed lost, the model finally attained one good "max" flight.

Next year, Cain was really laying in

Redesign by Wayne Cain
Text by John Pond

the weeds with careful attention to lightness and a considerable amount of flying time on the model. The unsuspecting writer was led to the slaughter as three straight max flights resulted! Eating crow is rough, as the feathers stick in your teeth!

Last year, Cain again confronted the writer with the same offer, but a bad case of gun-shyitis had set in. Bum hunch, as Cain had an abominable streak of luck. Starting by dorking his full size Interceptor, he suffered short engine runs, bad lift, and finally getting run over by a car (*Him, or the plane!? wcn*). It was indeed Bad day at Black Rock.

In summary, the wagering ended in a Mexican standoff as neither participant offered to bet this year. The Colonel should hear about those king sized Chickens! What will 1974 bring? Tune in for the next exciting adventure!

In discussing the model presented this month, no description of how to build it will be given, anyone contemplating this project should have built at least one Old Timer. If you have problems, let the writer know, we'll straighten you out!

Continued on page 66



Roger Tennyson with a group of "Doolittle Carrier Flyers." This is a new .020 carrier event for Junior flyers at WAM contests.



David Fitzgerald takes off from the Doolittle carrier. The "Hornet" is 8 feet long, has 4 arrestor lines. Planes are on ten foot lines.

Control line

By DALE KIRN

● What was the biggest control line contest you attended this year (except for the Nats)? How many planes entered by how many flyers? We attended another WAM contest in Modesto, California (Sept. 23rd) and saw an impressive 415 planes entered by 197 flyers! This was the biggest turnout for a WAM contest this year. There were 80 entries in the stunt event! Who sez control line contests have poor attendance?

SPORT RACING

Had a very interesting informative letter from Bill Leonard concerning another "unofficial" event that is being flown at many contests in the Midwest. It is called "SPORT RACING," which is a de-tuned version of AMA Rat Racing. Only sleeve bearing engines permitted (Maximum of .36 displacement) and

no pressure fuel systems allowed. With these requirements, it will allow flyers to use "inexpensive" engines to compete. A lot of fun for considerably less money.

If you are interested in a complete set of rules for this event, suggest you write to: Bill Leonard, 115 Ogontz Lane, Oak Ridge, Tenn. 37830.

CARRIER

Can you imagine a carrier event that would cost the modeler from \$10 to \$15 for BOTH engine and plane? Such an event is now being sponsored by the 049 'ers of San Mateo (WAM contests only). It is called the "Doolittle Carrier Event" and is for .020 powered planes. No throttle control allowed. Planes are flown on 10 foot lines. And this event is for Junior flyers only!

The "Carrier" is eight feet long and about two feet high. Landings are accomplished by stalling the plane (with full up) about one half a lap before making the approach. I saw several perfect landings in a matter of a few minutes. Sure looks like a fun event. For further info (rules, etc.) suggest you write to the promoter of this event: Roger Tennyson, 337 Greenfield Ave., San Mateo, Calif. 94403.

RECORDS

Roger Barrett (San Diego) recently established a new WAM stunt record in the "Expert" category with 677 points. ALL planes flown in WAM contests must have a "noise limiting device", so Roger had an ST muffler on his Aldrich-reworked ST 40. The tank was pressurized off the muffler for a constant en-



Sleeve bearing ST .35 powers Sport Racer by Johnny Tulach. Clocks between 90 and 95 mph.



Neat 1/2A Proto entry by Bill Osborne. This event quite popular in WAM contests.



Line-up of stunt entries at Modesto, Calif. Only 5 sets of lines allowed in pits at one time, inside rope guides. Very good idea!



Paul Isenhower, President of the Modesto Flying Circus, stands beside the custom made trailer for hauling member's planes to contests.

gine run. His plane (GYPSY) weighed 56 ounces and was flown on 70 feet x .015 cable lines. Prop was a Rev-Up 10 x 6 EW and fuel was the New K & B 100.

Jerry Bradshaw set another WAM record in 1/2A Speed (Expert) with his tuned exhaust equipped Tee Dee .049. Speed was 105.59 MPH. He is still experimenting with props and feels there is a lot more to be picked up here.

This year has witnessed a bunch of AMA jet records. Latest one was set by the team entry of Langlois and Pardue. They turned 195.76 MPH speed (Open) at Dayton, Ohio, in early September. For many years the jet speeds were slower than the Class C speed planes. But things have changed now. The jets are outrunning most of the 60's. Nearly all credit in this area belongs to Myrle Hoyt (Newton, Iowa) and Jerry Thomas (Tacoma, Washington). Hoyt produces several jet kits and engine parts. He also lets you "in" on the fuel mixes that make these things go! The days of white gas are gone . . .

Thomas is known for his all metal (aluminum) planes with an upright engine. This plane (Ironsides II) will soon be available in kit form. He also will be doing jet engine rework . . . extending tailpipe and head.

Another record for Mike Bussell. This Junior flyer from Dallas, Texas, has really been keeping AMA busy processing records this year. His latest was in Class A Speed: 153.07 MPH. This record was set in early October at a Ft. Worth contest.

.049 MUFFLERS

Have noticed several modelers having a problem when installing a muffler on their Cox .049 engines. A sudden loss of power and a critical needle valve setting. This condition will happen when the muffler is put on the WRONG cylinder.

There are two .049 mufflers currently in production (Cox and Tatone), but neither manufacturer gives adequate instructions calling out the importance of the special cylinder that is required when using a muffler on a Cox engine.

The Cox muffler consists of three parts; muffler housing (alum.), muffler

top (stamped steel) and the muffler band (stamped steel). There are two other VERY IMPORTANT parts included with the muffler kit . . . a new cylinder and piston assembly, and a high compression glow head. If these two items are not used, the muffler WILL ROB POWER from the engine, and make it very difficult to adjust.

The special cylinder has a No. 6 stamped just below the exhaust opening. It has two bypass grooves and no free port under the piston when it is at top dead center. The glow head is of the Tee Dee type (Cox part No. 1702). Early this year, the design of this glow head was changed to increase the power of the Tee Dee engine. It did give more power, but it will make the mufflerized

engine run too hot because it has a much higher compression ratio. You will have to add two or three .005 head gaskets to get the compression ratio compatible with the No. 6 cylinder design.

The Tatone muffler is a two-piece casting which is held onto the Cox cylinder with two machine screws. It will cut the noise level of the engine but will also ROB POWER if run on the regular Cox cylinder. It should be used only in conjunction with the No. 6 cylinder and the 1702 glow head.

Keep 'em flying . . . QUIETLY. ●



Roger Barret set new WAM Expert Stunt record with his ST.40 powered "Gipsy."



Kit Gehart (lt.) and Bill Leonard with their ST .35 powered Sport Racers. See more in text.



Cox Muffler Kit (Part No. 495). Three piece assembly with special cylinder (stamped with a No. 6 under exhaust opening) and glow head. Last two items VERY IMPORTANT. See more in text.

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R/C Soaring . . . Continued from page 13

Wing area (S) is span (b) times average wing chord (Wca), $120 \times 8 = 960$ square inches, or $(960/144) 6.67$ square feet.

While we're here, we might as well touch on Aspect Ratio . . . a frequently used term that any designer worth his Berlitz German recordings will work into every sentence. Aspect Ratio (AR) is the relationship of length to width . . . or span (b) to average chord (ca). In the 10-foot span example, AR is b/Wca , $120/8 = 15$, or properly noted, 15:1. AR can also be calculated as b^2/S which is $(120 \times 120)/960$. Comes out to be 15, but seems like the hard way. That long division is rough.

An AR of 15 for an R/C sailplane wing is a reasonable value, but anything from 10 to 20:1 is acceptable. Free-flighters get down as low as 6:1, and some models and many full-scale sailplanes stretch to 25:1 and beyond. Chances are that 12 to 18:1 is a good bracket for R/C designs.

With span, area, and the several wing chord lengths defined, there's enough information to lay out the wing plan form. It's just a matter of drawing.

The next order of business is the horizontal stabilizer. We know where it is . . . a distance M_s behind the CG . . . but yet to be determined is just what it is. This can be approached in either of

two ways . . . simple enough for even your Old Flying Buddy or with enough number juggling to keep your Junior Einstein away from the used hub-cap market for an hour or so. If you insist on doing it yourself, multiply the wing area (S) by 20 per cent. From previous data, that would be $960 \times 0.20 = 192$ square inches stabilizer area (S_s) for the design example.

The more complex approach considers Tail Volume Coefficient (CTv). In this case, stabilizer area is not considered independently, but rather in conjunction with tail moment (M_s), as well as average wing chord (Wca). The formula for all this is:

$$(CTv) = (S_s \times M_s) / (S \times Wca)$$

(CTv) Tail Volume Coefficient

(S_s) Stabilizer Area

(M_s) Tail Moment

(S) Wing Area

(Wca) Average Wing Chord

To this point, we've talked about tail moment (M_s), and even indicated its approximate position on the ref. line. But it's time to get serious. A real dimension for M_s must be established in order to calculate the value of CTv.

Assume overall fuselage length to be 35 per cent of wing span. This is strictly an arbitrary but reasonable value, and works out to 42-inches for a 120-in. span. Remember, nothing about the design is firm yet. If the fuselage length

needs to be adjusted later, so be it. The same is true for all other dimensions and values. We're not designing a simple "thing," but a "system" . . . and hopefully a balanced system. All elements must be flexible, so to speak, until the total concept is resolved.

Using the one-third, two-thirds ratio for positioning CG in the fuselage envelope, the nose length will be $(42 \times 0.33) 14$ inches, and the tail length $(42 \times 0.67) 28$ inches. Note that these are overall lengths. Therefore, the stabilizer must be contained within the 28-inch overall tail length.

If we establish the stabilizer root chord as 6 inches and position the stabilizer assembly at the extreme aft end of the fuselage, then the stabilizer leading edge will be $(28 - 6) 22$ inches aft of the CG. For simplicity, assume that the quarter-chord point (25 per cent) of the stabilizer average chord (Sca) is coincidental with that of the stabilizer root chord (Scr). (This would be true for certain plan forms such as a constant chord or symmetrical taper.) The tail moment (M_s) would be $(22 + 0.25 \times 6) 23.5$ inches.

Now we can work the CTv formula. Substituting the several example values: $CTv = 192 \times 23.5 / 960 \times 8 = 960 \times 8$

Keep in mind that a coefficient is a dimensionless value which means the only way you can measure it is by the degree of warmth or chill in your stomach when said value is compared to an acceptable known. A nice, big conservative CTv would be around 0.75, while any design less than about 0.40 might be considered to be a "pilot's sailplane." The 0.59 in the example would be quite acceptable.

For comparison, the melmac Cirrus has a CTv of 0.64. The Yankee Gull/1440 has a CTv of only 0.42. Both are quite stable and docile in pitch. A more conservative design, Frank Zaic's new Floater, has a CTv of 0.69. The Midwest EZ Juan's CTv is 0.54.

Obviously, a range of CTv values is acceptable . . . and flyable. It's just that automatic pitch stability may vary from "ya got to be on it all the time" to "if ya get in trouble, let go of everything." Other factors also effect pitch stability, but the subject is CTv for right now.

Several popular and highly successful domestic designs might be considered to be under-stabilized by the above standards, and some do require a bit of familiarization for low-time pilots. But they are flyable, and in the hands of an experienced pilot, they fly very well. Might even say that *especially* in the hands of an experienced pilot . . . but we won't.

In the Tail Volume Coefficient formula, any of the four contributing values can be varied to obtain any given coefficient value. Several sample calculations may be performed before you find the balance of dimensions and

areas that are suitable. And that's typical design activity . . . trial and error, adjust and correct . . . on paper. Beats hell outa building a lot of bad parts. Some of those may creep in anyhow.

Now some wise guy in the back of the room is going to bring up the point that certain wing airfoil sections are more stable than others, and that this airfoil stability factor should be considered in evaluating the CTv. The kid's got a point . . . but that's hard. Just keep in mind that, basically, a flat bottomed airfoil is more stable than an undercambered section . . . so, lower CTv values are workable with flat bottomed wings whereas an undercambered wing might better have a CTv in the higher ranges. And sections such as are utilized on flying wings don't hardly need no tail at all. Sit down kid.

To play with numbers just a little more, take a couple of other examples. Assume all other factors are constant, but use stabilizer areas of 15 and 25 per cent. CTv works out to be: $(0.15 \times 23.5)/8 = 0.44$ and $(0.25 \times 23.5)/8 = 0.73$. Now, with three different stabilizer sizes, 15, 20 and 25 per cent of wing area, adjust Ms to 30 inches. TVc becomes $(0.15 \times 30)/8 = 0.56$, $(0.20 \times 30)/8 = 0.75$, and $(0.25 \times 30)/8 = 0.94$, respectively. It all kind of works out like if ya got a skinny kid, set him way out at the end of the teeter-totter.

Once the stabilizer area has been established . . . based on an acceptable CTv . . . and an average chord for the stabilizer has been set, stabilizer span is determined by dividing area by average chord. Some adjustment may be required to get a reasonable shape. An aspect ratio of about 4 or 5:1 is fine.

If a conventional fixed stabilizer-movable elevator arrangement is planned, put the hinge line at about the 70 per cent point. That is, "flap" the back 25 or 30 per cent of the total stabilizer area, and call it the elevator.

All this scientific stuff may get too heavy. If so, relax and go the 20 to 25 per cent of wing area previously discussed. Besides . . . and if you're really serious about all this . . . you may want to build and fly a couple of different stabilizers to see what really works best for you in the air. Might start off with a 20 percenter, but have both a 15 and 25 per cent unit available and interchangeable. Don't feel that you're a failure if it takes this kind of flight testing to get the final configuration fixed. Ask Boeing, Lockheed, or McDonnell-Douglas . . . listed in alphabetical order.

One final point regarding stabilizers . . . that of airfoil sections. Probably the most efficient shape is that of a symmetrical section of around 8 to 12 per cent thickness. However, a flat section is acceptable and may be almost as good. Some designers prefer a "lifting" section. What they mean by that is a sec-

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tion with a positive chamber line . . . which means it's curved on top and is either flat on the bottom or has a concave lower surface. The reason that the term "lifting" is sorta dumb in this context is that any section used for a stabilizer has to "lift" or it just don't stabilize. There may be a lot of EBS floating around about "lifting" stabilizer sections, but there's pretty good argument that they offer little advantage and perhaps some disadvantages . . . like maybe tending to hold the tail up . . . and nose down . . . under some flight conditions such as in a dive. Where you don't hardly need that kind of help at all. But, if a so-called lifting section is used, a lower CTv should be acceptable.

Maybe 90 percent of that calculated for a symmetrical and/or flat section per the formula.

Since we're working the tail/end problems, might give some thought to the vertical surfaces . . . the fixed fin and movable rudder, which collectively are referred to as the rudder.

Most everything that has been said about the horizontal stabilizer is also valid for the rudder except that it has nothing to do with pitch stability. Oh, there's a crossover point such as in a steep bank where the functions of rudder and horizontal stabilizer interchange, but no need to get into that.

The rudder's capability to guide and/or turn (yaw) the aircraft is dependent

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upon several factors: wing span, dihedral, fuselage side area, rudder moment (Mr), and rudder area (Sr). Probably the most expedient manner in which the complex interaction of these several factors can be handled is to ignore the whole mess. At least almost.

As with the horizontal stabilizer, rudder area (Sr) can be developed by a simple mathematical calculation or you can fill a page with ciphers.

First things first. A reasonable value for Sr is 8 per cent of wing area (S). Using example values, Sr would be (0.03 X 960) 77 square inches.

A rudder moment (Mr) and a Rudder Volume Coefficient (CRv) can be calcu-

lated the same as were similar factors for the horizontal stabilizer. Figure that Mr is the horizontal distance from the CG to the 25 per cent point of rudder average chord (Rca).

The $CRv = (Sr) \times (Mr) / (S) \times (Wca)$
(Sr) Rudder Area
(Mr) Rudder Moment
(S) Wing Area
(Wca) Average Wing Chord

Now somebody might notice that the formula doesn't cover all the factors listed a couple of paragraphs back, but we'll get to them. Right now it's example time for the CRv formula.

Using the value of Sr developed on the percentage basis, and assuming the

rudder sits directly above the horizontal stabilizer ... therefore Mr is the same as Ms ... we can work the problem:

$$CRv = 77 \times 23.5 / 960 \times 8 = 0.24$$

A CRv of 0.24 is a workable value within a reasonable range of from 0.18 to 0.29, give or take. For comparison, CRv for some existing designs are:

Cirrus	0.29
Yankee Gull/1400	0.15
Zaic Floater	0.22
EZ Juan	0.28

From here on in, we get by the complex interactions by either eye-balling or by spending the next flying season on paperwork. To hell with it, let's eye-ball it and then go flying.

The CRv can ... and should ... be increased from formula value to allow for extra long wings (b greater than 5 Mr); to allow for deep fuselage contours or, conversely, reduced for the really skinny jobs; and reduced in consideration of dihedral in excess of 7 or 8 degrees per panel ... or for polyhedral. Chances are that an allowance of 0.02, plus-or-minus, should work pretty well for each of the noted variants. Just for practice, the calculated example might be adjusted as follows:

Calculated CRv	0.24
b less than 5 Mr	-0.02
Real Skinny Fuselage	-0.02
Polyhedral	-0.02
Revised CRv	0.18

If the established Mr is to be held, and assuming S and Wca are firm, then Sr can be adjusted to reduce the original CRv value (0.24) to the revised value (0.18). Rearranging the formula:

$$Sr = \frac{CRv \times S \times Wca}{Mr}$$

$$= \frac{0.18 \times 960 \times 8}{23.5}$$

$$= 59 \text{ square inches}$$

But again, only flight tests will tell for sure. Since the fin probably will be fixed permanently to something or other, any modifications for final sizing can be made to the hinged rudder ... especially if the change is an increase. Incidentally, a movable rudder area of about 50 to 50 per cent of total Sr is in the right ballpark. Too much don't hurt bad ... and more's better'n less. Most prominent designers prefer the rudder to be located aft of the fin. No reason to get ingenious here.

If you're thinking about v-tails, fine. Just consider the "stabilizer" part as that which you'd see if looking straight down on the assembly, and the rudder as that seen looking straight in from the side, times two. All the above areas and stuff would then apply. The included angle of the v should be some place between 90 and 120 degrees.

The next order of business is that of selecting a wing airfoil section. Probably the greatest boon to the amateur sailplane designer/brain surgeon is that practically no airfoil theoretical data are

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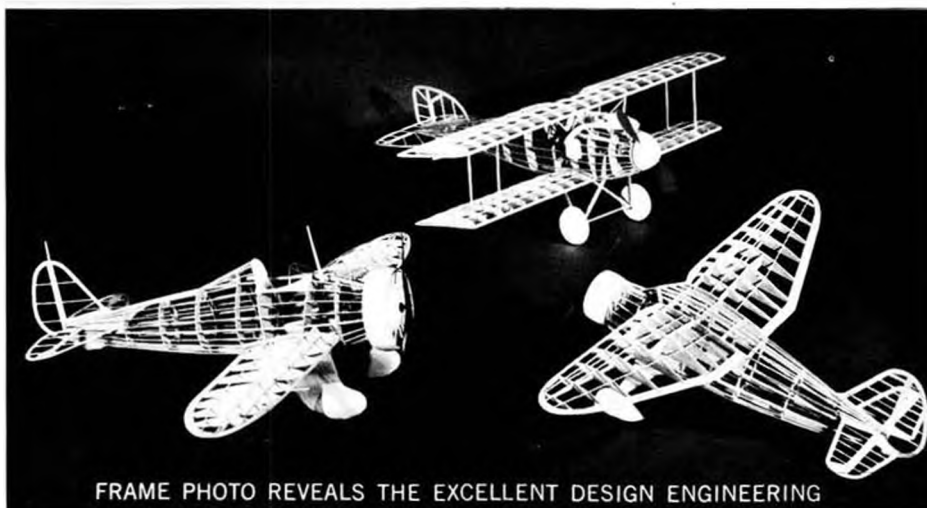
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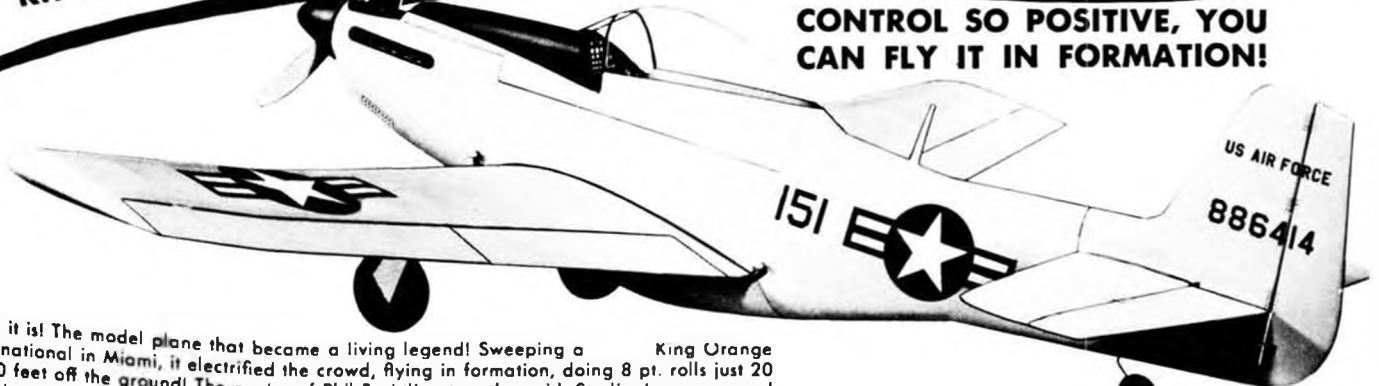
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available which are suitable for use in the design of R/C sailplanes. The reason that this is a boon is that it makes the selection of an airfoil so uncomplicated. Nobody has adequate low-speed data, so it's really a contest of who develops the best EBS to support his claims.

Many designers seem to feel that an undercambered section provides better duration performance in still air, and that a flat-bottomed section has the advantage in a wind. Others will argue far into the night that no undercambered section is worth the extra building complexity. Still others subscribe to the Italian or French shoe concept, and develop their airfoil sections by tracing around the sole of their newest dancing slippers. How sweet it is!

Probably the champion EBS-for-airfoil designers are those who capitalize on specific designations, but incorporate significant personal modifications... like changing a highly undercambered section to a flat-bottomed configuration. These hybrids usually are assigned nomenclatures such as NACA 6412 (flat-bottomed), or Eppler 385FB. One guy even came up with a "Laminar Y." This is not to say that any one of such airfoils is not useful. Some seem to be as good or better than most. Just don't be impressed by the fancy sounding titles. These sections would work just as well if referred to as a Swartz 9, a Florshiem 10C, or a Maidenform 34

(flat-bottomed). Maybe even better.

But the champions of all the champions are those designers with a built-in EBS factor who modify defined wing sections, but continue to use the section's original designation. And watch out for the guy who calls every flat-bottomed airfoil a Clark Y. It just ain't so.

Now how does all this help in the selection of an airfoil for any given design subject? Look at it this way. If there were only two sections available in the whole world, and they were the Clark Y and the NACA 6409, the performance of R/C sailplanes might never show any significant variance from what we attain with a selection from thousands. So relax. If the decision gets to disturbing your afternoon naps, copy the section used on some existing design. It ain't cheating. Where do ya think it came from?

The incidence angles of wing and horizontal stabilizer are not products of black art. Each is defined with respect to the ref line, which is considered to be 0 degrees. The difference between the two angles is important but not too critical so long as the wing angle of incidence (W_i) is more positive than that of the stabilizer (S_i). About three degrees is a good, garden variety differential.

There is a problem as to just where the W_i should be measured. There seems

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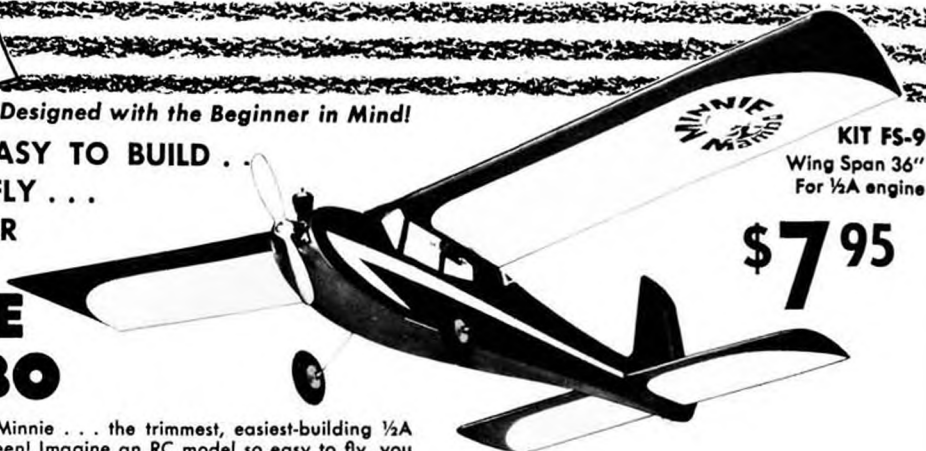
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to be three distinct schools. School number one, such as represented by the NACA (now NASA) reports, measures the angle at the section chord line . . . which is a straight line running from the center of the airfoil section's leading edge through the center of its trailing edge. The number two school would make the incidence reference line the ordinate line used in plotting the airfoil shape. That's fine and it happens to be one and the same with the chord line for NACA sections, but not necessarily so for other sections such as the Clark Y and the Eppler and other European plots. The third, middle-of-the-road school utilizes a double standard, referencing the chord line on under-chambered sections and the bottom contour line on flat-bottomed sections. Take your pick, but the latter is really the easiest to use in most cases. Don't let it bother you that a bottom contour incidence measurement on a flat-bottomed wing surface would be about 2 or 3 degrees less than a chord line incidence measurement on the same section. It seems to work out all right.

Location of the wing on the force model that we started about a month ago is a matter of drawing an airfoil reference line so that the 25 per cent point of Wca falls on the vertical line which represents the center of lift (L), at the desired angle of incidence . . . say + 3 degrees. For construction purposes,

the root section should be drawn on the force model in its appropriate position relative to the Wca.

Having set the wing incidence a +3 degrees, the horizontal stabilizer can be set at 0 degrees. The idea here is that with this angular differential, the stabilizer (a) will be streamlined . . . flying at 0 angle of attack and/or zero lift . . . under normal flight attitude; (b) will increase its lifting force in a nose-high attitude and thereby raise the tail of the sailplane and restore horizontal flight; and (c) will provide a downward force in a nose-low situation and thereby force the tail down and bring the sailplane back into a horizontal path.

The exact and preferred differential setting between Wi and Si on any given design can only be established by flight tests. Best idea is to incorporate an adjustable stabilizer. Don't try to take care of this by elevator setting. It's inefficient and it limits control movement around "zero."

Note that the important relationship is that of Wi and Si . . . not Wi and the fuselage ref line. Except for slight differences in drag due to fuselage attitude during normal flight, the Wi could be 0 degrees and the Si -3 degrees, and flight characteristics would be no different than the +3/0 degree setup. Set a "lifting" stabilizer a couple of degrees more negative so as to have about a 5 degree differential. That's because a



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lifting section starts doing its thing . . . lifting . . . at angles slightly less than 0 degrees.

Dihedral can be covered quickly. For conventional "V" dihedral, about 7 ± 1 degrees in each panel will be adequate. Add a degree or two for forward swept wings, and reduce a similar amount for sweepback. For polyhedral, something around 5 degrees on each inner panel and an additional 15 ± 5 should put you in a safe range.

You can get a good argument started by making loud statements in favor of either V or polyhedral at the next soaring banquet you attend. Chances are the whole evening will become a shambles. Might even get loud . . . and active.

Opinion is that strong and divergent. The emcee and guest speaker will remember you for years.

Bend the wings up the way you want . . . it's your sailplane. Also, you'll be a happier hooker of thermals if you put in 2 or 3 degrees of washout in each wing tip.

Plan on the towhook being just a little . . . half-inch or so . . . forward of the CG. A second location an inch or so further forward could help early test flights be more fun.

About all that's left is to put a pretty outline around the design force model. If ya got any taste at all, fuselage proportions will be okay, so don't sweat it. Might remember that frontal area means

drag and drag means sink, so it's usually a good plan to keep things as slim as is comfortable. Remember to leave room for the radio gear or you may be an entrant in the next Nordic contest.

Structure? Another entire subject, and an easy one to bone up on by checking the designs of others and stealing what you like best from each. Use lotsa balsa, ply, and fiberglass in the fuselage forward of the CG for strength and functional ballast. No point in giving a bunch of dumb lead a free ride in the front end of a flimsy model. Wing spars of spruce are nice.

While you're designing the various component structures, keep in mind that straight lines are keen . . . curves are hard. Ya gotta build it, use it, and maintain (repair) it. Don't get hung-up on "super-light." Lightness ain't everything. It's got to hold together, too.

As for wheels, brakes, spoilers, flaps, ailerons and all that jazz, save something for Mark II. Mark I will fly, but it might be Mark II before you humble the world with your genius. Don't use it all the first shot.

And that's it. Get in there and give it a go. Read everything you can get your hands on. There's some pretty good stuff being published these days . . . some even has to do with R/C sailplanes. It should improve your designs, but even if you don't use it, the information you obtain will upgrade your EBS output. That's important, because in the final analysis, the greatest difference between one good sailplane and another is in the skill of the pilot. So if ya can't fly, drown 'em in . . . esoterica.

Hey, it's Recess!

Heathkit Continued from page 7

pany even has a few non-electronic items, including a trail bike and an R/C race car, and at one time, was investigating the possibility of kitting a full size automobile!

In spite of the variety of items, there has always been one characteristic consistent with all kits produced by Heath; any individual with the ability to read and follow step-by-step instructions (checking off each step as it is accomplished) and to handle simple basic tools such as pliers, wire cutters and strippers, screwdrivers, etc., . . . and most of all, a soldering iron . . . can build anything Heath sells in kit form. With no knowledge of electronics prior to, during, or after completion, this writer has, over the years, built and successfully tuned, operated, and serviced Heath kits for AM and FM tuners (stereo and monaural), several amplifiers, test meters, tape systems, record players, a color TV set with remote controls, and three different R/C systems. Although we have operated LEGALLY on a six meter Technician's License (W6-MGK) since 1960, we only obtained the ticket after a great deal of coaching and just

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This year give yourself a super-slim Heathkit GDA-1057 3-channel System. Then next Christmas make it 4-channel. All you'll need is the GDA-1057-4 Modification for transmitter and receiver. There are three special system prices to make this one of the nicest holiday packages ever.

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Both transmitters have a two-position switch for landing gear, finger adjust tabs for auxiliary channels; trainer link jacks and "buddy button"; external charging jack for simultaneous charging of receiver transmitter and receiver batteries; eight range controls for adjusting servo travel.

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barely passed the test on dumb luck (The questions were multiple choice and the coin was red hot that day!). We mention this only to convince you that any knowledge of electronics is purely coincidental and if anything, detrimental (you're liable to anticipate instructions, miss a point that seems minor to you, and goof up).

The GDA-1057 transmitter is a departure from the usual cigar-box shape of today's units. Old time R/C'ers may be reminded of the early Citizen-ship unit which was often described as looking like a "square flashlight." "South-Paw" R/C'ers will really appreciate the layout as it readily lends itself to being operated either left or right-handed. In addition, an adjustable hand strap on the back provides extra one-hand holding power.

As a 3-channel unit, the control stick is two-axis, with the third channel being a full trim tab on the right side of the case. This makes it a dandy control system for powered aircraft on rudder, elevator, and throttle . . . for gliders that may also have flaps and/or spoilers, and/or air-brakes . . . for R/C power

and sailboats . . . and for cars, if you don't mind stick-steering.

By adding the 4th channel, which converts the 2-axis stick to 3-axis with a rudder control knob, one may have separate controls for rudder and ailerons on aircraft. (Some power boaters also rig up rudder and aileron servos to the boat's rudder tiller in order to have full and partial turn control). Car steering also becomes more realistic.

The GDA-1057 receiver is a two-deck layout enclosed in a plastic case 1-3/16 inches square by 2-1/4 inches long. A connector block at one end receives direct cable connection from the servos and the switch harness.

As previously mentioned, the price of the GDA-1057 includes 50 mAh nickel-cadmium battery packs for both receiver/servos and transmitter. Charging of both packs is accomplished simultaneously by an exterior (and safer) transformer type charging unit.

Our particular unit is on 53.3 MHz, includes the 4th channel conversion, and uses the sub-miniature, 3-wire servos. Equipped with our Wahl rechargeable soldering iron, wire cutter/strippers, a pair of tweezers, needle-nose pliers, and a small screwdriver, we completed the transmitter in 3 evenings, working about 2-1/2 hours at a sitting. Although the instructions caution you to charge the transmitter pack prior to operation, we couldn't resist the temptation to give it a quick shot to see if it would work . . . it did.

Next came the wiring of the airborne pack and then the transformer operated dual charger. Once these were completed (about an hour), we put everything on charge and attacked the receiver.

The GDA-1057 receiver, like its big 8 channel brother, the GDA-405 (not physically larger, just more stuff crammed inside) is built on two printed

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circuit decks, one each for the R.F. and the decoder sections. A total of fifteen resistors, six diodes, and three ceramic IF filters share space on the two boards, along with a varied assortment of resistors, capacitors, choke filters, and so on. The job of installing and soldering the parts in their respective locations is more tedious than difficult, and again, it's mostly a matter of carefully identifying the various components and putting them in the right spot. About the only way you can go wrong is if you're color blind when it comes to identifying resistor values. Those orange and red bands, or the green and blue, can look an awful lot alike . . . even to a good pair of eyes.

Building the receiver and the switch wiring harness took four evenings.

Next, we went back to the transmitter, now with fully charged battery pack, and went through the test and adjustment procedures. In all of the ensuing steps, the transmitter output meter was used. After tests were completed, and the receiver tuned, the meter was permanently installed in the transmitter. Seeing each step of the checkout go as

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Although most of the sequences in the Hall Bartlett production of Jonathan Livingston Seagull used live birds, certain "very special" sequences required a "very special" seagull. Mark Smith, of Mark's Models, was given the difficult task of designing, building, and flying a glider that would look and soar enough like a live seagull to fool the cameras, and he had to choose the best radio for the job. He chose Orbit.

As Mark tells it, "First I had to make the glider look realistic. Unfortunately, a glider shaped like a seagull doesn't lend itself to conventional glider controls so I had to learn to fly all over again. By the time we started filming, my Orbit had gone through more of a work-out than any radio deserves."

*Mark Smith
and "Jonathan"
at Torrey Pines,
California*

Mark also described the problems of the "crash scenes", when he would pick up the pieces of one seagull, put the radio in another one, and go on with the next scene. "A camera crew on location costs thousands of dollars a day, says Mark, "so the pressure on me not to be the cause of any delay was tremendous. During the filming, shooting for hours on end, Jonathan Livingston Orbit never "glitched" even once. I was able to concentrate entirely on making him fly perfectly. When you see the movie, I don't think you'll be able to tell the real seagulls from my models, except that real seagulls can't do what I make Jonathan do."

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indicated in the instructions is very satisfying.

Finally, we built a servo! Only one is needed in order to make final adjustments on the transmitter for servo centering and range of travel. The circuit board for the sub-mini servo is awfully small, and leads you to believe you're going to have a dandy time cramming all the parts in place. Fortunately, the integrated circuit makes up for a lot of parts, and cuts the labor way down. A total of 6 resistors, 6 capacitors, and two transistors, along with the I.C., all fit quite comfortably on the circuit board.

The first servo took about 3 hours to build, but each one that followed took less, with the last of four units only taking about an hour and a half. Each one ran perfectly, and it took only minor centering to prepare each one of them for use.

Since completion, the unit has been tested in two ships. One was Southwestern Sailplanes' Baby Bowlus glider (August, 1973 MB) and the other . . . a design of this writer's which goes back a few years . . . "The Square Hare," an

all sheet balsa, Veco .19 R/C powered trainer (honest), with rudder, elevator, and throttle control. We note that the transmitter is particularly handy when flying hand-launch type aircraft. With its narrow width and the adjustable hand-strap on the back, it's no problem to hold it in one hand while heaving an airplane with the other.

In summary, we would simply say that the Heath Company's success in electronic kit making can be accredited to two outstanding facts: First, most every red-blooded individual is a tinkerer who loves to take things apart and find out how they work. In this case the tinkerer gets something that's already "taken apart" and is shown how to put it together . . . twice the satisfaction! The second fact is that when you put a Heath kit together . . . it works! ●

PeanutContinued from page 35
15% chord point . . . that is, about half an inch behind the leading edge at the fuselage juncture. Lo and behold, it worked! The model would have flown better, perhaps, if it had notched spars on the upper surface.

This is why an alternative typical rib is shown on the plans. These ribs, because they are solid, can be made from one thirty-second sheet balsa. Obviously, the weight of the model will have an effect on its speed and an effect on its aerodynamics. A lot of ballast modified our model's behavior, both by moving the CG forward, which is more stabilizing, and by increasing the speed, which may have helped to prevent an airflow problem.

So, build your model of the Speed Spitfire with whichever type of wing structure you desire, and if you have flying troubles like I did, try turbulators.

This model is built using conventional techniques throughout, with only a few exceptions which will be covered in detail.

The surface outlines are laminated. Because the outlines are ellipses or at least smooth curves, lamination seemed the right way to go. If balsa laminations are to be used, they should be 1/32 by 1/16 in size and enough laminations to make the width shown on the plans. If model railroad basswood is used, the wing laminations need only result in a total width of 1/16, and the tail laminations need only be two of the thinnest available. Previous issues of Model Builder Magazine have defined the technique quite well. (July and December, 1972).

The landing gear uses a torsion bar suspension or shock absorbing system. Bend the wire as shown after threading it through a short length of 1/16 diameter aluminum tube. Poke the wire back through the rear spar and cement the tube to the front spar. This installation can flex until either the wheel or the leg strikes the wing lower surface without breaking any structure.

The tail surfaces can be left flat without adding balsa pieces to the streamlined section shown without affecting the looks very much.

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The propeller consists of two North Pacific plastic props notched half way through at the hub and epoxied together. The spinner is an old Kayson plastic one, notched to fit over the four bladed prop and epoxied in place after the propeller hook has been installed. This means you will have to remove the rubber from the propeller hook and wind it directly if you want to use an indoor winder. Usually, I prefer a winding loop bent in the shaft in front, but it would louse up the looks of the model here too much.

The upper wing fillets are made of bond paper. You will need to use the cut-and-try method to get them to fit. Make sure they fit, and then cover them with blue tissue before you cement them in place.

Blue tissue was used on this model. It has one unfortunate characteristic not found in lighter colors. Whenever there is a tissue lap joint, there is a darker blue where there is more than one layer of tissue. The best that can be done with tissue alone is to try to keep these laps only over a structural member. (This was not done very successfully on the model in the photos, I fear). Perhaps a better way would be to use Fernando Ramos' technique in painting the model with Floquil model railroad paint in a nitrate dope base.

Note that the oil cooler, as shown on

the front view, goes on the other wing.


When installing the fuselage upper stringers, continue the top three clear back to the aft end of the fuselage box. When dry, sand them to the proper contour. Later, when installing the horizontal tail, they will have to be cut free from the back of the fuselage box to allow the insertion of the tail.

Other than the effect of the structure on the surface contours of the aircraft, the only intentional deviations from scale are the size of the horizontal tail and the diameter of the propeller, both of which have been enlarged.

The great god of the thermals, "Hung," loves Peanuts. Let's go feed him.

Octagon Continued from page 19

added fore and aft and at the engine mount. The nose and tail cones can be made from 1/16 sheet or light balsa blocks. The engine mount is 1/16 ply with lightening holes, laminated with 1/16 sheet. The base is three pieces of 1/16 sheet laminated with the grain crossed. Add a plywood firewall and balsa fairing blocks for braces all around. An .020 is the best power, but anything from an .010 to a sick .049, or even a Jetex, will work. The thrust line is straight ahead. The heavier engines may have to be moved back to get a flat enough glide.

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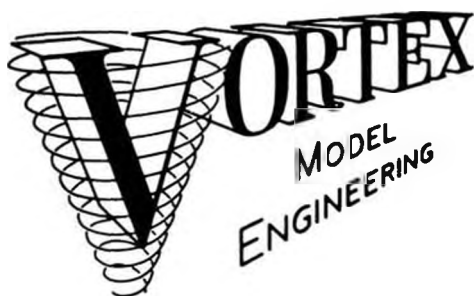
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The thing should be test glided and trimmed for a fairly flat glide by adjusting the motor mount to change the CG. If the motor ends up too far back, add some positive incidence to the front hoop and move the motor forward. It will fly nose heavy but the transition from power to glide can take too long. And by too long I mean 300 feet or more. It will begin to glide, given enough altitude, but the usual couple hundred feet in a climb is not enough. Directional control is rather strange . . . when in a tight turn it begins to wobble and drop too quick . . . turn the front hoop only enough so you don't have to chase it too far.

Trimming is very easy, and the thing will fly with the CG almost anywhere, but observe the above precautions concerning the transitions. For the first flight let the engine wind out . . . remember I said that it cannot loop . . . believe me! The climb and glide are assured, the only thing in question is the transition, but if it is gliding flat, that should be no problem either.

If you want some real fun, trim it nose heavy and use a full tank of fuel. The thing will be a tiny speck in the sky when the power quits and then it will dive straight down for several hundred feet before pulling out and gliding in, but be careful, an early engine failure

could spell disaster. A 30 to 45 sec engine run is normally sufficient.

I haven't figured out a dethermalizer yet, so put on your running shoes before the first flight. I can't believe it flies . . . but it does.

BILL OF MATERIALS:

- 1 3/32 X 3
- 1 1/16 X 2
- 3 1/32 X 1
- 2 1/4 sq.
- 5 3/32 sq.
- plus misc. plywood wire and scrap blocks

R/C Champs . Continued from page 23

further through the pattern this time, while David Hardaker began to find his form with an improved score. Impressive were Pretner, again, whose rolling maneuvers are really outstanding, and Matt, with Phil Soden deservedly close behind them. Round Two positions went like this:

1.	Pretner	8135
2.	Matt	7755
3.	Soden	7725
4.	Yoshioka	7660
5.	Kristensen	7520
6.	Okumura	7400
7.	Martin	7380
8.	Birch	7360
9.	Pasqualini	7330
10.	Cappuyns	7325
11.	Matt	7310
12.	Takahashi	7275
13.	Neckar	7245
14.	Whitley	7225
15.	Page	7140

Round Three which commenced late on Thursday after-noon benefited from virtually windless air conditions, which Soden and Takahashi of Japan put to good use with two truly brilliant performances. In fact, the Japanese received what amounted almost to a standing ovation when his model touched down smack in the middle of the center circle . . . the flying was that good!

Meanwhile the Americans, long-time dominators of the World Champs aerobatic event were faring less well than ever before, for although all were improving with each successive round, others were improving also. Big Jim Whitley for instance, very much the 'senior citizen' of their team, flies very well, but seemed to suffer the same problem we recall at Doylestown, positioning maneuvers too high and too far out. Also, it appears the over-large maneuvers (and some of Jim's looping maneuvers were the largest we've seen) tend to lose reference, with resultant downgrading. Jim Martin is undoubtedly the showman of the U.S. team. His Banshee mid-wing design, used by a number of other competitors, is very fast and will knife edge from horizon to horizon — as he forcibly demonstrated — then will knife edge through a 180 degree turn and knife edge all the way back! For Jim though, Round Three was one of

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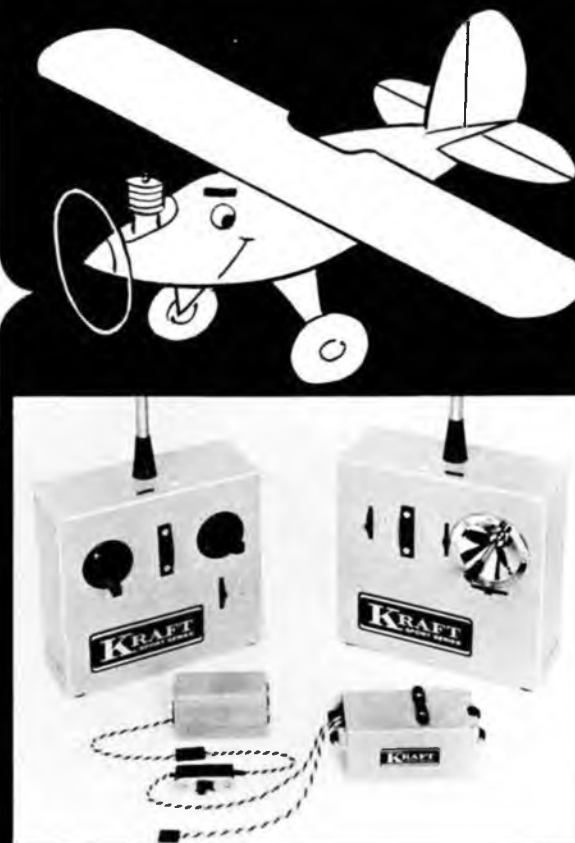
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real frustration. After what may have been his best flight of four, he landed and then went searching in the grass for the spinner cap which had fallen off in flight, giving himself away in the process. Until then, no one had noticed . . . in F.A.I. competition, bits are not supposed to fall off models during flight . . . and Jim took a big fat zero. Jim Whitley too was less than happy, having missed his spin.

Things didn't click right for Mike Birch either, resulting in a fairly untidy string of maneuvers which produced his lowest score of the competition. But for Dennis Hammant, bingo, a whole engine run and a score which would help the British team standing. Harald Neckar, whose practice performance had impressed, now began to show his worth with a score well over the 4,000 mark, unlike Yoshioka who produced his worst performance of the contest during this round, dropping him well below his two fellow team members Takahashi and Okamura in a scoring line-up that looked like this:

1. Pretner	12,280
2. Soden	11,740
3. Matt	11,620
4. Takahashi	11,515
5. Neckar	11,375
6. Okumura	11,370
7. Cappuyns	11,350
8. Kristensen	11,325
9. Page	11,260

10. Pasqualini	11,040
11. Yoshioka	10,995
12. Weixelbaumer	10,960
13. Bertolani	10,920
14. Birch	10,825
15. Werion	10,650

All three of the British team found their best form in **Round Four**, Birch again the best, almost topping the 4,000 point mark. This last round saw many determined do-or-die efforts with resultant noticeable all-round improvement in flying standard, as those with the most remote of chances piled on the pressure in a last-minute bid for a score which would spring them into the top five for the Sunday morning fly-off. Among these was Yoshioka whose flight, which we unfortunately missed, must have been tremendous — it was certainly the high pointer of the entire Championship. Norman Page of U.S.A. consolidated his position with another 4,000 plus score after his Round Three sparkler while both Matt and Neckar scored high.

The result was a considerable switching of positions, and while Hanno Pretner remained at the top of the pile, never having dropped below 4,000 points during the entire four rounds, Phil Soden had a disappointing flight which cost him a fly-off place.

From this last round effort emerged Hanno Pretner, who led for four whole rounds, Harald Neckar of West Ger-

many, Yoshioka of Japan, Wolfgang Matt and Norman Page doing the biggest leapfrog in score among the five to give U.S.A. a chance at the 'King Baudion of the Belgians' individual winner trophy. (Such royal patronage seems rarely remembered in the heat of competition.)

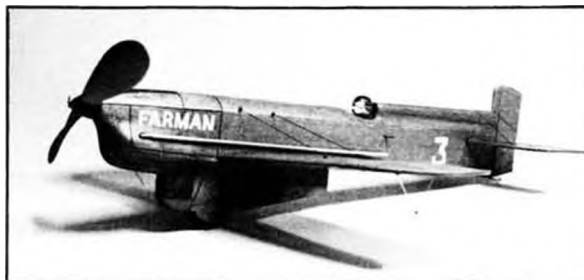
When these five assembled for the crucial two rounds early Sunday morning, they were watched by the largest and most critical audience of the whole competition.

The pressure was on, and first on the firing line was 21-year-old Harald Neckar, whose sleek slim fuselage model with all-flying tail broke ground and immediately sucked up the wheels. The pressure showed too because although the flight was a real pleasure to watch, there were imperfections in the Double Immelmann and the rolling maneuvers. The tenseness of the situation also affected Hanno Pretner and his mechanic father too. The flight by no means reflected the outstanding form of earlier rounds, drifting towards the judges in the outside loops, non-vertical entry to the Top Hat and finally resulting in disaster when Pretner Senior, nominated the start of the Landing Pattern as the Super Sicrolly was running downwind. The subsequent 180 degree turn into wind resulted in a zero score for the maneuver. It was a mistake which cost Hanno the Championship and Hans

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Pretner was visibly upset.

Next came Wolfgang Matt, whose flight, although without serious errors did not click — his Cuban Eight was a long way out — and scored accordingly.

If these three were nervous, then Norman Page's nerves must have been on the ragged edge when his Mach I finally took off — even with an electric starter, the engine had been reluctant to fire up and he zipped through the pattern to make up time, lost points for climbing away across the Top Hat and set the seal with a less than perfect spin.

Last in the round was Yoshioka who immediately almost blew the Figure M. His rolling maneuvers were rather undulating and the depth of field in positioning rather inconsistent. His score was therefore something of a surprise for some in a line-up that looked like this:

1. Neckar	14,235
2. Yoshioka	13,920
3. Page	13,880
4. Matt	13,640
5. Pretner	13,395

So now it all hung on one more round in which Harald Neckar, first off again, lost heading in his slow roll. His four-pointer came out poor too. Pretner, next up, made no such mistakes and, showing that a setback would not get him down, produced a superb performance from beginning to end — the high pointer of the fly-off.

Wolfgang Matt's flight was also excellent throughout, little short of Pretner on points. Norman Page's flight was one he'll certainly never forget. What looked like a truly perfect entry into the first stall turn of the Figure M (the model really was stalled) suddenly turned into a disaster, the flight finally capped with a spiral instead of a spin at flight's end, ruining his chances.

So finally, and appropriately to the flight that settled it all. If one were tempted to query his first score total, there could be no questioning the second — the swept wing model came through like an express train on each low scintillating pass, the Enya 60III

burning 45 per cent nitro. The score, within 20 points of Pretner's second, was deserved and with it Tsugutaka Yoshioka gave Japan the entire championship, the Japanese team, all three within the top ten having already secured top team position. We find it highly appropriate that the last single flight of the entire championship was the one that secured the individual trophy!

Hannan Continued from page 34

A beautiful clear, calm, Saturday . . . great for a ride and a picnic. He heads for the flying field.

He suggests a movie. Great, I say. It's "The Battle of Britain," or "Tora, Tora, Tora!"

His idea of excitement is going to a Fly-in. Mine is banning home-built airplanes. A garage a hangar does not make.

I want him to go to the store. He can't, he's just too tired. But just let him run out of dope or glue, and it is Mr. Energy!

You're at the flying site, and its past time to leave. He says: "just one last flight" . . . again.

My friend says, "What a cute airplane. Is it your little boy's?" I change the subject.

My husband asks me to time his next flight. He gets mad when I tell him 2 seconds.

Someone left water in the bathtub, and I pull the plug. He wants to know where his microfilm went.

"Remember all those old model magazines you had out in the garage? Well, the Goodwill truck came by and . . . where are you going, dear?"

TIRING IDEA

Scale model builder Howard Ferry, of the Bronx, New York, points out that rubber "O" rings made fine tires for small aircraft. Plumbing supply shops generally stock these items in 1/2 and 3/4 inch diameters. The actual wheel can be made from balsa or hardwood, lathe style, with the aid of a motor tool.

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in the Hannan's Hangar column of the July issue. The absence of pilots in model planes, or worse yet, the presence of dolls, Snoopys, etc., in an otherwise authentic looking aircraft has always been a source of annoyance to me.

"In reference to this, I thought you might enjoy seeing a photograph of the Antic I recently completed, and the touch of reality I feel my pilot gives it. After over a year of work on the plane, I really feel it was worth the extra week to make the pilot and really finish the job. The cap is made from material taken from a real cap and is even fully lined (that's where a wife comes in handy). The jacket is real leather and is made from an old pair of gloves. His mustache and sideburns are real hair, and his goggles are made from leather using Tatone 5/16 inch instrument Bezels for the lenses.

Sincerely, David Paine"

Quasoar Continued from page 11
the tip panel washout will hold it's shape and will not distort or flatten out.

Before the top sheeting is applied to the wing, take a razor saw and part the center section half from the tip panel by sawing the brass tube between the two plywood ribs. Now take the center section half and position the root end on the centerline of the opposite wing half plan. Block the completed panel 12 degrees and proceed to build the left panel onto the completed panel. Now follow the same sequence that you used on the first half. You should find that this system will be a fast and more important, an accurate method of building a long, thin, 3-piece wing.

As shown on the plans, the spoilers are made of .030 brass sheet. The brass is K&S, and comes in a variety of sizes, including the size used for the spoilers and air brakes. Most good hobby shops

carry it. This will eliminate the pain of cutting out the size you need from a large sheet.

The hinge for the spoiler is merely a thin strip of Monokote trim sheet which spans the length of the brass spoiler and airbrake. This works very well, since it seals the hinge line while it hinges.

The wing tip is made of balsa and is not too hard to shape. The curl up configuration was just to give the model a full scale appearance . . . and besides, it looks neat.

After the wing is completed, take a minute or fifteen to lay a strip of fiberglass tape on the center joint, top and bottom. Now you're ready to install the wing mounting hardware. First of all, construction alignment should be done with the wing positioned on the fuselage. This way you get a good fit-up of components. When you get the front turtle deck bulkhead secured, bolt the front fuselage bulkhead to it and use this system to locate the fuselage bulkhead. The trailing edge cleat is a must before you proceed to cover everything with the fiberglass turtledeck. Custom fit the turtledeck and glue into position. Now take the razor saw again and saw the canopy portion off of the center wing assembly. Now you should have a completed center section and a canopy with no frame under it.

Build a frame for the canopy. As you can see from the plans, the wing bolt serves two purposes; one to hold the wing on and two, to act as an aft hatch hold down. Clever, huh? You can install the rear fuselage bulkhead now.

Mix up some Epoxolite (Sig) and contour a smooth fillet on the corner created by the turtledeck and the wing. This fills in any voids that may have developed during construction.

TAIL

The butterfly tail is pretty much self

explanatory from the plans, but let me emphasize the necessity to keep the control movement slop free. It should be your prime objective not to acquire any slop at all. It will really show up when you start flying.

The movement for the "V" tail is illustrated on the plans as a series of positions which applies to the rudder- vator that they are shown on. Start with a small amount of elevator control and work to what is shown on the plans.

The construction for the butterfly tail is very simple and should not present any problems at all.

FLYING

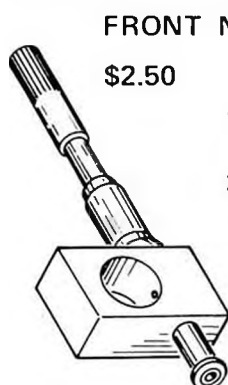
First of all, make sure you do not have any slop in your control linkage and make *super* sure that your surfaces return to center every time.

Balancing the Quasoar with lead shot as shown on the plans worked out very well. The sequence used on the prototype, I believe, will be very helpful to you on this bird, as well as on future encounters. Install all the radio gear and complete everything with the exception of the ballast. Suspend the fuselage at the C.G. Now, stick a Dixie cup on the tip of the nose with masking tape. Start pouring the lead shot into the cup until the tail comes up and the fuselage is parallel to the ground line. Now pour the lead that you have in the Dixie cup into the nose of the Quasoar. Mix up some Hobby Poxo Formula II and pour it in the nose and let it soak through the lead shot. Lay a piece of glass cloth over the works and let dry. You may want to balance your ship just a little bit tail heavy and bring it to the C.G. with a few loose pieces of lead. This way you are free to move the C.G. around a little.

Ok, you have it all balanced out. Now charge up the "Raydoe" and head for the field. Make sure that left is left

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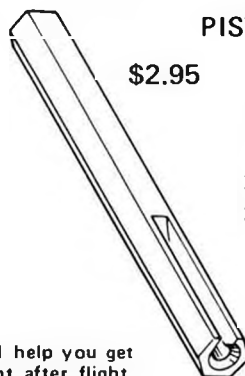


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and right is right. With a butterfly tail the movement is just opposite of what it would be if you pictured the ruddervators as ailerons. (*If you're still not sure, double check Le Gray's article in the June 1972 issue of MODEL BUILDER.* wcn) Give the Quasor II a few good hard hand launches. Don't be afraid to really throw it. After you've gone through the initial testing, hook it to the towline, because you're going to need some altitude to find out anything else.

After the towline has dropped away, start to get the feel of it. Let it go hands off, see what it's doing, and correct accordingly. You'll find that the butterfly tail gives you a very positive turn. Also, don't let the speed get too slow, get the hang of flying a little faster than usual.

The spoilers/air brakes I am sure you'll find very valuable, and with some practice, you'll have the landings down to a science. Use the spoilers as you would throttle on a power plane. Don't jerk them all the way out and then retract them. Instead, gradually extend them as you need them and co-ordinate the use of elevator right along with the spoilers.

Well, there you have it. I hope I have made the construction clear to you. If not, contact me through MODEL BUILDER.

So, in the interest of soaring, I wish to leave you with the immortal words of Jonathon Livingston Seagull, who, after completing 287 consecutive loops, thus breaking his old record of 285, turned to his good friend Maynard Gull and said, "Squawk!" . . . because everybody knows seagulls can't talk.

Pull-Q Continued from page 43 this method, only a minimal amount of ballast will be necessary to trim the completed ship. Note that the pylon

extends to the keel in the body, and wood screws that secure the towhook penetrate the pylon. This directs towing loads to the pylon, rather than the fuselage, and allows a lighter body without sacrificing strength at this point.

The original model was covered with light-weight Japanese tissue. We used an old trick with which may bear repeating here; use nitrate-based dope to prepare the frame work for covering with a minimum two coats on the underside of the wing ribs, and for applying the tissue. After careful water-shrinking, use butyrate dope for the finish coats, and the covering will not pull away from the underside of the wing ribs.

FLYING

Contest-tuning any towline glider is a long involved process, so stay with the machine and be certain that it is performing as well as possible.

The original Pull-Q is set up for "Solo" flying. The hook is located farther back than would be required for normal two-man flight, so the model will 'kite' up on a one-man launch from the reel. As a result, the model will tow docilely until all line is out. Thermal-searching with all line out is difficult because the ship tends to release too soon, so we hold back about twenty feet of towline. When the glider which normally stays at about eighty degrees in dead air, gets into lift and comes up directly overhead we let out the last of the towline before releasing it. This way, small 'bumps' won't disconnect it.

Make up a separate towline for your A/1's. The extra five or so feet allowed, (A/1 towlines are measured without tension applied), will many times spell the difference between a max and a short flight in marginal conditions.

The model is stable in both dead

and turbulent air, and the flexing-wing construction makes it pretty much goof-proof in windy weather. We hope you'll enjoy the success the machine is capable of achieving.

Interceptor . . . Continued from page 47

Historically, Goldberg first played around with this design in 1940 following on the heels of his outstanding success with the Zipper. The original development featured a much higher pylon that was finally settled upon in the production version. The design did undergo some changes in the post-war series, as Goldberg tried cutting the rudder away to the point where the model would do a half loop with a roll out on the top; in short, a series of immelmans!

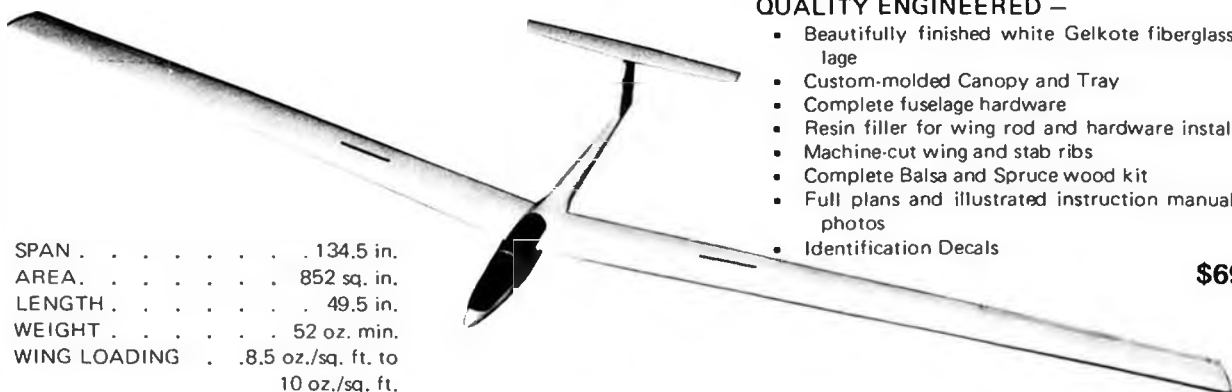
The same modification was made to his large size Sailplane, but in the long run, it was found the original rudder gave more reliability.

The kit was produced after it made a sensational debut at the Mississippi Valley Annual. Because of its size and ease of construction, Interceptors quickly dominated the Class A and Class B events. When Ray Arden came out with his famous Arden .19 after WW II, this, combined with an Interceptor, was unbeatable! Today, using Cox .049 engines, the boys can take this design using a glow engine with the short motor run handicap and still win handily. You should try one yourself!

Choppers Continued from page 15 easy, just like on the ground, and even rolling lift-offs created no "suction effect" as I had anticipated (from flying full size seaplanes). And the landings . . . wow! I never dreamed they could be so velvet-smooth, with the pontoons gently settling into the water!

Flight characteristics seemed to be about the same except that control

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response was slowed down slightly . . . and this might be favorable to the beginning pilot. When I received the floats, it was suggested they might make excellent "training-gear." I agree . . . they *might*, however, I feel there is too much "bounce and spring" to those air-filled pontoons when touching down on dry land, which could cause more problems than a conventional training gear. At this time of writing, I understand Kavan has a set of floats made especially for the Jet Ranger Helicopter, and it's possible they are also suitable for use as training gear, so you might be interested in checking this out with your dealer for availability.

My last reaction to float-flying was a surprise . . . after having sloshed through the shoreline mud in my bare feet a few times to retrieve and refuel the Kalt, it suddenly struck me I was doing it all wrong! The main reason for a helicopter is its utility and versatility . . . so, why not fly it "off" the water and "onto" the ground? 'Nuff said; the transition from water to land was the way to do it. And if you haven't done it yet, you should get a pair of floats and get set for the best fun-flyin session you've ever had!

HELICOPTER FLY-IN

In mid-September, a group of local heli-pilots decided to hold an exclusive "fun fly" in sunny Southern California. The chosen site was a cul-de-sac, closed-loop road, on the outskirts of Tustin, California. In attendance were:

Tino Villanueva, Kavan-Jet Ranger . . . Nate Rambo, Scratch Built . . . John Minasian, Hegi-Huey Cobra . . . Charlie Gilbert, Scratch built "Collective" . . . John Tucker, Kavan-Jet Ranger . . . Kim Tucker, Kalt-Huey Cobra.

The last member of our clan, John Gorman, had a last minute commitment and couldn't make it, however we had more choppers in the air than at

any other heli-meet I've attended! And that doesn't count the eight or nine other 'copters left hanging in our workshops because of transportation difficulties.

All the birds flew well in spite of a couple of near misses with the only tall street lamp on the entire block . . . Tino's new Jet Ranger just wouldn't do anything but "home-in" on that pole! As usual, Nate put in some beautiful "body english" as he polished up on his landing techniques while engaging in an informal contest with John Minasian's one-handed, mid-air catch and release-Ha!

Charlie Gilbert is a first class designer and machinist, and has just completed his latest helicopter with "collective pitch" control. He is basically a single-stick pilot, but had to install a two-stick unit after a radio failure, so is learning all over . . . A couple of the other two-stick pilots flew his machine though, and report that it is amazingly responsive and very stable. Charlie is now building a 4-blade 'copter with an eye toward "all-out" aerobatics, and knowing him, he will do it. More on this one later. Our next step is to get organized and form a heli-club . . . we talked a bit on this and decided to take more positive action at some future date when we could get together again.

HELICOPTER DEMO IN GUADALAJARA, MEXICO

Another September activity was the opportunity to take the Kavan Jet Ranger and a Hegi-Cobra down to the Aero Modelista Flying Club in Guadalajara, Mexico and demonstrate high altitude capability (or lack of it) during their annual Pattern contest. The first day didn't go too well because of the afternoon heat and altitude . . . we were plagued with sudden engine stoppages just before lift-off, and simply a lack of power output. Hotter fuel and rotor-

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blade pitch changes were of little help, although we were able to make short hops as long as the light breeze kept blowing. The following day however was considerably better . . . only because a still hotter fuel was used, glow plugs changed and the cooler early morning air was dense enough to support the weight. These were the first helicopter demos in Mexico and local interest ran at a very high level. Expect to hear a lot more from these wonderful people South of the Border as they branch out into this phase of modeling.


FINAL APPROACH

In closing for this month, let me again invite your photos, hints, etc. and especially your comments on this column . . . every other magazine sez "its your column" and "we want to publish what you want," but this time, I really mean it!


R/C Pylon . . . Continued from page 25

but not quite like the K&B. Jensen and Vartanian have the steadiest running engines so far. Their engines are easy on the needle and seem to get better air runs than Tussing's or Prather's. Prather seems to have the fastest set-up at the

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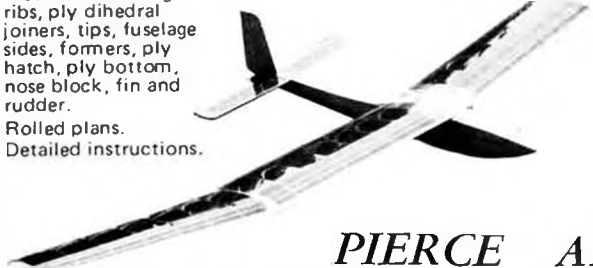
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moment. When he gets his to run as steady as Jensen's, LOOK OUT!! These fellows run with almost any engine they get their hands on. Only a few races ago, Jensen had an OPS screaming in a Pitts Pellet until the lower end let go! It will be interesting to see what these fellows do by the Tournament of Champions!

Remember a few issues ago, when we told you to watch the "El Bandido." This aircraft has really come on strong at the last few races. If you want to see some most beautiful work on a model airplane, you should see the sensational work of Harley Condra and his Bandido's. Harley is a very articulate builder but has problems taking his racer home in one piece. He has had bad luck in the last couple of races coming off No. 3 pylon, which is giving him a lot of practice in building. This airplane, the El Bandido, has really given Condra a lift. In his first race as an expert, he turned a fantastic 1:25 to amaze everyone! Ed Hotteling switched to the El Bandido and won his first overall event at the Western Formula I Championships at Tracy, California. We cannot say enough about this Ed Foster design, which is really coming on!

Rev-Up props are being used quite extensively now in pylon racing. At the last event we happen to see Don Powell, Ed Hotteling, Bob Smith, Ron Schorr, Jay Replogle, Jim Rogers, plus many others using the Rev-Ups (much

modified, of course).

A new rumor has it that O.S. Max will produce a racing 40 called the SR series. Should be available on or around January 1, 1974. A first run of 100 or 200 pieces is planned. Maybe by then we will have an organization that will require the 1000 that we all voted on! I seriously doubt it! (*Wrong! We will! wcn*) What happens to the fellas who buy the first one or two hundred and the next year the manufacturer decides not to make the mandatory 1000. Oh well, they will make good paperweights!

Plug Sparks . . . Continued from page 47

Naturally, the meet suffered from lack of Southern participation and the Northern boys won in a walk. This transplanted Northerner had planned on attending but when old hot shot Wallock threw his back (fell off a bar stool, I think) out of whack, that did it for transportation! Matter of fact, the whole Southern effort collapsed following this cancellation. See whatcha did, Gene!

Next year, the onus of responsibility will be on the Southern boys. The writer is hopeful of a real good turnout with a resulting high rivalry. This Yankee-Rebel idea is great. Just needs a good push! Call on this mag if you need publicity . . . you'll get it! (*Right! wcn*)

The highly publicized San Valeer

Annual featured two days of Old Timer flying. The big winners were Gene Wallock, and Larry Boyer of San Diego. Between the two, the majority of first place trophies were taken by them, and Wallock also wound up with the Sweepstakes merchandise award. That makes two in a row for Gene!

The oldest established Old Timer contest was again continued this year with the 13th Annual Stockton meet being held at the Fresno Gas Model Association's new field. Big winner was Larry Boyer, taking all three first places entered. How about that?? Three outta three ain't bad.

By now, you are probably tired of reading about the doings of California Old Timer flyers, but the writer didn't receive very much copy this time. The lone exception is Pete Sotich, who regularly reports the Old Timer Events from the Chicago area. This column has no intention of competing with the official S.A.M. publication, "SAM Speaks," as the results of the meets are generally carried therein. However, the writer is interested in hearing about the various meets with the idea to help same and promote next year's shindig. Eventually, we may be able to work up a contest calendar. Then too, good photos (notice I said *good* photos) are always welcome contributions. Let's hear from you characters!

MAIL BAG

Got a long letter from Bruce Chandler, representing the SCIF club, taking the writer to task for too much emphasis on R/C old timer free flight reporting. Honest injun, we didn't intend for two consecutive articles on R/C O.T. F/F to come out, but it just happened to occur that way. However, if SAM is to grow (and we are, with new members every day), then we must recognize what is extremely popular on the East Coast. This writer has no intention of abandoning the classic free flight models but does regard the radio control section as fun too!

Didn't hear too much in the letter writing end of things regarding the proposal advanced by the author to help alleviate the power scramble resulting from the present R/C O.T. F/F rules. Did receive some commentary from Jimmy Dean, Editor of the SCAMP newsletter, "Hot Leads," wherein he advances the idea of not using radio at all, except to retrieve the model. Several other modelers have expressed the same opinion, that when the transmitter is used, the flight time stops. However this does not solve the power race problem.

Dee B. Mathews of Greensburg, Kansas, takes a completely opposite view with radio control the whole way, but with certain power restrictions. His idea would be take the original airplane's specified power, say like a .60, and reduce this to a .29 glow engine.

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Similar scaling could be done with an original .29 power, limiting this to .09 or .15. He quotes his own experience with an OS Max 30 powered Buzzard Bombshell, where the model still has enough zip to fly upwind. He feels we should get with the rules in a hurry, as this could be the hottest thing to hit free flight.

Fred Collins also disagrees with the author's proposal. He reflects the same opinion as others, that the model without power control cannot get upwind a sufficient distance to register a good flight and at the same time hit the spot landing circle. To get back to the use of original ignition power, he suggests a 50% added motor run (30 seconds compared to present standard 20 sec.). He feels the aim of flying Old Timers should be to get as close as possible to the old days. AMEN!

Actually, the proposal advanced by this writer resulted from discussions with Art Schroeder, with the idea developing to get the flyer to use the transmitter only for the glide portion of the flight. Since then, darn little has been heard from the eastern boys. If you like the way the rules are now, lets hear from you. Otherwise, the author will initiate some action for a SAM rule change.

MOTORS

Bob Von Konsky, of San Jose, writes to propose a pool be set up to purchase "runner" type ignition engines. With many engine collections being bought and sold, a considerable amount of garden variety type engines are becoming increasingly available. Bob proposes that interested SAM members (or other interested O.T. fans, for that matter) would contribute an initial ten dollars in the pot to give the pool some buying power. This would make engines available to the average modeler who doesn't care if a fin is chipped or not, so long as it runs. This should get around paying some of those extravagant asking prices for old engines.

Perhaps we can prevail on Bob Von Konsky to head this thing up. His reputation is beyond reproach, he's a mem-

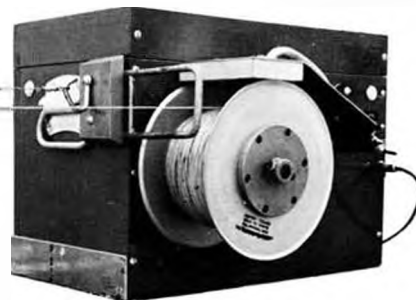
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ber of the Model Engine Collectors Association (MECA), and is an active SAM member. Drop a line to this mag expressing your willingness to go along with this proposal. If we get enough response, we'll launch the program. (Address your letters to "Plug Sparks" c/o MODEL BUILDER. wcn)

THISSA AND THATTA

Despite rumors to the contrary, the author was not held prisoner at Shakey's Pizza Parlor every night at the Oshkosh Nationals. Such defamation!

If some of the modelers think S.A.M. has a set of complicated classifications, the writer sez count your blessings after seeing what the Australians have adopted in their official rule book. Get a load of the following schedule for their old timer contests:

Wingspan (inches)	Points for size	Post	
		Pre 1943 motors	1942 motors
Up to 41	0	.19	.06
42 up to 54	0	.29	.09
54 up to 66	0	.49	.15
66 up to 78	0	.60	.19
78 up to 90	5	1.00	.29
90 up to 102	10	1.00	.35
102 up to 114	15	1.00	.45
114 up to 126	20	1.00	.49
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2 REF 440	7/8	3/8	female	steel	hardened steel	4-40	1.53	\$1.25
2 REM 250	1.0	3/8	male	steel	hardened steel	2-56	1.68	\$1.25
2 REM 348	1.0	3/8	male	steel	hardened steel	3-48	1.75	\$1.25
2 REM 440	1 3/8	9/16	male	steel	hardened steel	4-40	2.42	\$1.25

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3/4, 3/2, and 2/1. Also worth noting is that 10 points are awarded for using pre-1943 motors, with an additional 10 points for employing spark ignition. Up to 20 points are awarded for finish and craftsmanship. These points are added to the flight times, which are limited to three minutes maximum.

Something of interest for possible SAM rule modification is the Australian rule allowing a backup model to be entered if the original is lost or damaged. But, you start all over again.

LAST WORD

The writer has heard nothing from Woody Bartelt or Tim Banaszak, SAM guiding lights, regarding the site for the Old Timer Championships. According to correspondence received from Ed Franklin of the New Jersey Old Timer Eagles, it looks like Lakehurst will be next year's flying site for the O.T. Nats. Ed further notes he has been selected to run the free flight end of things. How about some confirming information men?? Quite a few west coast boys are going east if given enough time to plan for the vacation schedules. (*Understand it may be July 2, 3, 4. wcn*)

That's it for this time. Next month, we'll talk about the unique Texaco Event being staged by the SCIF boys at Taft. Imagine the R/C controlled jobbers versus the free flights. Sounds like more fun than a barrel of monkeys.

FLASH! Just received an announcement from Tim Banaszak, Secretary of the Society of Antique Modelers (S.A.M.) The 1974 S.A.M. Championships will be sponsored by the Old Time Eagles of New Jersey. The contest will be held on July 2, 3, and 4 at Lakehurst Naval Air Station. Contest manager will be Woody Woodman, 389 Floral Lane, Saddle Brook, N.J. 07662.

Inasmuch as this is the first time the Old Timer Nationals will be held on the east coast, all traditional events will be carried with the possible exception of Unlimited Antique. There isn't quite that much room!

Full credit should be given to the Old Time Eagles as they have been able to secure use of the N.A.S. at Lakehurst through Commanders Jack Bolten and John Kelly, both ardent modelers and active SAM members. In addition to having an adequate field for free flight, the blimp hangar will be available on July 4 for an indoor event. How about that??

Woody Woodman has assured S.A.M. that all activities will be held in addition to the regular contest; the Annual SAM meeting, MECA National Collectogether (that's a great item!), and the Victory Banquet. Also, campers will be allowed. So, let's not hear any excuses that motels are too expensive. The whole setup looks simply great, so make plans now to attend.

Workbench . . . Continued from page 4
Schluter make a 5 second flight in Harsewinkel, Germany, 1968, and has 5 or 6 "choppers" ready to go at any moment. His son Kim, is also an R/C chopper pilot, and between the two of them, they have built and flown just about every kit that has become available.

Like we said, "Ask a silly question . . ."

SPEAKING OF STAFF . . .

In addition to John "Chopper Chatter" Tucker, MB will have another new contributing editor starting with the January issue. Bob Stalick, Albany, Oregon, has joined us as moderator of the free flight department. Since Bob is about to retire as AMA District XI Vice-President, and has resigned as Director-At-Large of NFFS, we felt he needed something to take up his spare time.

WHERE YOU GOIN', NATS?

It seems that our confidence in Ontario Speedway, California as a western (at last) Nats site, was a little premature. Further investigation only a week later indicated that Speedway officials wanted \$25,000 . . . just for starters . . . that is, plus all profits from admissions, food and souvenir sales, exhibits, etc. After paying \$15,000 for Oshkosh, only to find out that the EAA was still pulling the strings, has made AMA a little gun-shy . . . to put it mildly, about taking on *any* cash responsibility. Can't say as we blame 'em.

Meanwhile, at the suggestion of John Embry, President of the Lake Charles, Louisiana LARKS (Lake Area Radio Kontrol Society), John Worth flew to that city to take a look at former Chennault Air Force Base. Embry and the LARKS had put together quite an offer to AMA, and to back it up, our AMA Executive Director was met at the plane by officials of the Lake Charles Chamber of Commerce, the J.C.'s, and the Tourist Bureau. He also met with the Mayor of the city!

Chennault Air Force Base, built for B-47's, was taken over by the city some 3 or 4 years ago, is closed, and is FREE! Most of the buildings are occupied by city organizations, but three hangars are available to AMA.

Now hear this . . . the main runway is 200 feet wide and 12,000 feet long! (That's over 2 miles!) This runway has a parallel taxi strip. Near the hangars are two 1,000 by 4,000 foot ramp areas! One problem . . . if you're on foot, you may starve to death getting from one site to the next! Free flighters will go APE if the Nats end up here.

As has been pointed out before, the flying site is the most important, but not only factor in choosing a Nat's location. However, as indicated by John Worth's reception, the city of Lake Charles is prepared to greet the 1974

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At this point in time, Lake Charles looks like *the place*. By the way, the date will probably be early August. Anytime in July would be too close to the proposed World Champs in C/L and R/C Scale, scheduled for Lakehurst, N.J. in early July.

OTHER THINGS TO DO

The RAMS (Radio Aero Modelers of Seattle) will hold their 9th Annual R/C Model Show on February 9 and 10, 1974, at the Sea-Tac Motor Inn, 18740 Pacific Highway South, Seattle, Washington 98188. Additional information on the show can be obtained by contacting Show Chairman Robert R. Gruye, 4118 32nd St., S.W., Seattle, Wash. 98126, (206) 932-7583.

* * *

R/C's mid-winter "MECCA," the Toledo Symposium, is scheduled for February 23 and 24, 1974, again at the Lucas County Recreation Center, Maumee, Ohio. For further information on this 20th annual truly biggest R/C "shew" on earth, write to the Weak Signals R/C Club, P.O. Box 5772, Toledo, Ohio 43613.

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SCALE PLANS. Big 30 x 42 BlueLines. All 1" = 1 foot. 3-Sheet sets: Douglas O-25C, YO-31A/O-31B, YO-31C/Y10-43, O-43A, O-46A, Fokker D-17; \$4.50 each. 2-Sheet sets: Douglas O-38, Davis D-1K; \$3.00 each. General Western Meteor, 1 sheet; \$1.50. Mailed folded and postpaid. PETER W. WESTBURG, 834 Seventh St., No. 6, Santa Monica, California 90403

Morton M5, excellent condition, complete. For sale to highest bidder. Ralph Lauritsen, 320 South Story, Boone, Iowa 50036.

Model airplane plans. Peanut, rubber, CO₂, gas. Free list. Send self addressed, stamped envelope to: Modernistic Models, Box 6932 Burbank, California 91510.

"DO-IT-YOURSELF AERODESIGN" — Sailplanes, FF, HLG, R/C Sport, Charts, instructions — \$4.95. Eric Lister, 953 Klockner Rd., Trenton, New Jersey 08619

Counter Continued from page 5

The company will also be importing the Czech MVVS .15 engine in glow and diesel, and circular-tow glider hooks are on the way. Write for full particulars.

* * *
As you will note in their advertisements, two model manufacturers have moved to new quarters. Carl Goldberg Models has relocated in Chicago. It's now at 4736 W. Chicago Ave., Chicago, Illinois 60651, where available floor space has been more than doubled.

Hi Johnson has also made a change, and is now located at 11051-18 Glenoaks Blvd., Pacoima, Calif. 91331, phone (213) 899-4312. Incidentally, Hi also points out that his molded canopies have now been repriced . . . lower! All three styles now range in price from 85 cents to \$1.60, depending on size. Tinted ones are coming!

R/C Continued from page 17

called the Flight Pacer. Very small in size, it mounts on the top of your transmitter and beeps you at any pre-set time . . . such as when you have a minute or two left on a pattern flight, and so on. You can set the timing to beep you at about any chosen interval. In addition, it will beep if your transmitter is accidentally left on. Cost is only \$7.98 and you can put it together from the complete instructions in just about two hours. It takes power from the transmitter and the current drain is very small. A very handy item. It is only an inch wide, barely more than half an inch deep, about an inch and a half long, and comes complete with the tiny case. Fully guaranteed. Contact: Telecraft, Box 495, Kirkland, Wash. 98033.

Workshops are always a problem for the modeller. Over the years I have had all sorts of them. My workshop when I was a kid was the basement in the "old home place," which also doubled as the furnace room and garage. Plenty of room, and I could even run the ignition engines down there without too many complaints from the folks . . . of course there were layers of blue smoke from

the gasoline and SAE 70 oil mixture.

After WW II, the family moved and the new basement was damp . . . no good for modelling at all. Then marriage and starting a family, and then building a house. Wonderful house . . . we did a fantastic job . . . only made one mistake . . . I forgot to work out something for a workshop and ended up in the carport storage room sharing space with the washer, dryer and furnace. There was room for a workbench over the oil tank for the furnace . . . just exactly six feet long . . . three or maybe four at the most feet deep, and a space to

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Scale floats for Lanzo Puss Moth or your favorite ship - 22" long. By Hal Cover.
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stand before it. This was not only the ham radio "Shack" and electronics workbench, but also the model airplane shop. Nice and cool in the summer but very, very cold in the winter. Although I had a small electric space heater down there, I never could keep my feet warm and to this day, whenever I think of that workshop, my feet ache from the remembered cold.

Years passed and I finally moved . . . this time an unfinished room was the

workshop but dope fumes permeated the house. Then a house with a full basement . . . I sprawled models all over the place . . . it really was heaven.

Now my workshop, at the very best, is a total mess, but what pleasure to have all the room you want. I know many modelers who work off bridge tables or converted closets and my heart goes out to them. I guess lots of wives and even home builders don't understand modelers need space. Usually

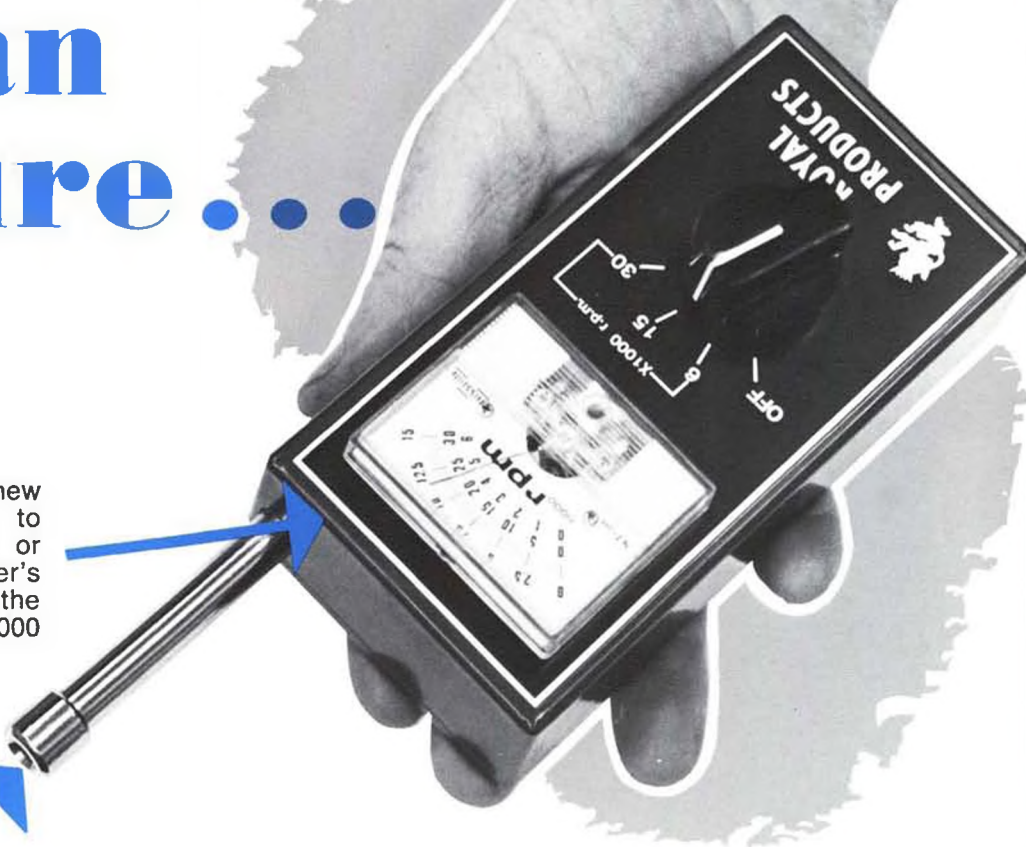
an eight-by-ten room or basement space (providing it is dry) is enough to keep a modeller happy and content for years. Right now, we are in the process of building a new home. The entire house will be just as Sweet Emily wants it . . . but the workshop is mine! All mine! A good dry basement room, fifteen by twenty, with heat in the winter and air conditioning in the summer. Who could ask for more! After all, they say that happiness is a big workshop! ●

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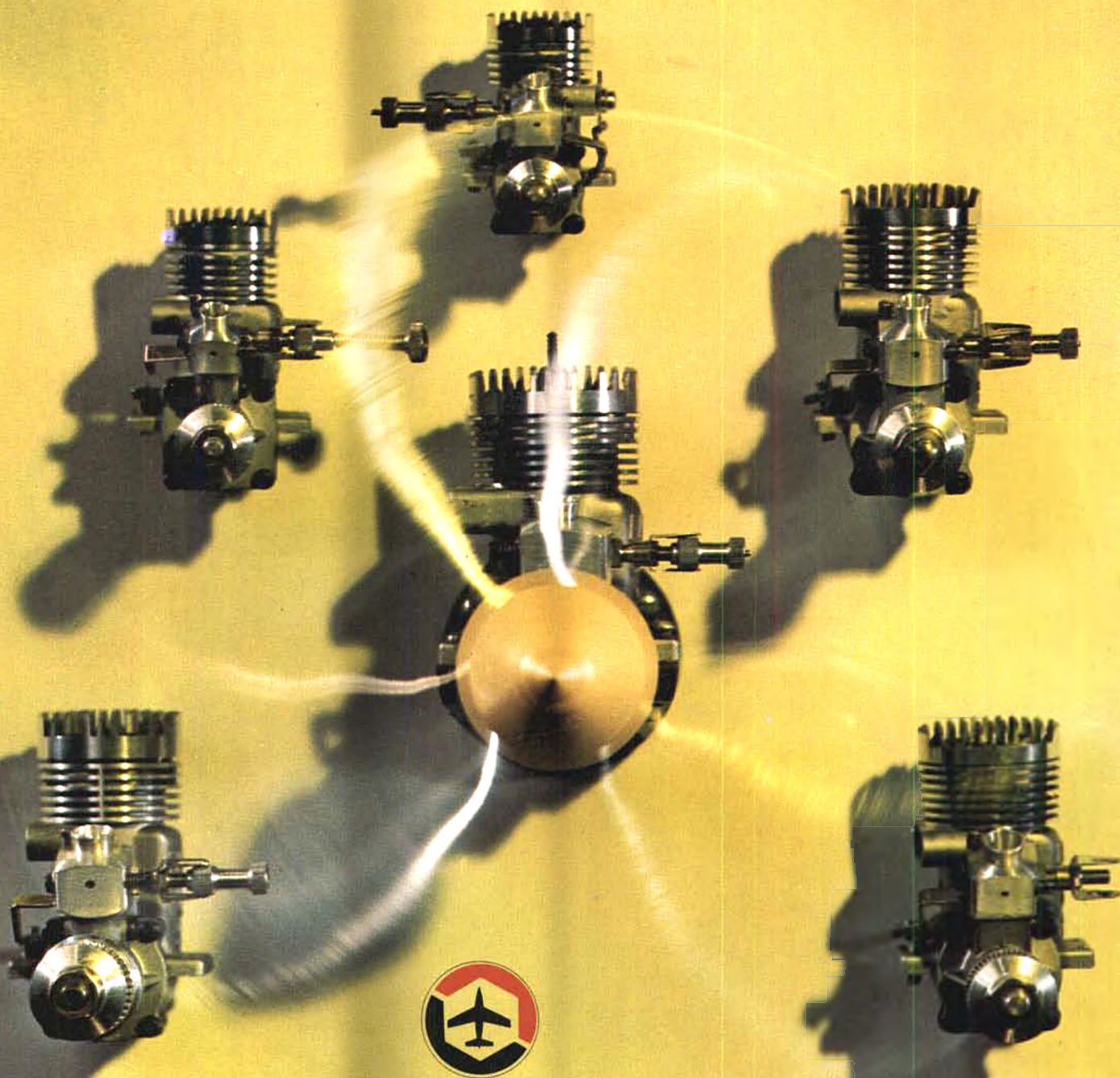
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