MODEL BUILDER

ICD 08545

JUNE 1983

$2.50

volume 13, number 137

BYRON ORIGINALS

A product of Midwest Industries Inc. Ida Grove, Iowa. 51445 Ph. 712-364-3165

F-86 SABRE JET

Powered By The Patented

BYRON ORIGINALS **ByroJet®**

Ducted Fan

SPECIFICATIONS:

- Wing Span . . . . . 57"
- Wing Area . . . . . 684 sq. in.
- Wing Loading . . . . . 30 oz. psf.
- Length (Model H) . . . . . 58¼ in.
- Length (Model D) . . . . . 62½ in.
- Ready-to-fly wt . . . . . 11 lb. (Including Econokote covering & retracts)
- Channels . . . . . 4 (5 w/retracts)
- Power. . . Byro-Jet & Schnuerle .60 & .80s

Another Rare Blending of Value And Performance From the Ducted Fan Specialists!

Item	Description	Factory Price	Plus Shipping
6130085	F-86D kit	$245.00	$8.50
6130086	F-86H kit	$240.00	$8.50
6030198	Opt. seq. door kit	$ 66.30	$2.00
6030203	Quick Pneumatic connectors	$ 22.10 pr.	$1.50

(2 pr. required for 4 line systems)

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For further details, send $2.00 for complete F-86 information packet. Includes materials list, assembly manual with drawings, Byro-Jet performance data plus a list of suggested engines.

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CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Aviation artist Bob Benjamin took photos of this Waco YKS-7, owned by George Franchini, of Black Diamond, Washington, at last summer's EAA Arlington Fly-In. Then, on the way home to Olympia in his Cessna 140, he took photos of the sunset from the cockpit. The cover painting is the result of combining aircraft and sunset pictures into this one dramatic scene.

MODEL BUILDER (ISSN 0194 7079) is published monthly by RCMB INC., 621 West 19th St., Box 10335, Costa Mesa, California 92627-0132. Phone (714) 645-8830.

Subscriptions: $25.00 per year, $47.00 for two years. Single copies $2.50. Subscriptions outside the US (except APO & FPO) $32.00 for one year only. All payments must be in US funds, drawn on a US bank.

Change of address notices must be received six weeks before date of issue that new address takes effect. Send old address with new; old label preferred. Post Office will not forward copies unless you pay extra postage. Duplicate issues cannot be sent.

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Mott's Hobby Shop
7241 Grapevine Highway
PH 817 281 0921
HOUSTON
Clear Lake Models
117 Camino S Shopping Ctr
PH 713 488 6315
HURST
Roy's Toys (For Big Boys)
1309 Norwood
SULPHUR SPRINGS
Miller's Hobbies
624 Bellview St
UTAH
OREM
Miniature Aircraft Prod
811 W 400 N
PROVO
The Model Shop
42 W 300 N
VERMONT
NORTH FERRISBURG
Vanden's House of R C
Route 7
SWANTON
The Hobby Shop
RFD 1 Rt 7
PH 802 524 2715
VIRGINIA
ANNANDALE
Model Masters Inc
6920 Braddock Rd
RICHMOND
The Hobby Center
1709 Willow Lawn Dr
VIRGINIA BEACH
Hobby Craft Centers
#1 967 Providence Sq Sh
#2 62 Princess Anne Sh
WASHINGTON
BELLEVUE
R/C Model Shop
14020 N E 21st St
PH 747 9914
BELLINGHAM
Hobby Hive (Graham's)
111 E Magnolia St
KENT
Kent Hobby
1313 W Meeker
PUYALLUP
Fergrove Model Supply
10611 136th St East
PH 845-7675
SEATTLE
Webster Supply Co
17818 Aurora Ave N
TACOMA
Bill's Hobby Town
14914 Pacific Ave
PH 206 531-8111
WALLA WALLA
Harley's R C
Route 1 Box 277A
PH 509 529 2618
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W Washington St
WISCONSIN
GALESVILLE
R/C Unlimited
825 Park Drive
PH 608 582 2853
MARSHFIELD
Mid Wisconsin Hobby Center
Northway Mall
503 E Ives St
MENOMONIE
True Value Hardware
1512 9th Street
L Mart Shopping Ctr
MILWAUKEE
Casanova's Hobby
1423 S Muskego Ave
PH 414 672 2700
CANADA
BAWLF ALBERTA
B & P Transport Ltd
Box 6
PH 373 3953
CALGARY ALBERTA
Hobby World Canada
Box 968 Stn M
CALGARY ALBERTA
P M S Hobby Craft
Calgary North Hill Centre
WINNIPEG MANITOBA
Cellar Dweller Hobby Ltd
1354 Main St
PH 589 2037
WINNIPEG MANITOBA
Gooch's Hobbies
646 Portage Ave
ST JOHN'S NFLD
Capitol Hobby Centre Ltd
6 Freshwater Road
DUNDAS ONTARIO
Skycraft Hobbies Inc
139 York Road
SCARBOROUGH ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave E
PH 416 755 1766
WILLOWDALE ONTARIO
Keith's Hobby Shop
5205 Yonge St
PH 222 4721
ARVIDA QUEBEC
LeModele Reduit Enr
116 Mathias CP 341
PH 418 548 2136
HAUTERIVE QUEBEC
Le Centre Du Modeliste
Allard 1223 Lesirat
MONTREAL QUEBEC
Can Air Hobbies
5850 Gouin Blvd Ouest
PH 514 332 3565
ST GEORGES QUEBEC
Le Mur du Son
1050 157 Rue
PH 418 228 1374
SASKATOON SASKATCH
Collins Aero Craft
238 First Ave North
PH 652 4775
YORKTON SASKATCH
Radio Control Hobbies
39 Betts Ave
WHITEHORSE YUKON
Ken's R/C Supply
8 Talchun Road
PH 667 4984
AUSTRALIA
BRISBANE QUEENSLAND
Underwood 4119
The Hobby Warehouse
30 Kingston Road
COLUMBIA S AMERICA
Aeromode Ltd Britannia Ltda
Apartado (P O Box) 52530
Bogota 2, Columbia
PH 212 7309
ENGLAND
LONDON N7 6NP
Henry J Nichols & Son Ltd
308 Holloway Road
ISRAEL
REHOVOT
Truaney Rehovot
70 Derech Yavne
NEW ZEALAND
INVERCARGILL
Model Shop
55 Arcade Dee St
PH E9439
SWEDEN
S 871 02 HARNOSAND
Modell Produkter
Box 2060
VENEZUELA
CARACAS 1070 A
Hobby World C A (Dist)
Apartado Postal 79054
PH (02) 34 33 02

CALIFORNIA (Foreign Dist)
IRVINE
Exportations Ltd
17635 Sky Park Circle #E
PH 714 957-1331

DEALERS: Write For Details On How Your Name Can Appear In This Column

from Bill Northrop's workbench

• • •

Anita Northrop and Al Novotnik in the Model Builder Magazine booth at the WRAMS Show in White Plains, N.Y. Al made the new booth backdrop. He's also MB's advertising representative, covering all areas, but particularly the east coast.

A BIT OF HISTORY

Most every aeronautica buff recalls the name Douglas Corrigan, and the flight he made that put him into aviation history books. However, if you're like me, the name and the flight may be all that's remembered . . . none of the details. The following brief account was published in the January 1983 issue of the Suburban Aeroclub of Chicago newsletter, edited by Byron Sauriol and Eleanor Graniczny. Though the source was not acknowledged, the piece was credited to James M. Murphy. We thought you might enjoy this little bit of aeronautical history.

DOUGLAS CORRIGAN'S STUCK COMPASS

An ex-welder from an aircraft plant in California hopped into his $900 single-motor Curtiss Robin plane, and 27-plus hours later . . . on July 9, 1938 . . . landed at Roosevelt Field in New York. Douglas G. Corrigan, a 31-year-old flying buff, explained he was on a "vacation flight," and had made the trip nonstop.

For a week, he stayed with a friend. Then, on Saturday, July 16, he took his nine-year-old plane to Floyd Bennett Airfield in Brooklyn, and sought permission to take off at 2 a.m. for the return flight home.

"I want to fly by the light of the moon," he told the field manager, "and be over the desert in the cool of the morning." He was denied permission to take off . . . "too dangerous at that hour," he was told.

At 4 a.m., he was given the go-ahead. He had had five new spark plugs put in, paid $62.26 for 218 gallons of gas (the craft now had 320 gallons, plus 16 of oil). A single United States map was pinned to the instrument board. There was no wireless, no special instruments.

Corrigan asked a boy from the hangar to swing the propeller, but he couldn't get it going.

"Here, you hold the plane throttle. I'll swing it," Corrigan instructed, and he got the craft going. After it started, he took a flashlight to check the motor to see that nothing was coming loose.

At 5:17 a.m. on Sunday, the plane left. Flares lighted the runway, and a fire truck and an ambulance stood by. Corrigan used 3,000 feet of the 4,200-foot runway before getting his craft airborne.

For some reason, the ship headed east, and field personnel wondered why.

A little more than 28 hours later, he sighted some fishing boats, then found himself over land; he searched for an airfield, spotted one, and came in for a perfect landing.

"I'm Douglas Corrigan," he told some field personnel who had gathered around his plane (which had no permit to land). "I just got in from New York. Where am I? I intended to fly to California."

He learned he was at Baldonnel Airfield in Dublin, Ireland.

Wearing oil-stained gray pants and a leather jacket, the flyer was taken to the American Legation, and there he tried to explain to newsmen what had happened.

"My compass stuck. It didn't come loose 'til the end of the flight. I took a wrong turning. . . I headed as I thought for California. I had no intention of flying to Ireland.

"For almost 26 hours, I was at 5,000 to 6,000 feet . . . in the clouds. I came down to 1,500 feet only when I ran into rain. I glimpsed some water, then rose back to 5,000. I came down and saw fishing boats. I thought I was over the Pacific Coast.

"A half hour later, I sighted land. It didn't look like what it should look like to me. I hugged the coast, and coasted around to find an airfield. And here I am, far from Los Angeles, where I had planned to go."

Despite probing questions from skeptical reporters, the American stuck to his story. Few believed him. Corrigan was known to have wanted to fly to Ireland (he had been denied permission the year before). And there was that eastbound takeoff in New York. . .

Soon nicknamed "Wrong Way," the personable welder-pilot had injected a bright note of levity into the dour, war-shadowed world of 1938.

Corrigan and his crate made history. And the Burlington, Wisconsin, Liars Club made Douglas Groce Corrigan a life member. —James M. Murphy

IN SEARCH OF

Larry Benham, 3536 West Ave., #231, San Antonio, TX 78213, has an eight-foot span Piper Super Cruiser, built from a Capitol kit. He's rebuilding it, and needs a set of the original plans and instructions. Can any of our readers give him a hand?

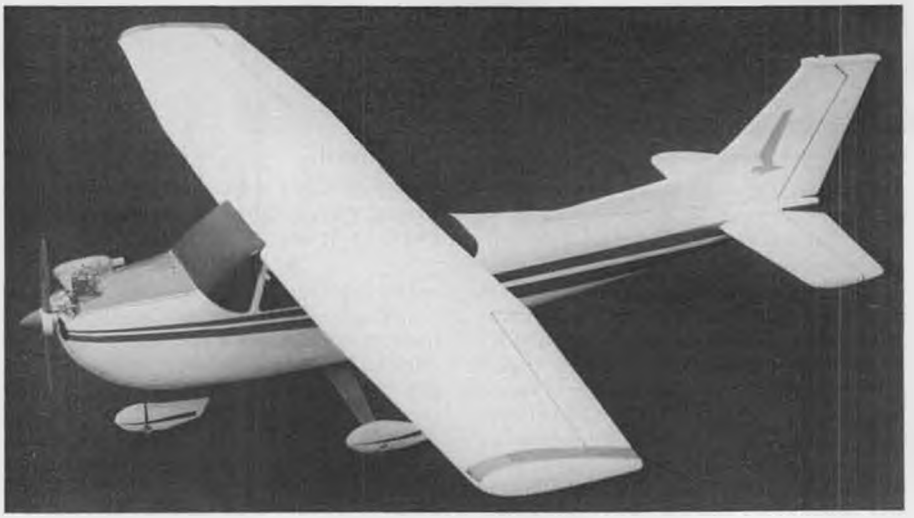
★ ★ ★

Our primary potentate, and purveyor of pretty popular Peanut plans, Walt Mooney, needs to hear from one Milton Patterson, of Crest Industries (or Industries Crest), who lives at 143 Dolomite Drive . . . somewhere in the world! It seems that Walt answered an inquiry from Mr. Patterson, but somehow left the town and country off of the address! He's believed to be located in Canada. If

Continued on page 102

OVER THE COUNTER

All material published in "Over the Counter" is quoted or paraphrased from press releases furnished by the manufacturers and/or their advertising agencies, unless otherwise specified. The review and/or description of any product by R/CMB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by R/CMB.



MRC's new 1/5-scale Cessna Sky Hawk, a quick building, complete kit.

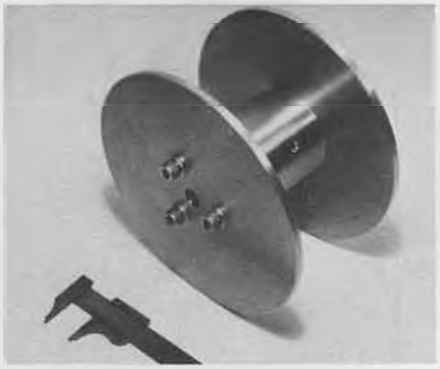
• Model Rectifier Corporation, also known as MRC, has just introduced its new 1/5-scale, ready-to-fly Cessna Sky Hawk kit. The Sky Hawk is an all foam airplane that comes complete with many of the assembly operations factory finished. Control horns, hinges, and pushrods are all pre-assembled so you can get into the air with a minimum of building. In fact, the Sky Hawk only takes one and a half hours to complete.

The Sky Hawk is a stable aircraft. Novices will be attracted to its gentle flight characteristics, and experienced fliers will appreciate its outstanding performance. Four channel control includes: steerable nose gear, ailerons, elevator, rudder, and throttle. The six-foot main wing surfaces are ribbed just like the prototype, and the wing is reinforced with wood spars for added strength and durability.

This complete Sky Hawk kit also includes a propeller, Enya .35 TV engine, glow plug, muffler with extension, and a spinner for a total suggested retail price of under $225 (radio control system is extra). Contact your local hobby shop, or MRC at: 2500 Woodbridge Avenue, Edison, NJ 08817.

★ ★ ★

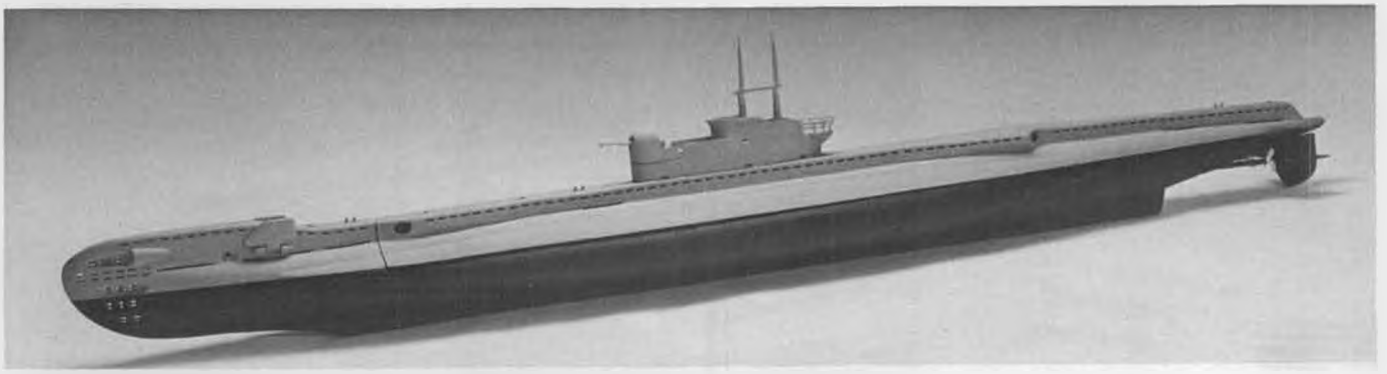
Top Flite Models, Inc. now has an educational video tape available for sale or rent which covers basic tips for beginners on how to Monokote: wings, fuselage sides, tail surfaces, fillets, as well as tips on hinging and simple trimming



RLF Products' FAI/F3B winch spool.

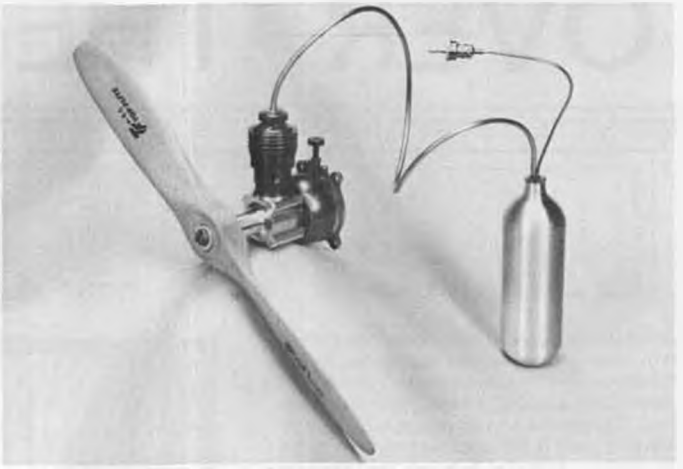
Top Flite Monokote "How to" video.

Leisure Electronics' newest gear motor.



Sidney Cole's five-foot-eight, three-channel R/C submarine which dives just like the full-scale version.

Bob and Bill Hunter shooting the new Hot Stuff "Video Tips II."



Davis Diesel CO_2 conversion for Cox .020 glow engine.

with Super Monokote, Top Flite's best selling iron-on covering. Proper use of the Monokote iron, heat gun, and trim seal iron are carefully shown.

This high-quality, one-hour video tape for VHS or BETA format players was produced exclusively for Top Flite by Four Pi, Inc., and sells for $39.95. If you wish, return your Monokote I Video Tape within 30 days for a $20.00 refund. Each video rental includes a coupon for 12 rolls of Super Monokote worth up to 50% off list price (applicable only to U.S. orders), which could mean a savings of a whopping $75.60!

If any of this interests you (maybe you should check you pulse if it doesn't), send your check or money order for $39.95 to Top Flite Models, Monokote I Video Offer, 1901 N. Narragansett, Chicago, IL 60639.

★ ★ ★

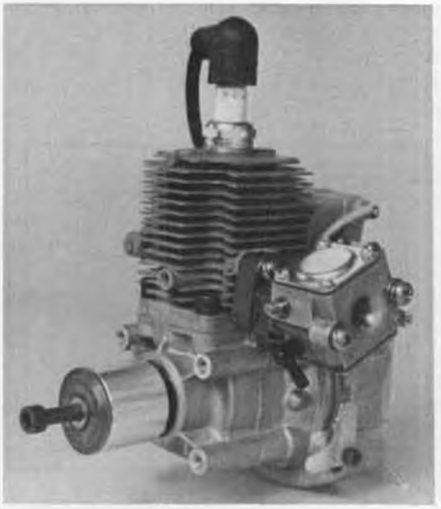
Enya Model Engines announces a major advance in four-cycle engines for quarter-scale model builders. The Enya .90 four-stroker has just been released to the modeling public. This new engine meets all FAI rules for displacement. The new Enya .90 features technological advances which deliver a 50 percent increase in power over .60 size four-cycle engines, with just a 30 percent increase in weight at only 28 ounces. Speed range is from 2,500 to 11,500 rpm. The Enya .90 four-cycle comes with an Enya G-8 carburetor, a detachable 7mm venturi, and an anodized muffler. Vibration is very low, and the engine sounds very realistic.

For more information and price, write or call Enya at P.O. Box 286, Fords, NJ 08863, (201) 572-5792.

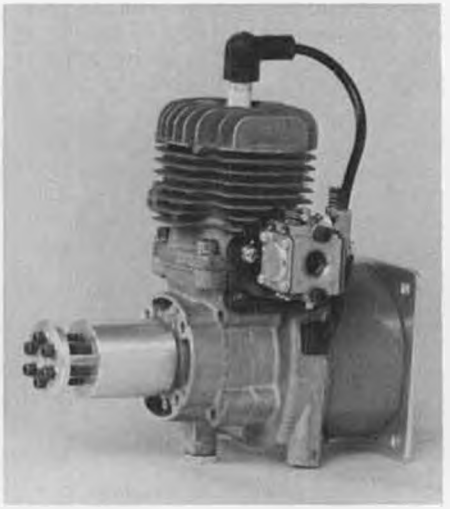
★ ★ ★

Attention model boat and ship enthusiasts! Here is a really unique item that will fascinate and thrill you . . . a three-channel, fully operational, scale, WW-II T-Class British submarine. This 68-1/2-inch long, two-piece fiberglass submarine features complete hardware (minus radio and glue!) including: pump and dive motors, pump and dive batteries, all linkages, and all accessories. The highly detailed fiberglass hull

A&L Distributors, Inc. new ordering catalog.

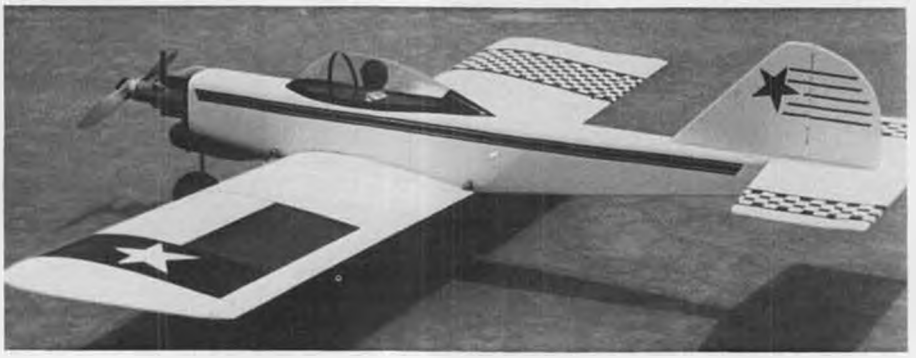


Roush Manufacturing's new 1.3 ci engine.



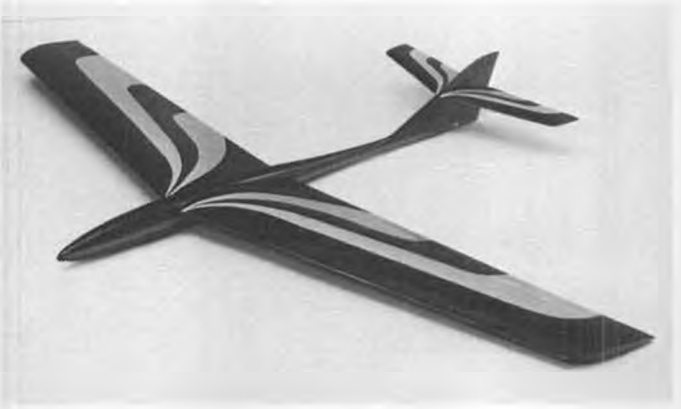
Roush Manufacturing's improved Cobra 2.3.

Enya .90 new technology four-stroker.



Fun Fli 40 from Flite Line Products.

New Standoff Scale Stampe SV-4 from Champion Model Aeroplane.



New Askant R/C slope glider from Aeronautics, Inc.

features all scale cut-outs, and tubing exits clearly marked.

This sub can submerge while under power or standing still, it can dive, surface, and steer using a three-channel radio. It's an ideal model for lakes or swimming pools. Don't worry about accidental submersion or loss of control as there is a built-in safety feature included in the design.

The price of this T-Class sub is $425 including shipping in the U.S. (California residents add six percent tax). Write to Sidney Cole, 1815 Sweetwater Rd., No. 51, Spring Valley, CA 92077 for more details or ordering information.

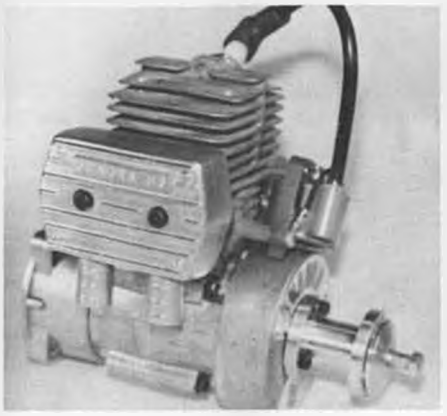
★ ★ ★

There's a new R/C sailplane in the air these days, and it's called the Askant. Intended for serious slope flying or thermal hunting, the Askant is a 69-inch span, swept wing glider of foam core wing and model epoxy-fiberglass fuselage construction. The wings are balsa sheeted and can be ordered with an optional ballast-carrying spar which will hold 23 ounces of lead shot. Tail surfaces are also foam core with balsa sheeting for durability. Two or three-channel operation: aileron, rudder, and elevator.

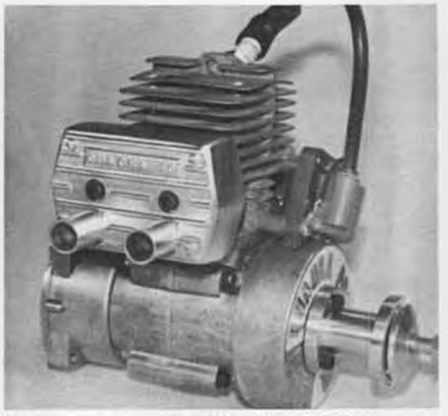
The Askant is available direct from the manufacturer at a special introductory price of $89.95 (regularly $119.95). Write to Aeronautics R.C. Sailplanes, 20291 Beam Circle, Huntington Beach, CA 92646.

★ ★ ★

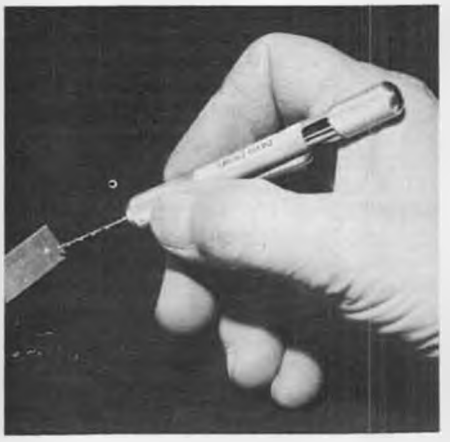
Quadra 50 owners will be interested in Tatone Products' new, quiet, and slimmer-than-factory muffler which it claims will deliver a 200 rpm boost in power. These mufflers are cast aluminum and are designed to accommodate the Tatone Losta Smoke system if desired. Model No. 12615 can be used for either *inverted* or *upright* engines. Model No. 12635 (with side exhaust pipes) can be used on *upright, inverted, or side* mounted engines. Price is $26.25 each. Each muffler comes with two neoprene exhaust extensions and



Tatone Quadra 50 muffler (No. 12615).

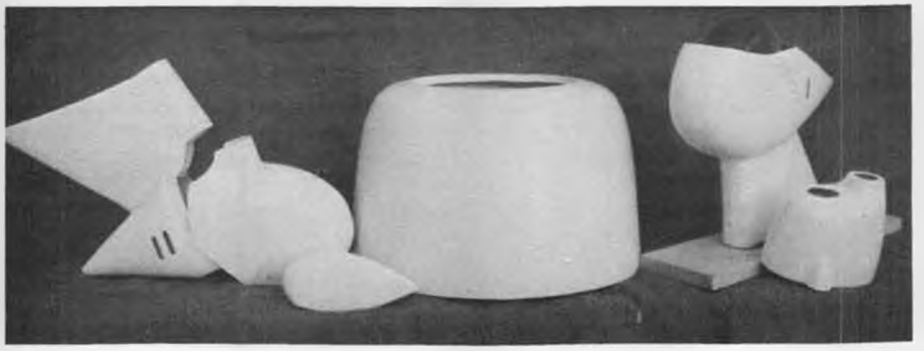


Tatone Quadra 50 muffler (No. 12635).

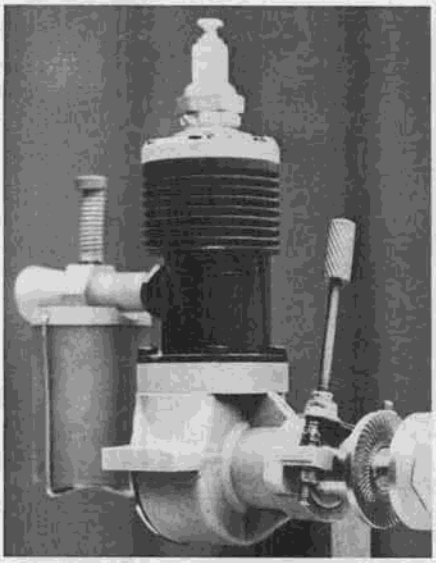


Davis Diesel's miniature drill set (left) and drill in use (right). Fits in pocket.

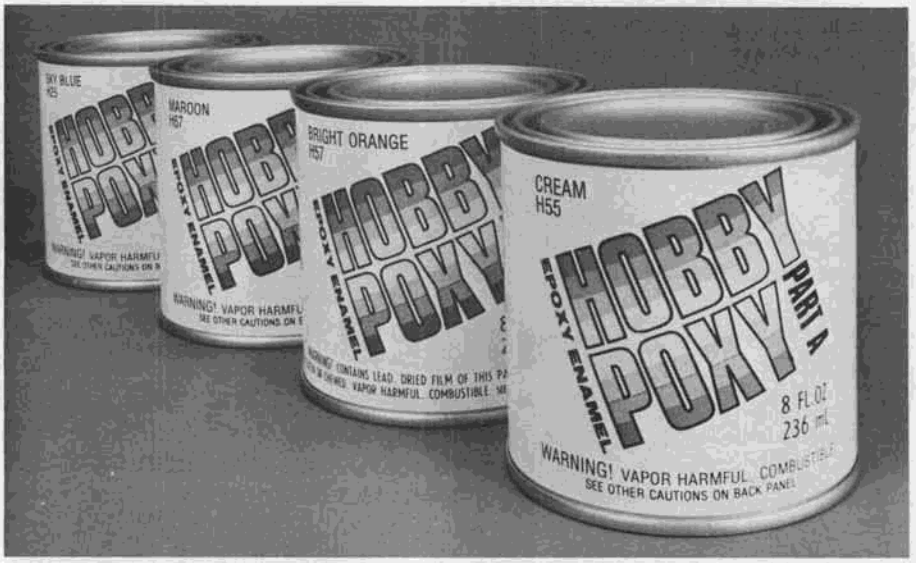
Bantam Precision Products' 2.6 ci engine.



T&D Fiberglass Specialties latest cowls, wheel pants, fairings, for Gee Bee R-1 and Snow White.



Replica ignition Mechanair from Striegler.



Four new Pettit, Hobby Poxy enamels: Sky Blue, Maroon, Bright Orange, Cream.

clamps. Available through most hobby shops, or direct from Tatone Products Corp., 1209 Geneva Ave., San Francisco, CA 94112, (415) 334-7189.

★ ★ ★

From the folks at Satellite City comes the new "Video Tips II," a very high quality instructional video tape (for VHS players) that takes up where "Video Tips I" left off. In it are all the latest hot tips on how to use the entire line of Hot Stuff products including the fabulous new CA accelerator, Hot Shot. If you saw "Video Tips I," you will want to see "Video Tips II" for sure.

To place your *rental* order for "Video Tips II," include $35.00 (check or money order payable to Satellite City), and mail to: Satellite City, P.O. Box 836, Simi, CA 93062, (805) 552-0062. If the tape is returned within 65 days, renter will receive $20.00 refund. To place your *purchase* order, send $25.00 total (includes postage and handling).

To rent "Video Tips I," send $30.00. Fee is totally refundable if tape is returned within 65 days.

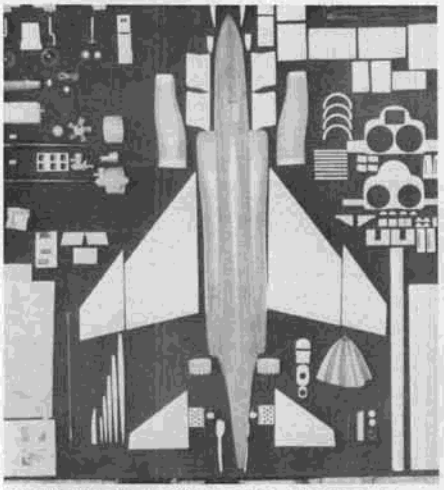
Add $5.00 (not refundable) for shipments outside U.S. and Canada. C.O.D. orders call (805) 522-0062 (no collect calls please), and add $1.50.

Include name, address (street address only, shipped UPS), and phone number. Where applicable, name club or shop. Specify which tape is desired, can be ordered together.

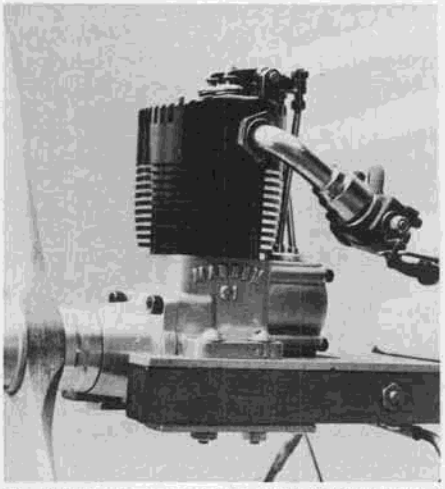
★ ★ ★

Leisure Electronics announces the availability of its newest gear drive motor and flight system, the LT-50 Gear Motor (3.6:1 Pattern Wind) which can produce up to two pounds of static thrust when operated on an 8.4-volt battery pack. Features include dual ball bearings, Delrin and brass gearing, and glass loaded polycarbonate housing. The LT-50 Gear Motor (3.6:1 Pattern Wind) weighs 6.38 ounces and lists for $59.95 (stock No. 6003B) It also comes as a very handy flight *system* including a seven-cell wired Sanyo battery pack and switch harness for $99.95 (stock No.

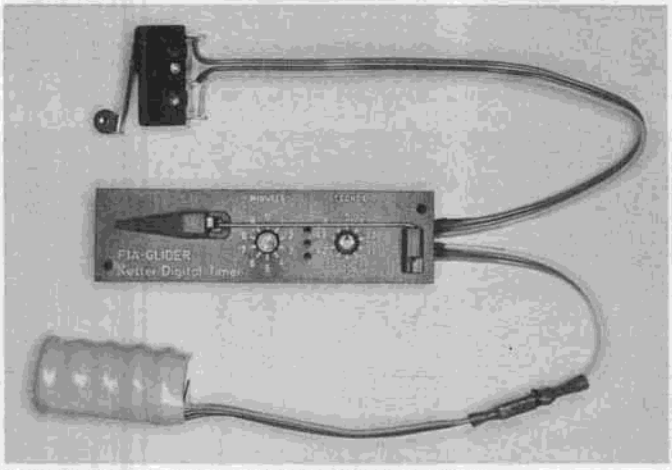
Continued on page 94



Jet Model Products' new F-4 Phantom II.



English Magnum .91 from Striegler's RC Supply.



Koster Digital Timer for FAI/F1A glider competition.

New Golden Falcon trainer from St. Croix.

Two major U.S. balsa magnates, Hazel Sig/Hester and Frank (Mid-west) Garcher in a serious strategy meeting.

Bev Godbersen, Rich Bauer, and Jinny Adams listen intently while a customer tells 'em how to do it.

R/C WORLD IN NEW YORK!

By BILL NORTHROP

• Just the other day, I was thinking back (as you get older, you spend more time thinking back, and less time creating new things to think back on) about the days when I was R/C editor for *M.A.N.* (1965 through mid-1969). My primary duty each month was to write the R/C column about what was happening and developing in radio control.

So, you say? So . . . it was a lot easier to put together a meaty column then, mostly because an R/C editor's duty was to report on *all* R/C activities: aerobatics, scale, soaring, pylon . . . helicop-

Gloster Javelin F(AW) Mk 9, by Mark Frankel, Gladwyne, Pa. Two OPS 65 driven Byro-Fans, weighs 26-1/4 lbs.

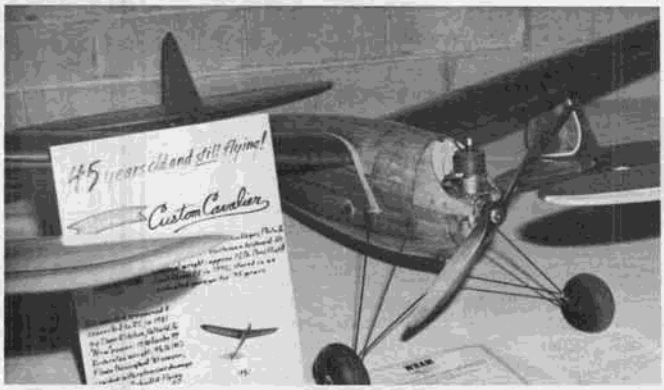
Pretty Stinson Senior Trainer, plans blown up from Oct. '37 M.A.N. design by J. Davidson. August Vecchione, Woodhaven, N.Y.

Typical South Shore, Long Island clam boat by Walt Maresco, Medford, N.Y. RAM electric K&B outboard conversion, 45" L.O.A.

Al Wolsky, Randolf, N.J., built this 1933 Arup (air-up). Span 40", weight 5-3/4 lbs., Enya .35 with 10 x 6 prop.

General shot of scale boat table, showing a wide variety of entries. Quantity of models down from last year.

Apologies to the builder of this finely detailed "Bird Dog" for not getting his name. Outstanding cockpit work!



Gerald Obschleger, Phila., built it in 1938. Resurrected in 1981 by Dave Ritchie, Hatfield, Pa., after 35 years in storage.

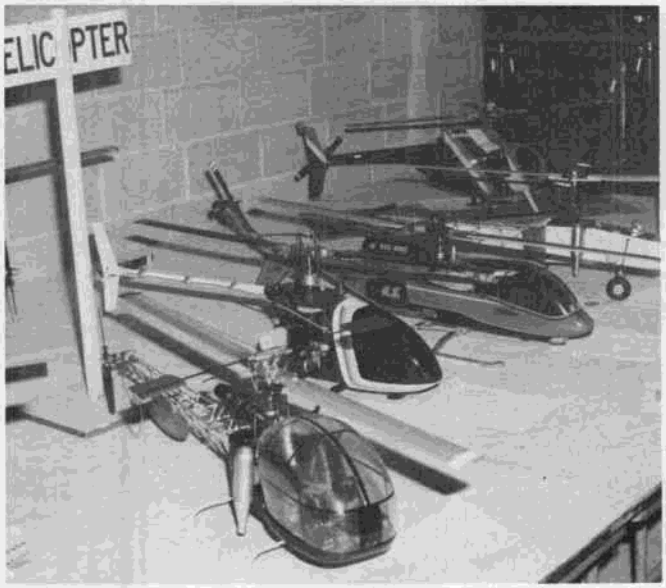
Latest aerobatic bird by Ed Izzo, Holliston, Mass. Rossi 60, 10x7-1/2, 8-1/2 lbs., 920 sq. in., pressure cowl, dive flaps, internal pipe.

ters? Not yet! Boats? Just barely. Cars? Mostly electric powered platforms for living room and driveway.

Now it's a whole different story . . . a separate columnist for each special interest, plus individual coverage of motive powers, electronics, finishes, etc. And so, what's left for the quote, unquote . . . "R/C Editor"? Just about zilch.

Of course, the magazine's editor is privileged to attend major trade shows, some local contests, and a few assorted major national and international competitions, on which he can report. But do you know what registers as the least interesting editorial material to model magazine readers? Reports on major trade shows, local contests, and major national and international competitions!

However, in good British tradition, we must, "Press on regardless". Trade shows are a vital part of our hobby. They provide an opportunity for manufacturers to place their latest products on display to a large number of important people . . . the ultimate consumers of their products. A manufacturer can shove any given quantity of his wares out the door that he cares to produce. These products may go through distributors, through dealers, or direct to the consumer . . . the modeler . . . the final destination of the product. If that final



A wide variety of helicopters on display. Many with modifications and scratch-built items.

Mike Garze, Edison, N.J. built this 84" span Hellcat. Weighs 20 lbs., Evra 1.9 engine. Randolph dope.

Sally Brown puts the double whammy on this photographer. That's how Dave wins so many aerobatic contests!

Beautifully detailed sailing vessels in the scale boat display area. Schooner rigs are the prettiest!

Highly detailed rubber powered Boeing F4B-4 from Golden Era, by Golden Age Reproductions.

Morane Saulnier AI by Tom Polapink, Centereach, N.Y. Tom is 17 years old. Nicely built and neat finish.

void (otherwise known as demand) has not been created for the product, by trade show exposure or advertising, all the distributor or dealer sales in the world will do no good, as the product will back up in warehouse and dealer shelves, and "die on the vine."

The trade show is important to the modeler. It gives him, or her, the opportunity to meet the manufacturer face-to-face, to ask questions, to make suggestions, to see the new products firsthand, and then pass the word around . . . and as in any special interest hobby or sport, the enthusiast grapevine of information is faster than the speed of light!

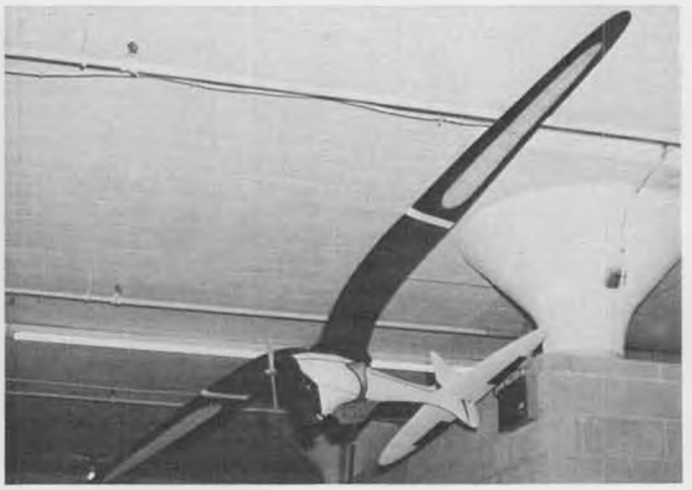
Above all, the trade show is a great social affair. Modeler and manufacturers alike enjoy the opportunity to rekindle acquaintances that may become alive only that one time each year. Manufacturers get the chance to trade ideas, to compare notes, and sometimes "make deals" that are most satisfying. Spectators also renew acquaintances, see new products, get to study all types of models that fire up their building (and purchasing) urge, and can often take advantage of "Show specials" that make the trip extra worthwhile.

This writer particularly enjoys the WRAM Show (Westchester Radio Aero Modelers) in White Plains, New York because of the opportunity to greet many long-time modeling friends from the days when we were actively engaged in the hobby on the East Coast. It's truly like "old home week." Although the

Continued on page 97

Straightwing Stinson (SR-5 or 6) rubber scale model by Golden Age Reproductions.

S. Newhouse built this Sikorsky US 300 helicopter, based on Kavan Allouette mechanics. Weighs 7 lbs., Webra 40.



Winnie Davis 13-foot Gull Wing, by John Hill, Yonkers, N.Y. Tissue and Coverall, 7 lbs., Enya 58.

Bob Boucher, Mr. Astro Flight, hands out nearly $2,000 of goodies . . . something for everybody.

Black Sheep Squadron control line entries: D.H. 4, Fournier, P-26, Skyraider, Thunderbolt, Airacobra, P-40, Corsair . . . variety! The D.H. 4 took first, P-51 took 2nd.

9th ANNUAL

Astro Electric Championships

PART ONE

By MITCH POLING . . . Our "Electric Power" columnist reports on the highlights of the entire 9th Annual Astro Championships. For special F/F coverage see Part II on page 62 of this issue.

• Where do you start when you are writing about a contest that covers two days, with events ranging from U-control to R/C quarter scale? It's like trying to cover a mini-Nats, and it is exciting!

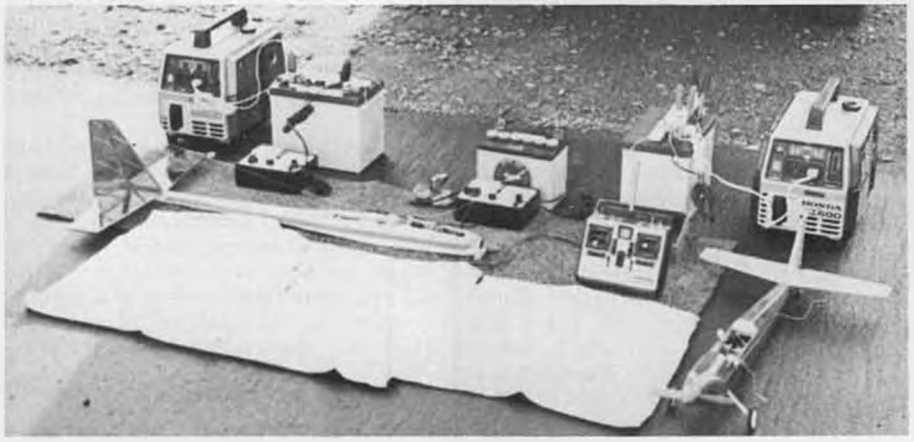
I shot six rolls of film at the Astro '83 Championships last February 5 and 6, and after much agonizing, narrowed it all down to a measly 20 photos for the

Bill Young and his Northrop flying wing . . . featured retracts. Future *MB* article.

Mike Charles holds his IBA 26 with which he took 1st place in F3E. Geist 60 cobalt.

Larry Jolly lofts his Astro 05 (cobalt) Electricus (*MB* plan 3831). First place in 7-cell

Larry Blakely flew this beautiful Commodore Old Timer to second place in Open Class O.T. Geist 40 cobalt. Climbed almost as well as the Playboys, suffered a little in the glide (heavy).



Larry Jolly and Roger Roth's pit area: two Honda generators, three car batteries, two Astro Flight AC/DC Auto Chargers . . . serious stuff! Models are Electricus (left) and Whistler (right).

Larry Jolly demo'ed the Ishimasa Skylark EH1 electric helicopter between events.

Skylark details: twin 05 motors, eight sub-C cells, lightweight construction. Condor Hobbies.

poor editor to try to cram into a few magazine pages. I sure hope he can, because that's what the contest was all about, variety in spades!

This was the best Astro contest yet, and I've been to most of them. The easiest way for me to tell you about all that happened is to start chronologically, on Saturday, with the old timers.

The immediate and overwhelming impression I got from observing the old timers was that their performance has easily doubled, maybe even tripled, in the last two years. My poor old Brigadier, which is a fun sport plane, was not even vaguely in the running! The Leisure Playboy is *it* for performance. It climbs like a bandit, and glides forever. Larry Jolly, the winner in both open and seven-cell old timer with his Leisure Playboy, had a beautiful thermal flight that lasted 20 minutes, and got a round of applause on the landing. He powered his Playboy with an Astro 05 XL.

Mike Charles, who took second place in the seven-cell class, powered his Playboy with a Leisure LT 05.

Second in the open old timer went to Larry Blakley with his Commodore, a beautiful old timer with a Geist 40 cobalt motor. This model climbed almost as well as the Playboy, and its takeoffs were beautiful, but it was larger and heavier, so it wasn't as competitive in the glide. For sheer looks, though, the Commodore is hard to beat.

Overall, I'll have to admit that the Playboy has performance that I would not have believed if I hadn't seen it. And to think that I had a kit at home waiting to be built! Gee, if only I had built it sooner!

The present old timer rules allow a 1-1/2 minute motor run for a seven minute max. I think this will have to be changed, because the Playboy can easily max from this motor run with no thermals at all.

Seven-cell sailplane was next, and by this time the threatening clouds over-

Mike Charles took second in 7-cell Old Timer with this Leisure 05 powered Playboy. Jolly took first with Playboy and Astro 05XL.

Addie Naccarato's 1/4-scale Cub, modified from a Sig kit, was a very attractive plane, and took second in R/C Scale. Astro 40 powered.

Dave Katagiri flew this Super Suburban to third place in Aerobatics. Leisure 05 powered.

Steve Manganelli raced this twin Leisure 05 to 3rd in Pylon and 2nd in Aerobatics.

Scott Manning raced this Astro 05 (cobalt) powered Super Rat to first place in Pylon.

Kim Waddell poses with her third place Junior F/F winner, Truant. Astro 02 powered.

head had started to do their dirty work. The sailplanes flew anyway despite occasional rain bursts, and some of them nearly disappeared in the clouds! There were some mutterings about "those Seattle guys and their rain," as Dave Katagiri and I had come down from Seattle for the occasion, leaving beautiful "California weather" behind in Seattle! In spite of the poor weather, the sailplane performances were fantastic, again, like the old timers, performance has doubled at least.

The dominant sailplane was the Electricus, Larry Jolly's design, which was featured in the March issue of **Model Builder** (plan number 3831). This plane is POTENT!!!

The technique to use with the Electricus is to launch it hard, and get it moving fast, then go up. Never let it slow down, or the climb will suffer badly, but that shouldn't be a problem if you lay off the elevator. If you let it go fast, it will climb fast, and in 1-1/2 minutes, it is nearly a thousand feet high. On this day, that meant ducking into cloud base.

The Electricus made a joke out of the rules, which allows a 1-1/2 minute motor run for a seven minute max. Everyone maxed with it, and then flew stunt patterns on the way down to get rid of all the leftover altitude! The event was changed to man-on-man, which made it a little more reasonable. The Electricus swept first through fourth! It is available as a kit from Wilshire Model Center, for $44.95. If you want a competitive ship, go for it. It does like speed, so don't try to float it around, and it will reward you with super performance.

There are other reasons besides aircraft design for the big jump in performance, of course. Everyone was using Sanyo cells, and they definitely put out more power, in a more constant manner, than the GE cells. There is no sag under load, and that is what contest performance is all about.

This year's motors were drawing up to 25 amps, which was unheard of a few years ago. The Astro cobalt motors and the Leisure LT 50 motors can handle this much current and use it. Don't try this on regular 05s though! The brushes will overheat and the motor will never be the same again. The brushes in the cobalt motors and the LT 50 motors are special, and are intended for heavy-duty use.

There were quite a variety of props used in the direct drive class, from 7x6 to 8x4.

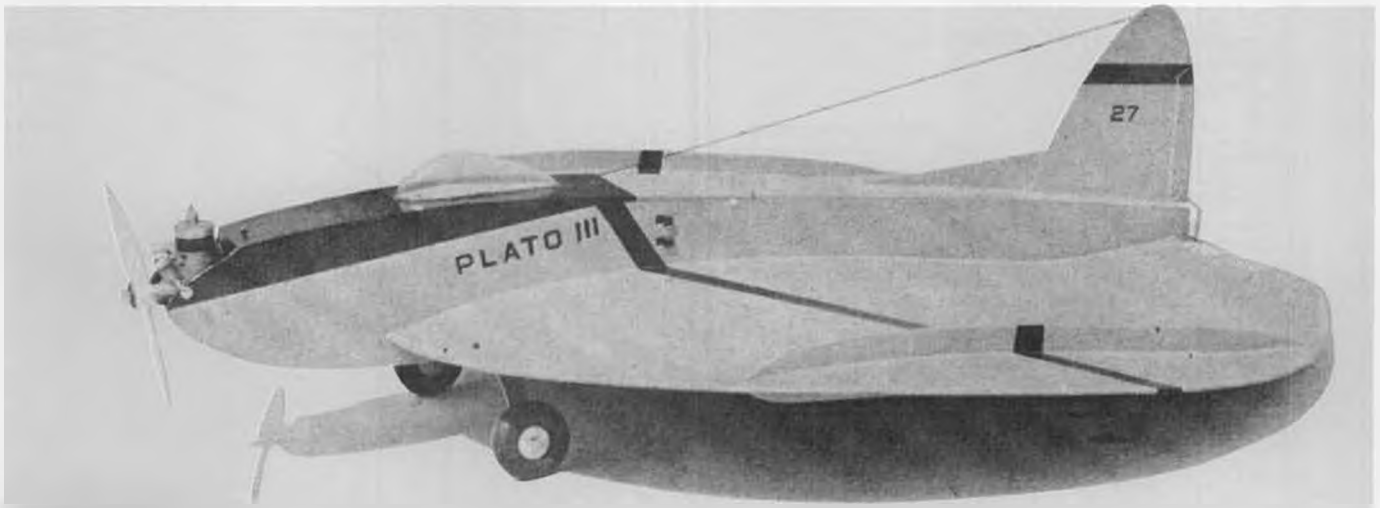
When the F3E class started its rounds, the skies really opened up, and it poured! F3E was postponed to Sunday, and we finished Saturday with an excellent dinner at a smorgasbord restaurant. While we were at the restaurant, Larry Jolly proposed the forming of a national competition association for electrics. Hopefully this association would orga-

Continued on page 88

Mike Charles' IBA on charge from a Modellbau-Electronic ASI3 charger. See text.

Roy Mayes' beautiful Astro 02 powered Dormoy Bathtub took first place in F/F Scale. Design is still practical for an ultralight.

Jim Ogg poses with his Satellite 320. Took third in Open F/F. Powered by Astro 035. Thermals well, climbs well.



Plato

By ERNEST HOUSLANDER, preface by BILL NORTHROP . . . The Plato (pronounced, play-toe) is an interesting flying wing for R/C combat or just having fun. Plato is as easy to fly as it is to build.

• *Here's another interesting and unusual R/C model originally published in the now defunct* American Modeler, *alias* American Aircraft Modeler, *alias* Hobbies For Young Men, *alias* Air Trails, *alias etc., etc.*

About a half dozen Platos were built and flown by members of the Delaware R/C Club shortly after it was published in October, 1960. All were flown using single-channel Galloping Ghost (pulse rudder and elevator), with engines ranging from K&B .15s, to Cameron and Veco .19s, to Super Tigre .23s. Developed in an era when most R/C aircraft flown from grass fields had to be hand-launched, the Plato had outstanding ground handling. It looked kinda comical as it hippity-hopped across the field on takeoff, but it never nosed over or ground-looped, and landings were almost impossible to mess up. Always being dead-stick (Throttle? What's throttle? In those days, you flew until the engine quit and then landed . . . simple as that!), landing was just a matter of aiming the model at the landing area and controlling glide speed (and distance) with the elevator. Even at full up stick, the Plato would just flatten out and land with almost no run-out.

Just one problem . . . with the stick all the way back, and the model flying nose high, directional control was sluggish at best, as the rudder was blanketed by the huge wing platform. But no big deal . . . let the stick move forward to neutral elevator (slightly up, to follow the normal shape of the reflex airfoil) and the nose would drop, speed would pick up, and full directional control would return.

The original article is reproduced as first published, as a matter of historical information, but please remember how long ago it was written. Don't send letters asking where to buy Mighty Midget motors, ESSCO receivers, and Crescent pulse boxes! Obviously, a small-to-medium three-channel modern radio will do the job now, along with most any .19 R/C engine. We've indicated suggested hinge lines for rudder and elevator. Other than that, everything can remain the same.

Well, we'd suggest one construction modification that would simplify matters. Instead of trying to install the top and bottom cross-grain planking between the sides of the top and bottom fuselage halves, trim another 1/8-inch from the sides and glue the planking to the outside, as is normally done in building all-sheet balsa fuselages.

Incidentally, several of us in the Delaware club may have been among, if not the very first, to fly R/C combat, using Platos. With a crepe ribbon tied on, the model looked like a huge polywog "swimming" through the air. We did manage a few cuts, and fortunately, no mid-airs. Combat or no, it's a fun airplane . . . easy to build, easy to fly, and certainly not just another run-of-the-mill "high wing cabin sport model." wcn

Ernie Houslander, Guelph, Ontario, Canada, poses with his R/C platter, the "Plato".

"Plato" is the third of a series of saucer designs employing the reflex wing section. I had used the section with some success on a Wakefield type fuselage model "way back when." But for radio control and "minus dihedral" this was something else again. In order to bolster my courage, a series of tests were conducted with sheet balsa gliders of all shapes and sizes. These tests proved that the reflex section is a remarkably stable method of obtaining lift. Still to be answered, however, were the questions of scale effect when enlarged, higher wing loadings, and the necessity ruggedness for radio control.

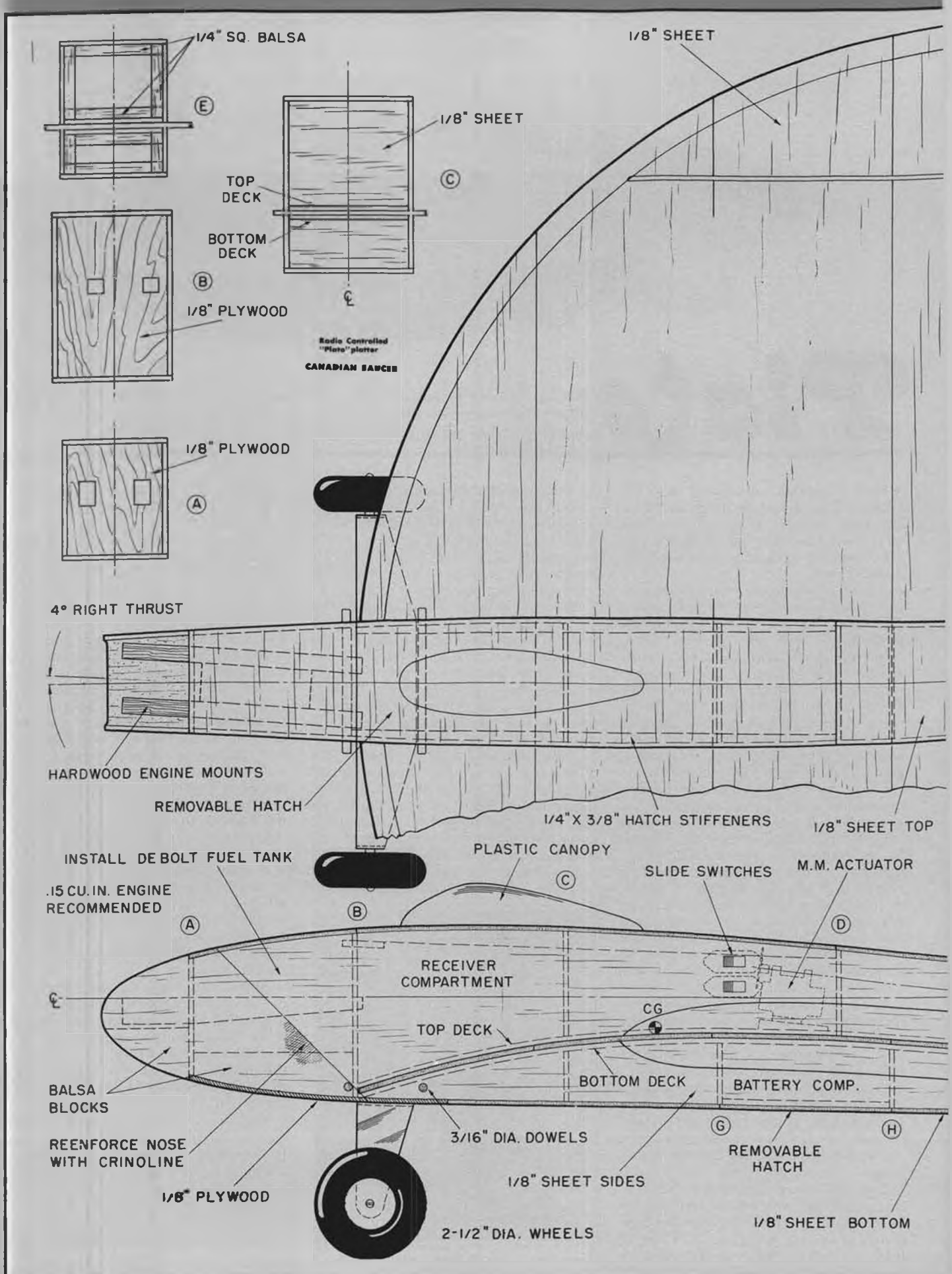
Plato I was a 24 inch saucer, high wing design with the motor mounted above the wing on an extension of the rudder, six inches back from the leading edge. It was underpowered with an .074 diesel, so an .09 was installed. This proved adequate to get it up "there, but it was simply too groovey. It would fight a turn and use up about 250 feet in a circle. I've laid this one aside for future use from my rocking chair.

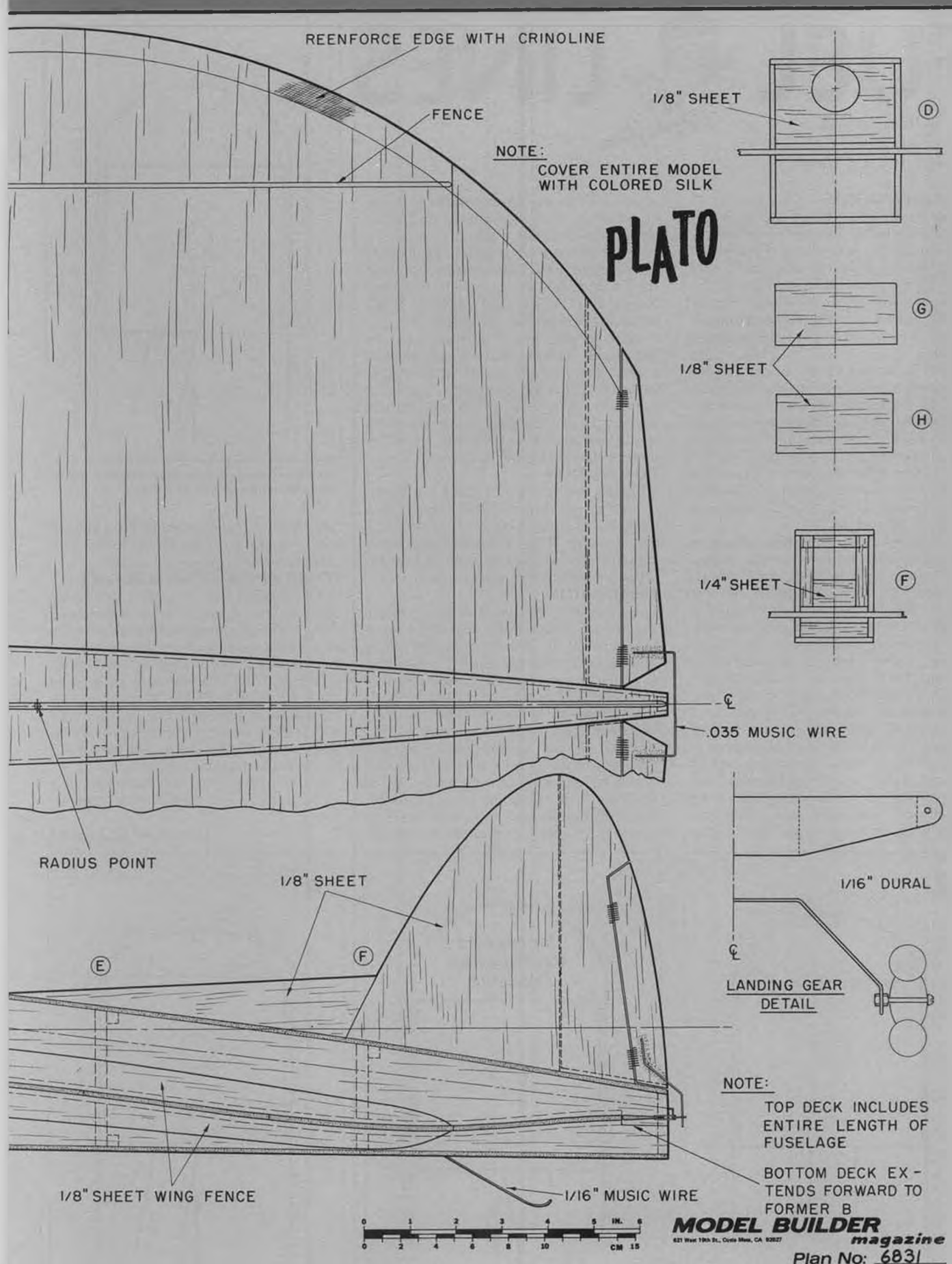
About this time the Pee Wee .020 motor came out and provided the inspiration for Plato II, an 18 inch saucer. It was a high wing design but this time the engine was in its normal position in the fuselage. The weight, 14 oz. overall, made the wing loading a little high, but it was much more nimble than Plato I.

The first two designs proved the efficiency and strength of the reflex section. It remained to improve the serviceability and simplify the construction so that it could be built with the minimum amount of time and effort.

To achieve this, Plato III was built. The wing was lowered and a hatch provided

Continued on page 64


1/4" SQ. BALSA
E
1/8" SHEET
C
TOP DECK
BOTTOM DECK
B
1/8" PLYWOOD
Radio Controlled "Photo" platter
CANADIAN SAUCER
1/8" PLYWOOD
A
1/8" SHEET
4° RIGHT THRUST
HARDWOOD ENGINE MOUNTS
REMOVABLE HATCH
1/4" X 3/8" HATCH STIFFENERS
1/8" SHEET TOP
INSTALL DE BOLT FUEL TANK
.15 CU. IN. ENGINE RECOMMENDED
PLASTIC CANOPY
SLIDE SWITCHES
M.M. ACTUATOR
RECEIVER COMPARTMENT
CG
TOP DECK
BOTTOM DECK
BATTERY COMP.
BALSA BLOCKS
REENFORCE NOSE WITH CRINOLINE
1/8" PLYWOOD
3/16" DIA. DOWELS
1/8" SHEET SIDES
REMOVABLE HATCH
1/8" SHEET BOTTOM
2-1/2" DIA. WHEELS


REENFORCE EDGE WITH CRINOLINE
FENCE
NOTE:
COVER ENTIRE MODEL
WITH COLORED SILK
PLATO
1/8" SHEET
D
G
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H
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.035 MUSIC WIRE
RADIUS POINT
1/8" SHEET
E
F
1/16" DURAL
℄
LANDING GEAR
DETAIL
NOTE:
TOP DECK INCLUDES
ENTIRE LENGTH OF
FUSELAGE
BOTTOM DECK EX-
TENDS FORWARD TO
FORMER B
1/8" SHEET WING FENCE
1/16" MUSIC WIRE
0 1 2 3 4 5 IN. 6
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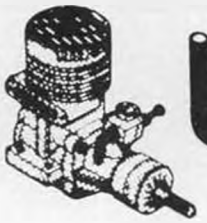
MODEL BUILDER magazine
621 West 19th St., Costa Mesa, CA 92627
Plan No: 6831

FUEL LINES



JOE KLAUSE
P. O. Box 2699
Laguna Hills, CA 92653

MISCONCEPTIONS

One of the nice things about writing this column is that it provides me with an opportunity to pass along information about misconceptions and such. Misconceptions abound in our world. For example, you've undoubtedly heard that the moon is made of green cheese. Actually, it's a slice of a very large, green tomato.

Well, in modeling we also have our fair share of misconceptions, and there seem to be plenty of them about engines. A popular one, that came up again in two recent conversations, concerns those so-called "explosions" in the combustion chamber which cause the power stroke of our engines. The honest misconception is that an explosion *does* occur . . . Wrong!

Well, should we point fingers of shame at anyone who believes in the explosion? I don't think so, especially when I consider how some "experts" tend to mislead laymen by their often poor or imprecise choice of words. For example, consider one popular book, *Small Gas Engines*, written by two university professors (1978). In the fundamentals section of the book, they made statements such as, "Atomized fuel exposes a large area of fuel which, when ignited, releases heat energy with an explosive force." One section, intended to explain the conversion of energy to work, was even entitled, "Explosion Must Be Contained." The unfortunate choice of words such as "explosion" or "explosive" will likely lead readers to the conclusion that explosions do occur within the cylinder walls.

Now, I'm not saying that explosions *never* occur in the combustion chamber, they sometimes do, but then it's called *detonation!* As we shall see later, that's not a very desirable condition.

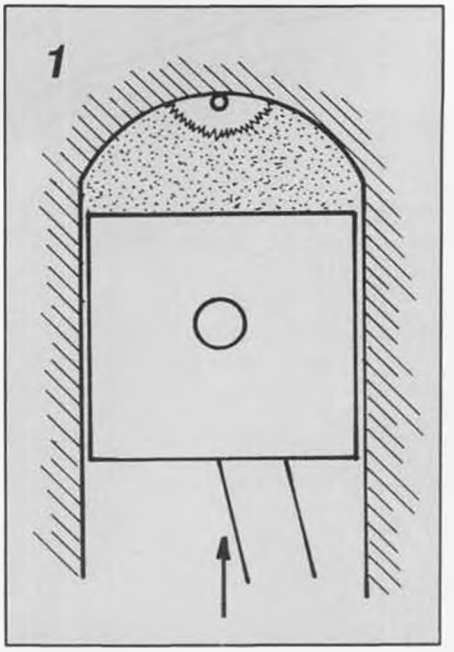
First, however, it is important to define our terms so that we can come to a clear comprehension of what is happening when an engine is running normally, and also when detonation occurs. Understanding these things is also essential for anyone interested in increasing engine performance.

COMBUSTION

Simply stated, *combustion* is a burning process. More explicitly, it is a chemical process that is accompanied by the creation of light and extreme heat. Typically, it is a vigorous, but not violent, union of substances with oxygen.

DETONATION

Commonly, *detonation* is a violent explosion. In an engine, it is very irregular combustion. More technically, it is abnormal, extremely rapid combustion. It replaces, or happens simultaneously with, normal combustion. It is usually manifested by a loss of power, overheating, and rough running of the engine. In our automobiles, another very noticeable, common characteristic is engine knocking or pinging. In model engines, it is not quite as easy to hear detonation. When it is detected, it usually sounds like what has been described as the cackle of frying eggs. If you only like your eggs soft-boiled, you may never recognize the sound.



During normal operation, glow element initiates the combustion of fuel mixture.

COMBUSTION/WORK SEQUENCE

Although I don't have a personal series of photographs, let me assure you that very high speed photography inside of a combustion chamber has been accomplished. These photographs, combined with the considerable volume of scientific data available in the areas of temperature and pressure, provide us with a clear understanding of the combustion/work sequence. With the help of a few illustrations, let's review it.

In the first drawing, a piston is moving upward and compressing the fuel/air

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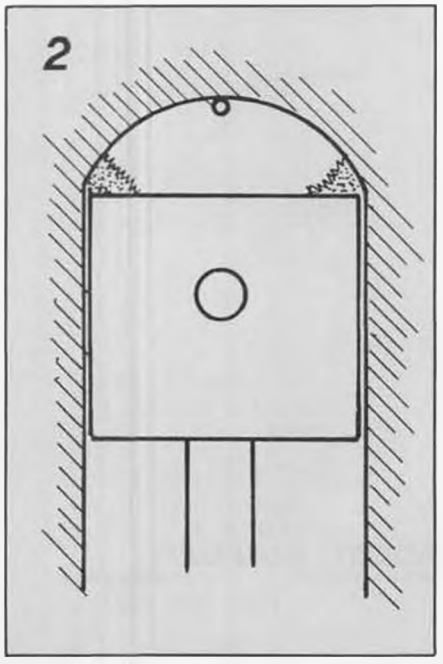
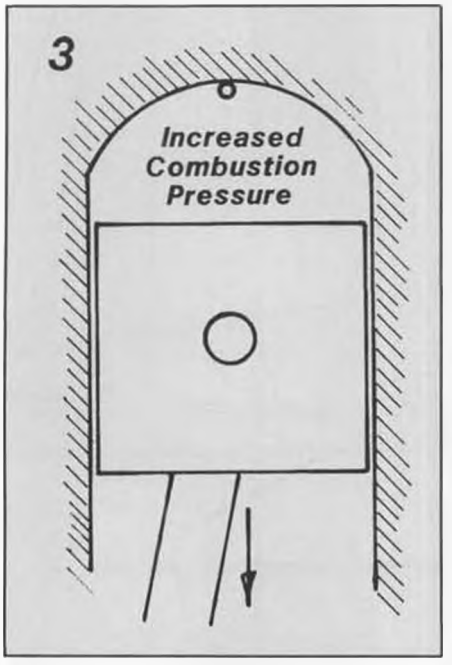
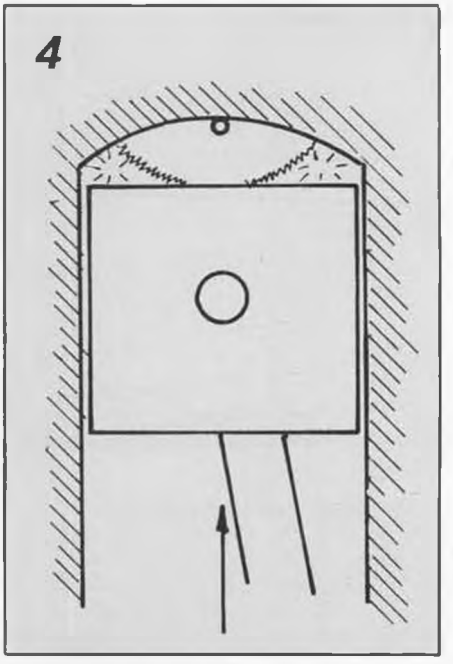


Combustion is almost complete as the piston passes top dead center in normal operation.



Increased pressure from combustion pushes piston downward on the power stroke.



Abnormally high compression can lead to detonation before normal burn is complete.

A second-story, interior view of the Orly airport near Paris, France reveals large kites suspended from the ceiling, and a Bleriot. "Why use a 737 when you can fly by Bleriot?" says Ron Moulton.

Claude Weber launches the Eiffel tower! Tether and bridle limit altitude of push-puller.

WHAT A WAY TO RUN AN AERODROME!

By BILL HANNAN . . . From the pen of the famous Hangar inhabitant comes this unusual feature about a special exhibition in France, based on a report by Ron Moulton and Georges Chaulet.

• What ever happened to the TOTAL AVIATION concept? Back in the "good old days," aviation was promoted as a package . . . encompassing every possible form of interest, including models, balloons, parachuting, airships, and gliders, as well as "regular" aircraft. Stalwarts such as Katherine Stinson, Lawrence Sperry, Charles Lindbergh, and Amelia Earhart left no stone unturned in their constant efforts to glorify aviation in *all* of its aspects. Pilots were treated with awe and respect equal to entertainment stars, and a trip to the airport was an exciting experience to be enjoyed by the entire family.

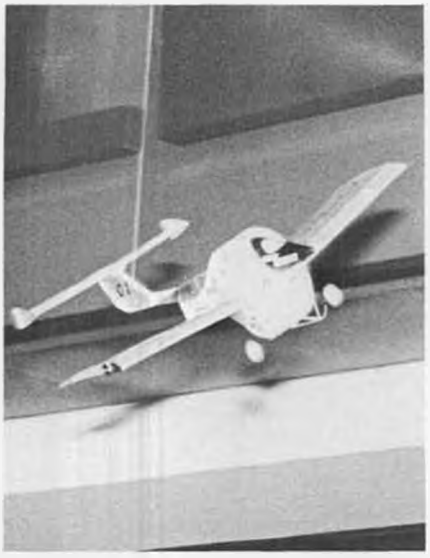
Today, unfortunately, most airports operate more like bus terminals, dedicated only to the promotion of rapid transportation. Think about it . . . while constantly decrying shrinking profits and diminishing passenger lists, very little is attempted to capitalize on the marvelous nature of the aircraft themselves. As Ron Moulton so aptly put it, today's passengers are "force-fed down corridors into a tube as though the external shape of the aeroplane was an embarrassment. . ."

Happily, there are exceptions to such dull airport routines, and at least a few far-sighted people are trying to reintroduce aviation's *magic* to the public. Thanks to reports from Ron Moulton and Georges Chaulet, we can gain a tantalizing glimpse of one such exposition. Orly is an international aerodrome located near Paris, and although it is less familiar by name than Le Bourget to

A showcase full of prop driven airliners carries out the international theme of the Orly show.

Construction demonstrations for kites and model hot air balloons typified Orly's variety.

Another showcase of antique, stamped metal toy aircraft attracted the attention of collectors.



Emmanuel Fillon flew these intriguing turbine engined Flying Fools airplanes to first place.

Emmanuel Fillon, winner of the Wakefield Cup for 1937, now specializes in small models. Here he poses with two of his "jet" powered aircraft. Georges Chaulet photo.

Americans, it has a long and historic background.

Beginning on December 15, 1982, Orly played host to a month-long total aviation presentation, with both of its terminals devoted to flight in all its aspects. For kite enthusiasts, there were colorful examples from French and Japanese collections on view, plus a "how to" workshop in action. For philatelists, there were rare and valuable stamp and postcard collections. For modelers, models of every type were on view, including free flight, control line, radio control, and even wind tunnel specimens.

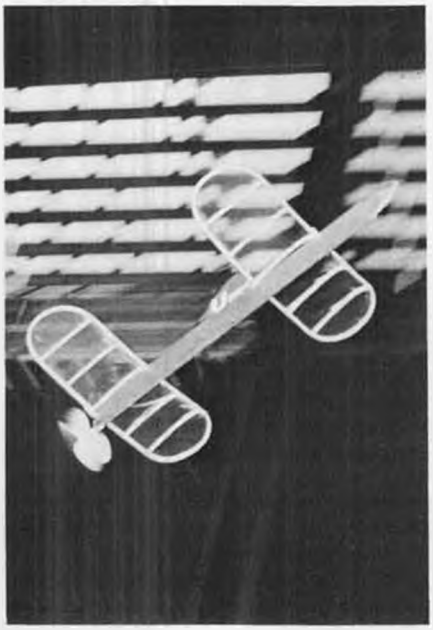
For the balloon aficianados, priceless antique memorabilia such as Napoleon's coronation baloon documentation, movies, and a nacelle in which they could pose for instant photographs. Bonuses consisted of displays devoted to parachutes, helicopters, aircraft engines (including a Wright brothers design and a WW-I Hispano-Suiza), as well as a profusion of photographs and posters.

How about full-size aircraft? On hand were a reproduction Bleriot, a Deperdussin and Latecoere 17, plus an original Spad VII. Of later vintage were the North American AT-6, the Beechcraft 18, and a Soviet 1947 Antonov.

Even the airport restaurants and boutiques joined in the spirit of the festival, by offering special "Dream of Icarus" menus, chocolate balloons, and sugar cubes decorated with Bleriots, Spads and Moranes!

But the *piece de resistance* for model builders was the 10-hour long indoor contest, which took place in the Orly departure hall, much to the satisfaction of the enthusiastic spectators. Flown were duration types, Peanut Scale types, and a special "Fou Volant" (Flying Fools) category which attracted the most outrageous of the French unorthodox models. For instance, Georges Chaulet, well-known for his sense of humor, entered a highly-detailed scale model of the historic Breguet-Dorand Gyroplane, which incorporated contra-rotating rotors. Ron Moulton saw it this way: "Georges had the crowd laughing each time he released, the fuselage remained on the ground, and the blades went up to the ceiling!"

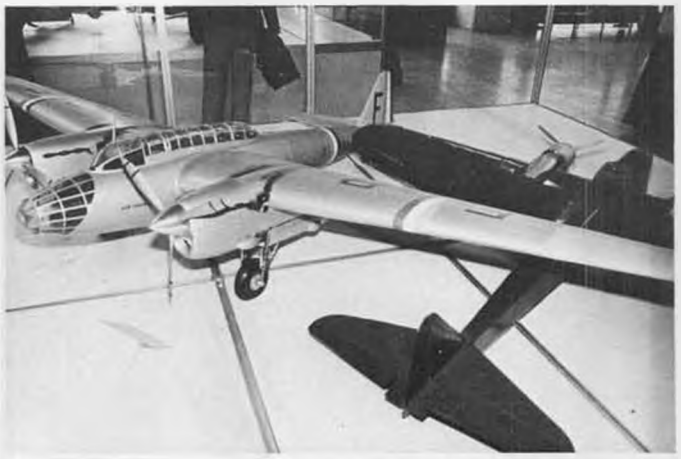
And this impression from Georges, himself: "There were plenty of piques (nose dives), wall strikes, and loops. But eventually we didn't care, because this is part of the fun. If all of the models would fly perfectly, the meets would be quite a bore." It was not the ideal place to fly



Monsieur Landeau's Flying Fool entry was this "U-boat" complete with conning tower and tiny 5-bladed prop. Moulton photo.

This delicate Avro triplane Peanut was regretfully crushed by a trunk (equipment box, not elephant). Fillon photo.

This original Spad VII figured prominently in the display of full-size aircraft shown at Orly. Moulton photograph.



Here are two of Claude Faix's remarkable series of large controlline scale models. Incredible detail is evident. R. G. Moulton photo.

indoor because of the low ceiling, and the onlookers on the floor and in the balcony. Every time a model headed toward the people, the owner would shout, "Ne touchez pas a l'avion!" ("Don't touch the airplane!").

Happily, most models did survive . . . but not one, an English triplane belonging to Emmanuel Fillon. He brought a large and heavy trunk to Orly in which he transported his models and associated accessories. He had positioned the trunk on a sort of trestle at a convenient height. Unfortunately, the trestle tipped over, the trunk fell, and the poor triplane was underneath!

Happily, Fillon had many other models to fly, and he won First Prize in the Flying Fools class with his rubber-powered *JET* models. These ingenious creations had squirrel-cage type fans for propulsion which were driven by rubber motors running spanwise along the wing leading edges.

We offer our congratulations to organizer Phil LePage and the various special interest clubs who combined forces to produce this most memorable demonstration which doubtless created a powerful and favorable impression upon the public, the air transport industry, and all participants.

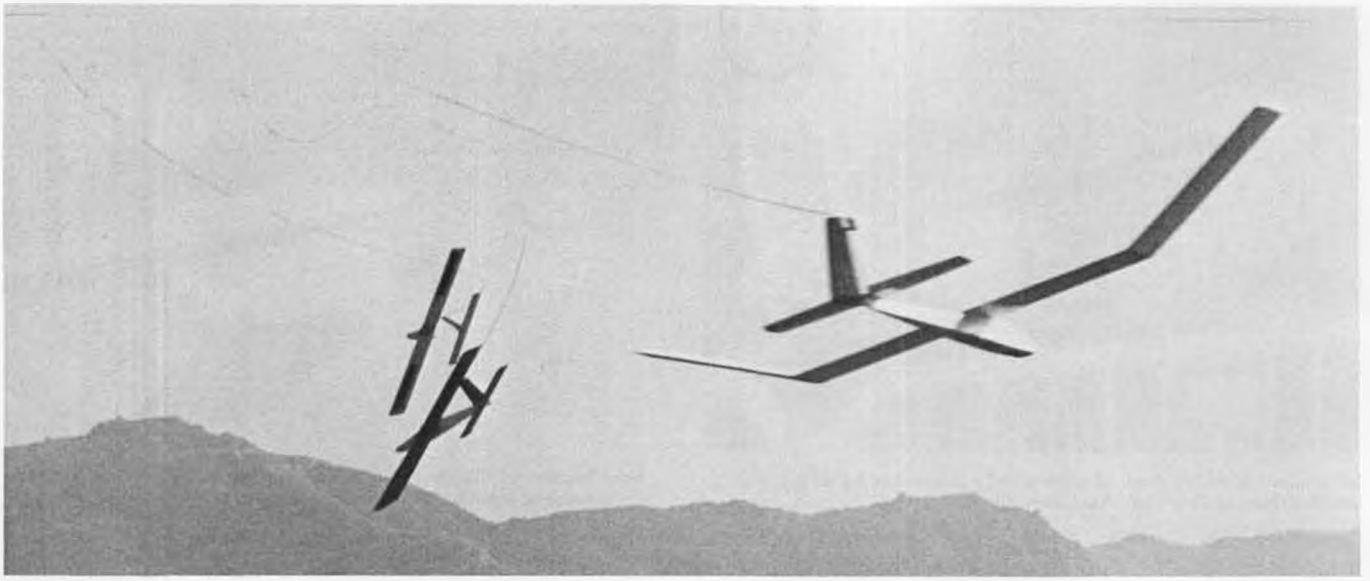
How about it, airport managers in other parts of the world, isn't there an important message here? •

Georges Chaulet's intermeshing rotor autogyro achieves proper blade separation via a simple music wire drive system. Photo by G. Chaulet.

This Pottier 100 in Peanut Scale was constructed by a junior model builder. Moulton photo.

Two more of Claude Faix's C/L scale models which were on display at Orly. Ron Moulton photo.

Georges Chaulet's highly detailed 1935 Breguet-Dorand Gyroplane was a crowd pleaser. Rotor flew, body remained on floor!



Slope combat fliers Alex Bower, Joe Wurtz, and Gary Ittner dice it out over the Malibu Mountains. Indestructible fuselages and inexpensively replaced wings are the keys to a good time. Mid-air collisions are part of the fun.

R/C SOARING

By BILL FORREY PHOTOS BY THE AUTHOR

• I think it would be fair to say that for the most part, R/C fliers do not like to fly their airplanes too close to the airplanes of other R/C fliers. Visions of mid-air collisions come to mind when two aircraft appear to be occupying nearly the same airspace at the same time. It might also be safe to say that avoiding those situations has become an automatic reaction for most pilots. Normally this is a healthy and safe habit pattern to have developed within you . . . except when you are flying SLOPE COMBAT!

If you've never heard of slope combat before, you probably have a pretty good idea of what it's all about from looking at the various pictures on these two pages. It's really too bad that these pictures couldn't be made to move (as in motion pictures), because not only would they paint thousands of words, they would excite you and thrill you, perhaps even to the point of audible laughter and cheers. Slope combat is an emotional sport.

Those who fly slope combat quickly become fanatical promoters of this fast-paced, adrenaline-packed facet of R/C soaring. The reason for this behavior is simple . . . second-for-second and minute-for-minute, slope combat offers more thrills and excitement for both participant and spectator alike than any other form of R/C soaring.

WHAT IS SLOPE COMBAT?

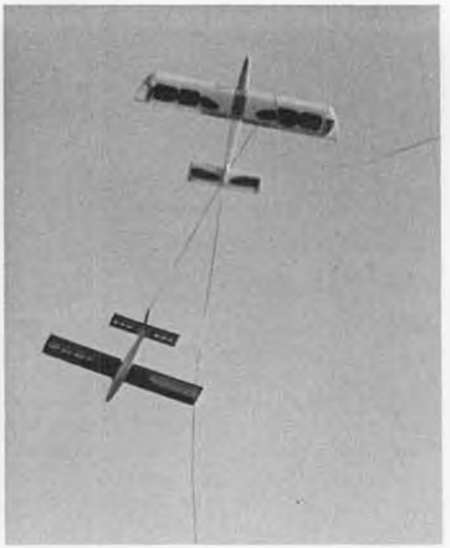
Slope combat is a type of R/C soaring competition. The object here, as with all competitions, is to rack up as many points as possible. This is accomplished by attacking the streamer attached to your opponent's glider. One point is earned for each and every "cut" you make on an opponent's streamer. What could be more simple?

Ah, but there's a twist! If you accidentally come too close to an opponent's combat plane and actually touch it or crash into it, you are awarded a penalty point . . . one point is taken away from your running total. So, slope combat is not as easy as it might seem. Negative scores are possible in slope combat rounds.

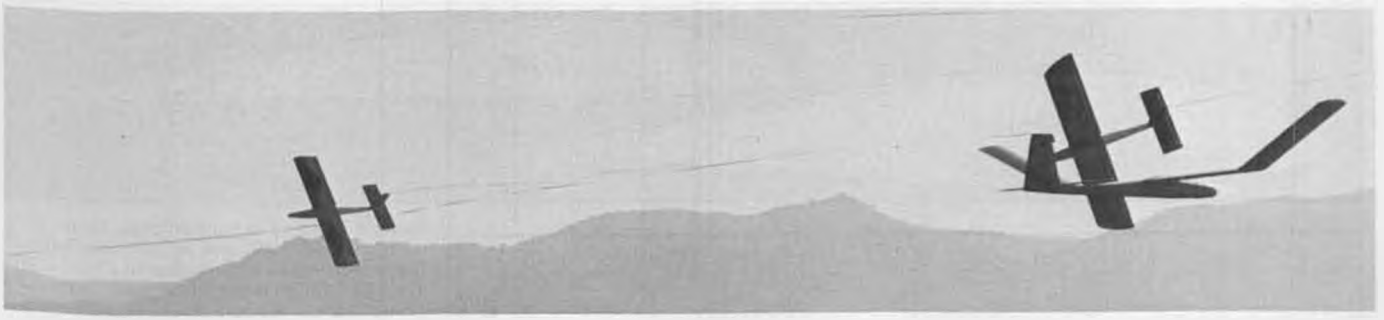
The streamer, which becomes the center of the pilot's concentration in the aerial melee, is actually nothing more exotic than common recording tape from a cassette. The rule of thumb is to attach a length of magnetic recording tape equivalent to seven times the wingspan of the model it's being attached to. This streamer is then fixed to

Mid-airs are seldom fatal to Cheetahs. Just fly 'em out or pick 'em up and throw!

The stab may be knocked cock-eyed, the fin may be hanging off, but the Cheetah still flies.



Mike Regan makes a perfect "cut" from below Alex Bowers' Cheetah.



Joe Wurtz, flying the big airplane on the right, spoils a perfect setup for Mike Reagan on Gary Ittner's tail. Both airplanes fell to the ground, receiving negative points for their head-on collision, then were picked up and flown immediately.

Shouts, laughter, and animated gestures are all part of the fun for spectators.

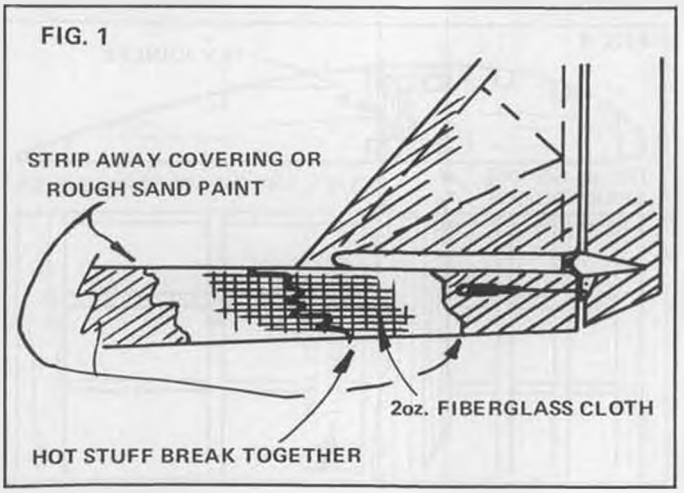
Jerry Krainock and Gary Ittner measure off seven lengths of recording tape over Alex Bower's Cheetah wing while Alex looks on probably thinking, "Hey, that's too much, guys!"

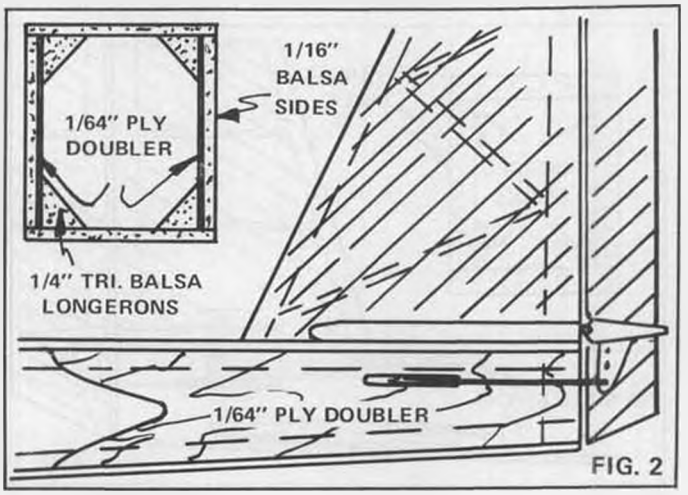
the rudder or fin by means of adhesive tape. Believe it or not, the streamer does not significantly hinder the flying capabilities of the model: the pilot will hardly know it's there.

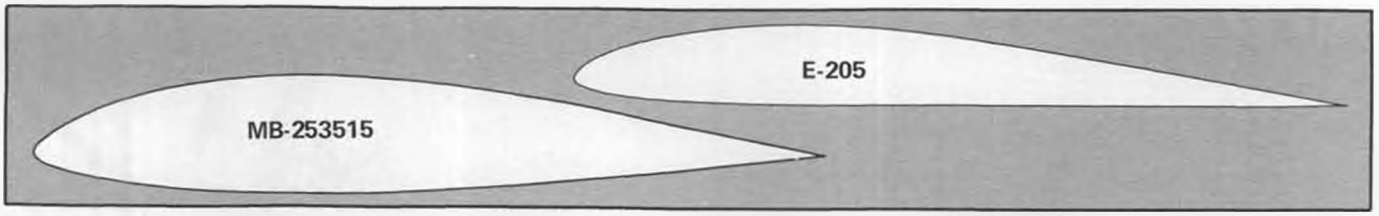
I first learned of this incredible departure from the standard, monotonous five-minute thermal contest through my involvement with the San Fernando Valley Silent Flyers, an innovative, progressive, sometimes controversial club in the Los Angeles area. Bill Watson, an honorary SFVSF member and club genius, came up with the idea of making an inexpensive, almost indestructible, aerobatic little slope soarer which could be mass produced, and used specially for combat. It wouldn't matter if it was mid-aired, flown directly into the ground, or otherwise mistreated, because of its durability and relative low cost. It was (and is) called, the Cheetah, and for about $35, you couldn't go wrong.

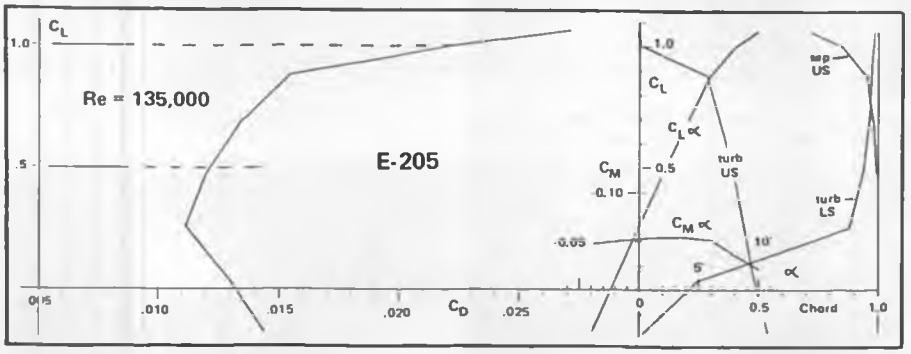
The Cheetah fuselage is made of rotationally molded, cross-link polyethylene plastic . . . the same stuff plastic trash cans are made of. This is the most important feature of the Cheetah design because of the very real need to protect radio equipment from the abuses of this type of flying. The battery pack and receiver are wrapped in foam rubber and stuffed into the nose of the fuselage. The fuse is canopy-less, so access is through an opening in the wing saddle. There is no way for your radio to fall out, get smashed by a collapsing nose, or get jarred by a hard landing. With this kind of protection, you can see how combat fliers can "loosen up" and fly daringly.

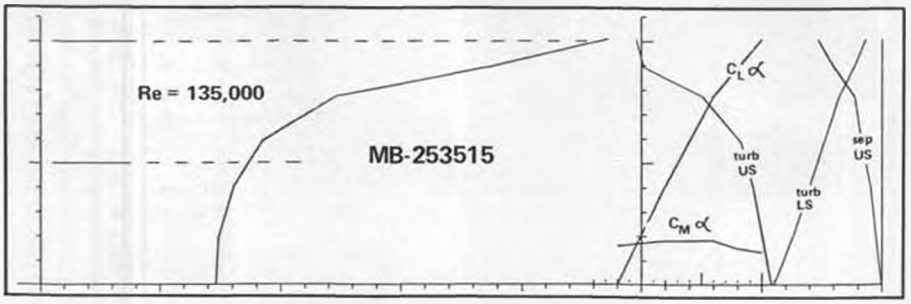
All flying surfaces are foam core. The preferred sheeting material is Chromecoat which is a thin, glossy, tough, inexpensive, white cardboard material that is used in the printing of posters and other litho art. A similar material called Plasticoat comes in colors. The best method of adhering these two materials to the foam core panel is with Hi Johnson Supertape. Supertape is a high-tack adhesive transfer tape that is very light











Late info sent to us from Michael Selig indicates that the E-205 was actually the Sagitta 900 airfoil which is *very* close to a true E-205. The MB-253515 is the airfoil used on the Gemini M.T.S. Smoothed out coordinates for the MB are below (rounded to four digits):

X: 1.000 .9000 .8000 .7000 .6000 .5000
Y: .0000 -.0107 -.0214 -.0317 -.0404 -.0466
X: .4500 .4000 .3500 .3000 .2500 .2000
Y: -.0487 -.0500 -.0505 -.0503 -.0489 -.0462
X: .1500 .1000 .0750 .0500 .0250 .0000
Y: -.0417 -.0347 -.0300 -.0246 -.0180 .0000
X: .0250 .0500 .0750 .1000 .1500 .2000
Y: .0264 .0407 .0527 .0630 .0784 .0886
X: .2500 .3000 .3500 .4000 .4500 .5000
Y: .0947 .0979 .0990 .0985 .0960 .0917
X: .6000 .7000 .8000 .9000 1.000
Y: .0785 .0608 .0408 .0203 .0000

For additional 32 plot points send SASE to Bill Forrey, c/o *Model Builder*.
NOTE: Theoretical data for airfoils under 250,000 Re are rather inconclusive without supporting wind tunnel data.

weight and very strong. There are other adhesives that could be used, but this is the best.

The wing structure consists of two 1/8 x 1/4 spruce spar caps (no shear webs, however), a spruce leading edge, a balsa trailing edge, and 1/4 x 1 tapered trailing edge stock for the strip ailerons.

The horizontal stab is the essence of simplicity: balsa leading edge, trailing edge, and 1/4 x 1 tapered trailing edge stock for the elevator . . . all covered with Chromecoat (that is, all *except* the elevator which is either painted, covered with Monokote, or left bare).

The fin is nothing but foam core with an optional balsa leading edge strip. After shaping the L.E. and lightly sanding the foam core, the fin can be covered with Chromecoat, and butt glued to the stab.

If you want the best performance out of the Cheetah, be prepared to make anti-vortex wing tips and rounded tip blocks for the tail surfaces.

The size of the Cheetah is perfect for the fast-paced aerobatic nature of combat flying. I'll give you the dimensions of the main flying surfaces and fuselage of the Cheetah to give you an idea of how big the design is: wingspan, 48 inches; wing chord, nine inches; stabilizer span, 20 inches; stabilizer chord, 5-1/2 inches; fin height, seven inches; and fin average chord, 4-1/2 inches. The fuselage is 36 inches long. The Cheetah airfoil is one of Bill's own 12 percent jobs with a little reflex in the trailing edge for improved stability.

The last I heard, Bill Watson was still producing Cheetah kits and parts. The price has probably changed since I bought my Cheetah three years ago, but I don't suspect it has changed much. If you'd like to get in touch with him about a Cheetah, write to: Bill Watson, 6736 Aldea St., Van Nuys, CA 91406.

If you are a cook 'em yourself type person, there are other ways to go to get basically the same thing (however, none are as easy or as inexpensive to make as the Cheetah).

First of all, I would recommend a fuselage similar to the Cheetah's for its indestructibility. Bob Martin R/C Models produces several unbreakable polyethylene fuselages which are called Duralene replacement fuselages. I would recommend either a Wanderer or a Katie II fuselage for slope combat. They are both a little longer than the Cheetah fuselage and can accommodate longer wings.

When you have made your choice of fuselages, I recommend that you order foam wing and stab cores from Hi Johnson Model Products. Write to HJMP at 11015 Glenoaks Blvd., Pacoima, CA 91311 and ask for their catalog, believe me, the catalog is worth every bit of the $2.50 it costs. It is more than just a

Continued on page 84

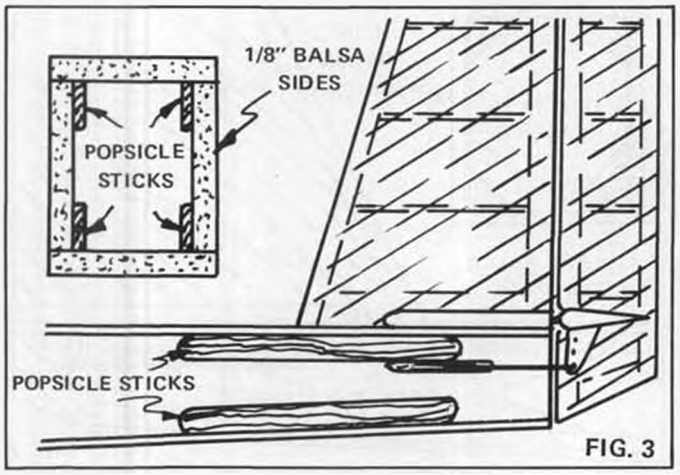
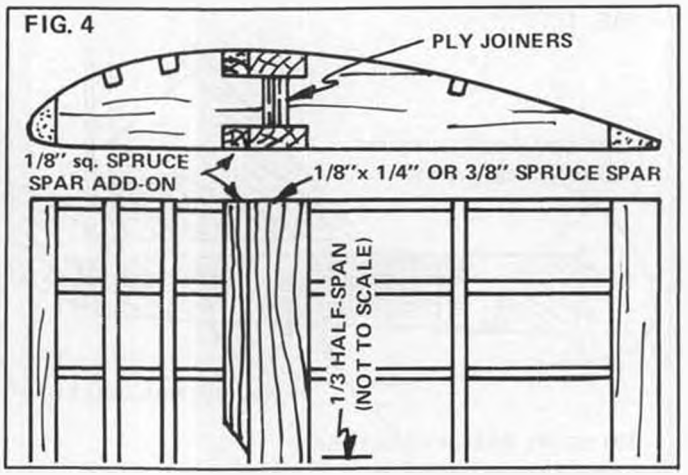


FIG. 3



ELECTRIC POWER

By MITCH POLING

• Bruce Klees, who sent the charging circuit for the Leisure digital charger (**Model Builder**, January 1983), asked me why I hadn't said anything about electronic throttles. That was a good question! My answer was a simple one . . . I hardly ever use them. I have been flying two-channel gliders, old timers, and sport planes, and somehow these never seemed to need anything more than on-off.

However, there are definitely times when an electronic throttle would be good to have, especially with scale planes or seaplanes. I plan to use them more in the future, especially now that I have the book on electrics done, finished, and sent to Kalmbach. (Hooray!! Writing books takes twice as much time, and twice as much energy than you think you have!) So, some scale projects will definitely be on the way, as well as some scale seaplanes. I will be using electronic throttles.

In the meanwhile, I asked Bruce to tell me of his experiences with them, and he was more than kind . . . he sent me a mini article! Such readers are the joy of every columnist. Before I let Bruce have his word, though, he also sent photos of his planes, so let's talk about them first.

The Wanderer, held by Lyrae Klees, is Bruce's first electric (built five years ago) powered by an Astro 05, and still actively flying . . . I know the story, "electrics last forever." I have an incredible assortment of planes (can't bear to let any of them go) just for that reason, with no vibration, fuel, or oil to deteriorate them, they are ageless (barring crashes!).

The Porterfield, held by Cathy Klees, was Bruce's first scale project, and uses the electronic throttle. Bruce did a nice job on the Porterfield (an Astro kit), as shown in the framework photo. This is a good design, it flies well, and is my next scale project, too. Maybe I'll put mine on floats!

Bruce's masterpiece is the T-tail High-Low Evolution kitted by Dumas. It was built to take an Astro 15, but after Bruce built it, he decided it was too pretty to fly (the dangers of building *too* well!), so it is hanging in the Anchorage (Alaska) House of Hobbies for all to admire! Fortunately for me, I have never built that well, so all mine wind up getting flown! Sometime you ought to fly it Bruce, it looks good just standing still, so its got to be good in the air. Anyhow, here is Bruce's report on electronic throttles, which he entitles, "Fly with ET" (electronic throttle).

Bruce Klees' daughter, Lyrae, holds the High-Lo Evolution. Astro 15 powered.

Lyrae Klees poses with her father's first electric, a Wanderer. Still flying at 5 yrs!

"Five years ago Mitch Poling visited Anchorage and joined our group for several building and flying sessions. As none of us had ever seen an electric powered airplane before, we were very impressed with his "Electric Drifter" and the tiny "Request" (020 old timer). I think I was the most impressed because I promptly bought an Astro 05 and a Wanderer kit, and began learning about the wonderful world of electrics.

"About two years ago, I bought my first electronic throttle . . . a Vantec ET-3, to put in a Porterfield that I was building. This ET-3 proved to be one of my better purchases and is the subject of this article.

"The ET-3 is a small aluminum box measuring 2 x 2 x 1-1/8 and weighing a modest 1.8 ounces. It has three sets of wires coming out of its sides: one pair of wires (No. 18 green and white) go to the motor battery pack; a second pair (No. 18 black and orange) go to the motor; and a third set of three wires (red is +4.8 volts, black is ground, orange is signal) goes to the receiver. No connectors are supplied for the power wiring. but a receiver connector of your choice is supplied.

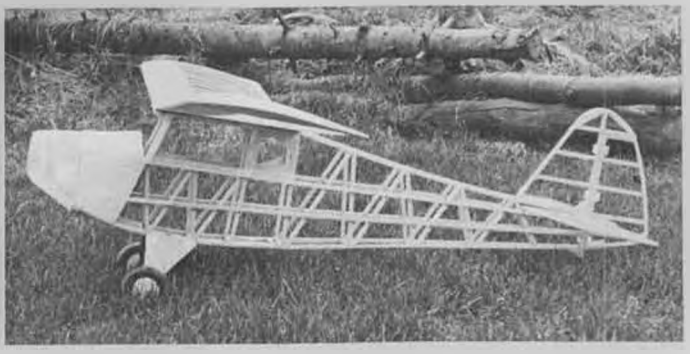
"The ET-3 will work with any positive pulse radio, and uses a standard one to two millisecond pulse width at any frame rate. Pulse widths less than 1.1 ms turn the throttle off, and pulse widths greater than 1.8 ms provide full power. The unit draws nine milliamps regardless of throttle position. According to the instructions, the ET-3 will output over 25 amps at any motor voltage from 4.8 through 36 volts with a very low voltage drop. I have used my ET-3 in the Astro 15 powered Porterfield, an Astro 10 powered Electra Fli, and an 05 powered Velie Monocoupe.

"The second unit is currently in an Astro 25 powered Bushmaster, and will soon migrate to my quarter scale Velie Monocoupe (to be powered by the same Astro 25 with a speed reducer turning an 18/10 Top Flite prop).

"About six months ago I stalled the 25 by running it wide open into a bush. Besides the structural damage, the ET-3

Continued on page 65

Cathy Klees holds the Astro Porterfield. This Astro kit is powered by Astro 15 motor. Flights are very realistic.



Lightweight structure is evident on this Astro Porterfield. Looks like this would be an excellent first scale model, very simple.


34. Internationale
Spielwarenmesse
Nürnberg 3.-9.2.1983
mit Fachmesse Modellbau,
Hobby und Basteln
COMPACT2
GOODYEAR

Beautiful Multiplex ASW-22 features epoxy fiberglass fuselage, 157-inch wingspan.

Robbe-Modellsport Argo is coming to U.S.

NÜRNBERG TOY FAIR

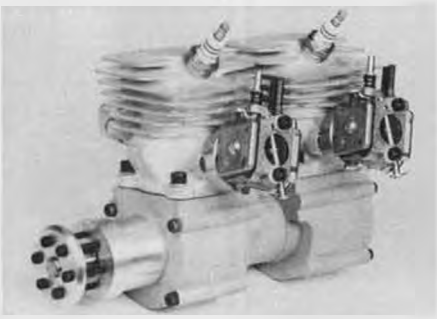
FEBRUARY 3–9, 1983

By ELOY MAREZ . . . Our "Electronics Corner" columnist takes a short busman's holiday to Germany to cover the world famous phenomenon that the Nuremberg Toy Fair has become. Take a ride on a 747 with Eloy . . .

A 1/3.24 scale Diabolo for 15 to 50cc engines, from Simprop: span 76.5 in., weight 17 lbs.

• The Nurnberg Toy and Hobby Fair, described as the world's largest, can only be further described as the world's most impressive. *How else* can you speak of an event of this type which takes place in *twelve* separate, interconnecting buildings, with a total area of 750,000 square feet (of which 600,000 is display area) any *one* of which is at least as large as that housing any U.S. show? *How else* can you refer to an event, *any event*, where 1762 manufacturers display their wares, and where 38 countries are represented? This then, was the 34th International Toy and Hobby Fair; which was attended by 40,000 industry buyers (not open to the public); which was held in the Bavarian City of Nurnberg, West Germany, February 3 to 9, 1983; and which was my privilege and pleasure to attend.

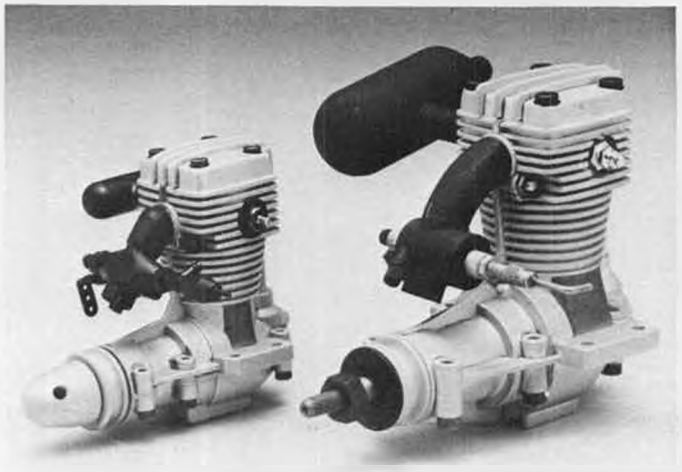
Nurnberg (Nuremberg), with its half-million inhabitants, is the second largest city in Bavaria, and is one of the oldest cities in Germany. It lies on the Pegnits River, 92 miles northwest of Munich, and 120 airline miles southwest of Frankfurt. The city is rich in history, with a still-standing castle which dates back to the tenth century, and numerous ancient cathedrals and buildings nonchalantly intermingling with thoroughly modern architecture. The first German railway ran from Nurnberg, to Furth, in 1835, and what may have been the world's first watch was invented here about 1500. The city also featured strongly in more modern times, having been the site of many early Nazi party assemblies and gatherings, and here, the infamous Nurnberg Laws restricting the rights of German Jews were enacted. Ironically, it was also the site of the trials at which many of the same Nazis had to answer for their actions. This was my second visit to the city, which I have found to be an interesting one that is full of friendly people. It is a place where the medieval and the modern blend into a perfect, most delightful mixture.



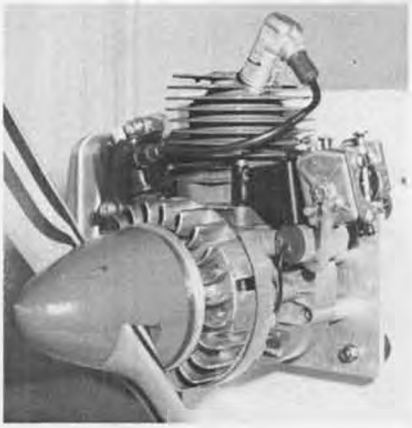
Aero Model Technik King 100: 100cc displacement, 8 h.p. at 7500 rpm.

Getting there is half the fun . . . Lufthanza, the German Airline, lifts you out of Los Angeles in one of its white and blue 747s, and only ten hours later, after you've had dinner, seen the movie, napped a while, and had breakfast . . . you land 5787 miles away in Frankfurt. I know some of you younger Jet Age readers will do a double take on that "only ten hours" remark, but having made the same trip in C-54/DC-4s in the early days of my Air Force career (which then took *four days*), ten hours is a matter of amazement to me. Frankfurt is the hub of all travel in and out of Germany. You get to spend two hours in

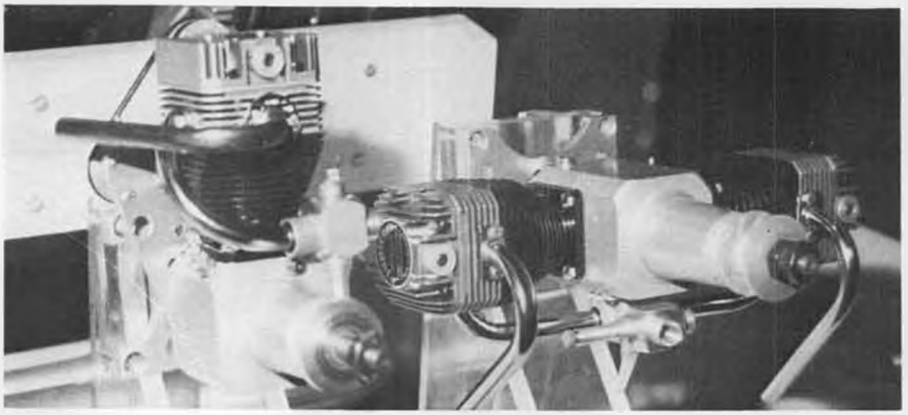
Webra's new 4-cycle engine, the T4-40. It's a 6.5, rated for a 10 or 11x6 prop at 11,000 rpm. Weighs 12.7 oz., power is .8 hp.



Two new HP engines. The VT-21 is available now, the VT-49 later this year. A V-twin version will be out before too long.



Solo HM47LE from Kleinmotorenbau S. Miadowitz comes in 35, 47, 81cc versions.



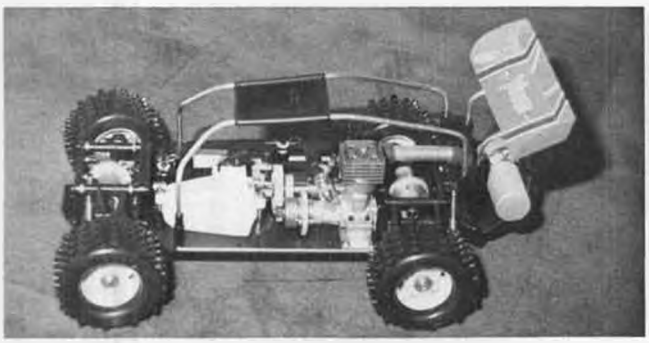
The Jupiter 4-cycle engines come in single and horizontally opposed twin versions, 37 cc displacement. The twin turns an 18 x 10 prop at 7300 rpm.

its airport terminal, a virtual city in itself: three stories of shops of all kinds including a supermarket, many restaurants, movie theaters, and even a train station in the basement. You then catch a Lufthanza 737 for the one-hour flight to Nurnberg.

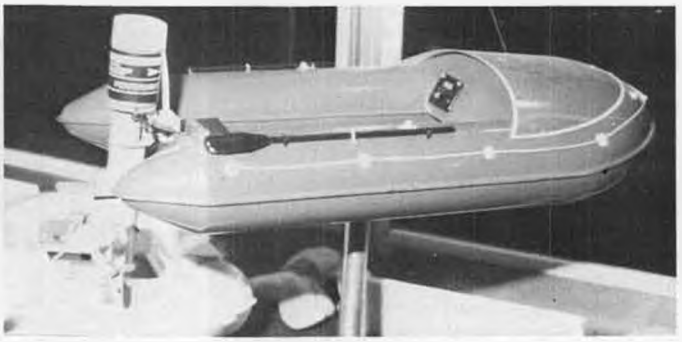
The "Messezentrum", the Fair Center, is located a short distance from the heart of the city. It is situated close to federal highways, and is serviced by a subway from the airport, by busses and taxis, and even helicopters. At the center itself, there are immediately adjacent parking lots for 10,000 cars.

The organization of this event is done by committee, under the direction this year of Dr. Benno Korbmacher. And organized it is, to the nth degree. Within the fair complex, in addition to the normal admittance, food, and sanitary facilities necessary, you will find accommodation, banking, and car rental services. You can make airline reservations, get your hair done, or buy flowers for any deserving friend you might make. There is a Foreigner's Meeting Point, with free linguistic and writing services, and for the press, there is a complete center with all the facilities. You can mail a letter, make a phone call, send a Telex, hire a photographer, get photostats made, or talk to a policeman if the need arises. You can get food of all sorts from a complete sit-down meal, to a package of Lebkuchen, the delicious gingerbread which is a Nurnberg specialty. It is all there, including a special room for Mothers-To-Be, of which I didn't get any further details.

The extensive organization and planning is further evident in the physical arrangements within the fair buildings. As mentioned, there are twelve separate buildings, all of which are connected by corridors which are clearly marked with color codes and pointing hands so that navigation is not a problem, whatever your mother tongue might be. Displays within the fair are divided into seven categories, each of which is assigned a color and hall letter. For example, "Model Construction and Hobby Craft" were coded brown, and located in Halls



Glow engine off-road racers are very popular in Europe. This one is the Enduro 84 x 4 Competition chassis by Yankee of France.



Baracuda 470 from Dieter Schluter comes in two versions for electric outboard up to 8 volts.

Lockheed Super 286L helicopter, for Kavan mechanics. Designer and flyer, Manfred Heid, poses with the wood and plastic kit for .60s.

Helimax 40 from Graupner, for .40 engines (.60 for experts). Rotor span 45 in., 7 lbs., uses Bell-Hiller system with collective pitch.

Powermax radial three, 45cc, 4-cycle overhead valve glow plug engine. V-twin also.

This impressive YAK-50 (for 15 to 50cc) is kitted by Topp Modelle. It boasts a wingspan of 80 inches, length of 68 inches, and flying weight of 15.5 lbs.

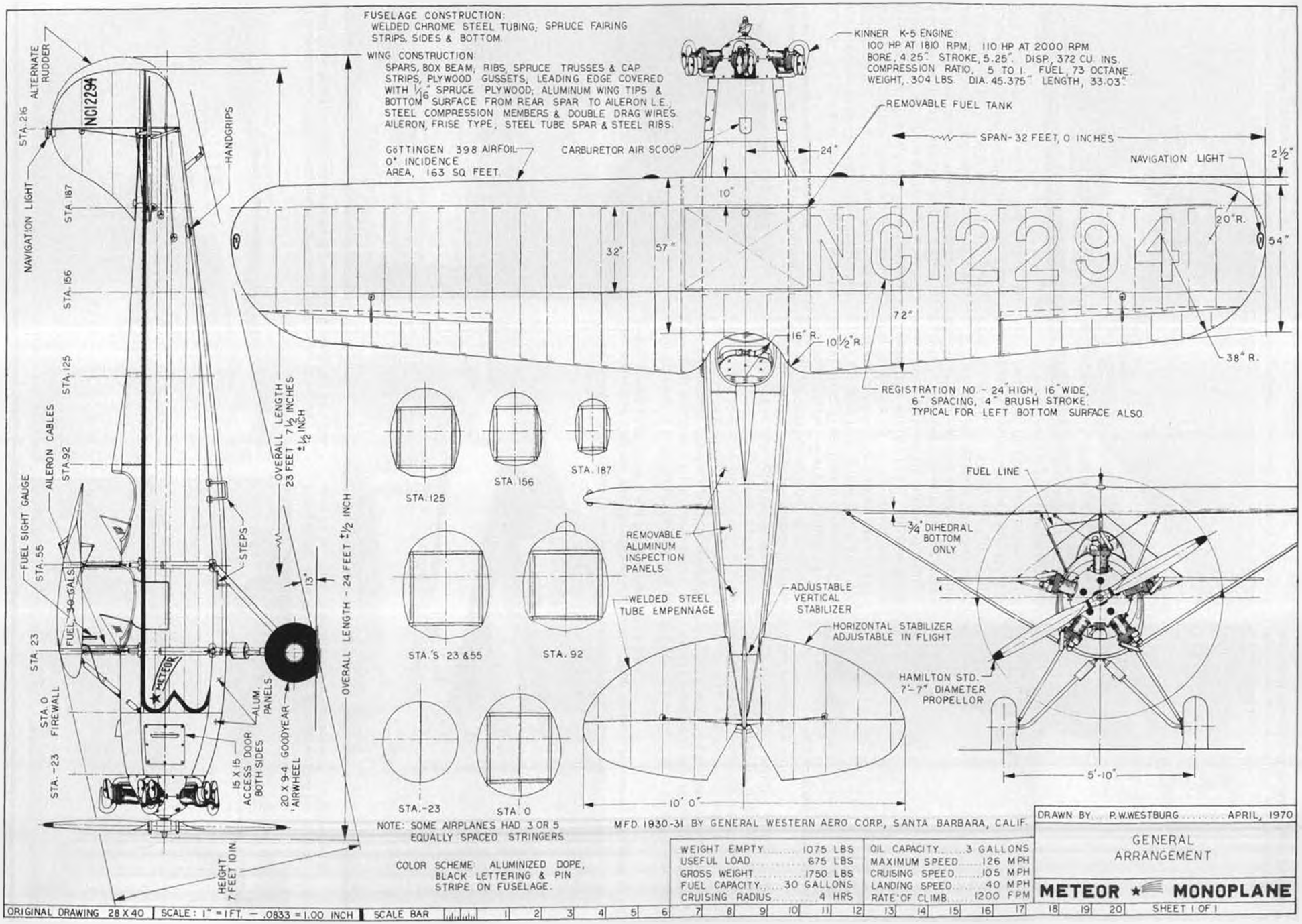
L & P. All printed guides, signs, letters, etc., referring to that subject were in that color, all easy to understand and easy to locate. In addition, there was available a 614-page guide, which listed alphabetically all of the companies present, and pinpointed their location within a hall, aisle, and stand. Another guide was available with line drawings of each individual hall, with each company's location within the hall. My guide shows 224 "brown" locations, indicating at least that many model companies. However, that is not exactly a true picture, as there is a multi-product area in two halls, for companies whose products fall into more than one category.

Then there were some nationalistic groupings. For example, there were two Israeli model companies located within a group of exhibitors from that country whose interests were outside of the model area. Even Carrera, one of Germany's largest hobby manufacturers was located outside the brown area, probably because of its apparent interests outside the model field. I'm sure there were over 250 strictly model manufacturers represented, including many which are household words here in the U.S., like Kavan, Webra, HP, Schluter, OPS, and others. Naturally, all of the European big guns were there; Graupner, Multiplex, Robbe, and down at the Simprop location, we found a smiling, carefree-appearing Hanno Pretner, different from the business-like flyer we see at Las Vegas, who was telling the world about the wonders of the Simprop radio. Seeing what he has done with it, there should not be any doubt that it works extremely well.

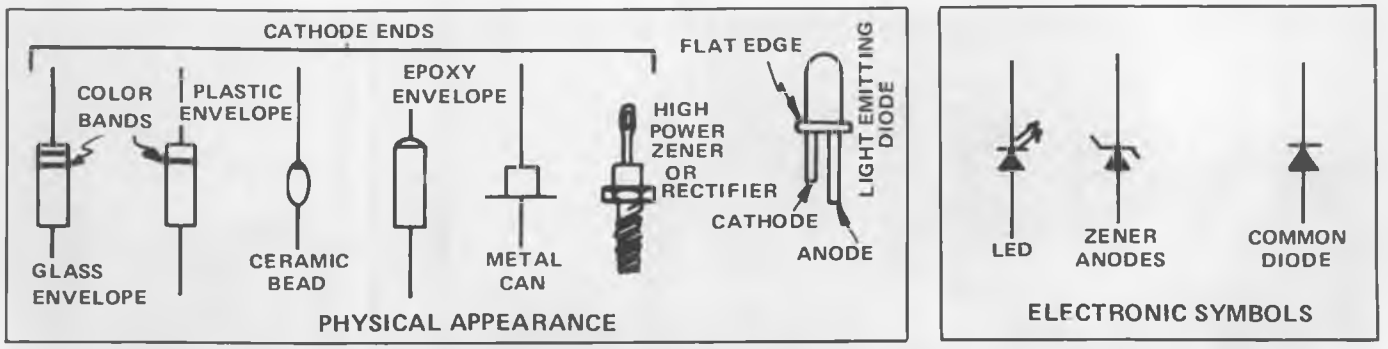
Continued on page 66

Graupner's 1/5th scale Stolp Starlet for Standoff Scale competition. Power source is .25 2-cycle or .40 4-cycle engine, weight is 4.8 lbs.

Would you believe an R/C wind surfer with wetsuited beach boy? Gundert Sportmodelle.



To order full size prints of this drawing, see ad on page 87.



Diodes come in many shapes and sizes, all of them are polarized and must be properly installed.

Electronics Corner

By ELOY MAREZ

E.S.V., O.M.T. (ONE MORE TIME)

Mr. John G. Klooz of Haslett, Michigan, writes:

"I have two boats, one of which has a GE 12-volt 2.5-amp battery, and the other a Dumas six-volt, five-amp battery. I think they are both lead acid batteries. Your circuit for an Expanded Scale Voltmeter should be perfect for checking the 12-volt battery, but I would greatly appreciate it if you would 'plunk' in the values on my enclosed sketch for building an Expanded Scale Voltmeter for checking the six-volt battery. (Maybe I could use a switch for changing from one voltage to the other using the same meter movement.)

"In addition, please send the Popular Electronics *charger article you mentioned.*

"I know this is asking a lot but I've never come across anything to check out these batteries so I'd like to take advantage of it."

John, the *P.E.* information is in the mail enroute to you, and don't worry about "asking a lot", the idea of the whole column is to be a meeting place and an information exchange for us tinkerers.

Converting the E.S.V. to six-volt operation could not be simpler . . . you have only to substitute a 5.1-volt Zener diode, such as 1N751 or 1N4733 (Radio Shack No. 276-565) for the one used originally, recalibrate to the new values that you wish to read using five volts as the minimum, and seven or eight as the maximum.

As you have gathered, the secret is in the Zener, whose primary function in life is to provide voltage regulation at its rated voltage, within its wattage rating. In order to do so, it will not conduct until the *applied* voltage reaches or exceeds said *rated* voltage, a feature which we use in E.S.V. circuits. Voltages lower than the Zener voltage simply do not go through, thus no indication on the meter. The top end reading is controlled by the resistances in the circuit, while the pots compensate for the tolerances involved.

As you mentioned (and which I think is a good idea), a dual range meter could be assembled, using the same meter movement. Of course, as different calibration is required for each range, you have to switch more than just the Zener, and after looking at it, the easiest thing to do is switch only the meter itself, per the enclosed sketch.

Calibration will be necessary, of course, and here you can use your 12-volt battery, with a 500-ohm pot connected across it, as a voltage divider. You'll need a voltmeter to read the output voltage, and you must remember to set the voltage with the E.S.V. connected, as the changing load actually determines the output. A similar circuit could be used to calibrate the 12-volt E.S.V. though in all cases you will need a battery voltage higher than the highest one you intend to set the E.S.V. to read. In your case, you could hook up your six and 12-volt batteries in series, and use a 1000-ohm pot in place of the 500.

How about an LED monitor for the batteries? It is also relatively easy to do, using the same features of the Zener diode described. The circuit uses a minimum of parts: use 1.5K for R-1, 680 for R-2, and a Radio Shack 276-2009 for the transistor. For D-1, use a Zener with a voltage rating .75 volts lower than the desired tripping voltage. For example, the 5.1-volt 1N4733 mentioned would cause the LED to extinguish when the applied voltage was reduced to 5.85 volts.

The circuit can be left attached to the battery continuously, however it will draw 15 to 20 mils, depending on the applied voltage. If this is too much for your application, insert a pushbutton switch in either leg of the source voltage which you can activate anytime you wish to test for the proper voltage.

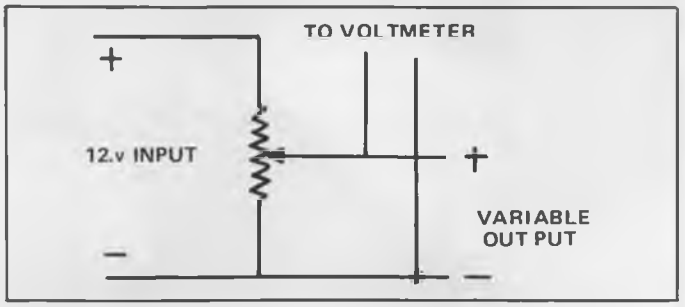
DUAL HEAT SOLDERING IRON

I have previously mentioned the importance of using the proper soldering iron for the extremely small components and printed circuit boards we use in R/C equipment. Too much heat can be disastrous in many ways. For a lot of my work, I use a 12-watt iron, and even that is too much sometimes, such as when working on small crowded servo and receiver boards.

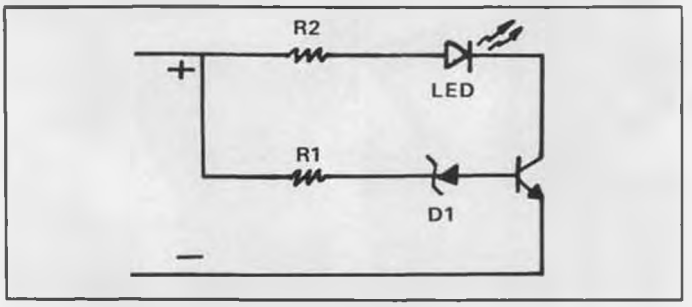
If you have an iron that you feel is a bit much for the job, there is a simple and inexpensive way to tame it down a bit, by about 30 percent. Simply add a diode somewhere in the AC line! What happens is that the diode only conducts on every other cycle of the alternating supply voltage, which results in an average effective remaining voltage 70 percent of what was applied.

The diode should be at least a 200-volt-unit, and capable of carrying the necessary current. Remember that current consumption is equal to the watts

Continued on page 69



This simple variable voltage supply is to be used for calibrating E.S.V. circuit. See text for valves and instructions.



LED battery monitor which can be tailored for different voltages by proper selection of the value of the zener diode, D1.

1. The Melbourne Welcoming Committee from P & DARCS club consisting of Norman Garrett, Mack Garrett, and Monty Tyrrell.

2. The only way to quench Austrailian thirst! King-size Calton beer is guzzled by a laughing Pond as Monty Tyrrell holds "bottoms up."

PLUG SPARKS

By JOHN POND

• This columnist had intended to write up his trip to Australia as a separate article, but one thing or another has led to a point where a spot on this column was open. Of course, at the Australian Nationals there were more events than could be adequately covered, but we will include some photos of interest on other phases of flying. However, the bulk of the coverage of the Model Aeronautical Association of Australia (MAAA) Nationals at Horsham, Victoria will be O/T oriented, so let's get on with our tale.

The phone rang (as it always does early in the morning) rousing the columnist from bed. Upon answering it, the columnist realized it was a long distance call from Monty Tyrrell of Australia demanding to know if I was going to attend the MAAA Nationals in Victoria. Monty is one of those fellows who broke no procrastination, and before I knew it, I had scheduled a trip to Melbourne, Australia.

Bringing models to Australia has always been a problem. The last time I went to Camperdown in 1978, the model shipment cost me $260 one way! One can readily understand why all models were left in Australia, as the return trip was rated over $300! You can build an awful lot of models for over 500 bucks!

The selection of models was narrowed down to .020 Replica, and rubber models not having a wingspan greater than 40 inches. At this time, Tex Newman, a corrugated box salesman for Champion Products, volunteered to make up a box the same size as my continental type suitcase.

Upon completion, this unique box looked so clever that Maryann Pond suggested it be covered with shelf paper with a pattern closely resembling artificial leather. The box was duly covered, and more than one porter got fooled with the very lightweight "valise."

The models selected were one .020 Strato Streak, one .020 So Long, one Coupe, and one P-30, along with miscellaneous fuels, rubber, winders, etc. The box was then carefully filled with styrofoam "popcorn" making it a very neat, compact suitcase. Would you believe that in both trips, out and back, not a hole was punched in the box, nor was there any damage incurred to the models!

Flying to Australia is a very long, monotonous trip with one stop in Honolulu before continuing on to Sydney. This involves 14 hours *minimum*, and one can get a "cooped-up" feeling in short order. Despite frequent gargling with vodka *(What? No Coors? wrf)*, the trip was still tiresome.

Getting through Australian customs is always a tedious affair as the officials

3. Some more Aussie characters: (l to r) engine man Gordon Burford, Ivor F (Stone), and Josie Burford.

4. Pond and Tyrrell try to have a good time at MAAA functions, but it isn't easy. Model is 1/4-scale Norseman, Quadra powered.

5. This Douglas DC-3 won the control line Standoff Scale event.

6. This is control line at its simplest. Unidentified flying youngster readies his Navy profile racer.

seem to delight in looking over the models. This time, I got lucky. It seems there was a group of cowboys on board who were scheduled to put on a western show at the first rodeo in Victoria. Of course, this group had been granted carte blanche privileges with customs and were easily passed through. Upon disembarkation, I was mistaken for part of the rodeo group as I was wearing my western style hat. Before I could say a word, the porter had loaded up my two suitcases, and trundled them past the custom officials and out those swinging doors! Needless to say, despite my astonishment, I managed to keep up with the porter.

Once outside, there was Monty Tyrrell, little changed from four years ago. A series of cheery welcomes ensued as Monty had brought his dear friends (who were in the local pub at the time), Norman Garrett and his son "Mack," to help with the festivities. Photo No. 1 shows all these characters. Note they have parking meters in Australia.

Well, in less time than it takes to tell about it, all three cars promptly took off for Horsham about 100-miles-plus north of Melbourne. Upon arriving at Horsham, getting settled at the Westender Motel, and then adjourning to the local pub . . . what happens but a truckload of my favorite Australian beer (Carlton) drives up.

There was nothing else to do but grab up the nearest and coldest Carlton draft. Photo No. 2 is strictly a gag shot with Monty Tyrrell patiently holding the oversize can of Carlton beer for Pond. I figure it was about the right size! Incidentally, for you beer lovers, Carlton actually makes Foster beer, one of the best-known Australian export beers. Carlton is not exported at present as the home consumption more than meets the production of Carlton regular, light, and draft. Yummy!

Bright and early the next morning we all hustled over to City Hall. This had been turned over to the MAAA to use as a headquarters, an area for indoor flying, and several scale judging rooms.

This writer was greatly surprised at the number of names he was able to recall as he met many old friends. Photo No. 3 shows Gordon Burford, Ivor Stowe (calls himself Ivor F), and Josie Burford. This was taken just outside of City Hall, Horsham.

Many modelers will recall the old Burford engines made in Australia which looked somewhat like K&B Torpedo engines. Burford's last bunch, the

9. This gorgeous Supermarine Sea Fury built by Norman Bell of the DARCS club failed to place. Farnan photo.

7. Frank Curzon smiles and "mugs" the camera as Pond takes his picture with the 1/4-scale, O.S. 90 powered Gypsy Moth.

8. Tony Farnan (left) and son Michael proudly display their O.S. engines in the Farnan showroom. Farnans are O.S. distributors.

11. What a shame! This beautiful Westland Whirlwind by David Hull was destroyed on the steel fence posts.

12. This young man is probably the hottest Formula 1 racer in Australia. Ranjit Phelan of New South Wales poses for Pond.

Taipan series, were fully competitive with all other engines. Ivor F (as he styles himself with shortened English titles) was the foremost collector of Burford engines, even stumping Burford as to *when* a certain prototype was made, and *if* it was even made by him!

Anyway, to make a long story short, after Burford retired from making engines, Ivor hit upon the idea of making engines to fill the gap left by Burford. After numerous tries, he has come out with a good engine called the "Sesqui" (Lord knows what that means). This is now being delivered worldwide to fill those orders that initiated the project. I do note the Sesqui engine is now being handled by a distributor in England.

As an afterthought, Gordon Burford later dropped in to see this columnist at his home in San Jose on his way back from the CIAM meeting in Paris. At that time, Gordon was exploring the possibility of producing a small engine, something like a Class A diesel, and was investigating the American market for sales. The old timers could use a good, small diesel!

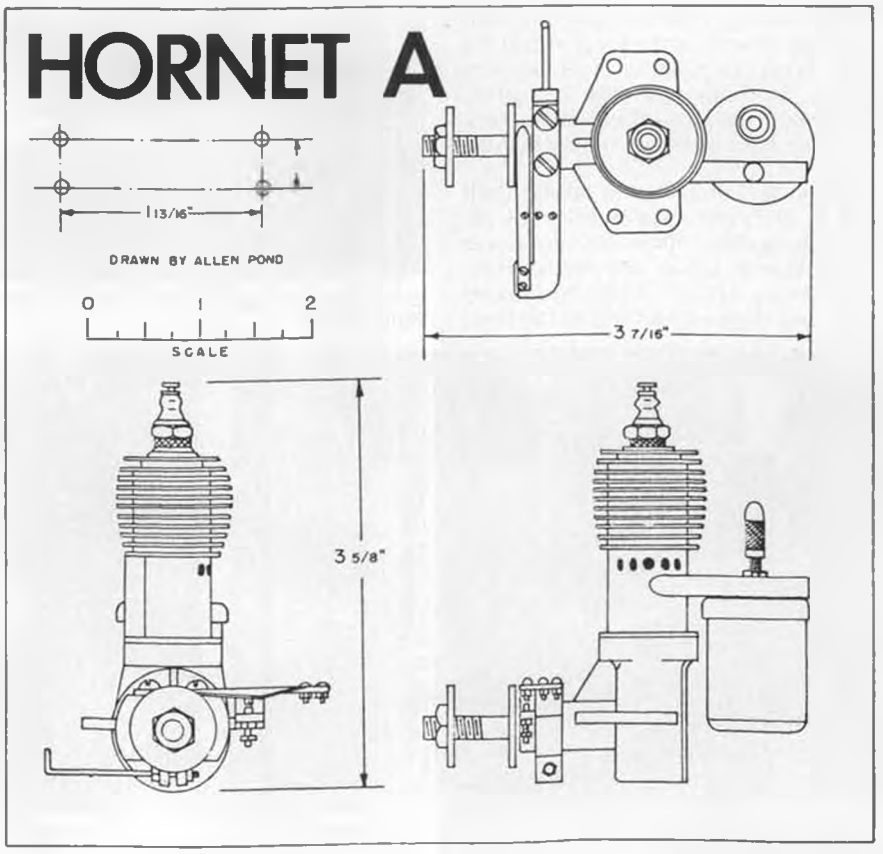
We seem to be easily distracted in our report of the Australian Nationals, but it was only because so much was going on all at once. One thing that made it a bit difficult to catch all the action was that free flight, control line, and radio control were on opposite sides of the town. Actually, one could go from one site to the other in 10 minutes, but you never knew exactly when the best flying would take place.

To say this writer was made welcome by the Australians would be the understatement of the year. Most Australians pride themselves on ruggedness, but they really have a heart of gold. I never met an Australian I didn't like. (He would have to be pretty obnoxious.)

The first day of the Nationals was spent registering, and getting contestant's events specified. I will say one thing, the Aussies really put out the red carpet treatment for this Yankee. As a matter of fact, I was even enrolled in the MAAA organization to make me legal for Nats flying.

At this time, the local newspaper photogs were taking pictures for their articles which appeared daily on the model plane flying. Naturally, they were impressed that this American had come all the way to Horsham (a town of only 12,000 population) to fly models. When

10. Monty Tyrrell's scratch-built de Havilland Hawk Moth as photographed by Tony Farnan. O.S. power, of course!



13. Typical Formula 1 racer line up. They look a shade "dated" compared to current American types.

14. Vic Dubery, the new chairman of SAM 35 (now 420 members strong!) launches an O/T Wakefield, Cloud Cruiser.

posed with Monty Tyrrell and his quarter scale Noorduyn Norseman, they got their facts wrong and credited the model to Pond!

As can be seen in Photo No. 4, this Quadra powered model attracted quite a bit of attention. After the newspaper article appeared, the kidding really started, asking how I was able to transport this huge model by air. Monty was even more communicative, referring to the reporter as a "Bloody Bak-stud" (one of his favorite invectives).

Well, there was nothing else to do but be Monty's helper as I was scheduled only for two days of the week's flying. Monty really flew his model in Monster Scale very well, but was unfortunately placed when doing his maneuvers for the judges. Can't say we didn't try, but the wind really plagued everyone. We wuz robbed!

In mentioning the wind, the Nationals were marred by heavy winds on all but two days, naturally, the opening days of registration! The Evening Bean Feed (an annual occurrence, sometimes called the Steak Fry) was so windy you could not lay your filled plate on the table lest the wind blow it off, steak and all. (Several dogs were really in hog heaven.) This was truly a shame as the location was ideal . . . a huge park lawn with the river winding through the greenery.

Let's take time off to look at this month's engine writeup. *(Don't worry, the MAAA story continues below. wrf)* There used to be a time when this columnist would leave this portion out of his column, but many complaints about the missing engine drawing forced me to conclude this item must be popular.

ENGINE OF THE MONTH

In the May 1982 "Plug Sparks" column, we featured an engine known as the Simplex Hornet which was produced by John Morrill. The engine we are featuring this month is the original Hornet engine as designed and built by Paul W. Lindberg, then Model Editor of *Popular Aviation*.

Lindberg had been producing a series of gas powered models (one every month for three years!) with most of the designs featuring the Hornet engine as motive power. Finally, in answer to the many requests from readers (and modelers), Lindberg prepared a two part article on how to construct this engine. These articles appeared in the January and February 1940 issues of *Popular Aviation*.

According to Lindberg, over 60 of these engines were produced at that time for use in his models and for those modelers who were associated with Lindberg. Nowadays, original Lindberg Hornet engines are to be found only in the hands of engine collectors.

This month we are again indebted to Dave Brodsky for the use of his engine. The engine has made a rather circuitous journey, at one time being owned by Bob Bowen who purchased the Ray Bunnel collection. One never knows when one of these engines will surface.

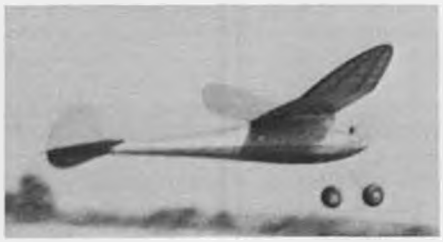
Naturally, with homebuilts such as the Hornet, variations will crop up, particularly in the timer design, tank, and needle valve arrangements. However, Hornet engines can be readily recognized even with these superficial changes.

The Hornet engine (as presented in 1940) was strictly a small type machinery job requiring at most, a simple machine lathe. Claims were made that material costs to make an engine would not exceed $2.50. As Lindberg pointed out in his article, the biggest problem was the crankcase casting which would require the making of a pattern. This was carefully detailed in the drawings.

In making the engine, cold rolled steel was specified for the cylinder and piston. He stated the denser the material used the better. I think what he was trying to say is that the harder or better tempered material would lend itself to better machining and fit, not to mention longer wear.

Interestingly enough, the piston was

Continued on page 71



Hayseed

OLD TIMER Model of the Month

Designed by: Carl Hermes
Drawn by: Al Patterson
Text by: Carl Hermes

• This model was one of a series that was flown from 1938 on, by a small group in the Bridgeport, Connecticut area. It turned out to be a pretty good team effort.

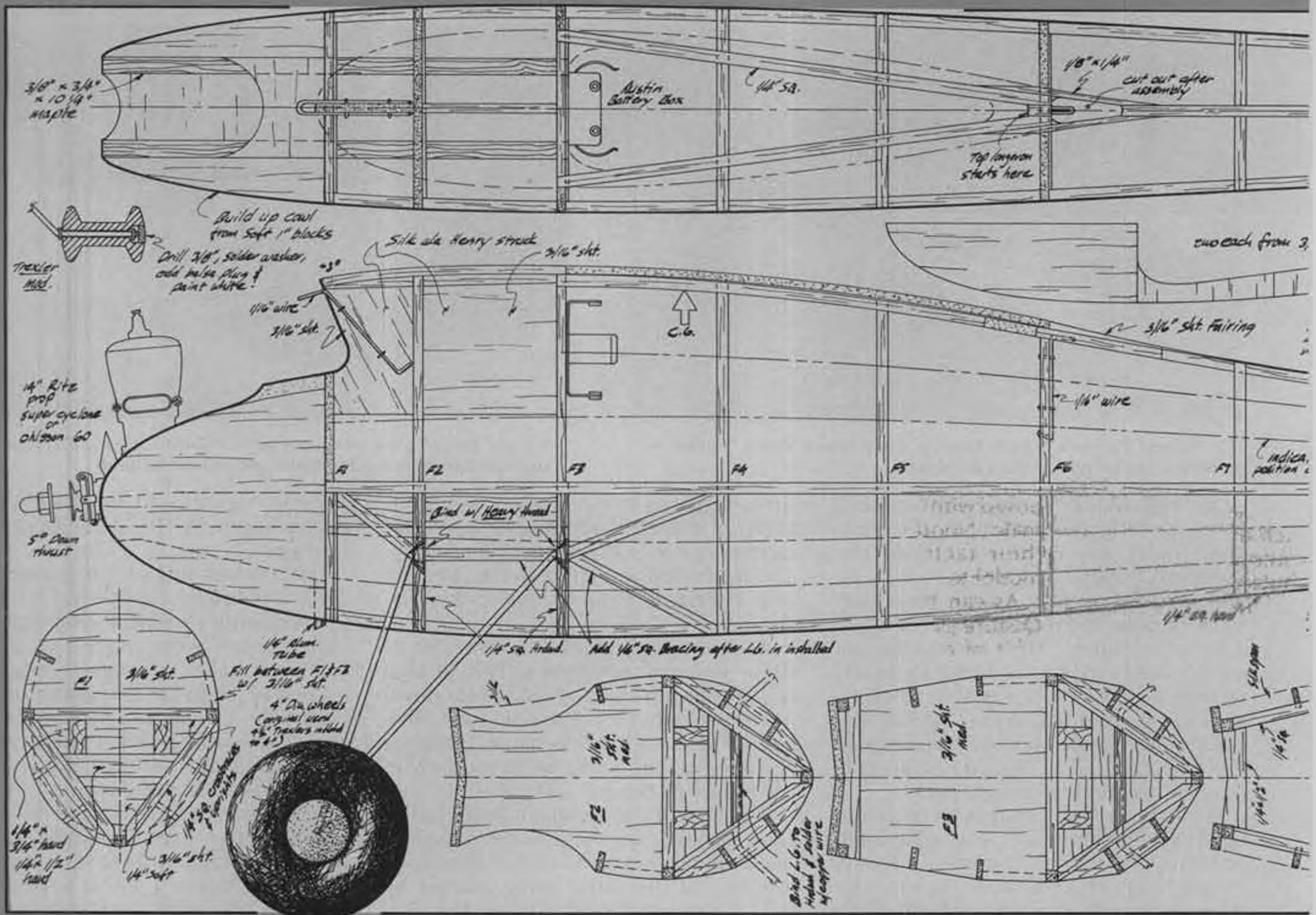
Chester Kowalkowski was an extremely fast builder and could turn out two or three ships in the time it took the rest of us to do one. We capitalized on this by talking Chester into building several wings and tails with different airfoils to try to find the best combination. Chester also showed us all by winning the 1940 State Champs.

Carl Cappozi developed the trim adjustments, tuned motors and modified props. He also owned a car (Hudson) and every evening during the summer we would all pile in and head for the flying field in Fairfield.

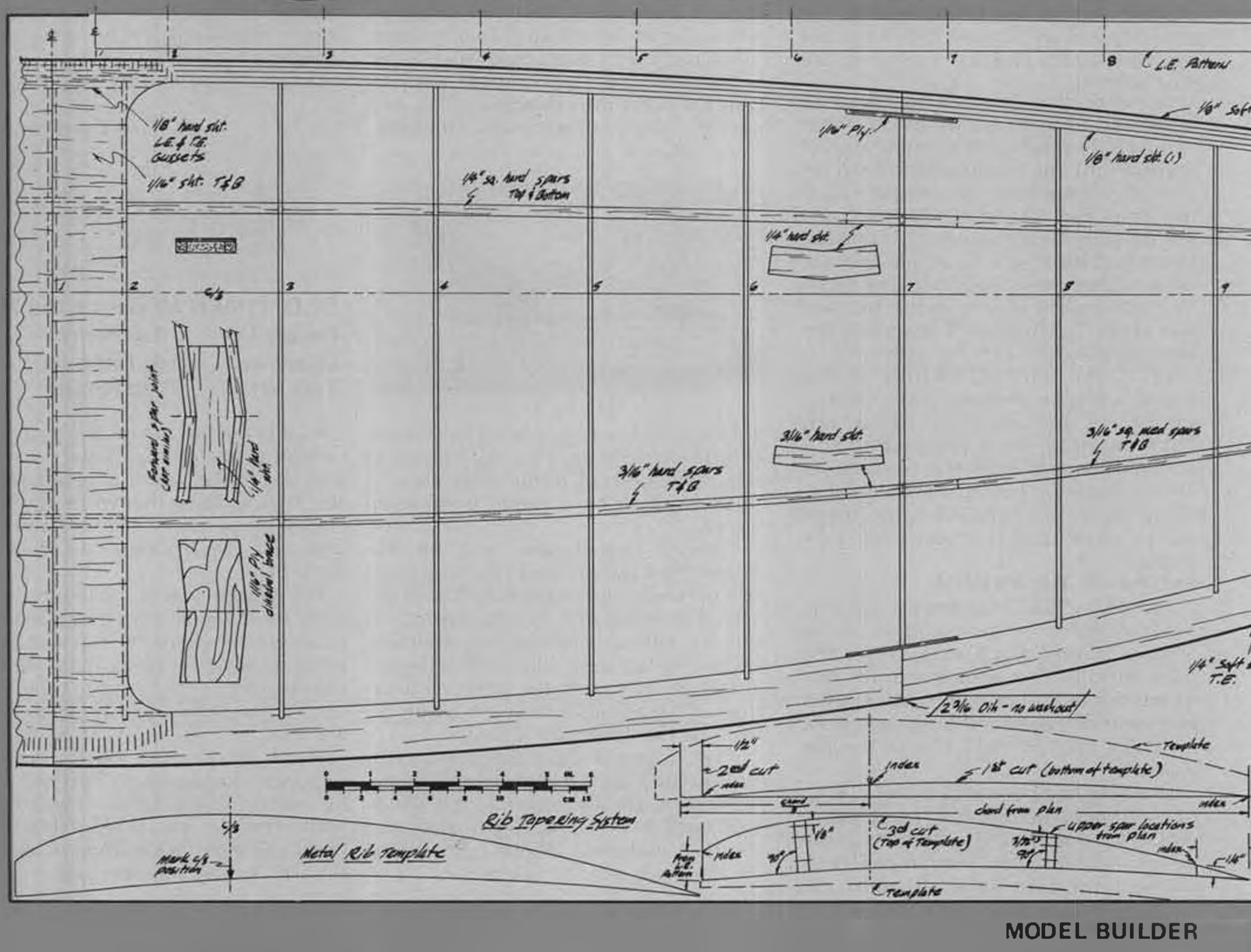
Paul Lyzak ran the model shop which consisted mainly of a little store front with a circular saw that produced any size stick of balsa that you wanted. The closest other source of good balsa at that time was Frank Zaic's (Jasco) in New York City.

Bill Wargo was a carpenter whose work took him all over the Connecticut countryside where he was continually scouting for new flying fields. Bill flew the Hayseed for the longest time. Its last contest was in Rocky Hill in 1980 where it was lost.

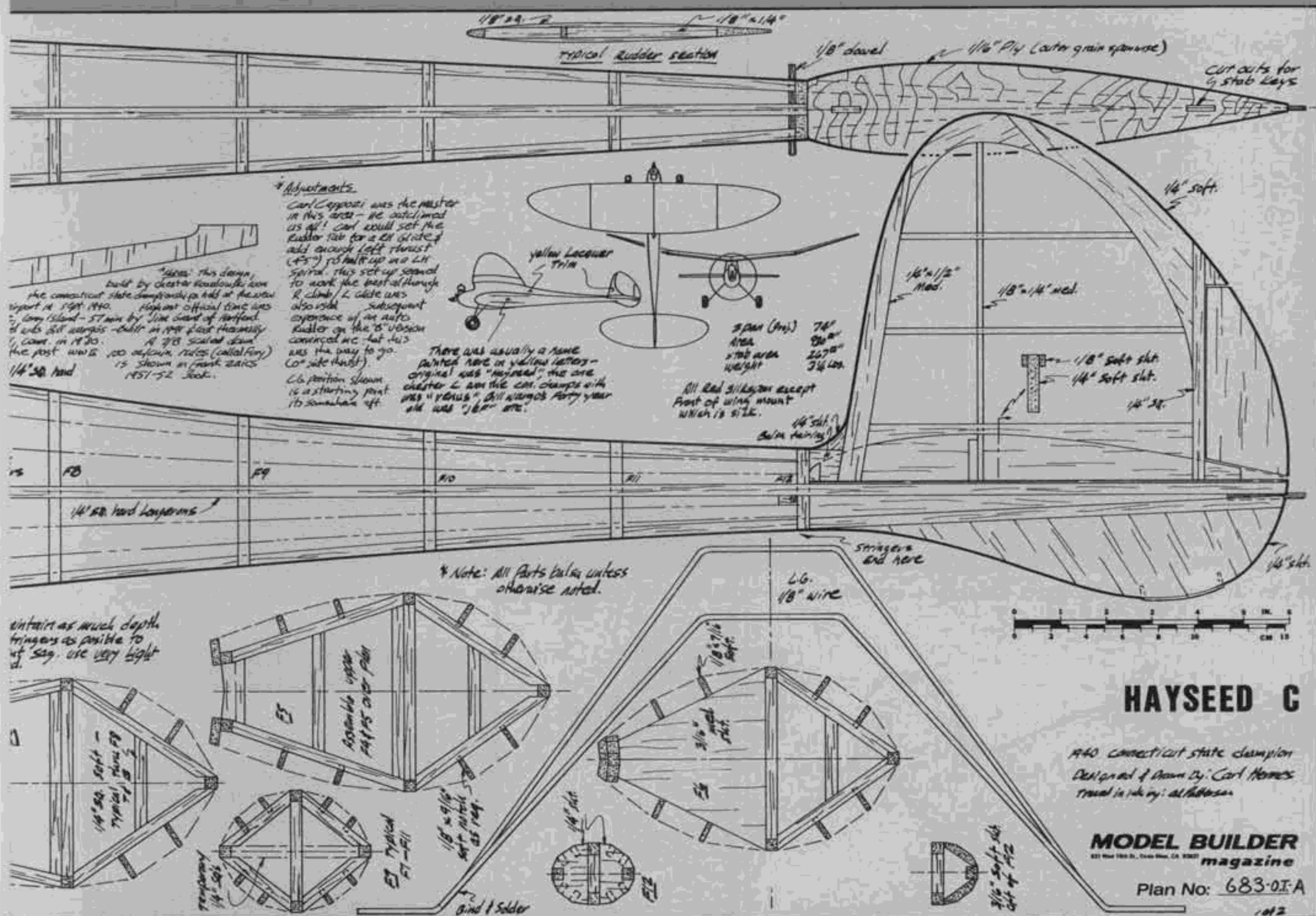
Frank Bushey (ex-AMA President) imported the design to Hartford where he and Jim Grant (later of indoor fame) built a few. Jim made the longest official flight (57 minutes) at Long Island after the war. *(see plans on next page)* •

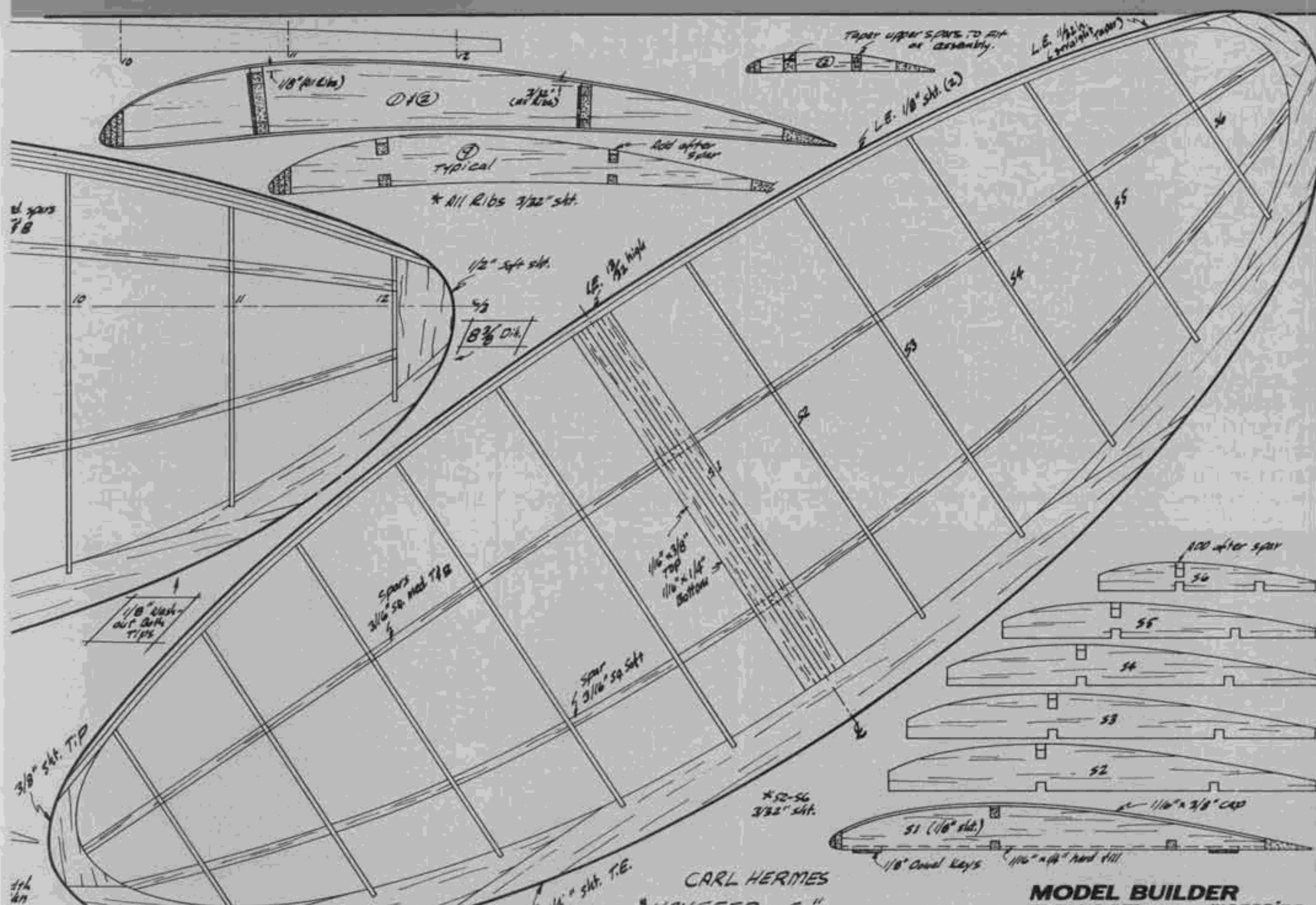


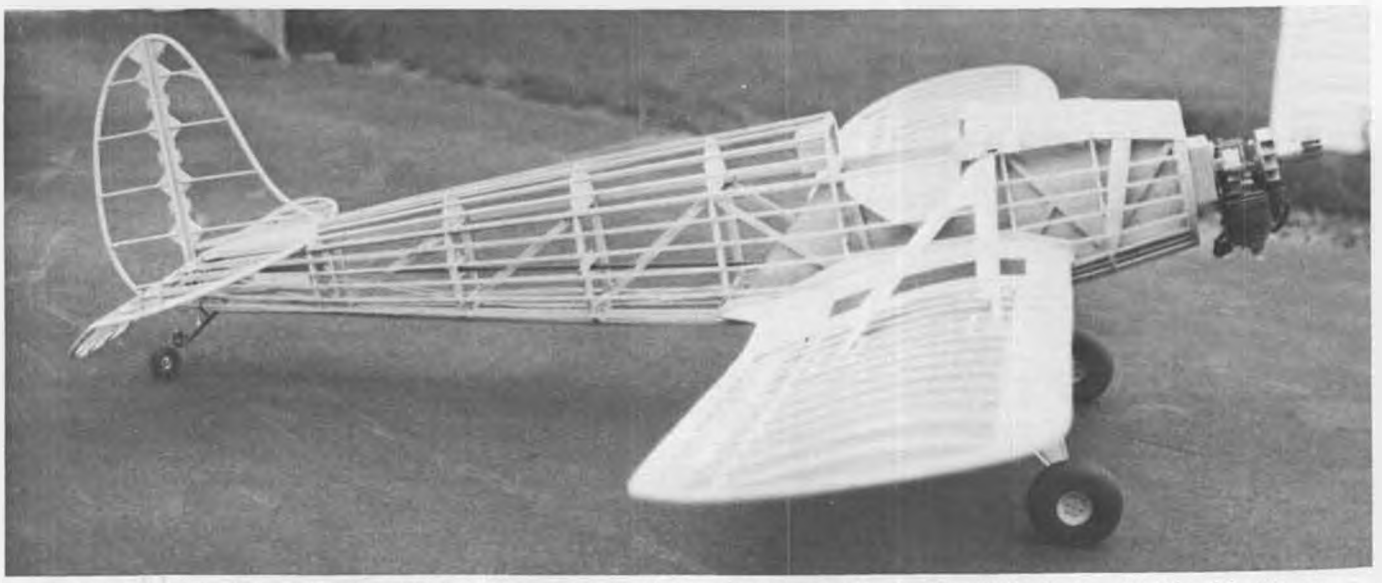
3/8" × 3/4" × 10 1/4" maple
Austin Battery Box
1/4" sq.
1/8" × 1/4"
cut out after assembly
Top longeron starts here
Build up cowl from soft 1" blocks
Drill 3/8", solder washer, add balsa plug & paint white
Trexler mod.
Silk ala Henry struck
3/16" sht.
two each from 3,
1/16" wire
C.G.
3/16" sht. fairing
14" Rite prop
super cyclone or Ohlsson 60
5° Down thrust
F1
F2
F3
F4
F5
F6
F7
Bind w/ Heavy thread
1/4" sq. hard
1/16" Alum. Tube
1/4" sq. hrdwd.
Add 1/16" sq. bracing after L.G. is installed
Fill between F1 & F2 w/ 3/16" sht.
4" Dia. wheels
1/4" soft



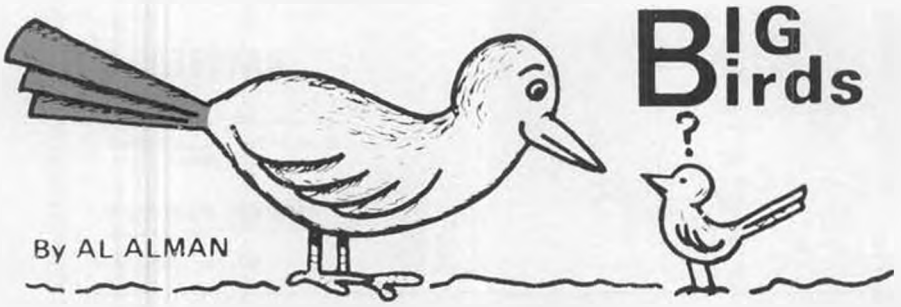
L.E. Pattern
1/8" soft
1/8" hard sht. L.E. & T.E. Gussets
1/16" sht. T & B
1/16" Ply
1/8" hard sht.
1/4" sq. hard spars Top & bottom
1/4" hard sht.
3/16" hard sht.
3/16" sq. med spars T & B
3/16" hard spars T & B
Forward spar joint
1/16" Ply dihedral brace
1/4" soft sht. T.E.
2 3/16 Dih - no washout
Template
2nd cut
Index
1st cut (bottom of template)
chord from plan
Rib Tapering System
3rd cut (Top of Template)
upper spar locations from plan
Metal Rib Template
Mark c/s position


Typical Rudder section
1/8" dowel
1/16" Ply (outer grain spanwise)
Cut outs for stab keys
1/4" soft
1/4" sq. hard Longerons
* Note: All Parts balsa unless otherwise noted.
L.G. 1/8" wire
Stringers end here
Bind & Solder
HAYSEED C
1940 Connecticut state champion
Designed & Drawn by: Carl Hermes
MODEL BUILDER magazine
Plan No: 683-OT-A


Taper upper spars to fit at assembly.
* All Ribs 3/32" sht.
Typical
1/2" soft sht.
Add after spar
3/8" sht. TIP
1/4" sht. T.E.
* S2-S6 3/32" sht.
1/16" x 3/8" cap
S1 (1/16" sht.)
1/8" Dowel Keys
CARL HERMES
"HAYSEED C"
2 of 2
MODEL BUILDER magazine
Plan No: 683-OT-B



DGA Designs' new Kinner Sportster. Plans are super, which is also the way this bird flies. A plain old Quadra is perfect for this airframe.



Al "BIG Bird" Alman's business card reflects some interesting side line occupations.

• Nowadays most everyone seems to be a self-proclaimed expert of one kind or another. And, as might be expected, each and every one of these "experts" has special stationery with an impressive logo or letterhead.

Take R/C experts, for example. Their letterheads always include the somewhat worn, but time-honored title of "R/C Consultant" . . . along with other equally vague descriptions of their abilities which are spaced along the bottom of the page. But, with very few exceptions, you're left to guess at exactly what that expert really knows, and what he can actually do for you . . . because his proclamation of expertise is so general and non-specific. Certainly not the best way to do business . . .

In contrast to these inane letterheads, may I offer you something more absolute . . . something that gets right down to the nitty-gritty and tells exactly what is, and what ain't . . . and leaves nothing to the imagination (see the pic of my bonafide, 100% official, "Expert's Business Card")? It stands to reason that anyone who knows exactly where he's at, and what he excells in, can be expected to deliver as advertised. Here's a rundown of my six very special categories of expertise:

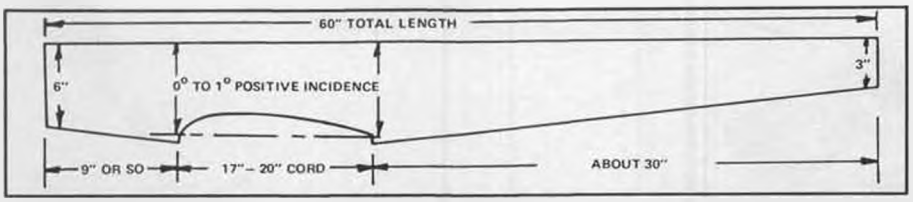
1) GIMBALS HOT STUFFED — Even though the new Hot Shot cyanoacrylate accelerator instantly solidifies all gimbals in place for eternity, the secret to success is in the timing . . . and not getting caught while doing the dirty deed.

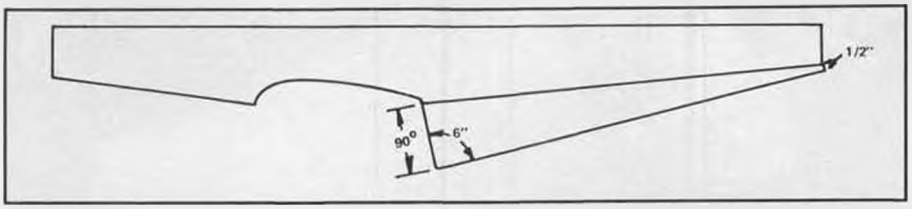
2) JUDGES BRIBED — Although I fully subscribe to IMAA's un-contest, low-key, no-judging type of fly-in, I realize there are others who do prefer the gut-wrenching, competitive atmosphere found at fun-flys, quickie-races, and pattern contests. As long as there are judges, my services will always be a worthwhile investment.

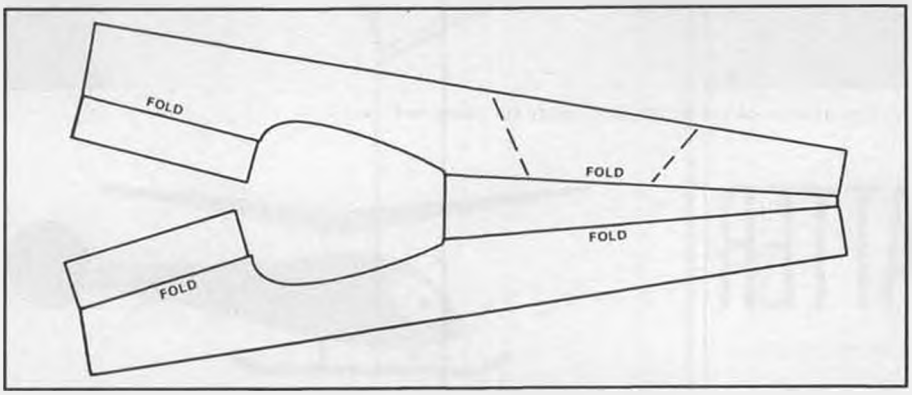
3) INFLIGHT WING REMOVALS — Much more easily done on smaller, glow-powered craft that use gummies or relatively small nylon bolts. For BIG Birds, a miniscule but potent explosive device (patent pending) must be secreted aboard and timed to rupture hold-down bolts at the worst possible time, i.e., at takeoff or just before the

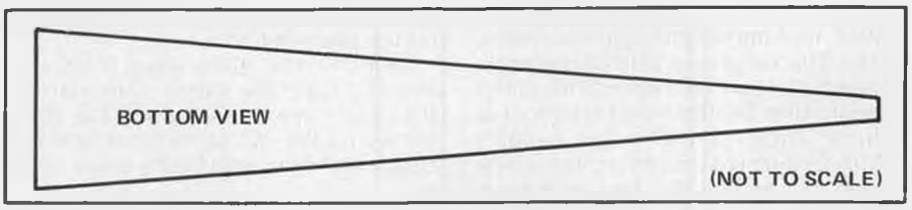
This is Bruce Gale's labor of love, a scratch-built Curtiss Robin. Bruce got his early stick time in full-size Robin. Quadra 50 powered.

Would you believe that Marv Reese's Mooney (left) is made of cardboard? Keith Penner (right) poses with his Laser.









bottom of a loop. Here, also, timing is of the essence because a wing coming loose during straight and level flight is a rather mundane happening and garners no points at all.

4) BUDDY CORDS CUT — Very few ever come close to succeeding here. The name of the game is to be extremely subtle . . . and twice as sneaky. It takes dedication, one helluva lot of practice . . . and an Uber Skiver knife to become competent.

5) BATTERIES DRAINED — This is probably the easiest of all categories . . . because so many BIG Bird pilots assist me by outsmarting and/or outdumbing themselves (inadequate charging time, using a standard charger to charge heavy duty packs, or not using a heavy duty pack in the first place, are the three dumbest reasons for premature battery failure). Maximum points are usually awarded to whoever speaks up first and claims responsibility for a battery failure.

6) SCHNUERLE PORTED WINDSTOCKS (SPW) — This one really separates the men from the boys. In fact, you won't find anyone else who has any experience in this category; I have a patent pending for SPWs, and although they can be used with the (ugh) smaller airplanes, SPW's really come into their own when aligned and operated with BIG Birds only.

One last word: if you're self-conscious and want to avoid any possibility of embarrassment, keep in mind that all communications will be held in the strictest confidence and treated as "priviledged information" . . . provided plain brown envelopes or wrappers are used.

Marv's first cardboard Mooney. Flew as good as it looks. Died 'cause battery came loose.

These life-like Latex rubber pilots can be "made-up" with ladies' make-up. See text.

CARDBOARD AEROPLANES

They've been around for quite a while, but interest in them seems to come and go, because, up until recently, there really wasn't any need for a cheaper way to build airplanes. And oh, those early cardboard aircraft were U-G-L-Y!!!! It seems that nobody even tried to make them look good, although the ones I saw flew remarkably well. Those early "hackers" just didn't seem interested in advancing the state-of-the-art in cardboard flying machines.

But then BIG Bird Lovers started to infiltrate their ranks and, suddenly, cardboard airplanes started to look like real, honest-to-goodness airplanes. Two perfect examples were Marvin Reese's Mooneys. I used the past tense because both birds have since gone to the "Great Flying Field In The Sky," but not because they were unsound or poorly engineered. Mooney No. 1 bought the farm because the battery pack came loose; Mooney No. 2 pranged because Marv ran it out of battery juice. However, in spite of his obsession for destructive testing, Marv did have two dandy looking and flying BIG Birds, and you certainly can't tell from the pix that either of those planes were built out of packing material. So, because Mr. Reese seems to know what he's doing when he builds with cardboard, and because so

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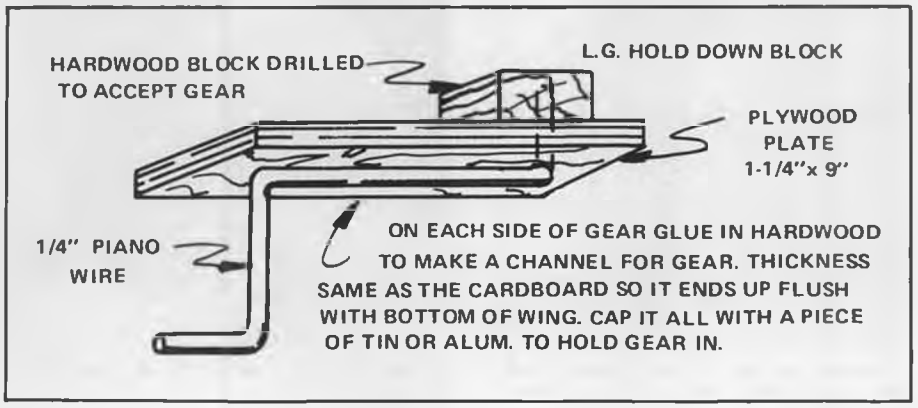
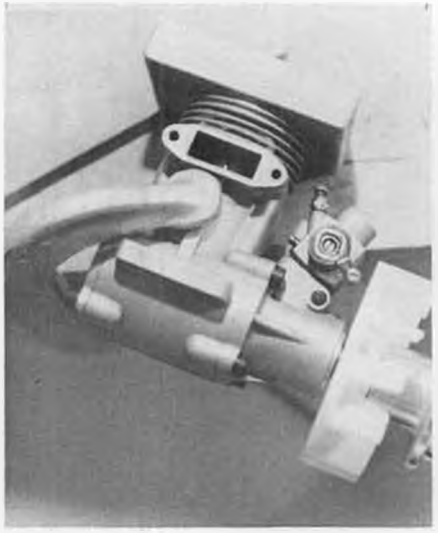
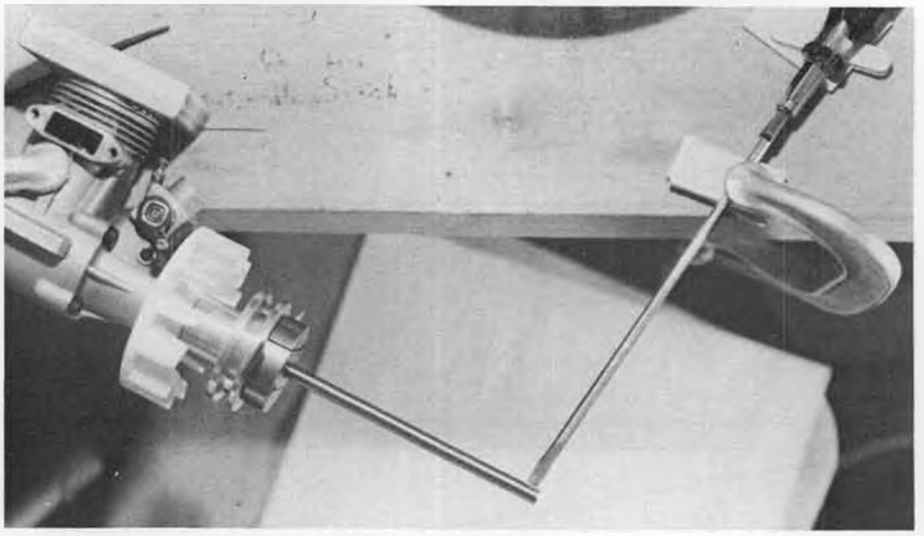




1. Engine is clamped to the workbench with a large C-clamp.



2. Overall view of the clutch shaft ready for alignment.

CHOPPER CHATTER

By RAY HOSTETLER PHOTOS BY THE AUTHOR

• This month will be of particular interest to those of you who presently own a helicopter with a vertical cone for starting. I hadn't really thought about all the problems associated with cone starting until a few weeks ago. Putting together the GMP Competitor for an up-coming review (in the next few months) made me think back years ago, when I flew the Schulter Heli-Boy . . . and all the pains that were necessary to get the starter shaft perfectly aligned.

Well, nothing has changed since then, either. The same care with alignment is necessary for any helicopter with direct cone starting. (Notice how I refer to it as "direct" cone starting. In last month's column, I detailed the new cone starting system that will be standard on American's Ultra-Mantis. With this new method, typical alignment problems are eliminated.)

What I want to do is give you a simple, yet effective way to perfectly align your starting shaft, then detail the rest of the drive train alignment process.

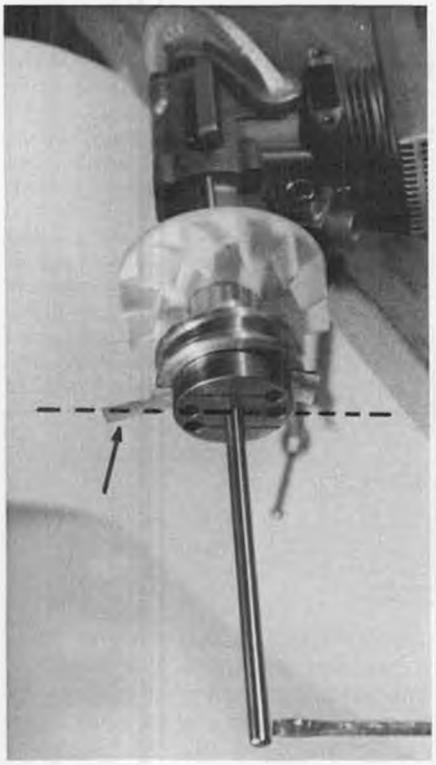
I will assume that you have your engine in hand with cooling fan screwed on tight. I would advise blue Loctite too. If you ever have problems loosening the nut for any reason, simply insert a one-eighth diameter, *wooden* dowel into the exhaust port of the engine. Gently bring the piston up to squeeze the dowel, and your prop nut will pop loose with a little more pressure. *Never* insert any metal into the exhaust port, or you will instantly ruin your engine.

Remove the glow plug from the engine. Take the clutch with starting shaft and place it on top of the fan. Place Loctite on the two screws that hold the clutch to the fan, and lightly screw them in.

Now you'll have to clamp your engine to a solid surface with the fan and clutch shaft free to rotate. See Photo No. 1. Once this is done, clamp a screwdriver or a piece of music wire to the table, and adjust the clamps so there is a slight gap between the tip of the clutch shaft and the indicator you use. Refer to Photo No. 2.

Rotate the fan/clutch assembly slowly, and observe any variation between the tip of the clutch shaft and indicator. This gap is technically called "runout". If the gap remains the same, you have a rare perfect fit of all components. Evenly tighten the two clutch screws snug, and recheck the runout.

For the majority of installations, there will be noticeable runout. Position the clutch shaft at the greatest gap, and then check to see where the two clutch screws are positioned. If they are approximately vertical, you may have to shim one or both ends of the clutch with the shims off-center to enable you to pull the shaft into alignment. (See Figure 1.) If the screws are approximately horizontal (Photo 3), you may have to simply shim one end of the clutch. Then again, with screws horizontal you may be able to differentially tighten the screws to bring the shaft into alignment. Tighten the screw on the inside of the clutch (right screw in Photo 3) a bit more, and recheck for runout. If you



3. With screws horizontal (dotted line) and max gap at pointer, shim clutch's left side.

4. Detail photo of corner shim along with an end shim.

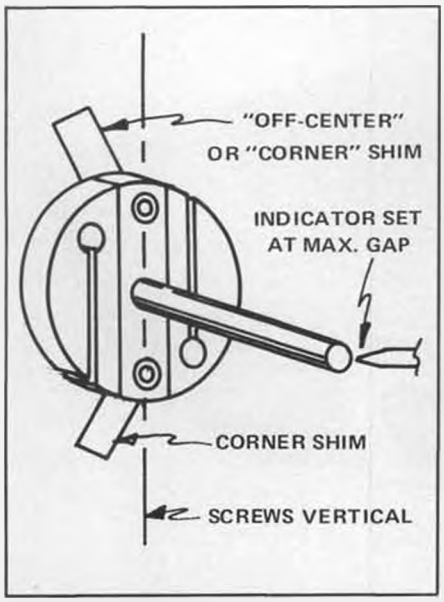


Figure 1. When clutch mounting screws are vertical, shims will go off-center as shown.

have a very close shaft to start with, this may be sufficient to line up everything.

As most installations need shims, you'll need shim material. Find the thinnest brass shim sheet you can. K&S offers assorted shim stock at any hobby shop that carries the K&S display. Use the thinnest sheet from this pack. (You'll find the thicker ones will come in handy sooner or later.) Cut a few nice-sized pieces (one-quarter by one inch) so the shim is easy to handle. The bulk of the material will be trimmed away at the end of the shimming process.

In Photo 3, I have set the runout gap at its maximum, and I've added a shim to the outside end of the clutch (left side of clutch in photo) because my screws were horizontal. Earlier, I had to shim with the screws vertical. See Figure 1 for the position of the "off-center" shims on both ends as I detailed before.

It is imperative that both screws be tightened up after inserting each shim. To insert another shim, both screws must be loosened enough to stick the new shim in. It will take several tries to get the shaft shimming straight. Please be patient. Time well spent here will save you "unsolveable" vibration problems later on.

In the particular example shown, you can see that I needed two shims on the ends, and one shim on the corner of one end. Detail of the corner shim is shown in Photo 4. It took me about 20 minutes to do this clutch shaft. The reason it takes as long as it does is because you just can't put in a shim and forget about it. Shim position is critical, and how far you push the shim in will vary how much the runout changes. Once you sit down and do a clutch, you'll find that it's not nearly as difficult to do as it sounds . . . Now if I could only talk WCN into producing a videotape magazine, it would be a lot easier for all of us!

After you get the shims in the correct spots with screws tightened down, you can add a drop of Hot Stuff on the shims to insure that they will stay put. This comes in handy of you ever have to disassemble the clutch. The shims stay neatly in place so reassembly is simplified. When everything is set, trim off the excess shim material with a sharp modeling knife. See Photo 5.)

Now you can be assured that you won't get vibration from a misaligned starter shaft. However . . . if the engine and clutch assembly is improperly installed in the helicopter, you'll still have vibration, so let's look at the proper way to set up the entire drive system. I want to let you know that I am making direct reference to the Competitor in the following paragraphs, but the theory can be applied to all side framed helicopters.

Place the engine with clutch between the side frames. Loosely install the engine mounting screws (finger tight) to the L-brackets or side frames as the case may be. Take the bearing that supports the clutch shaft and slip it over the clutch shaft and between the side frames. Insert the mounting bolts through the bearing block and tighten the nuts. Now drop down and progressively tighten all the engine mounting bolts.

What you have just done is to use the top bearing (just above the clutch) to center the engine. If you tighten the engine in place first, then force the top bearing between the side frames, the clutch shaft will not run true, and it will produce vibration. Most kits have a second (upper) bearing and bearing block that slips over the clutch shaft. Install this bearing now. Make sure that the mounting bolts slip easily through the side frames and mounting blocks. If not, enlarge the holes in the side frames just enough so the bolts easily slip through. The reason this is done is that even the second bearing block can throw things out of line if it's forced into place.

Once the engine and bearing blocks are tightened and in place, the whole assembly should not be moved again. I recommend that after the engine is mounted, you move the main gear slightly to set the play between the main gear and the engine gear. I realize however, that some kits make provision for sliding the engine to set the mesh between the engine and main gear. If this is the case, adjust the engine as required for proper mesh, then tighten the bearing on the clutch shaft first. In either case, you can use that upper bearing to center the engine between the side frames.

Given that the mesh is set between the engine and main gear, you can worry about the tail rotor drive gear mesh. I believe that most people who break tail rotor drive shaft wires set the drive system up "backwards." By this I mean that they set the tail rotor gear to the main gear, then they ram the drive shaft wire in place and screw it tight with the set screws. What happens is that the tail rotor gear assembly is never aligned perfectly parallel to the drive shaft wire. With this condition, each rotation puts unnecessary stress on the drive shaft wire, which eventually fatigues and fails. The way around this potential problem is to insert the drive shaft wire into the front coupler and gradually tighten the set screws to keep the wire centered in the coupler. Once this is done, *let the tail rotor drive shaft center the tail rotor drive bearings and gear.* To do this, the

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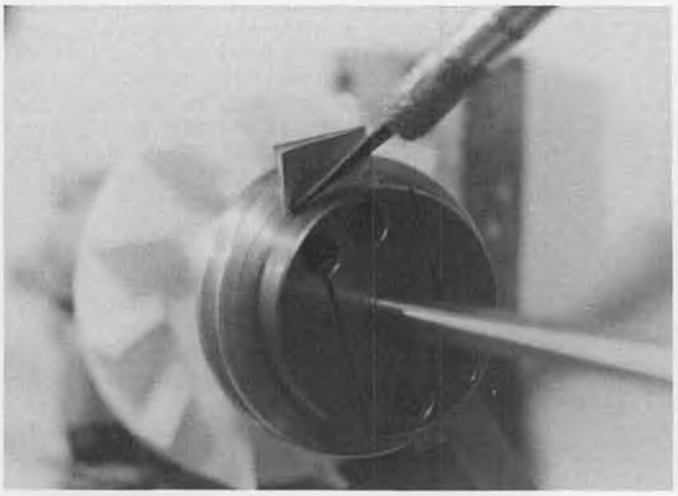
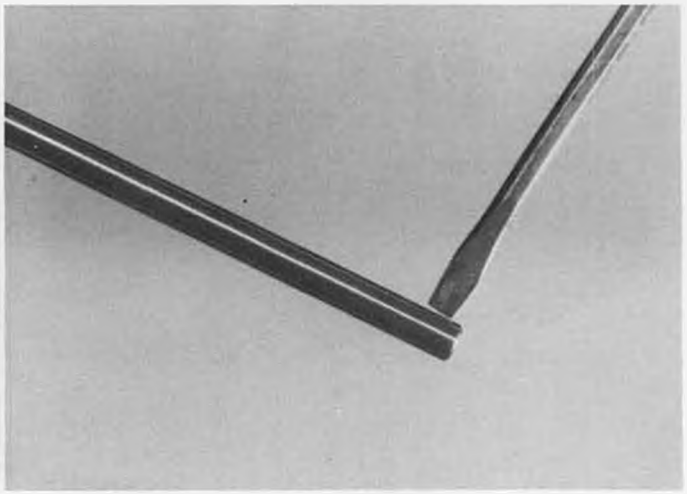


5. Trim off excess shim with a modeling knife



6. You can expect to achieve nearly perfect alignment if you take your time and do it right. Photo shows max runout after shimming.

Here's the new Delta Super Phaser 1/12 car as it looks wearing an MRP body, the new Kremer CK-5, one of those super-clean GTP numbers.

R/C AUTO NEWS

By DAN RUTHERFORD

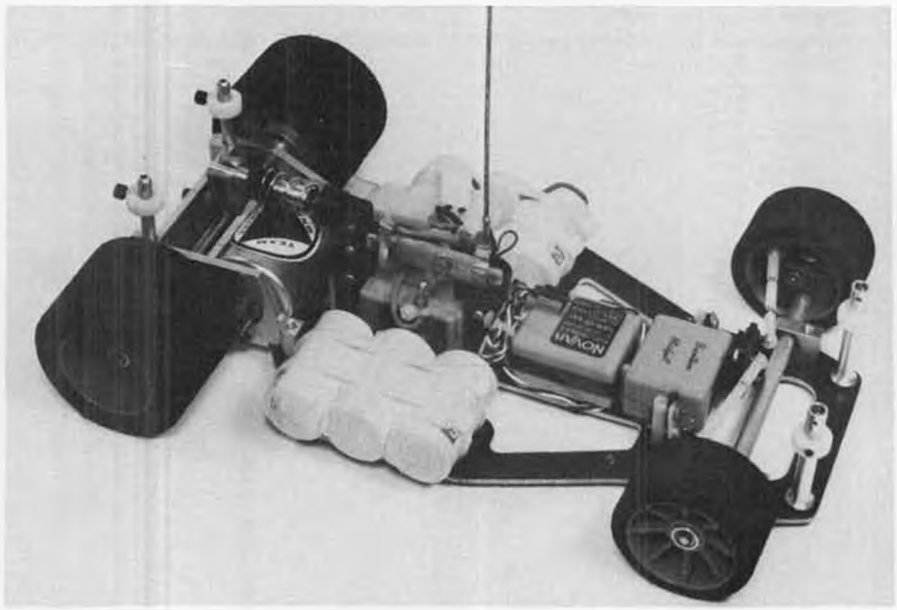
PHOTOS BY AUTHOR

THE DELTA SUPER PHASER

Yes, we finally offer a get-down, get-dirty test of the latest race car from Delta. The car has most impressive credentials, taking the very prestigious Modified Class at the World Champs.

You would expect that a race car like this would come wrapped in high-zoot packaging, right? Wrong, of course. This is a Delta product; they grab a standard size box off the shelf, slap a label on one end, wrap the sucker with some red tape, and ship it out. Absolutely terrible merchandising. But that's the way they have always done it, and there seems to be little likelihood of them changing now.

The good news is that you just read most all of the bad news about this race car, as what is *inside* the box is more important to Delta than the box itself. Delta's concern for the contents of the box shows in the accurately machined pieces, the basic design, and the overall attention to detail. This is quite evident when checking over the plan sheets, as everything you need to know to build the car is laid out step-by-step, and is backed up by excellent blow-up view drawings. Well, almost everything is there, a small addendum details a couple of items that were overlooked in doing the plans and instructions. My personal view of the instructions should probably be tempered somewhat in that I have built a number of Delta race cars, including two Phasers, the predecessor to the Super Phaser. So, when the plans call for an RP115, I know what to look for, while you may have to run your finger around the plans and through the parts for a minute or two. Anybody building his second or third 1/12 race car will have no problems, rookies will take an hour or so longer to get the car built properly. On a scale of one to ten, Delta gets a solid eight for the instructions. Associated is still tops here with a rating of nine. There are no six or seven ratings. . .

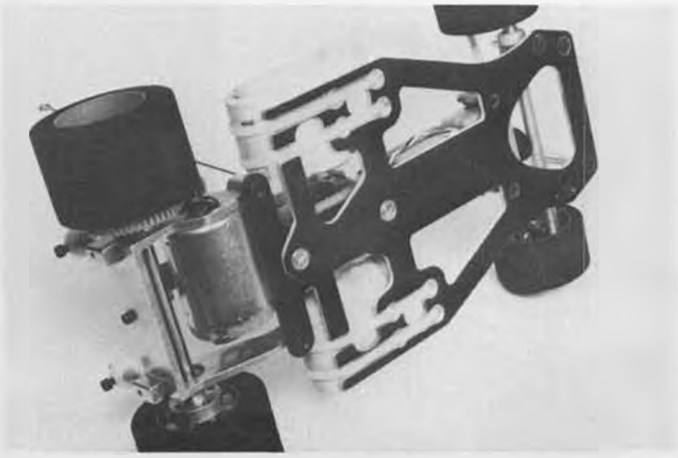


Overall view of the Super Phaser shows its light, strong construction, and neat layout of radio components. Note the small Novak receiver . . . easy installation!

As long as Associated's name has cropped up, it should be mentioned that they supply a couple of important pieces to Delta for the Super Phaser: the best ball-type differential available, and RC12E steering blocks and front wheel axles. Incidental items also supplied by them are the wing tubes and wing buttons. The Phaser and early prototypes of the Super Phaser also used Associated wheels, but this particular kit came with some lightweight wheels imported from England (Phil Greeno produced). Shown in the pictures are Delta's own wheels, which are lighter yet, and will be standard equipment in future kits.

Hmmm, I almost made a mistake by failing to mention that Art used Associated's TOJ body at the World Champs. In fact, Delta suggests its use; it is a body that handles very well. As you can see, I use MRP's Kremer CK-5 GTP body (say *that* three times quickly!) because it works and looks bitchen. I have also

Bullet-proof resistor installation and single shock absorber show well. Shock is the only piece above pan holding rear end "pod" on.



Corner marshall's view of Super Phaser. Typical Delta attention to detail seen in nylon tie routing. Allows minimal ground clearance.

used MRP's Ford C-100 GTP body on the car and suggest you try this popular body as well.

The most talked about and soon to be the most copied feature of this car is what has come to be known as the "broken back" chassis: the rear pod connects to the forward chassis pan by only a T-shaped (and quite flexible) chunk of black 'glass. To give credit where credit is due, the RC12i was the first production car to have this "broken back" feature, although it is not nearly as flexible as the Super Phaser, and the movement of the rear pod is dampened in a considerably different fashion. Actually, I do not know the sequence of design steps which led up to the Super Phaser, or whether it was even inspired by the RC12i, I'm just pointing out that this design is not quite as radical or new as one might at first suspect.

The execution of this idea is, however, outstanding in its simplicity and effect on the handling of the car. The T-bar gives a lot of flex, effectively suspending the entire rear end of the car which includes a rather heavy chunk of metal in the form of the motor. To dampen the considerable movements of the rear pod, a slightly modified Delta shock absorber is used, the same design that has proven so effective on the 1/8-scale Eagle. The mods include a much lighter spring, and a flat which is filed on one side of the piston to give the proper damping. The fiddlers are bound to have a field day with this shock, trying different rate springs, and all sorts of fluids for shock oil. I am using it stock with Delta's 90 weight oil, and have no reason (so far) to try any other combination.

A nice bonus which is a result of using this shock is that the ride height of the main chassis pan can be varied somewhat by running the adjust nut up and down the shock body. When getting the car set up "just so" for a particular track, this will be a handy feature as the battery pack is heavy, and it can have quite an effect on the handling.

As mentioned before, isolating the rear pod from the main chassis pan, and then damping the rear pod's movement somehow is an idea that is seeing rapid acceptance with other manufacturers; performance of box-stock Super Phasers is so good that everybody else is hustling to get caught up in the race to offer state-of-the-art chassis.

Suspension is also used at the front of the Super Phaser; again, not a new idea, the very first 1/12 cars (then gas engine powered and known as Jerobees) had springs in the front end, as did MRP's early electric cars. MRP and most everybody else dumped the idea, although JoMac (parent company of Jerobee) hung on to the concept, using it in the Lightning 2000. The difference here is that Delta is using much lighter springs in the front end. When set properly, the heavier of the two spring rates offered will actually compress enough to allow a 1/16 in. gap between the bottom of the steering blocks and the top of the cross bar. As with the broken back idea, look for other manufacturers to follow along. Associated already has a conversion kit for the RC12i, and locally, MRP has been racing cars fitted with a springer front end. The Parma car, which is based on the Lightning 2000, already has a sprung front end, but will no doubt soon be using springs that are much softer.

The aluminum cross-bar front end used on the Super Phaser is shared only with Delta's Phaser, and has proven to be a strong and lightweight piece. But where it really comes in handy is when you are adjusting caster; all you have to do is loosen one screw and the clamping block on the right allows the cross-bar to pivot freely to any caster setting you want. Even though the useful range of adjustment is only from zero degrees to about five degrees (if you need more than five degrees caster, what you really need are softer front tires) this feature is a great advantage for Delta racers who use it properly. Incidentally, the two blocks that support the cross-bar have been cut down (compared to the same

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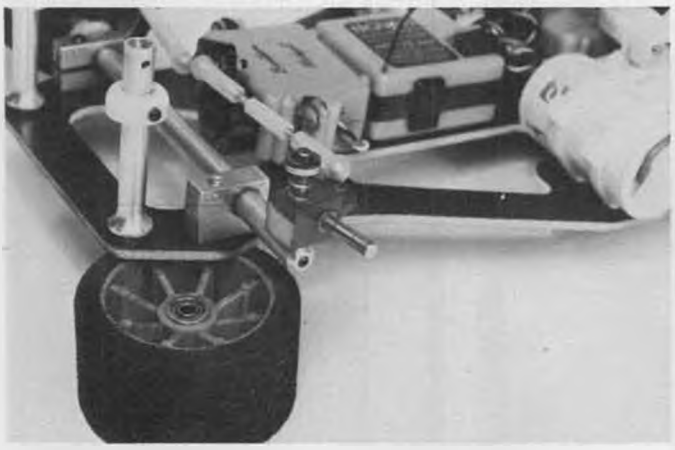
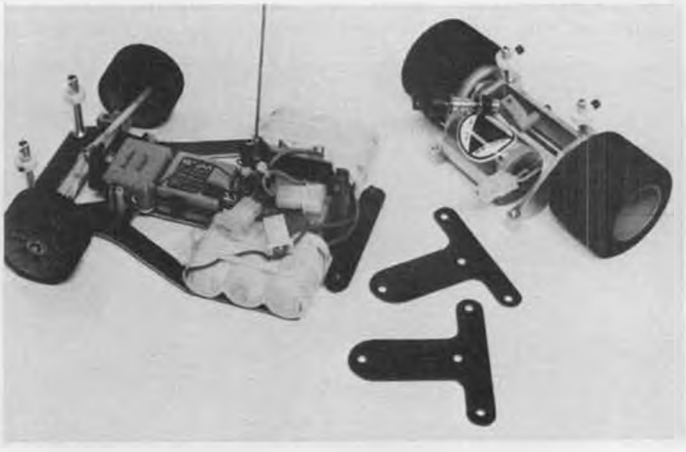
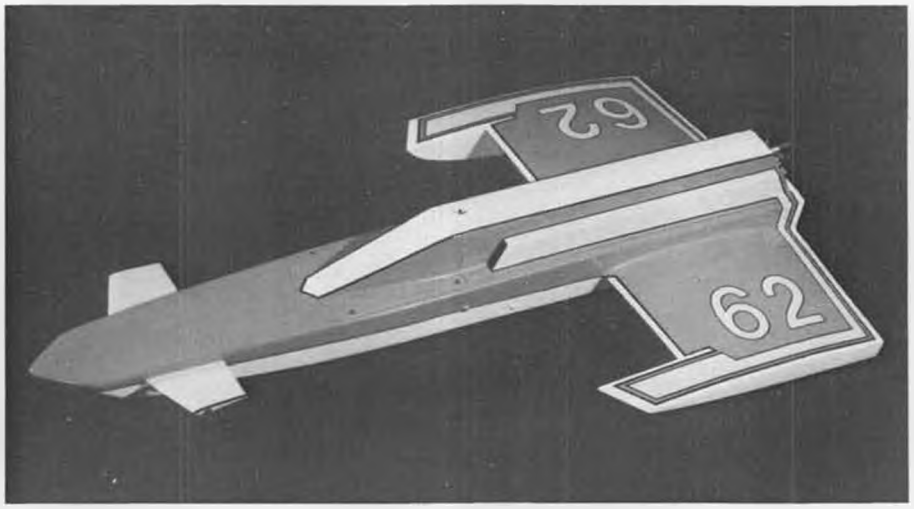


Springer front end of Super Phaser uses light springs. Crossbar is easily adjustable for changing caster. Light Delta wheels!



Yes, it was a terrible crash. . . Rear pod easily disconnects from chassis. T-bars tie pod to pan, and yield superior handling.

Bill Hornell (left) and Ed Fisher with the Fisher Boats 40-60 Canard . . . all big winners.



The 40-60 Canard looks like something from Star Wars, but is really a down-to-earth racer. Canard design breaks away from the outrigger and 3-point hydro concept.

R/C POWER BOATS

By JERRY DUNLAP

THE FISHER 40-60 CANARD

If any one model boat has caused a controversy lately (at least in the North American Model Boat Association) it would have to be the canard hydroplane design of Ed Fisher. Issues concerning this design came to a festering sore at the 1982 NAMBA Nationals in Los Angeles when the boat was protested as being illegal to race in the Sport 40 class. In my column a few months back, I gave an account of this controversy. Basically, there were model boaters who felt that the canard design didn't belong in the Sport 40 class because it didn't look like a traditional hydroplane. The canard hydroplane was allowed to race in the Sport 40 class and was subsequently banned from the class beginning this year.

Did I mention that it won the 1982 NAMBA Sport 40 National Championship? Besides winning the Sport 40 Championship, the boat also won the 40 Hydroplane Championship, and placed third in the 60 Hydroplane class. In all three classes, the boat had the fastest heat time posted in the class.

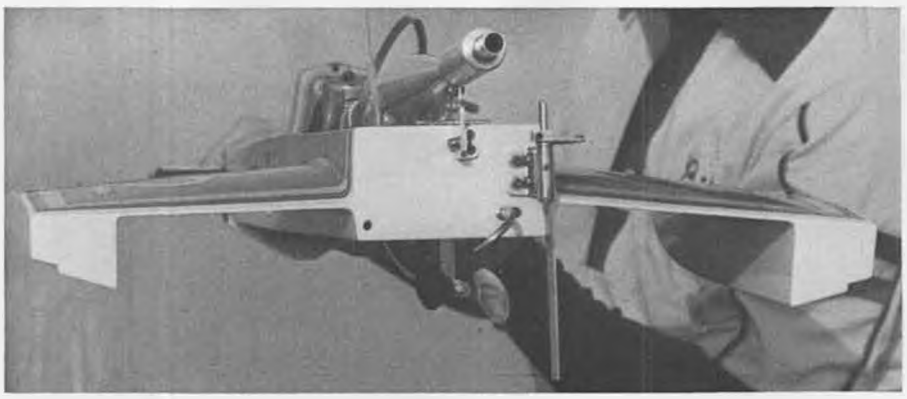
A limited edition, epoxy fiberglass version of this national championship and NAMBA record holding boat in 40 and 60 hydroplane oval racing is now available from Fisher Boats, 12001 Marine View S.W., Seattle, WA 98146. Everyone knows about epoxy fiberglass, but what's this "limited edition" stuff? Limited edition means the boat is only available through Fisher Boats. Don't bother looking for it in your local hobby shop . . . it won't be there. Each boat will be numbered as it is laid up, and the hull certification will be glassed into the hull.

You're probably thinking, "I bet this thing must cost an arm and a leg." Compared to mass produced fiberglass or wooden models, the basic boat cost of $248 for the Fisher Boats 40-60 Canard is higher than other model boats. However, a Porsche is also more expensive than a Chevette. There are a number of features about this boat that make the price tag not so terribly unreasonable. Epoxy fiberglass contruction is more expensive than regular fiberglass construction, but it is also lighter and stronger. The basic hull comes completely joined and includes all the necessary wooden parts needed for attaching the motor and hardware. The only gluing necessary is affixing the motor mounts and transom plate. Included with the basic boat will be a complete set of instructions, photos, and full-size drawings showing locations for all needed installations.

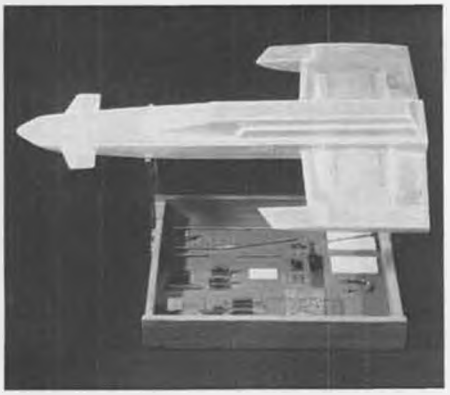
A hardware package designed especially for this boat is available for $98. This hardware package is all custom made, featuring top quality material throughout. All the necessary fasteners are included, and are made of stainless steel.

Just in case there is someone reading this and saying to himself, "I just gotta have one of these things," here's what you're going to need to do. Get out your checkbook and send Fisher Boats 50 percent down. This down payment gets you a hull number and an approximate date of delivery. The other 50 percent is due on delivery of the boat. "Wait a just a minute," you're probably saying to yourself. "Who does this Fisher fella think he is, expecting us good-old boys to pay in advance?"

Having to ask who Ed Fisher is in model boating is like having to ask who Jack Nicklaus is in golfing. In NAMBA, no one has established more records for model boating than Ed Fisher. He is



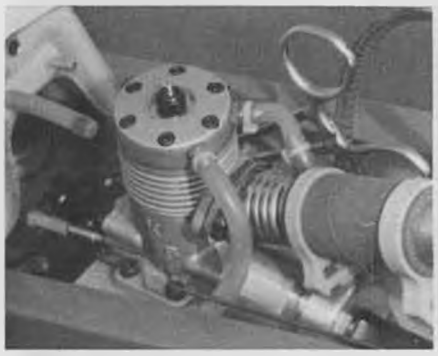
Transom view of the 40-60. This design successfully blends aerodynamic and hydrodynamic principles to produce a record breaking boat. Note lack of turnfin.



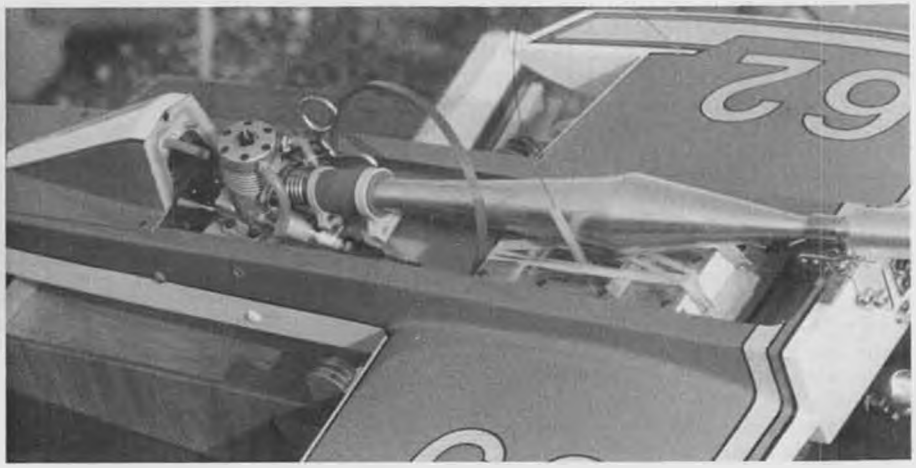
Basic 40-60 kit. Epoxy fiberglass construction, top quality hardware. See text.

The 40-60 at top speed. Not as fast as some in the straights, but doesn't slow down in the turns. Fast combination.

Bob Lafayette (Toledo, OH) sends this photo of his Dumas 'glass Hotshot 21. Bob's K&B 3.5 has header pipe added.



K&B 7.5 Marine with reworked K&B carb. Sullivan fuel tanks reside under cowl.



Overall view of Bill Hornell's Fisher 40-60. K&B engine is mated with Prather Products tuned pipe and coupler. Kraft radio equipment controls things.

rapidly approaching his one-hundredth record. He's a National Champion in monoplane, hydroplane, deep vee, and outboard.

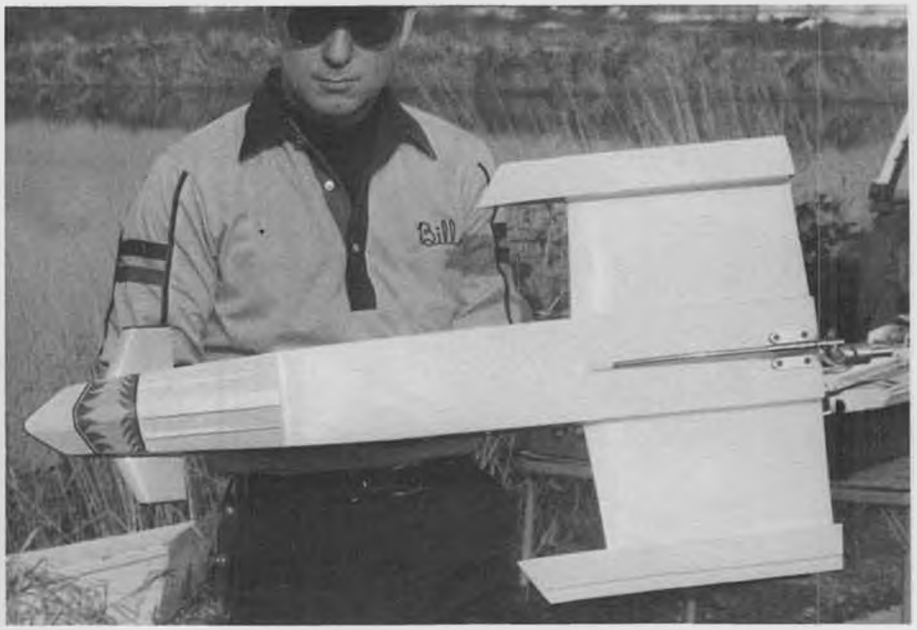
Another thing Ed Fisher is for sure . . . he's controversial. Ed never has been one to do things in the traditional way. When it comes to designing model boats this is especially evident. Back in the late '60s and early '70s the standard monoplane design was a semi-scale ski boat. Ed built and raced the standards and figured there had to be a better design. When he first came out with his delta-shaped "Northwind" monoplanes, we wondered what they were. Then, Ed quickly established records with the new boats and we soon discovered what they were. . . They were fast!

Ed also raced the standard hydroplane designs. At first it was pickle-forked conventional hydroplanes, then it was outriggers. He set records with both of these types of hydroplanes. In 1974, he began developing another concept for model hydroplanes, the canard. He wasn't the first one to try this concept as a model hydroplane. I can remember seeing this type of design at the 1969 IMPBA Internationals in San Diego. I think one of the Hawaiians ran the boat. (Could he possibly have thought up the idea while drinking fermented pineapple juice?) No, Ed wasn't the first one to try a canard model. However, he has had more success with the design than any other model boater. In the last five years, Ed's canard hydroplanes have established over 20 records in 20, 40, 60 hydroplane oval racing, and also in 20 outboard hydroplane.

The canard design is best suited for oval racing. I don't think it currently holds any straightaway records. This unique design allows the boat to corner at full throttle without any sliding. It does this without the use of any turnfin. This means the boat can be turned to the left without fear of tripping it on the turnfin which is sometimes a problem with outriggers. I have had the opportunity to drive these canards, and they remind me of driving my deep vees, but they are much faster. The cornering characteristics of the boats are fantastic. You can enter a corner with wide open throttle in lane one and exit the corner

Continued on page 78

Business end of the 40-60. Octura 1462 for .40s, Prather muffler for noise control.



The canard configuration is much different than the outrigger. Note steps on rear sponsons and strakes on front sponson. Appropriate shark's teeth!

Pattern Flying

By DICK HANSON

• This past winter season gave us the opportunity to develop some ideas which we think may be of interest to our fellow pattern enthusiasts. The first project was another attempt to achieve lighter wing construction.

To make a long story short, we couldn't find a substitute for one-pound density foam covered with six-pound density balsa using epoxy for bonding. Any necessary wing or aileron strength increases were accomplished using carbon fibers and/or glass cloth and epoxy. Typical weights were: 750 sq. in. wings, 16 oz. without landing gear, and 22 oz. using retract mounting plates; 900 sq. in. wings were 24 oz. with fixed gear mounting installed. Using Monokote for the covering material, we felt that the final weights were very satisfactory.

I keep reading about people who construct larger built-up wings to make gear mounting easier and structure lighter. Frankly, I would like to know what techniques and materials they are talking about. The only lighter technique I have found is the all balsa stressed skin type of construction (which is weaker).

We find that by simply cutting out bays (or holes) in the foam core wing, and leaving wide areas between the bays to simulate wide ribs, we achieve the best strength to weight ratio. This is because you can gnaw the holes any place you desire with no need to follow spars, ribs, etc. This must be done with caution, however, or the structure could collapse under load. The most practical places to carve out the holes are on ailerons, rudder, elevators, etc.

I must remind you all that I am not working with engines larger than .60-size . . . because that's my favorite size, and will be until the FAI limit for pattern changes. Neither have I tried building for static wing loadings exceeding 30 ounces per square foot. The gross-size models using 1 to 1000 cubic inch engines are great, but there is a certain element of absurdity abounding there at present.

Dave Stuart's C.A.P. 21 is totally finished in Monokote except for cowl and wheel pants which are painted. Dry weight works out to 10 pounds.

The photos of the C.A.P. 21 are Dave Stuart's, his model is finished with Monokote, including all lettering and details. The cowl and pants are painted. Dry weight of the C.A.P. 21 is 10 lbs., which is a result of using some heavy wood in the tail feathers which in turn necessitated adding some nose weight. The C.A.P. 21's tuned pipe is internal, and the engine is a stock O.S. V.F.A-1 gear box type. The prop is a Zinger 14/8, and the fuel used is five to 10 percent nitro.

Its performance is a little deceptive as the static thrust to weight is only a little on the positive side. In zero wind conditions at 4500 ft. elevation, the model will take off in approximately 25 ft. and can be pulled immediately into an Immelman. Vertical performance is good, but the four point roll gets soft on the last point if you try for long, vertical rolls. In our opinion, all of the current Masters pattern is duck soup for this plane.

The adjustable stab allowed trimming for "rudder only" knife-edge flight. The amazing thing is the 21's ability to sustain altitude in knife-edge flight. I suspect the long wings and considerable dihedral help here.

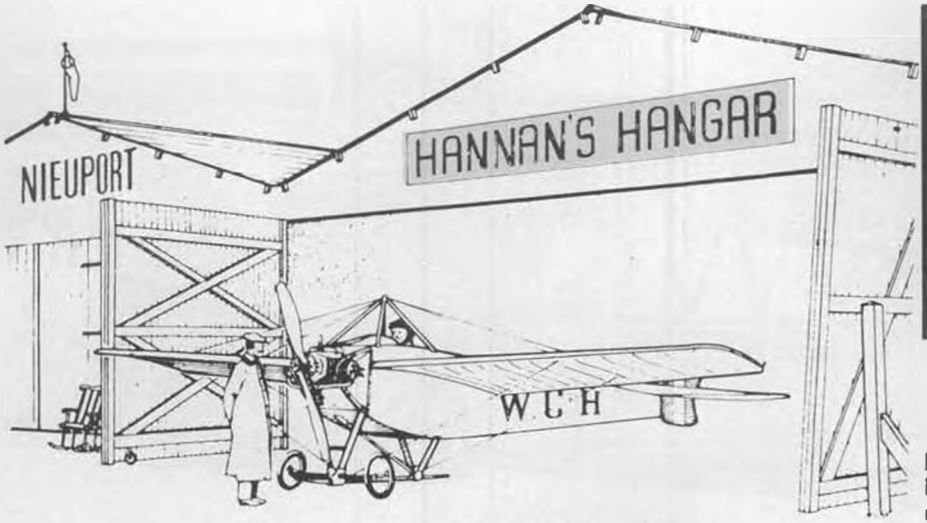
Dave showed me a little trick which he found the model does easily, an eight turn spin: two left, two right, two inverted left, and two inverted right. I have been flying this model every chance I get and look forward to testing the second model which is slightly lighter . . . just nine pounds using a O.S.V.F. C-2 unit running a 16x10 prop. These engines apparently will deliver power equal to popular chain saw engines with much less weight and vibration.

Another project this winter has been an attempt to get a new direct drive model that will do the FAI pattern with style. Our trusty 825 Hippo Tippo does it with ease, but we thought another design couldn't hurt!

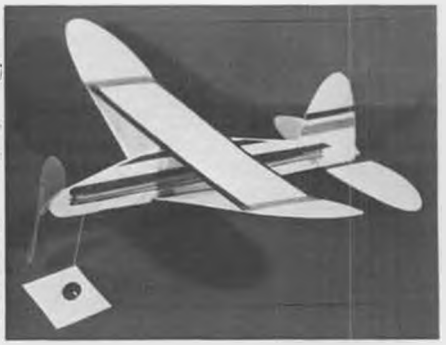
The Dalotel, as flown by Hanno Prettner, looked like a good shot, but we wanted to try to improve it by making it look more scale-like. My friend Roger Selander found three photos in some aircraft annuals, and we whomped up a pair of 825 sq. in. models using STx60 engines for power. They both turned out weighing 7 lbs. 10 oz. using Royal retracts and Monokote covering. No

Another side view of the C.A.P. 21. Model uses a stock O.S. V.F.A. -1 gear box type engine with internal tuned pipe. Prop is a Zinger 14 x 8.

Continued on page 80



"Good enough is not good enough."



England's King of the fun-flyers, Ray Malmstrom, does it again! Charming "Veebipe" spans 16 inches, weighs 1/2 ounce, and averages 45-50 seconds in duration.

• This month's lead-in line is from comedian/actor George Burns, and would seem to be a suitable motto for builders of scale models.

Our little "Hangar" logo (the drawing at the top of the page) has attracted a variety of comments over the years, but we particularly enjoyed this one, sent in by Bob Andrews, of Miami, Florida. According to Bob, the man in the great-coat standing by the Nieuport monoplane is saying: "Perhaps we should add another wing and install a round engine. . ."

GOOD QUESTION

Although we feature attractive girls relatively infrequently in this column, those who do appear are apparently appreciated, as witness this letter from Bill Kee, of Idaho: "What I want to know is how come an old geeser like you can continually have these pleasing-looking young dishes send in their photos? Never mind that they are holding their Pa-Pa's model. . . Now that is the way to get us other ol' geezers to chew our nails right down to the quick, through stark green-eyed jealousy. . . Well, some has it, some don't."

EFFICIENCY?

English model builder Denis Fairlie notes: "I find now that I'm retired, work expands to fill time available. Also keep chastisizing myself for making silly errors of building judgment . . . coming to the *best* solutions only *after* I've made the part(s). I never use a single piece of wood when I can use about seven, it seems." Well, rest assured you are not alone, Denis!

A.J. JACKSON

We regret to report the passing of A.J. Jackson, well-known English aviation historian. "Jack" is perhaps most famous for his Putnam historical books, including *British Civil Aircraft 1919-59, De Havilland Aircaft Since 1915, Avro Aircraft Since 1908,* and *Blackburn Aircraft Since 1909.* He was also deeply involved in *AIR-Britain,* the *British Civil Aviation News,* and was a long-time contributor to *Air Pictorial.* Jack had been a model builder during his earlier years, and we like to think his splendid publications will keep his name alive among builders of scale models for many years to come.

SAINT-EXUPERY

According to an Associated Press release, a Lockheed P-38 wing has been retrieved off the coast of France which may offer a clue to the fate of Antoine de Saint-Exupery, quite likely one of the most memorable author-aviators of all time. Fondly remembered for his *Night Flight, The Little Prince, Wind, Sand and Stars,* as well as other philosophical masterpieces, Saint-Exupery vanished without a trace during a 1944 reconnaissance mission. It is hoped that the discovery of the Lightning wing may help to resolve the mystery.

RUBBER LUBE SOURCE?

Ken Hannan recently found that some automotive accessory stores market a product called simply RUBBER LUBE. Manufactured by the McKay Mfg. Co., of Los Angeles, the fluid is intended for lubricating rubber suspension shackles, bushings and fittings, as well as for mounting tires. Locally, the lube is priced at $1.83 for an eight fluid-ounce filled plastic bottle. Have any readers tried it for model rubber motors?

THAT PERSISTENT P-FACTOR

We had anticipated some reactions to our mention of the propeller P-factor, which unfortunately appeared in somewhat garbled form. Don Typond, of New Jersey, was the sole dissenter, and he feels that a clear distinction exists between "One P vibration" and "P-factor": "I suggest that P-factor is still very much alive and well."

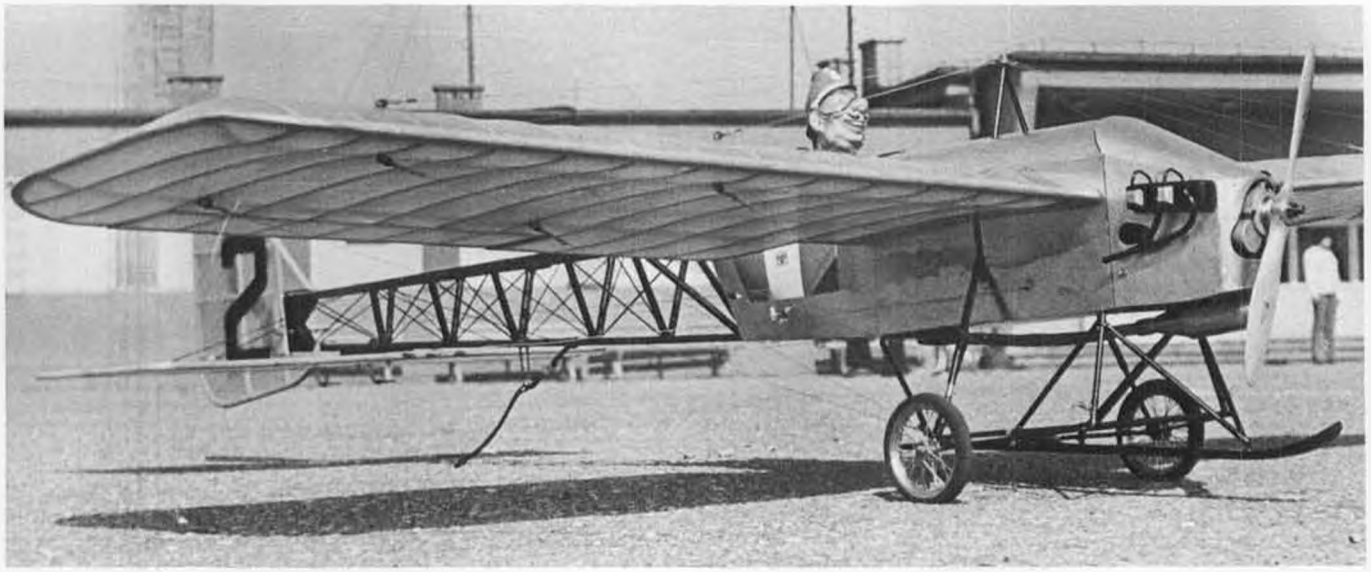
TURNABOUT

From Phil Jarrett's "Grapevine" in *Aeroplane Monthly,* we learn that the Smithsonian Institution has loaned the Gossamer Albatross of man-powered Channel-crossing fame to London's Science Museum. Seems rather poetic, as that Museum was the repository for so many years of the Wright Flyer, which is now displayed within the Smithsonian Air and Space Museum.

FOR WANT OF A BLADE

Model builders are an unusually discerning group who are reluctant to

Peter Frostick, of England, proudly displays his Farman Moustique and Lockspeiser canard Peanuts. Photo taken by Alan Callaghan.



If you look closely, you'll see the delightfully whimsical pilot who is flying Andrew Uminski's R/C Vickers Bleriot Type 22. Model and builder reside in West Germany.

settle for second-best products. Seemingly simple things, such as razor blades, are a good example. These may be among the most mass-produced items in the history of mankind (and womankind too, of course!), and are taken pretty much for granted by most people . . . but not by modelers. Although there is a profusion of brands and types, few are suitable for our unique purposes.

Single-edge blades are still available in good quantity and at reasonable prices. But don't count upon this always being true . . . plan ahead.

It is the double-edge blades with which we are here concerned. During the 1930s and 1940s, when many of us became involved in the hobby, the common approach to starting any model was to very carefully break a double-edged razor blade in half, and then to break the end of each half at an angle, to produce a sharp point. Model kit companies of the era routinely suggested this idea right on their construction plans, and the resulting cutting tool simply had no equal for certain tasks in cutting thin balsa and trimming tissue paper from the edges of covered frameworks.

During the 1950s, these fine blue carbon steel blades went quietly out of production, being displaced by stainless steel blades. These were doubtless better, for shaving purposes, as they featured sharper, hollow-ground edges, and were rust resistant. But they lacked the stiffness essential for modeling uses, and builders were hard-pressed to find suitable replacements.

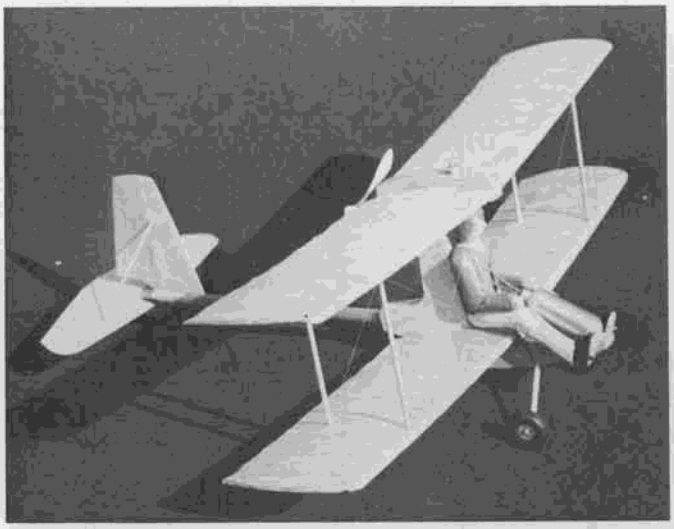
One individual who did more than complain about the situation was Jim Jones. Jim manufactures a quality line of model products including strippers which employ razor blades. He urgently felt the need to find a source for the "good old days" double-edge blades. To say his efforts turned into a monumental task would be a masterpiece of understatement. Suffice to say, he spent a bundle on long distance phone calls,

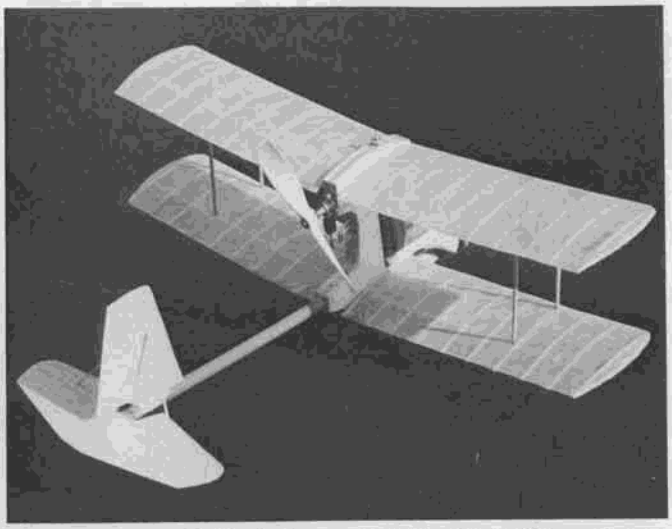
Continued on page 80

David Phillips made these remarkable Peanut Scale trophies using the Lost-wax casting system. More info about these little gems in the text.

Brass master model of Swedish Saab 92, built by Doug McHard, designer of several models in the *MB* book *Flying Models of WW-II.*

Milan Kacha of Czechoslovakia constructed this Hawker Hurricane from Earl Stahl plans. Modela CO_2 engine, 106 grams total.





The Hovey "Wing Ding" is a scaled-way-down ultralight biplane for CO_2 power. The pilot looks like he is ready for high altitude flight with that CO_2 tank between his legs. Tail boom is plastic soda straw.

PEANUT SCALE

PEANUT WING DING

By WALT MOONEY . . . Every now and then Perfesser Peanut does something outside the realm of rubber powered Peanuts. This time it's a CO_2 powered, scale ultralight named Wing Ding.

• The Wing Ding was conceived by R.W. Hovey as a simple, easily built, and easily dismantled (for ground transporting), ultralight homebuilt airplane. The little design makes an intriguing peanut scale model. As a basic design, it has some drawbacks as a peanut. First, the motor base and allowable propeller diameter are too small for a rubber powered model. Second, it is a pusher configuration, and might be hard to balance. Bill Brown's CO_2 engine, the A-23, makes the Wing Ding a real possibility. It will swing the right diameter propeller, and the tank system can be installed so that there is a good chance of balancing the model.

The full-size airplane has a built-up, plywood-covered, forward fuselage body with an aluminum tube tailboom. The tail surfaces on the prototype were foam core with cardboard covering, although this has been replaced since the early flights with a built-up fabric-covered empennage. It has wire braced, fabric-covered biplane wings and conventional, tail dragger type landing gear.

The model was built to resemble the early prototype version, so it uses sheet balsa tail surfaces. Before the model was covered, there were doubts that the tail was large enough and light enough to allow good flying characteristics. A larger, built-up set, of flying tail surfaces was constructed. However, the model was test flown with the scale-size balsa sheet surfaces, and it flies very well.

The high thrust line of the engine tends to hold the nose down under power, so the powered portion of the flight is relatively fast, while the glide tends to be considerably slower. The center of gravity location shown on the plan is where the model in the photos balances. Probably, this is about as far aft a CG as is allowable. A CG slightly forward of the position shown might be a little better. Even so, with the CG as shown, the model needed a 1/32nd shim under the top motor mounting lug to give a few degrees of up-thrust. Without this up-thrust, the climb was very shallow.

The model is also sensitive to rudder adjustments, as might be expected with the vertical tail directly in the slipstream. If the turn is tight, the model will tend to spiral dive, however, wide turning circles have proven to be quite safe. Some side area forward of the CG will tend to reduce the spiral diving tendency, so don't forget to have a pilot. A fat pilot might be even better, both from the standpoint of forward side area, and the forward center of gravity location.

The model in the photos weighs 28 grams. This is not very light for a peanut, but the biplane wings provide a lot of

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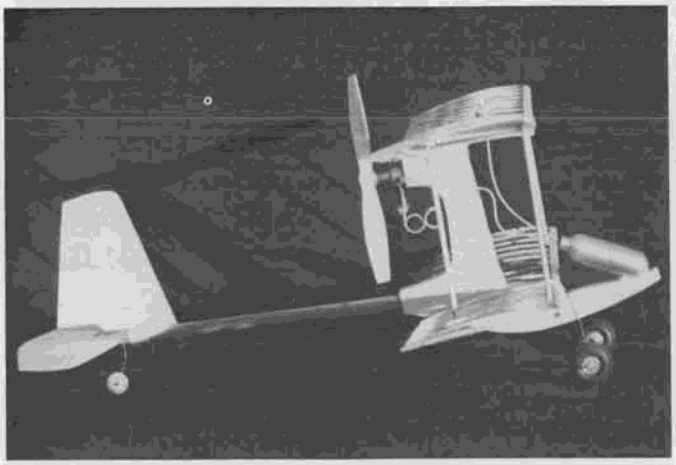
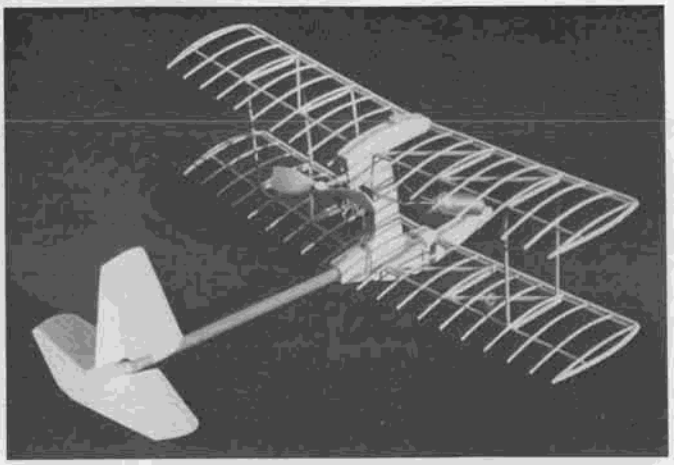
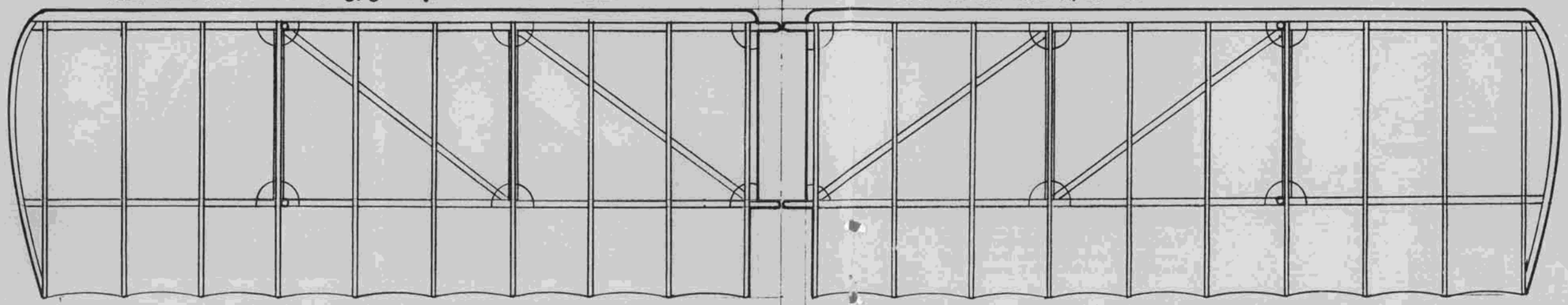




This is what your everyday Wing Ding looks like prior to covering up with tissue. Note CO_2 tubing bends and lack of trailing edge wood. See text for wing construction details and hardware installation.

THE LEADING EDGE IS 3/32 SQUARE BALSA STICK

THE WING SPARS ARE 1/16 DIAMETER BIRCH DOWELS



SIX COMPRESSION MEMBERS AND FOUR DIAGONAL BRACES ARE 1/16 SQUARE BALSA. CIRCLE GUSSETS ARE PAPER TOP AND BOTTOM WINGS ARE IDENTICAL

1/16 DIA. THRU HOLES 4 PLACES FOR SPAR ROOT INSERTION

FUSELAGE FOREBODY IS MADE OF THREE LAYERS OF HARD 1/8 THICK BALSA SHEET LAMINATED INTO A SINGLE PART

CO-2 FILLER LOCATION

THE AFT FUSELAGE IS MADE FROM A PLASTIC SODA STRAW. THE ELEVATOR PIVOT IS 1/16 DIA. ALUMINUM TUBING BONDED TO THE FLATTENED END OF THE STRAW

TAIL SURFACES ARE MADE FROM 1/16 SHEET BALSA

ALL WING RIBS ARE SLICED FROM 1/32 SHEET BALSA. WING TIPS ARE LAMINATED FROM TWO PIECES OF 1/32 BY 1/16 BALSA

THIS MODEL REALLY NEEDS A PILOT --- THE ONE IN THE PHOTOS WAS CARVED FROM STRYROFOAM AND PAINTED WITH PLASTIC MODEL PAINTS. IF YOUR MODEL NEEDS NOSE WEIGHT HE CAN HAVE FEET OF CLAY

CO-2 TANK MUST BE HERE FOR BALANCE

BILL BROWN'S MOST EXCELLANT A-23 CO-2 ENGINE IS USED TO POWER THE "WING DING"

NOTE HOW THE TUBING IS BENT. USE A SMOOTH ROUND DOWEL TO KEEP FROM KINKING THE TUBE WHILE BENDING THE LOOPS

USE SEVERAL LAYERS OF MASKING TAPE FOR STRUCTURAL DOUBLERS

USE 2 POUND TEST MONOFILIMENT FISHING LEADER FOR THE 'IRE BRACING

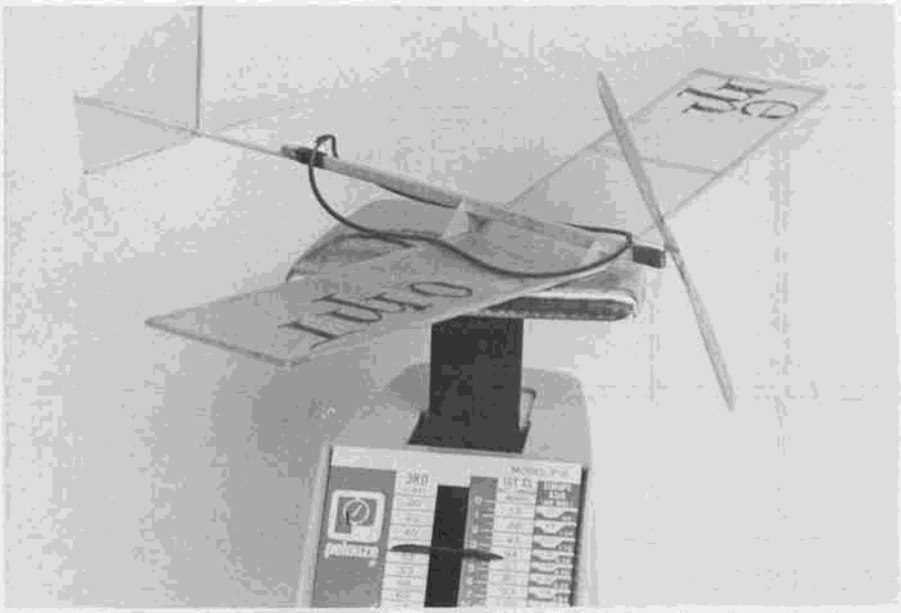
IT IS DIFFICULT TO KEEP THE CENTER OF GRAVITY FAR ENOUGH FORWARD ON A PUSHER MODEL SO MAKE THE TAILWHEEL AS LIGHT AS POSSIBLE AND YOU CAN USE HEAVY MAIN WHEELS

WIRE GEAR PATTERN

12-22-81

HOVEY WING DING AN ULTRALITE BIPLANE PEANUT.

Walt Mooney



"Escondido Mosquito . . . One More Time" a Bill Hannan design from *American Aircraft Modeler*, May 1970, as built by Gerald Myers of Redway, California. "A little heavy again."

FREE FLIGHT

By BOB STALICK

• The FAI Program is underway. As I write this column, the 1985 Team selection program has been approved by the participants, and as some sports commentators have said, "Let the competition begin."

This issue begins a two-part series on how to set up your power model for the latest in V.I.T. systems . . . including: stabilizer setups, autorudder, timers, and the very latest . . . the bunt system. Stay tuned, because even if you don't fly FAI Power, much of what will be presented applies to creating a super-zoot AMA power model as well. But first, a review of our regular features is in order.

JUNE MYSTERY MODEL

Right in keeping with the FAI Power theme for this month is the June Mystery Model. This midwestern design should evoke some memories from the Nostalgia crowd. The push-pull engine arrangement, very high thrust line, and underslung fin will probably give it away, but give it a try anyway. It was originally presented in *Flying Models* and was done by a prolific designer of semistrange FAI size ships. Original power plants were Webra diesels.

If these are not enough clues, then you weren't around during the right time, if these are enough clues, then drop your guess in the mail to Bill Northrop. A free subscription awaits the first correct answer.

JUNE THREE VIEW: DEJA VU FAI POWER BY TOM HUTCHINSON

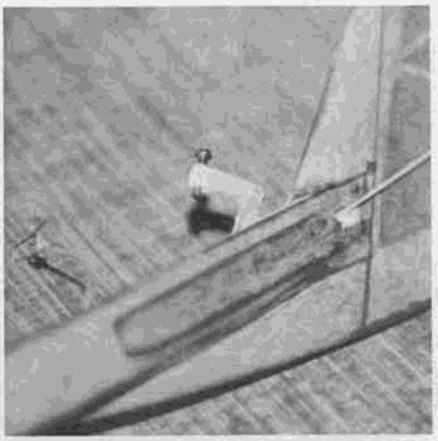
In late January, I spent a weekend at Tom Hutchinson's home inventorying his model supplies and equipment. Tom's organization of his model inventory was, like much of what he did, well laid out and logical. During the course of the weekend, I ran across this sketch of his version of a simplified FAI power model that would be competitive for beginners in the event. This design came from a rather lengthy and involved discussion that Tom and I had one weekend when we were driving together to and from an FAI symposium. Tom published my design when he was writing this column. Tom never got around to building his design.

What I like about Tom's design is that if you've built an AMA gas model, you can build the Deja Vu. The only exotic piece of machinery on this ship is the VIT, and if you read the rest of this column, and next month's as well, you will know how to take care of that little problem. So, take a good look at this month's three view, and scale it up. Someone should build it. If you do, take a picture of your efforts and send it to me . . . I'll print it.

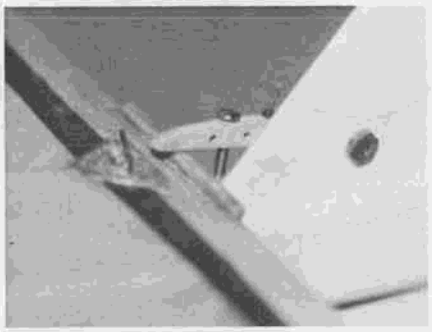
DARNED GOOD AIRFOIL: RITZ (NACA) 3406

Gerry Ritz, in his series on free flight airfoils in the early 1960's, developed an airfoil that was intended for FAI Power models. This is the section presented here. Ritz stated that with a lower camber, a consistent power pattern would be easier to obtain with high powered engines. NACA did not include 3% mean camber airfoils in any of its publications, so Ritz developed such a section using a #34 mean camber line. This section is intended as an improvement in high speed, high climb airfoils, and is a tad better than the NACA 4406.

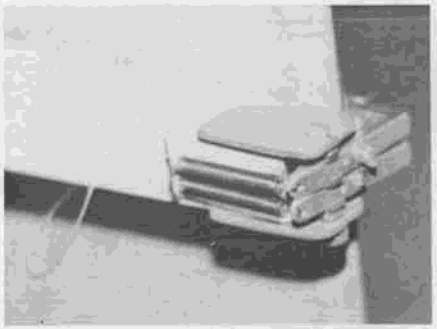
As I look at it, it appears that the major difficulty would be in the structure of the wing. With a maximum thickness (at the high point) of .4 inches on a six inch chord, the use of surface spars built into the wing skins would appear to be a necessity in order to maintain some kind of rigidity, but if it could be built, I think



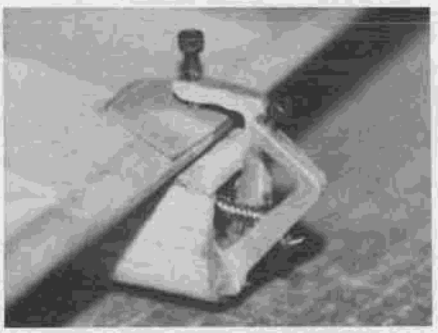
1. Single arm V.I.T. in the "stab released" position. The stab hold-down line is visible directly in front of the V.I.T. arm.



3. Single arm V.I.T. holds the stab in the glide position. Similar system in Photo 1.

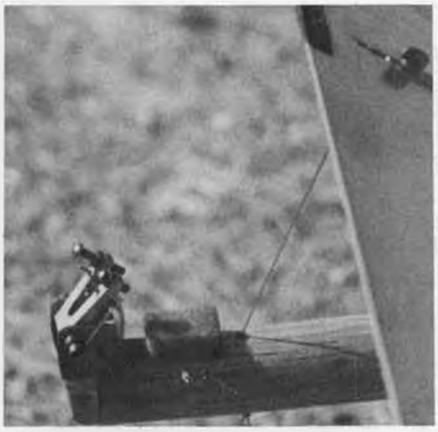


4. Double arm V.I.T. with Olofsson type springs. Stab is in the "power" position.



5. Double arm V.I.T. using trapped spring system. Stab in glide position (1 arm released).

EDITOR'S NOTE: Unfortunately, Photos 2, 6, 7, 11, and 12 were unusable due to poor focus and/or contrast.



8. Unidentified F/F model at Taft World Champs featuring clothespin type springs on double arm V.I.T. Note foam pad under stab.

this section holds a great deal of promise.

While on the subject of airfoils, I want to thank Carl Schueler, Don Brown, and Gerry Myers for sending me the G-5 coordinates. This airfoil will be featured in a future issue. Thanks, guys.

Gerry also sent me a picture of Hannan's Escondido Mosquito to tease our readers — it's a beaut, so I've included it this month.

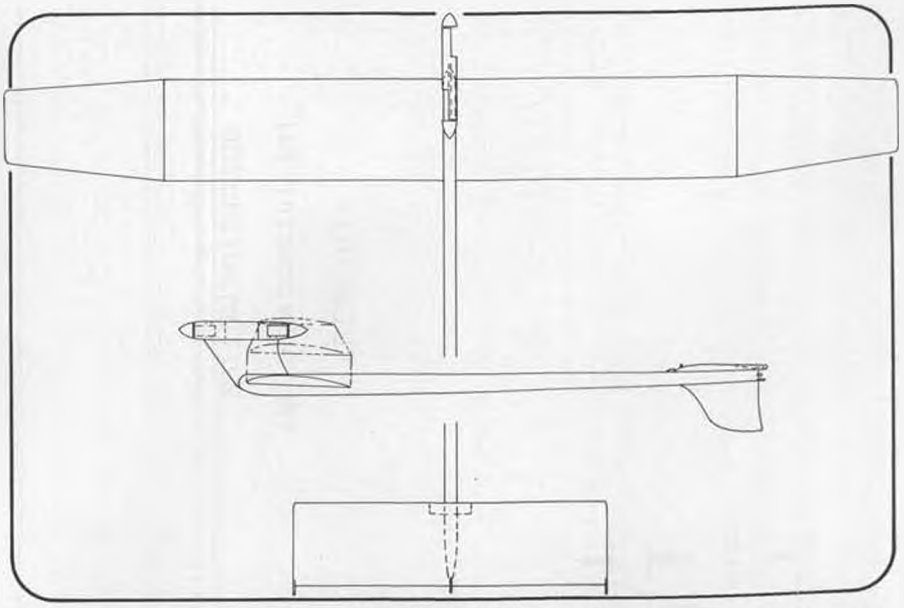
Finally, still on the subject of airfoils, the Satellite newsletter mentions an event that will probably destroy all of the energy and effort that has gone into airfoil design. Ralph Prey sez, "How critical do you think our free flight models are?? For example, I can well remember the day when I was in Oklahoma City at the FAA Aeronautical Center in 1949 learning about jets from Ray Matthews, who designed the FuBar . . . It was when we were flying our FuBars that Ray showed me how tolerant our free flight models can be. He strapped the wing of a 750 sq. in. FuBar on backwards . . . Yes, backwards. He fired up the Torp. 35 and let her go. You couldn't tell any difference. That sucker climbed out just perfect . . . hardly any difference in altitude."

So much for science . . . once again superstition and luck win out!

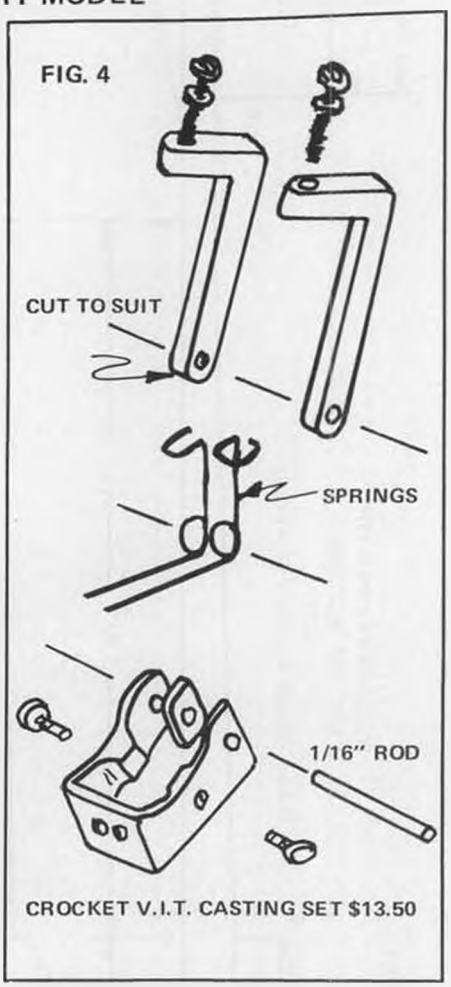
So, for those of you who have written to ask about the exact percentage of the nose radius, or the meaning of some esoteric designation on the airfoil, chew on Ralph's statement awhile. Nuff said.

V.I.T.: VARIABLE INCIDENCE TAIL, PART I

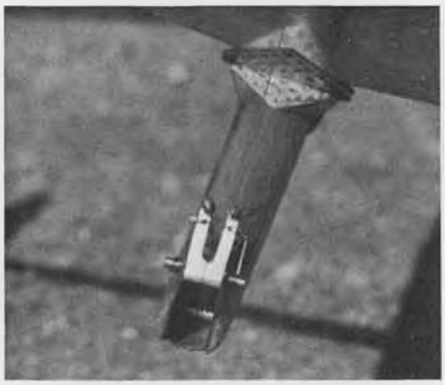
What is it? V.I.T. is simply a system that allows the model flier to fly a F/F power model with separate trim settings for power and glide. Essentially, you set up your model to fly with less incidence



JUNE MYSTERY MODEL



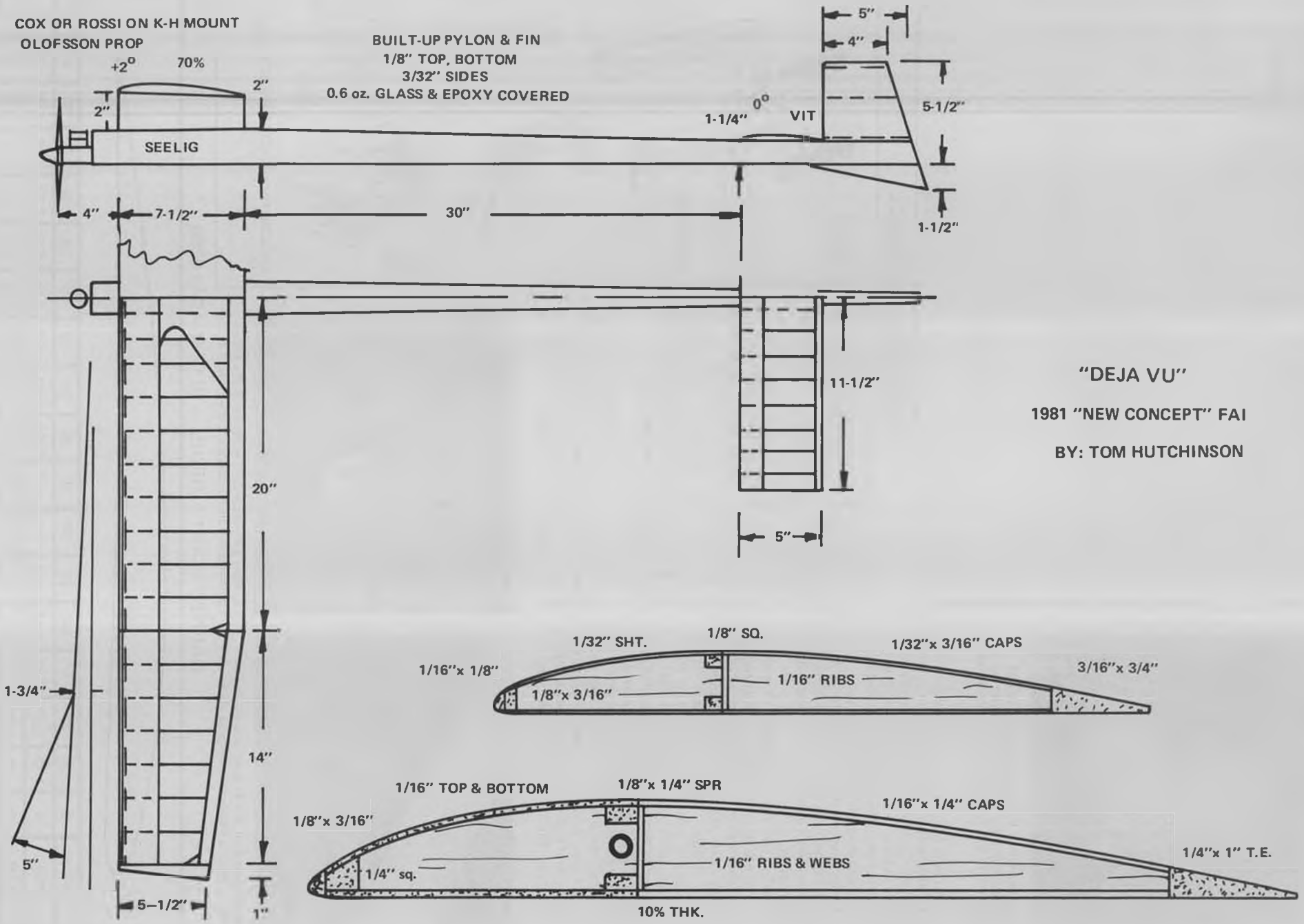
10. Double arm V.I.T. system seen at Taft WCs. Features flat head screws at stab T.E.



9. Rear view of V.I.T. in Photo 8. Pic shows aluminum stab mount/pivot plate, split arms.

DARNED GOOD AIRFOIL — RITZ (NACA) 6306

STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	95	100
UPPER	0	1.13	1.67	2.48	3.12	3.65	4.5	5.12	5.55	5.81	5.9	5.56	4.95	4.08	2.98	1.64	.88	0
LOWER	0	-.76	-.94	-1.07	-1.08	-1.03	-.85	-.62	-.39	-.19	.08	.27	.38	.42	.35	.19	.08	0



"DEJA VU"

1981 "NEW CONCEPT" FAI

BY: TOM HUTCHINSON

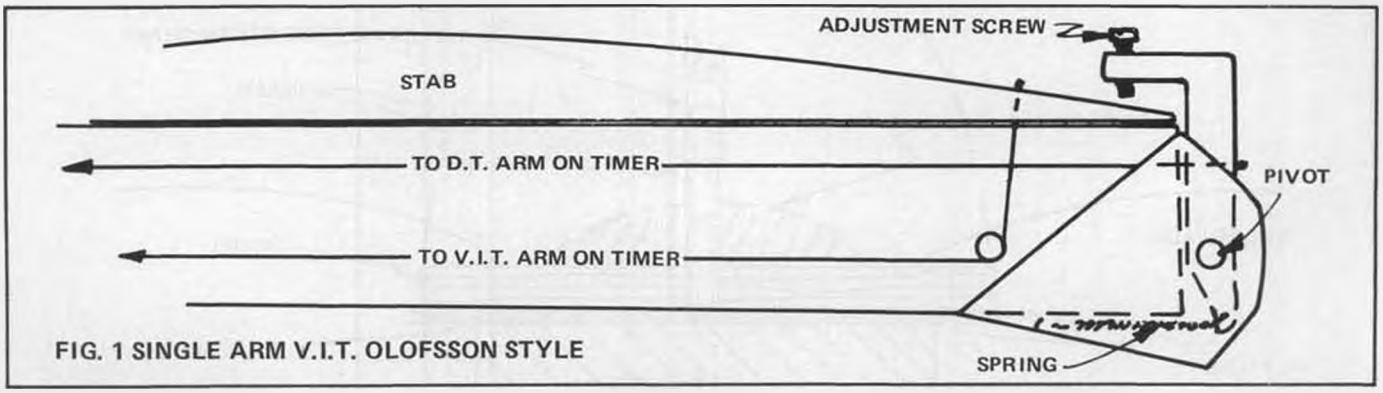


FIG. 1 SINGLE ARM V.I.T. OLOFSSON STYLE

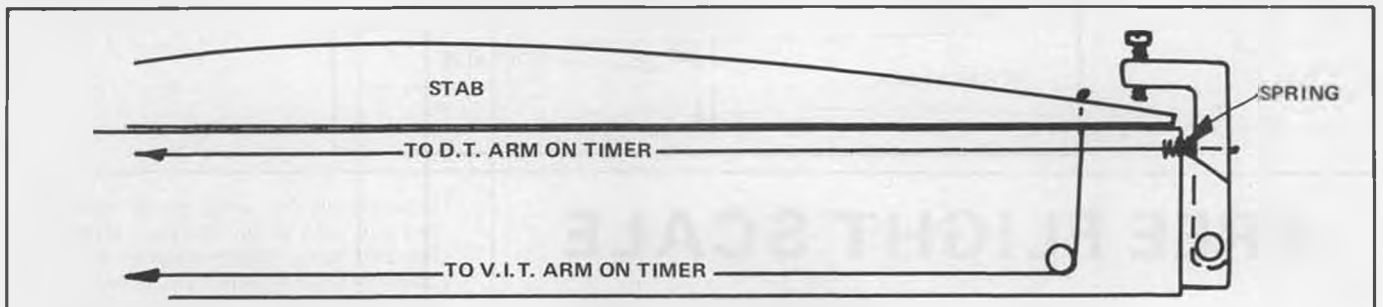


FIG. 2 SINGLE ARM V.I.T. – TRAPPED SPRING STYLE

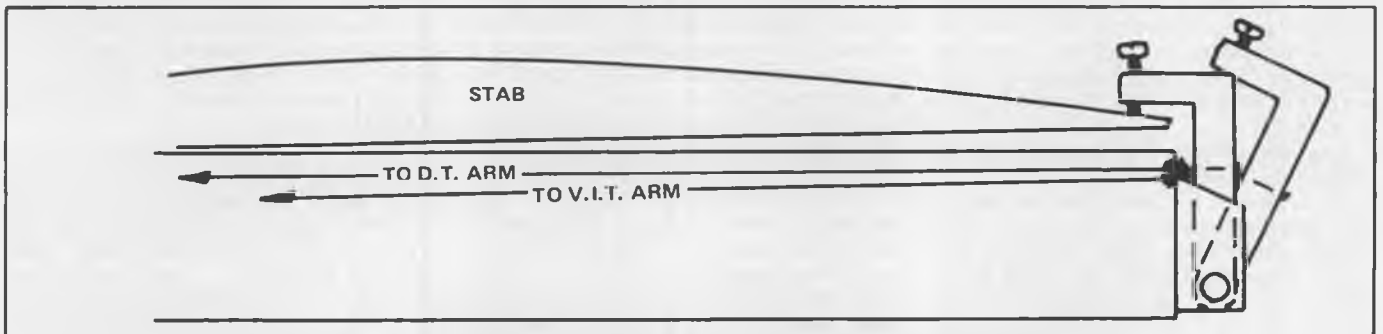


FIG. 3 DOUBLE ARM V.I.T. – TRAPPED SPRING – IN GLIDE POSITION.

(and less drag) during the climb, and more incidence for the glide, thereby improving the performance without compromising power for glide, or vice versa. As a bonus, models can be made that will transition quickly from power to glide phases without loss of altitude. That's the ideal, at least.

PRO-V.I.T.

PRO-V.I.T. ARGUEMENT

The pros were pretty much covered in the preceding paragraph, but some others exist:

A model is easier to trim when a VIT is used. The reason is that you can trim the power and the glide phases separately.

- More of the model's total surface area can be placed in the wing, as a large stab is not needed to control power. Consequently, the wing can be made more efficient.
- The balance point can be placed farther forward than on the typical AMA gas model. This forward B.P. has the potential of making the model more stable, and thus easier to control. With a smaller, more efficient stab, the total weight of the model should be less, and theoretically it will have lighter extremities (at least at the tail end).

CON-V.I.T. ARGUEMENT

The cons against V.I.T. are several as well:

- Additional gadgetry is needed for a V.I.T. system. This fact means that Murphy's Law ("If anything can go wrong, it will go wrong.") is apt to come into play.
- A special timer is needed. This is basically correct, however articles in *Model Builder* (and other sources) have shown how to modify a standard camera timer for use as a V.I.T. . . . so no additional expense or weight should result.
- The technology is beyond the average modeler. This con is generally not true. If you can build a model from plans, you can build a model with a V.I.T.

As you can tell, I favor V.I.T. systems, and when you finish reading this series, I think you will be able to see why. The pros do outweigh the cons.

HOW TO SET UP A TYPICAL V.I.T

The concept is simple. The stab is held in one position for climb and is allowed to increase its negative incidence for the glide. The change in incidence is timed to occur shortly after the engine quits . . . usually about one second, or whenever the model's speed decreases enough to enter the glide without either diving or stalling. All that needs to be done is to rig the model to do so. The following examples do not intend to represent the only ways that such rigging can occur, but do represent several typical installations.

Please refer to Figures 1 and 2, and Photos 1, 2, and 3.

SINGLE ARM V.I.T.

This system uses only one arm. The stab is held down against the stab mount by tension from a spring or rubber band loaded line that attaches to the stab and goes directly to the V.I.T. arm on the timer . . . much the same as an AMA gas model may have its D.T. line hold the stab in position.

At the end of the power run, this line is then released, the stab pops up, and it comes into contact with the adjustment

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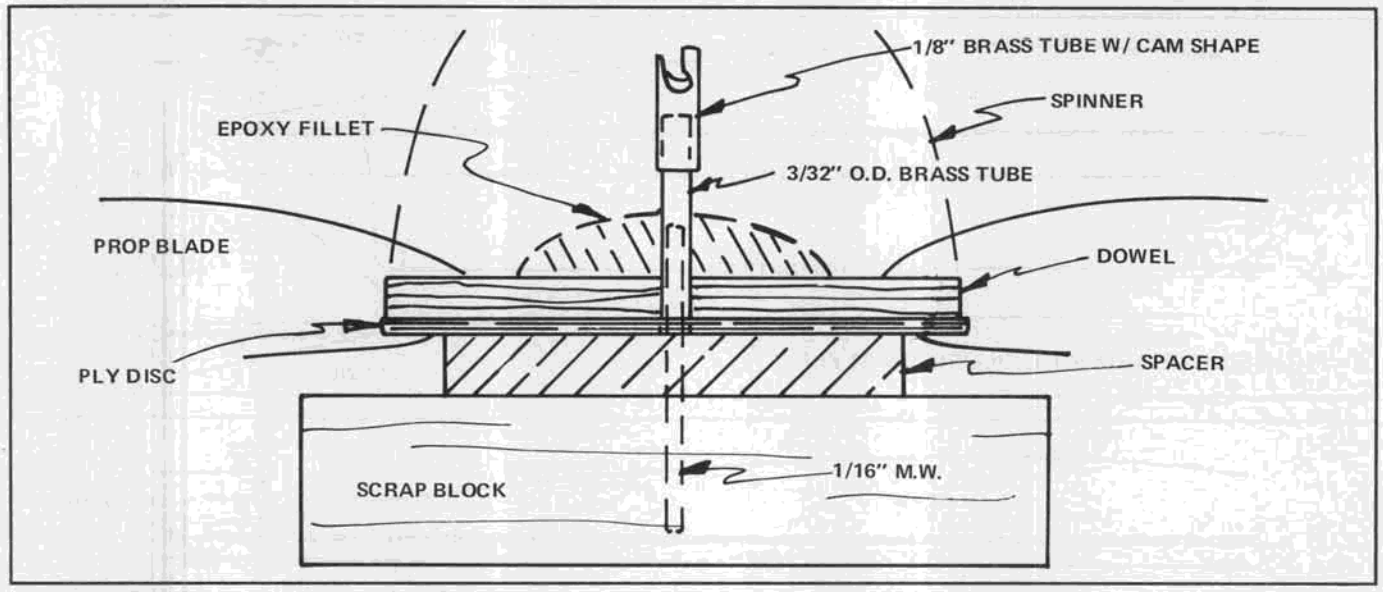


FREE FLIGHT SCALE

By FERNANDO RAMOS

• This month I want to start with another sensational idea from the workshop of George James. Last month I discussed his novel approach to fuselage construction, now I want to pass along a unique way of adding lettering, numbers, etc., to a model.

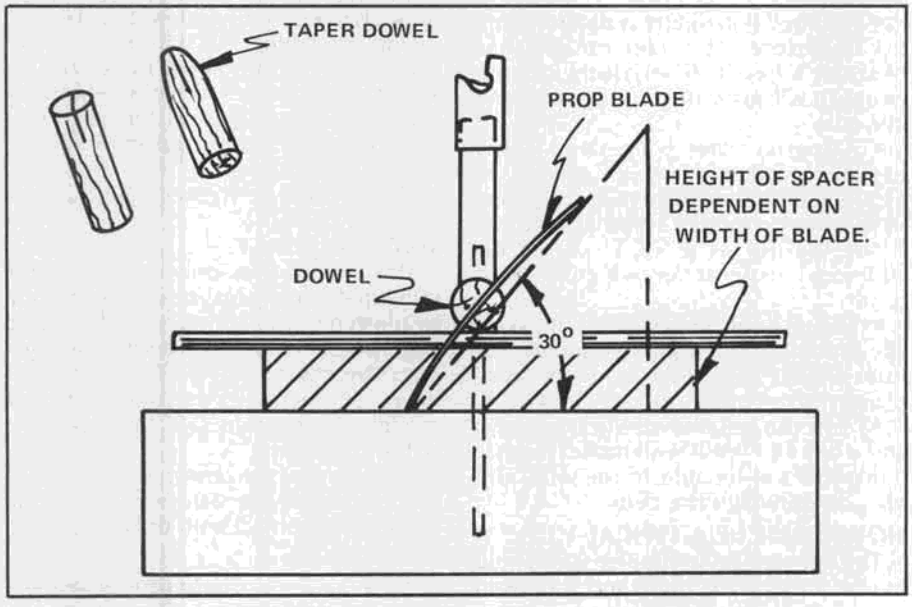
I wrote about George's finishing technique long ago, and no doubt a brief review is in order. George never uses nitrate dope until the absolute last step. Instead, after water shrinking the tissue with an airbrush, he sprays on a light, even coat of thinned-out white glue. When this dries, it leaves a semi-gloss finish with no pores showing through. This, in essence, takes the place of several coats of dope.

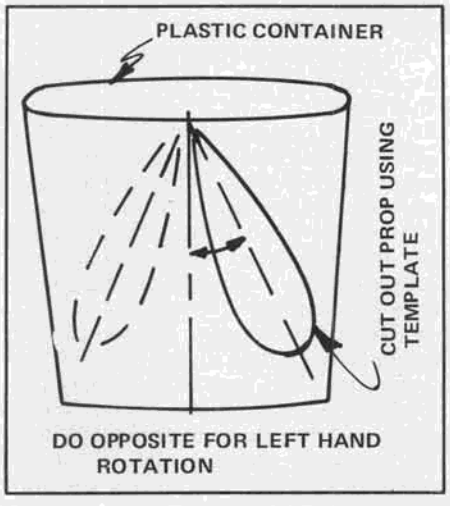
If you remember, George prefers to do almost all steps of construction in his hands. Seldom does a structure ever get pinned down. When I water shrink tissue on a wing or a tail, I always pin down the structure until thoroughly dry. George water shrinks the tissue with an airbrush, then immediately dries the tissue by blowing air only. In a matter of seconds the tissue is dry. There is very little chance of warping the structure as the water is not permitted to soak through the tissue. As soon as the water is dry, he immediately sprays on the thinned-out white glue. Again, this is blown dry, and in no time at all the structure is ready for color.

George, unlike me, prefers to use only water soluble paints and dyes. The next few steps are really where it starts to get interesting. Let's say that a wing panel is red and has white lettering. First, cut out the necessary lettering from vellum or graph paper (et al), and coat the back with one coat of rubber cement or equivalent. Lay these in the proper location on the wing. Spray carefully a red dye such as Dr. Martin's. Care is the byword here. Water soluble dyes, because of their watery nature, tend to run with little effort. In order to get uniformity of color, a super fine, even spray has to be used. If not done this way, there will be many dark and light blotches on the finish. Care in spraying over the masked letters is also required because you do not want the dye to bleed under their edges. When dry, simply remove the masks. Crisp letters should result.

Okay, so far this is pretty common knowledge. What if our example, on the other hand, was black lettering instead of white? In this case, spray a black dye wherever the letters will be. I know what you are thinking . . . the red cannot possibly hide the black undercoat. Hold on a minute. When the black color has dried, place the letters over the black in the proper location. Next, take some Clorox or Purex bleach and carefully spray around the masked letters. Again, care has to be taken because you do not want any of the bleach to bleed under the masks. Spray and blow dry as you go. The oversprayed black will completely disappear before your very eyes! The

Continued on page 90





Marty Schindler holds the beautiful Cox Sub Scout built by Hurst Bowers as Hurst couples its nose to the motor in preparation for an indoor flight.

MIAMA's Millard Wells holds his neat Hughes Racer peanut. Wing leading edge and fuselage are hollowed foam. Scene was Opa Locka Hangar in Florida.

INDOOR

By KEN JOHNSON

HOW TO DETERMINE WING AREA

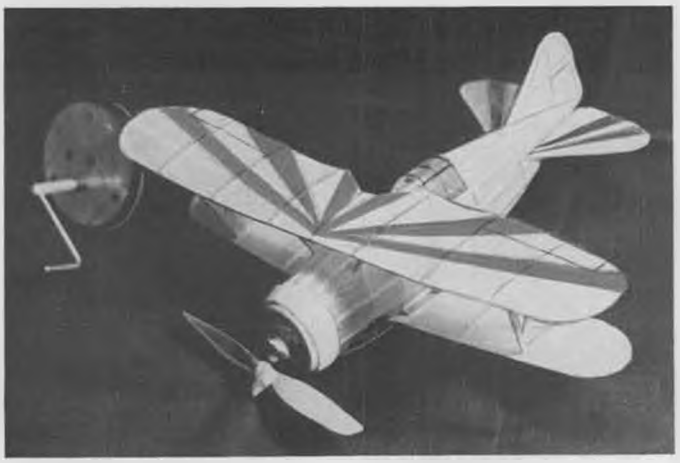
Have you ever tried to figure out the area of a Pennyplane wing? It's easy if the outline of the wing is all straight lines. You simply take your handy T-square and rule a straight line every inch vertically and do the same horizontally. Then you color in all of the full square inch areas with a colored pencil. When you come to the partial squares, match two or more partial squares so that they add up to one square inch, and color in those areas. Number each square inch area so that you can easily count them. Remember, some of the rules state that the area must be figured as *projected* area. Projected area is how the wing would look when viewed from above, including the shortening effect caused by the dihedral angles of the wing. On the plan sketch, modify the tip outlines to conform to this projected shape. Now make your square inch drawing over this. Remember, one square inch is one inch high times one inch across.

How do you figure the area of the wing if it has curved outlines? Well, some mathematically gifted fellows use a thing called a planimeter. Most of us, I suspect, don't have one of these lying around the house. Here is another way you can compute the area. This method does require the use of an indoor beam scale, the type of scale which will measure down to 1/1000 of an ounce.

After you have drawn the projected outline of the wingtip over your plan, place a sheet of bond paper under the wingtip area of the plan. Carefully pinhole the outline (make the holes 1/8 in. apart) through the plan and the bond paper. Remove the bond paper and cut the tip outline with sissors. Make the cut as accurately as you can. Next, cut one square inch from the same sheet of bond paper, and weigh the paper on your beam scale. (The scale must be set very accurately.) Then, weigh the tip pattern cut from bond paper. Divide the weight of the square inch of paper into the weight of the tip outline and the answer will be the number of square inches in the tip outline. Add to this figure the square inch area of the adjoining inner panel and double this amount for the total area of the wing. If one wing panel is larger, figure the area of each half separately. I believe this is an accurate way of figuring the area of your projected wing.

INTERNATIONAL POSTAL ORNITHOPTER MEET

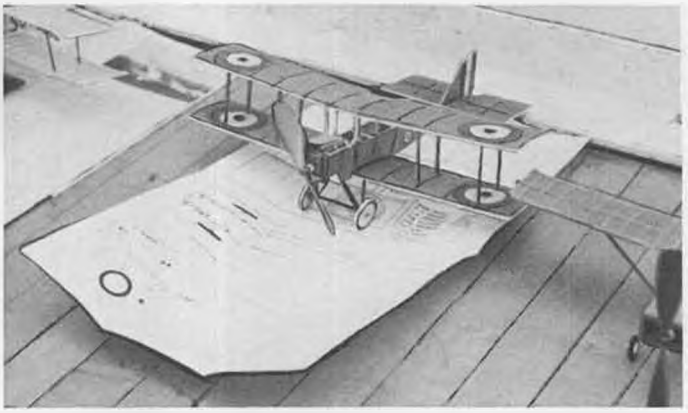
Dave Erbach of Canada has initiated a contest just for flapping wing indoor aircraft. This postal meet runs till December 1, 1983. The flights must be logged either at a contest or a record trial sanctioned by the Federation Aeronautique Internationale or by any of its



Gulfhawk peanut built by Junior age modeler, Chris Johnson. Wheels are in the retracted position. Flew very well. Photo by editor.

The MIAMA group flies in this Category I boxing gym for time trials. Three new records set: Heather & Mike Arak, and Dave Linstrum.

George Leffler launches his Hellcat No-Cal rubber model. So much variety in this indoor hobby of ours!



Nice DH-6 peanut built by Bill Warner on display for judging at Paul Revere Jr. High in Los Angeles. Bill teaches at this school.

affiliated national organization. No entry fee is required. The aircraft must be rubber band powered, and there is no restriction as to size (up to 1000 square centimeters for the total supporting surface). The best single flight wins. Unlimited attempts are allowed. Entrant must send his or her name and address, date of the flight, name of the contest, and the ceiling height to Mr. Erbach. A statement from the contest director is required varifying the flight time, as well as a scale three-view of the airplane with dimensions and rubber size. Include a photo of your model.

Mr. Lew Gitlow of Indoor Model Supply of Garberville, California has donated merchandise prizes to add to the awards. The first prize is $80 in cash and merchandise. Second prize is $50 in cash and merchandise. A special award of $35 in merchandise will go to the modeler with the highest flight time using an Indoor Model Supply ornithopter.

For further information regarding this postal ornithopter contest, write to: David W. Erbach, 1738 St. Mary's Road, No. 702, Winnipeg, Manitoba R2N 1G8, Canada.

FLAPPER FLAK

This editor is disappointed with one portion of the rules for this contest. Part of the event definition states that the sum of the areas of any supporting surfaces must not exceed one-half the area of the flapping surfaces. This restriction is not in harmony with the current AMA rule regarding areas in ornithopters. The AMA rule states that the projected area of the flapping part shall not be less than that of the fixed part. In other words, Mr. Erbach's rule cuts the ratio of fixed area to flapping area in half.

We flapper designers build our models to one formula (or rule), then Mr. Meuser comes along and rewrites that rule . . . Now Mr. Erbach comes along and rewrites that rule again. Now it seems we must discard our designs and start all over with new concepts. It would appear that we are moving toward a no-fixed-wing machine. Perhaps there should be two ornithopter classes: one having unlimited area fixed wings, and the other with NO fixed area whatsoever . . . then I could build whatever I please with no one putting boundaries on my creative thinking. After putting in 20 years, and building 132 flappers, you would think I should be able to build what I like.

I welcome your comments on the above opinions.

NEWS FROM THE GREAT NORTH

Usually your editor doesn't comment on individual letters, but this one is unique, and an exception. The news is that **MODEL BUILDER** is even read and enjoyed north of the Artic Circle.

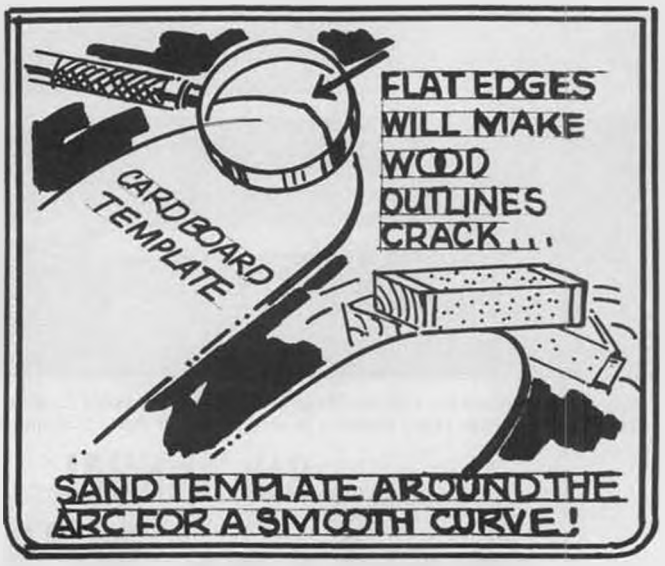
Mr. Andy Anderson commutes (by air, of course) between Fairbanks and Fort Yukon, Alaska. Fort Yukon is 8-1/2 miles north of the Artic Circle. Only the schools promote an educational program focused on "things that fly". A community center in Fort Yukon might become available for indoor flying. Its 24 ft. ceiling would be ample to allow fliers of all ages to learn and enjoy indoor modeling. In this remote area where fun activities are restricted by the elements, indoor model building would be ideal. Andy is trying to get the concept off the ground and into the "indoor air."

Someone commented that at 40 degrees rubber looses one-half its power. I

Whittman Tailwind Peanut built by Butch Hadland (left). Model is held by Peanut Proxy Chairman Mike Arak at 1980 West Baden Peanut Gran Prix. Linstrum photo.

Bob Andrews picture of Opa Locka site. This is a Cat. II hangar with a 69 ft. ceiling.

Jack McGillivray launches his sensational twin engined peanut for the TV cameras of a Louisville Kentucky station. Andrews photo.



A cardboard template will aid in the making of curved balsa wing tips. Accuracy and care taken while constructing the template will pay off in the final product.

can believe this. Wonder how much is left at 0 degrees?

This 57 year-old educator is seeking magazines and kits for the kids in the area, as well as any club organizing tips you readers can suggest.

Write to Mr. Earl B. (Andy) Anderson, P.O. Box 323, Fort Yukon, AK 99740.

(**MODEL BUILDER** *has decided to help out by giving the Ft. Yukon area indoor modelers a free subscription. wrf)*

EXCUSES BY NUMBER

Sometimes we launch our models and things just don't go as well as we would like. Maybe the model doesn't climb, or it flys in a straight line (right into the wall), spins in, etc. We all know that feeling. Then, predictably, a bystander strolls over with that question, *"What happened?"* "Well it was like this..." Then comes the excuse, right? If we just had numbers assigned to the various excuses we most often use, we could just say, "No. 6," or "No. 43," or whatever. Perhaps it would be less embarrassing.

Well, here are a few good ones to start off the list. Maybe you have a favorite one you can add to the list.

1. My downthrust fell out.
2. Someone was fooling around with my model.
3. My clay must have fallen off the nose.
4. The rubber motor has gone dead on me.
5. My cat chewed up the wingtip, and it hasn't flown the same since.
6. Someone just went through that door and disturbed the air.
7. The rubber band must have shifted to the rear and changed the balance.
8. It must have gotten damaged on

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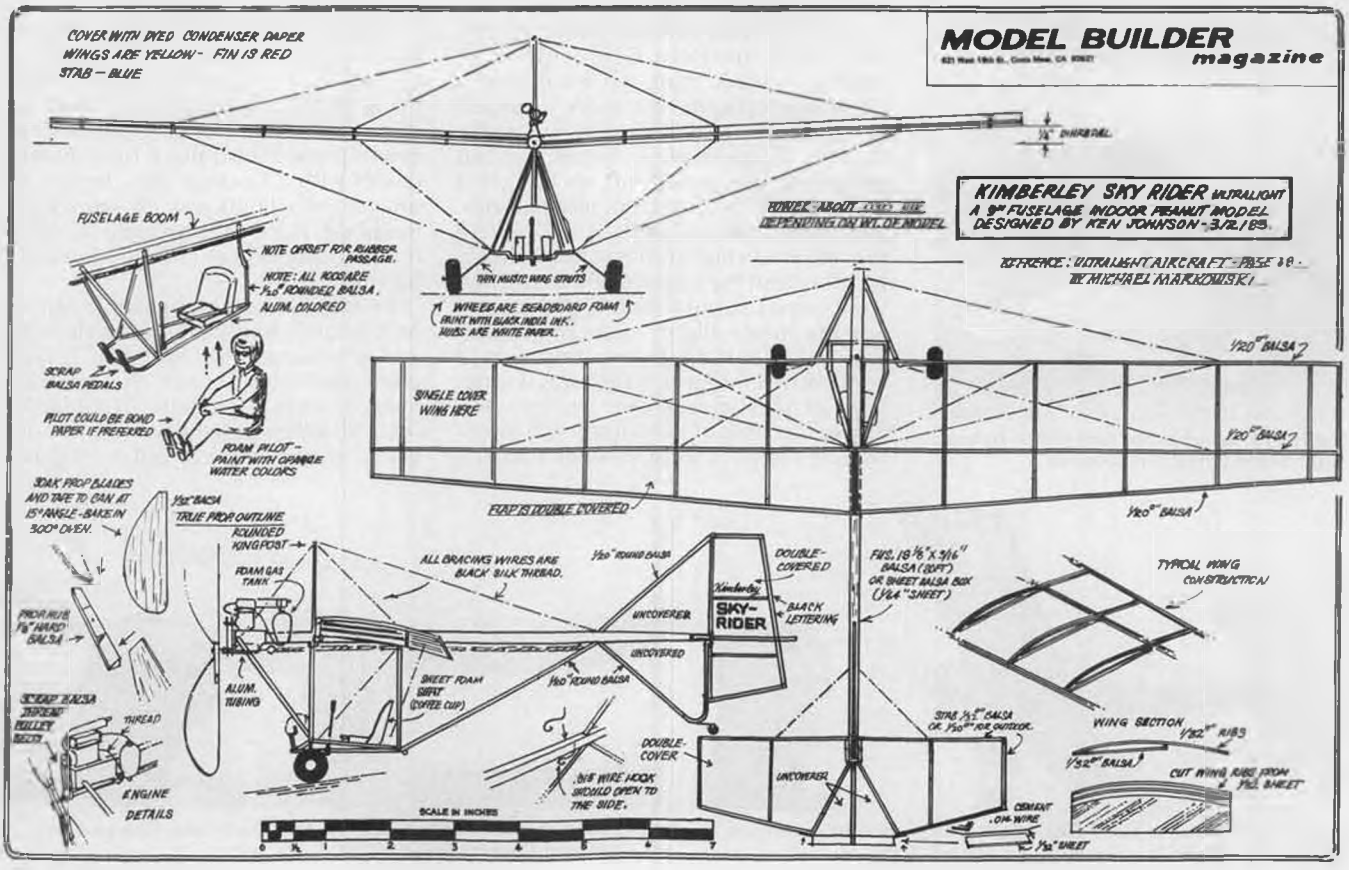

Bob Haight's beautiful Handley Page Helena (H.P.42) failed to make its qualifying flight due to rain swelled wheels which prolonged the taxi. This incredible free flight model is powered by four Astro 035 motors.

9th ANNUAL

Astro Electric Championships

PART TWO

By BILL STROMAN . . . The contest director for the 9th Annual Astro Electric Championships reports on the free flight events which he ran. For additional contest coverage, see page 14 for Astro Champs Part I.

• "Electric free flight sure has come a long way in a very short time." This was my most recurrent thought while I was running the F/F portion of the 1983 Astro Flight Championships. I remember when (just seven years ago) flying an electric powered model which could gain height from a hand launch was considered a big deal! Now the models can climb higher than 200 feet in 25 seconds! We are attracting more juniors to electric free flight now, which is very encouraging. Electrics are a good way to get started in powered flight, as there is less mess, no fuel or oil, and one doesn't have to flip the prop, just flip a switch ("No cut fingers, Mom!").

Bob Haight launches the four-motor Helena. Flight lasted only a few seconds.

As the contest came between two of our many Southern California rainstorms, I didn't think we would get a very good turnout. I was more surprised to see twenty modelers show up, some from as far away as Las Vegas and San Francisco. As it turned out, we had good weather, almost no wind, cloudy skies, and some light thermals. I did reduce the maximum flight times to two minutes for all except the junior event in case the wind came up, but it didn't. The reason I left the junior flights at three minutes was that I didn't think they would exceed two minutes. I sure was wrong; they all got flights of over two minutes, and in fact, two of them got some three-minute flights. Cynde Waddell had one flight of over five minutes, just as an example!

The largest turnout was for endurance, in which we had ten entries. Unlike some R/C pattern events, there were no two models alike. Seems like everyone has his own method and style of flying this event. Barnaby Wainfan had a flying wing that scored high, Joe Tschirgi had a model that reflected his flying of R/C sailplanes, very long and lean. Bob Smith, our only junior in the event, missed third place by only three points with a Country Boy. In fact, the only scratch flight was my own with a modified Starduster (should have listened to Sal and not changed the motor location).

Besides Barnaby's original design, Jim McDermoth had his original Hummer, and of course, Tschirgi's had his sailplane-like original O.D. The remaining models were from kits or published plans of other designers. As one would guess, many of these put in flights of

Ferrell Papic's Bleriot No. 7 Monoplane took second place in Free Flight Scale. Model is powered by an Astro 020 motor.

First place in Junior was won by Bob Smith who flew an 020 powered Country Boy.

Roy Mayes entered this jewel-like Dormoy Bathtub. Lots of detail, flew like the real thing, and took first in Scale.

Jim Ogg flew this Astro 035 powered 320 Satellite very nicely, and took home third place trophy.

Bill Warner likes to wear his French cap while flying his scale Caudron Simoun. Bill took third place with his Aero-Tropille.

Barnaby Wainfan loves flying wings. This one is a very stable Astro 020 powered beauty. Note pusher prop and twin fins.

over two minutes, in fact, Joe Tschirgi maxed out in all three flights.

Replica 02 is an Old Timer event which uses the same planes as the regular .020 glow engine event. The only changes are that we use an Astro 02 electric power system, a 25-second motor run, and we hand launch. Jim McMahon's Powerhouse took first place in this event with two maxes and a 76-second flight. Just to show that the Powerhouse is a good design, Joe Maher got second place with one. Art Wahlstedt's Stratostreak followed with a third, and my Valkyrie finished up the event. It also finished up the model for me, as the rear end was broken off on the second flight . . . back to the drawing board!

The junior event had three entries, but what they lacked in numbers, they sure made up in energy. Bob Smith had a great-looking Country Boy, and really knew how to fly it. He got the highest total time of the meet. I have had two young sisters really help me out in contests over the last year or so, Cynde and Kim Waddell. Now, their father, Roy, is a modeler, and between us, we managed to convince the girls that they should build a model for this event. Roy thought that McDermoth's Truant would be a good design base, so we modified the design for an Astro 02 motor with two Ni-Cad cells. The girls made the planes, and with some help, installed the motors. Boy are we on to something! Those darn models kept those two girls running all day! As I insist on the modeler naming each model, one of them came up with the handle of "McDermothvolt". The best thing was watching Jim McDermoth as these planes were flown, he really got a kick out of them.

As some of you may know, my first love in modelling is scale. We had seven

Continued on page 93

Cynde and Kim Waddell took second and third places with these two McDermoth-volt planes. Note prize under wing.

Joe Tschirgi's F/F Endurance winning airplane, the O.D. Joe maxed out in all three flights.

Plato . . . . . *Continued from page 17*

on the top of the fuselage for easy access to the receiver and actuator. This was done with some trepidation as to its effect on stability. There was no need to worry, however, as it had little effect on the flight characteristics. In addition, ground handling was much improved; takeoffs were as straight as an arrow, and "greased" landings without nose overs, that are typical with low wing designs, became routine.

The fuselage is composed of a top and bottom deck. The wing, a 30 inch disk of 1/8 sheet balsa, is sandwiched between the two, giving it its peculiar curve that imparts the necessary rigidity in flight. The fuselage sides are made by transferring the outline from the plan onto a sheet of 1/8 balsa, then tracing only the curve which is identified as the top deck line onto the balsa sheet. This line extends from the tail end to "B" and down to the bottom edge. After cutting and sanding the outline, carefully cut along the top deck line. If this is done accurately in one continuous cut, the 1/8 notch for the wing is provided by simply cutting 1/8 off the bottom of the lower deck with a straightedge. Using the two pieces as templates, make two for the other side of the fuselage. This is a good time to make the four pieces for the fences out of hard 1/8 sheet balsa using the fuselage sides to draw the wing section curves. Shape the bulkheads and assemble the top and bottom decks separately. Note that the planking along the top deck line is on the inside and flush with this edge, and the same applies to the planking along the bottom deck line.

At this stage it's a good idea to get on with the wing. Select the harder balsa sheets that you have for the leading edge. Double glue all butt joints to insure strength and a smooth contour when the sheets are curved. You should now have a panel approximately 30 inches square. Draw a center line on both sides running 90 degrees to the grain of the wood and the butt joints. Inscribe a 30 inch circle from the point marked on the center line. For this purpose, I made a trammel bar from a piece of 1/4 square balsa just over 15 inches long, tied a pencil to one end and stuck a straight pin through the other at a 15 inch center. Crude, but it works fine. Cut out the disk and sand with fine sandpaper on both sides, leaving the center line visible for reference. Now sand a radius around the outside edge. This is the time to do the finish sanding on the wing as it is impossible to do a good job after it is formed. Measure over from the center line 11-1/2 inches each side of the center, and locate the lines for the fences on the top and bottom of the disk. It is important that these lines are parallel with the center line of the wing. The wing can now be glued to the bottom of the top deck, lining the center line of the wing up with a center point on the fuselage. Then, glue the bottom deck into position below the wing. Attach the fences on the lines drawn in the exact position shown on the plan in order to preserve the same curve from the fuselage to the wing tips. The remainder of the fuselage is straightforward and should present no problems.

Before covering, the crinoline is applied to the nose and around the edge of the wing. The following technique for around the wing is suggested: Cut out strips of crinoline 1-1/4 inch wide with a straightedge. Fold lengthwise along the center of the strip and crease to form a "V." Spread a coating of fast drying glue on the first inch of the tape. Starting at the fuselage, wrap it around the edge, pressing it in place with your fingers until the glue oozes through the crinoline. Let it dry thoroughly. Now peel back the tape and apply glue for about two inches further along, grasp the free end of the tape and stretch tight around the radius. At the same time smooth out the wrinkles with your fingers and hold for a minute until the glue sticks. Repeat this procedure all the way around using a generous amount of glue so that the tape is well saturated. Apply two additional coats of glue all around the edge, allowing each to dry thoroughly. This adds greatly to the strength of the wing and prevents the edge from splitting.

In order to save weight, colored silk was used for covering. Silkspan could also be used, but avoid colored dope except for minor trim. Stitch on the rudder and elevator using nylon string for the hinges.

The center of gravity location was determined after a considerable amount of experimenting. The balance was achieved using five pen cells and one 30-volt battery in the battery compartment. There is plenty of room in the bottom deck to move the batteries if necessary.

Control is achieved by the Simple-Simul system, a Mighty Midget providing the muscle, still the most control for the least sweat. The ESSCO TRT receiver, and Crescent Puls-Air Pulser provide reliable operation. The crank on the torque rod should have a 3/8 throw and be positioned to give 10 degrees down and 20 degrees up elevator.

Give the radio equipment a final check and you are ready for the test glide. With the radio operating, set the pulser going and trim in a little up . . . yes, I said up elevator. Now, launch straight out, the plane will assume a nose high attitude and land this way. You can rear back and toss the high hard one with the same result . . . no stall and dive, but just a settling to a nice landing.

If you are over the shock of seeing a low wing, minus dihedral, glide without cluttering up the landscape, you are ready for powered flight. A good .15 motor provides lots of power so it's a good idea to restrict the intake to cut down the power on the first few flights until you get the feel of things. You can stooge along with the nose up and not get into trouble. When you gain confidence, you can open her up, and with a little down trim, Plato will really bore along. You can expect a quick response to the stick in level flight. Full left or right will turn Plato on a dime with a vertical bank, but it will straighten out just as quickly when the stick is returned to neutral. Press the full on button, which on this system gives full left rudder and full up elevator, and Plato will execute flick rolls at the drop of a hat. Plato flies well on rudder only. With escapement rudder only, reduce the throw of the crank on the torque rod to 1/4 inch and set the elevator at the position shown on the plan.

So there you have it. A versatile and

rugged little performer which will more than repay you for a few hours of careful construction. •

Fuel Lines . . . *Continued from page 20*

mixture. As you'll recall from basic physics, when a gas is compressed, both pressure and temperature increase proportionately. Furthermore, pressure and temperature changes are inversely proportional to changes in compressed volume. Thus, if the volume is squeezed in half, the pressure and temperature double. As the piston nears the top of the compression stroke, the temperature of the gas increases, which aids the ignition process. In our glow engines, the element (represented by the small circle at the top of the domed chamber) initiates combustion. In the drawings, the unburnt fuel/air mixture is depicted by dots. The absence of dots represents burnt gases. As the flame front (represented by the jagged lines) moves outward, the burning accelerates because of radiant heating of the rest of the unburnt gas combined with the temperature increase associated with the final part of compression. Combustion is just about complete as the piston passes top dead center as shown in the second drawing. With the end of the burning, the chemical conversion of mass to heat energy is complete, and the heat has proportionately increased pressure to do the work of pushing the piston downward (third drawing). All very neat and tidy, and our engine pumps out the horsepower for our models! Except . . . sometimes things can go awry.

There may be a variety of reasons, but for illustrative purposes let's just consider an example of detonation . . . a most common ailment of high performance engines. In the fourth drawing, the combustion chamber is smaller than the first three. That means a higher compression ratio and higher gas temperatures as the piston approaches top dead center. When you add to this radiant heating, the gas can reach the temperature of self-ignition. If it does reach that temperature, it *will* explode. That's a rather rough physical shock to an engine. If detonation continues, overheating will soon follow. Under conditions of detonation, the cylinder, piston, and head are deprived of the cooling effect of the unburned fuel/air mixture as it awaits the burning flame front during normal combustion. As you can well imagine, overheating really aggravates things. If it continues, engine damage is a sure bet.

The above sequences happen rather quickly . . . in micro seconds. However, normal *internal combustion* of a fuel/air mixture is a relatively slow process compared to the *explosive detonation* of it.

Guys, I usually strive for objectivity, leaving personal opinion aside, but in this instance, only some kind of a nut could want an explosion in the cylinders of his engines . . . the same type that likes green cheese. •

Electric . . . . . . *Continued from page 27*

no longer worked. I packed it up and returned it to Vantec with a check for $15, and two weeks later received the throttle back in time to put it back into the repaired Bushmaster. I was off flying again.

"My overall opinion is that the ET-3 is a well engineered option for the flyer who wants fully proportional speed control for his electric powered aircraft. This versatile throttle can be used with any modern radio and any commonly available flight system, but follow Mitch's advice and fuse the battery pack so that Vantec won't have to prove how good its service department is.

Note: I also use an Astro Flight 4023 on/off throttle control, and an Astro Flight 4023R on/off throttle with voltage regulator that eliminates the receiver battery pack."

Thanks, Bruce, for the excellent report. Vantec sent Bruce an update on their throttles . . . some of the specs have been changed slightly. The case is now 3.125 x 1.625 x 1, and the weight is 2.5 ounces. It only draws six milliamps at idle, and will handle 25 amps continuously or 50 amps starting surge (wow!).

Loss at 20 amps is 1/2 volt, quite good. Moderate air cooling is needed above 24 volts, 15 amps (again, this is very good, it shows little heat generation, and is very efficient).

There is provision for centering the throttle for the various radios with a small screwdriver, and you can reverse the effect of the stick throw by cutting a jumper line if you wish. This means that if the control stick moved fully up gives "off," not "on," cut the jumper, and fully up will now signal full "on." Very handy! The Vantec address for further information is 15445 Ventura Blvd., Suite 10-281, Sherman Oaks, CA 91413.

Last month I talked about the IBA ready to fly planes from Germany imported by Wilshire Model Center. Since then I have had a chance to see the IBA PB 26 motor glider in action, and I got an excellent flight report on the IBA PB 24 as well from Scot Clark.

The IBA PB26 has to be seen to be believed. It climbs at better than a 30 degree angle, and in 1-1/2 minutes it is almost out of sight. It has a wide speed range, which is just what the rules for F3E require (half of F3E is duration, half is speed around a course). There were two of them entered in the Astro '83 champs, and they took first and third respectively. It was easy to see why these planes hold the European championship in F3E.

Mike Charles, who won first, powered his IBA PB26 with a Geist 60 cobalt motor, and Roger Roth, who took third, powered his with an Astro 40 cobalt. Mike Charles uses 24 Sanyo sub-C's in his! The specs on the IBA PB26 are: 2.6 meter (10 ft.) span; 1.8 to 2.1 kg flying weight (5 lbs.). The power can be anything from the Astro Challenger 25 (cobalt) to the Geist 60.

The price is $259.95 from Wilshire Model Center. For that price you get a plane that is ready to fly, with a fiberglass fuselage, balsa sheeted wings reinforced with fiberglass inside (*not* a foam core), and a clear, smooth sanded resin finish, which is very attractive. If you want quality and the state of the art, this is it. I was very impressed with the performance I saw at Mile Square.

I'll run Scot Clark's report on the IBA PB24 in Scot's words: "The plane came finished in a natural wood finish, with a blue motor hatch. The wing is 424 square inches, I used a Keller 30/12 (cobalt), total weight was 68 oz. including 14 sub-C cells, and landing gear.

"The loading is 21 oz./sq. ft., which makes it an easy flier. I added wheels and steerable tail wheel for takeoffs and landings. The plane flies 'very, very' well. The ailerons, coupled with the no-dihedral flat bottom wing *(I think it is semi-symmetrical. mp)*, make it responsive. With the 14-cell pack the motor turns a 9x6 prop at 10,000 rpm. The plane is fully aerobatic from level flight. The power duration full-on is three minutes, 45 seconds, however, it will fly for 11-1/2 minutes if the motor is used only to haul it up, then shut off to glide down three times. A 9x4 prop on the 14-cell pack will turn at 11,200 rpm, and the power lasts, full-on, for 4-1/2 minutes. With 12 cells the 9x4 will turn 10,200 rpm with a motor duration of 5-1/2 minutes. Take your pick.

"The plane did have one major problem. It was 'twitchy' as purchased. It would lose lift when it was nose down *(i.e., it tended to dive. mp)*. The horizontal stabilizer leading edge was lowered by 1/8 in. to increase the negative incidence of the stabilizer. This solved the problem. The IBA is the best plane I have ever flown."

Thanks, Scot, for the report. Hans Weiss got the same report from Scot, so the "fix" is getting to be widely known. The IBA is handmade, and 1/8 inch could easily represent normal variation in any plane, so it is good to know how to handle it.

The IBA PB24 is also available from Wilshire Models for $240.

One last item . . . Hans sent me Wilshire's latest catalog, and it is a goodie. If you want to see what "the latest" is in Europe, this is where you'll find it. It is illustrated, with very complete descriptions of the planes and their prices. The catalog is $2.50 (less than most magazines) from Wilshire Model Center, 3006 Wilshire Blvd., Santa Monica, CA 90403; (213) 828-9362. I find myself going back to it often, just to browse and dream!

(Be sure to read Mitch Poling's and Bill Stroman's coverage of the Astro Flight Championships elsewhere in this issue.)●

Nürnberg . . . . . *Continued from page 31*

In addition, there were a large number of smaller companies from throughout Europe, some familiar to those of us who have been to Europe or have perused European magazines. Still, there were many companies completely unknown to me, many with interesting and worthwhile products.

Even the people were color coded! Everyone was given admittance badges in different colors, so that you could tell at a glance whether the person you were talking to was another displayer, a German buyer, a Foreign buyer, etc. Us Press folk sported grey/black badges.

Product-wise, the Europeans are not taking a back seat to anybody. Though somewhat expensive, the general product quality is high, often higher than that which we see here. Though by far the greatest majority of items are made on the continent, you still see foreign (to them) products which have gained international acceptance, such as Enya and OS engines, and it was like seeing an old friend to run across names like Goldberg, TopFlite, Novak Electronics, X-acto, and others, when visiting the booths of some of the general suppliers.

The hobby has developed along slightly different lines in Germany, and apparently throughout the continent, than it has here in the U.S. Control line is still much in evidence, though I didn't see a single free flight model, probably due to the lack of flying fields. Sailplanes, including some really large sailplanes, are found in great numbers, and seem to be the recommended way to learn to fly over there. Scale, including large scale, is very popular, and of course, there are numerous sport and trainer designs available from every major manufacturer. Boats are popular, with much more complicated race courses than the ones we run on here in the States. Cars, too, are much in demand, with all major companies having them, and many small manufacturers devoted strictly to them. In that too, there are some deviations from what is

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8½"	6½, 6¾, 7, 7¼, 7½, 8, 8½, 9
9"	7, 7½, 8, 8½, 9
9½"	8, 8½, 9

SUPER-M POWER PROPS

Diam.	Pitch
5¼"	3, 4
6"	3, 4
7"	4, 4½, 5, 6
8"	4, 5, 6
9"	4, 6, 7, 8
10"	6, 7, 8
11"	4, 6, 7, 7½, 7¾, 8
12"	4, 5, 6, 8

Large	Diameter
15"	6, 8, 10, 11
16"	4, 6, 10
18"	6, 8, 10
20"	6, 8, 10, 11
22"	8, 10, 11

SUPER-M TOP FLITE PROPS

Diam.	Pitch
6"	3, 4, 5
7"	3, 4, 6
8"	4, 5, 6, 8
9"	4, 5, 6, 7, 8
10"	4, 5, 6, 8
11"	4, 5, 6, 7, 7¾, 8, 8¼
12"	4, 5, 6, 8
13"	5, 6
14"	4, 6

NYLON PROPS

Diam.	Pitch
5¼"	3, 4
6"	3, 4
7"	4, 6
8"	4, 6
9"	4, 6
10"	3½, 6
11"	4, 6, 7, 8

SPEED PROPS

Diam.	Pitch
6"	7, 7½, 8
7"	7½, 8, 9½, 10, 10½,
8"	7½, 8, 8½, 9
9"	7, 12½, 13, 13½
10"	8, 8½, 9

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popular here; a lot of glow engine powered, off-road equipment was seen, very sophisticated and complex. There were no old timer airplanes to be seen, but there was a large variety of R/C vehicles. I saw operating bulldozers, earth movers, large trucks, a row boat with a little man actually rowing away. There was an R/C wind-surfer, a rickshaw, and even an R/C shark, using the mechanics from a submarine. It moved its fins, and very realistically snapped its jaws shut.

Generally, radios are developing along a different line in Europe, with much larger transmitters than we see here, all designed to be tray supported. They feature a lot of programmable flight buttons, and many more options are available to the buyer of a basic system than with U.S. sets. Included are most of the things we see here, switchable servo directions, variable throws, low rates, exponentials, mixers, etc., many of which are available as a plug-in option which can be added later by the owner. One feature which we have not yet seen here in the U.S. is a plug-in panel which includes and remembers all trims, rates, throws, etc., which are critical to a particular airplane. This panel is set up as necessary for one plane, then, when you change to another plane, you also change to another panel, which of course you've preset as necessary for *that* particular airplane. This is great for competition work where you have a backup model, and where you wish to fly different events with the same transmitter. Some of the systems that I saw featured a type of add-on decoder which is plugged into the last channel of the receiver, and which divides that channel into a number of on-off functions. There will be more information about these strictly electronic developments in my "Electronics Corner" column in future issues, in order to save some space here.

With the idea of saving space in mind, as there is only so much that can be crammed into the available space, I will cut down on the words describing products, and will show you as many photographs as possible of the things I found interesting, though it can only be a small portion. I am not including company addresses, prices, or much information other than what can fit into a two-line caption, however, all of that information is here, in my mountain of catalogs and brochures. If you are interested in any of the items that you see pictured, or in something else European that you have heard about, drop me a line, including a business-size SASE and I will gladly send you copies of what I have, or at least an address where you might get further information.

It wasn't all work at Nurmberg (but don't tell WCN), there were some fringe benefits. I made some friendships that will last the rest of my days, and I brought back some fond memories of time spent in their company, memorable meals, and (hard to find in Southern California) remembrances of a walk through one of Germany's hundred-foot-high pine forests in a foot of freshly fallen, clean snow. It was "Fasching" time in Germany, the pre-Lenten carnival season. I was a guest of some of my new friends at a Fasching costume ball, where, amidst four-hundred-or-so celebrants, I managed to find a young lady sailplane pilot who offered to show me the alps from her ASW-13. Except for the fact that it was two in the morning, and it was snowing so hard that anything with less instruments than a Lufthanza 747 was grounded, I would have taken her up on it. However, that is one date that I intend to keep!

In general, the language is not a problem, even though by no stretch of the imagination can I claim to know German. I did increase my vocabulary however, enough to know that in Bavaria, instead of "Guten Tag" (Good day) as they say in the rest of the country, you say "Gruss Gott", and an egg is not an "ei", but a "gagali". Actually, at most of the booths I visited, and I missed few, I always found at least one person that spoke enough English to get me by, and most of the young people have studied it in school. It is not at all uncommon to hear two Europeans from different countries conversing in English!

Even in Bavaria, in below-zero temperatures, time, as the saying goes, marches on, and all too soon it was time to start back. First, however, it was back to Frankfurt and Rhein Main Air Base for a couple of days for a homecoming of sorts, as I spent a lot of time there during my Air Force flying days. During the time, I lived in a small town on the outskirts named Zeppelinheim, which was the home of the German Zeppelin industry many years ago. There is a lighter-than-air museum there now.

Then, it was back into the 747 for the trip back home, which is always a little longer due to the winds, and a stop in San Francisco. Even so, I left Frankfurt at two in the morning, and was back in Los Angeles International at two that same afternoon. To the last, my German friends pampered and spoiled me. During this flight home, I was a guest of Captain Hacke and his crew in the cockpit of the 747. A most interesting visit . . . what a fantastic machine, I wish it were possible to describe it in detail. Enough to say that the degree of sophistication between it and the early C-54's previously mentioned has to have been experienced to be believed. But that is the way progress has been in aviation, what we then believed to be the ultimate is now only a museum piece.

Comes midnight, the coach turns back into a pumpkin. It was all extremely enjoyable, and I will do it again someday. The Nurnberg Fair is held annually, in early February. I recommend that you keep it in mind if you have any plans to travel to Europe around that time. It would certainly be worthwhile to in-

clude Nurnberg in your plans. When you do, I hope that you have as enjoyable a time as I did, for which I want to thank my German friends, with a heartfelt "Danke Schon", and until next time, "Auf Wiedersehen". •

Electronics . . . *Continued from page 33*

consumed, divided by the applied voltage. So if your iron is rated at say, 40 watts, working from 110 volts, it is using .36 amperes. Use a one-amp diode.

If you wish to install a permanent high/low switch on your iron, use one of those in-line switches as are often found installed in the cord of table lamps. You'll find that one of the conductors goes all the way through the switch, the other is cut and attached to two screws inside the switch, which then makes or breaks the circuit. Install the switch as normally intended, then add the diode between the two screws, right inside the switch housing. It works by shorting out the diode in one position, for high heat, when the switch is in its normally ON (or closed) position. In the OFF position, which now becomes low heat, the switch is open, and the iron is getting its reduced power through the diode.

The same circuit will work with incandescent lamps, any resistance-heated appliance or tool, DC and universal motors, but not with transformer operated devices or fluorescent lights. In this application, the polarity of the diode is not important, it can be installed either way.

A BETTER MOUSETRAP

I had a note from Paul Maharis, in Kew Gardens, New York, who writes: "Several of us flyers have L.R. Taylor and Ace R/C Ni-Cd chargers and cyclers. They all work fine, but why isn't there a Ni-Cd charger/cycler that us R/Cers can plug our transmitters and airborne packs into and forget about them overcharging. A charger/cycler that will monitor our Ni-Cds to full charge, then trickle charge them indefinitely . . . one week, one month . . . one year."

Lew goes on to remind us that such a system exists in our automobiles, and that it seems that something similar could be made available to us R/Cers.

Well Paul, something like that is easily within the reach of our present technology, but it isn't within the reach of our pocketbooks. You see, one of the features of the Ni-Cd battery which makes it so useful to us also creates a problem when it comes to this type of charging, and that is the fact that it has essentially a flat voltage curve throughout its useful life, right up until it reaches its critical voltage, at which time its voltage drops right off very rapidly. By contrast, the wet cell battery, as used in our automobiles has a very gradual voltage curve from its discharged up to fully charged state. And it is this voltage which must be measured accurately, and used to trigger a charger into its proper state.

In the case of the Ni-Cd, with its extremely small voltage change, an extremely accurate measurement must be made, which is difficult and expensive to do. In addition, this circuit has to maintain its calibration over wide temperature ranges, again, more cost. The Ni-Cd temperature must be monitored, and that information fed into the loop, yet more cost. Marrying all this to a battery discharging device, and the switchover circuitry necessary to go from discharge to charge, we are looking at a unit that would probably cost at least $300 *to build,* and would have to sell for much more, as the maker could not expect to sell them in great numbers.

I do know of one manufacturer that was well on the way to developing this type of a charger, sans the discharge feature, but that could have been easily added. As the cost figures and data were accumulated, it soon became evident that while he had a workable product, he did not have a *marketable* one, and the project was dropped. Paul, it looks like we are stuck with what we have, because that is what the market can stand, at least until we have some breakthrough. Let me see now, if we establish a stable voltage reference of. . .

DIODES & RECTIFIERS

I was recently asked by a friend to take a look at a kit project of his which wasn't doing just what it was supposed to do. Once again, dumb luck won out over skill and experience, I was able to get it going in a matter of minutes. Actually, it wasn't at all hard to do, and it took only the application of a couple of basic procedures.

The first thing to do is to inspect the board for poor solder connections and bridges. Good lighting and a magnifying glass certainly help here. Then the next step is to check for proper component identification and installation of those items that are polarized. This is exactly where the problem was, he had installed a diode backwards. In looking over the instructions, I can see why this was possible, as they were rather vague on this point. In the hope of saving someone similar frustrations, I thought I'd touch on the subject just a bit.

First of all, a diode is a sort of one way valve, it will pass current in only one direction. It has many uses in electronic circuitry, and there are many types of them, including vacuum tube diodes, lasers, and on, and on, but we are going to deal here only with those commonly found in R/C equipment. In this case, it is the small glass or plastic device which closely resembles a resistor, in some cases even having color bands around the body. One of the characteristics of a diode is its ability to convert alternating current into direct current, in which case it is referred to as a rectifier, as its function in this case is called rectification. It is still a diode, we find them doing this type of work for us in our battery chargers.

Diodes come in a number of different packages, and in many sizes. Generally, the larger they are, the more power handling capability they have, but most of the ones you will be seeing are no larger than a half-inch long, and usually smaller. Electrically, they have an anode, and a cathode, which determines the one way action, and they must be connected properly. When installing one, *always* check that it is going the proper way. If you are working up your own experimental circuit, you need only to remember that if AC is applied to the anode, you'll have positive DC at the cathode, and vice versa. In a DC circuit, if DC is applied to the anode, conduction will take place, and you will have current at the cathode. If the diode is reversed, there will not be any voltage on the opposite side.

Diodes are rated as to their P.I.V. (Peak Inverse Voltage), which is the maximum voltage they can withstand, and current carrying capacity. Until you get into charger circuits, most of our applications are well within the limitations of most diodes. In chargers, obviously, the diodes must be capable of handling the voltage and current requirements of the circuit. We work with relatively low values, so again, most diodes intended to be used as rectifiers are more than adequate, though it is still a good idea to check the ratings.

Basically, there are two types of diodes that you will run into, germanium and silicon. These names are in reference to the materials from which they are made, which gives them some slightly different characteristics. Silicon diodes are in much greater use, but you should always use the type specified.

Then there is the LED, whose complete name is Light Emitting Diode. The name tells the whole story, it is basically a diode, with the additional capability of emitting visible light when the proper voltage and current are applied. It has all the other features, one-way, polarity, etc., and must be installed and treated as any other diode. We mostly see them as charge indicators, though they also appear in some test circuits.

On the subject of test circuits, testing diodes is a very simple matter, requiring only an ohmmeter set at the lowest range. Read the resistance of the diode, then reverse the test leads and read it again. If you read a great difference, such as 10 to 15 ohms in one direction and no reading in the other, the diode is good. Low readings in both directions indicates a shorted diode, two high readings indicates an open one. Use only diodes with a definite differential in resistance.

One more diode must be mentioned, the Zener diode, whose function is to provide voltage regulation. They are polarized just as any diode is, etc., and are further manufactured to respond to a specific voltage, which determines which one is chosen for a certain function. Physically, they resemble all other diodes, though the schematic symbol is different.

That's it in a nutshell. Though it barely scratches the surface, this is what you can expect to find, and what you should keep an eye out for, in your work with R/C equipment and accessories.

METRICS

My recent trip to Europe, which you will be reading about elsewhere in this issue, brought to mind very strongly our slow conversion to the metric system of measurement. I don't believe that anyone who compares the two systems can disagree as to the advantage of metrics, though it is difficult for those of us who grew up with inches and feet to convert, primarily because we do not have a mental picture of a meter, or one of its multiples or sub-multiples, as we do of

an inch, foot, etc.

The whole process might become *easier* for you if you will only remember that a meter, by international standards, is equivalent to 1.65076373×10^6 wavelengths (in a vacuum) of the radiation corresponding to the transition between the levels $2p_{10}$ and $5d_5$ of the Krypton 86 atom. Bye! •

Plug Sparks . . . *Continued from page 37*

ground to five ten-thousandths oversize and then lapped with the cylinder, making sure the piston was of harder steel than the cylinder.

Also made of steel are the connecting rod and the crankshaft. Lindberg recommended the crankshaft be hardened (after the flats are fitted for the breaker points) and ground to suit the crankcase. The crankpin is simply riveted or screwed into the crankshaft counterweight flange.

Probably the biggest problem facing the neophyte machinist was the handling and machining of the crankcase casting. Chucking it in the lathe for the initial drilling and back cover work goes fairly easy. To drill and tap the top of the crankcase to accept the cylinder would require a method of holding the crankcase. Lindberg recommended using an angle plate to bolt to the crankcase holes. This portion of the work is accomplished after the crankcase bearing is pressed in place.

Regardless of the foregoing, the Hornet was a good home project for learning about internal combustion engines. It's just a shame that Lindberg didn't think to provide casting kits for this motor.

As pointed out previously in the Simplex Hornet article, the Hornet A was not truly a Class A engine as its 5/8-inch bore and 3/4-inch stroke gave it approximately a .22 cu. in. displacement, a bit large for Class A with its limitation of .199 cu. in.

Figures on the running ability of the engine are quite sparse. Ten-thousand rpm was claimed, but no propeller size was indicated. John Morrill, manufacturer of the Simplex Hornet claims better figures than this for his engine. John does indicate that the Hornet as designed would have problems getting up to the 9,000 to 10,000 rpm mark.

The particular Hornet engine we drew the plans from weighs in at five ounces, a very respectable weight for a small engine.

It also might be worth noting that the Hornet articles were among the last done by Paul Lindberg for *Popular Aviation*. That darn war ruined more darn good magazines!

CONTROL LINE AT MAAA NATS

Here was a great group of fellows, in spite of the fact that old timer control line stunt has not really caught on as yet in Australia. The big O/T C/L spark plug over there is David Axon, the Official Registrar who was acting as the MAAA President in the absence of Dr. Bob Allen (who was with his wife during childbirth).

Dave is one of those fellows who people naturally gravitate to. Directly after the Annual Steak Fry when the wind and impending rain were ruining the fun, all were invited to his large tent/awning adjoining the trailer. Naturally, Monty and I attended this funfest consisting of jokes, gags, and plenty of good beer.

After about an hour, one of the club members came in and excitedly announced that their club banner had been stolen. It appears that the custom in the trailer park is for all C/L clubs to post their club flag prominently at their particular trailer(s). The object then is to try to collect your rival's flag. Of course, this assumes that you don't lose your own in the interim, necessitating an exchange of flags.

Upon hearing the news, Axon tore out of the tent like a shot. Luckily he was able to spot the culprits, and in less than 15 minutes the prized club flag was again flying at full-mast.

Shortly thereafter, another group of modelers came over just as the New Year arrived. In the course of all the good wishes and hilarity, I raised my eyes to spot the club flag in place. This would be the perfect time for them to steal the flag, I thought. I was offered a beer, and

in less than five minutes, I again looked up and the flag was gone!

This time, despite all searches, threats, and cajoling, the flag remained unfound. Axon took quite a ribbing from the rival clubs and from his own club members.

Then came the night of the Annual Auction (these Australians have something cooking every night of the Nationals). Monty Tyrrell was the auctioneer. Numerous packaged items were sold. Finally, one mysterious package was brought out, and Dave Axon was induced to bid on it. Naturally, the fix was on, and Dave "won" the bidding for the package. Upon opening it in front of the assembled group in the hall, the package contained the long lost club flag! More darn fun! Dave had actually bought back his own flag!

Regardless of what anyone else says about control line, these boys are a good group. They have to be, as they are always in close contact around the field. Photo No. 5 shows the winning twin engine Douglas DC-3. Actually, the one who should have won the multi-engine event was Monty Tyrrell and his venerable Boeing B-17 of many years.

"Helper" Pond was on hand again to assist (?) Monty start all engines and get the model into the air. During the starting of the engines, one appeared to be a little out of "sync", so Pond started to needle the the recalcitrant engine. Naturally, a finger got in the way and was badly cut. Did our hero Tyrrell ask if Pond was all right? No! He simply exclaimed, "You bloody A! You stopped the engine!" With sympathy the only thing you can find in the dictionary, nothing to do but wrap up the cut and get the motor started. The grass proved the undoing of the B17 as it was not cut close enough to allow the model to gain speed. Then too, one of the tanks sprung a leak and absolutely refused to stay full long enough for all four engines to get the model airborne. We wuz robbed! (again!)

One thing can be said for control line, it does attract the younger set to it as can be seen in Photo No. 6. One unknown young modeler is about to launch his profile racer. To this writer, control line flying is the greatest way to learn how to start and run motors. You can really develop an ear for a motor set too "lean".

R/C SCALE

Backing up a bit to Monster Scale (where Monty Tyrrell flew his Norseman), Photo No. 7 shows the winner of that event, Frank Curzon. Frank did his homework for this event as he had improved remarkably in his flying technique from four years ago.

Despite the heavy wind, Frank was able to control the model to the extent that he garnered enough flying points (to augment the scale points) to make him a winner.

Note the large crowd in the background. The Flying Scale events always draw large crowds no matter where (in this case, out in the rural area). The sight of scale replicas of full-size aircraft has an amazing magnetic effect on people.

FOUL-UP NO. 1

Whadya mean number one? This 10-day saga was one after another! Tony Farnan, a well-known Australian modeler and now distributor for OS engines, made a date to be picked up by Monty at the Horsham airport.

The arrangement was for Tony to call us at the motel and let us know when he was leaving. Monty failed to receive a message, so he promptly called Farnan to find out what his status was, only to discover he had already left. Still no word from Farnan. Matter of fact, we never did see him.

Upon returning to Melbourne after the Nats, Monty contacted Tony at his place of business. It turned out that Tony had flown up on a charter plane, landing at a different location. Upon arriving at the Nationals, he claims that he took a flock of photos and went back to work, completely missing the gang. How we ever missed him I don't know, but we sure did suspect he was pulling our leg.

Anyway, as can be seen in Photo No. 8, Tony and his son showed us around his establishment. His spare parts setup was just tremendous as was his display room where this photo was taken. We all went to dinner (lunch time to us Americans) and thoroughly enjoyed ourselves for four hours. Needless to say, the beer flowed in copious amounts!

STAND-OFF FLYING SCALE

Probably the most fun in this event came from watching Ford Lloyd and his partner, Max Nichols, set up the models for judging in stand-off scale. No question about it, Ford did a good job in judging, but the gymnastics he went through to get the proper perspective was highly entertaining. Ford was thoroughly ribbed at the Red Lion (local pub/restaurant) that night.

Incidentally, for those modelers who have never attended a meet in Australia, the outlying towns such as Horsham offer meals at extremely reasonable rates. This year, as was at Camperdown four years ago, the favorite order of this writer was pepper steak at $4. Try getting a dinner for that price anywhere!

Flying Scale is always fun to watch, particularly Stand-Off which always draws between 30 and 40 entries. If you don't think the O/T flying scale events are popular at the SAM Champs, then you have another guess coming!

For some of the following photos we are indebted to Tony Farnan who really did attend the Nats and take photos. The first is a Supermarine Sea Fury built by Norman Bell of the MARCS Club (Melbourne area). Photo No. 9 shows Norm's beautiful Sea Fury at the Nats. His static score was a bit low, so he was unable to place in the first three.

Now we come to the piece de resistance, Photo No. 10 showing Monty Tyrrell's scratch-built DH Fox Moth. This model flies exceptionally well, and the wind did not handicap its performance one whit.

Unfortunately, I was unable to "assist" Monty Tyrrell during this time as I was competing in the Unlimited Rubber Event. However, Monty recounts his official flight as follows:

"Everything was working like a gem for a change; the motor started easily, tuned well, and the model taxied well under low power. 'This is going to be it!' I thought.

"The pattern flying went excellently as the Fox Moth was slightly overpowered, hence the high winds had only a marginal effect on its performance.

"I completed the pattern, made a super landing, then taxied across the field to the judges, brought the model up to a stop, and killed the motor. Then I announced, 'Gentlemen, landing and taxi maneuver completed'.

"The judges stared back at me until one of the judges gravely nodded his head and said, 'Very impressive. However, your group of judges are down at the next table.' "

What can you say, we wuz robbed again!

Incidentally, if the readers are interested in this particular model, the writer has the rough sketches with which to base a plan and an article for a possible feature in **Model Builder**. One thing for sure, this size model (about 5 ft. wingspan) is not going to require an arm and a leg to purchase all building materials.

Some interesting things were gleaned from Monty pertaining to the construction of his motor. He reveals that the

cylinders were made from wine bottle corks. It seems when Monty was building the model and casting for methods to build the exposed radial engine that he noticed the cork in his wine bottle. Geez! it was exactly the right diameter.

As Monty remarked, "It was a good thing I could only put seven of the nine cylinders on, as I was having a tough time building while drinking all that wine." Tyrrell is a very practical modeler!

Probably the saddest thing that happened later in the afternoon was the end of a superb flight by David Hull of Victoria, who was flying his twin-motor Westland Whirlwind all done up in World War II colors. Dave brought the model in for a long, "hot" glide, landed smoothly, but did not turn it. The net result was the model plowed into a steel pole which formed part of the restraining cable for the spectators. Photo No. 11 shows the sorry state of the Whirlwind. Dave sez he will build another.

FORMULA I COMPETITION

What! Formula I flying being reported in an old timer column?! This columnist looks at it from the standpoint that *all* model flying is fun, and it is always interesting to see what the other fellow is doing.

Photo No. 12 shows Ranjit Phelan of New South Wales who was heavily favored to win the Formula I race. However, he did get off a lean run during one of his heats and that effectively did in his engine.

In talking to Ranjit later on, it came out that he provides a service for reworking engines. Upon asking the price, it turns out a good hopped-up engine will cost you $300, a figure very comparable to USA motors.

Photo No. 13 shows a typical lineup of Formula I racers. Inspection of the models appears to indicate their designs are a little dated when compared to American counterparts. That may be, but the boys were still putting up creditable speeds in that blasted wind.

Actually, when you come right down to it, modelers are modelers, and they are always willing to talk about their models, engines, and flying. One can get a real education in motors just touring the other half of modeling (the first half is old timers, natch!).

SAM 35 YEARBOOK

Although definitely not a part of this report on Australian activities, the SAM 35 Yearbook is now available. Needless to say, David Baker has outdone himself again in producing a softbound book very similar in style and presentation to the old Zaic Yearbooks.

The price in American exchange is $7 which includes postage. This desirous book can be obtained by writing to David Baker, 22 Ellington Rd., Muswell Hill, London N10, England.

For those who are still hesitating, the book contains numerous old three-views, construction drawings, and many sketches of models heretofore never published. No true old timer should be without one!

While we are at it, we are publishing Photo No. 14 which shows the new Chairman of SAM 35, Vic Dubery, proxy flying an old time Wakefield model known as the Cloud Clipper. Couldn't have picked a better man to fly this model as Vic has been a member on numerous Wakefield Teams representing Great Britain. SAM 35 is lucky to have this man!

BURFORD ENGINE

True to his promise, Gordon Burford did send parts to a Deezil. He is proposing to manufacture an initial lot of 500 engines. What was received was two crankcases on a sprue which would make an excellent paperweight. (The shape is right for standing upright.) See the April 1982 **Model Builder** for a write-up on the Deezil engine.

Those interested in obtaining an engine(s) (especially collectors) should write to Gordon Burford, 86 Tierney Dr., Currembira, Queensland 4223, Australia, for particulars, possible price, and ordering instructions. Burford has always made an excellent product, so you will find you are not buying a pig in a poke!

Also, for those who are interested in the "Sesqui" engine as produced by Ivor Stowe (Ivor F), write to Ivor F, Box 11, Doonside N.S.W. 2767, Australia. Ivor will be the first to tell you that he would never have made it without Gordon's

guidance and help. These "new" engines may be just the thing you are looking for to power your favorite old timer.

THE WRAP-UP

If you think this description of my escapades in Australia was hilarious, wait until you see Part II, the free flight section. With the darndest winds you would ever want to cope with, the flying went on unabated. This writer has flown in the wind many times, but every day!?! There were a flock of crackups! Stay tuned! •

BIG Birds . . . . *Continued from page 41*

many of you guys have asked for this kind of guidance, here are some sketches and text that he "writ by hand."

"We are able to get six by eight foot sheets of the stuff from a paper company in Hutchinson . . . a town about 60 miles from Wichita . . . at a cost of three dollars a sheet. It's similar to the stuff most kit manufacturers use in boxing up their kits. It is white on one side and brown on the other . . . that is, until you build it into an airplane and wreck it, then it is brown on both sides.

"The first thing you do is draw out a side view of the fuselage (I'll explain the easy-to-build box fuse as in sketch No. 1). The top of the fuse side should be used as a zero reference line and everything should be measured from there . . . especially the incidence. If you use a six-inch firewall, the Quadra will fit nicely, and for those readers who don't know, the Quadra prefers to be mounted upside down *(as do most other gas engines . . . aa).*

"You also must know what airfoil you are going to use and have a plywood airfoil template already cut out. I recommend the NACA 2416, which is a nice semi-symmetrical section; it allows you to flip upside down and thrill the troops without needing a lot of down elevator *(I also like the 2415. aa)* . . . and it's fat enough to float in for a very slow, flaired landing. When making the template, remember, after you cover the wing with cardboard, its thickness will increase to about 16-1/2 to 17 percent . . . which is still on the maximum lift upswing.

"Next, draw off the bottom of the fuselage as shown in sketch No. 2. Using the bottom rear line of the fuselage side as reference, square off from that by using (of all things) a good square. From the trailing edge of the wing, drop down about five inches and from that point draw a line to the rear of the aircraft. The aft end will be about a half inch wide . . . or it can be one inch if you prefer. Actually, this width will be determined by how wide you want the fuse at the firewall.

"So now you have the bottom (aft end only) drawn. Use the last line drawn as a reference to establish fuselage No. 2 . . . again squaring from that line. Except for the first line drawn, most of the others square off of the last line, or bottom, of the fuse. Now, if you prefer, you can go ahead and draw in a top . . . but we usually cut it later as one separate piece, and make it fit whatever we end up with. Note the forward part of the fuse bottom has to be joined at the center. This is no problem. Just butt them together and use white glue or epoxy, as the entire front section will be doubled anyway . . . from the inside.

"Remembered something you should have known from the start . . . that I prefer to run the flutes (corrugations) lengthwise simply because I think it looks better, but the other way will work fine, too. On drawing No. 3, I've shown the location of the doublers with dotted lines. Basically, you run the flutes perpendicular to those in the fuselage sides. The entire front half of the fuselage is doubled, as well as the tail section. Then use 3/8 or 1/2-inch triangular stock lengthwise on all folds, top and bottom, as well as behind the firewall. This design is nothing classy, just a long ice cream cone (or baseball bat), but it is strong!

As with any other model, you have to fuel proof the front section all the way back to just past the T.E. of the wing. Use epoxy or resin. Any open flutes around the wing area can be filled with caulking. Generally, white glue works pretty well for gluing cardboard together. When doubling, I usually punch holes in

the mating sides so that the glue will form little nails which really insure structural integrity.

"Oops . . . wait a minute . . . I forgot to tell you how I fold the darned stuff. At the fold lines, I prefer to cut through (score) the inner paper using an Uber Skiver and a ruler so the cut is clean and straight. *Only cut the inner side!* Then, smush it down hard with the backside of a Stanley knife or the handle of a screwdriver. This flattens all the flutes in the area of the cut so you get a good, quick, and accurate fold.

"Now, if you want more than a flat top, cut out some rounded formers for the top. Make a design to your liking, then cut the formers out of either cardboard or foamboard. The rounded top can be covered with what we call posterboard, which is just plain ol' regular cardboard that has no flutes . . . like the kind your kids use in school. If this doesn't appeal to you, use anything you feel comfortable with; both Mooney No. 1 and No. 2 used balsa.

"For the horizontal and vertical stabs we just cut out the desired shape, and then ran a 1/4-inch square spar lengthwise, top and bottom, about 30 percent back from the leading edge. This will give you a kind of diamond airfoil. Cover the exposed edges with balsa about a 1/4 inch thick by whatever height is necessary. This gives you wood to stuff the hinges into. Fill in joints between balsa and cardboard with spackling.

The size of the stab, of course, is a certain percentage of the wing area . . . if you use an 18 inch chord by 90 to 100 inch span, you'll need a vertical of about 11 inches high by 9 inches wide (average). The horizontal should be about 9 inches by 30 (again, average chord). Make them any ol' shape that pleases you, but try to keep the area. By using the diamond airfoil, you'll be amazed at the torsional rigidity as well as the overall strength versus weight that you can achieve.

"Okay . . . let's hit the wing. We're going to use strip ailerons on your first monster. Make up ribs out of 3/4-inch thick blue insulation foam (first choice), or foamboard (second choice), or cardboard (third choice). Any will work fine. We will have only one I-beam spar in each wing panel (1/4 x 1/2 spruce caps) located about a third of the wing chord back from the leading edge. Space ribs about 5 inches apart, except toward the the root where they should be just three inches apart.

"If you put the landing gear in the wing, then cut out a piece of 1/4-inch ply about an inch and a quarter wide by about nine inches long, and notch out the bottom of however many ribs need notching to accept it. Install this ply piece so that either its front or back butts against the spar, and so that it starts and ends on a rib. *(However the ply plate is installed in relation to the spar, make sure the mains are angled so that your wheels are properly positioned: for a taildragger the wheel axles should be directly under the wing leading edge, and for training wh. . . oops, I mean tricycle gear, they should be about an inch aft of the balance point . . . and don't forget some toe-in . . . aa)* At the ends of the L.G. block, and at the ribs, make 1/16 ply gluing plates. Cut out several gluing plates to fit around the L.G. block and next to the ribs. This way you are gaining structural integrity in the rib and L.G. block assembly so it won't twist out of the wing. And if you do it this way . . . *it won't.*

"Now you must establish the dihedral. I recommend about three or four inches under each tip (but whatever looks right to you is okay). The most important key to achieving an indestructable wing is to get *the roots to mate properly;* it must be a perfect butt joint, with *no airgaps anywhere!* Believe it as the gospel, because over a dozen wings have been made this way and have *never* had a wing failure! The spars simply butt together. *You don't need a dihedral brace!* I know that some guys won't believe that . . . so go ahead and make your plane heavier by putting in a brace with all that epoxy (yuk).

Of course, you must run vertical webbing between all the ribs (with the possible exception of the outer two or three). Vertical webbing has been made from plywood, fluted cardboard, and foamboard, and all work equally well. Install the webbing so it's between the spar caps and makes an I-beam section. Cap off the T.E. at the aileron gap with balsa that is thick enough to hold a

hinge. The ailerons are made from cardboard (fluted) that is doubled over itself and glued together.

"Cover the wing with cardboard, making sure the flutes run spanwise. Lay out a piece big enough to wrap completely around the wing panel. The brown side is made from a lesser quality paper, so take a wet rag and dampen the entire sheet on this brown side. Get it fairly wet, let it sit for a few minutes, and then try tearing off some of it . . . which should come right off. If it doesn't, then try the opposite end. One corner or the other will peel right off, and you just strip all the brown paper off and throw it away. If it gets too wet, or sits too long, then the whole sheet will come apart . . . flutes and all. After you get the brown paper off, you'll see just how easily it will wrap around a wing or any other surface or form. Glue it down using moderate amounts of epoxy on the ribs; get the entire width of the rib coated with glue. After both wing panels are in this shape and covered, you then epoxy them together at the root with slow cure epoxy.

"When set, take the wing and whack it on the floor by holding onto one tip and smacking the other tip smartly. If you hear a 'crack!' take it apart, and this time make sure the root ribs mate perfectly. Next, wrap the joint with fiberglass . . . the same weight cloth used to repair auto bodies with, taking the fiberglass out about an inch beyond where the sides of the fuse will mate with the wing.

"That's it. It's all done but the paint, and you've only invested about a month of time, and 5 bucks in material, and maybe $20 in glue.

"OOPS! I almost forgot about the firewall. The firewall needs to be half-inch ply. Just butt it up against the front and epoxy it on. If you want a cowl, then tack glue a block of foam to the firewall, sand it to shape, cover it with Saran Wrap (extending the wrap onto the fuse), and then wrap it with fiberglass and resin. You then sand, and sand, and sand, and . . . then you prime and sand, and prime and sand, and . . . well, I'm sure you get the idea. Due to the Saran Wrap and the tack glue joint, the foam block will pop right off the fuse, and the 'glass cowl will come right off the foam block.

"If you build one just like this, you're gonna flip your gourd over how great it flies with zero-zero incidence . . . well, maybe one degree positive in the wing.

"Okay, now for your next set of questions. . . The Tartan Twin came glow and remains glow . . . 1-1/2 to two ounces per minute fuel consumption . . . fuel is methanol and seven percent oil . . . no nitro, so fuel is cheap. I have had the opportunity to run the single Tartan also. I find it equally as nice to start as the twin, and it has a ton of power for only 1.3 cubes . . . and it's smooth!

"After building two cardboard BIG Birds, I can really appreciate this material for model construction . . . but I'm not as fanatical about it as some."

So there it is, guys. Between Marv's words of wisdom and his sketches, anyone should be able to turn out a good-flying cardboard birdie. I'd appreciate hearing from anyone who does build one using this technique, and so would Marvin. And don't forget some pix to go along with the letter!

RETURN OF THE HUSTLER

Ol' flying buddy, Al Willaert (A&M Aircraft Supply, 1801 S. Crest, Carrollton, TX 75006) wants everyone to know that he's now taken over the Hustler engine . . . and that besides getting the new "A&M Hustler" on the market by May, his first order of business is to get all of the boxed-up Hustlers back to their proper owners. Most of the engines/boxes had names and addresses . . . but some did not. So if you haven't heard from Al by now about your long-lost Hustler, do write or call him so that you and your errant engine can be reunited.

DGA DESIGNS

These guys do mighty fine work, as those of you who've bought a set of their "Davis D1K" plans know. Not only are their plans a joy to behold, but so are their designs as they put quite a bit of airtime on their prototypes to insure that we get our money's worth. Well, I just received two of their new goodies: the first being the Kinner Sportster plans . . . and the second being the real surprise, a great "BIG Bird" pilot's bust made out of latex; it's outstanding.

Dave Reid's work on the Kinner was a labor of love, of this there's no doubt. As he's had a full-size Kinner to work from, this has allowed him to turn out a *very* scale aircraft. As you can see from the pic, the Kinner is beautiful . . . and she flies every bit as good as she looks. If you're searching for a different looking, but excellent flying sport machine, one that will respond well with a Quadra up front, and one that's got more "character" than most, send for your set of plans, pronto.

As for their three inch pilot . . . well, he's different from anything I've seen so far. The pilot, his "leather" jacket, his flying helmet, his goggles, and his red baseball cap are all made from latex . . . and the instructions even tell how to make "official looking" sunglasses to go along with the baseball cap when he's flying private aircraft. By adding a small piece of white material around his neck when he's dressed in his leather jacket, helmet and goggles, the intrepid latex pilot becomes a WW-I Ace.

This guy's not a shiny-faced, bug-eyed-looking yahoo like the plastic pilots we're all so accustomed to. He's got some wrinkles and character lines, and his skin has texture . . . along with a somewhat large nose. He's easy to color (he's already got a great looking flesh color): just use some of your gal's liquid makeup and voila . . . a superb looking pilot.

You can position this latex pilot at any angle inside his jacket so that he doesn't have to stare stupidly straight ahead. He is not a full-figured pilot (sounds like a Jane Russell commercial) . . . he's just a bust (oops), but one helluva good

looking one, and will easily be worth the $11.95 DGA plans on marketing it for. At some later date DGA also plans to come out with two and four-inch sizes.

Here's their address: DGA Designs, 135 E. Main St., Phelps, NY 14532 . . . and tell 'em BIG Al sent ya!

SECOND ANNUAL NORTHWEST MODEL EXPOSITION

They've needed something to fill the mid-winter void up in this part of the country, and hobby shop owner Bob Pfieffer knew it. So, Bob and the Mt. Rainier Radio Control Society started this expo bit. I wasn't around for the first one back in February '82, but I'm told it started off well, and with the lessons learned in '82, Bob and the Mt. Rainier gang did a great job for 1983. This year there was a 60 percent increase in manufacturer's displays, and a healthy 35 percent increase in spectators. The NME will continue to be held every year on the first weekend in February, right here in the Puyallup Fairgrounds, for an indefinite period of time to come. Y'see, Bob has that first weekend reserved till sometime after the year 2000.

Anyhoooo . . . BIG Birds were there in force. I didn't count how many of them were on display, but it was a very impressive number . . . and the workmanship was better than ever. It was a mixed bag of designs, many still being scratch-built, like the Kawasaki-powered Shoestring (Goldberg had a great kit some years ago; a BIG version, like this one by Bob Siegelkoff, should be a fantastic flyer), and the Spinks Akromaster (which Bob bought after the show ended). I'll be sprinkling in pix of the expo's BIG Birds in the next few columns, although you might want to check last issue's "R/C World" for Bill Northrop's coverage of the big show. When he wasn't in a corner of the **Model Builder** booth falling asleep, Bill was busy taking a bunch of pictures. Actually, this was the very first time that he and I had met . . . and now I know why he frequently runs photos of himself back when he was barely past the age of puberty.

Probably the wildest and most unexpected testimonial I've ever heard for any product came while Bill and I were in the booth . . . it was for the Uber Skiver knives. I had planned on a small separate blurb about the Uber because it's turned out to be such a great tool (as those of us who use it know. . .), but then I figured I'd just as well include it here. The story goes like this. . . After her husband bought some replacement blades for his Uber Skiver and mentioned how well he liked the Uber as compared to "Brand X" (as most do), this housewife up and tells us: "This knife of yours is absolutely the greatest! I haven't been able to find anything nearly as sharp and as easy to handle for castrating our pigs. Thanks for making a nasty chore so much easier!"

And she's right, y'know. This knife does make any job a lot easier, and for a number of reasons. First, it's a whole lot safer because you never have to expose your precious fingers to the blade when tightening it as you do when tightening "Brand X." The Uber has a *SAFE*, rear draw-bar clutch that eliminates any possibility of cuts or nicks. Second, in addition to this rear clutch, the collet design really holds the blade in place. With "Brand X" the blade frequently wobbles and comes loose, presenting an additional hazard to your fingers. Third, and still on the safety kick, the handle's hexagonal cross-section keeps it from rolling around on the workbench, or off of the workbench and into your foot. Fourth, the blades are about four to five thousandths thinner, and are made of *stainless surgical steel;* they are sharper coming out of their containers, they strop easier, and they hold that great edge much longer. And fifth, but by no means the least important reason for using Ubers is that you have a choice of bright, easy-to-see colors which helps eliminate lost time while trying to find the knife on a cluttered tabletop (is there any other kind?). I can easily find my violet (passionate purple?) Uber. Your knife and nine, vial-packaged blades (see pic) come neatly packaged in a foam padded, guaranteed real wood box . . . none of this plastic stuff.

So, even if you don't have any pigs to neuter, you'll find that the Uber Skiver will do the job faster and easier, and that intricate work will be much more enjoyable. Yeah, I did get mine gratis (it was a Channukah present), but that's not the point; it is a superior tool, and, like the other tools I've mentioned, it deserves to be brought to your attention. It's definitely affordable (see the ad for Uber Skiver in this issue), and most definitely a "better mousetrap."

IMAA'S '83 FLY-IN FESTIVAL

Don't let time run out for you and your chances to be part of this premier BIG Bird get-together. Because of the expected, humongous crowd, pilots MUST pre-register if they want to fly . . . and pre-registration closes on August 1. So don't dilly or dally! I have Festival brochures! A request, together with a stamped, self-addressed envelope, will get all the forms and info on their way back to you within 24 hours.

Here is some good news about the flying. . . Although you still can't expect to fly as often as you might back at your home field, the allocation of new frequencies has made two separate flight lines a reality . . . so, along with the comraderie and socializing, you should be able to get in a fair amount of stick time, too. (Some other problem areas that cropped up at the last Festival have also been taken care of. We try real hard!)

Remember, you do need current AMA and FCC tickets to able to fly . . . but you don't have to be an International Miniature Aircraft Association member, although you'll probably want to join before this four-day Festival is over (August 18-21).

ROC'S FIRST ANNUAL BIG BIRD BASH

If you live anywhere in the Northwest, set aside July 16 and 17 because the Puget Sound Rocs are sponsoring and hosting Washington's very first BIG Bird Fly-In. I have complete info packages available, so don't hesitate to send for one if you're thinking about, or planning on coming.

I'm the Fly-In Director, and I know that everything possible is being done to make this a G-R-E-A-T fly-in. As the Rocs are an IMAA Chapter, this two day affair will be run in accordance with IMAA rules and guidelines. In other words, this will be the typical uncontest, no-prize (except for the flier who comes the farthest), relaxed fly-in that BIG Bird People prefer . . . which gives everyone a good chance to meet old friends and

make new friends, to see what the other guys are building and flying . . . and to find out how to do some things a lot better. You'll be able to fly as much as you want to, (or not fly at all and just show your new bird) as our new frequency control board includes all of the newly allotted frequencies.

Bring as many BIG Birds as you want to . . . the Mt. Rainier Club Field (known to many as "Hog Hollow") is big and roomy, *and there's not going to be any registration fee!* You'll have a fantastic view of Mt. Rainier from the field, so bring lots of film. We also have on-site, plug-in capability for a dozen RVs or campers, and restroom facilities. A six-channel radio will be raffled off, and throughout both days mucho door prizes will be awarded to the lucky pilots . . . *and* we're gonna have good eats available at my kind of prices.

You're not going to want to miss this "Rocs First Annual BIG Bird Bash." You won't have to be an IMAA member to enjoy yourself, but you are gonna need current AMA and FCC licenses because we are both AMA and IMAA sanctioned. Also, please keep in mind that every aircraft scheduled to fly will undergo the IMAA Airworthiness Inspection, and that there will be *NO* test flying of any BIG Bird during those two days.

Seeya in July. . .

1983 QSAA FLY-IN

If you're planning on attending the QSAA happening, you'd better get crackin' because the fly-in will only be open to the first 200 airplanes . . . pre-registration only! A reminder from Pat Bunker that, "Birds must be quarter-scale or larger, same as in previous years, and all planes must have been flown before the fly-in."

WHAT — The 1983 Quarter Scale Association of America Fly-In.

WHEN — October 27, 28, 29 and 30. Banquet, Saturday night, October 29.

WHERE — Flying at the dry lake, static display at the Showboat Hotel, Las Vegas, Nevada.

WHO TO CONTACT — Pat Bunker, QSAA Secretary, 6532 Bourbon Way, Las Vegas, NV 89107, (702) 870-6076.

TIP OF THE MONTH

"Never, ever, eat prunes when you're famished!"

Al Alman, 2713 Alderbrook Court, N., Puyallup, WA 98373. Keep up the good input, guys . . . I do appreciate it . . . and don't ever forget that . . . FLYING SAFETY IS NO ACCIDENT. •

Choppers . . . . *Continued from page 43*

whole tail rotor drive gear and bearing assembly must be a smooth fit between the side frames. Sliding the assembly in place and inserting the mounting bolts without nuts usually works well.

Rotate the tail rotor drive shaft wire, and let it set the alignment of the tail rotor coupler and bearings. Notice that the mesh of the tail rotor gear and main gear is of *no consequence* at this point. (I even drop the main shaft with gear down and out of the way so I'm sure that the gear mesh doesn't interfere with the drive shaft alignment.) Once the tail rotor drive shaft is aligned with the bearings and gear, I tighten the mounting bolts to lock the assembly in place.

The final step is to *adjust the main shaft with gear up or down to set the mesh for the tail rotor drive gear.* This may require a thin brass shim or two between the main gear and lower main shaft bearing if the fit is too tight. (See, the extra brass shim material has come in handy already . . .) If you feel just the slightest bit of play between the two gears (when they are set at the tightest point on the main gear's circumfrence) the mesh is correct. No play can generate vibration and too much play will wear out the gears prematurely.

To recap the whole process so you don't miss the major points:

1) Engine mounting screws finger tight.
2) "Bottom" clutch bearing in place.
3) Tighten engine mounting screws.
4) "Top" clutch bearing in place.
5) Set mesh of main gear to engine by moving main gear slightly.
6) Install tail rotor drive shaft to coupler and let drive shaft set tail rotor drive gear assembly.
7) Adjust main gear up or down to set proper mesh with tail drive gear.

Re-read the whole process again if it didn't make sense the first time. After you can visualize what's happening, I think you'll agree that each step flows into the next, with the whole method giving a superbly aligned drive system.

In the next few months some interesting reviews will be coming up: The new gasoline-powered Hughes 300 from California Model Imports will excite those of you who have always wanted a Kioritz powered helicopter. Shortly thereafter a close, in depth look at GMP's new flag ship, the Competitor. Hope to see you then. •

R/C Boats . . . . *Continued from page 47*

in the same lane. It's a real experience to drive this type of boat.

Besides the boat and hardware kit, Fisher Boats is also offering an epoxy fiberglass radio box. The box was designed to be used in the 40-60 Canard, but it could also be used in any type of model boating application calling for a radio box. The cost of the radio box and all the necessary fittings, cover, and gasket is $28.95. The radio box comes as a kit, and it is necessary to glue the lid mount to the box and drill the holes for the lid fasteners and pushrod seals.

After reviewing my notes about the Fisher Boats 40-60 Canard, I see there are a few things I forgot to mention. The 40-powered version can be set up race-ready for under seven pounds. Ed's

record holding 40 weighs six pounds, 12 ounces. When he stuffs his OPS 65 in the boat, the weight goes to seven pounds, four ounces. Fuel tanks are not provided, but standard Sullivan tanks can be used in tandem.

I've had the opportunity to watch the development of the canard model design because Ed Fisher lives in my neck of the woods. Regardless of what one might think about the appearance of the boat, the achievements of Ed Fisher's canard hydroplanes are documented by records and national championships. For the model boater willing to pay the price for excellence in design and construction, this outstanding model is now available.

HOW FAST IS THAT?

Arlid Melang of the Seattle Model Yacht Club, ran out an average speed chart for the NAMBA .9 mile oval. In oval racing, we set records in seconds. It is interesting to see what the various times average out to in miles per hour. As we were discussing Ed Fisher's 40-60 Canard, let's see how his 40 and 60 NAMBA records equate in miles per hour. In 40 Hydroplane, Ed's record is 1:14 which comes out to 43.78 mph average. Ed's 60 Hydroplane record of 1:11 works out to a 45.63 mph average. Many of us 20 tunnel racers feel we've done well when we can get close to the two-minute mark with our 20 tunnels. A two-minute clocking on the .9 oval would render a 27 mph average.

Anyone interested in obtaining a copy of this speed chart can send me a stamped, self-addressed envelope, and I'll gladly send him or her a copy.

A READER WRITES

"Dear Mr. Dunlap,

"Thought I would send you a picture of my boat, a Dumas 'glass Hotshot 21. I have added a few things to the boat for better performance. The engine is still stock, except I added a header pipe to allow it to breathe more freely. I extended the cowl to improve its looks and aerodynamics. I have also added Aeromarine trim tabs. The boat uses the K&B Auto Trim. I have experimented with turnfins, and it is my opinion the boat needs one when riding loose on the water.

"I enjoyed your article on the Coyote 21. I hope to see more pictures when it's all finished. Have you ever thought of adding an Atlas Van Lines fin on the back to complete the cowl?

"I am interested in 20-class deep vees. I built a Prather 21 vee after reading your product review in the August 1980 **Model Builder**. *I have raced the boat, and I have placed fourth in high points in my club running with 40 and 60-size boats. What props have you run besides the G-22? I have tried J.G. F-22, G-22, H-25, and Octura 1240 and 1740. What about an Octura X440/3?*

"Bob Lafayette, Toledo, Ohio."

Thanks for the photo and information about your boat, Bob. I hope space will permit using the picture of your boat. I have finally gotten around to painting the 20 Coyote, but I haven't yet decided what to do for a cowl. Concerning the props for your 20 deep vee, I think the X440/3 from Octura is definitely worth a try. I might also recommend the Octura X442 and X445. We are running a slightly cut X445 on our 20 deep vee, and it's making the boat perform very well. The "slightly cut" means that the trailing edge of the prop has been cut away.

HEY JERRY, YOUR SPONSON EDGES DIDN'T WORK ON MY TUNNEL

This was the message I received at a club contest back in February from one of the local model boaters. It seems that this modeler did the things I suggested in the article, however, his boat wanted to hook in the corners as a result. He said he tried different motor settings, but he couldn't eliminate the hooking problems. He eventually gave up, trimmed the edges flush with the sponson sides, and put his turnfin back in place. I suppose this could be the case with others who may have tried the sponson edges after reading my article a few months back. I'd be interested in hearing from anyone who has tried the idea, as I am curious to find out the results they obtained.

Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

Pattern . . . . . *Continued from page 48*

paint was used anywhere.

Roger's model used conventional rounded block wingtips and a rear exhaust engine. It flew great! Mine used the scale-like slashed wingtips and a side exhaust engine. It flew great, until you hit the rudder. The model would then roll and dive. Changing the rudder to a taller shape did not help.

Finally, I glued some foam blocks to the wing tips and carved the blocks to a smooth round shape . . . the problem ceased immediately. I really never expected the slash tip design to create that much effective dihedral but apparently it's true. I'm not condemning the slash tip, I just didn't use it with the proper dihedral.

While we were test flying one day, a friendly radar patrolman offered to clock the models. Using a technique to reduce possible speed error, we determined the Dalotel could fly as quickly as 103 mph and as slowly (and reliably) as 24 mph! We didn't suspect the model's top speed would be over 100 mph, but we did suspect the 24 mph low end speed was really closer to 15 mph. The radar gun said otherwise, and these new guns are very accurate when properly used. SPEEDERS BEWARE!

The C.A.P. was not clocked, but it is no slouch . . . I guess 75 to 80 mph tops. I'll let you know.

Also, if all goes well, we will have some good info next month on the 1:9 gear box OS VF in a high performance (souped up) configuration in our number two C.A.P.

If you have any solid data on speeds . . . low or high speeds recorded for pattern models, please let us know and we will pass it on to our readers. •

Hannan . . . . . *Continued from page 50*

and wrote dozens of letters before seeing any useful results. The difficulties he encountered in trying to deal with large U.S. companies as compared to the ready cooperation received from a foreign concern is a sad commentary on the state of attitudes in today's American business world.

But Jim persisted, and finally succeeded in obtaining a quantity of blue carbon steel blades. In order to obtain them, he was required to order a very large quantity, and it seems unlikely that more will be available when these are gone. The price is $18 per hundred (sold in lots of 50 each only), postpaid.

Also available in limited quantity are the imported Leopard blades by Wilkinson. These are also carbon steel and very sharp, but not quite as rigid as the blue blades. These are priced at $6.63 per 100, plus 88 cents postage, from: Jim Jones ABS, 36631 Ledgestone Dr., Mt. Clemens, MI 48043.

A SIMPLE PROBLEM

"Design a plane"; the head men say,

It must be built in such a way
That the dumbest mug can fly hands-off,
Make the hardest landings still feel soft.

Make up for brains that the pilot lacks,
Make the seats lean forward and still
lean back.

It must be fast and not land hot,
(What a heckuva job the designers got).

Fast and light and comfortable, too,
With a cruising range to Timbuctoo,
Of course, this is no common hack,
But must carry the load of a ten-ton
Mack.

It must climb straight up and land
straight down,
But the pilot must scarcely feel the
ground.

And one last word the head men say,
"It's gotta be finished by yesterday."

On second thought there's one thing
more,
"They'll have to sell at the 10-cent store."

Author unknown, submitted by Dave Shipton of Hobby Hideaway.

OHIO, HOT-BED OF AVIATION

Frank Scott, of Dayton, favored us with a copy of *Ohio* magazine. While most of us are familiar with that state as being the home base of Wilbur and Orville Wright and the legendary Cleveland Air Races, but did you know about these other claims to fame? Ohio has been the place where the most aviation records were set, and is the home of the Wright-Patterson Air Force Museum. The state has 61 companies producing aircraft or parts today, and boasts 84 airports featuring hard-surfaced runways.

Among the more renowned aviators from Ohio have been Captain Eddie Rickenbacker (WW-I air ace and later head of Eastern Airlines); Buck Weaver (stunt flier and builder of WACO aircraft); Captain Don Gentile (WW-II air ace); General Curtiss LeMay (father of the Strategic Air Command); Colonel John H. Glenn (first American to orbit the earth); Donn F. Eisele (Apollo astronaut); and Neil A. Armstrong (first person to step on the moon)!

Hats off to Ohio and to Editor Robert B. Smith for tabulating this remarkable information.

MODEL CONTEST, 1910 STYLE

From reading most Old-Timer reports, one might conclude that all the early-era models were large, ungainly creations, hampered by lack of modern materials and knowledge. But such was certainly not always the case, as is clearly apparent from a contest report in *The Aero*, for June 14, 1910, from which we have abstracted the following: "A One-Ounce Model Competition." "Those who were present at the impromptu meeting held by sundry members of the Aero-Models Association on June 5 certainly received a very great and

agreeable surprise at the performance of the models flown."

"Flights of anything under a hundred yards were practically unnoticed, and the maximum flight was between 270 and 280 yards."

"This meeting was originally intended to take place in Richmond Park, but, with the intelligence for which our governing bodies are noted in the country, instructions have been issued that the flying of model aeroplanes is prohibited in all Royal Parks." *(Some things never change! wch)* "Consequently, the competitors had to adjourn to Ham Common, which is just outside Richmond Park, where, by taking up a position in the middle of the common, they were screened by gorse bushes from the main road, they were able to carry out their interesting tests comparatively undisturbed, though the gorse on the ground was not good for the models on landing, and set up most eccentric ground currents."

Listed were the participants and brief descriptions of their entries, including: Burge Webb (pusher-puller flying wing); W.G. Aston (contra-rotating prop canard); T.W.K. Clarke (three Clarke speed fliers); E.V. Twining (twin-prop monoplane); E.J. Poynter (fore and aft prop models); W.O. Manning and P.K. Turner (entries damaged during practice). These names are intriguing, as most of these individuals went on to gain fame in model and/or full-scale aviation.

The article concludes with this summary: "Those who spend much money on producing large and expensive models would have been rather sorry for themselves, we should imagine, if they had been able to see the splendid flights made by these tiny machines on this occasion. None of them were freak machines in any way, but were simply the outcome of a combination of good design frames, motors, and propellers, all reduced to the minimum weight and raised to the highest efficiency."

Well, here we are folks, some 70 plus years later, and still at it!

PEANUT TROPHIES

Ray Harland was kind enough to send us a photo of some custom cast trophies made by David Phillips, 88 Winslow Ave., Somerville, MA 02144. Made by employing real peanuts to create molds via the lost wax process, the metal castings are mounted on turned brass bases. David is considering production of more of these classy items, in the event any clubs may be interested.

RADIO CONTROLINE

Gordon Codding, 3724 John L. Ave., Kingman, AZ 86401 has been experimenting with a model control system which combines features of both R/C and C/L. The model is tethered in "G-line" fashion to a central post via a suitable swivel, and flies around in a circular path. The operator, however, stands outside this flight circle and operates the elevator (and throttle, if desired) via a standard R/C transmitter. As Codding puts it: "The system allows any flier to practice takeoff and landing technique, train beginners in R/C and C/L flying, or test new designs with greater safety to the model and personnel."

Gordon is also clearing out some of his collection of old models and accessories, and a stamped pre-addressed envelope will bring you information on them as well as his novel model control system.

WHAT TEST FLIGHTS!

John Blagg, of England, opines that arriving at any scale contest for small free flight models with untrimmed models is just part of the program: "After all, you have two chances, A) instant success, applause, and amazement from the onlookers; or B) nail-biting agonies, the shakes, and any amount of free advice from the onlookers you wish weren't there in the first place! At this point it is probably wiser to return your new, untested model to the boot of your car!"

HOW'S THAT AGAIN?

Abstracted from a translation of instructions for flying a French autogyro model, sent to the Hangar by Georges Chaulet: "All this can appear well complicated, but I reassure you here that it is. It is more easy, or less difficult in making flights with this type of model." Ah well. . .

SIGN OFF TIME

Ed Lockhart and Richard Miller teamed up with these parting thoughts for model builders: "As soon as you carefully put a tool away after using it on a project, it will be needed again, almost instantly"; and: "Model paint causes seams to crack." •

Peanut . . . . . *Continued from page 51*

area, so the model flies quite well.

So let's build the Wing Ding! First, find a soda straw that has the right diameter. Now, lay out the pattern of the fuselage forebody three times on a piece of 1/8th sheet balsa. Take your A-23 CO_2 engine and proceed to bend the tubes into the shape shown. Get a smooth dowel or piece of tubing to bend the loops around so that you do not get any kinks in the lines. Make sure the motor, the tank, and the filler will fit in the appropriate positions.

Now, select one of the forebody sheets and groove it to allow the tube to go aft to the engine. Also, cut out a spot for the bottom of the tank, and cut it apart to fit the filler. Next, place the motor in position, and fit the two other forebody pieces in position. They will also have to be slightly modified to accept the engine components. When all three pieces fit together as they should, cement the three layers of 1/8th balsa together. Make sure the tank and the fillers are securely in place. The motor itself is secured to the forebody by three bank pins. These are just relatively thick straight pins. The top center pin is stuck into the center balsa lamination. The other two pins are just about flush with the outside of the

forebody; they need a slight notch, and must be cemented in place.

Drill the 1/16th diameter through-holes for the wing spars. Note that they must allow for wing dihedral, so they must be drilled halway through from each side at the correct dihedral angle. If they aren't perfect, they can be enlarged and filled on final assembly.

Make a hole in the back of the forebody to accept the tailboom. If you have a piece of brass tubing the same diameter as the straw, you can simply sharpen the end of the brass tube and push it a short way into the forebody. When it is removed, the straw can be pushed into place. Cut a short piece of aluminum tubing for the horizontal tail pivot. Now squeeze the aft end of the tail boom so that it can be bonded to the aluminum tube. The boom will have to be slightly notched so there will be a small, overhanging flap on top and bottom which will serve as the giving surface.

Bend the main gear wire from 1/32nd diameter music wire to the shape shown in the front view, and cement it in place. The tail wheel wire should be as thin as possible, and is poked up through the tailboom at the appropriate place. It can extend up into the vertical tail a short distance.

Cut the tail pieces out of 1/16th sheet balsa. The balsa grain should be parallel to the longest dimension of the parts. Sand them to the airfoil section shown. The horizontal tail is mounted on the tail boom by means of a length of wire which is run through the pivot tube, and them cemented to the horizontal stab. The tail will be free to pivot, and can be held in one position by two little pieces of masking tape over the tail and the aft end of the boom. Once the tail has been adjusted for flight, a little cement can be run into the pivot tube to fix the pivot wire rigidly, and the tape can be removed.

The vertical tail is cemented to the top of the boom. The full-size airplane has several structural doublers surrounding the tail boom which hold the vertical tail in place. These are simulated on the model by a couple of layers of masking tape. Near the top of the vertical tail there are some oval doublers where the tail brace is attached, these are also simulated with masking tape layers. At the horizontal tail, the braces are pivoting, and no doublers show.

The top and bottom wings are identical. They have a forward and an aft spar separated by three compression members and two diagonal members per wing to rigidize the spar positions. At each of the joints there is a segment of a circular, bond paper gusset. Bond paper makes perfectly adequate gussets for the model. Build the spar assemblies directly over the plan. It is probably best to make the upper (or lower) set completely *before* doing the second set of spar assemblies so that the wing can be completely assembled before the spar assembly is removed from the work board. Now, cement the 3/32nd square balsa leading edge member to the front of the forward spar. Don't attempt to shape the leading edge now, leave it square until later. Make a pattern the shape of the wing ribs, and slice them off one after another out of a piece of 1/32nd sheet balsa. Separate the aft spar from the work board and prop it up slightly while leaving the forward spar and leading edge members pinned down. The correct shim for the rear spar is about an eighth of an inch thick. Cement all the rib pieces in place.

Laminate the wing tip pieces (one on top of the other) from two pieces of 1/32nd by 1/16th balsa to the shape shown, and cement them in place. Note that there is no trailing edge piece on the wings, and at this point in the construction sequence the ribs are somewhat delicate. Carefully add a line of sewing thread along the aft ends of the ribs to simulate a wire trailing edge on the wing.

When both sets of wings are complete, sand the leading edges to the contour shown in the side view. Now fit the wings to the body of the Wing Ding by inserting the root end of the spars into the proper holes in the forebody. It may be necessary to adjust the holes, primarily by enlarging one or the other slightly, to get the spars completely inserted. The struts are made from the same material as the spars. Cut the struts to length and make a trial fit of the wings. Do not glue them in place yet.

Now cover the wings. The wings appear to be unpainted on the full-size Wing Ding and are probably white dacron sailcloth, so plain, white tissue will be OK. White glue, thinned with water (about 50/50) works well as a covering cement. Cement the tissue to the leading edge, the root rib, and the wing tip only. When the glue is dry, trim the tissue. Then, using as little glue as possible, glue the tissue to the thread trailing edge. When this is dry, the tissue can be water shrunk and then given a coat of thin, clear dope.

Before assembling the completed wings to the model, cut a small, circular hole in the tissue of the bottom wings to accept the struts at the proper location. The wing spars should be inserted in the forebody holes. Start with the bottom wings, and block them up into the proper dihedral angle as shown in the front view. Cement them in place, and let the spar joints dry. Then, install the top wings. Use the struts to position the top wings for the correct dihedral. Cement the spar joints and the struts in place. When this assembly is completely dry, you can add the brace wires. Two-pound test monofilament fishing leader was used on the model. It can be tightened over a source of heat if the wires end up a little slack. Too much heat can make them disappear so care is advised. There is an X-shaped, crossover pattern of wires in the same plane as the upper and lower forward spars on both sides, and also in the plane of the upper and lower rear spars.

Now, carve the pilot for the Wing Ding model. The one in the photos was carved from fine-grained, light blue styrofoam. His legs go on both sides of the tank, and he needs to be split almost all the way up through his chest and neck to fit around the CO_2 tubing. The pilot may have feet of clay (ha ha) if more nose weight is required. Clothe the pilot is suitable colors of plastic model paint.

Before flying the model, make sure the center of gravity is at least as far forward as shown. Check to see that the surfaces do not have any unwanted warps. Now, glide it over something soft. Adjust the tail so the model glides in a straight line, and with a smooth descent. It should neither dive now swoop up into a stall. Adjust the A-23 so that it runs quite slowly, and try a hand-launched flight. If the motor power is low enough, it should only extend the glide. Quite possibly, the model will turn under power. Adjust the rudder to counteract the turn, and try a low power flight again until the model flys fairly straight. Gradually increase the power until the model climbs with the motor running. If increases in power result in shallow dives, pull the top pin out slightly, and shim the motor so that the thrust line points higher to the front. As long as the model glides OK power off, do not change the horizontal tail setting to adjust the powered portion of the flight. Use a thrustline adjustment instead.

If the rudder adjustment (which is required to keep the powered portion of the flight reasonable . . . that is, the model has wide enough turns under

power so that it does not spiral dive) makes the model turn too tightly in the glide, reduce the rudder offset a little, and put in a little side thrust by adding a shim at one of the side engine mounting lugs.

Have a great time flying the Peanut Wing Ding! •

Free Flight . . . . *Continued from page 57*

screw on the arm. This is the glide position . . . which can be adjusted simply by turning the adjustment screw.

When the model is ready to dethermalize, the D.T. timer releases tension on the arm, and it pivots backwards, allowing the stab to assume a normal dethermalizing angle. The line that fastens directly to the stab to hold it in place during the power phase (the V.I.T. line) must have enough slack in it to allow the stab to pop up to the proper dethermalizing angle.

This setup is probably the simplest, having a minimum of gadgetry. The pictures show variations on this theme. The sketch (Figure 1) shows that the arm is loaded against the tension of a spring located below the pivot point. Photo No. 4 shows how this system is constructed, although it shows a double arm system.

Another variation on this theme can be seen in Figure 2. In this case, the spring is coiled over the line that goes to the timer and is in compression until the line releases. The spring then pushes the arm out of the way of the stab, allowing the stab to move to the dethermalizing position. Photo No. 5 shows this system well.

Please refer to Figure 3 and Photos 5, 6, and 7.

DOUBLE ARM V.I.T

This system uses two arms. One holds the stab in place for the power phase of the flight and then moves out of the way for the glide, as shown in the sketch and Photo No. 5. Photo No. 6 shows the same arrangement but with the Olofsson spring system. Photo No. 7 shows both arms in place. For dethermalizing action, both arms swing back, and the stab pops up to a normal dethermalizing angle.

SOME PERSONAL PREFERENCES

I prefer the double arm trapped spring system better than any other type. The reasons are that very little tension is placed upon the timer as is the case with a single arm system, and the adjustments to a double arm system are much easier to make. The trapped spring allows me to use easily obtainable springs . . . such as ball point pen springs or the spring from a Bic butane lighter. In addition, all of the components can be visually checked to see that everything is in place before the flight.

COMPONENTS

In all cases, the components can be made easily. The Olofsson style requires some superstructure that hangs outside the model, and the arms are a bit longer. The pivot can be made from a piece of brass tubing, a 4/40 bolt, or some music wire. The arms are made from 1/8 in. to 3/16 in. aluminum sheet, and are drilled and tapped to accept the pivot, the line, the springs, and the adjustment screw. The 1/8 sheet will necessitate using a 2-56 screw, the 3/16 sheet allows the use of the 4-40 size. I use the larger sizes in my models.

The lines from the timer should be stranded control line cable in all cases except when a single arm system is used. In this latter case, standard dacron fishing line (I use 40 lb. test), or heavy monofilament should be used on the line that is fastened directly to the stab. In the case of the double arm V.I.T. system, a spring can be used in the lines to keep the appropriate tension on the arms, or the lines can be made the exact length to eliminate the necessity of springs. I prefer to use springs in the lines as I have never achieved such an exact fit. In no case do I advise using rubber bands . . . *unless* you are using a fuse D.T. system (more about this next month).

To make part of the task easier, Jim Crocket Replicas, P.O. Box 12600, Fresno, CA 93778, markets a very slick V.I.T. system for $13.50 that was designed by Doug Galbreath and others. As usual, this is a high quality casting, and takes quite a bit of the sawing and filing out of making your own system. (See Figure 4). Jim's casting uses a clothespin spring type arrangement to move the arms out of the way, but in all other respects, it is similar to the types described earlier.

I have included some pictures taken at the Taft World F.F. Champs to show other variations on the V.I.T. theme.

Next month, I will conclude this V.I.T. show with some suggestions for starting points in trimming your V.I.T. model, a description of the now experimental "bunt" system, and a couple of ways you can set your timer up . . . or make a timer . . . to accommodate a V.I.T. system. Stay tuned for Part II next month.

NFFS PUBLICATIONS DEAL

I got a letter from Fred Terzian, proprietor of NFFS Publications. He announces that all "NFFS Symposiums" and "Technical Reports" are now on sale until August 1, 1983; three issues for $20 and six issues for $35. Surface postage is included. Non-members are requested to provide an additional $4.00. Also, back issues of "NFFS Digest" are available as a set for $18.00 (membership not required). Send to NFFS Publications, c/o Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129. These publications contain priceless information about the current state of the free flight art (and science). Here's your one chance to catch up. Mail your check to Fred.

SOME DAFFYNITIONS FROM THE CIA INFORMER

TURBULENCE: What happens to an airplane in flight at the very instant that the stewardess begins to pour your coffee. . .

EXPERTISE: Varies directly with the previous number of models you have

"dorked."

That should more than do it for June. If you haven't done it yet, dust off the models . . . the good weather is here, get out and fly . . . and thermals to all. •

Soaring . . . . . *Continued from page 26*

list of wares, it is an instruction guide for foam wing construction and all kinds of other stuff . . . get it now, you won't regret it later.

Of course, there's nothing that says you need a special slope machine to fly combat. Anything that flies and is expendable will do. It is nice, however, to know that the plane is inexpensively and easily rebuilt after a serious crash or mid-air, and this is where the Cheetah really comes into its own.

TACTICS FOR COMBAT

The biggest single tactical advantage a slope combat pilot can have is altitude. As long as you are higher than your opponent, he will have a very hard time attacking you. You, however, have the advantage of a higher level of stored energy (potential energy), and thus the advantage of greater speed and maneuverability.

Another good tactic is to hug the slope until your victim is within striking distance, and then go out and get him. Chances are he won't try to flush you out from the hill, or play cat and mouse with you, for fear of crashing into the hill. This won't earn you any points however, unless you get out there and mix it up occasionally! And you won't get many kills unless your victims are at your altitude or below.

If an attacker is hot on your tail, there are several moves that you can put on him to shake him off.

If your opponent's skill level is inferior to yours, don't worry, just about anything you do will shake him off: try a split-S, or a quick series of right and left turns.

If your attacker's skills are on par with yours, you may have a problem. If you think you have a superior machine, try to out maneuver or out climb him to gain that height advantage, but if slowing down to gain altitude allows your foe to get too close, forget it. If you don't have a superior ship, try a high speed pass followed by a loop which is big enough to place you behind him. If that fails, hide in the pack, go where there are other targets for him to kill, and get a few in for yourself. Your options are unlimited! Above all, have fun!

OTHER GUIDELINES TO FOLLOW

The time limit for one round is usually five or six minutes. During that time a pilot can relaunch as many times as he needs to. Intentional landing and relaunching is forbidden. Repairs to damaged ships are allowed within the working time of the round. The minimum number of planes in a round should be three, unless there is no other choice but to have only two in a round. Obviously, the more planes up the better. Each pilot needs a spotter who is in charge of keeping track of his points. Scoring is best done on a man-on-man basis. Three rounds with a fly-off for tie scores is about right timewise, any more and you can't trust the weather, any less and the contest is over too quickly.

That's about it . . . keep it as simple as you possibly can, but above all, TRY IT!

Q & A FORUM: FUSELAGE AND WING BEEF-UP

I recently received a short letter from Ed Depue, of Long Beach, California, in which he states: "Your idea of a Q & A section sounds great. Here's a question for you. I've built a few gliders, and all of 'em have broken just in front of the stab sooner or later, mostly sooner. What can you, or some of your seasoned friends recommend for beefing up this area without adding tons of weight?

"And how about reinforcing the wing spars to get a good, strong wing? Carbon fiber looks good, but how is it best used? How much, where? I hope you can answer. Thanks."

Fuselages often break just ahead of the horizontal stabilizer. Rough landings are usually the cause. In a sideways, cartwheeling, or ground-loop landing, the tail surfaces invariably hit the ground . . . *hard*. Because these surfaces stick out from the fuselage, they have the ability, through leverage, to magnify the power of the blow to the fuselage. This stress often causes the frail structure of the balsa fuselage to split and break at its weakest and thinnest spot, which just happens to be the area closest to the source of the stress.

Ideally, we want to increase the strength of the fuselage in direct proportion to the stress encountered at any point along the fuselage without adding any more material than necessary. The best way to accomplish this is by laminating the building material in extra layers where the stress concentration requires it.

Most kit airplanes, as I see it, are designed with sufficient strength if they are flown within the range of abuse dished out by the typical intermediate to expert flier . . . which is to say the beginner to intermediate flier could use a beefed-up or reinforced airplane in most cases. Unfortunately, it's the beginner who is not going to know this, and it's the beginner who is most likely going to build poorly in the first place. Kit manufacturers are in business to make money. In order to do this they have to keep the cost of their kits down to a level that is competitive with others. Kits that have a lot of materials or labor going into them tend to be more expensive, which is one reason why you see so many boxy-looking fuselages and open structured wings. Similarly, expense is one of the reasons why they are only marginally strong. Spruce and plywood are expensive. Exotic materials like carbon fiber or Kevlar are out of the question.

Which leaves us with the task at hand . . . fixing that broken tail boom. Now that you have discovered a weakness in the fuselage, you have the opportunity to not only repair it, but make it stronger. By far the easiest way to do this is to use fiberglass. Yes, that's going to add weight, but any other method will too, and it won't look as nice when you're done.

Begin the repair by stripping away the covering from the area of the break. Save all of the little broken pieces as you will need them to fill in all those holes in the jigsaw puzzle that is now your fuselage. (Don't be discouraged, it's never as bad as it first seems.) If you have wooden pushrods inside the fuselage, check to see that they have not been damaged in the crash (or whatever it was

that broke it). If they are only cracked, a drop of Hot Stuff will make them almost as good as new, and in some cases even better. If the pushrods are broken in two, it's best to simply replace them.

The next part is the one that can be the most dreaded for the inexperienced model builder: reassembling the broken pieces into a fuselage again. If you have access to an extra pair of hands, this can be a real help to you, if not, don't sweat it. Have your helper (or friendly bean bag assortment with shims) hold the fuselage in the exact position required to get things lined up again, then take that bottle of Hot Stuff or similar cyanoacrylate adhesive and glue any joints that are *perfect* just as they are. Some joints will require a little poking here and tugging there to get them back into shape before you can glue them too. Carefully replace any chunks or pieces of balsa that may have fallen out or been pulled out since the crash. The fuselage probably won't look too pretty at this point, but take heart, it'll look better in the end.

Now that the basic fuselage has been put back together, it needs to be sanded to eliminate high spots, and filled in with Pactra Plastic Balsa then sanded smooth to eliminate low spots. I would use a fairly coarse sandpaper, such as 150 grit, to save time. You are now ready to 'glass the fractured area.

I have found that the best way to repair small areas of model airplanes using fiberglass is to use Super 'T' Hot Stuff instead of epoxy. This method is practically as strong, and much lighter. What you have to do though, because of the speed at which the Super 'T' cures, is work in small areas.

Begin by cutting a patch of two-ounce (2 oz./sq. yd.) fiberglass cloth big enough to cover the broken area and extend a little beyond it in all directions (remember, you want this area to be stronger than before). Turn the fuselage on its back and center the cloth over it. Tack glue the cloth in place on the bottom surface using the thick CA adhesive. When this has kicked off, generously apply the adhesive to the cloth and rub in briefly with a fingertip protected by a sheet of waxed paper. Stop rubbing before the glue cures and leave it alone till it does. Continue applying thick CA glue until the bottom of the fuse is done. Rotate the fuse to its side and repeat the process. Do the other fuselage side next. When you get to the top, you may have to trim the cloth to get it to go around horizontal and vertical stabilizers. You will have to trim it so that it will overlap only a small amount across the top as it will have to be sanded smooth later.

Take some 320 grit sandpaper and smooth out any rough spots on the fiberglass cloth. Carefully feather out any rough edges so that there will not be any lumps in the covering to give your repair job away. That's it! All there is left to do is cover or, in the case of a paint finished model: fill, sand, prime, and paint. My personal favorite covering material is still Monokote. It's strong, light, and looks just like a professional paint job when applied correctly.

Now . . . if you are about to build a model that you suspect is going to be too weak for your kind of flying, then your course of action is much simpler. (Refer to the sketches.) Here you can see two methods (there are many variations) of beefing up the inside of a fuselage where it doesn't show. The first way is to cut a pair of doublers out of 1/64th ply. Design them to extend at least two inches beyond the leading edges of the tail surfaces, and have them either taper off in an angle or in a rounded fork as shown in the sketch. The second way, and the simpler of the two, is to eat two popsicles (yummie), and use the four sticks as the doublers in place of the plywood. This way is probably not as strong as the first, but it is lighter and it does the job. This is the method that Ed Slobod (Pierce Aero Co.) recommends to beef up the tail of the Paragon.

A third method, in the case of a fuselage with internal longerons, is to simply add longerons in the area of desired extra strength. This is light, simple and effective.

I would not recommend using carbon fiber and epoxy to beef up the fuselage if the receiver antenna is to run down the inside where it can be blanked-off or shielded from the transmitter's signal.

Wings are also very simple to beef up. If a wing is going to fail under flight or launch loads, it will invariably fail near the root (provided it was built right to begin with). If the wing is one piece, or it has a one piece center section, the job is a little easier than that of a plug-in two piece wing. In the sketch, I have shown the basic method: glue on extra spar material. If the spar in the kit is 1/8 x 1/4 or 3/8 spruce, then add another 1/8 square cap piece (top and bottom) to increase the width of the spar cap. You might also add more shear webbing and/or more wing joiner material depending on what's in the kit. In the case of a Pierce Aero Gemini M.T.S., the "cross your heart" wing joiner is plenty strong enough, but for the model with a die cut 1/16th ply joiner, you'd better make a second one.

Carbon fiber and epoxy spars are not really necessary unless you plan to *really* be tough on a wing. But, in case this turns you on, the best way to do it is to follow the idea outlined in my November 1982 "R/C Soaring" column. In that article, I detailed one method of molding C/F-spruce spar caps in extruded aluminum sliding window channel. Another way to go is to write to Twinn-K (P.O. Box 31228, Indianapolis, IN 46231), and ask to see their catalog of carbon fiber reinforcement materials which are preimpregnated and cured with epoxy, ready to epoxy to anything, be it spar caps, fuselage sides, etc. Another source of precured C/F is Aerolite (1325 Millersport Hwy., Buffalo, NY 14221), again,

write for prices and details. The idea here is to use the spruce cap as a stiffener for the C/F lamination(s) because C/F loses most of its strength if it is twisted or warped in any way while under load. D-tube construction is a must if you are planning to use C/F. Anything less is asking for trouble.

As for the correct *amount* of C/F to use . . . well, that's a little like saying, "When are we going to get there, Daddy?" . . . it depends. It depends on how much of a load you are planning to put on the wing, how thick the section of the wing is (for spar depth), and probably a few other factors. I have never really heard of any *precise* method of calculating "How much is enough?" But I would say that in the case of a beef-up, *no more* than one 10 to 12 thousandths-inch layer is ever warranted. Carbon is strong stuff. In the case of a *purely* C/F spar, things such as wing span, wing area, spar depth, planned wing loading, and maximum G-loading must be known before the calculations can be made to determine the answer . . . even then I'd probably *add* a few thousandths just as a safety factor to account for defects and imperfections. If you are interested in this type of info, it can be provided here in "R/C Soaring" if anyone is interested. Write to me and let me know.

Write to R/C Soaring, Q & A Forum, P.O. Box 10335, Costa Mesa, CA 92627. Any questions related to soaring are welcome . . . please, no personal problems, or matters of finance! Seriously, I'd like to help the soaring community if possible, and this is one way for me to do it. I may not know all the answers, but I can get a hold of those who may (within reason!).

MB-253515 vs E-205 AIRFOIL DEBATE CONTINUES

I recently received a very interesting package in the mail from Michael Selig, a student at the University of Illinois. In the package were a number of computer printouts including L/D, pitching moment, coefficient of lift vs. angle of attack, velocity distribution, and upper and lower surface turbulent flow and separation graphs for both the Eppler 205 and Mike Bame 253515 airfoils. Along with the prints outs, Michael wrote a brief synopsis which summarized his findings. I showed this data to Mike Bame and a few others in the San Fernando Valley Silent Flyers club where the MB airfoils have been tested in various designs and L/D trials (at 5:00 a.m.) over the past three years or so. Their comments ran along the lines of, "We told you so," and, "This only proves what we've been saying all along."

I thought it would be interesting to reproduce Mr. Selig's findings this month in place of a *new* "Airfoil of the Month" as is the usual practice in this column. As you may recall, Alex Bower flew the MB-253515 airfoil to the fastest time ever in U.S. F3B speed at Joliet last summer. He is planning to fly the MB section again at the World Championships in York, England this summer as a member of the U.S. team. Anyway, on with what Michael Selig has to say:

"Dear Bill,

"E-205 vs. MB-253515 Debate Over!

"I doubt that really, but now it is my turn to get my two-cents-worth in.

"Enclosed, you will find some goodies, that is, graphs. These graphs were generated by the Eppler and Somers computer program for the design and analysis of airfoils at low Reynolds Numbers which I ran here at the University of Illinois . . ."

At this point, Michael explains how to figure out where the air flow turbulates and separates at any given angle of attack (a) of lift coefficient (C_L) using the graphs for both the MB-253515 and the E-205. He begins with a definition of terms: *us* is upper surface; *ls* is lower surface; *turb* is turbulent transition point; *sep* is separation point; *S* is length of arc as measured from the trailing edge (this measurement is always given as a decimal fraction of one chord length).

He takes the example of *a* equals four degrees and gives the *us* and the *ls* position of *Sturb* (0.5870 for *us*, 0.2398 for *ls*), *Ssep* (0.0859 for *us*, 0.0000 for *ls*), and C_D (coefficient of drag 0.0107 for *us*, 0.0035 for *ls*, 0.0142 total C_D). He also gives the C_L (0.588) and C_M (pitching moment coefficient at 1/4 chord, -0.0454). All of the foregoing information was obtained from a numerical printout, not a graph, but it could have been taken from the graph with a little less accuracy (one decimal point less).

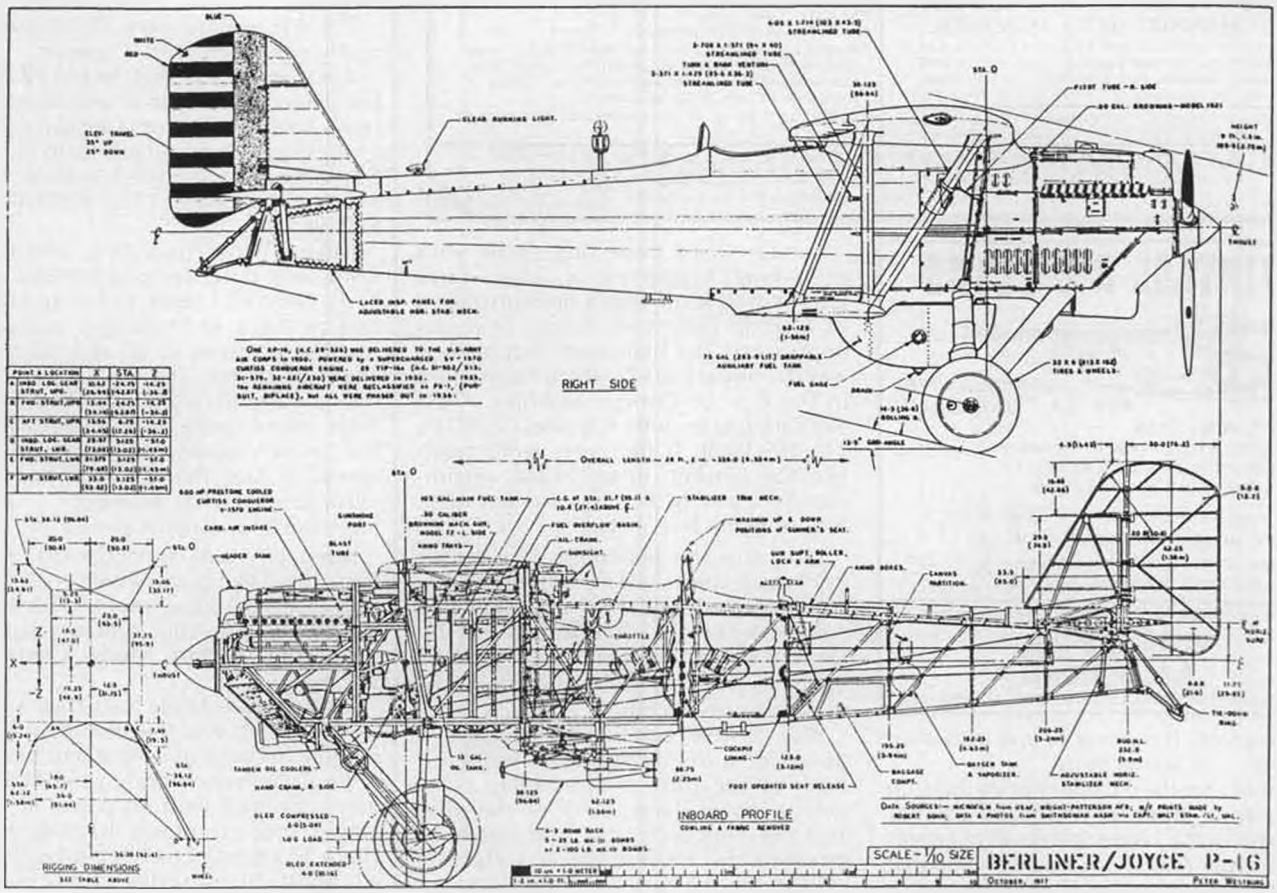
". . . The points are clearly seen on the graphs at C_L of 0.6 (*which corresponds to a of four degrees. wrf*). Draw a line along C_L = 0.6, it will intersect the boundary layer curves at the points drawn above.

"Now look at C_L = 0.16; the transition point for both profiles is the same. As C_L become smaller, the transition point on the lower surface of the E-205 moves forward much faster than the MB. This results in the E-205 having more drag on the lower surface *relative to the MB at negative angles of attack. From the drag polar, the MB has less drag than the E-205 at* C_L less than or equal to 0.1. So, in the speed run the MB has less drag (at these C_L, *but* in duration the MB pays the price of more drag for a given C_L Possibly, the drag of the MB could be improved by adding a turbulator of some type ahead of the transition point for a given C_L This could delay this separation, thus decreasing the drag. How about a retractable turbulator?

"Well, the work is still going on here, I'm going to run the Eppler with the MB and E-205 at a Reynolds Number of 260,000, add a turbulator to the MB, and run some other airfoils for comparison.

". . . I'll tell you, to run the MB and E-205 through the Eppler was a real chore. First I had to scale up the airfoil using the 20 or so top and bottom points that I have (*probably from points published in the S.O.A.R. newsletter. wrf*) Then I have to draw a smooth curve through them and get 20 top and bottom more. So, now I have 40 top and bottom points . . . accurate? Not at all. At least not good enough for Eppler. I tried it with those raw, inaccurate points and the velocity distribution looked like the Rockies. This screws up the boundary layer curves. So, what I did with the 40 top and bottom raw points was run them through a NASA smoothing program, and boy are they smooth (to the sixth decimal point)! From here they went into the Eppler, and Eppler smoothed

Peter Westburg's
SCALE VIEWS



SUPER-ACCURATE AIRCRAFT DRAWINGS. USE FOR SCALE DOCUMENTATION AND/OR FOR DEVELOPING MODEL CONSTRUCTION PLANS. ALL DRAWINGS ARE 28 x 40 INCHES BORDER- TO-BORDER, AND ARE SCALED AS LISTED BELOW.

1/24th scale: ½" = 1 ft.	Shts	$
Douglas O-35/B-7	1	4
Douglas XO-36-XB-7	1	4
1/12th scale: 1" = 1 ft.		
Boeing F4B-4/-3	4	16
Boeing P-12E	3	12
Curtiss A-8 Shrike	3	12
Curtiss Gulfhawk IA	2	8
Curtiss N2C-2 Fledgling	4	16
Curtiss O-1B/A-3 Falcon	3	12
Curtiss P-1B Hawk	3	12
Curtiss XP/YP-23	3	12
Curtiss SBC-4 Helldiver	4	16
Czech Avia B-534	2	8
Davis D-1K	2	8
Douglas O-25C	3	12
Douglas O-31A/O-31B	3	12
Douglas O-38/O-38B	2	8
Douglas O-43A	3	12
Douglas O-31C/Y1O-43	3	12
Douglas O-46A	3	12
Fokker D-17	3	12
General Western Meteor	1	4
Grumman F2F-1	3	12
Grumman F3F-2	3	12
Stearman 4E Mailplane	2	8
Travel Air 2000	2	8
Waco ATO Taperwing	2	8
1/10 scale: 1.2" = 1 ft.	Shts	$
Berliner/Joyce P-16	4	16
Curtiss BFC-2 Goshawk	4	16
Curtiss F9C-2 Sparrowhawk	4	16
Curtiss P-6E Hawk	4	16
Fiat CR-32	3	12
Great Lakes Trainer	4	16
Hawker Fury Mk I	4	16
Hawker High Speed Fury	3	12
Hawker Persian Fury	3	12
Monocoupe 90A	2	8
Swedish Sparmann P-1	2	8

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Price includes 3rd or 4th Class mail. For Airmail or First Class in U.S., add 25% of total order. For Overseas Airmail (includes Canada and Mexico), add 50% of total order. Remit by International Money Order or U.S. funds drawn on a U.S. bank for overseas orders. Master Card or Visa orders add 5%, include card number, expiration date, and signature. Send payment to MODEL BUILDER, P.O. Box 10335, Costa Mesa, CA 92627.

Minumum order, $4.00

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them again! It is never happy with what it gets . . . it wants more."

Thanks for the excellent work that you have done, Michael. Well, add another chapter in the ongoing debate of Eppler 205 vs. MB-253515. I would only add that the differences in drag that we are talking about are very small, and are probably not very significant in the real world of model sailplanes where six-decimal airfoil accuracy is impossible, and hangar rash, errors in construction, and just plain old wear and tear cause deterioration of efficiency at very significant rates. Eppler 205 or MB-253515? Take your pick!

That about wraps it up for another month. Good luck with your next sailplane project, and happy flying with the ones you have already!

The correct address for any mail coming my way is: Bill Forrey, Model Builder, P.O. Box 10335, Costa Mesa, CA 92627. Thank you. •

Astro Part I . . . *Continued from page 16*

nize some international competition, and select a U.S. team. Larry even talked about having an international meet here in the U.S. in 1984! (Perhaps in conjunction with the 1984 Olympics to be held in Los Angeles? wrf) Larry may be the one to pull it off if anyone does, judging by the feats he performed at the Astro Champs!

Sunday was a three ring circus, with everything happening at once. Larry Jolly started it off with a demonstration of electric helicopter flying. That was impressive! The helicopter that he flew was the Skylark EH-1, which is sold here in the U.S. by Condor Hobbies (17835 Sky Park Circle, Suite F, Irvine, CA 92714, 714/556-1888). It flies very well, much like the Cricket. In fact, Larry recommends learning on the Cricket first, before flying the Skylark.

Larry put the helicopter into hover right away, then skated it around a little, "walking the dog", and then flew circuits of the field at about 20 to 80 feet up. He had Roger Roth timing, as there is only about two minutes of run time on the eight sub-C cells.

After a few circuits, he brought it down for a low hover, then walked it back to the pits. A thoroughly competent job of flying, both by the pilot and the helicopter. I would not have guessed the helicopter was electric except for the lack of noise. And, to think, a few years ago an electric helicopter was considered barely possible!

Larry also flew it on a power cord hooked up to a 12-volt car battery. It flew well this way too, and can fly for an hour off of a ground based battery. That is the ideal setup for learning how to fly helicopters because you can fly in your own backyard.

I have the kit, and I am impressed by the quality of the workmanship, it is well laid out and well made. The price, $169.95, is quite reasonable compared with other helicopters. The two 05 motors needed to power the Skylark are included in the kit along with the power cord (you do have to buy batteries separately). Larry feels that the flight time can probably be doubled if cobalt motors are used, I think he will be trying it soon. Good job, Larry!

(Now that the book is done, I'm going to learn how to fly the Skylark!)

Take a look at the photo of Larry's charging station: Two Honda generators, three car batteries, two Astro Flight AC/DC Auto Chargers . . . wow! Larry believes in doing it right!

Speaking of superchargers, the ASI 3 is really impressive; both Larry and Mike Charles had one at the contest. It is a "smart" charger, just plug it in, and it does the rest. The photo shows Mike's IBA PB26 F3E motorglider on charge. It has 24 cells, so the charger must have a voltage doubler or tripler in it as well! It senses when the batteries have peaked, and turns itself off. The charger is about $200, and is available from H&H Lippert, Postfach 1245, D-5067, Kurten, West Germany.

The F3E events were flown concurrently with the non-R/C events.

It was soon clear that the IBA PB26 was the plane that couldn't be beaten. It is a ready-to-fly plane from Germany, beautifully made, and available from Wilshire Model Center, 3006 Wilshire Blvd., Santa Monica, CA 90403, (213) 828-9362, for $259.95.

Mike Charles took first, and Roger Roth took third flying IBA PB26s. Mike had a Geist 60 (cobalt) in his, and Roger had an Astro 40 Challenger (cobalt) in his. These planes climb at a 30 degree angle or better, and in 1-1/2 minutes they are almost out of sight. They have a wide speed range, which is needed in F3E, which combines duration with speed. In fact, the IBA PB26 holds the European F3E championship . . . pretty impressive for a ready-to-fly!

Larry Jolly took second with his design, the Olympian, which was flown with a Geist 40 cobalt motor. This design is also very impressive, and is available as a kit from Wilshire Model Center for $129.95.

In R/C scale, Addie Naccarato's quarter-scale Cub was the dominant entry, not just because of its size, but because of its attractiveness and overall finish. It flew very well with an Astro 40 Challenger (cobalt) motor turning a Top Flight 16 x 8 on a 2 to 1 belt drive. It only weighed 10 pounds, which is light compared to even the gas powered quarter-scale Cub. Addie modified the Sig kit extensively to get it so light.

Unfortunately, Addie encountered some radio interference (a non-impounded transmitter was suspected), so the flight had to be cut short. It looked so real in the air, and the landing and takeoff runs were so pretty, that I've decided that I just have to try quarter-scale electric myself. Dream on!

Another beautiful scale entry was Dave Katagiri's Super Suburban, a Brazilian design, which he entered in pattern! Furthermore, he took third with it! Dave was entered in so many events that he couldn't keep up, so he didn't enter it in scale. I think it would have placed if he had. The Super Suburban is powered by a Leisure LT 05.

The Northrop flying wing entered by Bill Young is incredible. It uses twin cobalt 05s, and even has retracts! The detailing had to be seen to be believed! Unfortunately, there were radio problems with it, so its flight was short (it suffered minimal damage though).

Roger Roth won first with a very nicely done Porterfield (an Astro kit) with an Astro 25 cobalt motor. The Porterfield

flies so well that it can win on flight points alone.

The seven-cell pylon racing was fast, my guesstimate was over 60 mph, easily, with times around 2:15 on a 330x60x330 foot course. Scott Manning won with his super-clean Super Rat, using an Astro 05 cobalt motor. Steve Manganelli took third with his unique twin Leisure 05 powered racer (this one was really fast). Dave Katagiri took second with his original design using an Astro 05 cobalt. The cobalt motors have moved pylon racing into a new bracket, you have to be a good pilot to keep up with the high speeds.

While all the R/C events were going on, the U-control people were having their event. Eleven planes were entered in the scale event. These planes are very well done, most of them were constructed from Guillows kits, and powered by the Astro 020. There was everything from a D.H.4 biplane to a folding wing Corsair!

In free flight scale, Roy Mayes' Dormoy Bathtub powered by an Astro 020 took a well deserved first. The workmanship was lovely. I got to talking with Roy, and discovered that he spent many years teaching full-scale aerobatics! He has quite a range of talent!

Jim Ogg entertained me with a beautiful thermal flight with his Satellite 320 powered by an Astro 035. Funny thing, Jim kept muttering to himself as we watched his perfectly trimmed plane float overhead, "Why didn't I make this an official?!" Perhaps Jim is unfamiliar with one of Murphy's Laws: "The demo flight will be perfect, but just *try* to do it on an official flight!" Jim did take third in open though. Free flight forever, Jim!

In free flight junior, Cynde Waddell took second, and her sister Kim took third. Their planes were particularly interesting, as they both flew the Truant, designed by Jim McDermouth, and available as a plan No. 366 ($2.25) from *Model Aviation*. This is a simple all sheet balsa plane, and is delightful in the air. It was published as a gas 020, but it is perfect for the Astro 020 F/F unit. I recommend it to anyone starting out in free flight. Kim and Cynde had a blast with theirs, Kim got a beautiful thermal flight that ended by skimming over the cars to a perfect landing on the pavement, amid applause!

Last, but not least, came the awards and prizes. Bob Boucher sponsored the contest, and came up with nearly $2000 worth of prizes ranging from Astro 15 cobalt motors, to books on electric flight. Everybody got something. The prizes were done on a drawing basis, while plaques with solar cells from the Solar Challenger were given for first through third places. Dave Katagiri and I got *Quiet Revolution* books, which explain how to get started in electrics! (We are the local Seattle experts!) Come on guys, we really didn't plan to bring the rain!

Thanks, Bob, for the best contest ever. Electrics have come a long way, and it was dramatic to see the new "state-of-the-art".

RESULTS

F3E SAILPLANE

1.	Mike Charles, IBA PB26	Geist 60 cobalt
2.	Larry Jolly, Olympian	Geist 40 cobalt
3.	Roger Roth, IBA PB26	Astro 40 cobalt

SEVEN-CELL SAILPLANE

1.	Larry Jolly, Electricus	Astro 05 cobalt
2.	Steve Neu, Electricus	Leisure 05
3.	Rick Schrameck, Electricus	Astro 05 cobalt

OLD TIMER OPEN

1.	Larry Jolly, Leisure Playboy	Astro 05XL
2.	Larry Blakley, Commodore	Geist 40 cobalt
3.	Bruce MacAenue, Long Cabin	Astro 15

OLD TIMER SEVEN-CELL

1.	Larry Jolly, Leisure Playboy	Astro 05XL
2.	Mike Charles, Leisure Playboy	Leisure 05
3.	Mitch Poling, Brigadier	Astro 05

PYLON SEVEN-CELL

1. Scott Manning, Super Rat	Astro 05 cobalt
2. Dave Katagiri, Uno	Astro 05 cobalt
3. Steve Mangenelli, Twin Racer	Leisure 05 twin

AEROBATICS

1. Larry Jolly, Shoestring	Leisure 05
2. Steve Manganelli, Twin Racer	Leisure 05 twin
3. Dave Katagiri, Super Suburban	Leisure 05

R/C SCALE

1. Roger Roth, Porterfield	Astro 25 cobalt
2. Addie Naccarato, Sig Cub	Astro 40
3. Bob Sliff, Rearwin Speedster	Astro 15

JR. F/F

1. Bob Smith, Country Boy	Astro 035
2. Cynde Waddell, Truant	Astro 020
3. Kim Waddell, Truant	Astro 020

F/F SCALE

1. Roy Mayes, Dormoy Bathtub	Astro 020
2. Farell Papic, Bleriot A7	Astro 020
3. Bill Warner, Aerotorpille	Astro 020

OLD TIMER F/F

1. Jim McMahon, Powerhouse	Astro 020
2. Joe Maher, Powerhouse	Astro 020
3. Art Wallspeth, Strato Streak	Astro 020

OPEN F/F

1. Joe Tschirgi, Olive Drab	Astro 020
2. Jim McDermouth, Hummer	Astro 020
3. Jim Ogg, Satellite 320	Astro 035

JR. CONTROL LINE

1. Frank Godell, DH 4	Astro 020
2. Eddy Paz, P-51	Astro 020
3. John Godell, F6F	Astro 020

CONTROL LINE OPEN

1. Lon Tardiff, F4U Corsair	Astro 020
2. Addie Naccarato, Bell Airabonita	Astro 035
3. Carlo Godel, Schweitzer I-30	Astro 020

F F Scale . . . *Continued from page 58*

red can then be sprayed as mentioned before. The masks can be removed leaving nice, crisp lettering. The advantage of using dyes is that the finish gives the same appearance as regular colored tissue. This is the way to go for those who don't like the opaque look.

Another interesting twist. What do you do about the small letters and numbers on the vertical stabilizer? Unless you are quite talented, it is very difficult to cut out tiny letters out of vellum to use as masks. Fortunately, there is an alternative. Use dry transfers, and I don't mean as a final product. These will be used as a mask, as in the previous example. The technique is a bit different because it is quite difficult to transfer (rub) them off their sheet onto the open areas of the tissue between structure. George applies them ahead of time by taking a piece of tissue and taping it down on a clean, flat surface. This is done to keep the tissue taut and immobile while transferring the letters. When this step is completed, he carefully white-glues the tissue onto the structure, making certain that the lettering is lined up properly. The water shrinking and the spraying of the thinned-out white glue is done in the normal manner. Next, the color is sprayed on.

When the color coat is dry, the removal of the dry transfer letters is easily accomplished by placing the sticky side of masking tape over each letter. They are then peeled off one-by-one. The results are very gratifying. Remember, if you need red, yellow, or whatever color for the letters, spray the area with the appropriate color, let it dry, and then place the dry transfers in place. The excess color can be removed with the bleach as mentioned before. If the letters are to be black, some of you might just want to leave the black lettering in place. I wouldn't, the effect is just not right, plus, the addition of the thinned-out white glue and the dye may alter its appearance.

When all of the detail work has been accomplished, then George comes along with a single coat of thinned-out nitrate dope. Believe me, that's all a model will require if his methods are employed.

What can be done when special insignias or company logos are part of the overall paint scheme? Again, George has a clever idea here, and you don't have to be an artist to do it. Ninety-nine percent of George's building comes from plans he has enlarged himself, naturally these insignias and logos are enlarged as well. Let's say for example, that the overall color of his model is yellow. He will then take a piece of yellow tissue (store bought) or a piece of white tissue which he has "dyed" yellow, and lay it over the enlargement. The logo is then pencil drawn onto the tissue.

He has brushes which resemble very expensive sable art brushes, and which are fairly thick in the middle but end in a fine point. The width of a line made by his brushes can go from very fine to wide depending on how much pressure is applied. These sell in good art stores for under two dollars. George uses a high quality water soluble poster paint, and with these brushes, paints the logo or whatever, onto the tissue. When this has dried thoroughly, the logo is trimmed; leaving a bit of an edge. It is then applied to the model using a coat of clear dope. As the paints used are water soluble, the dope has no affect on the paints. The overall affect is sensational. It is a lot easier painting designs on a flat surface than on a fuselage, wing, etc.

One other item I want to mention is that George likes to try different color paints and dyes over colored tissue. In other words, he might cover a model all yellow, then spray it with orange or green dye, or whatever. Naturally, the results are different than just spraying over plain, white tissue.

Now you have no excuses for finishing a model the way you've always wanted!

At the last Jumbo-Peanut-Multi-Engine Contest held by the Flightmasters in December, I saw something that I know will be of interest to all you rubber scale buffs. Dick Howard, former P-38 pilot and model builder extraordinaire, has come up with the classiest, easiest, most novel way to make props. Dick had several multi-engine models there including (naturally) a P-38, and a Douglas B-26. The third model he had was a very familiar German job, but one I can never seem to remember the name of. Each of these flying beauties had landing gear in the retracted position. Flying models this way is definitely hard on propellers. Dick has overcome this problem with his ingenuity. I might add that all of these models had three-bladed props, and each had a set of right- and left-hand rotating props! So, you know he wasn't using commercially made plastic props.

Dairy products, such as cottage cheese, are being packed into plastic containers instead of the old waxed paper type. Dick consumes a brand that comes in plastic. From these he cuts out props with scissors, any blade shape or size. What's really exciting about all this,

is that by changing the cutting angle, right-hand or left-hand props can be made!

Please refer to the illustration. By drawing a vertical line on the side of the container, then drawing another one 15 degrees to the first one, you will have a centerline that will give you a pretty good pitch for your prop. Using a piece of file card stock, draw out a blade shape that suits you, and use this for a template. Place the template on the 15 degree line and draw around it, then cut it out. Simple, eh?

The one area I forgot to ask Dick about is how he attached the blades onto a hub. This is the way I plan to do it, and I'm certain that most of you can improve on my method. First, I'd start by taking some 1/8 dowel and cutting it into several equal lengths. (The length will vary depending on the size of model, as well as the size of the dowel.) Each length should have a slot on one end for the blade to slide into. This slot can be easily made using a Zona saw. The end of the dowel with the slot is then sanded according to the illustration. The prop blades are glued onto the hubs with Super 'T' Hot Stuff.

The next phase has a lot of steps, but they are all easy. Take a scrap piece of pine or other hard wood about three inches square, and drill a 1/16 hole in the center. If you want to construct a three-bladed prop, you must draw three lines out from the hole 120 degrees apart. Insert a short piece of 1/16 piano wire into the hole. Next, cut out a 1/32 or 1/16 plywood disc the same diameter as the spinner. Drill a 3/32 hole in the middle, and set it aside momentarily.

For most of my rubber models, I like to use free-wheelers, like the ones found on the front of plastic props. They are very simple and efficient. By taking a piece of 1/8-inch O.D. brass tube, and some small files, a cam-like shape can be filed on one end of the brass tube. Every time I do this, I always refer to a plastic prop to make certain that I am filing in the right direction. By checking with the drawing, you can easily follow the next few steps.

Once the cam shape has been filed, it is cut off with just a little bit of extra tubing. This in turn is Hot Stuffed onto the end of a piece of 3/32 O.D. brass tubing with the cam shape extending beyond the 3/32 tube. The 3/32 tube is then cut (the length depending on the spinner size).

Slip a small scrap of 1/4-inch balsa over the 1/16 wire. This will act as a spacer. Next, slip the plywood disc over the wire so that it is resting on the spacer. (By the way, the spacer has to be large enough that the plywood disc will not be able to wobble.) Slip the 3/32 brass tube over the wire and into the hole previously drilled in the plywood disc. You may want to Hot Stuff the tube onto the disc. Whatever you do, don't get any glue on the piano wire, otherwise you'll have to start over. You may want to put a drop of oil in the brass tube as a precautionary measure . . . cyanoacrylate adhesives won't stick to oily surfaces.

Take one of the dowels with a prop blade inserted into it, and line it up carefully on one of the three lines drawn before. A 30 degree triangular wedge will hold the prop at the correct angle. Hot Stuff the prop in place. Repeat the procedure with the other two blades. Mix up some five-minute epoxy and pour throughout the dowels and tubing. This will "lock" everything down pretty well. *(A combination of Super 'T' and Hot Shot should work as well. Build up the fillet gradually and cure each layer with a mist of Hot Shot accelerator. wrf)*

All that remains is to figure out the nose plug arrangement, and bend the hook. Don't forget a thrust washer! Now, vacuum form a spinner to cover up the whole works. As I said before, many of you probably have a better way of doing all this, and maybe if you have the time, you can pass it along so that others may try doing it your way.

Prolific Dave Diels is coming out with more and more rubber powered scale plans. His catalog sheet No. 7 has thirty different plans listed. His latest two are the Westland Whirlwind, and the Curtiss SBC4. The Whirlwind is 1/20 scale and spans 27 inches. The SBC4 is 1/24 scale, and it spans 17 inches. Two others almost ready to go are the Grumman F3F-2 Gulfhawk and the Hawker Typhoon. both at 1/24 scale. The samples I've seen are just great.

In addition to his plan service, he is also providing a reduction/enlargement service. In order to fine out more about both services, send Dave an S.A.S.E. His address is: Dave Diels, P.O. Box 101, Woodville, OH 43469. •

Indoor . . . . . *Continued from page 61*

the way to the contest.

9. The air has gotten colder in this room.

10. The rubber band has knotted up over the hook again.

11. My kid turned on the water sprinkler just as I was carrying it to the car.

12. A guywire snapped on the left wing and changed the trim.

None of the above excuses could be considered your fault. That's why they are so great to use.

FIGURING CEILING HEIGHTS

How high is the ceiling in the room where you fly your models? Do you know for sure? Many times we will ask the custodiam at the gym or the rec center this question, and he will usually say something like, "It's 34 feet." But suppose you are planning a record trials, and you must know exactly. What do you do?

Many rooms are constructed with concrete or cinder blocks. It's fairly easy to measure one of these blocks (plus the mortar joint), and then count the number of blocks to the ceiling.

I've also seen some modelers who have used a small optic device to measure this distance. They lay on the floor, sight through the device, and come up with a height in feet. However, I'm not sure just how accurate this method is.

I think the most accurate method is to send a gas filled balloon (tied to a string, of course) up to the ceiling. When the balloon is just touching, mark the string at floor level, and bring down the balloon. Disconnect the string and lay it out across the floor. A carpenter's tape measure laid along the string, plus the height of the balloon, will give an accurate measure of the room height.

Check your AMA rule book to verify

that the room is category I, II, III, or IV, then you can look for the current record times for that room. This list is printed about four times a year in that AMA magazine, *Model Aviation*.

GETTING STARTED IN F.A.I. INDOOR

Modelers are sometimes reluctant to jump into building F.A.I. duration models. They look so delicate. Maybe you have wanted to try it, but the microfilm is difficult to pour at first, and the wings look hard to build. First, let's talk about building the wing and stabilizer with templates.

When constructing heavy outdoor models, pins can be inserted through the wood and into the plan. The pins will not usually damage the wood. This is not so with indoor duration models. The wood is fragile and narrow in width. A pin will split the wing spar. The technique when building indoor is to cut a 1/32 in. thick cardboard template to the shape of the wing or stab, and draw lateral lines to mark the rib positions. A V-shaped notch (1/2 in. x 1/2 in) is cut out of the cardboard where the rib touches the leading and trailing edge of the template. After the wing spars are stripped, the wing tip outlines are wrapped around a form and baked to shape in the oven. The wing template is pinned down to the building board over a sheet of waxed paper. The wing spars are laid against the edge of the template, and a pin is inserted alongside the spar. This pin gently wedges the spar against the edge of the template. The ribs are cut (along the edge of an aluminum template) and cemented to the leading and trailing edge of the wing. These ribs will fit in the V-shaped notches in the template. Position and cement the wing tip outlines.

If you need some practice pouring microfilm, but want to fly right away, why not cover your F.A.I. model with Microlite or Absolite, and fly it that way till you master the microfilm? Flying a model of that size will help you gain the touch necessary to move into the super-lightweights.

ULTRALIGHT SCALE MODELS

Have you indoor scale modelers considered going after the Fikes and Laceys with ultralight aircraft? Last summer I drew up the Kimberley Sky Rider for Jumbo outdoor rubber scale. As fate would have it, time ran out, and I didn't get it built. The airplane had a lot of potential as a scale subject. The surfaces are all straight lines, and the structure is very light. The pilot sits under the wing, and his whole body is visible. The wings are wire braced. I think it would make a good indoor peanut model.

Three-view drawings and a photo can be found in *Ultralight Aircraft*, a rather new book on ultralights by Michael A. Markowski. This 288 page book is crammed full of the new breed of machines. Plans, photos, engine details, and every thing you need to know to fly one. The publisher is Ultralight Publications, Post Office Box 234, Hummelstown, PA 17036.

Similar aircraft which would be good for indoor scale and peanut are: the Eagle, the Birdman RB-1, the Goldwing (a canard), and the Weedhopper. I'm sure there are many more.

PLANS AVAILABLE

David Aronstein now has two ultralight plans which will costs you $1.00 each. A 22-inch Cloudbuster peanut that has flown for one minute 56 second. This is a very complete plan . . . two sheets. The second model is the canard Goldwing. An 18-inch peanut with enclosed fuselage. Write: David Aronstein, 50 Pasture Lane, Poughkeepsie, NY 12603. Add 20 percent for postage when ordering.

WEST BADEN

Remember that INDOOR WEEK is scheduled for June 11 through June 18, 1983 at West Baden, Indiana.

Here's the schedule of events:

Sat., June 11: Check in . . . all day practice.

Sun., June 12: Practice till noon. Easy B, and Paper Stick till 6:00 p.m. FID practice afterwards.

Mon., June 13: Handlaunch glider 8:00 a.m. till noon. Indoor stick and FID noon till 8:00 p.m. (four two-hour rounds).

Tues., June 14: Manhattan and Boston Cabin 7:00 a.m. till 10:30 a.m. (turn in all scale models by 9:00 a.m.). Pennyplane and Novice Pennyplane 10:30 a.m. till 3:00 p.m. Two FID rounds, ROG Cabin 3:00 p.m. till 7:00 p.m. Banquet: 7:30 p.m.

Wed., June 15: AMA Scale, Peanut Scale (51-A) 8:00 a.m. till 1:00 p.m. Peanut Speed, Unlimited Speed, Kit Plan Scale. Start of ENART 1:00 p.m. till 9:00 p.m. All "Heavy" models — Manhattan, Boston, Pennyplane and Novice Pennyplane.

Thurs., June 16: All light models 7:00 a.m. till 7:00 p.m. FID, HL Stick, Paper Stick, Paper Stick, "A" and Cabin R.O.G., Helicopter, Autogiro, Ornithopter (turn in all scale by 10 a.m.). ENART Banquet 8:00 p.m.

Fri., June 17: Glider and Scale day. 7:00 a.m. till 9:00 a.m. (see Wed. above events.) Start of 24 hour World Peanut Grand Prix 7:00 p.m.

Sat., June 18: End of Grand Prix 7:00 p.m. Peanut Banquet 8:00 p.m.

Get those models built and trimmed. Fly with the best in the United States. You'll never forget it. See you there.

Write to Ken Johnson, 16052 Tulsa Street, Granada Hills, CA 91344. •

Astro Part II . . . *Continued from page 63*

entries in that event (I didn't enter as I had to judge, or we would have had more). Although it didn't qualify, Bob Haight's four-engine Handley Page HP 42 "Helena" was a real crowd pleaser. This five-foot span model was re-engined with Astro 035 motors instead the 02 motors used before. It seemed to have much more power, but it was found that the wheels had swelled from the moisture and were dragging on the axle. Bob did get one really long taxi which took the whole width of the runway. After the long taxi, it managed to rise off the ground for a little while, but not long enough. Speaking of long taxis, Carlo Godel won the prize for that with his I-30 monoplane. It must have taxied 500 feet down the runway, straight as an arrow.

Roy Mayes got top scale points with his Dormoy Bathtub. This model was really something to see, it featured hand made spoke wheels, working landing gear, a nicely detailing engine, and delicate rigging. This was the first time Roy had ever tried an R.O.G. with this model, and as the Bathtub is rather short coupled, I was more than a little worried. I shouldn't have been though, it took off very well, and flew well in the bargain.

Flightmaster President Ferrell Papic flew his Bleriot No. 7 Monoplane. He had top flying points in scale, in fact, he got top score in two out of three flights. As Ferrell is a real scale modeler, he flew his model during the rest of the meet just for fun.

Nyle Nagle came down from Las Vegas to fly a P-47. The wing loading was rather high, and it didn't do too well in flight, but he sure is a fine builder. As he won the book *The Quiet Revolution,* I'm sure he will have better luck next year.

Bill Warner flew his Aero-Tropille, which is a pusher monoplane with eliptical dihedral of about 1913 vintage. This also flew well, but lost points as Bill wouldn't R.O.G. the model. I can't say I blame him though, as it had small wheels and the runway would have damaged the model if it had ground looped.

We did something different this year. Bob Boucher donated motors and other goodies as prizes. Contestant's names were put in an Astro Flight charger box, and then drawn by Lonnie Cope (who didn't fly, but helped out in the contest). Everybody who entered the contest received something. As we did this at the end of the contest, it sure kept the fliers from leaving early!

Well, that's about it, except that many thanks should go to the people who timed and helped me with the contest. Hope to see you all next year.

RESULTS OF CONTEST

SCALE

1 Roy Mayes	Dormoy Bathtub
2 Ferrell Papic	Bleriot No.7
3 Bill Warner	Aero-Tropille

ENDURANCE

1 Joe Tschirgi	O.D.
2 Jim McDermoth	Hummer
3 Jim Ogg	320 Satellite

02 REPLICA

1 Jim McMahon	Powerhouse
2 Joe Maher	Powerhouse
3 Art Wahlstedt	Stratostreak

JUNIOR

1 Bob Smith	Country Boy
2 Cynde Waddell	McDermothvolt
3 Kim Waddell	McDermothvolt

R/C Autos . . . . *Continued from page 45*

pieces on the original Phaser) to allow starting that big main event on tires that are just barely over the legal minimum size.

The only problem I can find with the front end is that as caster is changed, toe-in varies also. Fortunately, this is easily reset with the Du-Bro ball links used in the steering linkage. Speaking of this linkage, it is worth copying no matter what kind of car you race. The ball links, of course, are Du-Bro parts, and the main pushrod is nothing more than the inner rod taken from Sullivan (Pylon) GRSF tube-in-a-tube pushrod sets commonly used in R/C model aircraft. Studs having 2-56 threads are screwed into the ends of the tube, and then the ball links screw onto the studs. Neat, light, easily adjustable, and no soldering! I'll have to admit to having used these Sullivan pushrod sets in many an R/C model, yet I never thought of using the inner rod for steering linkage!

Do be careful with the ball link setup, however. The main thing to be concerned with is that the balls don't fit the ball sockets properly, at least for this application. What you should do is chuck the ball thingies in a drill, and sand the balls down some with fine sandpaper or crocus cloth. Keep at it until a brand-new ball link will swing freely on the ball. If you don't do this, you will find that the slight amount of friction present in the ball links will keep the steering from centering . . . most unhandy.

I assume the ROAR rules have been bent far enough by now allowing the front of the chassis pan to be legal as a "bumper". At least that is the assumption, as few of the top racers are using a separate bumper, and the Super Phaser kit doesn't even contain one. Personally, I am using bumpers from the Phaser, although they are cut down a little. Clamping bumpers down, or in the case of a stock Super Phaser, standing alone on the pan are the neatest body posts you'll ever see this side of the numbers used on Delta's 1/8 Super J and Eagle cars. These posts are machined from aluminum barstock, tapped 8-32 in the lower end, and then drilled through to make then very light, yet much more durable and long lasting than the more common nylon posts. Two sizes of these aluminum posts are available. Fine adjustments to body height are done with the body support collars seen in the pics.

The steering servo is firmly bolted in place using simple, nylon posts .. . light, effective, and strong. The receiver, located immediately to the rear of the steering servo, is stuck in place with servo tape. Here we are using the new (and very small) Novak NER-25 receiver, but there is room for most any other brand of receiver, in fact, the car was first run using an older model Futuba.

From the receiver to the rear of the car, things get a little complicated. Not from a parts-count standpoint, but because most of the pieces do double- and triple-duty. For instance, the post that anchors the roll-over antenna also clamps the forward end of the T-bar to the chassis pan, as well as providing a mount for the forward side of the throttle servo. The thin 'glass piece that appears to be just a mount for the resistor, is also a clamp to securely locate the throttle servo. The post which is located just in front of the motor, clamps the T-bar to the pan, is a mount for the rear of the servo, and acts as a pivot for the forward end of the shock. By now, most of you have heard that this car is light in its stock condition (sorry, I forgot to weigh mine, and the scales are out on loan). Now you know at least part of the reason: one part is made to do as many jobs as possible.

The rear pod is aluminum, and it does all the obvious things in addition to acting as a heat-sink. I'm not sure if this is a positive feature or not. It certainly can't hurt, yet a number of other cars use

nylon parts out back and don't seem to suffer from it.

The T-bar feature has probably been discussed adequately, but it has been suggested to me (not by Delta, but by an independent racer all excited and giggly about his new Super Phaser) that because this part is so small compared to the main chassis, that in severe crashes, this easily replaced and inexpensive part will break first. Could be, but after looking at the car closely, my feeling is that a lot of the impact's force would simply be absorbed by the shock absorber, and I would be very surprised to see either the pan or the T-bar break. I haven't broken anything on the car pictured, but then I have only broken one 1/12 in all of my 1/12 racing, including the nasty and fast, gas-powered cars.

Even though access to the motor appears to be limited, actually there is no problem. Loosening a single set screw at the forward end of the shock allows slipping the locating pin out, and then the shock can be folded up out of the way. Same deal for changing battery packs, except that the motor needs to be

unplugged. I could have wired the pack so that the crossing leads were at the front of the resistor, thus avoiding any possible loosening and unplugging, but I prefer to keep as many leads as possible away from the Rx.

Setup of the car is straightforward, even though it is somewhat different than most other cars. Toe-in can be set at zero degrees. I set mine so that there is just a very slight amount of toe-in, mainly so I'm absolutely certain there isn't any tow-out. Any tweak in the chassis should be shimmed out at the forward end of the rear pod, *not* at the front cross-bar. This car took .033-worth of shim at the right hand screw location to get it all squared up.

Caster should probably be initially set at zero degrees and increased only if you need more power-on steering. Most of Delta's own Team Cars are running zero degrees to two degrees caster, any caster in excess of five degrees indicates a need for softer front tires. Well, *usually* that is the case, harder rear tires will also increase power-on turning, as well running a flatter wing, pulling the wing altogether, trimming the rear air dam on the body, and so on. For the first time out, run on the stock, kit tires ("B" fronts and "A" rears). For some real soft, sticky tires try Delta's new TR1241 series, available in "AA", "A", and "B" compounds (TR1240 series tires are supplied with the kit). The 1241 tires have been working great on this car with the "A" grade being the best for our tracks, and they have only been used as rear tires so far in conjunction with TR1240 "A" compound front tires. I never thought I would see the day when we could use that soft a front tire and still able to actually control the car, but the Super Phaser loves it.

RACING IT. . .

If the truth be known, I'm not super-enthused about racing indoors, but at the time, that was the only show in town . . . so it was off to Tacoma to race with the T.E.A.R. group (Tacoma Electric Auto Racers). T.E.A.R. is a really outstanding bunch of racers who keep absolutely no secrets when it comes to helping new racers get their cars setup for their track, which is the usual indoor/outdoor stuff that, combined with WD-40 and/or suntan lotion traction additives, offers really super bite.

Having only one decent four-cell pack to my name, I raced on six-cell packs. This indoor track is definitely a track for four-cell cars running Modified Class motors . . . It is a very tight track. I had never raced on this track before, and after two practice runs (which were interrupted by my having to get the tweak out of the car), I was far from dialed-in, although the car was pretty close. Never did get the tweak just perf, and I ended up "cheating" on that by putting a Kraft staple-gun transmitter to good use, setting it for equal left and right turns. This is not suggested practice; the car should be set flat first.

The first heat netted me 39.5 laps, several laps off the pace shown later by a couple of really smooth racers who have this track, and their cars, really dialed. I was a little down about that . . . until later when it was let slip that Dave Clark, a racer who regularly bucks heads with me in both 1/12 and 1/8, was in the 36-lap bracket for his first several visits to this track.

In ths second heat, I went to "A" rears (1241 series), and the car turned a little tighter. However, this heat turned into one of those let's-all-crash-our-brains-out heats, and I dropped a lap in the process. For the last heat, I slipped in the four-cell pack and a Delta modified motor. The more controllable power of this combination brought the laps up to a 39.9 total in the eight-minutes-and-stop scheme of things. This put me in the B Main where I got second or third, this time with the four-cell pack, hot Delta motor, "A" rubber out back, and a switch to "A" in the front for even more steering.

Throughout the day's racing, the car was very smooth, and even with six-cell power was easily controllable. All adjustments had a predictable affect on the handling of the car, no tricks at all, which is a trademark of all Delta race cars.

SO, HOW DOES IT STACK UP?

Well now, things change quickly in racing, all the manufacturers are out to have the hot tip in chassis, but at this point in time, they are all trying to get their cars up to the state-of-the-art and the Super Phaser presently determines where that is in 1/12 racing. If you just have to have the best, and are willing to pay some extra money for it (Delta products are nearly always more money), the Delta Super Phaser is the only choice as of this writing. •

Counter . . . . . . *Continued from page 10*

603B).

A good application for this combination of motor, gear drive, and battery is an "05" Open Class electric sailplane such as: the Ultra IV as featured in *Model Builder*, January, 1983; the Electra Lite; any lightweight, 100-inch sailplane; or any stretched-wing two-meter. Performance is rated at: climb, up to 1,500 feet in 90 seconds. Three 90-second

climb out (per single charge) yield up to 20-minute flights each.

Write or call Leisure Electronics for any further information or ordering instructions: 11 Deerspring, Irvine, CA 92714, (714) 552-4540.

★ ★ ★

J-5 Enterprises is announcing its relocation to 256 Schuman Drive, Newmarket, AL 35761, with new phone number (205) 852-2566. The relocation was necessary due to the tremendous response from the United States, Canada, and European countries for its line of boat and airplane kits. The new production facility will provide faster service, and C.O.D. orders can now be accepted from anywhere in the U.S. ($3.00 service charge on C.O.D. orders). Shipping is included for orders larger than $25.00 (under $25, add $3.00 shipping and handling).

J-5 presently is developing a drive train accessory which will allow the new Quadra Q-50 engine to be used in model boats. Watch for future announcements.

★ ★ ★

David Diesel Development, Inc. now has a really nifty converted Cox-020 glow engine which runs on CO_2. No other details were provided, so if this idea turns you on, write to Davis Diesel, P.O. Box 141, Milford, CT 06460. You can order the conversion for $39.95 plus $2.00 postage and handling.

Another new product in the Davis Diesel line-up is a very handy little set of 12 pocket-sized drills sizes 50 through 70 for only $10.00 plus $2.00 postage and handling. (Extra sets of drill bits are $4.00.) Now you can drill tiny holes in inaccessible places without electricity wherever you go!

★ ★ ★

St. Croix of Park Falls, Ltd., P.O. Box 279, Highway 13 North, Park Falls, WI 54552, (715) 762-3226, has released information on a brand-new complete kit which it is producing, called the Golden Falcon. The Golden Falcon is designed to be the ideal beginner's R/C airplane. It's super-stable flight characteristics take the trauma out of R/C flight training; yet, the full four-channel control and semi-symmetrical 58-inch wing make it capable of performing many aerobatic maneuvers when the pilot is ready to try them.

Excluding the four-channel radio and .19 to .25 glow engine, this kit *contains everything needed* to build a complete flying airplane, including glues and Monokote! Jig-assisted assembly ensures easy, accurate construction. Engine mount permits easy removal of engine and tank. Write for free brochure and prices. Factory direct sales.

★ ★ ★

For those scale modelers looking for scale plans and documentation, we hereby inform you of a relatively new scale service known as Scale Plans and Photo Service. This service features kit type plans, factory or best-source drawings (enlargements), and both B&W and color prints of literally hundreds of military and civilian aircraft. A 16-page catalog is available, write to Scale Plans and Photo Service, 3209 Madison Ave., Greensboro, NC 27403, (919) 292-5239.

★ ★ ★

The Champion Model Aeroplane Co., Inc. announces its latest scale airplane, the Stampe SV-4 Standoff Scale French primary trainer. This 56-inch span biplane kit is superbly hand-crafted with "Super-Kit" prefabrication. Outstanding features include: preformed and brazed cabane strut assembly; machine cut formers; and machine shaped, notched, and grooved lending edges. This kit will satisfy the most critical builder.

For more information and prices, write to Champion Model Aeroplane Company, Inc., P.O. Box 891, Woodbridge, NJ 07095.

★ ★ ★

Striegler's R.C. Supply, 5831 McKnight, Houston, TX 77035, (713) 729-5652, has a couple of interesting engines to sell. Immediately available are the Magnum 91 four-stroke, and the replica, 1945-vintage, Mechanair ignition engine.

The Magnum 91 is imported from England. This 31-ounce engine is ideal for scale applications. It can be made to run *backwards* by simply switching the pushrods! The Magnum 91 is a strong brute of an engine which will turn a 16x6 prop at 7300 rpm on five percent nitro, 10 percent oil, glow fuel, and do it quietly. Watch for V-twin and three-cylinder radial versions, coming soon.

The Mechanair replica is based on the pre-WW-II Astral 5.9cc ignition engine which was marketed as the Mechanair between 1945 and '46. It has an increased displacement of 6.9cc (or about .42ci), 10mm Champion plug, top quality materials and workmanship, and will turn a Top Flite 12x6 prop at 6500 rpm.

Write to Striegler's R.C. Supply for details.

★ ★ ★

Scale Unlimited Class hydroplane enthusiasts will want to know about Newton Marine's plan service which has a 300-plus selection of scale plans for competition hydros which raced between the 1950's through present-day. Famous hydros such as: Slo-Mo-Shun-IV, Miss Thriftway, Shanty-I, Hawaii Kai III, Miss Budweiser, Atlas Van Lines, Pay 'n Pak, and many others, are available in 1-1/2-inch-to-the-foot scale. All boat plans are for built-up wood frame construction, and conform to both IMPBA and NAMBA guidelines. For further info and free catalog, send a SASE to: Newton Marine, 14518 167th Pl. S.E., Renton, WA 98056.

★ ★ ★

Jet model Products announces the release of Tom Cook's legendary F-4 Phantom II kit in two versions.

The Deluxe kit includes: F/G fuselage and inlets; foam wing and stab cores; two Turb-Ax fans with two (2) modified K&B 7.5 engines; OS 7DV carburetors and tuned pipes; assembled and tested

engine/fan units; custom made Air Command MK 20 landing gear with scale aluminum struts and tires; canopy with complete interior; stab actuating mechanism; drogue chute and hardware; hand-cut balsa and ply bulkheads; and the list goes on!

The Semi-Kit includes: F/G parts; foam wing and stab cores; canopy; exhaust ducts; stab mechanism; plans; and instruction booklet.

For more information and prices, write: Jet Model Products, 304 Silvertop Rd., Raymore, MO 64083.

★ ★ ★

It seems that every month T and D Fiberglass Specialties comes out with another F/G cowl (or two, or three. . .). Well, this time it's a Gee Bee R-1 cowl, landing gear fairings, and wheel pants in quarter-scale! *That's the big of it . . . the small of it is* the wheel pant (one piece) and cowl for Bill Effinger's "Snow White" 20. Also worthy of note here is that T and D has available 1/4-in. wire gear (brazed and reheated) for the Gee Bee R-1. An SASE will bring to your mail box more info, as well as complete list of F/G parts. The address is: T&D Fiberglass Specialties, 30925 Block, Garden City, MI 48135.

★ ★ ★

RLF Products was rather pleased to make the recent announcement that in addition to their existing line of sailplane launching equipment, they now have available a new F3B style winch spool designed specifically for high speed "zoom" launching techniques. The all aluminum reel features a four-inch diameter by four-inch wide (plate-to-plate) center hub, and two 10-inch diameter, 1/4-inch thick end plates which are securely bolted to the hub. The hub is bored for a 5/8 shaft, but other sizes may be special ordered. Two 1/4-inch steel pins attach the spool to the shaft. Write for more facts and stats: RLF Products, R-3 Box 360, Paoli, IN 47454.

★ ★ ★

Two engines from Roush Manufacturing, one new, and one improved, are pictured for you on the opening pages of this "Over the Counter" section of the mag.

The first one is the new Cobra Jr. 1.3 ci engine, the first of "a new breed of engines from Zenoah in Japan." The new Cobra Jr. has been designed by a Hallograph Computer to achieve the ultimate in weight reduction, performance, and quality. It weighs a scant 2.5 lbs. (barely more than a .90), and produces a rated 1.5 hp at 8000 rpm. Will fit .90 powered models.

The improved engine is the popular Cobra 2.3. What's improved is the new version cylinder head with better combustion chamber and porting. Performance is up, the price is the same . . . which is your cue to write for more information at the following address: Roush Manufacturing, Rear 3405 Cleve. Ave. S.W., Canton, OH 44707.

★ ★ ★

Okay all you FAI/F1A glider fliers, listen up! The Koster Digital F1A Glider Timer is now available. If you want the ultimate in reliability, extreme accuracy, fail-safe operation, and lightweight D/T devices, you must take a look at this little beauty.

Write to Koster Digital, P.O. Box 54, DK-3400 Hillerod, Denmark for additional stats and info.

★ ★ ★

A note to hobby dealers. A&L Distributors, Inc. proudly presents its all new *Dealer Sales Catalog* containing 20,000 items of over 225 manufacturers . . . This catalog has one of the largest selections of sophisticated modeling and train hobby products to be found anywhere. Available in three versions: Models (only), Trains (only), and a combination of both.

Contact A&L Dist., Inc., at P.O. Box 7147, Van Nuys, CA 91409.

★ ★ ★

Flite Line Products, 3207 34th St., Lubbock, TX 79410, introduces its newest product, the Fun Fli 40. This sport flier is a good machine for fun flies, club racing, one-design events, and pattern practice. Light wing loading and wide performance envelope are two of its strong points. Some basic stats are: wingspan, 51 inches; wing area, 510 sq. in.; four channel operation; length over all, 40 inches; weight, 3-1/2 to 4-1/4 lbs.; engine, .19 to .40. For more info on this fast-building, complete kit, write to Flite Line, and tell 'em *Model Builder* sent ya.

★ ★ ★

Oh-my-gosh! That's a big 'un! Would you believe a 2.6 cubic inch, Schnuerle ported, rear rotary disc valve, chrome plated cylinder, rear exhaust, transistorized ignition, dual piston ringed, muffler and mount equipped, 4.6 lb., GIANT Scale engine? The Bantam 2.6 is a new, designed-from-the-ground-up-for-modelers, Ben Shereshaw type biggie . . . and if that doesn't get your attention real fast . . . well, you probably aren't "into" big model aircraft anyway. If you are interested in this BIG Bird type engine . . . write to Bantam Precision Products, Inc., Box 263, Ridge Road, Oakridge, NJ 07438, they'll be happy to send you more facts and details.

★ ★ ★

Pettit Paint Company, manufacturers of Hobbypoxy products, announces the addition of four new colors to its line of epoxy enamels. The new colors . . . Bright Orange, Sky Blue, Cream, and Maroon . . . are blended to precisely match Super Monokote covering film, allowing the modeler to paint or trim areas that are difficult to cover. Six others are available to match Monokote colors: Bright Yellow, Bright Red, Dark Blue, Silver, Black, and White. Additional Hobbypoxy colors are: Cub Yellow, Dark Red, Stinson Green, Light Blue, Gray, and International Orange . . . for a grand total of 16 colors. That's more than any other two-part epoxy paint manufacturer. Write to Pettit Paint Company, Inc., 36 Pine St., P.O. Box 378, Borough of Rockaway, NJ 07866.

★ ★ ★

Squadron/Signal Publications, publishers of scores of historical aviation books, has just released three new books, *A-20 Havoc in Action*, *Messerschmitt Bf 109 in Action*, and *Air War Over Southeast Asia*. These books are very valuable to scale enthusiasts who are looking for scale documentation for their latest project. For a list of all of Squadron/Signal Publications books, send a large SASE to: 1115 Crowley Dr., Carrollton, TX 75011, and ask for it.

★ ★ ★

Argus Books Limited, P.O. Box 35, Hemel Hempstead, Herts HP2 4SS, England, also has some very interesting books with self-explanatory titles: *Introducing Radio Control Model Aircraft*, and *Introducing Radio Control Model Boats*. Each book is about 94 pages of text, photographs, and illustrations covering all aspects of introductory-level modeling. There's a lot of good "How to" information to be read in these books. Write to Argus Books Limited for prices and information.

★ ★ ★

For those modelers considering entry into the world of homebuilt ultralight aircraft, or for those already into it who would like to fill out their ultralight knowledge, here are two books (numbers three and four of a series) which will do the trick: *Ultralight Flight* and *Ultralight Propulsion*.

Ultralight Flight covers everything from history, to aerodynamics, to handling, and performance of ultralight aircraft.

Ultralight Propulsion covers all aspects of ultralight engine design, maintenance, trouble-shooting, modifications, and accessories.

There is even a monthly tabloid style newspaper called the "Ultralight Times" which will keep you informed of newsworthy items of a timely nature.

Write to Ultralight Publications, P.O. Box 234, Hummelstown, PA 17036, and ask for their brochure. •

R/C World . . . . *Continued from page 13*

show may have the least floor space of the major shows around the country, it certainly isn't the smallest in number of exhibitors or spectators. At no other show will you find yourself coming to a complete involuntary standstill in the spectator isles, literally packed in like vertical sardines.

This year, over 100 exhibitors were exposed to between 13,000 and 14,000 spectators in the two-day show at the Westchester County Center. The weather was ideal (a lot better than Southern California at the time!) with sunshine and mild temperatures. Next year's show is scheduled for February 25 and 26. Incidentally, Nick Ziroli, kit manufacturer and model designer was the recipient of the annual Howard McEntee Memorial Award.

We'll reserve our review of new products for the Toledo show report, but one item really caught our attention, which we'll mention here. Don Harris, of Northern California, demonstrated a neat little onboard generator, aimed primarily at the gas powered, large scale model. Mounted to, and driven off the rear driveshaft extension of a large gas engine, the generator, about an inch in diameter and three inches long, was wired through two voltage regulators to a dual, back-up battery system for the airborne radio. A digital voltmeter display gave visual proof of the generator's ability to maintain constant peak battery voltage.

We'd like to congratulate Frank Devore and the rest of the WRAMS members on another great show. Next month, we'll report on the Toledo Show, the big one, and concentrate on new, or improved, products. •

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Hi-performance Cl. C Cabin ship. Contest winner then, and now. By Carl Hermes.

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Very simple, 46" span sport R/C aircraft for 05 electric power. By Stan Wilson.

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Goldberg's rubber powered Clipper scaled to 54", for .09 - .15 R/C. Stu Richmond.

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Sharp little 44-1/2" span cabin gas model from Nov. 1937 M.A.N. Malcolm Abzug.

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Electric powered, 2-inch scale biplane for 3-channel radio. Bill Gilchri

No. 4831 FRANKLIN SPORT $9.00
Electric powered, 2-inch scale classic biplane for 3-channel radio. Bill Gilchrist.

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Inexpensive 1/2A ukie sport racer. Build two from one 1/4 x 4 sht. James Martin.

No. 483-O.T. BELLANCA CARGO $3.50
Rubber scale cabin Aircruiser from July '37 M.A.N., 32" span. By Joseph Kovel.

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Electric powered two-meter competition sailplane, for 05 motors. By Larry Jolly.

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Foam-built flying wing R/C glider, based on Navy carrier fighter. By Larry Renger.

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One of best Hank Struck gassies, from April/May '40 A.T. Constr. article incl.

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Easy built, .049 powered flying boat-like 2-ch. R/C sport biplane. By Bob Banka.

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Early post WW-II Berkeley kit design returns as 05 electric R/C. Mitch Poling.

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Sharp little 20" span rubber scale model of a cabin homebuilt. By Perry Peterson.

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Cl. A '40 Nats winner and record setter. Pylon. Detailed instructions. Bill Gibson.

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All sheet bass and balsawood 1/2A sport C/L for all skill levels. By Tyrone Parker.

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OF OUR MOST POPULAR

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SEE PAGE 98 FOR ORDERING INSTRUCTIONS
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No. 1180-O.T. FOKKER D-VIII $4.50
Very stable F/F flying scale ship for .23 ignition engines, 57" span. By Earl Stahl.

No. 980-O.T. DOLPHIN $10.00
Beautiful planked-fuselage 9' streamliner from 1939 M.A.N. By Thracy Petrides.

No. 880-O.T. HAYSEED $4.00
Hot A/B pylon (no-window cabin) never before published, 4-ft. span. Carl Hermes.

No. 780-O.T. STRATOSPHERE $3.50
Streamline cabin rubber ship from May 1941 M.A.N., 36" span. By Henry Cole.

No. 380-O.T. FLAMINGO $6.00
Rare old-timer appeared in 1938 JASCO catalog, 89" span. By Roger Hammer.

No. 280-O.T. RED RIPPER $5.00
Sort of a 'squared off' Zipper, from 7/40 Flying Aces. 72" span. By Jerry Peeples.

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Highly refined version of 1937 Moffet winner, from 1941 A.T. By Jim Cahill.

No. 1279-O.T. MISS TINY $4.00
Well known and sharp little 1938 gassie for .19-.23 ignition, 46". Barney Snyder.

1179-O.T. MISS PHILADELPHIA $8.00
Maxwell Bassett's famed 8-ft. parasol gas model, kitted by Scientific. By MB staff.

No. 979-O.T. LANZO '37 STICK $8.50
First R/C Nats winner, 4th in Famous R/C series. Spans 9 ft. By Chet Lanzo.

No. 879-O.T.-2 CHALLENGER $4.00
Easily-built Class B gassie with 50" span from May '41 Air Trails. H.A. Thomas.

No. 579-O.T. TAYLORCRAFT $12.00
Quarter-scale in 1941! Famous 9-foot design kitted by Miniature Aircraft Corp.

No. 379-O.T. PRIVATEER $6.00
Very clean cabin design from Sept. '38 M.A.N., 87" span. By Thracy Petrides.

No. 878-O.T. .020 RECORD HOUND $2.50
Classic Henry Struck design. Could dominate .020 Replica class. Dave Sweeney.

No. 778-O.T. CURTISS ROBIN $6.00
A 1937 Sport Scale ship! From Comet kit, 72" span. Designed by Joe Konefes.

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Steve Kowalik's 1937 Junior Motors Consistency winner. Easy to build, 7' span.

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Earl Stahl's 33" span 1940 rubber powered low winger. Northrop & Patterson.

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Walt Good's 1938 Class 'C' gas winner, from '40 AT. Span 72". Al Patterson.

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Payload gas model winner from Aug. '38 M.A.N. Spans 8 feet. By Thracy Petrides.

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Frank Zaic's 1938 Stout Trophy winner, also for Wakefield. Patterson & Northrop.

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Class C free flight from March 1941 Air Trails, 68" span. M. Schoenbrun design.

No. 477-O.T. CLOUD CHASER $1.50
This 30" span stick job from 1938 MAN is OT, FF trainer, Unlim. Bruno Marchi.

No. 377-O.T. GAS CHAMP $5.00
The famous 1940 "Eastern States Champ" by Russell Simmons, span 76". Al Patterson.

No. 1276-O.T. RAMBLER $4.00
Good 72" span contest gas model from 1939 Flying Aces. By Gilbert Shurman.

No. 1076-OT CALIFORNIA CHAMP $3.00
1940 Wakefield with retract wheel, twin rudders, anhedral stab. Tom Engleman.

No. 976-OT WINGED VICTORY $5.00
Classic and realistic gas model from 1937 MAN. Radial cowl, 5' span. Joe Weathers.

No. 876-O.T. RECORD HOUND $5.00
Shoulder-wing mono-wheeler with anhedral stab. Span 72". Hank Struck design.

No. 576-O.T. SCRAM $5.00
Clean Class C cabin job from July 1938 Flying Aces. Span 83". Heit/Patterson.

No. 476-O.T. CABRULER $4.00
Never before published Class A cabin model New Ruler, by designer Hank Struck.

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Good looking, stable cabin gas model of the 1937 era. Span 78". Phil Bernhardt.

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The classic of all rubber powered competition free flights. By Phil Bernhardt.

No. 1175-O.T. FOO 2 U 2 $3.00
A pre-Zipper design by Dick Obarski, reduced to .020 Replica, by Ron Shairpton.

No. 875-O.T. '38 MOFFETT CHAMP $3.00
Canadian Roy Nelder's beautiful rubber ship. A real classic. By Phil Bernhardt.

No. 775-O.T. BOMBSHELL $4.00
Famous winner of Class C gas at the '40 Nats, by Joe Konefes. Phil Bernhardt.

No. 575-O.T. MERCURY $5.00
Designed by Ben Shereshaw, kitted by Scientific. 72" span. By Phil Bernhardt.

No. 475-O.T. G.H.Q. SPORTSTER $5.00
From July 1936 M.A.N., also kitted by G.H.Q. By Louis Loutrel. Phil Bernhardt.

No. 175-O.T. FLYING QUAKER $5.00
First gas model kit by Megow, 1937. Span 7 ft. Redrawn by Phil Bernhardt.

No. 1274-O.T. THERM'L THUMBER $4.00
Hot Class A or B pylon type gas model. Span 48". Redrawn by Phil Bernhardt.

No. 1174-O.T. LANZO STICK $3.50
Rubber stick winner, '40 Nats. Span 4½'. Still good in Unlim. By Phil Bernhardt.

No. 91074-O.T. BUHL PUP $6.00
Semi-scale 8 ft. span model published in 1936 MAN. Redrawn by Phil Bernhardt.

No. 874-O.T. POWERHOUSE $5.00
Taibi's famous design for Forster 99 ign. Great for R/C O. T. By Phil Bernhardt.

No. 674-O.T. RED ZEPHYR $5.00
One of the most famous of early kit gas models. Redrawn by Phil Bernhardt.

No. 574-O.T. The T-D COUPE $5.00
Classic high wing 1936 'C' cabin gas job. Span 64". Redrawn by Phil Bernhardt.

No. 474-O.T. PACEMAKER $5.00
J. L. Sadler's famous Class C low wing gas model. Redrawn by Phil Bernhardt.

No. 274-OT PACER "C" $4.00
Sal Taibi's famous 1941 Nats gas winner. 60" span. Redrawn by Phil Bernhardt.

No. 174-OT EHLING '37 GAS JOB $5.00
Frank Ehling's 8 ft. span 1937 gas model. Still winning! Drawn by Phil Bernhardt.

No. 1273-OT INTERCEPTER $2.00
An .020 Replica of popular Goldberg design, kitted by Comet. By Wayne Cain.

No. 1073-OT GOLDBERG ZIPPER $4.00
Most famous of all OT gas models ended cabin era. Redrawn by Phil Bernhardt.

No. 973-OT SPOOK 48 $4.00
Well known gull wing design qualifies for Antique Old Timers. By Snyder & Muir.

No. 773-OT LANZO 8' GAS MODEL $6.00
Chet Lanzo's famous "Record Breaker." Two large plan sheets. By Phil Bernhardt.

No. 673-OT ALBATROSS $4.50
Class C gas ship designed by George Reich. Redrawn by Phil Berhardt.

No. 573-OT 1 AERBO 020 $3.00
Replica of 1941 Class A Nats winner. Span 30". Redesigned by Phil Bernhardt.

"I don't know whether to enter the FAI program or not. I already have a career."

Workbench . . . . *Continued from page 6*

Mr. Patterson is tuned in, please contact Walt at 2912 Camarillo Mesa Dr., San Diego, CA 92123.

STEAMROLLED

From time to time, modelers ask for rolled prints when ordering plans. While on the surface it may not seem all that difficult to offer a choice of rolled or folded prints, take a look at the facts.

When the paper on which a plan has been printed comes out of the copy machine, the paper is limp, almost like cloth. It can easily be rolled into a tube or folded. Once the paper dries out, however, it becomes stiff and takes a set. Everyone has experienced the exasperation of trying to unroll a plan in order to examine it. The stubborn thing will roll back up, taking everything with it but a heavy book placed at each corner! Folded prints, on the other hand, have annoying creases when opened up, are sometimes difficult to fold back into the original shape (like road maps), and when building over the plans, the creased paper tries to push the wood away from the construction surface.

When studying a plan and/or "mentally building" a model, a folded print is the handiest. When actually assembling a model structure over a plan, a rolled print is handiest.

From the marketing point of view, folded plans have it all over rolled plans. Imagine storing approximately 2000 rolled plans (we try to stock three or four copies of every one of our more than 500 model plans). Not only that, we would have to keep hundreds of mailing tubes in stock . . . in various lengths to suit various plan sizes. On the other hand, 2000 folded prints can be cataloged and stored in three normal size file cabinets . . . and regardless of plan size, they are all folded to the same dimension . . . 8½ x 11 to fit in 9 x 12 envelopes.

If the plan buyer has only a few prints on hand, it shouldn't be too difficult to store them in the corner of a closet. However, if you're storing quite a few plans for those models you're going to build "some rainy day", folded is the only way to go.

When it comes time to build, or if a collector really insists on rolled drawings, the folded plan buyer can "have his cake, and eat it too." If the household doesn't happen to possess a steam iron, now is the time to buy a nice "gift" for the chief ironer in the family! Lay the unfolded plan on the ironing board and make sure the iron is ready to make steam. Press the steam trigger and give one of the creases a healthy shot, followed by direct application of the iron. Pretty soon you'll have a smooth drawing which can be rolled into a tube . . . Steam Rolled . . get it?

By the way, store your prints in a dark area (another point in favor of folding and enclosing in an envelope). Long exposure to normal light will turn the exposed area of a print yellowish-brown. It's still usable, but doesn't look too nice.

THINGS TO DO

Hosted by the Barons Model Club of Spokane, the Spokane Scale Internats is scheduled for June 10, 11, and 12, 1983, and you'll never guess where. Events will include Expert, Sportsman, Team Scale, and Giant Scale. Fees are $17 per event, with an additional $3 for Scale Masters finals. Pre-registration is required by June 1, or pay an additional $5. For more info, call C.D. Joe Fox (509/456-0500) or Assistant C.D. Bruce Nelson (509/484-5631). For information and registration requests, write to Marcie Nelson, E 807 Vicksburg, Spokane, WA 99208.

★ ★ ★

The Fourth Annual Keystone R/C Club Electric Fly will take place on August 20 and 21, 1983, in Hatfield, Pennsylvania. This event is intended to promote electric flying. It's a fun-fly where all electric R/C models are welcome, including: scale, sport, aerobatics, old timer, powered glider . . . you name it! In addition, the KRC offers an Electric Fly Clinic during the fun-fly, including: seminars, static displays, product information, flight demonstrations, parts and supplies, and personalized technical assistance. For further information, contact John Hickey, 1624 Maple Ave., Hatfield, PA 19440.

★ ★ ★

For eastern freeflighters who want to tune up for the first East Coast Nats in 14 years, the Eastern Freeflight Conference and Minneapolis Honeywell is co-sponsoring the Eastern U.S. Freeflight Championships (triple-A sanction) at Galeville Army Field, above West Point, New York, on June 24 and 25, 1983.

Classes to be flown include 1/2A, A, B, C, and FAI Gas; A/1 and A/2 Nordic; H/L Glider; P-30, Coupe, Wakefield, and Mulvihill rubber; and Peanut, rubber, and power scale. AMA rules, Category 2, three-minute max.

Trophies and merchandise awards will total over $2500, with most events being trophied through fifth place.

For further information, contact Overall C.D. Tom Kerr, 7484 Lexington Ave., Philadelphia, PA 19152, (215) 331-4890, or C.D. Joe Wagner, 12 Cook St., Rowayton, CT 06853, (203) 866-2426 home, or (203) 853-7654 (office.

TWO BITS

While we're talking freeflight, a new OT rubber event is being offered by the Southern California Ignition Fliers (SCIF), and it seems worth describing.

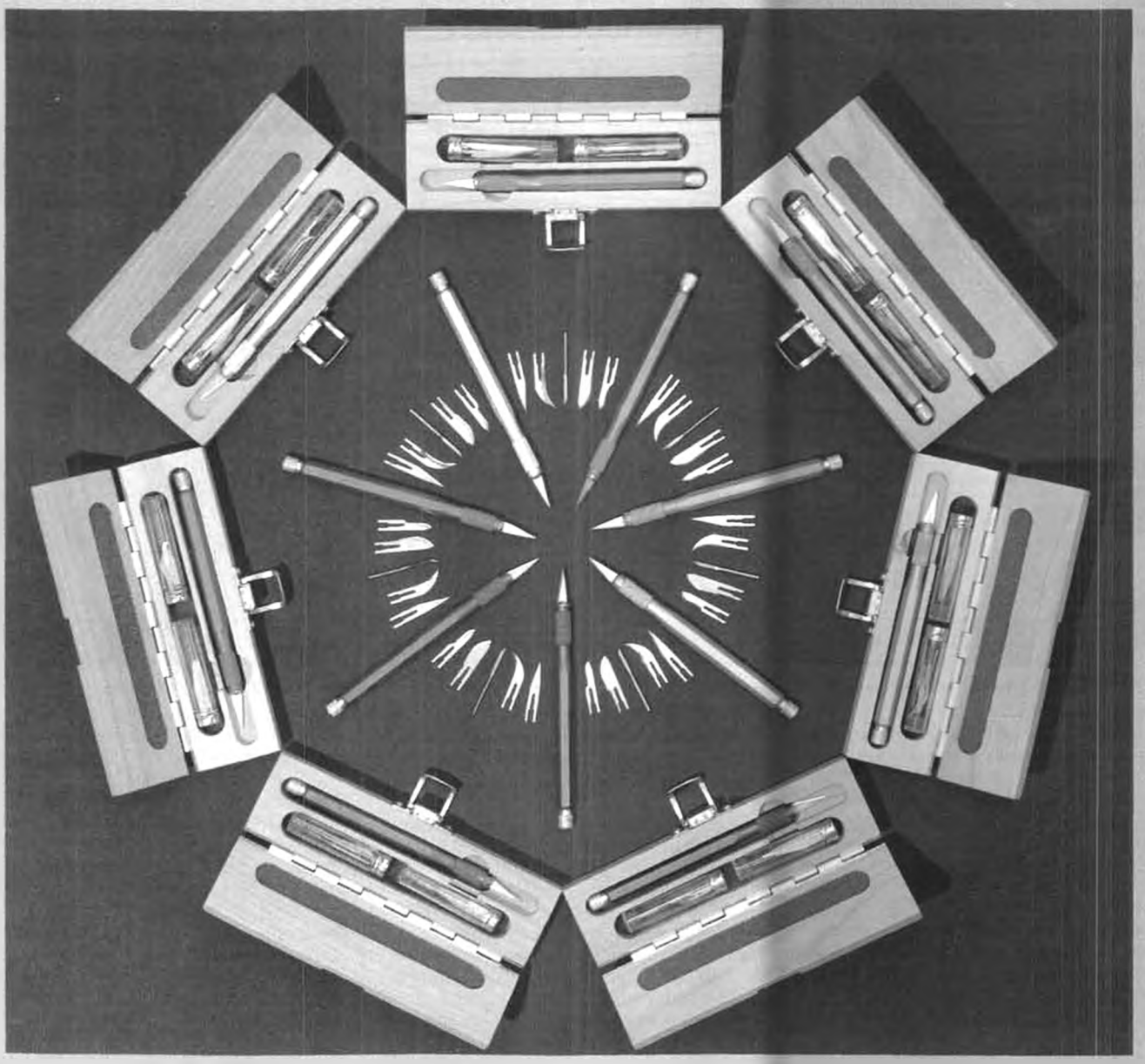
1. To provide the beginning modeler, or new OT recruit, with a simple, but competitive, event as an inexpensive and interesting introduction into the spirit and practice of Old Timer modeling fun.

2. To provide the experienced OT flyer with a simple, but challenging, fun event that will not interfere with the pursuit of regular OT events.

DESIGN RULES:

1. For published or kitted OT rubber models with a maximum (projected) wingspan not exceeding 25 inches.

IN THE BEST CIRCLES, IT'S **über skiver**



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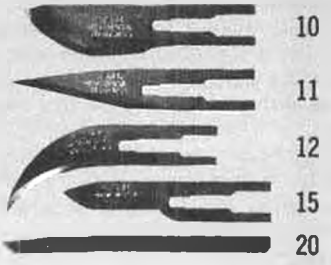

NEW PRICES AS OF APRIL 1, 1983

Available in seven satin anodized handle colors: silver, blue, red, green, gold, black, & violet. Complete set in fitted hardwood case, includes uber Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 . . . . . $16.50

Individual handles (specify color) $6.95

Vial of 6 blades (No. 10, 11, or 15) $3.00

(No. 12 or 20) $4.00

See your dealer, or order direct.
Dealer inquiries are invited.
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2. Original design must show a landing gear.

3. Any type of design is permitted which meets Rules 1 and 2 above: (i.e., "Commercials", Scales, ROGs, Indoor/Outdoor types, etc.).

4. Propellers: Original prop design must be used. If no prop plan is provided, a classic OT design must be used (i.e., diameter not exceeding 36 percent of wingspan, and layout to "X" blank, or basic "4-quarters" blank). "Modern" props (i.e., plastic, molded, foam, dowel hubs, etc.) are not permitted. Folding props are not permitted, but freewheeling is OK. DTs are permitted.

FLYING RULES:

1. Model must ROG. Official flight: 20-sec's minimum, 2-min. maximum.

2. Unlimited attempts to make 3 Officials. A second, and third model may be used for lost (but not broken) model(s) to complete Officials.

3. All fly-offs to break ties are 2-min. maximums.

Incidentally, while chatting with Henry Struck at the 1983 WRAM show in White Plains, New York a few weeks ago, I mentioned my comment in the May issue about the possibility of limiting some beginners and/or OT rubber events for small models, to hand-winding . . . the real grass roots early modeler method of winding. . . He thought it was a great idea. By the way, his never-before-published, 1937 Wakefield model, will appear in **MB** in the near future.

NEW BOOKS

Paul Matt's *Historical Aviation Album* offers two new items, the *Ninth Air Force Story* ($7.95) and *Cobra in the Clouds* ($6.50).

Ken Rust has written the new, revised, and condensed story of the Ninth, taking it from its first combat action in the North African desert, to Sicily and Italy, and to England, for the D-Day invasion and joining with the 8th Air Force for the final European operations.

The 39th Fighter Squadron, attached to the 35th Fighter Group, was one of the first to see combat in the Southwest Pacific in '42, and got its "Cobra" nickname because its first aircraft were P-400 (P-39) Airacobras. John Stanaway wrote *Cobra in the Clouds*, covering its history from 1942 and WW-II, through Korea and beyond. Based mainly on pilot reports, it describes the 39th operations with P-39s, then the P-38, followed by the P-47, and finally the P-51, which it continued to use when called back to Korea, until the jet age came along with the P-80 and then the F-86.

Both books are 8-1/2 x 11, on high quality coated paper, heavy card stock four-color covers, and loaded with photos. Write to Historical Aviation Album, Box 33, Temple City, CA 91780, and send 50 cents in stamps or coin for latest illustrated catalog. Tell Paul that **Model Builder** sent ya.

WHO OWNS WHAT

If it doesn't have wings, and won't fly without needing motive power, our assistant editor and *R/C Soaring* columnist, Bill Forrey, may not know its origin. In writing about the new chrome plated wheels for off-road R/C cars by Kraft Systems (in the March 1983 "Over the Counter"), Bill said, "Kraft Systems is spinning circles around **its** Rough Rider and Sand Scorcher R/C cars . . . etc." Our apologies to MRC for inadvertently "transferring ownership" of these exciting R/C vehicles by Tamiya of Japan, which are marketed in the U.S. by MRC.

LIMITED EDITION PRINTS

As mentioned in a late 1982 issue, limited edition, full size (22 x 28 inches) litho prints of Bob Benjamin's painting for our October 1982 cover (Harold Krier's Great Lakes Special) will be available by the time this information reaches the newsstands. Only 500 prints will be made, each numbered and signed by the artist. These large, full-color reproductions, when suitably mounted and/or framed, will make an outstanding decoration for your home, office, or workshop. Price will be $50 plus handling and shipping charges. All prints will travel in sturdy mailing tubes. By the way, other limited edition prints will become available at suitable intervals. However, if you want the Great Lakes print, get your order in early. Estimated handling and shipping charges should not exceed $5. •

The K-Line KP5K Confidence for his first solo.

You've given him a lot of instruction and this time he wants to solo. You want to be sure that nothing interferes with the pride of accomplishment he will feel when he finally lands. You're confident he's using the best available equipment; a reliable K-line series radio from Kraft Systems.

K-line radio control systems from Kraft are the imported R/C systems with a big difference; the Kraft label. K-line R/C systems are the result of Kraft's efforts to bring you an inexpensive imported radio with the same solid record of reliability as those made at the Kraft plant in Vista, California. Because K-line R/C systems are designed, manufactured and tested to strict Kraft Systems standards, they will perform reliably for years, and you can purchase them at a competitive price.

The KP5K is the K-line 5 channel R/C system. This system features adjustable dual rates on the transmitter with plug-in radio frequency sections available for all existing and the 11 new frequencies. The transmitter's smooth, responsive control sticks and high technology single integrated circuit encoder send clean strong signals to the highly sensitive, interference resistant and compact receiver. Our standard K-line servos deserve special mention. Unlike other standard economy servos, ours are fast, low current drain servos that feature sealed pots with carbon wipers (not metal) and 5 pole motors with carbon brushes for high torque and long life.

There's a variety of K-line radio control systems just suited to your particular needs including our innovative championship KP3KW/B pistol grip wheel radio for R/C cars and boats. See your favorite R/C hobby dealer or write for our detailed brochure on the complete line of Kraft radios and the Kraft quality difference.

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HAVE A BLAST WITH MRC-TAMIYA'S NEW WILD WILLY OFF-ROAD STUNT BUGGY.

KIT SPECS
Body derived from Willys M38 military vehicle
Length 13½"
Width 9½"
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(2 channel R/C system and 6 or 7.2 volt battery required... not included)

Talk about wild... Willy is it. Talk about fun... Willy's the one. It's MRC-Tamiya's stunt buggy kit. Its been geared for everyone... whether you're into R/C off-road, or ready to take the plunge. ■ To begin with, it looks like fun. From Willy in the driver's seat, to its oversize sand tires and rugged, jeep-like chassis, through its spring loaded front bumper that soaks up shocks and bounces Willy back into action, Willy was made for stunting. Its wide track and short wheelbase make it perfect for wheelies, spinouts, donuts, figure eights, and uphill climbs... Wild Willy was engineered to do it all. From asphalt to mud, from sand dunes to rocky slopes, Wild Willy takes them in stride. ■ **STUNTABILITY**... It's all in the engineering... technology that only MRC-Tamiya could create. We've given Wild Willy an ability for super, quick acceleration beyond conventional off-road cars. And we've coupled this with a front wheel independent suspension, four ball bearings, long trailing arms and differential gear on the rear axle. It adds up to stuntability you're going to love. Then, to make sure this wild buggy keeps its balance, we engineered spring wheelie casters to keep it right side up while it's hotdogging through the boonies. But just in case, we had a strong roll bar built into the rugged chassis to keep Willy in one piece. ■ Wild Willy... engineered, conceived and built to be the first, high performance, off-road stunt buggy ever made. It's pure pleasure. Go for it.

MRC TAMIYA

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WILD WILLY OFF-ROAD STUNT BUGGY