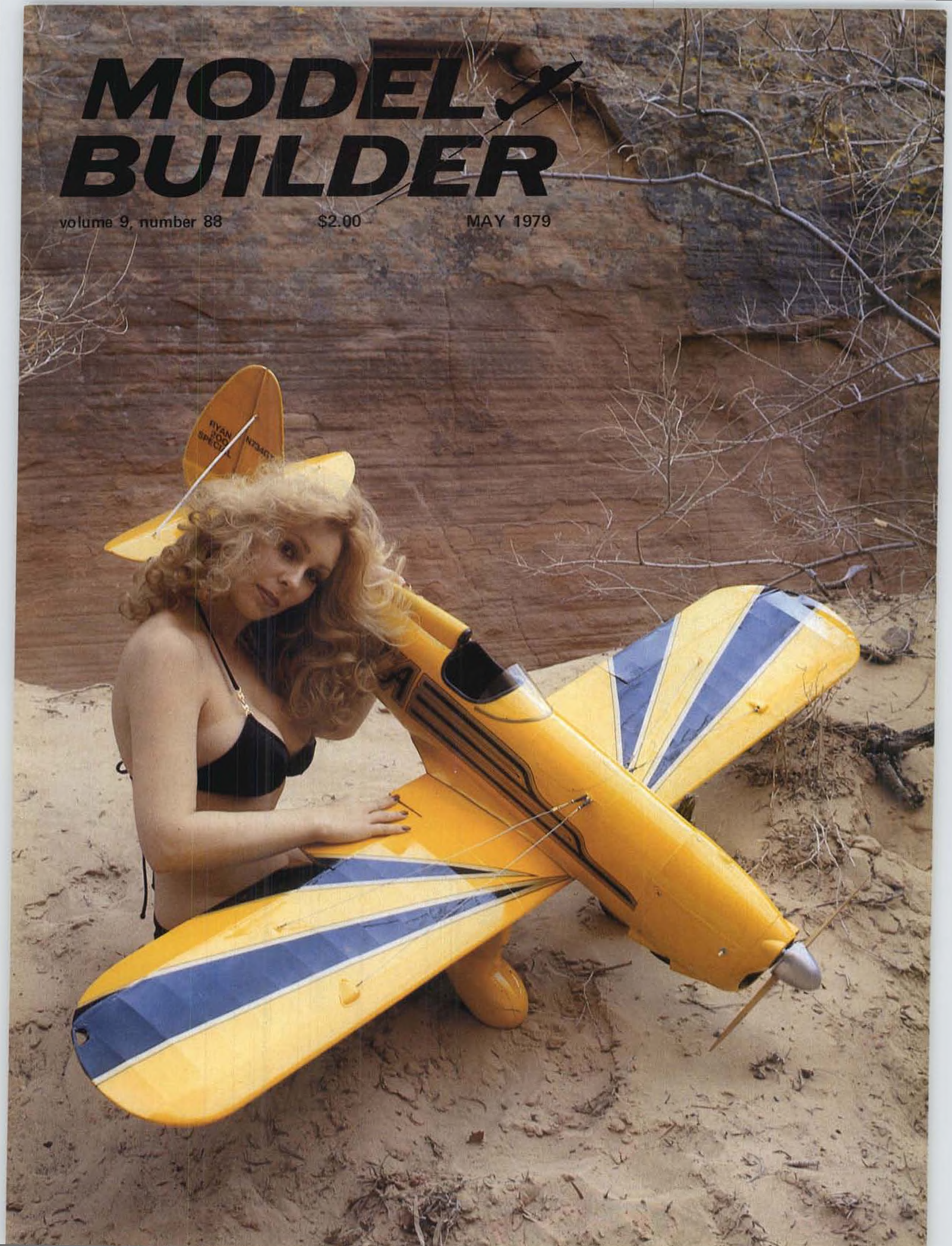
MODEL BUILDER

volume 9, number 88 $2.00 MAY 1979



HOT STUFF.... 1/2 oz.... $3.95

ZAP.... .35 oz... $3.25

JET.... 1/2 oz.... $2.95

Nuff said?

ALL YOU HAVE TO DO TO SAVE ONE DOLLAR is ASK FOR JET

1/2 oz. $2.95
1/4 oz. $1.75

AVAILABLE IN CANADA

Dear Carl:

I'm enclosing a picture of my Baron 58, with my daughter. I was able to get some factory drawings, and I scaled it 2.25" to the foot. It has done very well for me on the contest circuit--three first places this summer. It's built almost entirely with JET. It really speeds the construction time; and most important, it keeps the weight down!

I've had many pleasant experiences with your designs. My first successful gas job back in the 30's was a Clipper, and I learned to fly R/C in 1964 with a Senior Falcon. I still recommend the Senior Falcon as a first airplane for a beginner; I haven't seen anything better yet. Oh! If we had only had JET back in those days.

Cordially,

M. C. Caddell

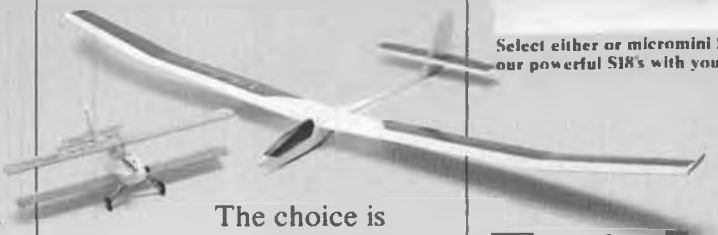
CARL GOLDBERG MODELS, INC.
4736 West Chicago Avenue • Chicago, Illinois 60651

ALL ITEMS AVAILABLE IN CANADA

The Futaba FP-3S provides precise, single-stick control of rudder and elevator.

The Futaba FP-3S system makes a great combination for the RC sailplane or ½A pilot. First, you get smooth, accurate control with the single-stick operation preferred by competition flyers. Then you can match up our R3F double-tuned, RF amplified receiver with your choice of S18 or S20 servos to best suit your model and your budget. Equipped with a pair of S18's, the 3S system is just $144.95. Or you can specify our mighty mite, ball-bearing S20's with the 3S for $159.95.

Select either or micromini S20's (shown) or our powerful S18's with your 3S system.



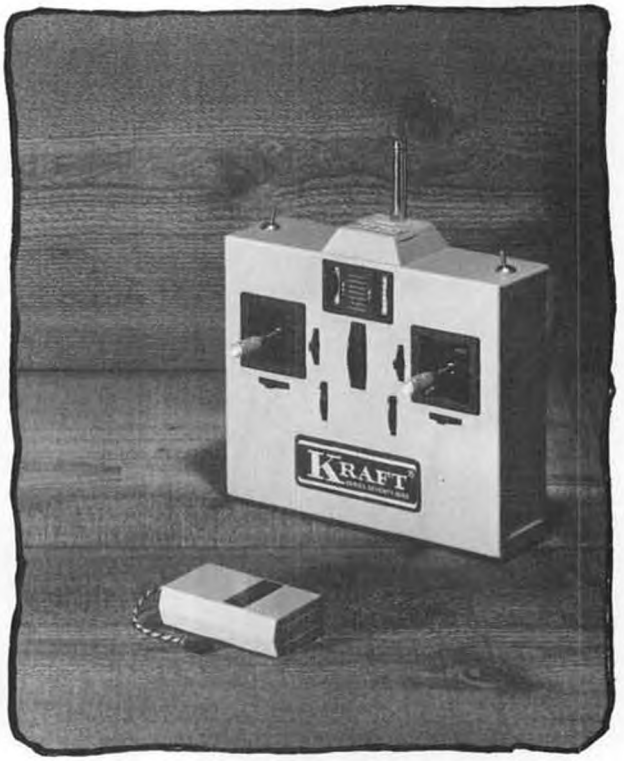
The choice is yours, but either way you'll be flying with the leader in radio control performance, reliability and service. Futaba.

Futaba

2065 East Victoria Street/
Compton, California 90220

The FP-3S. Three channels. Two servo choices. Single-stick control.

Pioneers



Pioneering major developments in radio control is second nature to us; it's the way we started. Back in 1959, a Kraft single channel receiver was introduced, the first of its kind. Simple as it may appear today, it far surpassed in performance and reliability anything then available. In fact, it was immediately put to the test by many leading contestants in the 1960 R.C. Nationals.

Continued development led to other significant breakthroughs. In 1964, our KP-4 introduced the age of reliable digital radio control. It was simply the best you could own, and it was backed with the superior design and high quality that had come to be associated with the Kraft name.

In 1968, our Gold Medal Series brought simplicity, miniaturization, and lower cost to the average enthusiast. It was the most popular system of its day, and is now considered to be an R.C. classic. Nineteen Seventy-five brought the world's first programmable R.C. system designed for the competitive modeler, Phil Kraft's Signature Series. The 1976 Bicentennial Series was the first to feature interchangeable frequency modules, making easy frequency changing in the same band or to all frequencies in other bands a reality. In 1977, we built the world's smallest and lightest servo, the KPS-18, which set a new standard in miniaturization. Last year, we developed an FM receiver and transmitter module for present and future applications.

Today, our Series '79 and Sport Series systems are a culmination of 20 years' design experience and innovation. We offer seven different systems with a wide range of components and accessories. Kraft continues to stand for progressive design, quality, reliability, and service. As a demonstration of our confidence, all new systems are covered by a one-year limited warranty. Write for a free catalog.

Remember, we've been leading the way since 1959!

450 W. California Avenue
P.O. Box 1268. Vista, California 92083
(714) 724-7146

KRAFT SYSTEMS, INC.

ANTIDOTES FOR BIPLANE FEVER

FULLY AEROBATIC SYMMETRICAL WINGS

Skybolt

Designed by CLAUDE McCULLOUGH

KIT RC-34

SIG

$69.95

ENGINES: .60
WING SPAN: 51"
LENGTH: 42-1/2"

1ST, 2ND AND 4TH ADVANCED BIPLANE AT 1976 MULTIWING CHAMPIONSHIPS
1ST SPORTSMAN BIPLANE AT 1977 SIG IMAC CHAMPIONSHIPS
1ST SPORTSMAN BIPLANE 1978 SIG IMAC CHAMPIONSHIPS

LIBERTY SPORT

Designed by DICK GRAHAM

SIG

KIT RC-33

$72.50

ENGINE SIZE: .60
WING SPAN: 57"
LENGTH: 45"

NATIONALS WINNERS

1st Place - 1973 National Multi-Wing - Dick Graham
1st Place - 1975 CL AMA Scale Sr. - Cathy Burnstine
2nd Place - 1975 FF Scale Gas JS - Scott Gesner

AN EXACT SCALE RC MODEL

PLAN TO ATTEND THE SIG IMAC CHAMPIONSHIPS IN MONTEZUMA, JUNE 16-17. SCALE BIPLANE, MONOPLANE AND MAMMOTH AEROBATIC COMPETITION.

RC SPORT SCALE BIPLANE

Glen Sig's SMITH MINIPLANE

Designed by MIKE GRETZ

SIG

KIT RC-38

ENGINES: .40 to .45 Cu. In.
TOP WING SPAN: 44"
TOTAL WING AREA: 650 Sq. In.
LENGTH: 40-3/8"

1ST SPORT SCALE 1976 NATIONAL MULTIWING CHAMPIONSHIPS
1ST SPORT SCALE 1976 CANADIAN NATIONAL CHAMPIONSHIPS
2ND SPORTSMAN BIPLANE 1978 SIG IMAC CHAMPIONSHIPS

$54.95

The Best Hobby Dealers Stock SIG - Catalog 40 - Complete Line Of Kits And Accessories - $2.00

SIG MANUFACTURING CO. . . . . Montezuma, IA 50171

for Spring By Sterling Models

A Super "SURFACE VEHICLE!" For 2 Channel R/C

Length 24

Width 7¾

Engine .049

KIT LV – 1 SPACE SQUIRT

Two Beautiful Models developed for 2-channel R/C, expertly engineered, featuring accurately die-cut Balsa, precisely vacuum-formed parts, Hardware and detailed Plans and Instructions.

Kit FS37

Piper Tri-Pacer

Wing Span-44 **Scale 1½ 1**

For .049-.10 Engines

Another Great Kit For 2 Channel R/C

Catalog of entire line of airplane control line model kits R C scale and Trainer kits boat model kits accessories etc 50¢ enclosed

Secrets of Model Airplane Building Including design construction covering finishing flying adjusting control systems etc 25¢ enclosed

Secrets of Control Line and Carrier Flying Including preflight soloing stunting Carrier rules and regulations Carrier flying hints and control line installation instructions 25¢ enclosed

No checks Only U S money orders or currency accepted

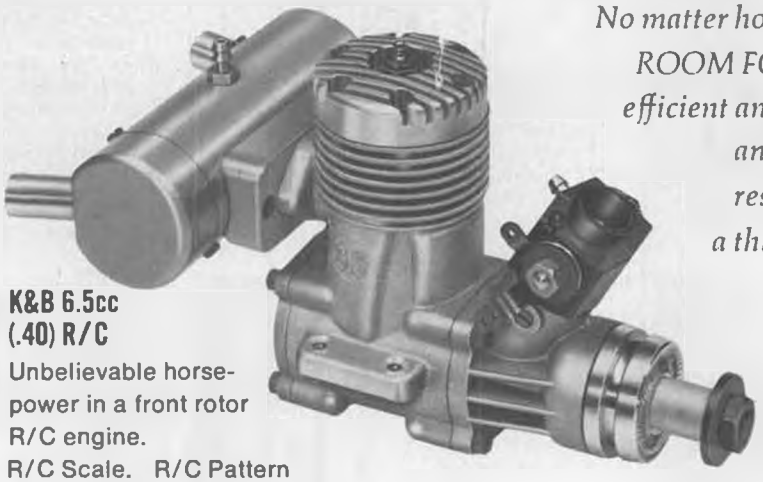
STERLING MODELS • 3620 G ST PHILA PA 19134

If no dealer available direct orders accepted — with 10% additional charge for handling and shipping (60¢ minimum in U S $1 25 minimum outside U S)

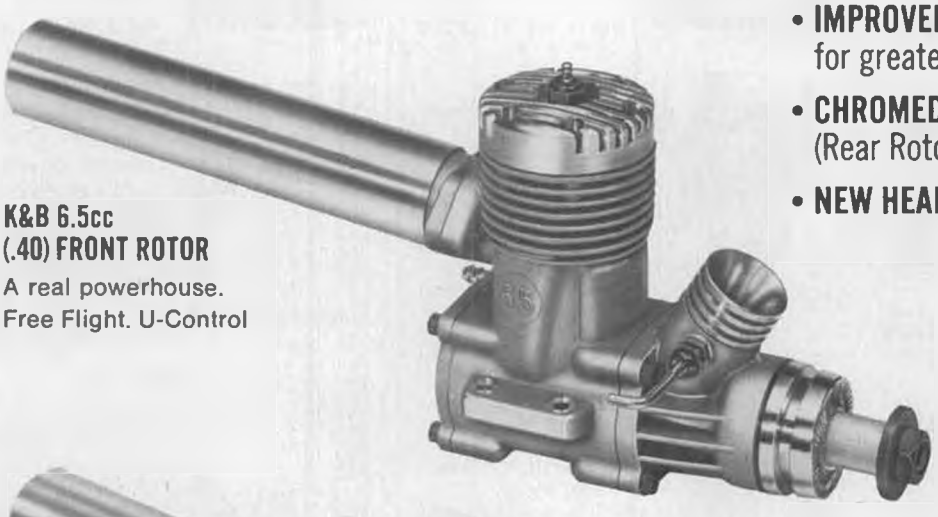
Name _____

Address _____ City _____ State _____ Zip _____

ALWAYS ROOM FOR IMPROVEMENT!



K&B 6.5cc (.40) R/C
Unbelievable horsepower in a front rotor R/C engine.
R/C Scale. R/C Pattern



K&B 6.5cc (.40) FRONT ROTOR
A real powerhouse.
Free Flight. U-Control

K&B 6.5cc (.40) RACING ENGINE
"Out of the box" the most powerful production 6.5cc engine ever built!

No matter how good a product is there's ALWAYS ROOM FOR IMPROVEMENT! These popular, efficient and durable engines are MORE efficient and MORE durable due to our extensive research and engineering knowledge . . . a thirty two year tradition of K&B quality and leadership. The resulting factors that have substantially improved these three engines are:

- **THE MACHINED 7075T-6 CON ROD** bushed at both ends
- **IMPROVED CRANKSHAFT** for greater strength
- **CHROMED STEEL ROTOR DISC** (Rear Rotor models only)
- **NEW HEAD DESIGN**

STANDARD FEATURES
found in all 3 engines

- **ABC CYLINDER & PISTON**
- **K&B QUINTUPLE PORTING**
- **REAR EXHAUST**
- **MUFFLER** (Front Rotor only)
- **BALL BEARINGS**
- **HIGH DENSITY ALUMINUM DIE CASTING**

Because K&B engines are better today you can be assured they'll be better still tomorrow. K&B's time-honored desire to improve our products impels us to move forward . . .

THERE'S ALWAYS ROOM FOR IMPROVEMENT!

K&B®

K&B MANUFACTURING
12152 WOODRUFF AVE., DOWNEY, CA. 90241

OLDIES (BUT STILL GOODIES!)

MOST BACK ISSUES OF "MODEL BUILDER" ARE STILL AVAILABLE, THOUGH SOME ARE IN SHORT SUPPLY. ORDER NOW, WHILE THEY LAST! PRICES VARY ACCORDING TO QUANTITY REMAINING IN STOCK. NOTE SPECIAL ANNIVERSARY PRICES LISTED BELOW!

November 1971

Nancy, R/C soarer.
R/C Pattern World Championships.
Peanut Fokker D VI.
ILSF Tournament story.
Bi-Prentice, R/C bipe trainer.

Vol. 1, No. 2 $3.00

December 1971

Curtiss-Wright Junior R/C 2" scale.
R/C Twin Trainer 75" span, for .40's.
Peanut Laird LC-DC.
Volksplane 3V-1 3-views.
How to build light "wire" wheels.

Vol. 1, No. 3 $2.00

January 1972

SHOCer F/F by Mel Schmidt.
White Trash, famous R/C soarer.
Peanut Ord-Hume.
Chet Lanzo's famous rubber Puss Moth.
Curtiss Robin 3-views.

Vol. 2, No. 4 $1.00

February 1972

Minnow U/C profile scale racer.
Fokker E-I R/C scale.
Al Vela's SOLD OUT Boy 1/2A
E-Z Bo[SOLD OUT].A, Al Vela.
Peanu[SOLD OUT]d Flivver.
Fibe[SOLD OUT]ing over balsa, by Le Gray.
Spoiler, FAI Combat.

Vol. 2, No. 5 $3.00

Mar/April 1972

Yankee Gull R/C glider 8' to 12' span.
Miss Cosmic Wind, QM R/C Pylon racer.
Peanut Scale Bucker Jungmann.
Siebel 1/4A F/F scale.
Mr. Mulligan 3-views.
FAI power "Folder."

Vol. 2, No. 6 $1.00

May 1972

Seahorse II, R/C seaplane. For .19-.35.
D.H. Humming Bird, F/F or R/C pulse.
Peanut Fokker V-23.
Whetstone 1/2A U/C combat.
Ryan ST 3-views.
Tethered Cars, R/C sail.

Vol. 2, No. 7 $2.00

June 1972

Bob White Wakefield.
Mongster QM biplane R/C pylon racer.
Calif. Coaster R/C glider. Sheet wing.
Three profile Peanuts.
Deperdussin 3-views.
Pesco Special 3-views.

Vol. 2, No. 8 $3.00

July 1972

Fairchild 51, 1" scale, R/C or F/F.
SAM-5 A/2 Nordic.
1912 Avro G rubber.
Comanche C stand-off R/C scale.
Travelair 2000 2" scale R/C, by Editor.
Chester Jeep 3-views.

Vol. 2, No. 9 $4.00

August 1972

Bonzo standard R/C sport pylon scale.
Counterfeit SOLD OUT ailless A/1 glastic.
Shoestring R/C QM.
Pear[SOLD OUT]aylorcraft on skis, also big one.
Fairey Delta 3-views.

Vol. 2, No. 10 $4.00

Feb/March 1973

Profile F4U Corsair C/L stunt, .40 power.
Beecroft's Satan, Class A free flight.
Indoor Ornithopter.
Peanut Travelair 2000
PT-3 Scale Views.
Thermal hunting with R/C gliders.

Vol. 3, No. 16 $2.00

April 1973

Fabulous PEA POD, R/C sailboat.
Briegleb BG-12, scale R/C soarer.
R/C Spirit of St. Louis, semi-scale, .049-.09.
Peanut Volksplane
Finish painting of rubber scale models.

Vol. 3, No. 17 $3.00

May 1973

Bantee mini-pattern R/C 3channel, .19 power.
Woodwind A/2, all sheet covered wing.
Slope soaring technique.
Teakettle, twin-boom CO_2 pusher.
Peanut Monocoupe 110.
Aerbo, .020 Replica, OT

Vol. 3, No. 18 $1.00

SPECIAL ! ! !

MODEL BUILDER MAGAZINE'S

5th ANNIVERSARY BACK-ISSUE SALE ! !

ANY ISSUE MARKED WITH "o" 75 Cents!

ANY ISSUE MARKED WITH "•" 50 Cents!

Nov. 71	$3.00( )	May 73	o 1.00( )	Apr. 74	o 1.00( )
Dec. 71	2.00( )	Jul. 73	• 1.00( )	May 74	1.00( )
Jan. 72	o 1.00( )	Aug. 73	• 1.00( )	Jun. 74	• 1.00( )
~~Feb. 72~~	~~3.00( )~~	Sep. 73	• 1.00( )	Jul. 74	o 1.00( )
M/A 72	• 1.00( )	Oct. 73	• 1.00( )	Aug. 74	• 1.00( )
May 72	2.00( )	Nov. 73	o 1.00( )	S/O 74	• 1.00( )
Jun. 72	3.00( )	Dec. 73	• 1.00( )	Nov. 74	o 1.00( )
Jul. 72	4.00( )			Dec. 74	o 1.00( )
F/M 73	2.00( )	Jan. 74	o 1.00( )	Jan. 75	o 2.00( )
Apr. 73	3.00( )	Feb. 74	• 1.00( )	Feb. 75	2.00( )
		Mar. 74	o 1.00( )	Mar. 75	2.00( )
				Apr. 75	2.00( )
				May 75	3.00( )
				Jun. 75	1.25( )
				Jul. 75	• 1.25( )
				Aug. 75	o 2.00( )
				Sep. 75	o 1.25( )
				Oct. 75	o 1.25( )
				Nov. 75	o 1.25( )
				Dec. 75	o 1.25( )
				Jan. 76	o 1.50( )
				Feb. 76	o 1.50( )
				Mar. 76	o 1.50( )
				Apr. 76	o 1.50( )
				Jun. 76	o 1.50( )
				Jul. 76	o 1.50( )
				Aug. 76 through June 78,	1.50( )
				July 78	Sold Out
				*Aug. 78 to date each	2.00( )
				*Nov 78	Sold out

Put a check mark ( ) by the back issues you wish to order. Magazines will be mailed by Second Class, postpaid. Foreign orders (except Canada, Mexico, FPO, APO) add 30¢ per copy. Allow about four weeks for delivery. If United Parcel Service (UPS) is desired, add 80¢ minimum for up to two magazines, or add 80¢ plus 10¢ for each additional magazine on orders for three or more. Send check or Money Order (no cash, please, and no COD's). A facsimile of this order form may be used.

Name: _____

Address: _____

City: _____ State: _____

PLEASE PRINT ZIP: _____

MODEL BUILDER, 621 West Nineteenth St., Costa Mesa, Ca. 92627

MODEL BUILDER

MAY

1979

volume 9, number 88

621 West Nineteenth St., Costa Mesa, California 92627 Phone: (714) 645-8830

MODEL BUILDER (ISSN 0145-8175) is published monthly by Model Builder Magazine, 621 West Nineteenth St., Costa Mesa, California 92627. Phone (714) 645-8830.

Subscriptions $20.00 per year, $37.00 for two years. Single copies $2.00. Add $3.50 per year for postage outside of U.S. (except APO and FPO).

Change of address notices must be received one month 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.

Second Class postage paid at Costa Mesa, California, and additional offices

CONTENTS

Cover: Who cares if the controls aren't hooked up! The aircraft model is a Sig Ryan STA, built by George Tienkin and Billy Root, Las Vegas, Nevada. The girl-type model is actress Deborah Devine, and for further information you'll have to contact Billy Root, who set things up and snapped the shutter.

from Bill Northrop's workbench . . .

After a 9-year hiatus, back on the same team again . . . but a different team! Bill Northrop was R/C and Managing Editor of M.A.N. for five years, ending in 1969, while Walt Schroder was Editor at the time. Now Walt is Publisher and Business Manager of Model Builder, also handling advertising accounts, and Bill Northrop is Editor. New ballgame, same players.

MESSAGE FROM WALT SCHRODER

"Hey I'm back, like the proverbial bad penny I am constantly turning up and here I am with **Model Builder.** It's good to be back in the saddle once again . . . good for a few reasons, and one that is of real importance is our team effort at home. The team manager had worked with me at M.A.N. for seven-and-half years and never a heavy word between us, and now with the retirement and home only three days, words were being exchanged . . . it's hard to believe, but I was climbing the walls. A lot of that could be due to the New York winter, as all we had was confinement and the boob tube or the workshop. The workshop held no appeal as after more than fifty years of regular employment, it was hard to accept the status quo of retirement, so my interest level was very low!

"All I can promise at **Model Builder** is my usual total type effort, but can't promise a monthly column, as this is Bill Northrop's department and youth must be served . . . between us he'll be a lot better and not nearly as corny.

"Can't let the testimonial dinner slide by without mention. More than thirty industry and old friend types got together at the WRAM's show and gave me and the Team Manager a send-off party to end all parties, with good food, lots of good wishes; each one of those attending had a personal anecdote and I had no idea that I was quite that bad.

"Frank Garcher and Walt Caddell of the HIA presented me a plaque on behalf of the Model Aeronautics Division of the HIA and Joe Schmid presented Sue and I a lovely inscribed silver tray on behalf of the WRAM's. Nat Polk, the ringleader for the whole thing, was masterful as a master of ceremonies . . . he was a fund of jokes and reminisces.

"One last item . . . did you get to see page 66 of the April '79 issue of *RC Modeler*? Don, Pat, and the two Dicks went all out on my behalf, and if it was their intent to really soften me up they sure accomplished their purposes. Thanks is all I can say, but it's from the bottom of my heart.

"So to all my friends, I am back with you once again, and for all those lovely letters, please accept my thanks as I can't possibly write each of you personally. Please KNOW I am with you all in heart

Continued on page 108

Frank Garcher and Walt Caddell, of HIA, presented a plaque on behalf of the Model Aeronautics Division of the HIA to Walt Schroder during the dinner in his honor at White Plains, N.Y.

OVER THE COUNTER

Sterling Models is coming out with two new 1/2A models which should be on your dealer's shelves somewhere around the middle of April. The first is called the "Space Squirt" and is a snappy little land vehicle designed for 1 or 2-channel radios. This unusual model may provide a step up in model building for all those beginners who tried the Puddle Jumper, as it's just about as easy to build. The kit features die-cut balsa and plywood for building the simple internal frame, and a vacuum-formed plastic body and engine shroud. All hardware (including wheels) is included, along with detailed plans and instructions.

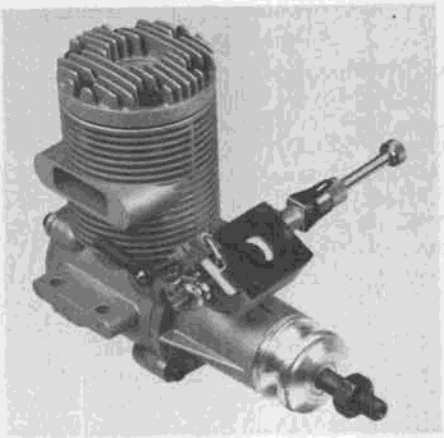
The second new kit is for something a little more conventional . . . a 1/2A Piper Tri-Pacer designed for 2 to 4-channel R/C systems. This attractive little ship spans 44 inches and is not intended to supercede Sterling's big 58-3/4 inch Tri-Pacer that has been produced for years, but rather to enhance Sterling's line of 1/2A kits and to give the modeler a step up from the trainer (Mini-Fledgling) before going into a high-performance ship (Corsair).

At 44 inches, it's bigger than most 1/2A models, and experienced fliers will probably find that the Tri-Pacer will perform more to their satisfaction with an .09 or .10 size engine in the nose. The kit is complete with accurately die-cut balsa and plywood, vacuum-molded plastic parts, hardware, and detailed plans and instructions.

The Sterling Space Squirt will sell for $24.95, and the Tri-Pacer for $29.95. From Sterling Models, 3620 "G" St., Philadelphia, PA.

* * *

Attention, pattern fliers! A new version of the Webra .61 Speed engine has been announced by MRC-Webra. This is the engine with the much talked-about slide-valve Dynamix carburetor that has been used by most of the top European and American pattern fliers, but up until now has been relatively scarce as a saleable item from Webra.



An improved version of the Webra .61 Speed from MRC-Webra.

Besides the new slide-valve carburetor, the engine has a beefed-up crankshaft and a wider intake port. The results of these changes are higher rpm's when used with a tuned pipe, and better mid-range response due to the new carburetor. The Dynamix carb must use pressure (either muffler or pump) for it to operate properly.

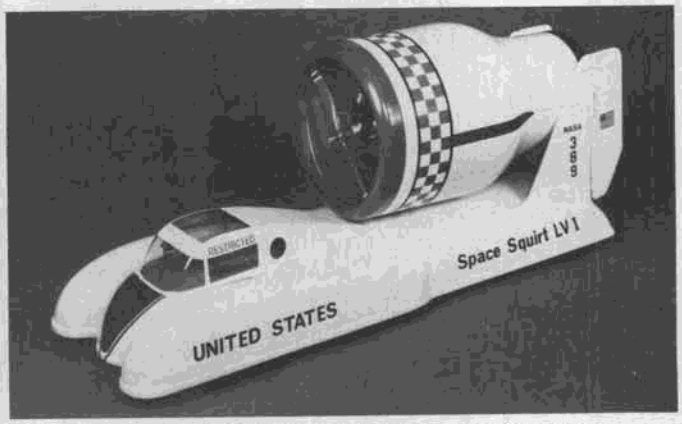
No word on the price, but you'll probably be able to see one of these engines at your dealer soon. An interesting note is that the tuned pipe for this engine (No. 1100/7) is now lower in cost, yet still comes complete with silicon tubing, manifold, and pipe. Whaddaya know! Prices DO come down . . . sometimes.

MRC-Tamiya has two new additions

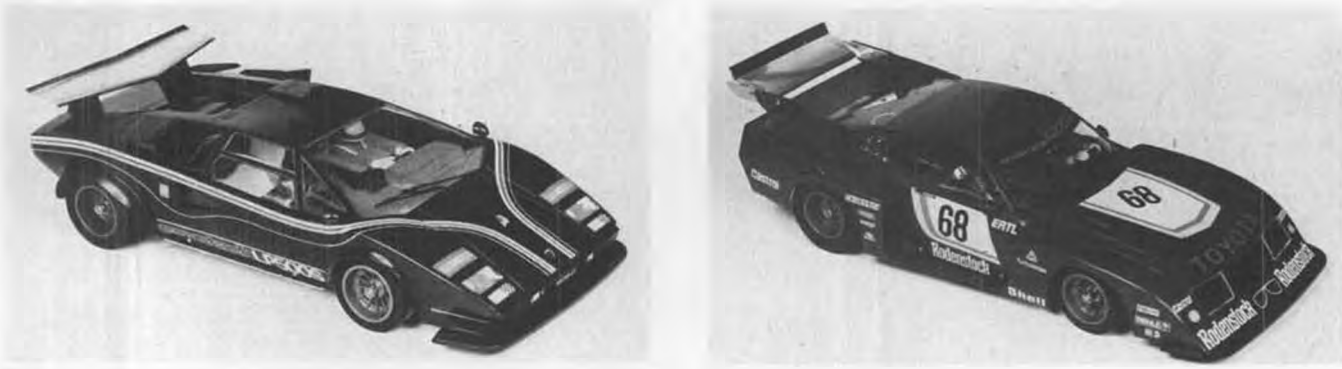
Top Flite's new "Hot Stripe" tape.

New hex-head nylon bolts from Du-Bro.

Sterling's 1/2A Piper Tri-Pacer.



Another new 1/2A model from Sterling, the "Space Squirt" land vehicle.



MRC-Tamiya's Lamborghini Countach Competition Special (left) and Toyota Celica, R/C electric cars.

to its line of top-quality R/C electric cars: the Toyota Celica and Lamborghini Countach Competition Special. Both are equipped with the Mabuchi RS-540 motor and have the same fine detailing and excellent quality that is typical of MRC-Tamiya kits. During assembly, you have a choice of using either a direct drive gear for faster speeds or a differential for better handling on curves (see Chuck Hallum's comments on differentials in "R/C Auto News" in this issue). Other features are proportional speed control in forward and reverse direction, an aluminum alloy chassis, sandwich type front tires, and ball bearing supported front end.

Both cars go for $84.98 each and should be available at your dealer. If not, have him order one for you.

Don't go away yet! There's one more new goodie from MRC-Tamiya. It's the Flakpanzer Gepard, another in MRC's fine line of 1/16-scale tanks. This is the most advanced and sophisticated R/C tank that MRC-Tamiya has produced yet. The strong aluminum frame and ABS plastic body make it a rugged model, weighing over 11 pounds less R/C gear.

The Gepard requires a 3-channel radio and 6-volt battery to make it go. There are three separate electric motors which operate different functions. One servo provides proportional speed control for forward and reverse direction. The second servo provides proportional steering control by the use of two clutches, allowing the tank to make wide turns or to pivot. The third servo operates the 360° revolving turret and also makes the antiaircraft guns move up and down. In addition, when the third servo operates and turns the turret, the radar antenna revolves in a realistic manner. They've thought of everything on this model!

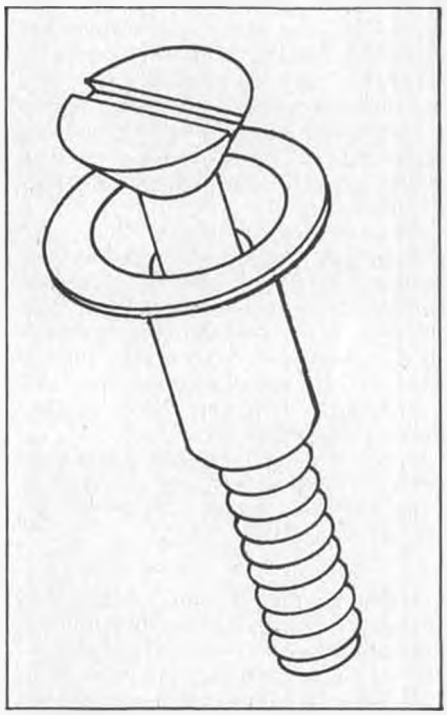
Many of the hatch covers are hinged and can be manually opened and closed. Other features of the Gepard are a working suspension system, metal treads, and an all-metal-gear transmission for long life. This tank is a real conversation piece and will give many hours of enjoyment, too. Retail price of the Flakpanzer Gepard is $249.95.

All from Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

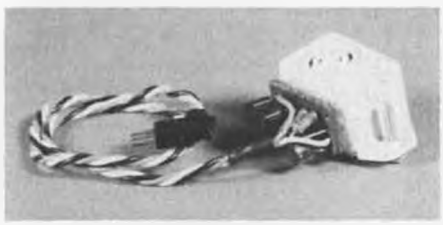
* * *

Du-Bro recently sent us a sample of its new 1/4-20 x 2-inch long nylon wing bolts. What could possibly be new in the way of nylon wing bolts, you ask? Well, the answer is that these bolts sport a completely different type of head. Instead of having the usual slot for a screwdriver, they have a hex head that will fit your glow plug/prop nut wrench, and also a hex socket molded into the bolt head that will fit a 3/16-inch Allen wrench. Both methods give you a safe, non-slip way to secure or loosen your wing bolts. If you've ever had the screwdriver slip and put a ding in your new wing while using the slot-type nylon bolts, you can appreciate what that statement means.

The new Du-Bro wing bolts are molded from black nylon and come in a package of 4 for $1.00. Du-Bro Products, Inc., 480 Bonner Rd., Wauconda, IL 60084.

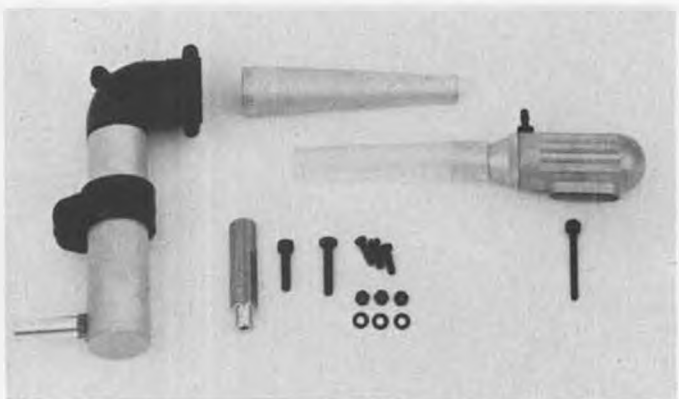


Flush Head Captive Wing Bolts, from Vortac Mfg. Co.

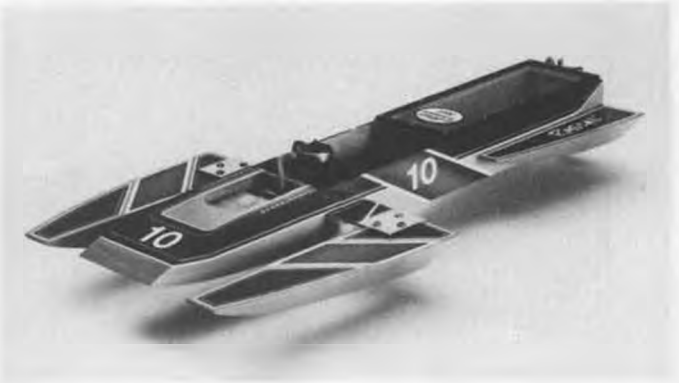


The Sono-Beacon, from C. Sidles Co.

New 1/16-scale R/C tank from MRC-Tamiya, the Flakpanzer Gepard.

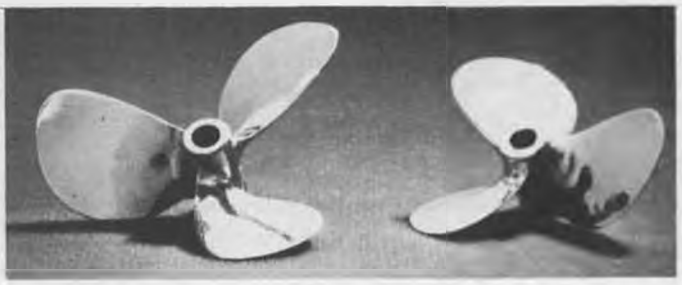


Tuned pipe system for HB .21 PDP Car engines, from Bavarian Precision Products.



New outrigger hydros from Dumas: the Quickie 40 (left) and Lil' Rascal 10.

Dumas' "Short Stuff" Deep Vee is now available with a fiberglass hull.



New highly-finished metal props for scale boats, from Dumas.

* * *

If you're into R/C cars, check out the new Model 7100 Tuned Pipe outfit from Bavarian Precision Products. This system was designed especially for the HB .21 PDP Car engine and, like all tuned pipes, features a reduction in noise as well as an increase in power.

This tuned pipe was tested on an HB .21 PDP by the German model magazine, *Modell*. Quoting from the poop sheet that was sent to us, here are the results:

"The test was made with the HB .21 PDP Car engine equipped with the new Model 7100 Tuned Pipe set, a 7018 glow plug and the standard HB Air Cleaner. The engine was run on 12% nitro fuel.

"Running the engine with a flywheel, without a load, it reached 30,000 rpm, which is close to destruction speed. With a 7 x 3 Graupner prop, it turned 24,000 rpm without reaching maximum performance.

"As with all HB engines, fuel consumption was very moderate. A 125 ccm fuel tank should easily last through a half hour of racing."

So there you have it. If you're interested in learning more about this nicely-made tuned pipe system, contact Bavarian Precision Products Co., P.O. Box 6, New Canaan, CT 06840, and tell 'em who sent you!

* * *

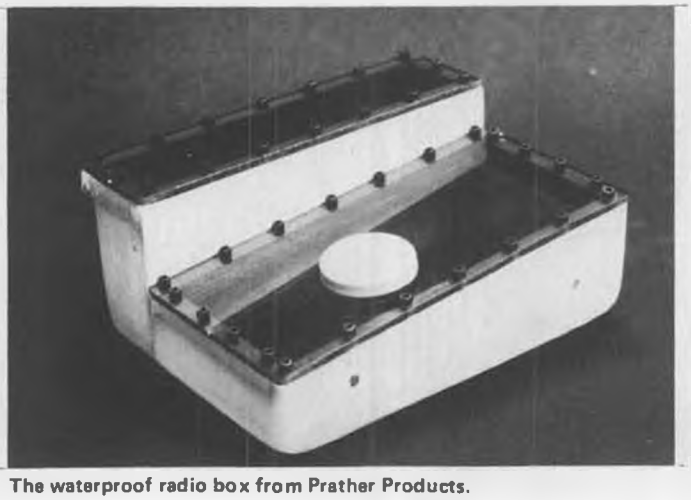
This must be the month for new nylon wing bolts! Now Vortac Mfg. is getting into the act with its 1/4-20 x 2-inch Flush Head Captive Wing Bolts. These bolts are unique in that they stay in the wing after it's been removed from the fuselage, so there's no way to lose them or leave them home when you go flying. As you can see in the drawing, these are flat-head bolts, which means no more unsightly bolt heads sticking out of your wing.

The secret to Vortac's new wing bolts is the specially-designed sleeve, which is epoxied into the wing. The sleeve is threaded 1/4-20, the same as the bolt. The unthreaded shank part of the bolt is designed so that when the threaded part of the bolt is screwed all the way through the sleeve, the bolt has 3/8 of an inch of free vertical travel, which aids in alignment and eliminates jacking tendencies. The bolts can be unscrewed and removed from the wing if desired, yet they won't fall out by themselves if you leave them there.

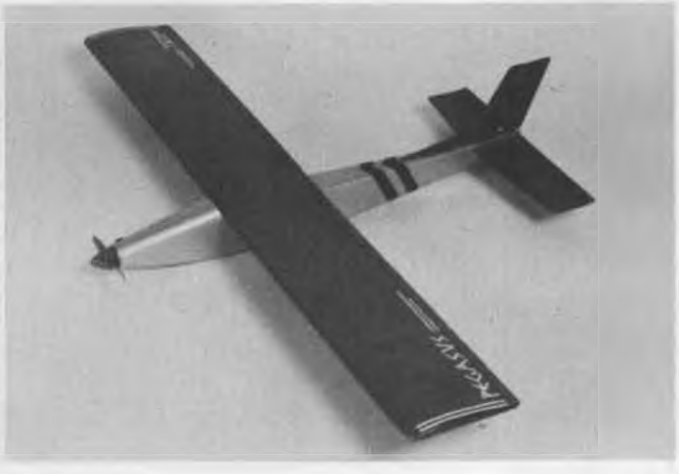
The new Vortac wing bolts are worth taking a closer look. For $1.69 you get two bolts, two sleeves, and two 1/4-20 blind nuts. They should be available at your dealer by the time you read this, or order direct from Vortac Mfg. Co., P.O. Box 469, Oak Lawn, IL 60453.

* * *

Panavise Products, Inc. has moved to a

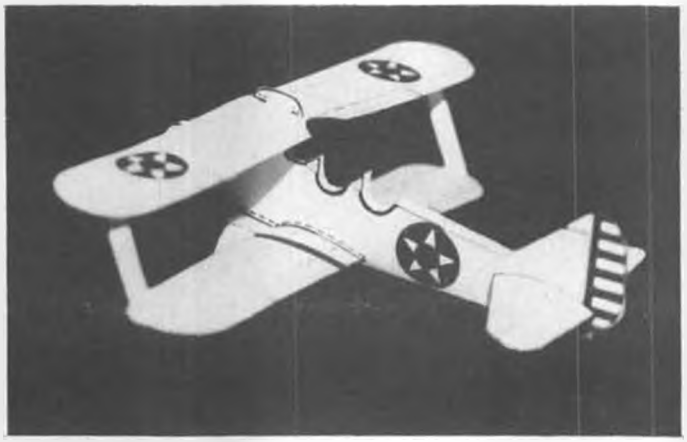


The waterproof radio box from Prather Products.



New sport model from The Model Factory, the "Pegasus."

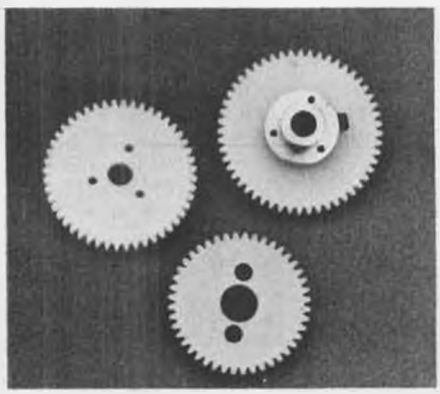
Precision knife and tweezer set from The Aptex Corporation.



An example of the scale-like paper airplanes from Little Brown Jug Enterprises.

new location in Long Beach, California. Gary Richter, President of Panavise, says the move was necessary to meet the demands of the rapid sales growth at Panavise. The new plant has 26,000 square feet, more than twice as big as the former plant in South Gate.

The new location is adjacent to the San Diego freeway and the Long Beach Airport. For further information on Panavise or its products, contact Sandy Parkerson at Panavise Products, Inc., 2850 29th St., Long Beach, CA 90806, or call (213) 595-7621.



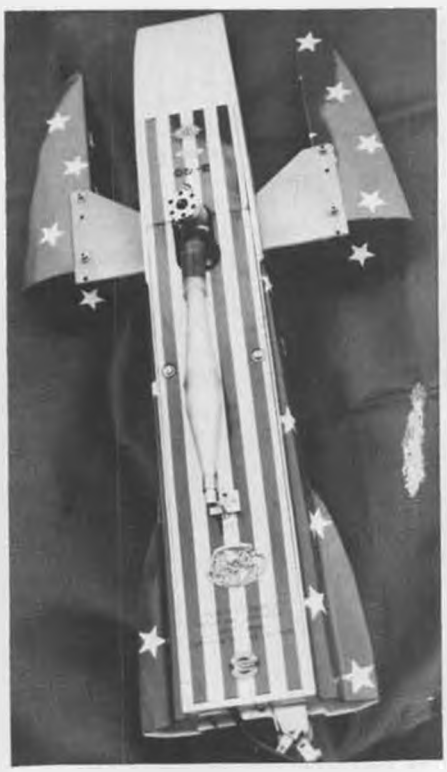
The Pipeline's high-quality gears for R/C electric cars.

The Smithsonian's new book on the Aeronca C-2.

From Top Flite Models comes a new idea in striping tapes. Called "Hot Stripe," it is a low-heat, *iron-on* material that can be applied over foam, paint, plastic canopies, fiberglass, and all types of covering materials. Like most other brands of striping tape, Hot Stripe is very flexible and can be formed into intricate curves and circular designs. It is thinner than other tapes and, because it isn't sticky until heated, doesn't collect dirt at the edges. And once it's on, it's on to stay; if you've ever tried to remove striping tape that has been exposed to heat for a while, you'll know what I mean!

An added feature of Hot Stripe tape is the combination package/dispenser. You simply pull out and cut off as much tape as you need; the rest remains neatly rolled up in the dispenser, staying clean and unraveled.

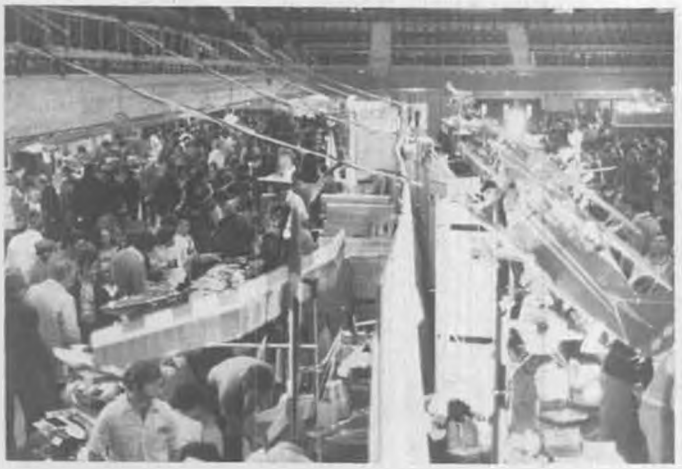
Continued on page 104



Mini Marine's "Hustler Mk. II" outrigger hydro.

The Loctite Gluematic Pen.

Another new book from the Smithsonian, all about the Excalibur III Mustang.



PHOTOS BY AUTHOR

The above photos show only the two side areas of the Westchester County Center's display floor, as set up for the annual WRAMS R/C Show. It was wall-to-wall people from opening to closing. Static model exhibits are on the floor below, Swap Shop upstairs.

R/C WORLD AT THE WRAMS SHOW

By BILL NORTHROP

• The second major consumer trade show for the 1979 season took place at the Westchester County Center, White Plains, New York, on February 24 and 25, sponsored by the WRAMS Club. As in many recent years, the Center was jammed to the hilt with spectators from the opening to closing of each day.

This year, because of the rainy conditions outside, the management allowed the spectating public to enter and pay their admission prior to the opening time of 10 a.m. The early birds were not allowed on the exhibit floor until 10, but were directed to the balcony seats overlooking the area. To the exhibitors below it was a welcome, but almost frightening sight, knowing that on the dot of 10 we would be pounced upon by that mass of humanity impatiently waiting above us!

We did most of our visiting and examination of products during set-up day on Friday. With the huge crowds, attempting to hold an informative conversation with an exhibitor was near

WRAMS club president, Larry DiRubbo presents "Best In Show" trophy to Dennis Donohue, for his Stphens Acro, which incidentally, won Best of Scale at the 1978 Las Vegas T.O.C.

The "Sportster 20" for guess what size engines, designed by Dick Sarpolus and kitted by Champion Model Aeroplane Co.

D.H. Tiger Moth for medium size engines, from Gee Bee Line, the makers of seaplane floats and the Dreamer bipe.

The "Stag", a new .30-.40 size bipe from Special Edition Plans' Ted Strader.

Don Clark shows off the new license-free lift detecting "Thermic Sniffler".

Coverite's new peel-off letters and numbers are very thin and very flexible.

impossible, and besides, we did not like to take up the exhibitor's time from the spectating public during the show.

Several new items were shown, and we'll try to describe some of them. Sonic Tronics, 518 Ryers Ave., Cheltenham, PA 19012, had a new double-stick film in 1/4 and 3/4 inch tape rolls. In a few words, you could call it laminating glue, out of a tube! Sonic-Tronics calls it "Crazy Tape". Pulled from the roll, you apply the tape to one surface. The backing paper is then removed, exposing the other surface of the .004 inch thin (!) adhesive film. Attach the other piece to be glued (make it right the first time!), press, and you're done. For laminating, doubling, applying wood skins to foam, and the like, it's the best thing since paper clips. Sample pieces of 1/16 balsa, once stuck together, could not be separated without breaking. And the film is tough and tear-proof (Hmmm, very thin hinges).

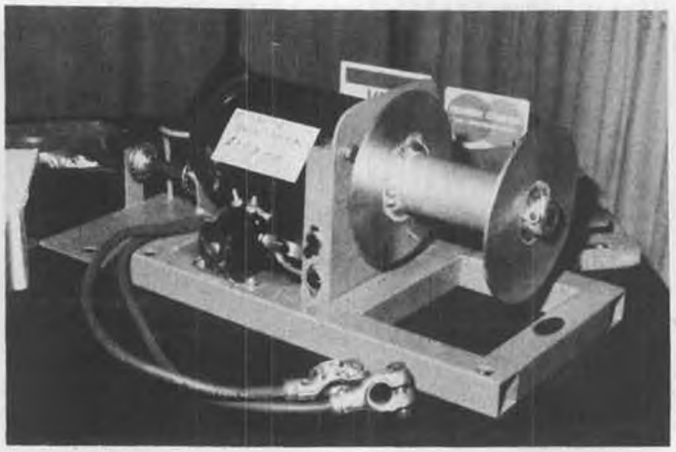
Imagine cutting halfway through a piece of silicone fuel tubing and not being able to pull it apart! Such is the case with Sonic-Tronics' new Silicone "X" tubing. S-T also introduced gasoline

Hank Baer's Forster .29 powered Brooklyn Dodger won 1st Place in Old Timer static display. He's from Flemington, N.J.

Bob Pickney, Whitesboro, N.Y., built this 1/3-scale 1930 Fleet. Ship weighs 22-3/4 lbs., span is 98", and power is a Profi with prop drive.

Bud Barkley watches the face of a spectator to check his reaction to the beautiful 3" scale Tiger Moth he's producing in Canada.

The photo tells all about this Stearman from Bergen Hobby. It's a fiberglass fuselage. Construction said to be 100% complete.



The Hi-Flight winch is available in kit or completed form, also parts can be had to "roll your own". From Hemet, California.

The "Easy Bailer" produced by Eastcraft, the electric starter folks. It's a hole in your boat, but the water only goes one way . . . out!

RAM's conversion kit allows you to put an Astro 25 electric motor on the K&B Outboard drive unit. RAM also has instant boats for R/C.

and diesel fuel-proof tubing. It's a translucent red/orange color, and neither this nor the Silicone "X" is affected by an open flame held on it.

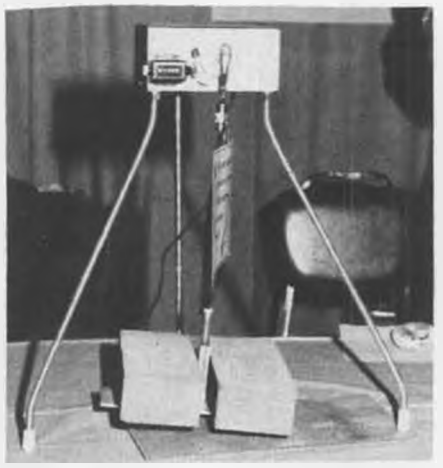
Gee Bee Products, Box 18, East Longmeadow, MA 01028, has a new 45 inch span Tiger Moth kit of all-balsa construction, priced at $52.50. For .25 to .35 engines, the Moth weighs 4 to 4-1/2 lbs. and uses 4-channel radio. Kit includes pre-bent cabane struts and all hardware.

The DaCa "Model Master Caddy" field box features a detachable power module that you can take with you to the flight line, instead of the whole box. The module contains your starter, 12-V battery, power panel, and transmitter. The "Caddy" starts at $79.50 and the address is Box 14078, Omaha, NE 68114.

Gemini Models, 311 Lakeview Ave., Clifton, NJ, showed the "Super Champ", a 56 inch span sport trainer high wing cabin ship for .20 to .35 engines. It features a unique rubber bandless, nylon boltless snap-on wing device which could be applied to many designs. There's a patent pending on the idea.

Novak Electronics, 1915-A S. Evergreen St., Santa Ana, CA 92707, originators of the versatile Bantam Midget servo, which is available in any color of the rainbow and matched to any currently available radio, has now introduced an equally versatile IC receiver. Only 0.7 x 1.08 x 2.45 inches in size, this 1 to 9 channel unit has a double-tuned front end, large AGC range, high level diode noise clipper, double balanced mixer IC, IF amplifiers, class "B" detector, audio amplifier in second IC, and . . . good grief . . . who cares, it works!

Available in 8 case colors, it's compatible with all modern AM transmitters except Westport International (there's one in every crowd), and is priced at $59.95 in all 72 MHz frequencies, and $64.95 in all 27 MHz and 6 meter frequencies.



"Head Lock" glow plug connector by Model Products Corp. lifting plug fastened to two bricks! Twist to lock on or remove from plug.

Rosie Rehling is a delightful Hungarian dish whose husband, Dick, is the talented designer of, among other things, the Bantam and Bantam Midget servos (the case, mechanics and outputs . . . not the electronics) as used by Ace, Cannon, Litco, Novak, Royal, World Engines, and others. The "other things" include switch mounts, switch guards, battery cases, servo trays, an .049 power pod, transmitter dual and single sticks, and the like. Rosie's R/C Products is now the worldwide marketing media for all of these and other fine products. Contact her at 3501-B W. Moore St., Santa

Nick Ziroli's completed Corsair shown earlier. Spans 93", 22 lbs., Kraft radio, Quadra power. Plans kits available soon.

Pete Reed must have had a lot of spare time on his hands when he started painting this DeNight. A real pretty bird.

Two new motor mounts from Edson. One for the Quadra, and the other for the .90's and up to the 1.5 Suevia.

What a brute! This is the in-line HP 120 Gold Cup Powertwin. Alternate firing, single automix carb, 34-1/2 oz. Midwest Model Supply.

The Italian CMB 90, winner of many races during the 1978 season in Italy, is now available in the U.S., J.V.S. Products, Anza, Calif.

Ana, CA 92704.

Bavarian Precision Products Co., Box 6, New Canaan, CT 06840, is the source of the complete line of HB engines from Germany, ranging in size from .12 to .61 and including marine, auto, and aircraft versions.

Radio Control Models (RAM), 3631 N. Kedvale Ave., Chicago, IL 60641, manufacturers of that interesting line of ARF (Almost Ready to Float) boats for gas or electric power, showed its new waterproof radio boxes. These retail for $7.95 and include a clear plastic lid, two Robart output bushings, four lid lock seals, instructions, and, oh yes, the molded radio box!

RAM also makes a neat electric conversion unit for the K&B outboard, using the Astro 25 motor, which goes fine with its O Bee 30 ARF boat.

Model Products Corp., Box 314, Pompton Plains, NJ 07444, showed the "Head Lock", a battery-to-glow plug connector which will not pop off (and usually into the prop) when your engine fires up. The tubular brass connector is pushed down and twisted 30 degrees into a locked position on your plug. It is released by pushing down and twisting off in the reverse direction. It retails for $2.95 with a length of hook-up wire attached.

Dave Platt Models, Inc., 6940 N.W. 15th St., Plantation, FL 33313, is introducing a new air-operated retract gear for larger models. Main struts are 1/2 inch diameter tubing, with a spring shock absorber at the bottom end. We assume these will work on the new 2.4 inch scale Messerschmitt Me 109 which has also been added to the kit line.

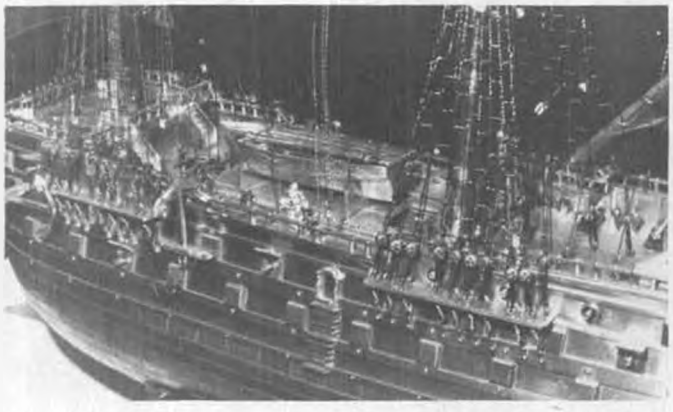
House of Balsa, 20134 State Rd., Cerritos, CA 90701, showed its P-51D with fiberglass fuselage and built-up balsa wing for .29 to .40 power. Price of kit is $109.95. Write for the complete catalog of gliders, 1/2A R/C scales, and building

Heat doesn't bother this new silicone tubing from Aerotrend. Same goes for Silicone 'X' from Sonic Tronics.

gimmicks.

The best of stick-and-tissue scale modeling and modern R/C techniques have been combined by Flyline Models into a beautiful array of built-up R/C scale models on the small side. The latest additions, shown in New York, were the Travel Air 6000, the in-line engined version of the Bucker Jungmeister, and the Curtiss "Seagull", a rubber (or CO_2) powered free flight model designed by famed Earl Stahl and published in a 1941 *Model Airplane News*. The Travel Air and Jungmeister are both large enough to take lightweight single or two-channel radios.

Top Flite Models has now extended its line of .60-powered WW-II scale R/C



Frigate in brass. Ed Kaufman, Randolph, N.J., built this 36" French warship of the year 1635. An exercise in soldering!

Maynard Jubert, Plattsburgh, N.Y., built this Mistal S3A. House of Balsa FW 190 and scratch-built Ju 88. Both on R/C. Fantastic!

ships to include the famous F4U-1A Corsair. And to its revolutionary super Monokote line it has added Cream, Maroon, Aztec Gold and Copper Red. Also, Econokote now comes in black.

New for 1979 is "Hot Stripe", iron-on striping in 1/16, 3/32, 1/8, and 1/4 inch widths and in blue, gold, black, red, yellow, and white.

The latest from Sterling Models is a "new" Piper Tri-Pacer (Sterling was one of the first companies to produce an R/C kit of any kind. It was a 58-3/4 inch span Tri-Pacer) for .049 to .10 engines and up to 4-channel radio. Another new Sterling kit is the "Space Squirt", a 2-channel R/C "Surface Vehicle" air car for .049 engines.

Two new scale aircraft based on the non-load-carrying fuselage shell technique are coming from Sig. One is a model of Glen Sigafoose's own Beech Bonanza E-33A and the other is of Hank Pohlmann's Cessna Skyhawk 172. Both are for .60 size engines and use foam cored wings.

A powerful new HP 1.2 cu. in. in-line twin was shown by Midwest Model Supply. Based on the Gold Cup 61, it features Schnuerle porting, chromed sleeve, and Dykes ring. Alternate firing cylinders are fed by a single automix throttle. Weight is 34-1/2 ounces, and the price is in the $350 range.

"What's that wing doing on top?" This was our facetious question to Southern R/C Products, known for its line of winning pattern competition ships, such as Ron Chidgey's "Tiger Tail III", Matt's "Atlas", Rhett Miller's "Compensator", and Steve Helms' "Bootlegger" . . . all low-wing aircraft. The question was about the latest product, a shoulder-wing trainer for .40 to .46 engines, with fixed trike gear. Called the EZ Flyer, the kit is also said to be EZ to build, with all pre-cut parts, EZ built fuselage, all hardware, and full size rolled plans. Span is 54 inches, area is 600 sq. in. and the price is $54.95.

Karoden Hobby Products, Box 434, Bergenfield, NJ 07621, markets Dennis Donohue's "El Tigre" pattern ship, along with the Uni-Mask and Flex-Mask. The former is a one-piece filter mask for sanding, grinding, and painting, while the latter is extremely flexible, low-tack masking tape that can navigate around 1/2-inch radius curves.

Edson Enterprises, 17 Speer Place, Nutley, NJ 07110, now has motor mounts for the big .90's and also for the Quadra.

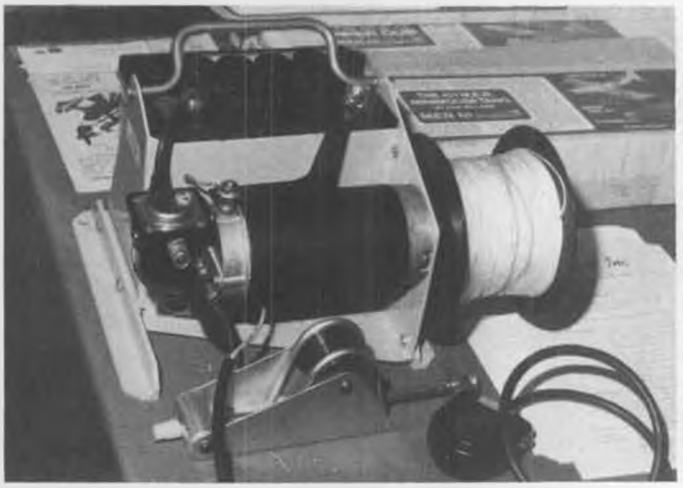
R/C Kits, 706 Eastern N.E., North Canton, OH 44721 offers a kit for the T-38 Talon, as flown by the Air Force Thunderbirds. For .60 power, the ship has foam wing and stab, balsa fuselage. Price is $94.95.

W-K Hobbies, 19 N. Main St., Centerville, OH 45459 is offering an epoxy glass and foam kit for Dave Brown's new pattern ship, the "Tiporare". Write for info on complete line of new kits.

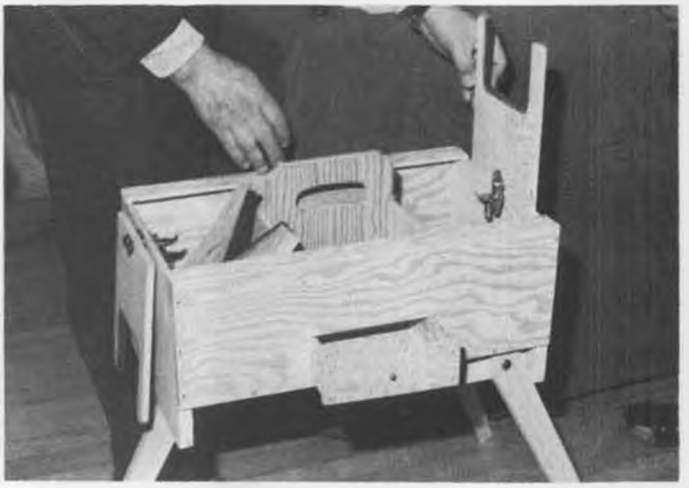
Fab-Tek Inc., 17 Sugar Hollow Rd., Danbury, CT 06810, is making a light-

Frank Garcher, standing, brings a laugh from (l to r) Nat Polk, Susan Schroder, and Model Builder's new team member, Walt Schroder. Occasion was dinner mentioned in "Workbench".

The always colorful Sig Mfg. Co. booth, with Hazel Sigafoose in the center. New Cessna "Skyhawk" and Beechcraft "Bonanza" are described in the text



Lightweight glider winch for up to 80 oz. birds uses Sears tractor battery, available separately. From Fab-Tek. See text for info.



Aerotrend's completely assembled field box was selling for a special price at the show. Needs only polyurethane painting to finish it.

Fascinating array of radio controlled electric powered racers and dune buggies displayed by Peerless Corporation.

W-K Hobbies, new company from Centerville, Ohio, is making kits with epoxy-glass fuselages of Dave Brown's new "Tiporare".

weight sailplane winch designed around the Sears Garden Tractor Deep Discharge battery. The unit weighs 34 pounds, with battery, braided nylon line, and footswitch. Complete with line, turnaround, and footswitch, but without battery, price is $159.95. Takes up to 80 ounce gliders, and provides about 40 launches on one charge.

M.E.N., 54 Chestnut Hill, Norwalk, CT 06851, has come up with a long overdue item that many R/C modelers should consider. It's an *automatic* transmitter and receiver pack charger. Plug it in and leave it. Charger automatically keeps batteries topped up, monitoring their condition continuously, and shutting off when not needed. Price is $34.95.

The 5 and 7 cylinder radial engines which **Model Builder** introduced a couple of years ago, only to have the manufacturer go down the tubes, are back again. All of the parts stock, special machining, etc. have been brought into this country by Executive Engines Co., 16650 S. 104th Ave., Orland Park, IL 60462. Prices range from $685 to $895, with silver, black, and gold trimmed black versions available.

Special Edition Plans, Box 2555, Sche-

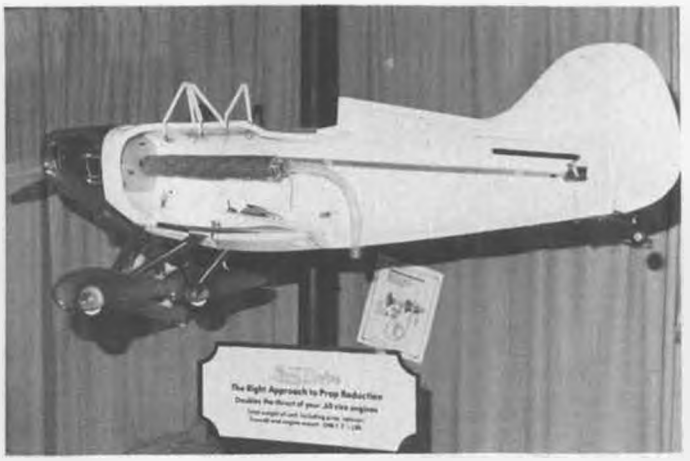
Super Mammoth Fieseler Storch by George Bussman, Seneca, N.Y. Span is 133 inches, weight is 28-1/2 pounds, and it's Quadra powered. Fuselage is built up of welded steel tubing.

Experimental British Vampire jet, designed and built by Nick Ziroli to test Midwest ducted-fan unit. Features easy access to engine and fan compartment.

Sailplane Accessory Co. had this mock-up to display its various items, such as spoiler controls, blade-type wing joiners, etc.

Eastcraft's electric on-board starter is an easy fit in this .60 powered Cessna. System adapts to all large engines, including Quadra.

Bruce Godberson, of Byron Originals, explains the Byro-Drive speed reduction unit to an interested spectator.



Cut-away display of the Byron Originals all-foam, 1/3-scale Pitts S-1A, showing interior pipe mounting and exhaust system.

Nino Dironza is importing the interesting Aviomodelli line from Italy. Many R/C scale ships and beautiful sailplanes.

The fiberglass boats by Futuraglass are beautiful and well built. Boat on the right carries a .90 cubic inch engine. "Awesome" is right!

nectady, NY 12309, showed a new staggering biplane and a .15 to .25 powered low wing model with 56 inch span. For 3 channels, the low wing "Yeoman" features interlocking fuselage construction for strength and accuracy. Write for info on complete line of Ted Strader designs.

Aviomodelli of Italy is now offering its line of kits through Avionics International, 403 Clagett Dr., Rockville, MD 20851. The line of interesting kits includes .40 to .60 powered R/C scale models of the Piper Arrow, Cessna 177, Spinks Akromaster and Cessna 182. Gliders range from 200 cm up to 410 cm in span, some with glass fuselages and wood-covered foam wings.

Champion Model Aeroplane Company, Inc., Box 45, Keyport, NJ 07735 is offering the Sportster 20, designed by Dick Sarpolus. The shoulder-wing, trike-geared model spans 50 inches, and takes .15 to .25 engines. Kit line also includes scale-like trainers, a stand-off Cessna 150-152, and the Anderson Amphibious Kingfisher for .60 to .80 engines. Gear retracts for use on water.

Space will not allow us to mention all of the exhibitors or all of the new products seen at the WRAM Show, and from a reporter's point of view, the Toledo R/C Exposition will be even more frustrating, but we'll do our best to cover all new products being introduced for the 1979 season. We suggest that manufacturers send us information and photos on their new products. A write-up in "Over the Counter" is only as expensive as the postage to mail us the information, and assures everyone exposure in **Model Builder**'s pages. •

MODEL BUILDER

Ace R/C offers complete flight packs to go with your transmitter. Build 'em yourself and save money.

Sterner Engineering, Bath, Pennsylvania, will have this A-7 Corsair kit available in June. Uses Turb-Ax 1 fan, includes main retracts.

Flight INSTRUCTOR

Conducted by
DAVE BROWN
8534 Huddleston Dr.
Cincinnati, OH 45236

• The phone rang about a month ago here and it was Bruce Berrettini calling, asking for information on how to mount a pipe on the bottom of his Curare. This type of call is not unusual around here, and I described for him in detail how I mount the pipe on my Curare, and he thanked me and hung up. A couple days later he called again and said it worked well and offered to draw it up for our readers. Boy, was I surprised when I got his drawing and it was completely different from what I described! Both mounting systems are shown in the diagram. Either will work great, with each having its advantages.

Well, that comedy of mis-translation worked well, so the next thing I'll use is a letter and diagram from one of my flying buddies, Dick Hanson, and if you think *I* can confuse you, wait until you read this one!

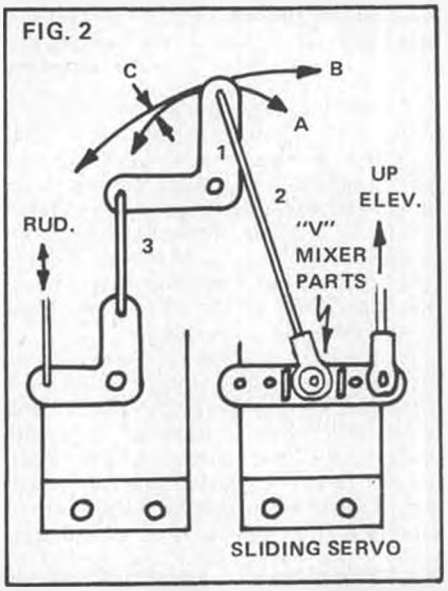
Dear Dave: You recently published a rudder gadget in your column and asked for comments.

I tried that set-up plus various others last spring in an effort to correct a coupled rudder problem (yaw-dive) in my "Sneaky Pete" design. The set-up you showed gives an unpredictable couple that is unnerving, as the elevator adds a very sharp input just as the rudder reaches full deflection (non-linear input). The set-up shown here (Fig. 2) may be tailored to give just the desired input of elevator to compensate for elevator loss due to yaw (blanketing of elevator and stab). Take a look at the sketch. Arc A is a function of arm length 1. Arc B is a function of link length 2. The starting position of arm 1 (angle) plus its length plus the throw provided by link 3 will provide an intersect and overlap of arc A through arc B. The result is C, which is the movement given to link 2 each time the rudder is moved.

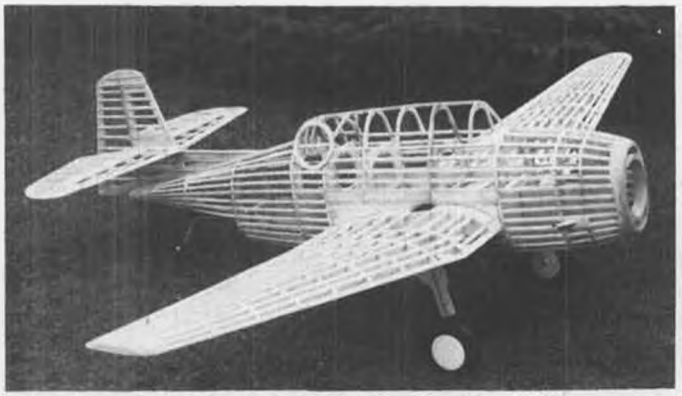
If you study this awhile you will see that a smooth, progressive (or whatever curve desired) elevator couple can be achieved by changing angles, intersects, and moments.

This set-up works on almost any conventional aircraft design and is, in my opinion, highly desirable in scale models that are overweight and/or have small stabs and are nose-heavy. It could also prevent sudden noseover on a crosswind landing. Think of the coupled rudder-dive problem in the following manner. The stab and elevator provide a balancing load at the tail of the aircraft, which holds the nose up. Each side of the elevator/stab shares half the load. If you skid the aircraft (add rudder yaw only), one side of the stab will be hidden from the undisturbed airflow by the rudder and/or fuselage. One-half of the balancing load may now be lost! The result is the down elevator effect. Just like a boy jumping from one end of a teeter totter, the load at the other end (wing-generated lift) takes over. If you have learned anything from this rambling, please let Dave Brown know . . . don't call me, as I may be sober when you call and will understand none of this! Just be glad I did not discuss how to do outside loops by applying rudder or how to increase spin rate by decreasing elevator input. The normal reaction I get is a blank look when I start on these. Dick Hanson.

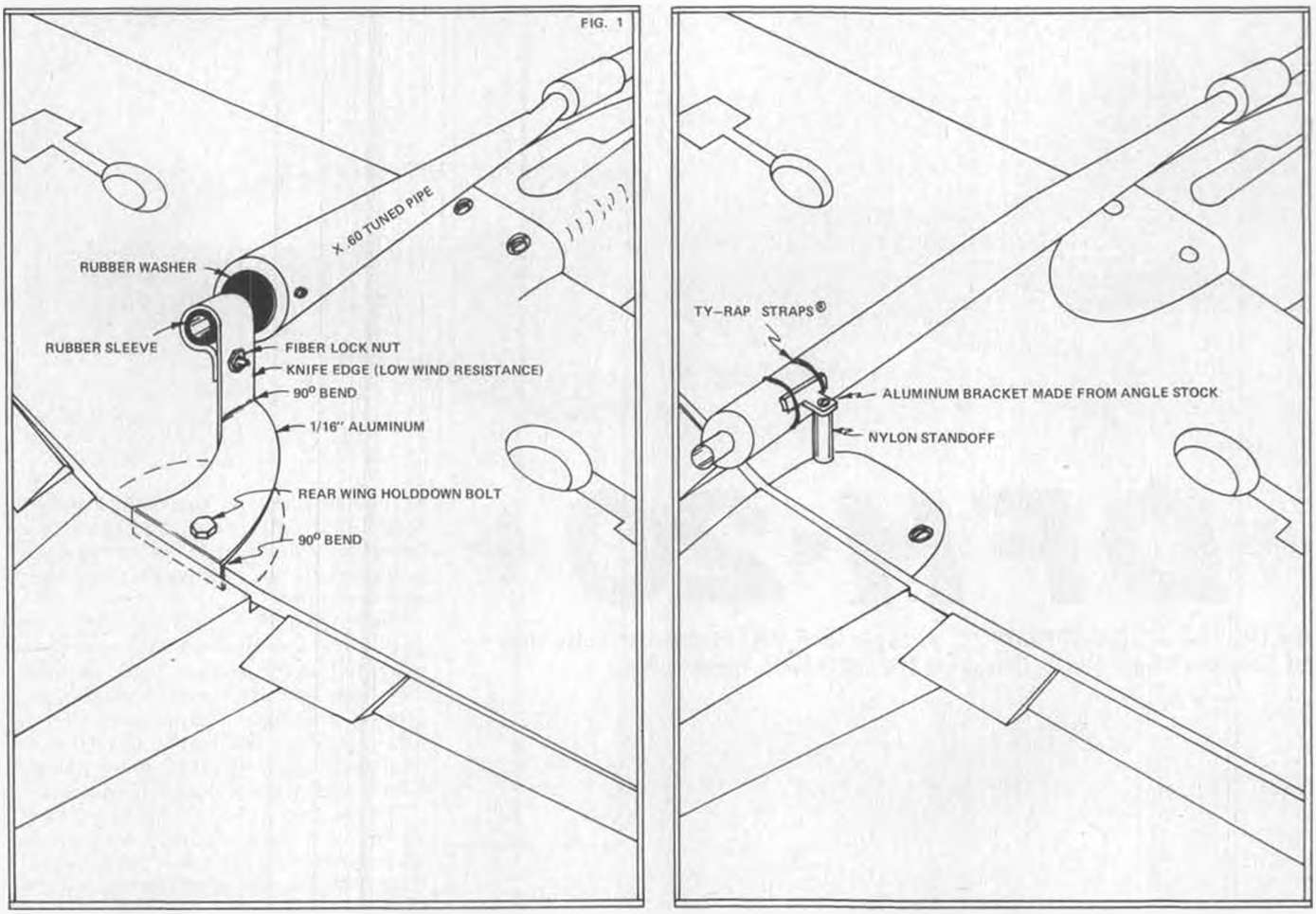
FIG. 2



Dear Dick: I realize that disagreeing with you is ridiculous, as you are usually right, and I can perhaps buy an airplane spinning more rapidly with less elevator, but that outside loop by applying rudder I've got to see! Sounds like something that should have been discussed with Don Lowe during our celebration after



Before and after covering shots of Jim Urozik's 7-foot TBF Avenger, powered by Fox .78 and controlled by a 4-channel Heathkit. Model has a flat-bottom airfoil for high lift and slow speeds, weighs 15 lbs. Looks like GI Joe is gonna need a ladder to climb into that cockpit, Jim.



the first flight of my Zlin.

Dear Dave: I've asked a lot of people about this and I've got some contradicting answers. Say, for example, you have a wing with a 15% thick airfoil at the root and 13% thickness at the tip, and another wing 15% all the way through, and both have a constant radius leading edge. Which one will stall first in slow speed flight? I always thought that a thicker tip is better because the air is flowing over it faster than at the root. Why, then, do a lot of prominent designs (I believe the Curare is one of them) have a thinner percentage at the tip than at the root? You've got a great column here, I hope it keeps going. Thank you. Henry Piorun.

Dear Henry: The reason for your conflicting answers is that there are many conflicting theories on the subject. The thicker percentage tip has been used on many airplanes (the Phoenix, for example) and appears to be successful, and the thinner tip with constant leading edge radius has been used on many airplanes. I believe that the constant leading edge radius has the effect of decreasing the sharpness of the stall because the leading edge is effectively blunter at the tip. I know that sharpening the leading edge at the tip increase the ability to snap-roll, due to the easier tip stall characteristics, so I would think conversely that making it more blunt would have the opposite effect. Perhaps a letter to Hal deBolt would get us both a little better explanation.

Dear Dave: Thank you for the very good articles written in **Model Builder.** *I have been building for years and have enclosed pictures of my most recent project. Now for a few questions: 1) What is your opinion regarding flat-bottom airfoils on a large radio control model (84 inch wingspan)? 2) I'm also building an Aeronca 'K' seaplane, 75-inch wingspan with 30-inch pontoons. An auxiliary rudder is used to compensate for the added area of the pontoons. Is this really necessary? Do you know where I can get pictures of the seaplane version? My research does not reveal pictures of this version. 3) Can you explain wing loading to me? How do I compute it for my Avenger? Wingspan is 84 inches, root ring chord 18 inches. 4) Also aspect ratio . . . what does it really mean? How do I compute?*

OK! Just remembered another new idea to accurately measure wing area. I take ordinary string (kite string or heavier) and stretch it around the perimeter of my wing, holding it in place with Scotch tape, and then tape it in a rectangular shape on a door and multiply the top and side dimensions . . . true wing area. Jim Urozik.

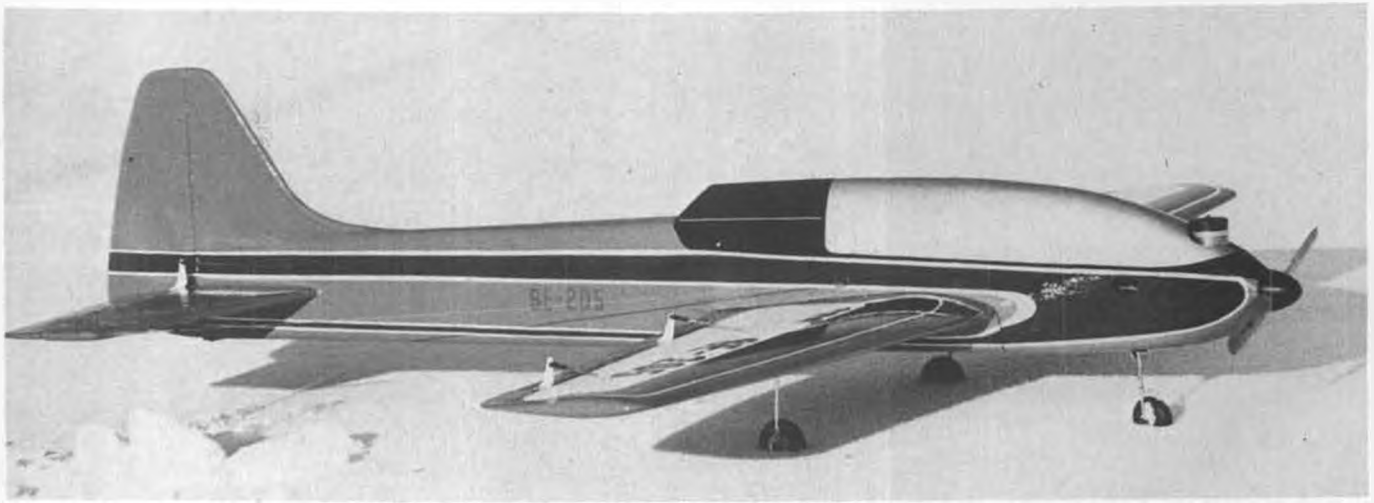
Dear Jim: Thanks for your letter and the pictures of your beautiful TBF. It looks just like the old stick-and-tissue kits, until you realize it has an 84-inch span. I'll send the pictures to Fearless Leader (Bill Northrop) and feel quite sure he will be able to use them in this column.

Now to your questions. Flat-bottom airfoils are typically high-lift, low-speed airfoils with normal drag. As such, they are great for large, heavy models, but they normally are very speed sensitive and tend to "balloon" a lot. I feel that for your large models, which appear to be fairly lightly loaded, a semi-symmetrical airfoil such as the one on the Goldberg Falcon 56 is better, as it doesn't tend to balloon as much but still provides plenty of lift at a reasonably slow speed.

As to the Aeronca K seaplane, I've seen pictures of one years ago but can't remember where. Perhaps one of our readers can help. The sub-fin on the seaplane was probably added to compensate for the additional area added forward of the CG by the floats. I have personally flown a number of full-scale pontoon-equipped airplanes which "fishtailed", and the sub-fin on the "K" was probably an attempt to cure this. Actually, we had many arguments as to whether it was the weight distribution of the floats or the area which caused this, and I don't think it was ever settled.

Sorry, but your method for determining wing area won't work. A rectangle of 1 by 17 inches would yield a string length of 36 inches, which if made into a square would be 9 inches on a side. This comes out to 81 square inches, and obviously

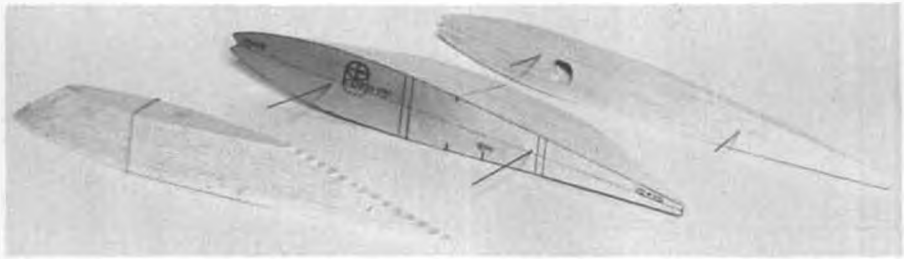
Continued on page 88



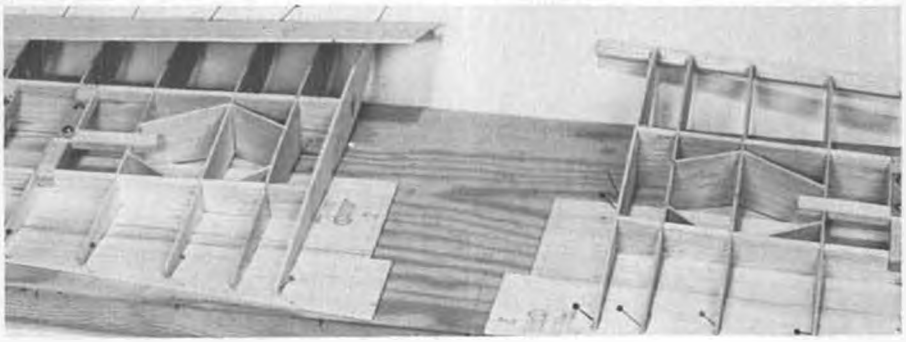
PHOTOS BY AUTHOR

DFH-20

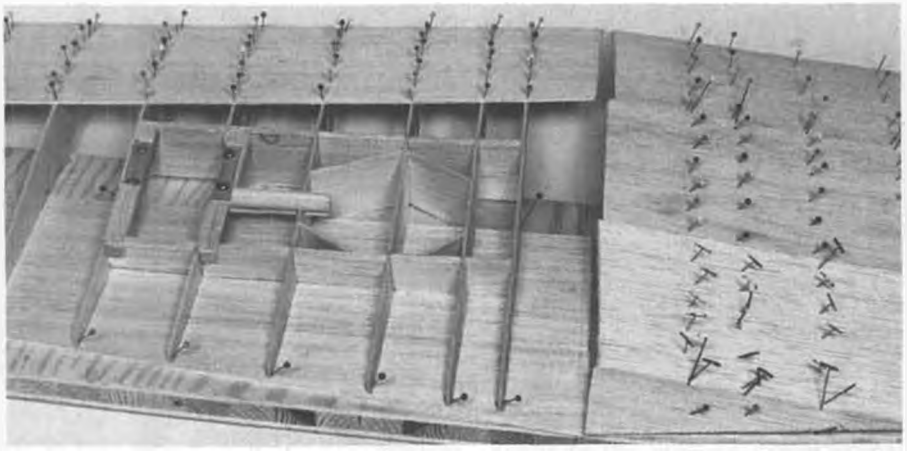
By BENGT LUNDSTROM . . . A top-notch FAI Pattern ship by one of Sweden's best fliers. Designed for .60's with tuned pipes.



Finished wing ribs. As shown by the batch in the middle, rib blanks are stacked and pinned between plywood root and tip rib templates, then carved and sanded to shape.



Starting to glue the wing sheeting in place. Wings are built upside down.



All of the bottom sheeting is applied before taking the panels up off the board. The panels are built on top of the rear 1/3 of the top wing sheeting, since that portion of the wing ribs is flat.

• The name means "The Flying Carpenters Bench 20." Years ago someone called my models that. As I am no good at finding names I just kept it, together with a number.

Pattern planes have developed a lot during the last 15 years. We have seen many fads come and go. Many of these fads have had little or no logical background and have disappeared after a few years. You just had to have this or that to be appreciated by one's pals or judges and place well at the contests.

There is one trend that has been there all the time: the more and more powerful engines. You don't win because you have the most powerful engine, but it is always a good help.

When designing the DFH 20, I wanted the most powerful engine to be found, and to put it in a low-drag model with good aerobatic flying capabilities. The easiest way to get a good plane is to make it at least close to a mid-wing layout with reasonable side area. This assures, among other things, good rolls with little or no unwanted reactions when applying rudder in a knife edge position, or applying rudder on top of a Figure M. The DFH 20 has the wing and stabilizer within 3/4 of an inch from the thrust line.

I wanted low drag and equal behavior on "both sides up" in a knife edge. That meant no pipe or muffler in the open or on the side. However, this also means an extremely "good" (which is bad) landing glide. If that is important to you, put in spoilers.

Finally the engine. It had to be one with a rear exhaust to hide the necessary pipe, and a rear intake gives a little more power than the front intake ones. Only the "OPS Speed 60 RCA" qualifies. Nowadays there are some front-intake rear-exhaust engines which would suit the DFH 20 well: OPS .60, Super Tigre X60, and probably the Rossi.

Most hidden pipe designs seen have been rather awkward installations with the pipe under the wing, or a short pipe which works more as an extractor. The DFH 20 design has the upright engine and pipe hidden under a big canopy on top of the fuselage. A lucky thing is that the tank has to be placed low to clear the

exhaust tube. This suits the low placed rear carburetor. With a front intake engine, you must use a pressure pump.

The DFH 20 is a very fast plane. As this increases the risk of getting aileron flutter, I use the unusual solution of using double aileron pushrods. These are very safe and also give less drag in full aileron application, as there are no aileron surfaces in the prop wash. They also have more throw in the tip than in the innermost part (twisting ailerons). To take away play, both the rudder and elevator pushrods are doubled, with a little tension in them.

BUILDING THE MODEL

Build it light, particularly in the tail. The high power cannot compensate for too much weight.

THE WING

The chosen airfoil has one very critical feature: the rear third of it is completely flat from root to tip. This makes it very easy to get a straight and warp-free wing, even with this more complicated built-up design. I assure you that you won't notice anything inferior with this airfoil to other more aerodynamically intricate airfoils.

Start by making the wing rib packs, then follow the following sequence:

A) Build each wing half upside down on the rear flat portion. Mount all retract details and center spacers of soft balsa.

B) Fit all sheets to the wing bottom.

C) Remove the wing halves and fit the rear spar.

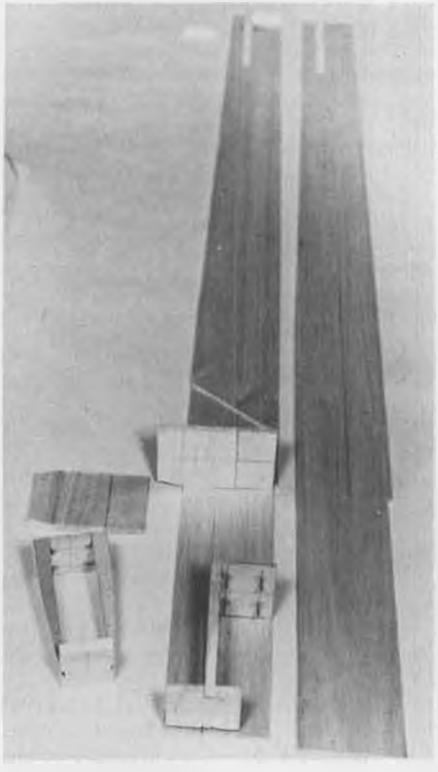
D) Make the long aileron pushrods and test their fitting.

E) Join the wing halves with the pushrods fitted. Turn the wing right side up now.

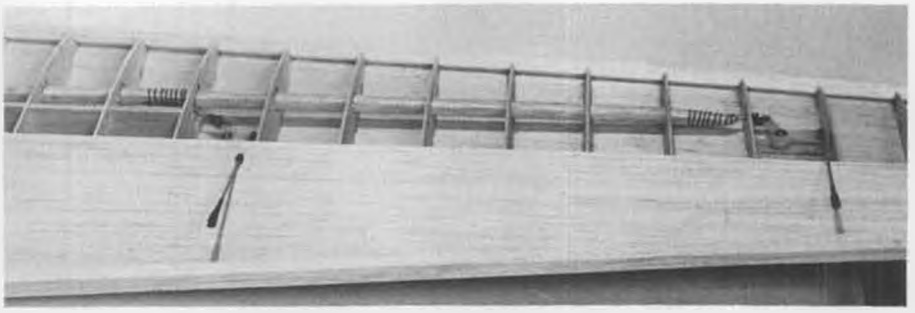
F) Complete the upper sheeting.

G) Put the epoxy and fiberglass reinforcement in the center after the wing halves are joined.

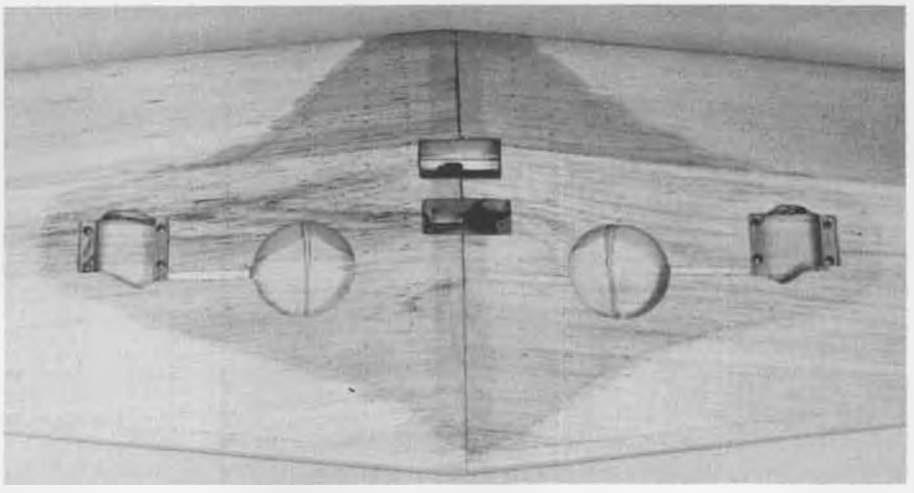
H) Mount all retract and aileron servo details now, including the retract pushrods.



Start of fuselage construction. Note subassembly of engine mounts and formers 1 & 2.



Aileron pushrod details. Each aileron has 2 horns, one at each end, to prevent flutter and to provide for "twisting" ailerons by using more throw in the outboard linkage than in the inboard.



Bottom view of joined wing, showing cutouts for the wheels, retract units, and servos, and also the area covered by the center section fiberglass reinforcing.

STABILIZER AND FIN

Use light balsa!

FUSELAGE

Again, avoid all unnecessary weight in the tail.

A) Make the two vertical sides of equal hardness.

B) Make a subassembly of bulkheads No. 1 and 2 with the hardwood engine bearers.

C) Glue the fuselage sides to the subassembled front and join them in the back. This must be done with a symmetrical curvature. If not, break it up and glue again.

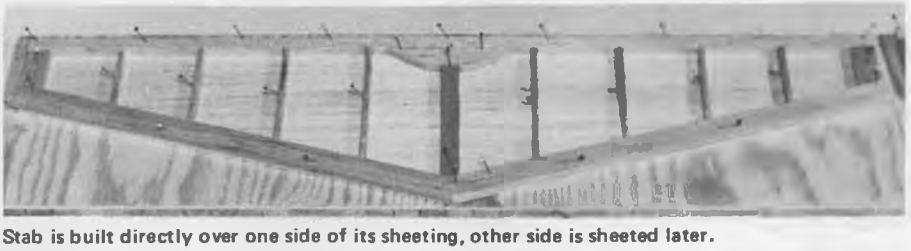
D) Fit the rest of the bulkheads and the stabilizer and fin. Fit all pushrods, tank and retract compartment. Mount the triangular corner longerons.

E) Fit the bottom sheeting.

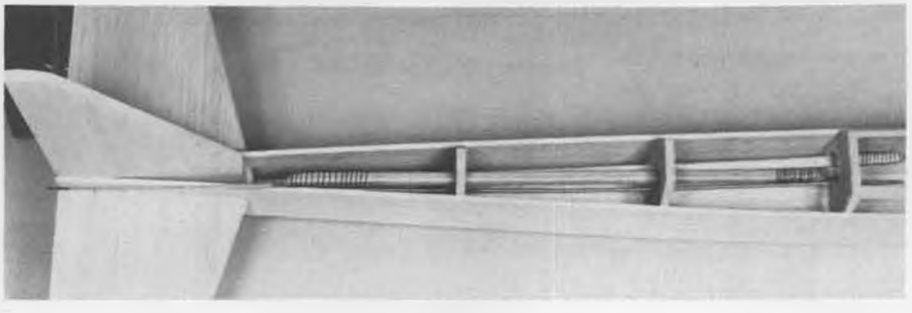
F) Mount the engine bay blocks.

G) Fit the inclined fuselage sides and the top.

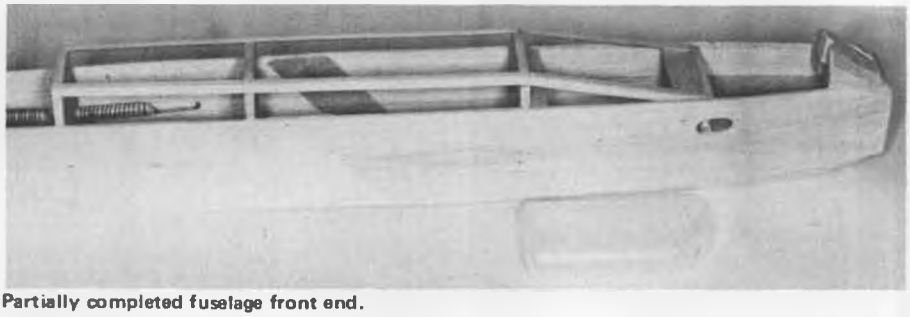
H) Cut out the wing slot and the belly pan. Glue the ply reinforcement above



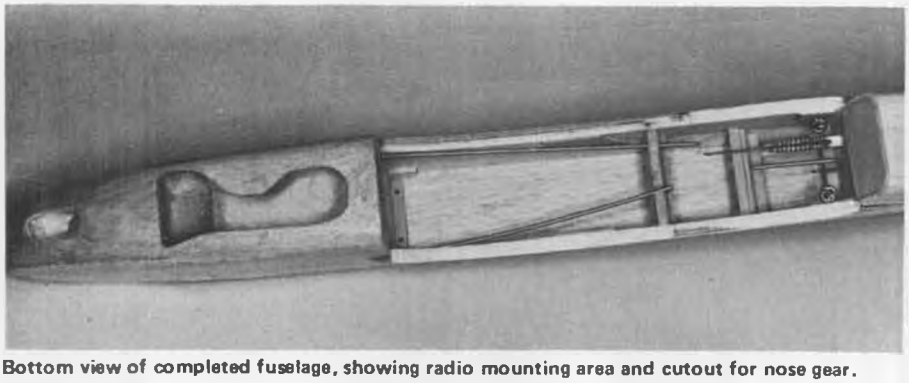
Stab is built directly over one side of its sheeting, other side is sheeted later.



Tail end of fuselage with pushrods and tail surfaces installed. Each control surface has dual pushrods, push-pull action eliminates slop in control system.



Partially completed fuselage front end.



Bottom view of completed fuselage, showing radio mounting area and cutout for nose gear.

the wing slot.

I) Fit the belly pan to the wing and mount all wing attachment details.

J) Apply epoxy and fiberglass to the fuselage and the wing/belly pan assembly.

K) Make all servo installations.

L) Make the ailerons, elevators, and the rudder. Note that they are a little thinner than the main surfaces to soften up the response a little around neutral (I hope).

MAKING THE CANOPY/
PIPE COVER

A) Make a plug of balsa (or an expanded polyurethane block) which fits the fuselage top front part exactly.

B) Add balsa downwards to follow the canopy lower outline.

C) Add the 90° mould part line.

D) Using filling compound, make a perfect canopy surface. When satisfied, add a layer of clear polyurethane.

E) Prepare for the female mould by putting a loosening agent and wax on the male model.

F) Make the female mould of polyester (or epoxy) resin and fiberglass for a total completed 1/16 to 1/8-inch thickness.

G) Take out the plug and polish the mould surface.

H) Coat the female mould with a loosening agent and wax.

I) Mold the canopy of 1-2 layers of fiberglass and polyester (or epoxy). Cut around the outline when half set.

J) Take out the molded canopy.

K) Cut the canopy outline, if needed, and make the cylinder hole. Note that this hole ought to be as small as possible. The cooling will be OK anyway. Most of the exhaust tube cooling air *must* come from the bottom intake, which also feeds the carburetor with cool air. If the cylinder hole is too big, too much hot air may enter the carburetor with disastrous results. If in trouble, mount a separating air baffle above the carburetor.

FINISHING

To save weight, use Solarfilm or Monokote instead of paint on the stabilizer and fin. I use cellulose-nitrate paint and a protective coating of clear polyurethane, except around the engine bay and tank, where I use epoxy.

WEIGHT

The weight with empty tank ought to be not more than 8 pounds (3600 grams).

FLIGHT TRIM

A) Check the Center of Gravity position with empty tank and gear down. If necessary, add lead where needed and never move the R/C gear around.

B) Adjust the aileron, elevator, and rudder throw as indicated. I recommend dual sensitivity on rudder and elevator. It is also better to use racks to get a softer reaction around neutral. The disadvantage is that you can't differentiate the throw so easily, but with the newest transmitters you ought to be able to limit the throw individually to each side. If you have an older set, use the rotating outputs with angled connections, if necessary, to get the indicated throw:
Elevators: For normal flying, use as small movements as possible. It is also important to have the same radii for inside and outside loops. The bigger throw is used for spin and snap-rolls.
Ailerons: Three rolls in 5-6 seconds.
Rudder: Normal throw (reduced) for most flying. Full throw for spin, snap-rolls, and figure M.

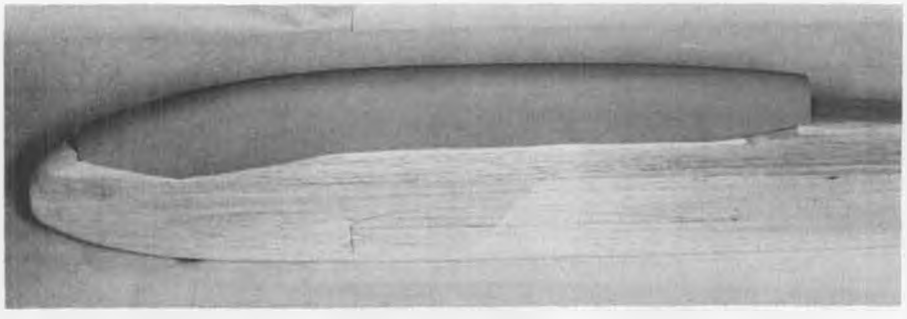
C) Check the wing tips to make sure they weigh even. If necessary, add lead in one wing tip (it is always necessary). However, in flight you can still have serious problems with uneven-weighing tips. The left and right wing areas are seldom the same. This weight adding can be touchy. Proceed as follows:

Trim the plane straight and level and note if one wing drops. Then fly inverted and note which tip drops. If the same wing drops, this one is too heavy. If the other wing drops, just give some aileron trim.

A much more sensitive method is to apply G-forces by making several outside loops, assuming you first have the plane OK in straight and level flight. If the plane slowly rolls to the right on the top, you have to put lead (0.1-1 oz.) in the left tip. That's because the G-force is adding to gravity in the bottom of the loop, but vice versa in the top.

If you are confused when testing, add 0.2 oz. in one tip and note what happens.

Don't listen to people who say it is impossible to make a warpy model fly OK. It is *always* possible if you work hard trimming it. The warpiness is, however, felt in which side is best for stall, spin, and snap-rolls, but is usually not any big problem; just choose the best side for the snap-roll.



First step in making the canopy/pipe cover is to carve a balsa or expanded polyurethane block to the desired shape, as shown above. This will be used to make a female mould.

After carving and sanding, the block is filled, sanded, then covered with glass cloth and resin to a thickness of about 1/8-inch. This glass part then serves as a female mould.

D) The landing gear ought to give a horizontal to slightly nose up attitude of the model. A slight toe-in (2.3°) on the main gear is also an advantage. It reduces the risk of ground loops and makes the retracting a little easier when the main wheels enter the bays.

E) The pipe has to be adjusted to the rpm's you will use. A shorter pipe means a higher rpm, and vice versa. A too-short pipe is more dangerous than a too-long one. A rough estimate says that a 1000 rpm change equals 3/8-1 inch in length.

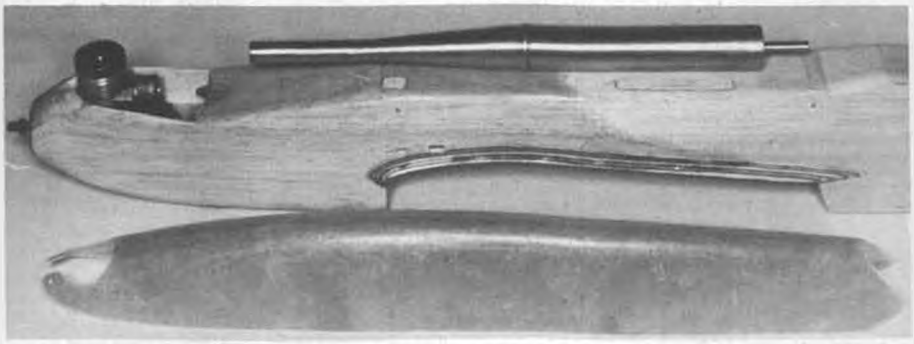
Using a pipe will make the needle setting quite touchy, particularly with a high-power engine like the OPS Speed .60. I strongly recommend an in-flight fuel needle adjustment. Without it, you can find the right setting for an evening's flying, but the next day with another temperature, humidity, fuel, or propeller, it won't work. And you must be "safe" at a contest.

F) Nowadays, noise is more and more an important factor. As this pattern model probably has the most powerful engine to be found, you may have to do some work to reduce the noise. The pipe is usually a very good muffler. No problem here, particularly with the OPS pipe-muffler set-up.

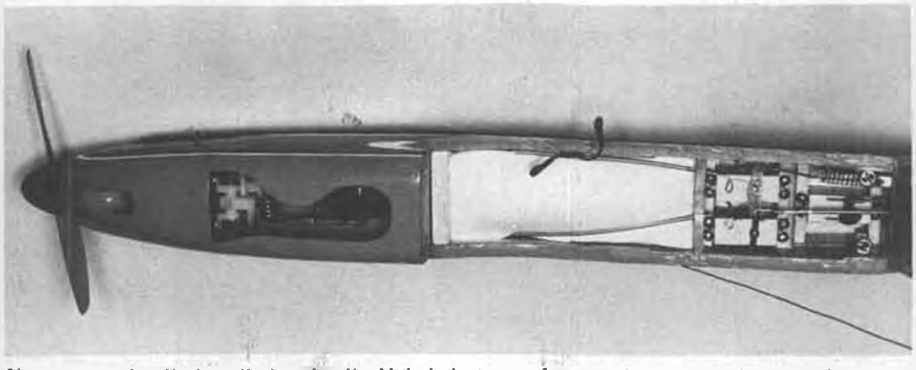
The intake noise is no problem with a rear intake engine. With a front intake, you may need some sort of intake muffler.

The propeller is by far the worst noise generator, and the tip speed is usually the limiting factor. With an 11-inch diameter prop, you can't rev higher than about 13,000 rpm with today's FAI noise standards.

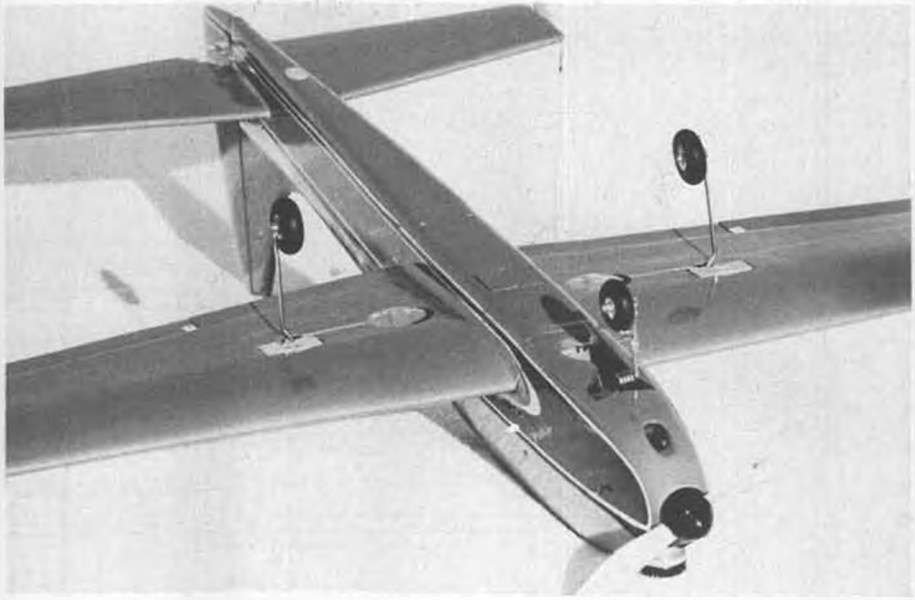
As the OPS .60 needs higher rpm's for full power, you must reduce the diameter. It would be possible to use a 10x8 or 10x9 wide blade prop at 14,000-14,5000 rpm. However, I think a three to four-blade propeller of 9-10 inch diameter, 7-8 inch pitch and wide blades to reach above 15,000 rpm, where the OPS .60 Speed is happiest, would give the best results with acceptable noise. I hope we will be able to buy such propellers soon. I need them! •



Finished at last! Canopy/pipe cover is cut out as required for engine and tuned pipe.



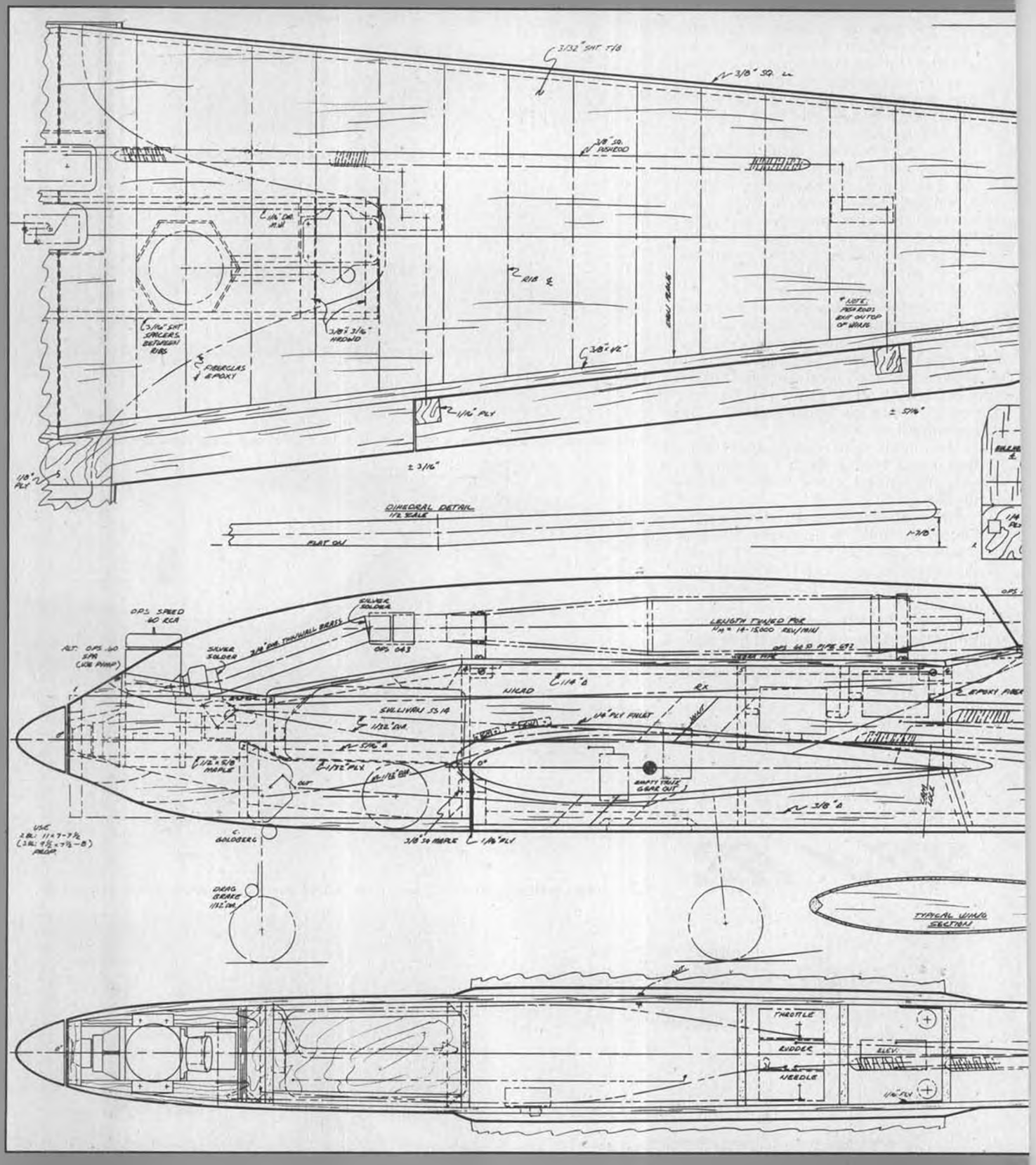
Nose gear and radio installation details. Hole in bottom of nose is for extra carburetor air.

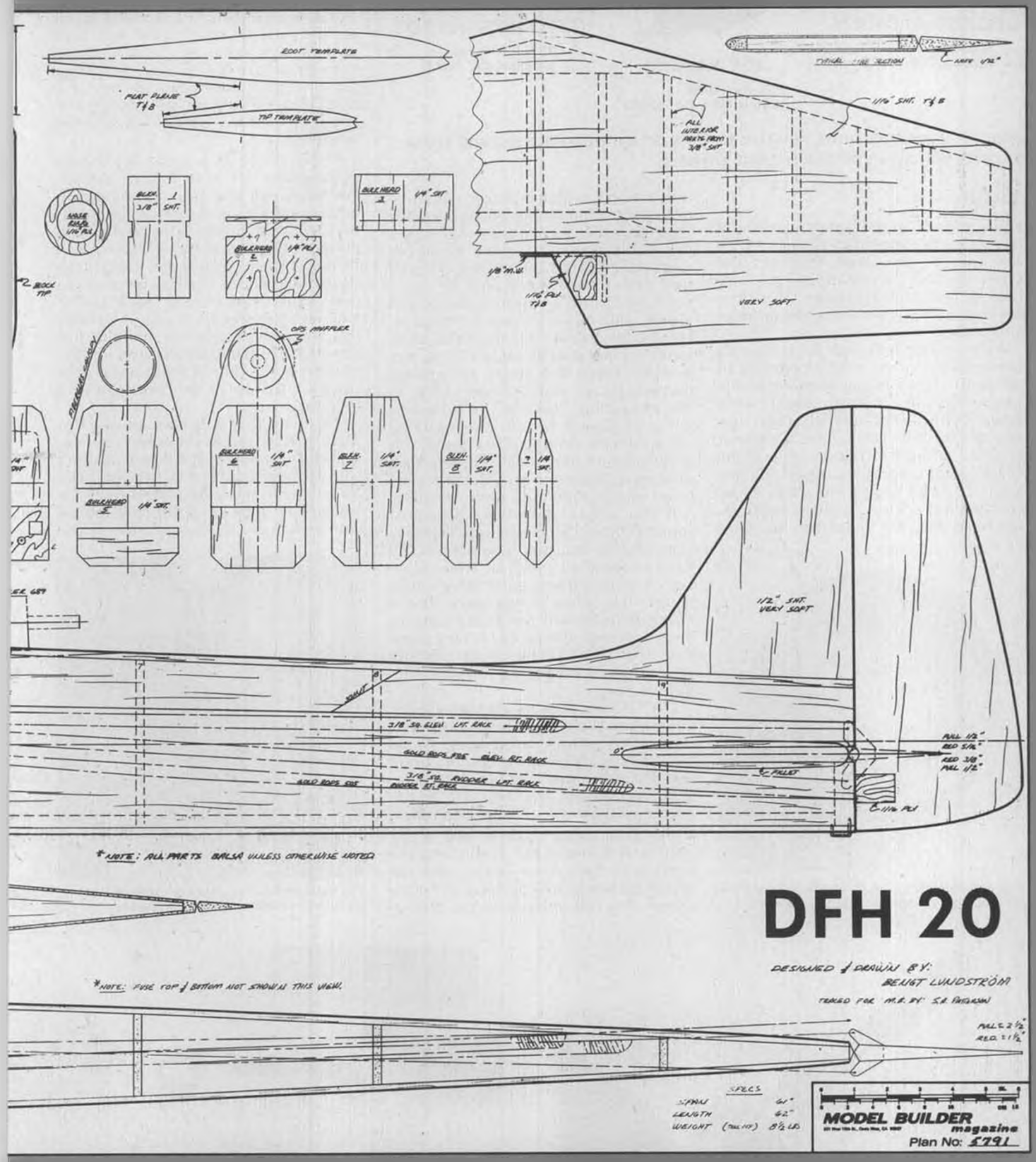


Bottom view with the gear down. Small door in belly pan is for hooking up nose gear linkage.

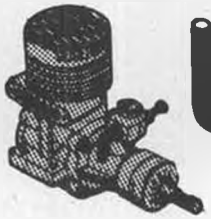
Side and front views of the DFH 20 reveal especially clean lines. With a OPS .60, this is one of the fastest pattern ships around.

Bengt Lundstrom, one of the top Swedish pattern fliers, with his pride and joy. His DFH 18 and 20 designs have also appeared in MB.


3/32" SHT. F/B
3/8" SQ.
3/8" SQ. FIREWOOD
1/16" DIA. MUSIC WIRE
RIB @
3/16" SHT. SPACERS BETWEEN RIBS
FIBERGLAS & EPOXY
3/8" 3/16" HARDWD
3/8" @ 12"
1/16" PLY
± 3/16"
± 5/16"
1/16" PLY
DIHEDRAL DETAIL 1/2 SCALE
FLAT ON
SILVER SOLDER
O.P.S. SPEED 60 RCA
ALT. O.P.S. 60 SPA (USE PUMP)
SILVER SOLDER
3/8" DIA. THINWALL BRASS
O.P.S. 043
LENGTH TUNED FOR 11,000 TO 14-15,000 REV/MIN
O.P.S. 60 TO FIT 072
HARD
SULLIVAN SS-14
1/32" DIA.
SPR. @
1/16" PLY
1/4" PLY FILLET
WING
EMPTY TANK GEAR OUT
3/8" @
3/8" SQ. MAPLE
1/16" PLY
USE 2 BL: 11-7 1/2 (3 BL: 9 1/2 x 7 1/2-B) PROP
GOLDBERG
DRAG BRAKE 1/32" DIA.
TYPICAL WING SECTION
THROTTLE
RUDDER
NEEDLE
ELEV.
1/16" PLY


ROOT TRIM PLATE
TIP TRIM PLATE
1/16" SHT. T/B
VERY SOFT
1/2" SHT. VERY SOFT
3/16" SQ. ELEV. LHT. RACK
GOLD ROD SIDE
3/16" SQ. RUDDER LHT. RACK
*NOTE: ALL PARTS BALSA UNLESS OTHERWISE NOTED
*NOTE: FUSE TOP & BOTTOM NOT SHOWN IN THIS VIEW.
DFH 20
DESIGNED & DRAWN BY:
BENGT LUNDSTRÖM
TESTED FOR M.B. BY: S.A. PATTERSON
SPECS
SPAN 61"
LENGTH 42"
WEIGHT (TAIL HVY) 8½ LB.
MODEL BUILDER magazine
Plan No: 1291

FUEL LINES



GEORGE ALDRICH
P.O. Box 1426
Mission, TX 78572

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

OTTO BERNHARDT
17119 S. Harvard
Gardena, CA 90247

Send in your questions, relative to glow or ignition engines, and these experts will give you the correct answers.

KLAUSE

• Last month, in the opening article of this series on elementary tuning of 1/2A engines, we discussed "mating" the crankcase and crankshaft, and pressure fuel system modifications. This time around, we'll go to work on the cylinder and piston.

At the outset, let's clear the air about a few possible myths, misconceptions, or whatever. First, as any knowledgeable custom tuner will tell you, if you have a good cylinder/piston fit, then the chances are that you'll have a superior engine. Without question, this is the single most important aspect of any single cylinder, slug piston, two cycle, competition engine. Timings, bearings, the head, etc., are important, but without a good cylinder/piston combination, the engine simply will not provide "top drawer" performance. Second, a reputable tuner will have an ample supply of cylinders and pistons, etc., and he'll select from them unitl he has a good set. Third, a custom cylinder and piston will require a proper break-in. Fourth, all custom sets from the same tuner are not exactly equal. Some may be a little better than others, and a minor percentage are extraordinary. Fifth, all the measuring, "feeling", or whatever will not reveal which ones will be extraordinary. Among other things, this is because of very small metallurgical differences from one set to another. The proof of the pudding is in the running.

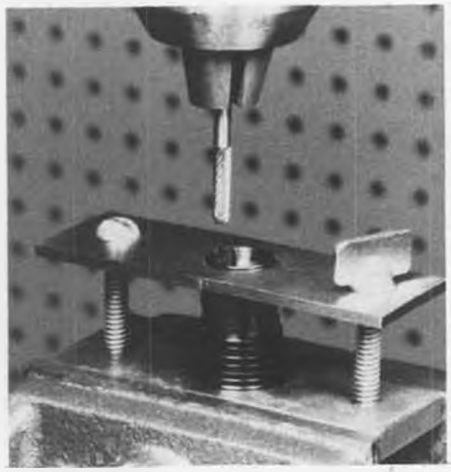
If you reflect upon the meaning of some of those comments, you'll appreciate why the "top dog" competitors still have to work so much at winning. A custom engine from a good tuner will be better than when it was stock, but it alone usually will not make you an instant winner. It'll probably take more than that. That cliche about "getting your whole act together" may be trite, but it's true.

OK, let's get to work on the cylinder and piston. We'll begin by finding out if the set has rework possibilities. To do this, thoroughly scrub the cylinder using the test tube brush, liquid detergent, and warm water. Do the same to the piston with one of the toothbrushes. Rinse them thoroughly, and while they're wet, insert the piston into the bottom of the cylinder. Now raise the piston by very gently pushing up on the connecting rod with one finger. Stop at the slightest resistance, and remove your finger. The piston probably will remain in position, and hopefully it won't be sticking completely out of the top of the cylinder. This technique may take a little practice until you get the feel of it. Keep the parts clean and wet as you do this. Ideally, the piston will hold position not quite at the top of the cylinder, where the shoulder begins for the threaded glow head section. If it does, it means your set is a tad snug, and you'll be able to carefully lap it to the desired fit.

If the piston is a loose fit, there's nothing you can do to improve the set. However, you can swap it around with others to get a good running combination. With the piston at the barely-hold position, the slightest touch on the top of it will cause it to quite freely drop down the cylinder. Do this a few times so that you'll remember the feel of it. The goal we're aiming for is a fit or feel like this when the piston barely-holds just about 1/32-inch past the top of the cylinder wall. One of the photographs shows a piston in this position in a cylinder.

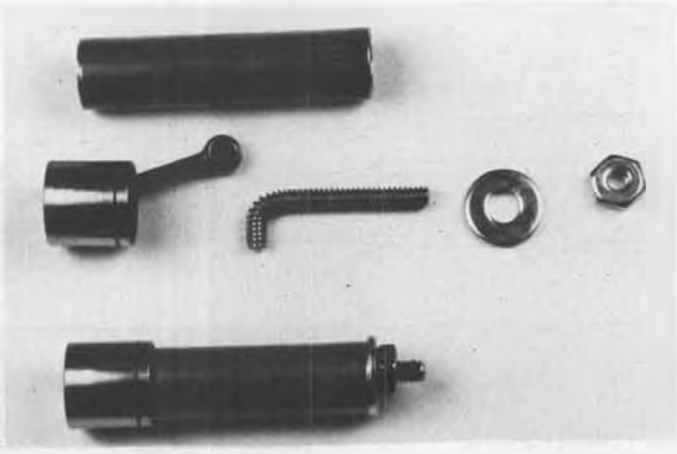
Assuming that you have an ever-so-slightly-snug set, thoroughly dry the cylinder and piston, and then coat them with WD-40. Our first rework step will be to check, and if necessary, reset the ball-socket joint. Holding the piston with one hand, push and pull on the

This cylinder/piston set shows the piston at the optimum barely-hold position . . . see text.

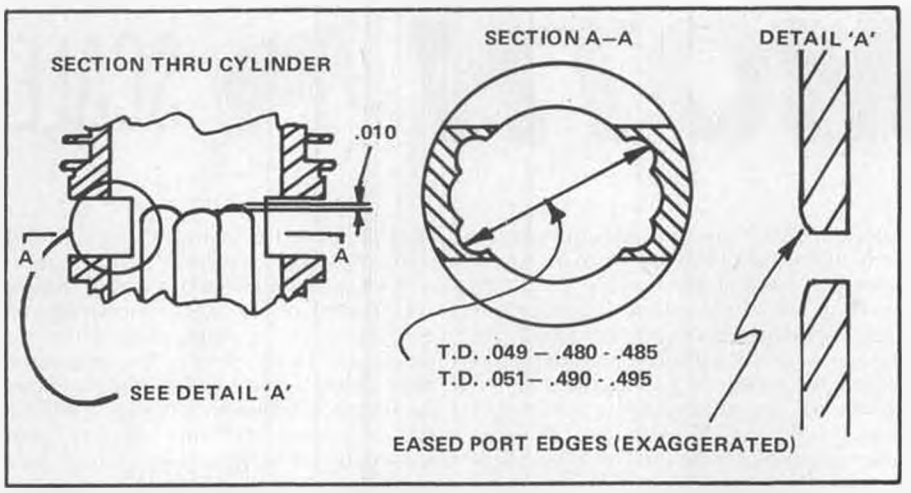


The cylinder held in a milling machine fixture, ready for remachining of the bypasses.

A Cratex Rubberized Abrasive in a Dremel Moto-Flex tool. It's used to "ease" the port edges to reduce power losses.



A simple piston lapping tool. Easy to make, or you can buy one from Kustom Kraftsmanship.



connecting rod with your other hand. If you feel any play, then the joint needs tightening. Several brands of reset tools are commercially available. If you can't find one in your local hobby shop, you can order one by mail, complete with instructions, from Kustom Kraftsmanship. See the advertisement elsewhere in this issue.

The next procedure involves remachining the cylinder bypasses. This is properly done on a milling machine as shown in one of the photographs. The two outer milling cuts of each bypass should be remachined with a 1/8-inch ball-end cutter to the dimensions shown in the accompanying drawing. Some guys have successfully done this using a Dremel Moto-Tool. However, the chances of ruining a cylinder are very good. So, proceed at your own risk. Otherwise, if you don't have access to a mill, then skip this step.

We're now ready to deburr or "ease" the edges of the bypasses and exhaust ports. When a cylinder is manufactured, the edges of the ports are left very abrupt. This edge can ever so slightly trip a moving piston. It's almost undetectable, but the least trip means a power loss. To remedy this, we can "ease" the edges inside of the cylinder. Properly done, they'll resemble the enlarged port in the drawing. Be careful not to ease them more than about .010 of an inch onto the cylinder wall. All you want to do is get rid of that sharp edge. I've personally found that this can be done best by using an extra-fine Cratex Rubberized Abrasive mounted on a Dremel No. 424 mandrel. The abrasive can be easily trued to the shape shown in the photograph by using a Dremel dressing stone. The holder also shown in the photograph is the ball bearing hand piece of a Dremel Moto-Flex, Model No. 232 . . . an exceptionally fine tool.

After you've eased the ports, thoroughly scrub and dry the cylinder, and coat it with WD-40. Now we're ready to lap the set to the desired fit. To do this, we'll need a simple lapping tool to enable us to rotate or twist the piston in the cylinder. If we only hold onto the connecting rod, it would turn in the ball-socket joint, and the piston would not turn in the cylinder. Refer to the photograph of the tool, and you'll see that it's quite easy to make. Simply take a piece of 11/32-inch diameter brass tubing and cut a piece to a length of 1-3/8 inches. Next, put a 90° bend about 1/8 inch from one end of a headless one-inch 4-40 machine screw. Insert this into the crankpin hole of the rod, and then slide the other end through the brass tubing. After adding a washer and nut, you can then snug the brass tubing against the inside of the crown of the piston. Thus, whenever you twist the lapping tool, the piston will turn in the cylinder. Lapping tools and 1000 grit aluminum oxide lapping compound are also available from Kustom Kraftsmanship.

Begin the lapping procedure by putting a small dab of lapping compound on the side of the piston . . . about the size of a pinhead. A little bit goes a long way. Smear it around, and completely soak the cylinder and piston with WD-40. Insert the piston into the bottom of the cylinder, and carefully work them together. Twist the piston in the cylinder as you gently work it towards the top.

Now stop, take them apart, meticulously scrub them clean, and use that wet "feel" technique. Remember, lap only a little bit at a time, then clean and recheck the fit. Tedious? Yes, but if you try to take short cuts by doing a lot of lapping without checking the fit, then the chances are you'll have it too loose. When it's right, it'll feel ever so smooth throughout the entire stroke, but yet if you put your thumb over the top of the cylinder, you'll hardly be able to push the piston up. Very free and smooth, but yet great compression. Remember, the wet piston should barely hold just a fraction past the top of the cylinder. Too far out, and it'll be too loose.

This is running long, so we'll finish up next month. Meanwhile, don't hesitate to ask questions. There is no such thing as a stupid question. •

BERNHARDT

• Quite frequently I receive mail asking advice on how to rework a model engine to obtain maximum power output. To increase an engine's horsepower is relatively simple; to get *maximum* performance is a good deal more difficult, and in some cases, only possible with special equipment. Nevertheless, suppose we give it a go and see just how much we can accomplish using the tools that the average modeler would possess.

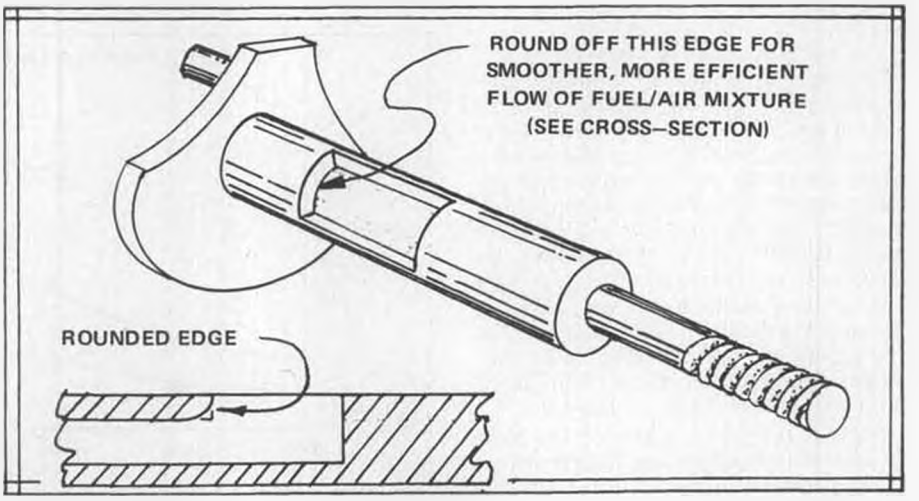
Before a model engine is offered for sale to the public, the prototypes are subjected to extensive testing by the designer/manufacturer for the purpose of making improvements and eliminating weak areas. But since the difference in profit and loss in manufacturing today depends on how inexpensively an item can be produced without sacrificing quality, hand finishing is held to an absolute minimum to hold down manufacturing cost. A machine can only accomplish what it was designed to do, which, in many cases, leaves a lot to be desired. As purchased from the local hobby shop, the modern model engine can be hand finished to a degree that a 20% increase in power output is not uncommon.

The first and primary operation to be accomplished in our quest for more power is that we must deliver and retain a greater amount of fuel mixture in the combustion chamber. This can be done in various steps, each step adding an increase in performance.

Before we can make any improvements, we must first understand exactly what is taking place both inside and outside of the engine.

Visualize the piston of your engine starting its upstroke. This results in the

Continued on page 83



MAMMOTH SCALE

By RON SHETTLER

• The Pasadena IMS Show is fresh in my mind as this column is being written. It wasn't the biggest show on earth, but one where you as an exhibitor could spend a bit more time with each interested person, help them where you could, and more importantly, listen to what they had to say. One of their chief complaints was that they could no longer rely on advertising to give them the technical information they needed to make a choice in purchasing a product, or worse still, depend on the editorial content of the magazines themselves, which looked like a rehash of the manufacturer's propaganda. Many felt that their intelligence was being insulted by some of the claims in advertising and by some of the test reports. If you took the time to list the claims as to horsepower, torque, thrust, and the engine rpm required to achieve these figures (often on the same prop), you could only conclude that the test figures were arrived at with totally different equipment, some obviously not accurate and others just wishful thinking. I'm sure that the magazine people as a whole would like nothing better than to be able to publish true facts only (especially if they could do it first). But to provide news instead of history, they must presently rely on the integrity of the manufacturer or advertising dispenser to provide this information. I believe modelers are some of the most intelligent people in the world, and they deserve straight answers.

I was very fortunate to have with me at my booth Gary Isberg, chief engineer of Trail Manufacturing Ltd., manufacturer of the Quadra engine. Gary came with me to give out technical information and straight answers and also to see firsthand what was needed to do a better job. We would like to thank the many modelers who took the time to volunteer suggestions or improvements and to tell us how they licked problems on their own. That alone made the trip worthwhile.

We were also able to talk with kit and accessory manufacturers who are producing items suited for the Quadra engine and for Mammoth Scale. It was generally agreed among those with whom we spoke that we would all work closer together to ensure a compatible product package for the customer to enjoy. Some results of this will soon be seen on many products. If you weren't one of the manufacturers we talked to, then we cordially invite your inquiry at any time. I'm hoping that in doing this, other manufacturers of fine competitive products will see fit to do likewise.

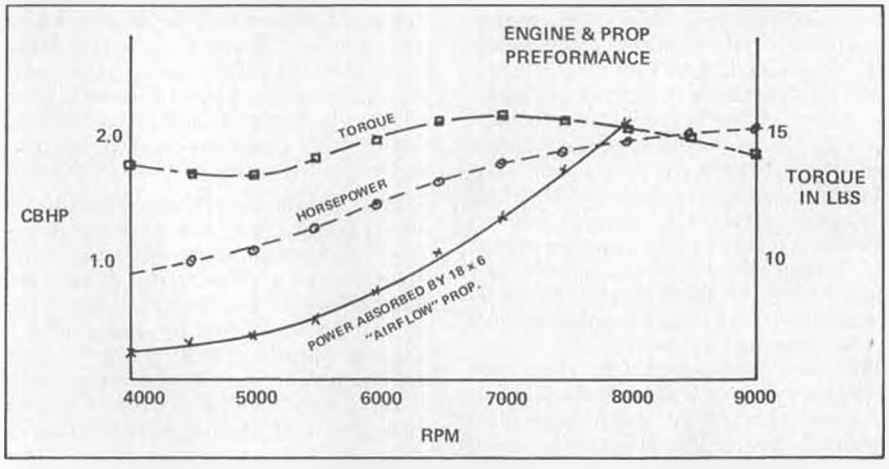
I've been told by some of the best experts in the advertising field that you have to "peak" your specifications to be noticed, and if you have a feature which only slightly improves performance, you state you have eliminated the problem, and you can't be sued for the statement because you haven't said "entirely". The problem is that a good many manufacturers of excellent products have listened to these advertising "experts" about fighting fire with fire or have attempted to copy them. If exaggeration or misrepresenation is the fire they refer to, then it's time we put the fire out. Let's face it, some of the money you pay for any product is used for advertising. *You* pay for it.

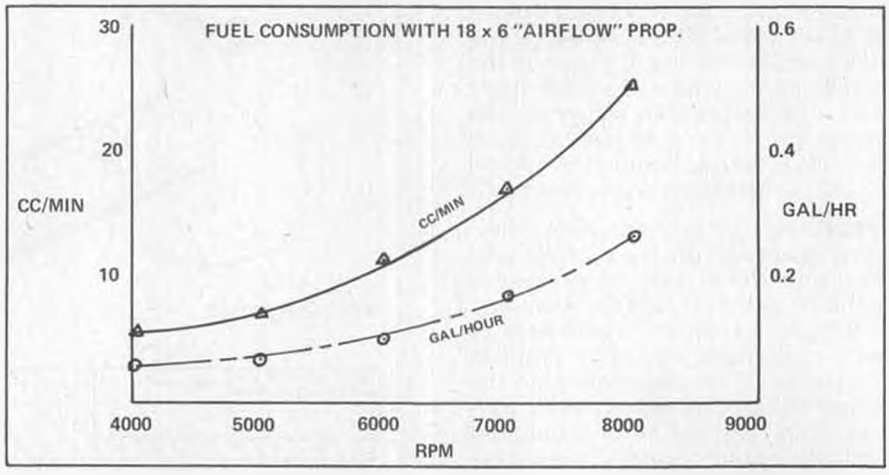
Probably part of the reason you buy your favorite model magazine is to find out what's new. If the advertising doesn't provide the facts you need to select your product, you're not getting your money's worth. Some of the best products in the world are not being enjoyed by consumers because they don't know they exist. The fact is, if you have been stung because you believed exciting claims once, would you ever really believe anything in advertising again? Many people do not advertise their products because they feel you won't believe them anyhow, and they rely instead on word of mouth by satisfied users. Really, everyone is a loser here.

A lot of people feel this way, modeler and manufacturer alike. However, to exist, a magazine must print what you want, and to reach you, the advertiser must abide by your wishes also. Let your favorite editors know whether it will be fact or fiction, and then support them with your patronage. If you don't, you can't expect your editor to turn down advertising dollars on questionable ads. I'm sure many who are advertising a little overenthusiastically now will discover that they don't have to, because they have a good product which can be presented factually and sell on its own merit, and if they don't, it's best to improve the product, not the ads.

Gary and I have long discussed how we might serve you as a team, one member of which is long on engineering and short on modeling, the other being short on formal engineering and long on modeling. Don't laugh! It makes a good compromise. We're presently spending a lot of time and money to give you some facts which you can use. It has become a challenge for us to provide this. As to

Continued on page 97





FLY with SAFETY

By ARTHUR SABIN . . . Borrowing from full-size aviation practices, the author tells how to become a safer pilot. It's *everyone's* concern.

• We aren't "little brothers" or "kids with toy planes"; we know it and so does anyone even remotely familiar with R/C piloting of planes. Yet, ever since I began training for my private pilot's ticket, and since earning that ticket, it has become plain to me that a number of concerns, techniques, and lessons applicable to full-scale flying are relevant to R/C piloting. Unfortunately, sometimes these are either ignored or simply not understood.

Let's examine a list of relevancies that should help make us better pilots.

SAFETY CONSCIOUSNESS

Pick up any pilot oriented magazine and you can't help but find articles devoted to the safety aspects of flying. *Every* issue is going to have columns, articles, and materials devoted specifically to the topic of safety. Full-scale pilots are probably the most safety conscious group of Americans. While it may be argued that the concern of R/C pilots should be less, since our lives are not on the line every time we fly, safety concerns simply haven't been appreciated or gotten the recognition they really deserve. As R/C modeling becomes more popular, as more and more people of all ages and backgrounds get involved in piloting, as the engines get more powerful, as speed records continue to be broken, and as such sophisticated devices as ducted fans are used, the concern for safety should be achieving a pre-eminent position. It isn't just our lives or bodily parts that are involved; it's the potential dangers to spectators, passers-by, or just anyone who gets in the way of an R/C plane that has gone out of control and has become a deadly missle.

What this really means is that everyone in R/C, from designers and manufacturers through retailers to modelers and pilots, must really be concerned with the safety aspects of what they're doing. The safety message is getting across to manufacturers . . . that I know. Five years ago it would have been thought out of the question for propeller manufacturers to warn and direct modelers on the proper (and improper) use or a model propeller. But those days are past and safety is and should be the real concern of each of us. We can learn a lot from our full-scale brothers; they have learned how important safety is, and they know their lives depend on it. The same is basically true for us and for those who *depend on us to be safe pilots.*

Safety can be broken down into three major components:

1) Is your model structurally safe to fly?

2) Are all operating components (radio, engine, accessories) operating properly and consistently?

3) Are you safe as a pilot, competent with respect to this model and at this time?

THE PRE-FLIGHT CHECK

Regardless of how experienced a pilot, our full-scale brother (or sister) will do a thorough pre-flight check. A written checklist is used as the pilot walks around the plane and in the cockpit run-up procedures. *The matter is not left to memory.* Every R/C pilot should have a checklist of his or her own performed before flying a model. Minimally, this should include:

1) A range check.
2) A frequency clearing check.
3) Determine that fueling has been completed.
4) An engine check.
5) All moving surfaces free and correct.
6) Timer (or watch with time noted) set.
7) Field clear for takeoff (landing planes have right of way).

A crucial point is to regularize and systemize the pre-flight check. With a real pre-flight check, we can be confident that major potentials for in-flight failure have been minimized. Without one, given enough flights over enough time, you are sure to forget or miss some element that will lead to a serious problem.

A simple suggestion is made: why not create your own checklist on a three-by-five-inch index card and carry it with you to the field, or cover it with some plastic and tape or glue it to your field box so that you have it in front of you and ready to use before every flight. Try it! You'll be amazed at the confidence it will build, as well as peace of mind!

KNOWING FLIGHT CHARACTERISTICS

Every full-scale pilot spends a great deal of time acquiring a knowledge of the flight characteristics of the particular plane that he is flying. While it is certainly true that manufacturers do not issue books concerning the flight characteristics of a model (nor do those who design and build their own models), a studied attempt to understand the flight characteristics of each model we fly is a rational step toward better piloting. A conscious effort should be made to know just how that particular model reacts in terms of such things as how much rudder is necessary on takeoff, how fast the ailerons are, the stall characteristics of a plane (when was the last time you took the model up high enough, then stalled it?), the correct landing characteristics for the model, etc. One thing all of us can do is have someone else fly the plane and observe how it behaves, and compares notes with that person on the flight characteristics of your model. Put aside pride and ego and let's aim at safe flying through sound knowledge of the behavior of each model. It does amazing things in terms of increasing the longevity of the model.

FLYING WITHIN YOUR AND THE PLANE'S CAPABILITIES

Before even the most experienced pilot moves into a different type of airplane, e.g. low wing to high wing or even a more powerful version of the one that he or she has been flying, the full-scale pilot will undergo a check-ride with an instructor. The purpose, obviously, is to make certain that the pilot's capabilities match the demands of flying that plane. Isn't there a lesson for us to learn in this full-scale technique? It begins with honest questioning as to whether our abilities as a pilot match the power, speed, and flight characteristics of a particular plane. We are a danger to ourselves, our plane, and others if we are not really capable of handling what

Continued on page 82

"Engine's running a little too rich, I guess!"

One of the outstanding scale models that were shown at this year's WRAMS Show was this P-38-L by Jim Funduk, of Onslow Beach, N.C. The metal-covered (!) bird spans 84-1/2".

1 TO 1 SCALE

By BOB UNDERWOOD

• The cold winter months that turn part of the country into a deep freeze and limit most modeling activity to building, dreaming, and reading old issues of model magazines is upon many of us.

As I sat persuing one of the above activities one day, I came across an article that told how to win contests by improving your cheating quotient. While written tongue-in-cheek (I hope!), many valuable points can be gained from it.

I stared at the glistening ice coating our beleaguered St. Louis trees and mentally traveled back over years of competition and thought about events that I had witnessed which tended to support some of the basic ideas generated by the article.

It was comforting to realize that most often the problems found at contests were not overt acts of cheating, but rather acts of omission, sometimes by the contestant, and other times by the contest management.

More often than not, the pattern of the contest management becomes one of hanging loose until some problem develops. This, of course, lends a certain degree of informality and ease to the proceedings, *if nothing happens.* But woe betide the officials in a loosely-run event, should something significant develop.

For this reason, and not because I feel we should teach cheating, I would like to indicate some concerns I've noted over the years. Again, I must strongly emphasize that in probably every case, the intent was positive on the part of those concerned. By the same token, both contestant and management alike should expect that the rules be adhered to in order not to present an advantage for one person or another.

1) Assuming that it is an AMA sanctioned event, membership cards should be checked at the time of entry. The same is true of the FCC license. Beyond the concept of sportsmanship and the like, the contest management, in this day of ever-escalating lawsuits, could perhaps find itself in an awkward position in the event of an accident, should the modeler be uninsured.

2) Builder of the model rule. Ah, yes! I sense the sly smiles creeping across many modelers' faces. They know of models "ghosted" into competition and feel that an attempt at enforcing the rule becomes futile in the cases of some hard-core hardware hunters. I suspect that this is true, but it has become a requirement in an increasing number of contests that the modeler sign a statement that he is the builder. While such a signature may not completely discourage the individual who flaunts this rule, it does tend to make him think about it more objectively. Most people tend to be careful about signing a declaration when there is the possibility they may be challenged on it. At least at a later time he cannot disclaim any knowledge of such a rule.

3) Weight check. In the case of scale competition, there are restrictions on weight in the various categories. While there are certainly many other items which bear directly upon the safety of a model, weight is a critical one. I would venture to say that less than 25% of the contests in my immediate area bother to weigh scale model aircraft.

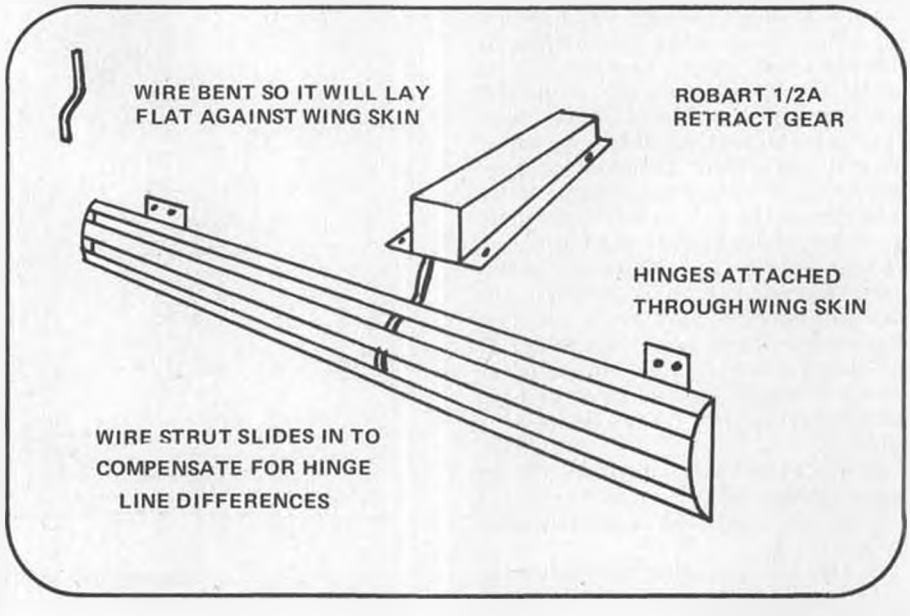
As an illustration, last year at a contest a large model competed in Sport Scale. At a subsequent contest, the same model was disallowed because it was overweight. One can argue that since it competed safely in one contest, there should be no reason why the rule should not be ignored or waived at other times. This argument, of course, does not consider the rest of the contestants who struggled to make the limit and perhaps have a touchy model because it really could stand some additional noseweight. These people then fly at a disadvantage, because they adhered to the rules.

It has been a pleasant experience to witness the manner in which the Mint Julep meet has handled this. When the process of registration takes place, each model is not only weighed but it is given at least a cursory check for such things as pointed projections, etc. Any type of examination would seem to be valuable. It is imperative that it be carried all the way, however. Quite often models do not get to the flight line in the same state in which they were static judged.

There are certain legal changes which can be made, such as spinner (with certain restrictions), antenna, etc. However, one often finds things added or more often subtracted following the static judging.

It would seem logical or perhaps critical that this type of check be made in order to eliminate problems. Reasons that the check is *not* made include the

Continued on page 88



• Countless words have been written about the Fokker D-VII . . . all justified because it was a remarkable airplane. But a few numbers prove far more than can mere words just how remarkable an airplane it was. In April of 1918, the German Air Force shot down 217 Allied aircraft; in June, when the D-VII became the standard German fighter, the score jumped to 468, to 517 in July, and 565 in August. That is more that 17 planes a day, and one an hour during the long daylight hours of the summer of 1918.

The D-VII would not have existed had it not been for Anthony Fokker's gnawing desire to get his hands on the Mercedes 6-cylinder, liquid-cooled engine. Until the D-VII, Fokker aircraft were powered by rotary engines, not because the Dutchman preferred that engine but because the German authorities were allotting all production of the Mercedes to the successful Albatross fighters.

However, through influential friends such as von Richthofen and Werner Voss, to whom he gave improved DR. I triplanes, the wily Dutchman inveigled the German Air Ministry into holding a competition for new fighters, some of which had to be powered by the Mercedes. The competition was scheduled for January 1, 1918.

Anthony Fokker's Mercedes-powered fighter was the V. 11, an airplane with a DR. I fuselage and tail and landing gear, and two thick, wide wings, the upper supported on two tripods of struts at the front spar and two struts at the rear. It is said that there were no interplane struts on the V. 11, and it is likely, since the "V" meant *verspannungslos*, or cantilever.

During the competition at Johannisthal, outside of Berlin, in early January of 1918, Fokker lengthened the fuselage of the V. 11 to improve directional control, a change that proved that the V. 11 was the best new fighter. The redesignated D-VII won the competition, not on speed but on its ability to climb faster and maintain complete control at high angles of attack and low speed, where its competitors stalled out. Fokker won a contract for 400 D-VII's and for the D-VI, a rotary-engined backup for the D-VII.

The victory was doubly sweet for Fokker; he not only got all the Mercedes engines he needed, but his disliked competitors, the *Albatross Werke*, were also ordered to manufacture the D-VII. A few changes were made in the production D-VII; the trailing edges of the ailerons were lined up with the trailing edge of the wing, a triangular fin added to further improve directional stability, and the comma rudder enlarged.

•

The 1939 movie "Men with Wings" saw this Hisso-powered D-VII in action. It was a genuine D-VII except for the fuel tank in the wing and the nose section.

FOKKER D-7

PART ONE

Drawings by: NICK KARSTENS
Text by: PETER WESTBURG

This D-VII without crosses and a strange insignia on the fuselage probably fought in the Baltic region against the Bolsheviks in 1919.

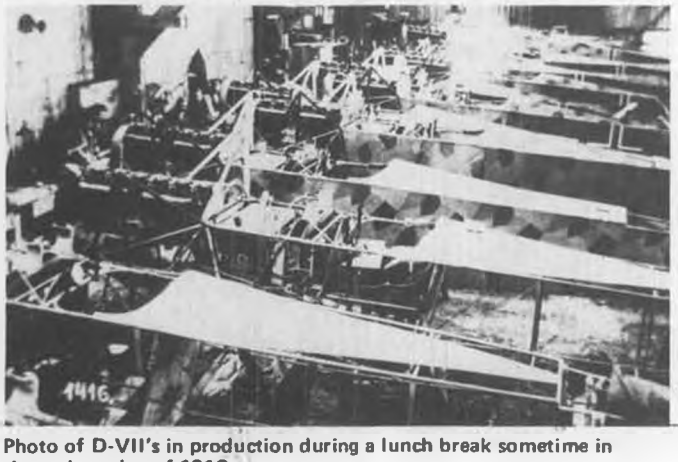
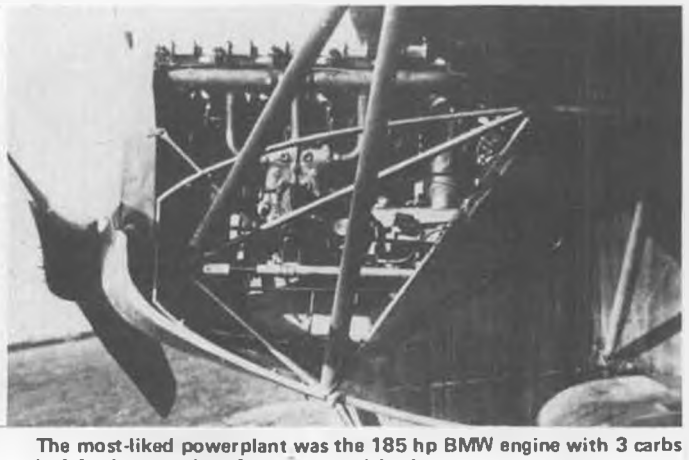


Photo of D-VII's in production during a lunch break sometime in the early spring of 1918.



The most-liked powerplant was the 185 hp BMW engine with 3 carbs in 1 for improved performance at altitude.

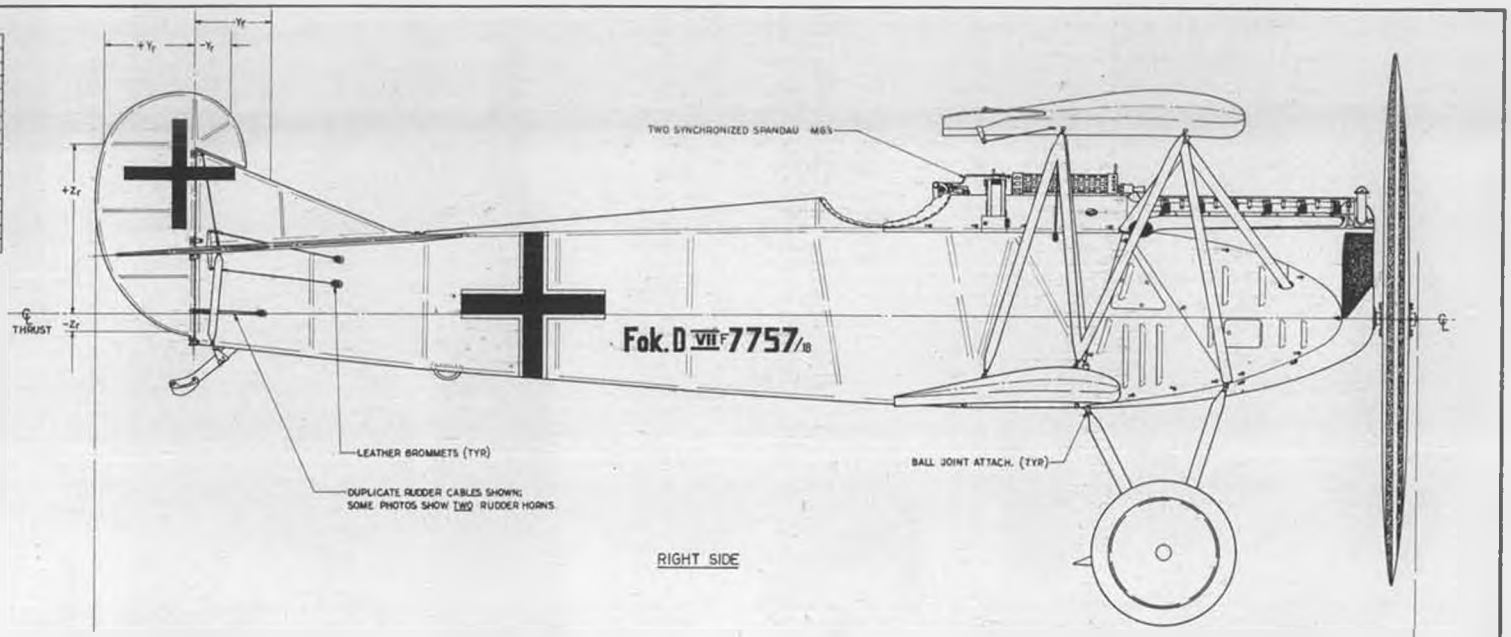
RUDDER COORDINATES

Z_r		$+Y_r$		$-Y_r$		Z_r		$+Y_r$		$-Y_r$	
cm	ins	cm	ins	cm	ins	cm	ins	cm	ins	cm	ins
117	46.06	8.0	3.15	—	—	*54	21.26	52.5	20.67	—	—
115	45.28	21.0	8.27	5.4	2.13	47	18.50	52.0	20.47	—	—
113	44.49	26.6	10.47	10.2	4.02	*38	14.96	RUD. H.L.		RUD. H.L.	
111	43.70	31.0	12.20	13.0	5.12	37	14.57	50.0	19.69	—	—
109	42.91	33.9	13.35	15.6	6.14	*30	11.81	RUD. H.L.		RUD. H.L.	
107	42.13	36.0	14.37	17.6	6.93	27	10.63	46.9	18.46	—	—
102	40.16	41.2	16.22	21.2	8.35	*19	7.48	42.8	16.85	—	—
97	38.19	44.6	17.56	23.7	9.33	7	2.76	53.7	13.27	—	—
92	36.22	47.0	18.50	25.3	9.96	**2	0.79	28.7	11.30	—	—
*89	35.04	48.0	18.90	26.15	10.30	-3	-1.18	22.9	9.02	—	—
*84	33.07	RUD. H.L.		RUD. H.L.		-8	-3.15	14.65	5.77	—	—
77	30.32	50.8	20.0	27.0	10.63	-15	-4.53	1.5	0.59	—	—
67	26.38	52.2	20.55	—	—	*150	-5.9	RUD. H.L.		RUD. H.L.	

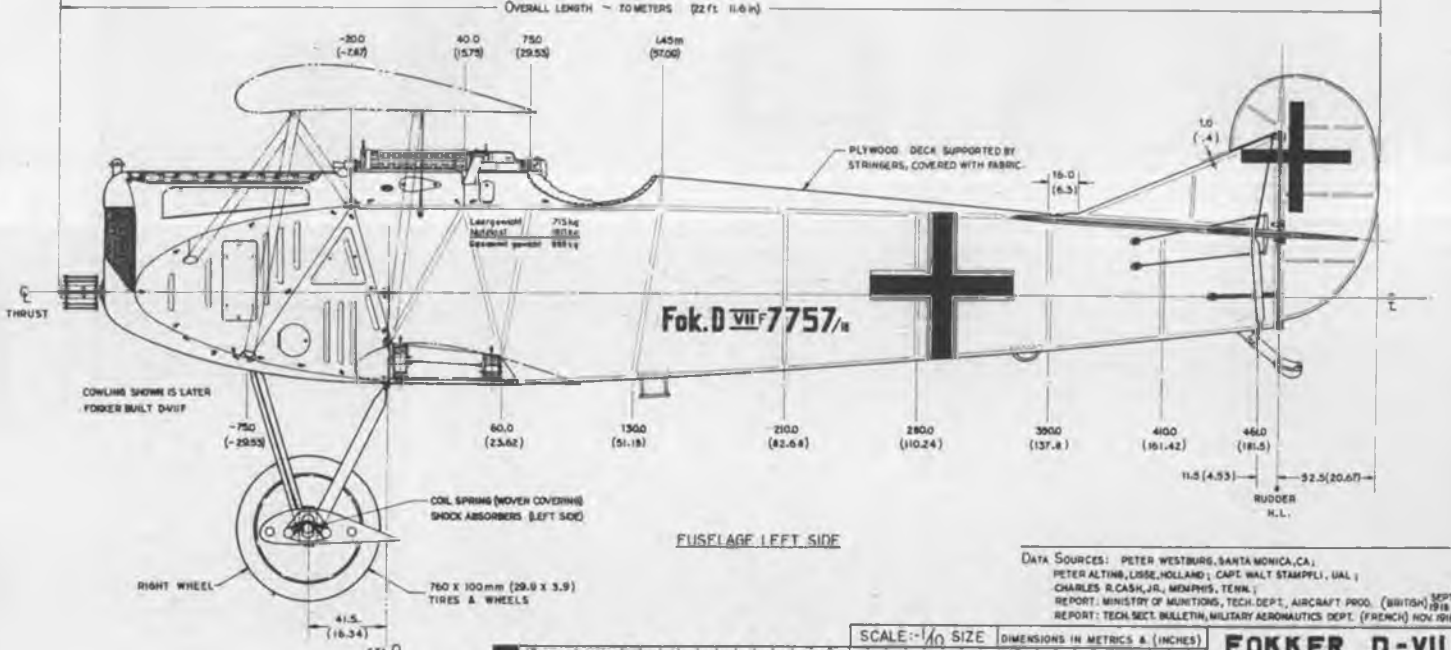
* RIB
** CONTROL HORN
h HINGE POINT

FIN COORDINATES

Z_f		$-Y_f$	
cm	ins	cm	ins
h 88	33.07	7.10	2.80
77	30.32	24.5	9.65
65*	25.56	42.1	16.55
54	21.26	81.2	31.97
47	18.50	98.8	38.94



RIGHT SIDE



FUSELAGE LEFT SIDE

HISTORY:

THE FOKKER D-VII IN A NEW FIGHTER DESIGN COMPETITION AGAINST TEN OTHER ENTRIES, EACH FLOWN BY A PROMINENT FRONT-LINE GERMAN ACE., WON HANDS DOWN. THE PILOTS CHANGED PLANES THROUGHOUT THE EVALUATION (MOCK BATTLES) TO FAIRLY COMPARE THE FIGHTERS. SEVERAL COMPETITORS WERE FASTER, BUT THE D-VII's AGILITY AND ABILITY TO OUTCLIMB THE OTHERS, HOLD ALTITUDE, PLUS BEING A STABLE GUN PLATFORM WHILE HANGING ON ITS PROP, MADE IT THE FAVORITE.

FOKKER WAS AWARDED AN ORDER FOR 400 D-VII's TO BE MFD. AT -

1. FOKKER FLUGZEUG-WERKE GmbH SCHWERIN (FOK)

HIS RIVAL, ALBATROS, WAS ORDERED TO PRODUCE QUANTITIES UNDER LICENSE AT-

2. ALBATROSWERKE GmbH. JOHANNISTHAL (ALB)
3. OSTDEUTSCHE ALBATROS WERKE SCHNEIDEMUHL (Osw)

THE HIGHLY SUCCESSFUL D-VII WAS SPECIFICALLY SINGLED OUT IN THE TREATY OF VERSAILLES AS A DESIGNATED WEAPON TO BE TURNED OVER TO THE ALLIES.

FOKKER SMUGGLED A LARGE NUMBER OF D-VII's INTO HOLLAND WHERE HE CONTINUED MANUFACTURING AIRCRAFT. D-VII's WERE USED BY THE DUTCH AIR FORCE UNTIL THE LATE 1920's IN THE NETHERLANDS EAST INDIES.

CHARACTERISTICS:

POWERPLANT -

160 hp MERCEDES D III 6 CYLINDER IN-LINE WATERCOOLED ENGINE
Improved performance achieved later in 1918 with installation of 185 hp BMW III 6 CYLINDER IN LINE WATERCOOLED ENGINE

DIMENSIONS, AREAS, WEIGHTS, COWLINGS, & RADIATORS VARY BETWEEN D-VII's PRODUCED BY THE THREE MANU - FACTURERS AS THERE WAS NO MASTER SET OF PLANS.

AREAS

TOTAL WING AREA	20.4 sq.m. (218.50 sq.ft)
UPPER WING AREA	11.62 sq.m. (125.03 sq.ft)
LOWER WING AREA	7.58 sq.m. (81.56 sq.ft)
AXLE WING AREA	1.2 sq.m. (12.91 sq.ft)
AILERON AREA	0.74 sq.m. (7.96 sq.ft)
HORIZ. STAB. AREA	1.66 sq.m. (17.86 sq.ft)
ELEVATOR AREA	1.41 sq.m. (15.17 sq.ft)
VERT. FIN AREA	0.25 sq.m. (2.69 sq.ft)
RUDDER AREA	0.35 sq.m. (3.77 sq.ft)

WEIGHTS

EMPTY	GROSS
698 kg. to 736 kg.	850 kg. to 895 kg.
(1539.1 lb.) (1622.9 lb.)	(1874.3 lb.) (1973.5 lb.)

PERFORMANCE:

MAXIMUM SPEED
189 km/hr (117.5 mph) with MERCEDES D III ENGINE
200 km/hr (124.3 mph) with BMW III ENGINE

CLIMB

ALTITUDE		TIME OF CLIMB		SPEED AT ALTITUDE	
METERS	FEET	MIN.	SEC.	MPH	Km/HR
1,000	3,281	4	15	110.6	178
2,000	6,562	8	15	114.1	183.6
3,000	9,843	15	49	109	175.3
4,000	13,124	22	49	103.5	166.5
5,000	16,405	38	5	94.9	152.7

this table from BRITISH REPORT (FRENCH TEST)

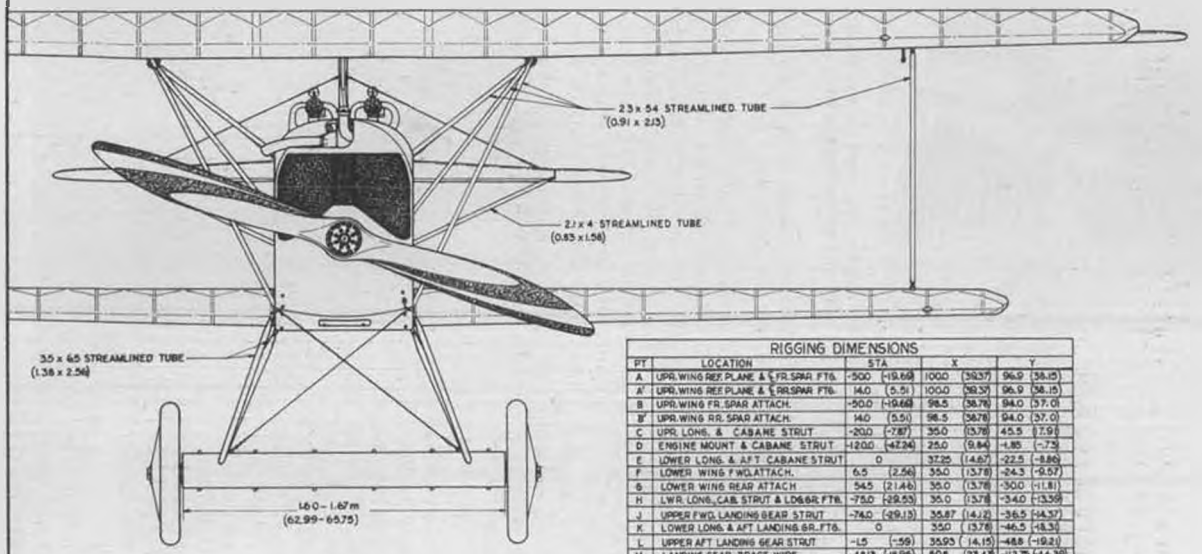
DATA SOURCES: PETER WESTBURG, SANTA MONICA, CA.;
PETER ALTING, LISSE, HOLLAND; CAPT. WALT STAMPFLI, UAL;
CHARLES B. CASH, JR., MEMPHIS, TENN.;
REPORT: MINISTRY OF MUNITIONS, TECH. DEPT., AIRCRAFT PROD. (BRITISH) SEPT. 1918
REPORT: TECH. SECT. BULLETIN, MILITARY AERONAUTICS DEPT. (FRENCH) NOV. 1918

SCALE: 1/10 SIZE DIMENSIONS IN METRICS & (INCHES)

FOKKER D-VII

NICHOLAS KARSTENS 1976

DRAWING SIZE: 70 x 100 cm



FRONT VIEW

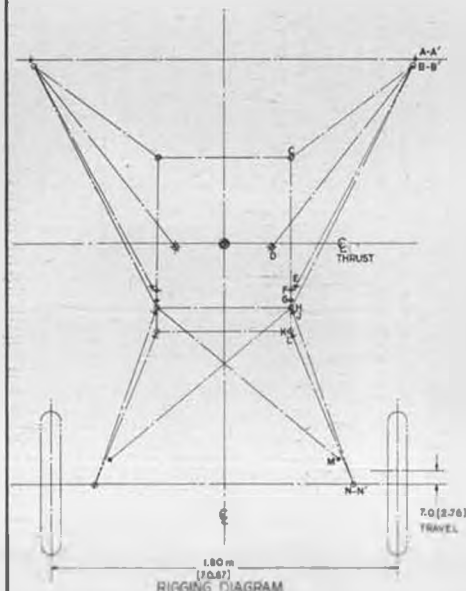
RIGGING DIMENSIONS

PT	LOCATION	STA		X		Y	
A	UPR. WING REF. PLANE & ℄ FR. SPAR FTG.	-50.0	(-19.69)	100.0	(39.37)	96.9	(38.15)
A'	UPR. WING REF. PLANE & ℄ FR. SPAR FTG.	14.0	(5.51)	100.0	(39.37)	96.9	(38.15)
B	UPR. WING FR. SPAR ATTACH.	-50.0	(-19.69)	98.5	(38.78)	94.0	(37.0)
B'	UPR. WING RR. SPAR ATTACH.	14.0	(5.51)	98.5	(38.78)	94.0	(37.0)
C	UPR. LONG. & CABANE STRUT	-20.0	(-7.87)	35.0	(13.78)	45.5	(17.91)
D	ENGINE MOUNT & CABANE STRUT	-120.0	(-47.24)	25.0	(9.84)	-1.85	(-.73)
E	LOWER LONG. & AFT. CABANE STRUT	0		37.25	(14.67)	-22.5	(-8.86)
F	LOWER WING FWD ATTACH.	6.5	(2.56)	35.0	(13.78)	-24.3	(-9.57)
G	LOWER WING REAR ATTACH.	54.5	(21.46)	35.0	(13.78)	-30.0	(-11.81)
H	LWR. LONG., CAB. STRUT & LDG. GR. FTG.	-75.0	(-29.53)	35.0	(13.78)	-34.0	(-13.39)
J	UPPER FWD. LANDING GEAR STRUT	-74.0	(-29.13)	35.87	(14.12)	-36.5	(-14.37)
K	LOWER LONG. & AFT. LANDING GR. FTG.	0		35.0	(13.78)	-46.5	(-18.3)
L	UPPER AFT. LANDING GEAR STRUT	-1.5	(-.59)	36.93	(14.15)	-48.8	(-19.2)
M	LANDING GEAR BRACE WIRE	-48.13	(-18.95)	58.5	(23.43)	-112.75	(-44.39)
N	AXLE & FWD. LANDING GEAR STRUT	-43.6	(-17.17)	67.16	(26.44)	-126.0	(-49.61)
N'	AXLE & AFT. LANDING GEAR STRUT	-40.25	(13.85)	67.16	(26.44)	-126.0	(-49.61)

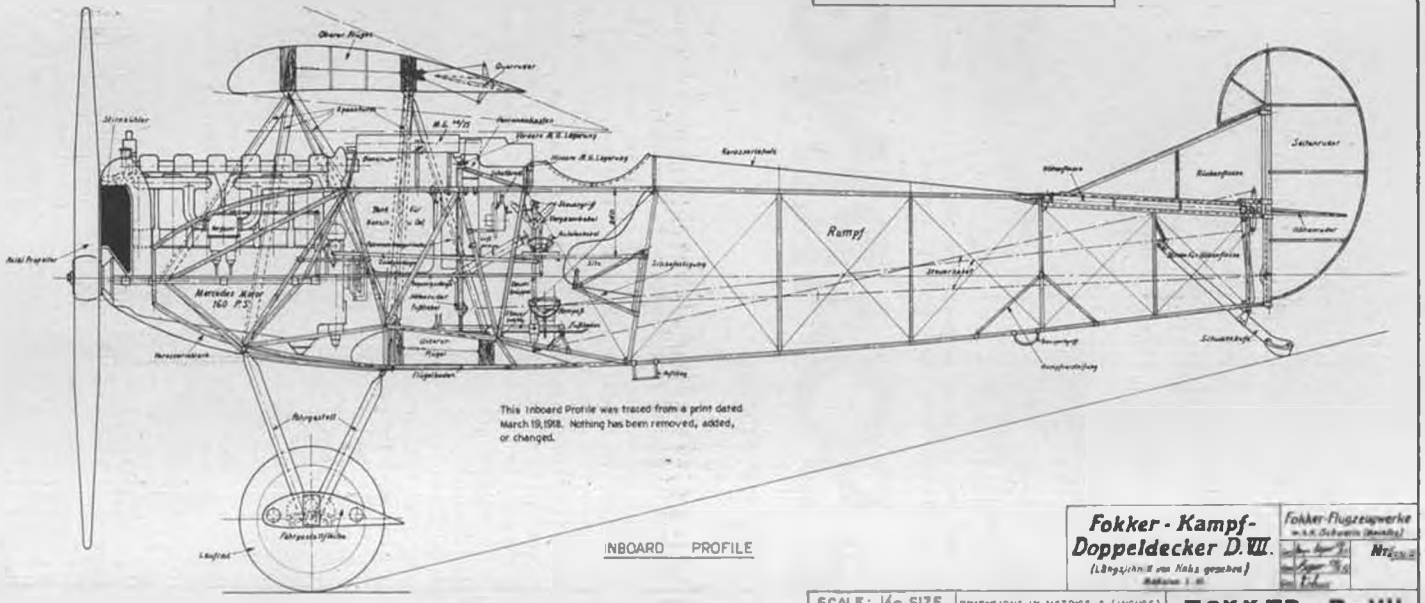
AILERON CONTROL SYSTEM

COLOR SCHEME

DAVI WAS COVERED WITH PRE-PRINTED LOZENGE DESIGN FABRIC. THERE WERE TWO PATTERNS, ONE A FOUR-COLOR & THE OTHER A FIVE-COLOR SCHEME. THE PATTERNS WERE PRINTED IN LIGHT SHADES FOR UNDER SURFACES & DARKER SHADES FOR TOP & SIDES. EARLY FOKKER BUILT DAVI FUSELAGE FABRIC WAS A STREAKED CAMOUFLAGE. MANY & VARIED COLOR SCHEMES WERE APPLIED OVER THE PRINTED FABRIC BY JAGDSTAFFELN PERSONNEL REFLECTING UNIT IDENTIFICATION & INDIVIDUAL PILOT DESIGNS & INSIGNIAS.



RIGGING DIAGRAM



This Inboard Profile was traced from a print dated March 19, 1918. Nothing has been removed, added, or changed.

INBOARD PROFILE

Fokker - Kampf-Doppeldecker D.VII.
(Längsschnitt von Kahn gezeichnet)

Fokker-Flugzeugwerke m.b.H. Schwerin (Mecklb.)

SCALE: 1/6 SIZE | DIMENSIONS IN METRICS & (INCHES)

FOKKER D-VII

NICHOLAS KARSTENS JUNE 1978

SHEET 2 OF 4

DRAWING SI... — 70 x 100 cm

Steve Neu takes time to look up while hacking away on his one-day wonder at recent Torrey Pines "Build and Fly" contest.

Steve's creation in flight. Uses aileron and elevator controls, balsa slab profile fuselage. Most took 2 or 3 hours to build.

R/C SOARING

by Dr. LARRY FOGEL

PHOTOS BY AUTHOR

• I bet you haven't participated in a "Build and Fly" contest. You can only use hand tools, glue, tape, spit, and shoestrings. The balsa wood is provided in rough planks three to four inches wide, 3/4 of an inch thick (grade Z). Your task is to pick and choose, conceive, assemble, then fly an R/C sailplane. The winner is by mutual acclaim. Here's a real competitive fun-fly.

The task began at Torrey Pines around 10 a.m., and after two to three hours of industrious labor, sailplanes started to emerge. Scotty Johnson flew a V-tailed zero-dihedral aerobatic ship (the tail served only as an elevator, no mixer being involved). Rich Fernandez also came up with a fast flier. Dickson Pratt built a large wingspan ship. Phil Merrick was first in the air with a polyhedral craft that outperformed conventional planes of the same size in the light air of that afternoon.

Steve Neu hacked together a real beauty, controlled by ailerons and elevator. It handled so well that he accepted a challenge for combat with Frank Cox (flying a crepe-paper-carrying Hobie Hawk). Steve snared the tape several times, but then there was the inevitable midair. Both planes went down in a terminal dive. They achieved their intent: combat to the death.

Geoff Vincent, of Traralgon, Australia, was on a business trip to Europe and the States. He stopped by to share our airspace with the SB-10 he acquired in Europe. It looked good in the air and handled well. We swapped stories as we drove to the Desert Soaring Festival at Palm Springs. That contest was the first time he had winch-launched the plane.

Nevertheless, he demonstrated a worthy performance. Geoff has been in modeling for 15 years and R/C soaring for the past six. He currently holds the Australian Pylon Championship and has been the Victorian Aerobatics Champion for the past two years. He flies several gliders of his own design (including the Avenger), and of course, the Kestrel 17 designed by Ralph Learmont. I asked him for a hint worthy of spreading here in the States. He came up with the following, which describes the spoiler arrangement on his Avenger:

"Many types of spoiler mechanisms exist, some simple, some complicated. The system evolved for my triple-task Avenger had a few prerequisites in that it had to be simple, robust, and easy to connect up for flying.

"The spoiler blade itself is a quadrant of 1-1/2-inch diameter aluminum tubing of approximately 1/16 inch wall thickness and 10 inches long. This is fastened to three 5/64-inch wire pins (both ends and center) about 3/4 of an inch long, the other ends of which are

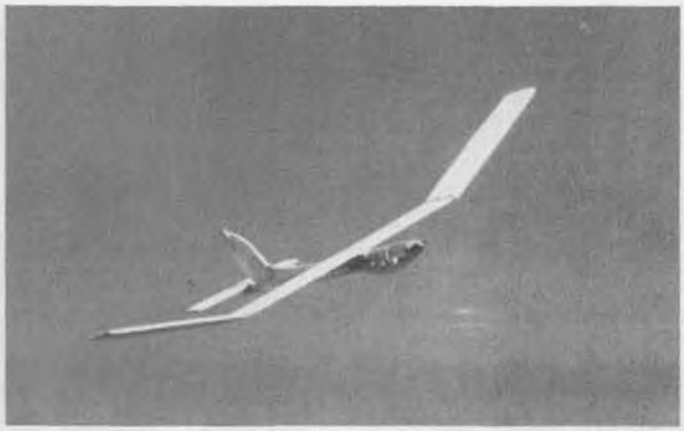
Scotty Johnson hooks up the linkage on his V-tailed bird, used ailerons and elevator.

Scotty's zip-zip ship in flight. Note undercamber in wing.

Dickson Pratt carving away on the elevator for his bird, one of the biggest ones there.

Dickson Pratt's biggie was the most conventional-looking ship at the meet.

Phil Merrick getting ready to heave his just-completed brainstorm off the cliff. Used rudder instead of ailerons.



Phil's beauty coming around in a slow, easy turn. This model was capable of flying in light air and was super stable.

Rich Fernandez working on his one-of-a-kind sloper. That's the wing in foreground.

Rich's model turned out to be one of the fastest creations at the contest.

Bob Gerbin at the Desert Soaring Festival with his 100" Santana, a real lightweight floater.

fastened to a 3/16-inch diameter aluminum tube torque rod. Thus, the torque rod is at the center of the 'circle' from which the spoiler blade was cut . . . see sketch.

"By rotating the torque rod counterclockwise, the spoiler may be raised through a slot in the wing upper sheeting, to a maximum height of approximately 5/8 of an inch. Care is necessary in accurately drilling the holes for the wire pins, which are secured with Zap and epoxy fillets. The drive end of the torque rod, which extends approximately one inch into the fuselage through the wing root, has a brass arm soldered to a steel pin glued into the torque rod end. Both are coupled directly to the spoiler servo by means of a Y-shaped pushrod.

"Advantages that I have found are:

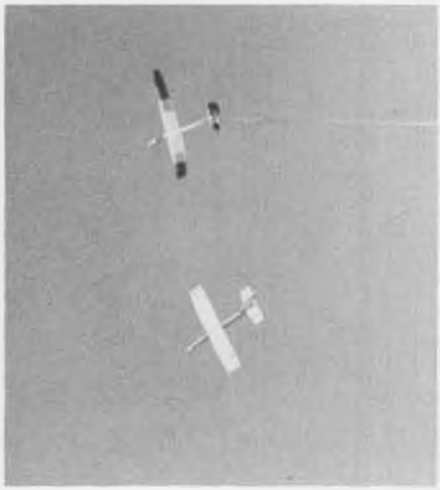
A) Very simple to couple-up on the field (only two clevises to engage).

B) Very neat in appearance (slot in wing needs to be only slightly wider than thickness of blade).

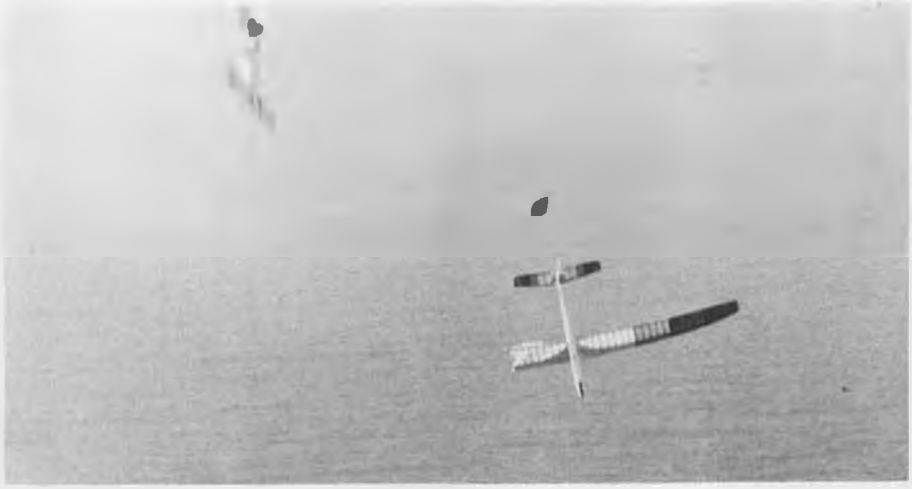
C) Load on servo is independent of airspeed.

Try it, it really works!"

At Palm Springs I met Bob Gerbin, who designed the Santana after many years of careful experimentation. This 100-inch span craft can be operated at as low as five ounces per square foot. It carries 1080 square inches with a 12-inch root chord. The construction is interesting in that Bob has designed it to be easy to scratch build. For example, the main spar is one-inch high spruce. I witnessed its performance and find no criticism. Here is a plane that deserves to be kitted and flown in many future



Before . . . . . .

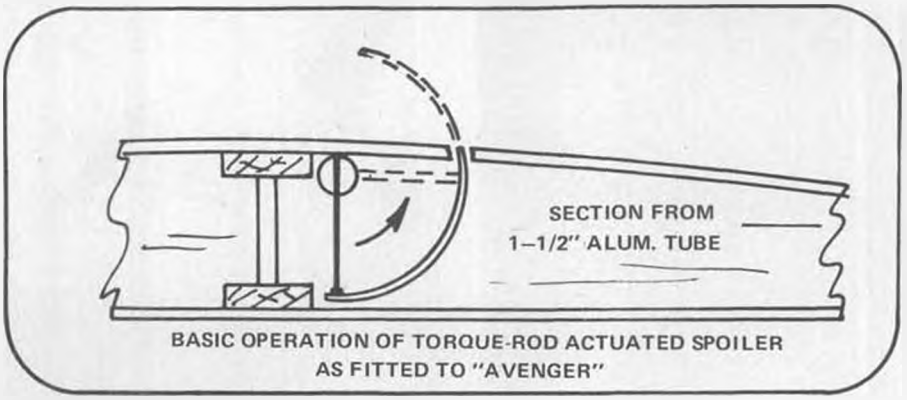


. . . and after the mid-air. Note the folded fuselage on Steve Neu's model, and that Phil Cox's Hobie Hawk is still shedding parts. See text for story.

Geoff Vincent of Australia with the Carrera SB-10 he acquired in Europe. A super flier.

Young Gary Fogel holding his catapult-launched Avro Vulcan glider.

The Avro Vulcan mounted on Steve Neu's electric-powered Astro Flight Super Monterey.



BASIC OPERATION OF TORQUE-ROD ACTUATED SPOILER AS FITTED TO "AVENGER"

Caught just after its release, the Vulcan is on its way back down to terrible firma.

events.

My 10-year-old son enjoys free flight, so I bought him the Avro Vulcan manufactured by Easybuilt Models and Crafts . . . an easily assembled delta wing, containing only four ribs. Covered in blue and white Monokote, it looks great and performs well when launched by a suitably stretched rubber band. Steve Neu was flying an electric-powered Astro Flight Monterey, so we hitched a ride, the towhook on the Vulcan being slipped over a masking tape "loop." Up they went, staying together until Steve did a tail slide. The return flight downwind was exciting, with the electric plane chasing the free flying Vulcan.

You may expect to see the Aquila Grande soon. Lee Renaud designed this oversized Aquila to fit between the plane that won the World Championship and the Aquila XL. Al Doig built a prototype which included flaps, but these will not be in the kit and are not recommended by Lee. The Bird of Time, designed by Dave Thornburg, was flown by Steve Work, who placed first in the recent competition held by the National Soaring Society for the team which represents the United States in the international competition, to be held in Belgium. Mark's Models plans to offer this bird in kit form.

It's interesting to look at R/C soaring overseas. For example, J. Fikejz and S. Prokes fly R/C gliders in Czechoslovakia. Fikejz's is the largest one in that country at the present time. It measures 4.5 meters in span and 2.2 meters in length. He uses an Eppler 387 airfoil and flies at an overall weight of about four kilograms. There, the interest is in achieving altitude. The plane contains a home-made barograph and has recorded a height of 1000 meters so far. A year ago, Fikejz broke the Czech altitude record of 1250 meters using a smaller craft.

Prokes' glider is 3.2 meters in span and uses a NACA 4472 airfoil. Jaroslav Lnenicha owns the largest F1A free flight glider in Czechoslovakia and has been

Continued on page 85

From Czechoslovakia comes this photo of Jaroslav Lnenicha's youngest daughter holding his 4-year-old, 100" R/C sailplane.

J. Fikejz (left) and S. Prokes with their soaring machines. Fikejz' glider is currently the largest in Czechoslovakia, looks like a F/F.

This month's feature sailplane is the "Osprey," a top-notch FAI design by Ray Hayes, of Fort Wayne, Indiana. Ray flew it to 11th place at the FAI Finals at Pensacola last year.

The Osprey's light, rigid tail structure. Like most original designs, it shows traces of its ancestry . . . in this case, the Windfree.

PHOTOS BY RAY HAYES

DESIGNING YOUR OWN SAILPLANE

By DAVE THORNBURG . . . In Part IV of his series, Dave talks about the stabilizer: what its area should be, its vertical placement on the fuselage, and what it really does back there (you might be surprised!).

• Last month's design article was chock-full of areas and moment-arms and percentages, a real feast for the math and physics dilettanti among us. (Math, fortunately, is largely a youth disease . . . nearly everyone grows out of it eventually.) This month we tie up the loose ends: center of gravity placement, stabilizer sizes and locations. A few more arrow diagrams, a little technical data here and there, all interspersed with the usual quota of crank opinions, veiled threats, and sly insults to all and sundry.

Let's begin with the stabilizer, "that small wing in the back." It obviously can't be too important, this stabilizer, or we'd have talked about it sooner. It must be some kind of afterthought . . . just a little something to hold the tail up, keep it from dragging in the dust like a gila monster's. After all, don't buzzards get along gloriously with only a stub of a stab? Maybe we could just leave it off completely. . .

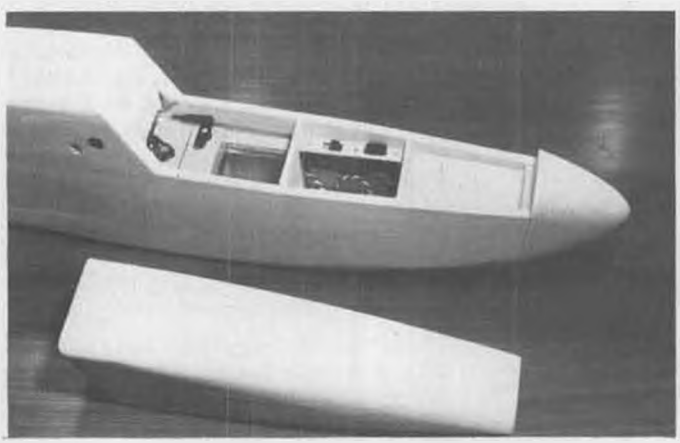
Not so, I'm afraid. Unless we're willing to make some serious compromises on our airfoils, like the folk who build flying wings do.

Because the lowly stab actually has a very exalted function, and not many folk take the trouble to understand just what this function is. Most stabilizers don't really "lift" the tail at all . . . on R/C gliders, for example, they actually *pull the tail down*! Their lift is negative lift: in normal flight they work *with* gravity, rather than against it. Now you know why your plane won't stay up, right? It's that durn stabilizer, pulling it out of the sky! (Tell them you read it first in **Model Builder**.)

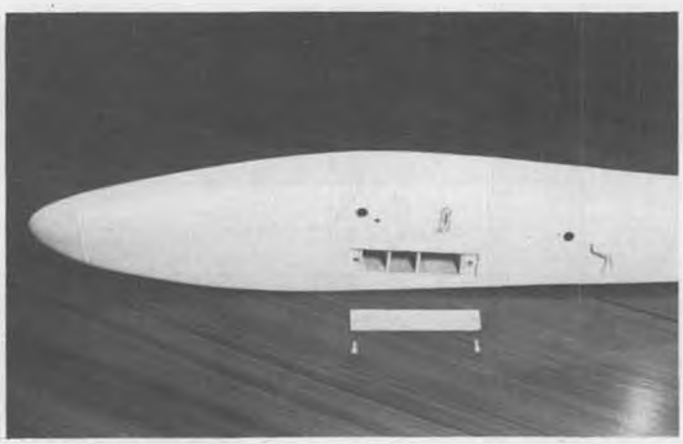
And the reason the stab "lifts down" is very simple: it has to pull down constantly on the tail in order to balance the force of the plane's noseweight, which is constantly pulling down on the nose! But before you jump to the conclusion that you should just chuck the noseweight *and* the stab, let's look at the reason for this delicate balance.

Picture your sailplane sitting atop the point of a sharp arrow, balanced perfectly. Where would you have to place this arrow, to simulate horizontal flight? Exactly under the Center of Gravity, right? When you do this, the upward force of the arrow exactly opposes the downward pull of gravity, and the plane is in perfect balance, perfect equilibrium.

If the plane were actually flying, we could think of the arrow as the "lift force" of the wing, the sum of all the upward forces that are keeping the plane airborne. In short, the arrow represents the wing's Center of Lift. Now we have a picture of "ideal" flight: our center of lift is exactly in line with



Hatch assembly on the Osprey. Ray turned 13.6 seconds in the speed run run at the FAI Finals. That's really movin'!



Unique ballast box on the Osprey. Ship weighs 54 oz., can carry up to 48 oz. more. Note actuating crank for flaps.

our center of gravity, and the plane is in perfect aerodynamic balance. No nose-up, no nose-down forces . . . just smooth, straight-and-level flight. This rare and idyllic condition is so low in drag and high in efficiency that we notice it instantly whenever it happens. Borrowing a term from the world of hydroplanes, we call it "being on step".

Unfortunately, this kind of perfect balance occurs mostly in textbooks and in wind tunnels, where the air is rigidly controlled by government dollars. Out in the real world, where contests are held, our planes get tossed about by all kinds of upsetting forces . . . gusts and bubbles and eddies and assorted turbulence . . . causing the nose to pitch constantly up or down, upsetting our "ideal" balance a hundred times a minute. And here's the real kicker: Every time our wing changes its angle of attack (i.e., pitches up or down) its Center of Lift shifts positions, too. And which way do you suppose the Center of Lift ALWAYS shifts? The wrong way, of course . . . the way that tends to make matters worse!

For example, when the leading edge of a wing is suddenly pitched upward in the direction of a stall, the damned Center of Lift moves *forward*, pulling up on the front of the wing even more! Conversely, when a wing goes into a dive, the Center of Lift creeps backward, doing its part to help raise the rear of the wing and further aggravate the dive. Ain't Nature grand, folks?

The simplest way to deal with this sort of cosmic perversity is just to abandon our ideal: stop trying to line up the Center of Lift and the CG so perfectly. Both model and full-scale designers agree on this. They know that the Center of Lift is going to shift around a bit as the airfoil changes angle of attack, and they know they can't possibly change their CG in flight, like birds do, to compensate for it. So they reason this way:

"Since we can't stop the Center of Lift from moving, let's determine the *range* of its motion, and locate our Center of Gravity just outside this range. If, for example, the center of lift on our particular airfoil never gets any further forward than the 35%-chord point before our airfoil stalls, we can locate our CG at 33% and it will always be in front of our Center of Lift. The Center of Lift is still going to move around, but at least this guarantees that it won't be in *front* of the CG one second, pulling up on the nose, and *behind* the CG the next second, pushing the nose down. It will always be somewhere behind the CG, pushing the nose down. True, it's going to exert a stronger nose-down force the farther back it moves, and a weaker nose-down force as it creeps forward again. But at least the force will always be in the same direction . . . always nose-down. Now we have an upsetting force that's half-tamed already: it may vary in intensity, but it will never vary in direction.

"To balance this force and keep our plane from nosing down continually, or worse yet, from 'tumbling' head over heels, the way a wing does when it comes off in flight, we need some kind of continual down-force on the tail of the plane. Let's see . . . we can't very well add weight back there, because that would shift our CG rearward, into the territory that's been staked off for the Center of Lift to wander about it. Suppose, instead, we put a kind of small fin or wing on the rear of the plane, and set it at a slightly negative angle of attack, so it would continually 'lift down. . .'"

So now you know how the stabilizer was born, and why, which is more than you know about yourself!

Just about here some wise guy will say, "how come we can't put the CG *behind* the Center of Lift range, and make the stabilizer lift UP instead of down. Wouldn't that do exactly the same thing?"

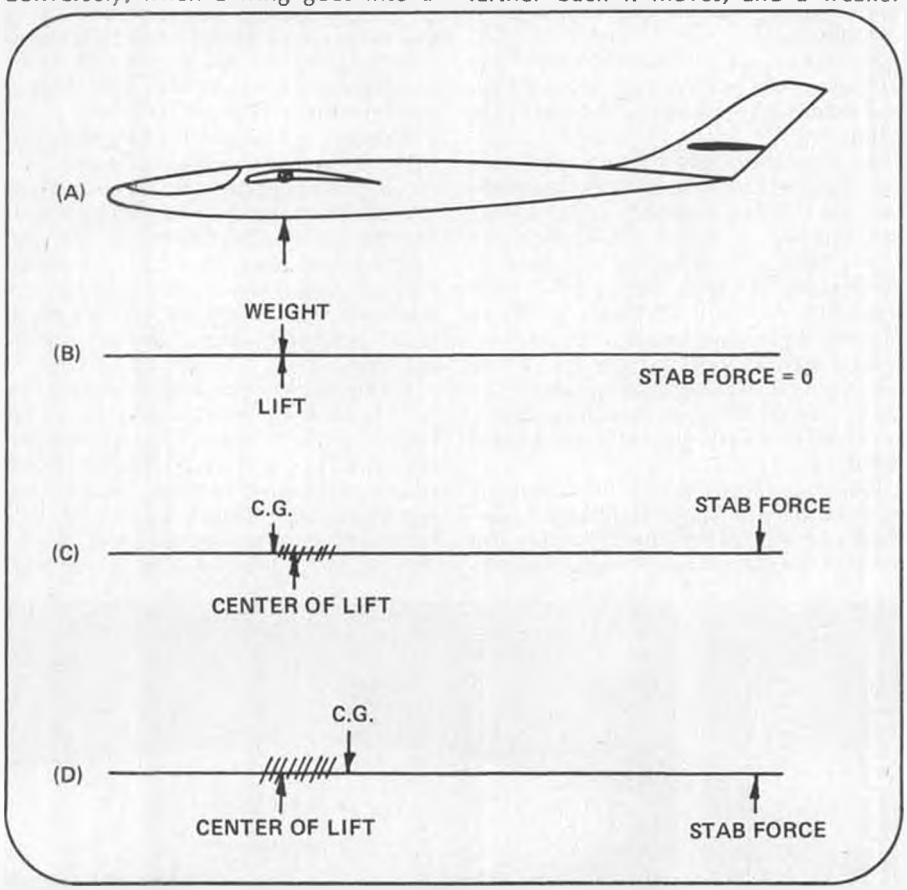
Well, as the Pope himself might put it: yes and no.

Yes, it would achieve the same sort of fore-and-aft balance. The lift arrow, being always in front of the CG, would continually pull the nose up into a stall, and the stab would continually try to counter this stall with its lift-force. But. . .

To make the stab lift upwards instead of down, we'd have to set it at a positive angle of attack to the air, just as the wing is. When we do that, the stab will be just as vulnerable to stalling as the wing. More so, in fact, because a small, stubby lifting surface will always stall earlier than a large one, everything else being equal. And a wing that continues flying after its stabilizer has stalled is practically the same as a wing with no stabilizer at all . . . in other words, it's in trouble!

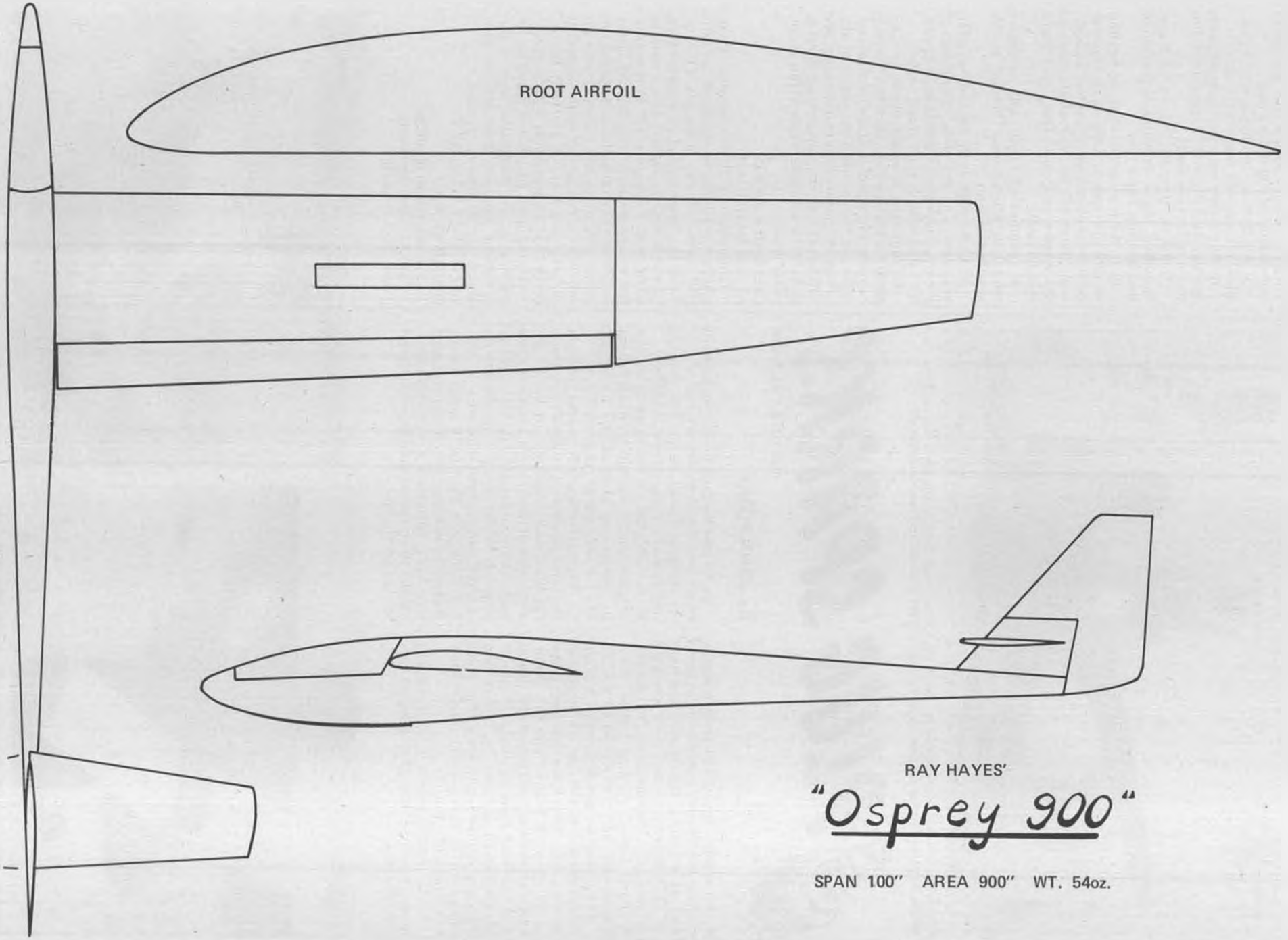
Conversely, if this same wing should go into a steep dive with its stabilizer set at a positive angle of attack, the stab will continue to lift up on the tail even as the Center of Lift moves backwards, providing less and less nose-up force to counter the stab's lift. Again, the ship is in trouble!

The conclusion is pretty obvious: a lifting stabilizer is not really a "stabilizer" at all. It's more like a second wing, and a less efficient, less dependable wing at that. Just when you need it most . . . in cases of extreme pitch change . . . it's most likely to work against you! For this reason, full-scale aircraft and heavy R/C models almost never carry their CG behind the Center of Lift. (Most competition free flight models do, however. Their mass-to-drag ratio is small enough to risk flying in this less-stable condition for the slight advantage it gives them in lowered sink rate. For a stab that lifts *against* gravity, when all is said and done,



The three ways of achieving longitudinal aerodynamic balance in a model. Figure A shows a model "balanced on the point of an arrow" (see text). Figure B diagrams this ideal balance: the lift force is directly under the CG, the stab exerts no up or down forces at all; the plane is "on step." In Figure C, the Center of Gravity is in front of the Center of Lift, so the stab must exert a negative (downward) force to balance the plane. This is the force arrangement of most full-scale and R/C aircraft. Figure D shows the CG behind the Center of Lift, a force arrangement found only on freeflight models. (In C and D, the shaded area represents the range of movement of the Center of Lift.)

Continued on page 92



RAY HAYES'

"Osprey 900"

SPAN 100" AREA 900" WT. 54oz.

Winnie Davis fine-tuning the Forster .99 in his 13-foot "Big Gull" at the 1940 Kansas State Model Airplane Championships. Graceful model later hit a car and was demolished.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• This month, instead of talking about contest results and contestants in general, we are going to propose a new type of Old Timer contest. With electric-powered O.T. events starting to take off, Richard Tanis, of Hawthorne, New Jersey, says the latest way to go is CO_2.

No question about carbon dioxide powered models, the cost would appeal to the youngsters. If we don't get some of the younger fellows into this game, there won't be any old timers left. (If you don't believe that, this column almost always has an obituary on one or two fellows.) Simple guidelines (not rules engraved in stone yet!) might look something like this:

1) All models selected for this event must meet SAM rules governing acceptable designs.

2) All planes must be scaled down in exact proportion to the original.

A) Wingspan shall be no less than 22 inches and no more than 24 inches.

B) Airfoils shall be the same as on the original model. Airfoils on models built by juniors may be modified to a simple Clark Y for ease of construction.

C) All parts (wings, tails, etc.) are to be in the same position as originally designed.

D) Materials used are to be at the discretion of the modeler; however, the construction should conform to the original model design. (Example: no sheeted wings, sheet tails, etc.)

3) Tank size shall be 6 cubic centimeters in volume. This is the standard size tank supplied with the motor. (Note: 10 cc tanks could be considered for longer flights.)

4) Contestant will receive one point per second of flight duration.

5) All forms of models (cabin, pylon, stick, etc.) will fly under one class.

6) All models must be equipped with the standard plastic CO_2 prop (size and make to be specified).

7) Planes may R.O.G. or be hand launched, the latter with a deduction of five seconds flight time.

8) In the interest of safety, no heating of tanks or special gadgets to improve performance will be permitted. In addition, there will be no modifications to the engine (standard Telco and Shark motors only).

9) Number of flights will be determined by the Contest Director as the weather dictates.

As Dicks puts it, fly for the fun of it. Enjoy the sun, the skills, friendship of others, and have a good time. After all, isn't that what it is all about, Alfie?

In summary, any new event needs a good push. Hopefully, Dick Tanis, who is running a junior club at the local school, will find the answers to some of the problems that are bound to crop up. We will be waiting for a report from Tanis as to how the youngsters take to this event. Good luck!

OLD TIMER EVENTS
AT THE NATIONALS

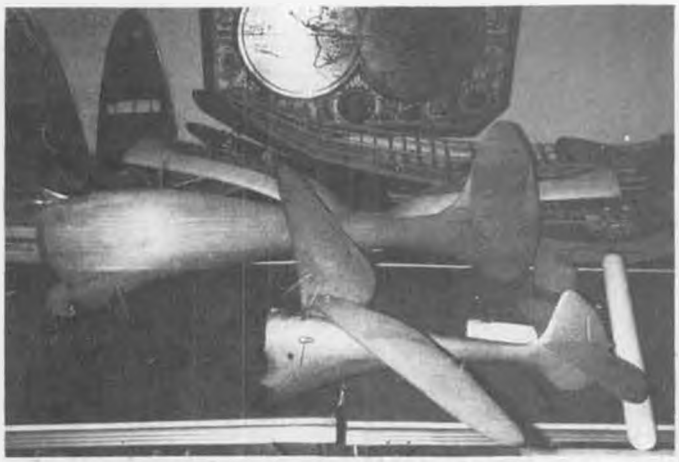
Originated by this columnist, these events have become standard "unofficial" events at the Nationals. Of late, there has been a gradual expansion to take in R/C O.T. and C/L O.T. events in addition to the regular F/F O.T. events. We are even considering an Old Timer indoor event (Frank Ehling is egging me on for this one), but haven't come up with a set of rules as yet, and not least of all, what kind of support can be expected for a once-a-year type event.

Getting back to what is going to be cooking at the Nationals, here is the ambitious program that will be presented in Old Timer activities:

WEDNESDAY, AUGUST 1
OLD TIMER R/C
Class AB, Glow/Ignition
Class C, Glow/Ignition
Texaco, 1/8 oz./lb.

Jack Law, one of the English modelers who attended the 1978 SAM Champs, brought over this neat Ohlsson .23 powered Musketeer 54.

Well-known O.T.'er Woody Woodman lines up the R/C Powerhouse belonging to Henry Van Omen (with transmitter).



The Gull models still exist! Pop Schreiber's small Gull in foreground, Winnie Davis' restored Big Gull in back. See text for story.

Bernard Shulman sent in this photo of his half-size Ehling 4-1/2 Hour Flyer. Says it flies great with an .09 diesel and R/C.

THURSDAY, AUGUST 2
OLD TIMER CONTROL LINE
Stunt Open, Glow powered
Stunt Open, Ignition powered
FRIDAY, AUGUST 3
OLD TIMER FREE FLIGHT
Class A Gas
Class B Gas
Class C Gas
30 Sec. Antique
.020 Replica
Rubber Cabin
Rubber Stick
Beauty

To top it off, we will have (if possible) a Victory Banquet Friday night, August 3, to award trophies, have guest speakers, show O.T. movies, and in general, have a heckuva good time.

At present, there doesn't appear to be any central location to set up an Old Timer booth, *but if it is at all possible*, we will set one up for a central meeting place. Notices will be given out as to the location of the various events. Hopefully, we can reinstate the model display corner where we all put our models out for public display. In short, the name of the game is fun, and we are going to have a ball!

ENGINE OF THE MONTH

For this month's engine, we have reached way back in the early Thirties to bring you what the early gas model pioneers were using prior to the advent of the sensational lightweight Brown Jr.

Elmer A Wall, located in those days at 5900 North Fairfield Avenue, Chicago, had a shop devoted particularly to the development and production of gasoline engines. As noted by R.E. Dowd, the Experimental Model Editor of *Aero Digest*, Wall had about every type gas engine you would want at that time: air-cooled and water-cooled; two ignition types, both horizontal and vertical inline; and two cycles and four cycles. The laboratory (if you could call the shop that) was simply loaded with all sorts of ideas and engines.

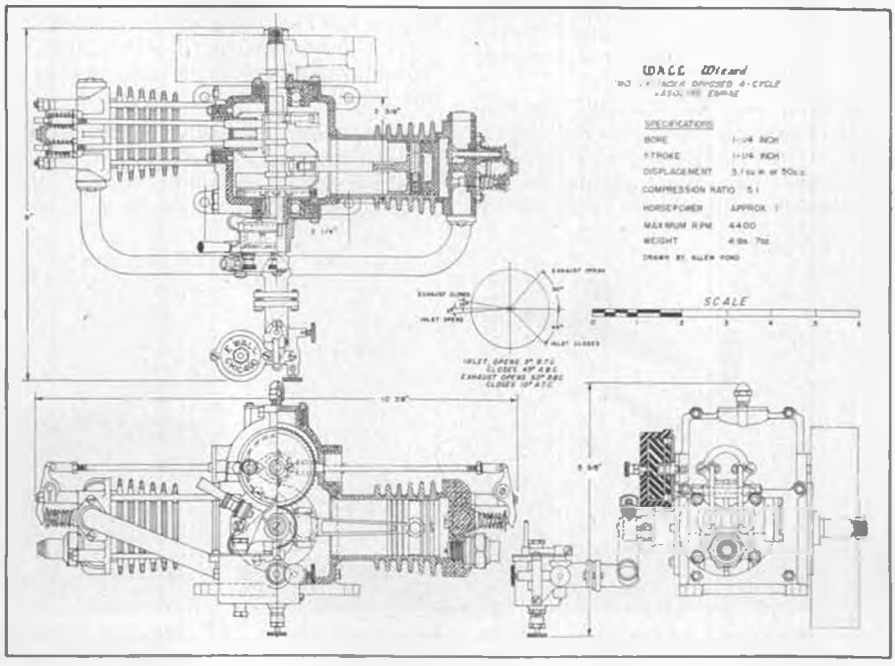
Wall ran most of his engines with mufflers, otherwise the noise indoors would be ear-splitting. Demonstrations in his shop were commonplace, as Wall had been developing gas engines for over 40 years. Most all of his engines reflected his long experience in building his own engines, carburetors, and ignition systems.

Mike Granieri poses with two sizes of the "M-G" (named after his initials) which he designed way back in the late '30's. Esio Grassi did a beautiful job on these two, built for R/C.

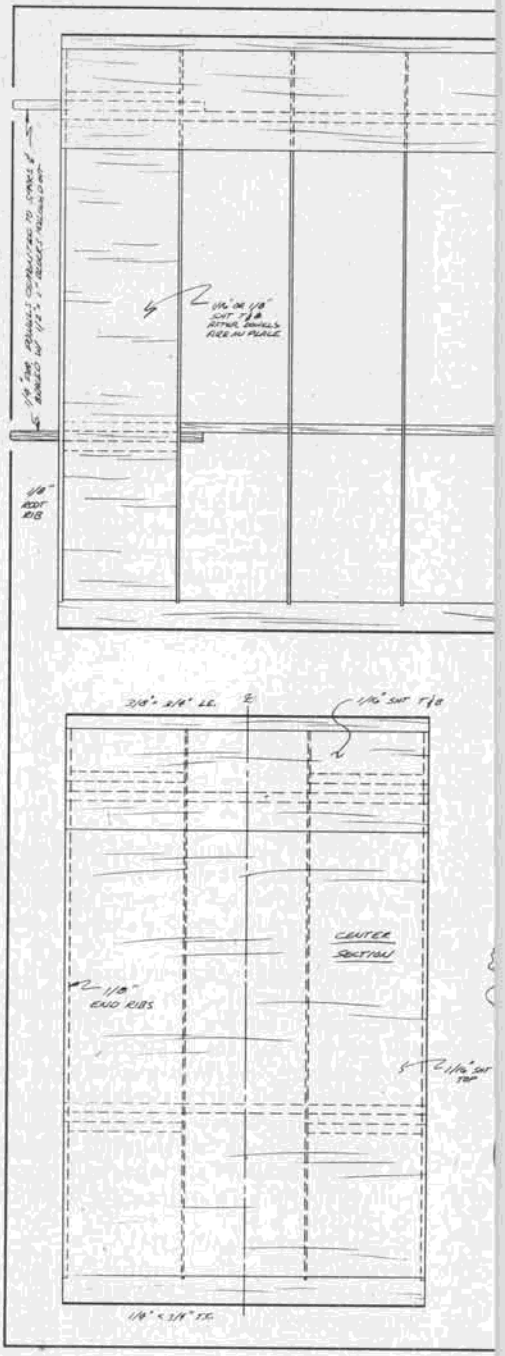
Wall offered a service to the modeler in those days who was interested in building his own engine from castings.

Many a classroom used a Wall Wizard or Wall Jr. (single cylinder version) as a machine shop project. The best part in building one of these engines was the implied guarantee of success based on a proven engine design.

Wall engines were big and heavy, generally necessitating an eight to ten-foot model weighing over ten pounds, ready to fly. Although most of his engines only weighed about two pounds, by the time you added propeller (always hand-carved in those days), gas tank, ignition coil, and batteries, you could figure on another 1-1/2 pounds. With an initial weight of 3-1/2 to 4 pounds, it took a stout heart indeed to venture on a gas model project.



A 1943 photo of Granger Williams (left) and Virgil Clark, with their V-G (Virgil-Granger) U/C speed model design, and trophies won during that contest season.



Wall engines featured aluminum crankcases with bronze bushings for the crankshaft bearing. The crankshaft of about 7/16-inch diameter (!!) was cast steel furnished with cast-on extensions to facilitate machining by providing the eccentric centers. Brass counterbalance weights were attached by four 5-40 machine screws. The crankshaft terminated in a No. 1 Morse taper. The journals also featured oil retention grooves near the ends.

Rather than use steel connecting rods with bushings in each end, Wall used bronze conrods. Although the connecting rod was provided as an integral casting, after machining, it had to be split to put it on the crankshaft. Two 5-40 screws then held the bearing cap on (as in standard automotive practice). Lubrication holes in each end were provided for oil access.

The Wall engines featured cast-iron cylinders, generally with six cooling fins. However, the transfer port cover and the cylinder head were aluminum, the head being equipped with radial fins for cooling. The head was tapped for a 12-millimeter Bosch spark plug.

Wall designed his own carburetors, generally of the horizontal multi-jet type. These carburetors featured cork float, needle valve, and adjusting screws for idling and air bleed (and we thought we had something new in model engines when this feature was added to R/C stunt engines about 10-15 years ago!!).

Both the intake and exhaust manifolds were made of aluminum.

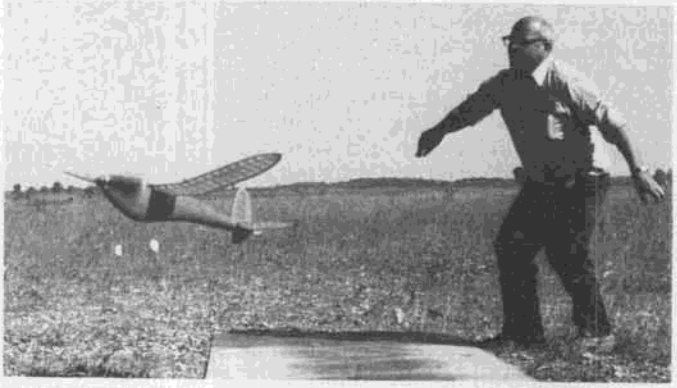
Wall employed a standard Delco-Remy breaker arm for his make-and-break ignition system that was actuated by a cam on the shaft. A small automotive type spark coil was provided in the engine kit. The timer was located in the rear of the crankcase (like the later OK .60 engines) where fingers can be kept in one piece.

Interestingly enough, Elmer Wall used a fuel mixture of 15 parts gasoline to one part oil. Every indication is that Wall engines were fairly economical, as they only turned in the 2000 rpm plus area.

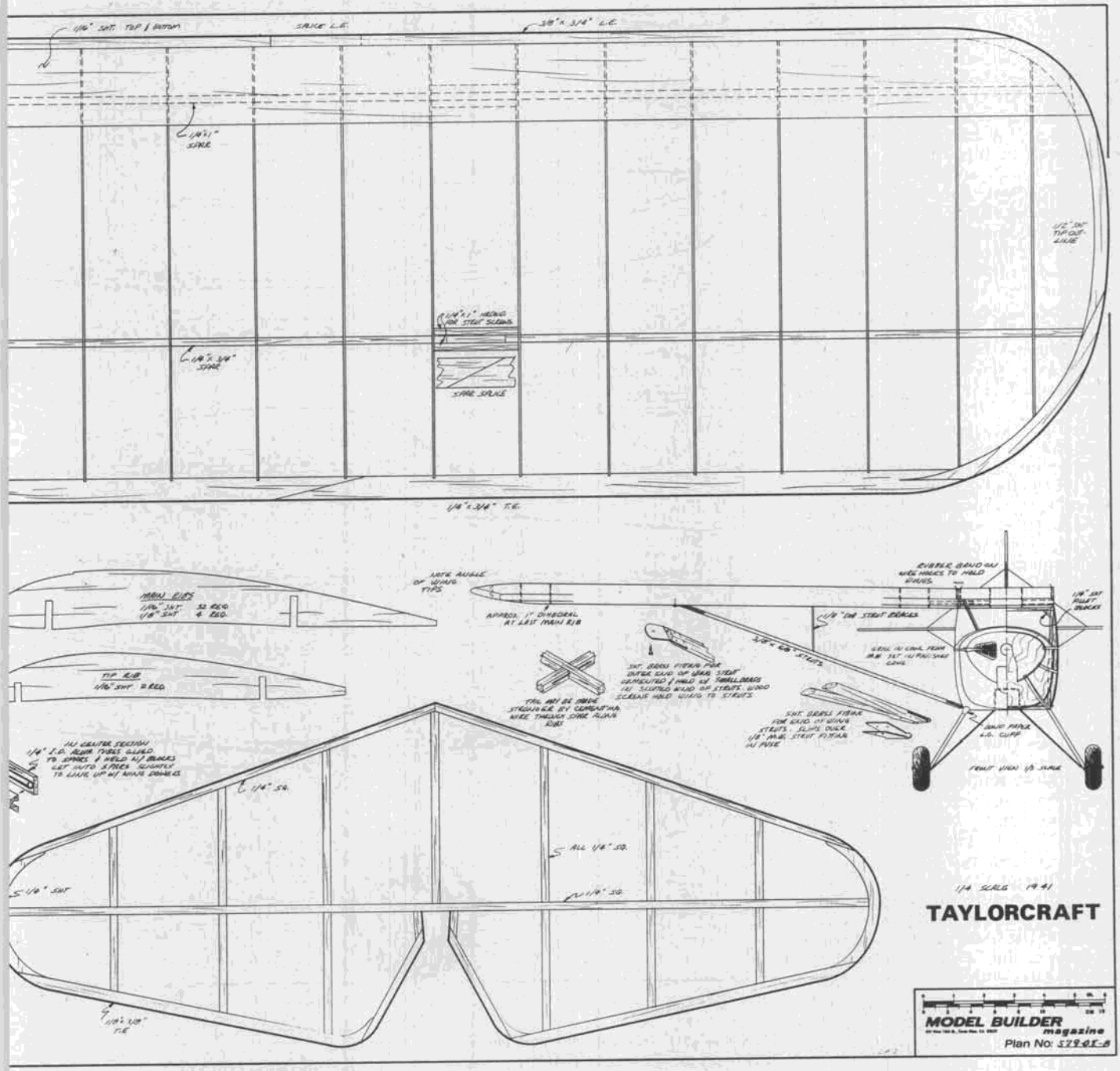
THIRTY YEARS AGO, I WAS. . .

Bryan Wheeler reports a story on

Chuck Markos caught Art Christenson in the act of launching his Lanzo Stick at recent O.T. meet at Bong Field.



Clean launch of a Cahill Clodhopper by Bob Warmann, of the Chicago Aeronuts, at Bong meet. Photo by Chuck Markos.

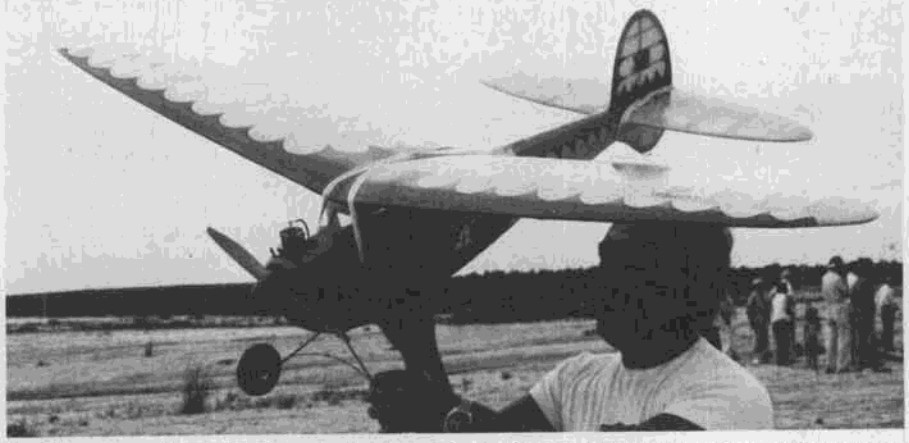


FULL SIZE PLANS AVAILABLE – SEE PAGE 110

Winnie Davis and the development of his "Big Gull" (the beautiful 14-foot gull-wing airplane that stood everyone collectively on their ears) that is simply too good to pass up.

The Big Gull originated as the brain-child of Winnie Davis and was built collectively by Winnie and H.M. "Pop" Schreiber, proprietor of the Kansas City Country Aero Club (Hobby Shop). This model was originally powered with a Brown Jr. Winnie entered it in a contest at the Old Richards Field and won a TWA prize of a trip to the 1938 Detroit Nationals. As a sidelight, Pop said the model climbed real show with the Brown and stayed up forever!

The two decided that Pop would take the Big Gull and the smaller gull-wing



Jim Travers, another of the English contingent at the 1978 SAM Champs, shows off his DeLong 30-powered Scorpion, the British version of Murray's Topper. Spans 66 inches.

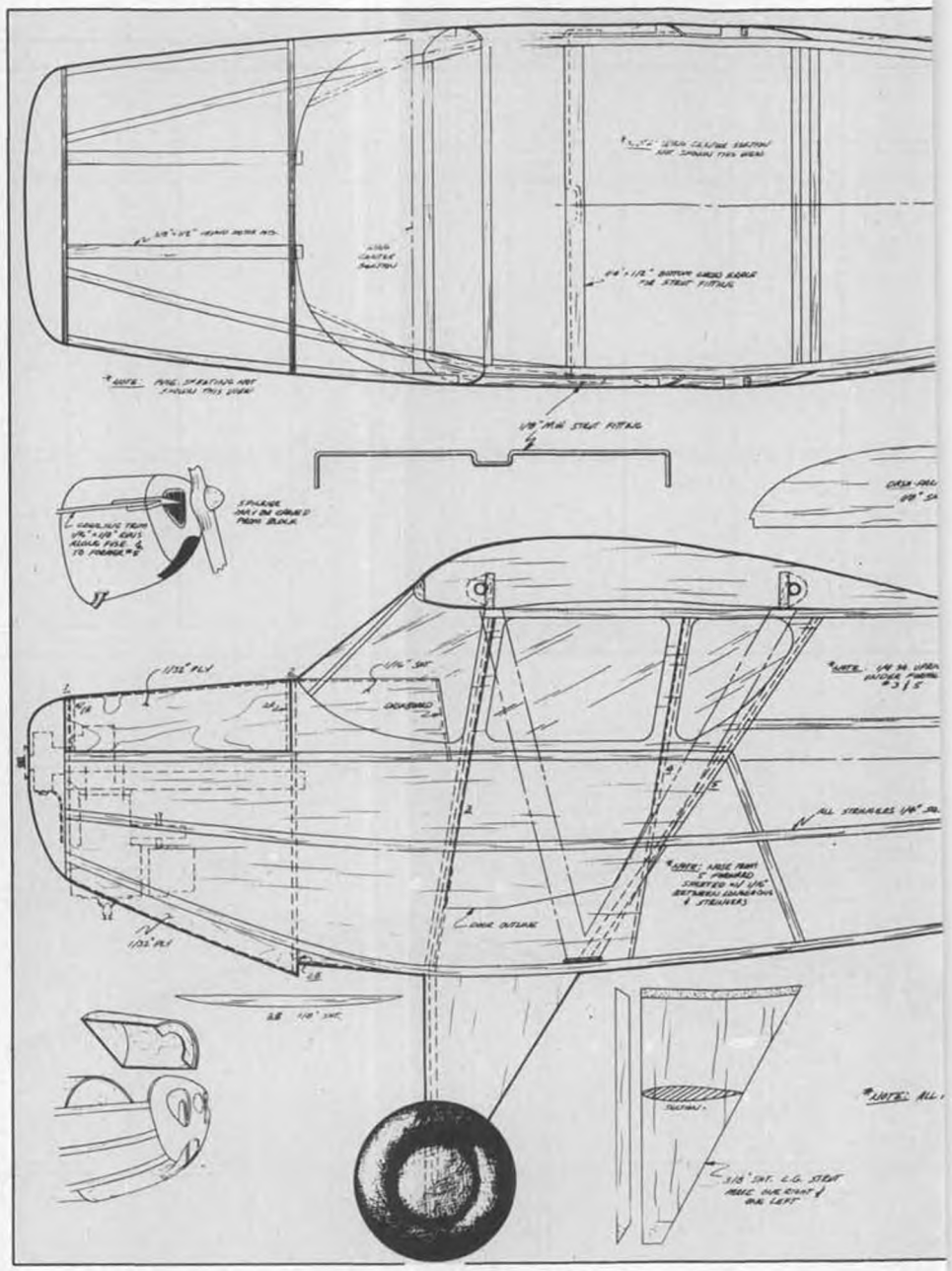
model Pop had built in the meantime (See *Model Airplane News*, October 1938, Picture No. 3 of "Gas Lines"). Pop was to take the models to Detroit in his Pierce Arrow while Winnie waited at the shop in K.C. for the mailman to bring his newly-ordered Forster .99. The Forster people had promised immediate delivery and true to their word, the engine arrived well in time before the flight scheduled for Detroit.

Upon meeting Pop at Detroit and getting set up at the local motel, they proceeded to mount the new engine. At 4:30 a.m. the installation was complete and there was nothing to do but to run it. And run it they did!

Everyone at the motel started raising all sorts of complaints for noise at this ungodly time of the morning. The motel manager (who was quite sympathetic to modelers) said, "These boys come up every year. So if you don't like the noise, you can go somewhere else and I'll return your money." Can you imagine this happening in this day and age?

Out on the field that day, the Big Gull checked out beautifully with the Forster .99. The first flight was official! However, it took over two hours to find the model, finally running into two boys who had found it in a wheat field. Feeling extremely fortunate to have recovered the model, Winnie refused to fly it in the windy afternoon, fearing that he would lose it for good. Actually, the one flight was good for seventh place. So, to pass the time, they flew Pop Schreiber's small Gull. Performance was rather disappointing, as the Elf Corncob engine simply didn't develop enough power to fly the model adequately. To the best of Bryan's knowledge, the model was never flown again, being hung up in Pop's K.C. Hobby Store.

The Big Gull was not flown again until 1940 at Topeka, Kansas. On the first attempt, the engine quit on the climb and dove under the bumper of a car, shearing off the spark plug and bending the top fin of the Forster .99 (Bryan still has the Forster with the nicked fin).



About an hour or so later, they had replaced the plug and were ready to attempt another flight. Alas! Someone had monkeyed with the clockwork adjustment on the stabilizer. The model went straight up, and then straight down! The fuselage pratically exploded! A sad ending.

Winnie did rebuild the model, making a whole new fuselage, but never completed the covering. This is as far as the restoration got until one day, thirty years later, Pop Schreiber gave Bryan Wheeler the entire framework with the priceless Forster .99. As Bryan said, "Wow!!"

To wrap up this story, Bryan Wheeler undertook to make complete construction drawings of the Big Gull, based on the original model and construction notes left by Winnie. This is how the Big Gull plans became available for all modelers. It truly is a beautiful project.

For those who would like to get a good action shot of the model, see the September 1938 issue of *Model Airplane News*, where a beautiful overhead shot was used for the caption of the "Passing of the Nationals."

Those interested in details on the Big Gull can write Bryan Wheeler at 7604 Appleton, Raytown, Missouri 64138.

A.I.R. MEET

The A.I.R. Meet (Antique Indoor Replica), as proposed by Ken Johnson, came off in great style at the Paul Revere Junior High School in Brentwood, California. Put on by the Flightmasters West (a schism of the Flightmasters), the meet enjoyed fifteen contestants, with thirteen official entries in Cabin and five in Stick.

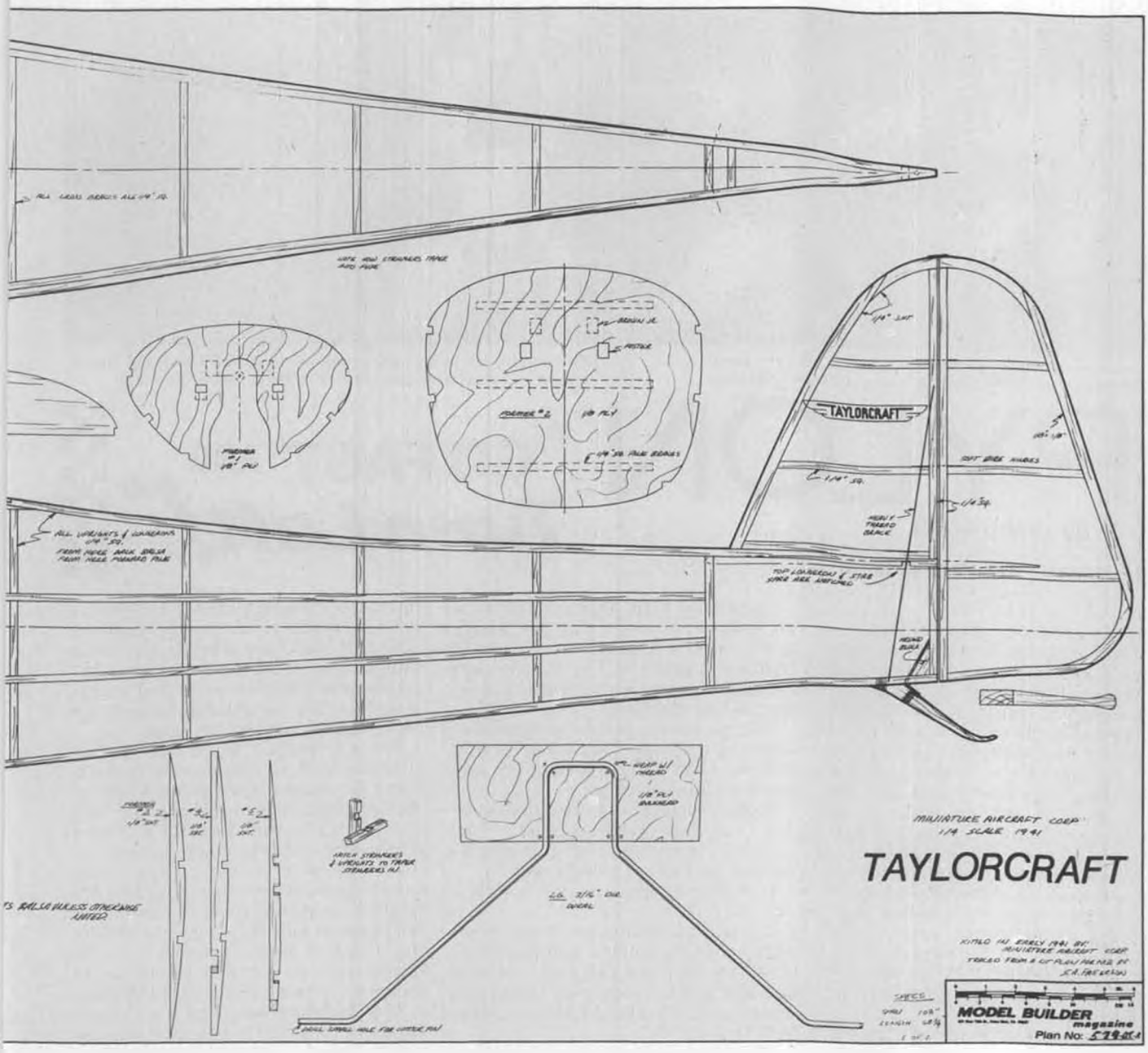
The event calls for the use of pre-WW-II rubber designs scaled to 20-inch wingspan or smaller. In some respects, this indoor O.T. meet was somewhat like a flying scale contest, as bonus points were awarded for coloration and marking. These points were added to the best flight time to determine final winning places.

As George James, Flightmasters President, reports, "To see the old models transformed into gently floating indoor models was indeed a gracious testimony to the original designers." If you don't think the Flightmasters had fun, take a gander at the list of contestants and the models they flew:

CABIN

1) Ken Johnson (Sparky) 1:55
2) Walt Mooney (Pacific Ace) 1:42
3) George James (Victory) 1:30
4) Dick Baxter (Ideal Taube) 1:17
5) Tom Comparet (Sparky) 1:03
6) Mike Mulligan (Cessna) 1:02
7) Curtiss Mooney (Pacific Ace) .. 0:59
8) George James (Red Zephyr) ... 0:55
9) Lonnie Cope (Victory) 0:43
10) Joe Bailey (Victory) 0:37
11) Marlon Albert (Triangle) 0:34
12) Chuck Conover

Continued on page 101



FULL SIZE PLANS AVAILABLE – SEE PAGE 110

MINIATURE AIRCRAFT CORP.

9ft TAYLORCRAFT

OLD TIMER Model of the Month

Designed by: Unknown

Drawn by: Al Patterson

Text by: Phil Bernhardt

• Every modeler knows that "Quarter Scale" is the big thing (no pun intended) in R/C now, but actually, there's nothing new about 1/4-scale models themselves, either R/C or F/F. At least one of these biggies, the model presented here, was designed and kitted as far back as the early 1940's: Miniature Aircraft Corporation's 1/4-scale, 9-foot Taylorcraft. According to John Pond, this is the same design (albeit with some structural changes) that was later kitted for R/C by Vic's Custom Models.

Going through the boss's collection of old model mags, the earliest ad we could find for this model appeared in the April 1941 issue of *Model Airplane News*, which puts it out of the running as far as the Texaco and Fuel Allotment Antique events are concerned, as it's not old enough. Old Timer Scale is about the only F/F event the T-Craft could really excel in, but not many O.T. contest fliers are willing to shell out the bucks necessary to build a model this size for a two-to-three-times-a-year event. However, if you're one of those free flighters who says to heck with contests and *truly* flies for fun, you'll have a ball with this big, realistic performer.

According to the original ad, the model weighs 3-3/4 lbs. without engine, which would probably jump to about 5 lbs. ready to go. With an effective wing

Continued on page 104

Meet two of your new 1979 NMPRA officers: Art Arro (left), NMPRA newsletter editor, and Bill Hager, NMPRA President.

This month, Jim tells all about how to run a race. This is the shutter system and protective cage at No. 1 pylon at recent Ohio race.

PYLON "GO FAST AND Turn Left!"

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

Hi!

• Sorry I missed you the last few months, but it was unavoidable. Things are back to nearly normal now, so stick around . . . '79 looks like a good year for racing.

Big news, of course, is the NMPRA Championships being held in Las Vegas this year. And while it isn't going to be quite the grand spectacular that the Pattern event has been (what with the best of national and international hot shots competing for those Big Bucks), at least we're back on the right track.

It will be extremely important that we be at our most sportsmanlike behavior while competing and that we show up in significant numbers. So, even if you don't qualify for the Champs, plan on going as a spectator . . . this may be Pylon's best chance for a great year.

NMPRA

The election of new officers for the 1979 season should also lead to expanding and improving pylon racing, as they are all dedicated and knowledgable individuals. The new officers are: President, Bill Hager, 5200 Rye Drive, Dayton, Ohio 45424; Treasurer, Ed Rankin, 6072 Wonder Drive, Ft. Worth, Texas 76133; Newsletter Editor, Art Arro, 117 Grandview, Ann Arbor, Michigan 48103.

To help make this a good season, the NMPRA needs your support, and in this case we mean numbers and money. The NMPRA works *for* you and *through* you. When the AMA, or sponsors, or the general public weighs the value of anything concerning use of flying sites, budgets, etc., the number of people involved is a major deciding factor. So join up now. Send your $13.00 dues (yes, it's gone up, just like everything else) to Ed Rankin at the above address.

WHAT DO WE DO NEXT?

A call for our help, in the form of a letter I recently received, is the basis for this month's column:

"Dear Jim,

Need some help. My club is planning on holding a fun-fly Quarter Midget pylon race. We voted to use the Sig Doubler II and the Fox 15 Schnuerle (bushed) engine, with choice of stock prop left to the flier.

"Our problem is we have no experience in setting up pylon races (even for fun), and the AMA Rulebook does not spell out everything, such as:

1) How high should the pylons be?
2) How many pylons is best?
3) How many non-flying people are needed for calling, judging, etc.?
4) Where do these people stand?
5) Etc.????

"I could go on and on. I'm sure you understand the million and one questions. Any help you can give for setting up a safe and fun race would be greatly appreciated. Thanks, Al Alman, Brown Mills, N.J.

"P.S. I can send you written and photo coverage of our event if you'd like me to."

Thanks for the letter, Al. I'll try to answer your questions as best I can, and also take the opportunity to expand upon your query. Naturally, this is going to be biased towards the way I have personally evolved running a contest. If any of our readers (both of you) feel they have a better way to do things other than the way I'll outline procedures, I'd certainly be glad to hear them, as I'm continually looking for better, easier ways to run races.

First off, I suggest you reread the AMA rulebook on R/C racing events; Formula I and provisional Q-M rules. Much of the information is interchangable, and the Form I layout drawing will very nicely define where people go to a great extent. Also, try to get a copy of the booklet put out several years back by the NMPRA on pylon racing; try writing to Bill Hager at the address given earlier in this column. There is much valuable information in it and it would be an inexpensive investment for a club library.

The first thing you need is a Contest Director; for a club fun-fly race, you can merely select a capable-can-do-type person. For a sanctioned open-entry race, you'll need the services of a qualified contest director; the AMA rulebook spells out the necessary requirements on becoming one.

Assuming that you've decided to be the C.D., enlist the help of another

Example of pylons 2 and 3 as used at the Nats. Opening in pylon base is for judge to duck into to avoid an out-of-control model . . . or to answer a call from Nature.

individual to act as a contest organizer. While you can get along without a right hand in all the preparations for race day, you'll be much too busy on race day making sure the race is going smoothly to be worried about the parking area, food, prizes, etc. Work closely with your C.O.; you both should know each other's position on most matters that may come up.

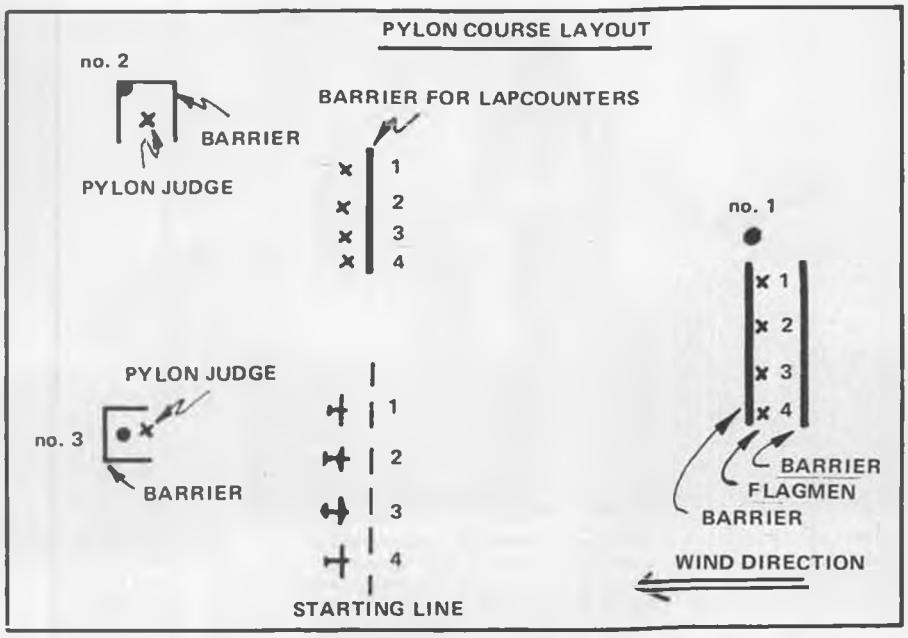
Send to the AMA for a sanction form. While not technically necessary for a fun-fly event, you can't go wrong spending the two bucks and making sure you're protected. A sanction is necessary for an open-entry event. Select a contest date far enough along in the season that any club members not currently ready to race will have enough time to prepare for the date.

For a fun-fly race, I suggest you go with nominal value prizes to eliminate the win-at-any-costs-type competitor. For an open-entry, serious race, I like to see cash prizes; as much as you can easily cover from the proceeds of the race event. If you're having a major race, make sure the club treasurer or other reliable person is in charge of the finances and keeps a good eye on the money handling. Good record keeping of disbursments and receipts is mandatory.

Decide on the course layout, referring again to the AMA rulebook. Select a reliable person to be in charge of managing field set-up. A good person for this job would be the club trustee or groundskeeper, or whatever your club calls him. Lay out the set-up on paper and have a trial set-up some weeks prior to the contest. Bearing in mind the prevailng winds for your area, try to set the field up so when flying down to the No. 1 pylon, you'll be flying directly into the wind. Consider alternate pylon layouts, because come contest day, the wind is sure not to cooperate. Pay strict adherance to the minimum distances shown in the rulebook; it's important for the course to be the right length for those experienced fliers used to flying legal length courses. The minimum distances between the course and the pits and the spectator area are musts from a safety standpoint as well as a legal one. You might find your insurance voided should you have an accident and not have followed the safety rules, so these distances should be regarded only as bare minimums. If you can readily increase these distances, please do so, since fliers prone to be excitable have a tendency to fly wide around the course, and sitting in the pits working on your plane only to have your hair cut by a Q-M can be unnerving.

Personal preference and experience in traveling around to many races and having competed both on the 3-pylon course and the 2-pylon course, I suggest your race follow the trend over most of the country and use the 3-pylon layout. You'll need three pylons 15-20 feet high. A ready source for pylon poles is your local carpet sales emporium. The card-

Continued on page 94



An example of chain link fencing used to protect lapcounters. Note how lapcounting cards are set up, and use of cardboard tube as a pylon.

Another type of wire cage for lapcounter protection.

Still another type of protective cage for lapcounters, as seen at recent Dayton, Ohio race.

Winners of the 2nd Annual Northwest Outboard Championships. Kneeling, l to r: John Moss, 4th; Dennis Caines, 3rd. Standing, l to r: Mike Wight, 5th; Dave Blacksten, 2nd; and Larry Knudson, 1st. Meet was hosted by the Longview R/C Boaters, Longview, Washington.

Larry Knudson prepares to launch Dave Blacksten's original design tunnel hull.

PHOTOS BY AUTHOR

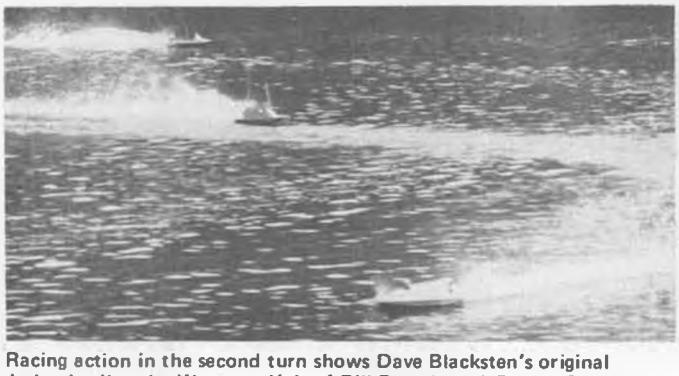
R/C MODEL OUTBOARDING

By JERRY DUNLAP . . . The Outboard class is probably the fastest-growing phase of R/C model boating. Here's a little background on how the class got started, and what you can expect to see in the future.

• Although there are some die-hard traditional model boaters who don't like to admit it, model outboarding is definitely gaining in popularity in many parts of this nation. The evidence is more than obvious. There are now a multitude of model boats available for outboard application. K&B Manufacturing, at this time the only supplier of a truly competitive and reasonably priced model outboard, produces more K&B .21 Outboards than any other marine engine it makes. It ranks second in K&B's total production of engines, with only the K&B .40 front rotor R/C ahead of it in total units produced. As a racing class, the K&B Outboard has attracted some very large gatherings at different events the past couple of years. And if the number of phone calls I receive from all over this country requesting information on a model tunnel I designed is any indication, there is little doubt left in my mind that model outboarding is going to continue to grow. Because of these indicators, and also because I needed to get in an article to **Model Builder,** I though it might be of interest to knock out something about model outboarding, past and future. The article will meet two needs. First, WCN Jr. will be happy (I hope) because he will have a boating article, and secondly, I'll get to ramble on about one of my favorite R/C activities.

Although model outboarding has gained its greatest impetus in the last couple of years (the introduction of the K&B .21 Outboard in the late summer of 1976 would certainly have to be considered the catalyst that really started the reaction), radio controlled outboarding did exist on a rather limited scale prior to that time. I can remember doing a review of a Fuji .15 Outboard on a Norco Avalon cabin cruiser some seven or eight years ago. Those of you who can remember a publication titled *Model Boating World News* can consider yourselves Old Timers in the hobby of model boating. Although the Fuji Outboard did have a scale-like appearance, it wasn't much in the way of performance. There were a couple of very creative model boaters back in the early '70s who actually developed some very powerful model outboards using much of the same engineering now employed by the folks at K&B. One of these individuals is still very active in the hobby today. That person is Ed Hughey, of Hughey Boats, Indianapolis, Indiana. Ed placed a Veco .19 (you Old Timers will remember when that was The Engine) on top of a homemade lower unit and used flex cable as the drive system. Hughey Boats is still into model outboarding with their offerings of outboard hardware accessories and a tunnel kit.

The other fellow who really did some neat things with an original outboard was a West Coast model boater by the name of Bill Young. Known to many of us as Wild Bill or Willie, Bill was truly one of the creative minds in model boating during the late '60s and early '70s. How about it, some of you Old Timers in California, remember the Flying Flapjack? Bill also used a Veco .19 mounted to a flex drive lower unit. I can still remember Bill running that engine setup on an original hydro at the 1973 Seattle NAMBA Nats. He only finished one heat, but he had the fastest time of



Racing action in the second turn shows Dave Blacksten's original design leading the Klampon Kais of Bill Brazzle and George Smith.

Norm Nordby's very quick Dumas Hotshot kicks up a wall of water as it pulls away from the pit area.

Racing action showing Dave Blacksten's original leading Bill Brazzle's Klampon Kai into the first turn.

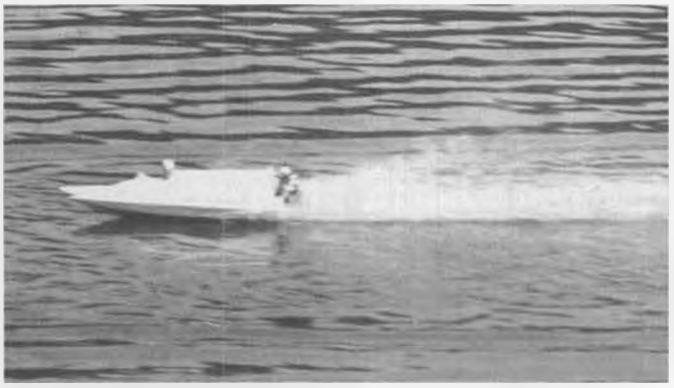
Gary Havens launches George Smith's Kampon Kai as John Moss and Norm Nordby wait their turns.

any outboard entered. Well, Willie's no longer in model boating, but he's given this writer many fond memories. His old boating buddy, Russ Kominitsky, told me that Bill is now doing guidance and counseling out of Los Angeles. Although he didn't develop any original model outboard engines, I'd be remiss if I didn't add the name of Jay Selby, of Redwood City, California, to those who were influential in developing model outboards. Recently, Jay has become one of the spokespersons for model outboarding through his articles in *R/C Sportsman* and as NAMBA's National Outboard Chairperson. Jay's roots in model outboarding go back to the early '70s, and he has probably designed and built more model tunnel hulls than anyone else in the whole world. But as I mentioned earlier, it was the K&B .21 Outboard that really started the old ball rolling, as they say.

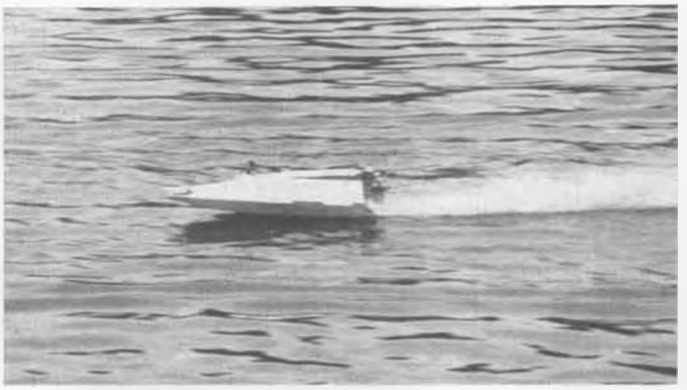
Something that still amazes me is that no other model engine manufacturer has jumped on the outboard bandwagon. It certainly doesn't take an expert in the area of model marketing to realize that model outboarding is here to stay. And there certainly isn't anything complex or exotic about the K&B Outboard. That's one of the appealing things about the unit. It is one of the easiest marine systems to work with that I've ever used. One of the criticisms of model outboarding has been the fact that there is only one manufacturer. I've even heard people complain that K&B has a monopoly on model outboards. That's just plain ridiculous. A monopoly implies "exclusive control of the supply" as well as "exclusive possession of anything, as of learning." The only reason K&B has control of the supply is because no other manufacturer has chosen to offer us model boaters an alternative. And there's just no way that K&B has possession of all the learning. Even though I have some very good boating friends at K&B, I honestly think it would be a great benefit for the hobby of model boating to have more sources of engines available to us. Who knows? We might be provided with something in the future.

A question that I'm often asked is, "When will there be a .40 or .60 size outboard available?" There is now a limited production .40 size engine from

Continued on page 99



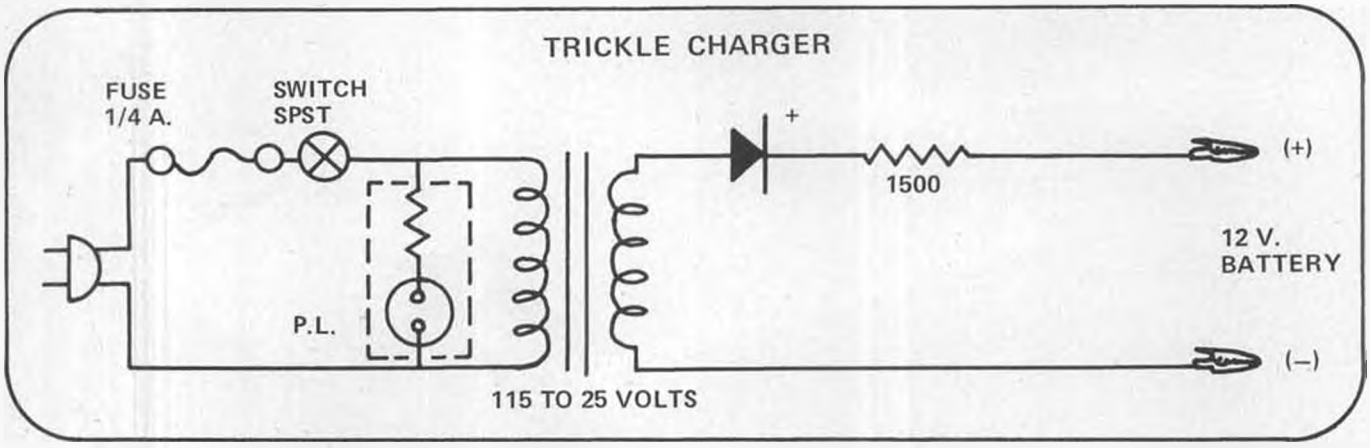
Dave Blacksten's tunnel design won firsts in both the heat racing and 10-minute Enduro events at N.W. Champs.



John Moss's Klampon Kai was one of the front runners in the 10-minute Enduro. This Midwest kit is a real competition boat.

Dennis Caines used a wooden version of the Excaliber II to win the Fastest Qualifying award and 3rd place overall.

John Havens, Jr. raced his NAMBA straightaway record holder, a wooden version of Jerry Dunlap's Excaliburll.



PHOTOS BY AUTHOR

WET CELL TRICKLE CHARGER

By GEORGE A. WILSON, JR. . . An elementary electronics project that is simple and inexpensive to build, but will pay for itself by prolonging the life of your wet cell starter battery.

• One of the biggest frustrations for hobbyists who own an electric starter or high start device is keeping the lead-acid 12-volt battery in good shape. Lead-acid batteries tend to discharge themselves and, if stored in the partly discharged state, soon develop high internal resistance. This condition is described by many people as "the battery's inability to hold a charge." Battery life can be extended dramatically by maintaining the charge level somewhere near full charge. This can be done by recharging the battery after use, then trickle charging the battery while it isn't being used.

My study of the subject of trickle charging was all but unsuccessful. The question that needs answering is, what charging rate is needed? The answer appears obvious when you think about it; you need just enough to prevent discharging and to charge without causing the battery to outgas appreciably. With this in mind, a simple charger was designed and built to provide about 5 milliamperes of charging current. To prove the charger's capability, it was used successfully the last two winters to trickle charge the battery in my tractor/snow blower. This machine is used about once a month from November through March, near Boston, Massachusetts. The temperatures were below freezing much of this period. A full charge was maintained and the tractor started in temperatures as low as 10°F. I didn't try it in lower temperatures; thank goodness it doesn't snow very often when the temperature is that low! Of further interest, with the battery continuously on charge, there was no appreciable loss of the electrolyte. This shows that little, if any, outgassing occurred.

The tractor battery is about twice the size of the normal motorcycle battery used by modelers and, therefore, the 5 milliampere rate should be more than adequate to prevent discharging. However, don't expect it to do much actual charging. Charge your battery regularly using your normal charger, then trickle charge it continuously when it is not in use.

Trickle charging should begin with a brand new battery. It won't hurt an old battery, but it will do nothing to revive it. Perhaps it will extend its life, but only if the deposits that cause leakage have not already built up.

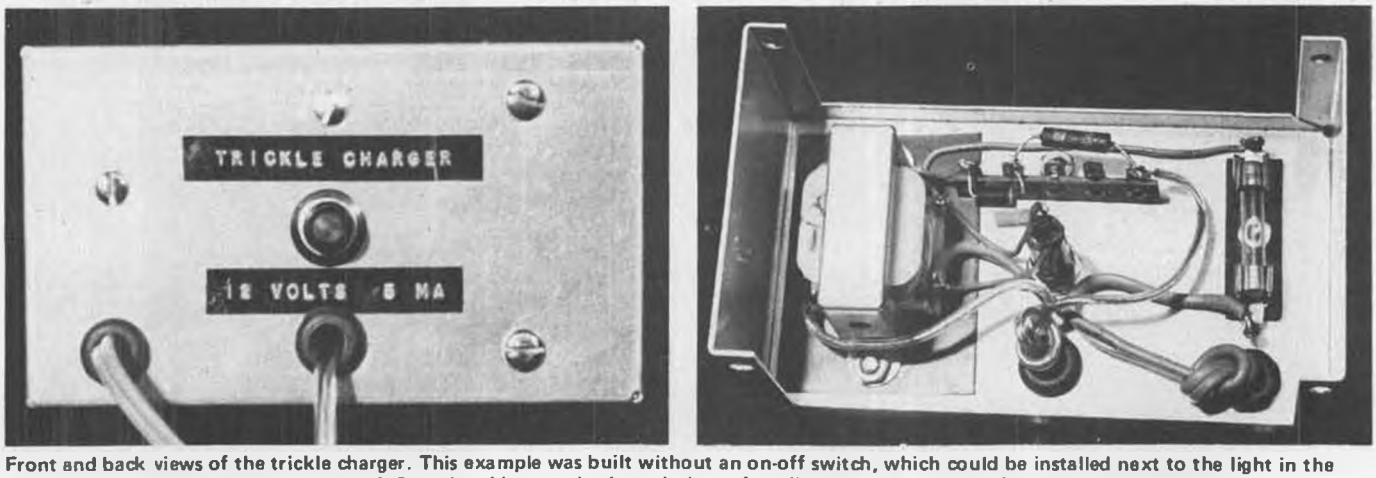
Make sure you keep the liquid level up in your battery. I am told that if the plates get exposed, they are subject to reactions that are not reversible by charging. For the same reason, don't overcharge your battery. Once it starts to bubble freely during charge, it is nearing full charge. It is best to stop a little short than to "cook" the water out and be sorry!

While we are on the subject of cautions, it should be pointed out that what is said in this article about liquid-electrolyte lead-acid batteries is also true of lead acid gel-cells and of liquid-electrolyte nickle-cadmuim batteries. However, *make sure all liquid-electrolyte batteries are vented during charge.* Lead-acid batteries normally have a vent built into the cell covers. Nickle-cadmium batteries are often meant to be sealed during discharge and do not have vents built in. Open the vents (usually by backing out the vent screw) to accommodate outgassing during charge. If you do not, gas pressure will build up and will crack the case.

HOW IT WORKS

The transformer reduces the 115-volt

Continued on page 86



Front and back views of the trickle charger. This example was built without an on-off switch, which could be installed next to the light in the center. Note grommets used to protect A-C cord and battery leads, and piece of cardboard under the transformer to prevent shorts.

House of Balsa makes some of the neatest 1/2A R/C kits around. Shown here is the Beechcraft Bonanza, for .049 to .10 size engines and 2 to 4 channel radios. A good subject for Stand-Off Scale.

The 1/2-A SCENE

By LARRY RENGER

PHOTOS BY AUTHOR

Charming Linda Chabot models her husband George's "1/2A Stik" design, a good flier.

Tony Nacarrato holds his very fast original design 1/2A unlimited pylon racer.

• Christmas is past and the new year is upon us. One thing I do at holiday time is take a good look at the toy stores. (I have two little boys.) You can learn a lot and get some good ideas.

There are lots of styling ideas for your latest flying creations lurking in the Star Wars, Battlestar Galactica, and similar toys. A little extraneous detailing goes a long way toward making a model outstanding, and needn't really hurt performance noticeably.

You can buy dolls for pilots, or a light table for tracing templates and lettering. How about those (ugh) plastic kits, both for some of the detail parts and really accurate scale contours? Speaking of dolls, how about the one down the aisle, waiting on a customer? Oops! Forgot, this is a family magazine. Better get on to:

BEGINNER'S WORKBENCH

The subject for this month is erratic engine run in 1/2A models. There is a wide variety of interesting causes for your engine to refuse to hold a nice, steady setting. The course can be broken down by classes, into The Engine, Engine Mount, The Tank, Tank Mounting, Fuel, and Thou.

First, look for an out-of-balance prop or spinner, a bent connecting rod, or your glow plug filament mashed, mangled, or burned. The cylinder may be covered inside with varnish or outside with dirt. Examine your needle valve for vibration causing it to turn, and for looseness in the threads, leaking air into the fuel pick-up system. You may have the wrong glow plug, or too many or too few gaskets. On a Tee Dee or Medallion, check the carburetor body (plastic part) for looseness, and epoxy seal it if necessary. The backplate may be loose, or on a reed valve engine, either the backplate gasket or the tank-to-back gasket may be leaking. A tank back screw could be loose, too. You may be using too large or too small a propeller.

Second, examine the nose structure of your model. If it is solid, the entire airplane should be absorbing engine vibration; if not, the nose acts like a spring under the engine's driving forces. If the engine or any part of it seems to blur when running, your engine is on too flexible a mount. Key places to look are the end of the needle valve, tip of the

Continued on page 87

Interesting toggle switch system for turning the bladder pressure on and off, seen on a 1/2A pylon racer.

A really eye-catching T-38 1/2A stunter, seen at the '76 Nats. Model weighs 16 ounces and flies well. Who's the designer?

Tony Avak flew this R/C blimp at the Pasadena IMS Show for 1 hour, 40 minutes before running out of releasable ballast (BB's), thus ending the flight. The motor was mounted on a pivot and turned with the rudder, enabling it to turn in its own length.

ELECTRIC POWER

By MITCH POLING

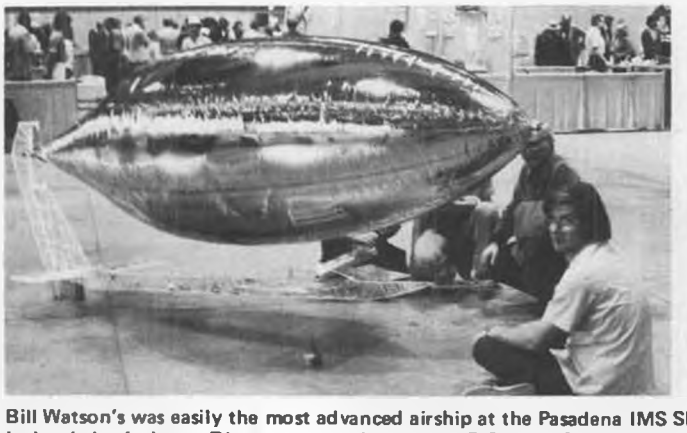
PHOTOS BY AUTHOR

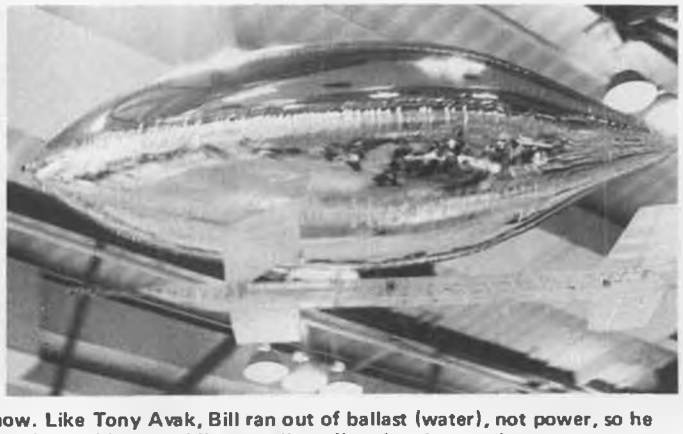
• The lighter-than-air craft at the indoor record trials flew so well that, at the time, I took them for granted. Of course, it's easy to design and fly a blimp . . . they float, don't they? Well, I found out that it isn't that easy. Ken Conrad, the owner of the Great Winds kite shop in Seattle, and I built a blimp based on my photos of Bill Watson's winning design, and it didn't fly! As usual, I learned a lot, and the next one will fly, but my appreciation of the problems solved by the craft I saw at Pasadena went up several notches. It is hard to build strong enough and at the same time light enough for the sizes that model blimps come in. Well, on to the designs at Pasadena!

Bob Peck, of Peck-Polymers (makers of those neat kits) designed and flew an attractive "Jules Verne" style blimp using two rubber balloons, each about 34 inches in diameter, giving about 26 ounces of lift. Both the front and back stabilizers pivoted for up and down control. The three-channel radio ran the rudder, elevator, and motor, which was an Astro 020 turning a 6x3 prop on 2.4 volts. Bob got extra endurance by running the cells of the Astro 020 pack in parallel, instead of in series. Bob's blimp flew very slowly, about a slow walk, and the control surfaces had a hard time maintaining direction at the low airspeed. Sometimes it would just hover and turn around its own axis! It was fun and entertaining to watch.

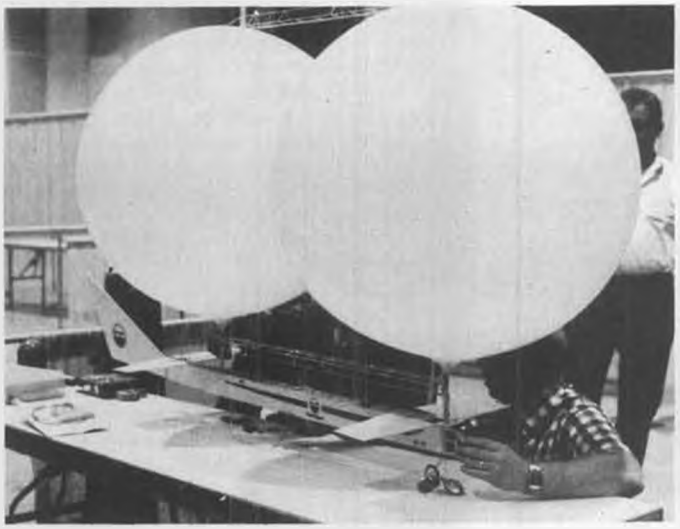
Tony Avak had a very successful and interesting mini-blimp which showed a lot of thought and ingenuity. Tony's craft was made of transparent 1/2 mil mylar, and was 6 feet, 8 inches long by 22 inches in diameter. This looks small in the air, and *is* small for a blimp, with only 11 cubic feet of helium, enough to lift 11 ounces. I nicknamed it "The Bubble"! Now for the amazing part; Tony packed in rudder, elevator, motor, and ballast control, using a Cannon super-mini radio; and flew for 1 hour, 40 minutes! In fact, the motor and batteries were still going strong, but the supply of releasable ballast ran out. Tony used BB shot for ballast, and a Mitsubishi servo motor for propulsion. I think it ran on two sub-C Ni-Cd cells (2.4 volts). The motor was mounted in the nose and was pivoted for pulling the ship around in turns. This, plus the large control surface, made it very maneuverable at its cruising speed, which was a fast walk. By the way, all the structure, *plus* the radio, motor, and batteries, weighed 8.5 oz.! And, in case you think blimps are expensive, Tony spent 80¢ on wood, 40¢ on tissue, and $3.00 on mylar. The helium for one fill is about $3.00. Tony's ship had it all together; a good design, I wish I could do as well. It showed that small lighter-than-air craft are not only possible, but practical, with good performance to boot.

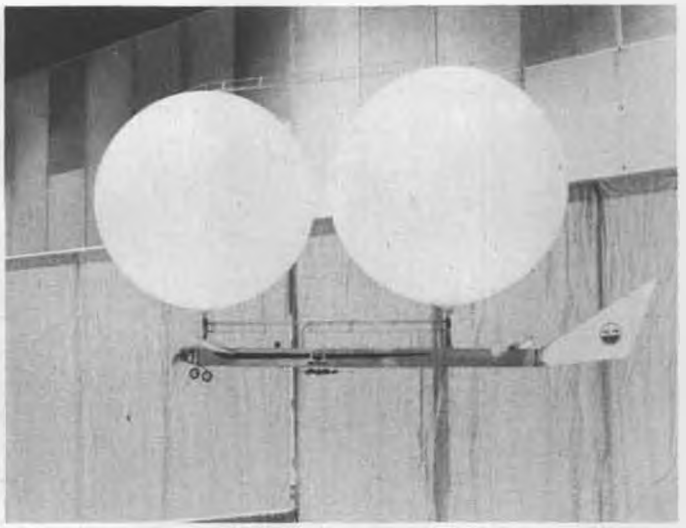
The winner in the lighter-than-air division was Bill Watson's ship, christened the "Golden Football" by Bill Northrop, and it was no joke! The envelope was Kapton, a special film with a coat of real gold evaporated onto it. It was spectacular and beautiful to behold! Bill, who also won the CO_2 plane division and builds man-powered planes for Paul MacCready, took this project on with tremendous technical expertise, and it showed. He designed the envelope shape for minimum drag, by computer, and chose alkaline batteries for maximum endurance. It paid off in a more than three hour flight, limited





Bill Watson's was easily the most advanced airship at the Pasadena IMS Show. Like Tony Avak, Bill ran out of ballast (water), not power, so he had to bring it down. Distance covered was some 7.6 miles. Motor is mounted in rudder, providing excellent directional control.





Everyone loved Bob Peck's airship. Not having time to prepare a single bag, Bob fitted a couple of weather balloons, which provided a lot of drag. Very slow speed made the control surfaces somewhat ineffective. Gimballed and controlled engine thrust was ingenious steering aid.

finally by running out of ballast (water), not power. The envelope held 50 cubic feet of helium (50 ounces of lift) and was driven by a rewound Astro 020 turning a 8x5 prop. The motor was mounted on the rudder, so it helped in pushing the ship through the turns. Six C-size alkaline cells provided the power, and they were still going strong after three hours. Bill used a Futaba radio for controlling ballast, elevator, rudder, and motor. The forward elevators were pivoted, the rear ones were fixed. The ship flew at a medium jogging speed, with excellent control.

Ken and I imitated Bill's design a few weeks later, and found that our fuselage structure was not rigid or strong enough, and our weight went five ounces too heavy for flight. So, Bill solved more problems than I had guessed on seeing his ship, and his prize was well won. Now if I can just build lighter and stronger!

A few more photos of Hal Cover's winning plane are included here to show it in flight and some of the details of the clever detachable power pod which held the Hytork 48 motor and batteries. Hal used 1.5 Ah cells to power the plane. These were not the usual sealed cells, but the rectangular see-through types that have often been used for glow plugs cells in the past. Hank Fasola, who designed the motor and battery system, says that these deliver a little more endurance than the sealed units. They are also easier to charge, because once they are fully charged, they start to bubble. This is easily seen through the clear plastic, and the charge is stopped. This is a clever idea, maybe I'll try it. These cells are cheaper than the sealed units, about half the price on the surplus market. The 48^2, by the way, refers to the 4.8x4.8 gear reduction (23:1 total) done by putting two Hytork gear boxes in line. This makes a very clean reduction set-up. Note also the fine selection of props that Hal carved. He really got the props tuned in, with an 18x24 prop as the final choice. Other features to note are the high pylon mounting, undercambered wing and stabilizer, and the flat center section wing with tip dihedral. Much to my surprise, this was the most popular dihedral layout at the meet, and it was also the best, with excellent stability coupled with superb turning ability. My own favorite layout (polyhedral) just didn't compare. Live and learn! Be a pioneer and fly electrics! •

Two more photos of Hal Cover's original design R/C ship that set an indoor R/C record of 23:02 at the Pasadena IMS Show. Hal had the best thought-out design at the Show.

English drivers, using differentials, dominated the Monaco World Cup R/C Car Race. Four English cars made the "A" Main.

R/C AUTO NEWS

By CHUCK HALLUM

PHOTOS BY AUTHOR

• This month's column is going to be a hodge-podge of thoughts primarily concerned with a letter Larry Flatt wrote about the cost of R/C car racing and what might, or should, be done concerning some of the potential problems. Larry sent this letter to several individuals and publications. I replied to Larry's letter, but since that time I have changed some of my thoughts on the points brought up. So, to get you on board, here is Larry's letter:

Dear R/C Car Racers:

I can see it all now, in 1979 or early 1980, the hot set-up will probably be an inline engine, driving through a differential to fully independent suspended rear wheels. Brakes will be proportional electronic disc brakes, a three or four channel radio will be used in order to control boost or mixture to the heavily tweaked Rossi .21. Front suspension will be fully independent, everything will be in ball bearings, and tires will be semi-pneumatic. Each of us die-hard racers will have two of these fine racing machines because the cost will only be $1195 per car.

One-eighth scale R/C car racing is at or maybe beyond the point where I quit racing slot cars, go-carts, and an H-production Sprite. We have to have a competitive class of R/C car racing that does not get overly expensive every year. I'm sure many of you feel that you already spend too much money on R/C cars, only to find out at the next race that so-and-so has the newer trick carburetor, newer trick brake, newer trick graphite chassis, etc., etc., etc.

I for one am getting a little tired of it all, and I want to be able to work on my car a little, and race and fellowship with fellow racers a lot. I know it's too late to change the rules for 1979, so I'm starting early to propose some rule changes in 1980. I am hopeful that we will try some of these in the H of A Superstock class in 1979.

Open class would probably continue to be an Open class, although I think some effort should be made to prevent the example in the first paragraph of this article.

The Superstock class offers the potential to be a lower cost class, but I believe our rules need to go further to keep it that way. I would suggest that the following additional items be considered for at least the Superstock class:

1) A 1/10-inch maximum bore carburetor. This is easily done on Delta, Thorp, and Perry carbs. The engines run good and will last a full season.

2) A 5/16-inch maximum (no-go) or smaller muffler hole. (A 1/10-inch bore carburetor and a standard Thorp pipe with a 5/16-inch restrictor will meet the new proposed 80 db muffler rule!!!)

3) Prohibit differentials (sorry John, but your Thorp car works pretty good without a differential, too).

4) Prohibit independent suspension systems.

5) Restrict radios to two channel.

6) Restrict engines to commercially available .21.

7) Only sidewinder engine/drive train configurations allowed.

8) Restrict brakes to mechanically actuated.

9) Prohibit semi-pneumatic or pneumatic tires.

Those are probably not all the things that are needed to keep the racing low cost and competitive, but I think it is a good start. These rules would still leave lots of room for experimenting and improvement coupled with the existing general ROAR rules. Some tweaking of the engines could be done, but you wouldn't have to worry about buying a special crankshaft or rod to handle the increased power, as the stock equipment would stand the strain.

I personally think some of these suggestions could apply to the Open class, such as only two channel radios, mechanical actuated brakes, and even carb size and mufflers, but I'll leave that to others for the present time. There should be an outlet for those who want to do or spend whatever is necessary to go fast, or those who like to dream and experiment. I would suggest that the factory teams and only a very few independents will have the time or bucks to compete in Open class unless some parameters are drawn pretty soon.

This past year I was very fortunate to win the Heart of America Championship in Open class. I did it with a stock Delta Super J, a mild K&B, and lots and lots of luck. I never had the fastest car, although it was reliable, and later in the year when the other guys got their big carbs working reliably, I couldn't even qualify in the "A" mains, much less have a chance at winning. It's clear to me that I will not be able to be competitive in Open class unless I do a lot more (spend more money), and I'm at a point where I'm questioning if it's really worth it all.

If you share my concerns, please talk to people about these proposed additional SS restrictions, put a 1/10-inch plug in your carburetor and try it, and let's see if there is some support for this type racing.

And here is my reply:

There are quite a few interesting points brought up in Larry's letter. But it certainly is not the first time these concerns have been voiced. Cost and time *are both extremely important to keeping the sport alive. I find most racers don't complain about the initial investment (where it is now), but rather the time and money to keep the car competitive and ready. Also, only rules that are simple and enforceable should be made. Now on to Larry's letter.*

Competitive suspension and complex engine and brake controls are still a ways off. I actively worked on suspension (cars) for two years and thought about it for a couple more. The problems were weight and reliability. Engine boost or supercharging may be more of a threat; several people (with know-how) are thinking about it. The problem really boils down to the power-to-weight ratio. Without increased power, I don't think suspension cars will be competitive.

Larry's second and third paragraphs reflect some of my feelings: ". . .next race so-and-so had the newer trick. . .," and ". . .work on my cars a little. . ." The modifications and prep time are a lot of the problem, and these are significantly reduced by restricted horsepower. I also feel that if some more restrictive rules are to be, the Superstock class is the

place for them.

As for the rules presented for consideration:

1) Carburetion: yes, we may want to go to 1/10-inch bore if there are no fuel restrictions.

2) Muffler: '79 approved 80 db at 10 meters sufficient.

3) Differentials: with reduced power, they don't help. But with present carburetor and no fuel limitations, or to keep cost down, consider prohibiting.

4) Independent suspension: low minimum weight should make suspension cars non-competitive. For cost reasons, consider prohibiting.

5) Radio, two channel: I haven't seen anything to worry about this yet.

6) Engine restrictions: if carburetion is limited, I don't think we need to worry about engines per se. But we may need to specify no inlet supercharging.

7) Drive train: if suspension is prohibited, no need to worry about this.

8) Brake restriction: should we worry about this?

9) Pneumatic tires: should we worry about this? The original R/C cars had these.

Personally, I think Nos. 1, 4, and 6 should be given strong consideration in the Superstock class. The no-intake supercharging should also apply to the Open class. On the others, I'd take a wait-and-see attitude. And I'd reconsider the minimum weight rule, at least in the SS class.

Part of the problem is that many racers automatically jump on a bandwagon without really determining what it can do for them, or if it's really better. Look at the fiberglass chassis . . . lots of racers just got broken front ends and no real performance improvement. The front end and glass chassis each cost more than the old aluminum chassis. Now there will be new front ends to reduce the breakage. Same thing with engine internals . . . you don't need a chopped-up engine. But because the big guns screw up their engines, many racers follow. The reason the big names come in first is because they: 1) finish, 2) drive well, 3) make proper choices, 4) are prepared, . . . and 99) have a fast engine. We should not use rules to control this sort of decision.

So, all things being considered, I would support the following:

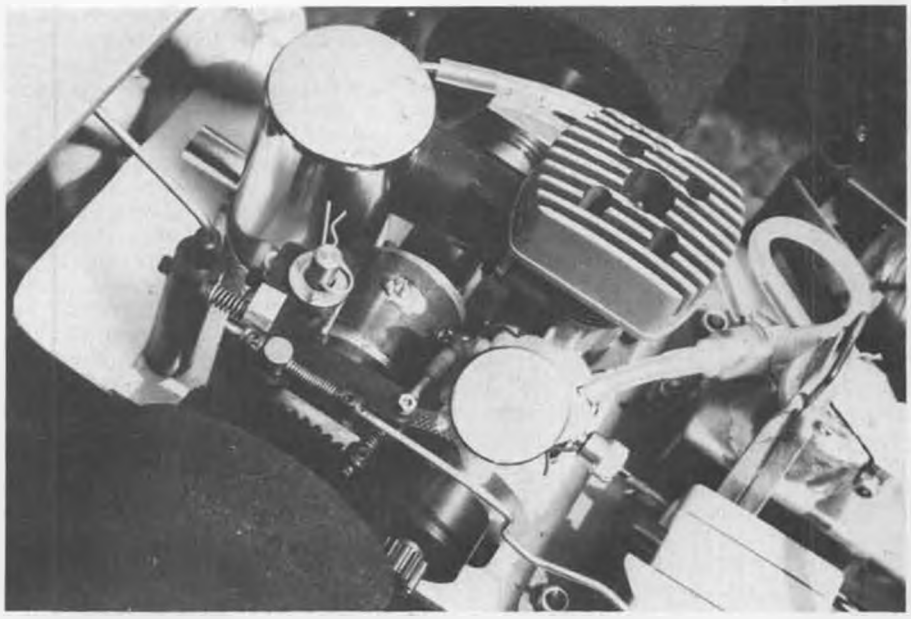
1) No intake supercharging (in all classes).

2) A 1/10-inch bore carburetor (if there are no fuel restrictions) in Superstock.

3) No independent suspension in Superstock.

4) A 5-1/2 lb. minimum weight in Superstock.

When the Superstock rules were first developed, Mike Morrissey read them over. He thought the SS rules were great . . . except that he thought the minimum weight should be 6 lbs. The 5-1/2 lb. weight and 10% nitro fuel were a compromise between all ROAR Regional Directors and SS Rules Committee members. Most of these people realized that the power-to-weight ratio is a very important factor to keep R/C cars competitive. IMSA, the ruling organization for full-size GT cars, just announced weight increases, carburetion limitations, engine porting limitations, and radical bodywork limits to even the competition.



Phil Greeno's World Cup winning car, showing the differential between the engine and muffler. Differential is a natural for formula cars.

Now, we have to be careful because some influential racers and manufacturers will agree that (yes) lower power and more weight will even the competition. But they will be unwilling to give away any advantage they feel they may have. I for one feel that anything that will even the competition and possibly keep time and dollar costs down is a good thing for the sport of R/C car racing. Even with restrictions in the Superstock class, the all-out race has the Open class to compete in and do all the trick stuff. However, there probably should be some limits placed on the Open class cars to control extreme cost items.

The real problem as I see it is to get enough votes to pass good and needed rules changes. Racers who are not interested in Superstock racing can kill the class because they don't understand why a rule is proposed, desired, or required. I personally did not vote on most 1/12 scale and electric rules proposals this year because I am not active in 1/12 scale and did not feel my vote would reflect a knowledgeable choice. I will leave rules approval to those who race the class. A class of interest to only 25% of ROAR may be a dynamite class and probably should exist. For this reason I think ROAR should have the power to create and impose certain rules without a general vote. I thought the 80 db at 10 meter muffler requirements for '79 should have been in this classification.

In general, I'm in agreement with Larry Flatt's concern about the time and cost of maintaining a competitive car. And the Superstock class is the place to continue with restrictive rules. The all-out racer should have a place . . . and that's the Open class. So, as Larry says, "Put a 1/10-inch plug in your SS car and try it" (I plan to do just that), talk about the SS class with your fellow racers, and think about what rules would be good for the SS class. Then maybe needed rules can be proposed and approved for 1980.

Well now, I have done a little more thinking and observing. Differentials have become the big rage in Europe, and many U.S. racers are trying them with a considerable degree of success. The problem as I see it now is that differentials may be a handicap at the large races where traction conditions can get super, but at local club races differentials can provide quite an edge when traction conditions may not improve sufficently during the race day. So differentials may prove to be more beneficial at club level races. Club races, however, are exactly where the cost factor should be kept down. Differentials typically cost $90 to $130, so that's a big bullet to bite. I don't see any way for the cost to get below $75, and that's still too steep. So, I personally feel more firmly than ever that differentials should be banned in the Superstock class. (I even forgot to put it in my list in my reply to Larry Flatt.) The one additional problem is that differentials may really help formula road cars all the time. Reduced power is a good solution, but I don't think our '79 Superstock rules are restrictive enough to yield a good-handling formula road car. So, it is conceivable that an Open class car with a differential may handle better than a Superstock car without a differential. If engine power is restricted enough in the Superstock class, this would not be the case. This is another reason why I am listening intently to the arguments for a smaller carb bore, or even a smaller engine displacement. The reduced power would also help Sports and GT cars and even the competition.

Let's discuss differentials for a moment so you can see what they really do. Then maybe you can understand what they do to help car controllability. In reality, differentials are power losers, which makes them good on slippery tracks and bad (from an ultimate performance viewpoint) on sticky tracks . . . sort of like a slippery clutch, but in a different manner.

The elements of a differential are shown in the drawing with the spider gears (and housing) and each half axle gear indicated. The spider gears and housing are driven by the engine, and the spider gears in turn drive the axle gears. When both wheels have good traction, the spider gears do not rotate about the spider shaft because the resistance of both wheels and axle/gears is the same and the whole spider-housing rotates, driving both wheels. What happens is that torque is applied to the housing and spider shaft; one axle gear resists the spider gears, so they want to rotate about the spider shaft and speed up the other axle/gear, but the other axle gear also resists motion, so the spider gears do not rotate about the spider shaft, and the complete housing and both axles rotate at the same speed . . . as long as the tires hold traction.

When one tire loses traction, the torque supplied by the engine to the housing and spider shaft is resisted by only one axle gear, so the spider gears rotate, driving the axle/gear to the tire that lost traction at a higher speed. But there is very little resistance offered by the axle/gear whose tire lost traction, so very little torque is applied to the tire that still has traction. Hence, power delivered to the ground is drastically reduced and car acceleration, and possibly speed, is reduced until the car stabilizes and both wheels have traction again.

So, the simple differential is a neat on-board device to automatically reduce power delivery when one tire loses traction and the car would normally get out of control. But power delivered to the ground through the tires is really reduced and thrown away by the spinning wheel and differential heat build-up. When track traction really gets good, R/C cars depend heavily on power oversteer to get around many corners. R/C cars are very understeer prone in constant-velocity turns. At Thorp Raceway, I have to increase gear ratio to increase delivered mid-range torque to break the rear wheels loose to make the sweeper going into the back straight. But with a differential, when you go around the sweeper faster, the inside rear wheel slips, delivered power is reduced, and power oversteer cannot be induced. So the differential car exhibits understeer characteristics, and a very soft front tire compound must be used to get the car to turn properly. In the meantime, the inside rear wheel lifts more and actual cornering speed is reduced.

You have to be smart if you use a differential. Use it under conditions where the track is slippery, dusty or wet, but have the smarts to take it off when traction gets good.

So, to keep the Superstock class at a reasonable cost level, differentials should not be allowed in the SS class, and likewise, suspension systems should not be allowed. But the biggest forcing factor of all the above and future improvements is engine power. With restricted power, a differential is not needed to help handling, and probably reduces performance. With restricted power, the simple chassis performs well and suspension is not needed. And besides, with reduced power, good Amateur or B class drivers can compete almost equally with the best of the experts. To minimize the effects of future changes, restrictions in power must be considered.

Weight is also a great performance equalizer. And the weight chosen should be one that is easily met without lots of cutting or loss of chassis strength, or expensive lightweight fasteners, or lots of time. And don't forget, when you start thinking about what would be a good weight, that we now have to run 80 db (at 10 meters) mufflers, which add a few ounces. When the weight limit was 5-1/2 pounds, I added a stiffener to the rear of my car and braced the front a little extra. To meet the current 1979 SS weight, much trimming, lightweight fasteners, and possibly a light body will have to be used to compensate for the bigger muffler and the 1/2-pound lower minimum weight. To be competitive in SS, a car at the minimum weight (at big races, anyway) is a must. So, I want to go on record as favoring the old 5-1/2 pound minimum and would even support a 6-pound minimum if it were the choice compared to the 5-pound minimum ROAR now has in the SS class.

Supercharging is a definite possibility. I have run out calculations to size a unit and Dick McCoy has also mentioned the subject. The control would be rather complex and the unit would run at very high speed. I would guess the cost in excess of another $100. I think we might bar this everywhere before it has a chance to get started.

Front brakes sort of fall into the same category. Lots of us have this on the drawing board. But the difference here is that the cost may be fairly low . . . about $25 or so. For this reason, maybe we should ban the use of front wheel brakes only in the SS class.

To summarize rules proposals for 1980 which I think are necessary:

I GENERAL RULES

1) No intake supercharging.

II SUPERSTOCK RULES

1) Carburetor bore limit: 1/10 in. dia. max. (if there are no fuel restrictions).

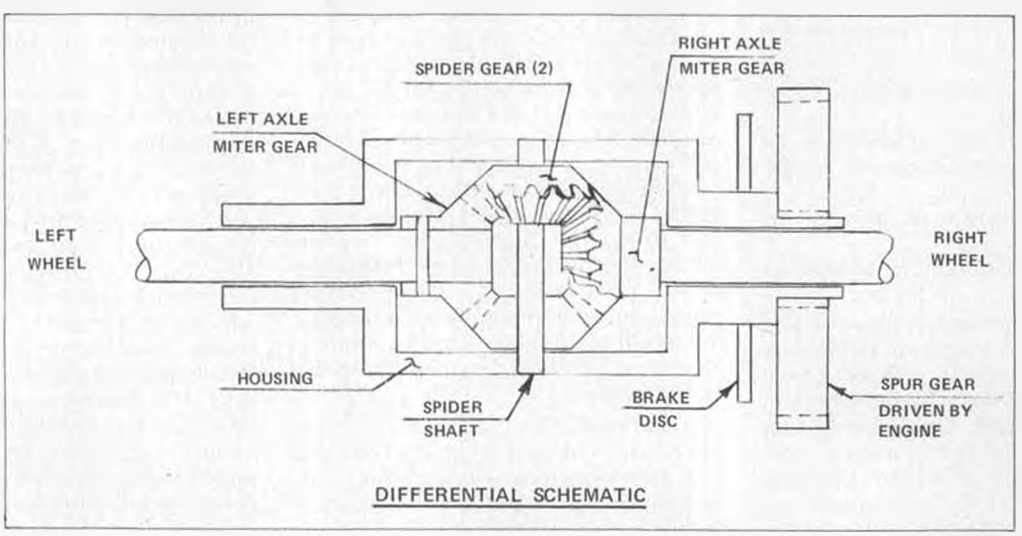
2) No differentials.

3) No suspension systems, independent or otherwise; only simple plate chassis allowed.

4) No front wheel brakes.

5) 5-1/2 pound minimum weight (or 6 pounds if there are no changes to fuel or carb restrictions).

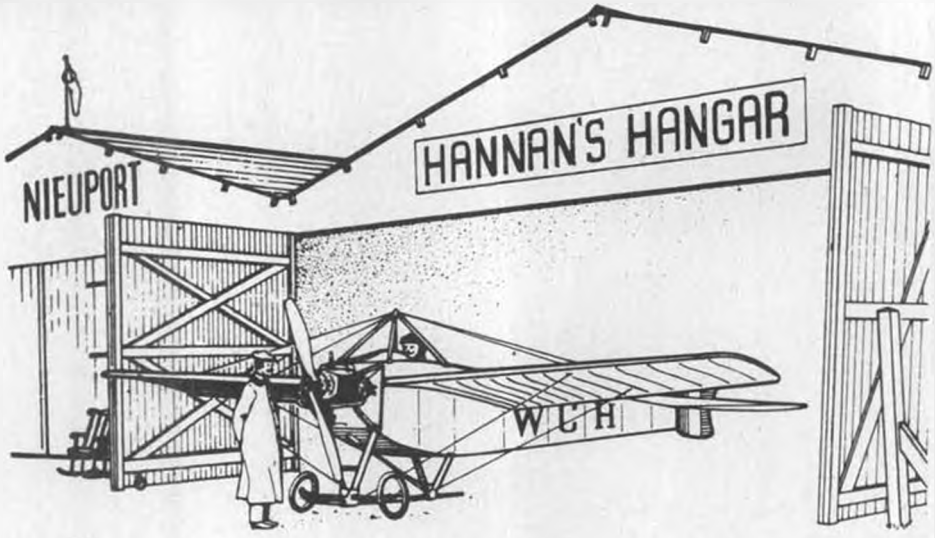
Well, I've rambled on enough. But I do intend to look up the appropriate sections in the ROAR rules so that proper proposals for 1980 can be presented at the 1979 Nats annual meeting. For now, don't gripe, go out there and race up a storm. But let your regional director know what you think, and vote only on things that concern you when the time comes. •



DIFFERENTIAL SCHEMATIC

FREE FLIGHT AND CONTROL LINE

"Miss Los Angeles" free flight scale, by Bill Warner. Wings flex to dihedral position in flight, being mounted on wire stubs. A Mills .049 diesel powers this 29-inch span non-beginners model.



"Avec de la patience, on arrive a tout."

• This quaint French expression (with patience, one arrives at everything) would seem to be an ideal slogan for model builders!

WALT MOONEY HATES PEANUTS!

Now it can be told. Professor Walter Mooney, the world's most prolific producer of Peanuts, doesn't enjoy their namesakes. Seems he has bad memories of eating far too many of 'em during his Army service days.

TIN LIZZIE?

The Ford Motor Company was founded 75 years ago, and to mark the occasion, the Gerrard jewelers (England) produced one thousand 14-inch long solid silver Model T miniatures. Like one? Only $4,850 each!

AND SPEAKING OF EXPENSIVE MODELS

The Queen Mary liner, Long Beach, California's floating tourist attraction, now features a "Hall of Maritime Heritage". Diplayed are naval paintings and scale historical ship models. Over a hundred miniature Navy warships by builder William Tompkins of Northridge (Frank Zaic's home town) are shown. Representing a near lifetime of work, the models are valued at as much as $25,000 each! Also on view in the Queen Mary, are ship models employed in Hollywood movies, and Lord Nelson's "Victory" in miniature, which required 5,000 man-hours for completion.

CAMEL FINANCES ORGAN

It sounds as if even the Arabs' animals are getting into the money game, but not so. This was a full-size Sopwith Camel, which was suspended in flying attitude near a Boise, Idaho theater where the vintage movie "Wings" was featured. Proceeds from the benefit were earmarked for restoration of an antique pipe organ.

PHILATELISTS HONOR ZEP

During January, the ORCOEXPO '79 stamp collector's show, held in Anaheim, California, selected as its theme the 50th anniversary of the Graf Zeppelin's round-the-world flight. Very appropriate, with postage rates rising like balloons!

As are stamp values. For example, a single specimen of the famous upside-down Jenny stamp was recently sold for $100,000.

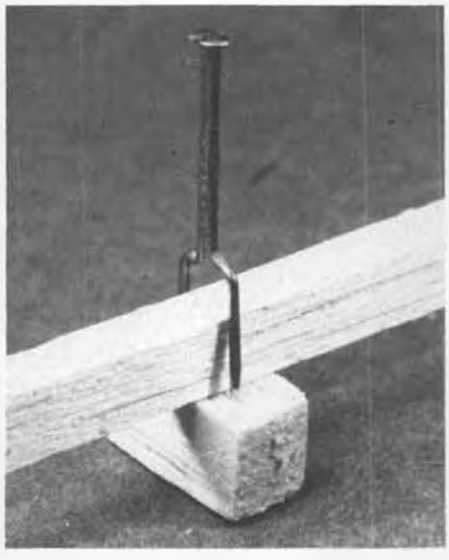
FAI F/F SCALE

According to Bob Wischer, Dolly Wischer, and John Worth, who attended the CIAM meeting in Paris, the FAI remains unconvinced that F/F Scale has any support except in the United States and England.

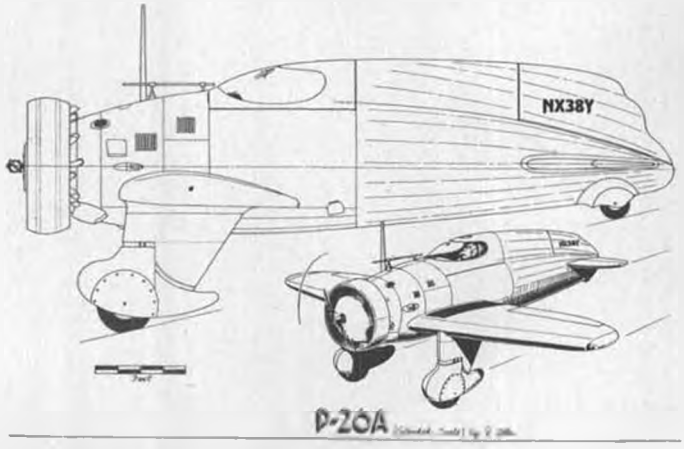
What is needed is a show of interest in the class by modelers from at least five

Continued on page 91

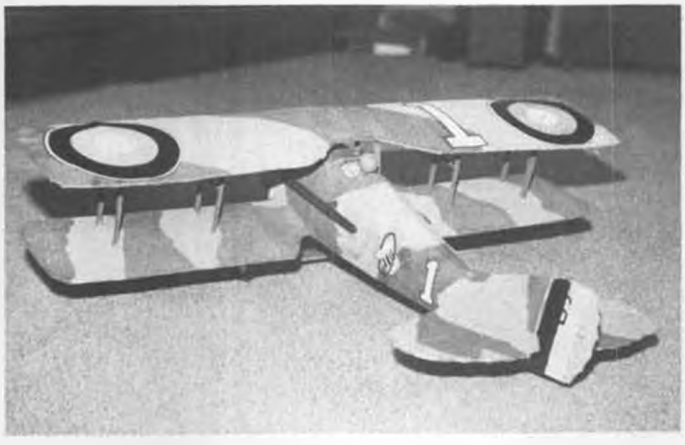
Hübsche Andrea Sabel, West Deutschland, mit ihrem Vater Bennos 1909 Grade Monoplan. Which, for those who don't speak German, means "Pretty Andrea Sabel, of West Germany, with her father Benno's 1909 Grade Monoplane."



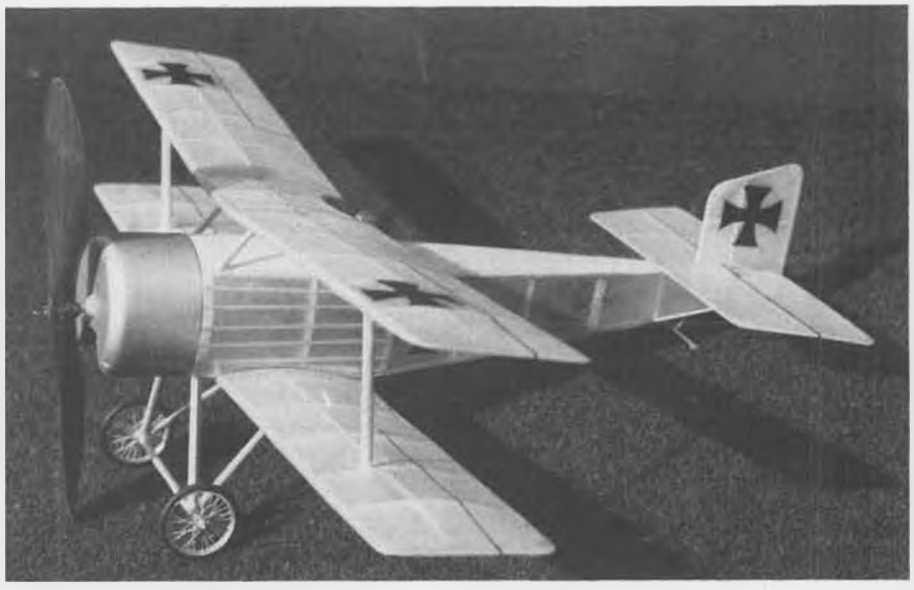
A simple, yet ingenious form of clamp by Herb Kelley. Two common pins are bent, then soldered or epoxied together. Perfect for holding longerons or stringers during construction.



Richard Allen's idea of an "Extended Scale" P-26A. See text for his thoughts on this proposed scale category.



An electric Round-The-Pole model Spad by Jack Corkhill, of Scotland. This form of flying is quite popular in the U.K. because of small space requirements and quiet operation.



PHOTOS BY FUDO TAKAGI

PEANUT SCALE + EULER D-2 +

By WALT MOONEY . . . Walt had problems with his Fokker Triplane, but his Euler D-2 flies well enough to compete against larger models.

• Sometimes our plans do not materialize in spite of our best efforts and considerable sweat and toil. Does this model look like the prototype Fokker Triplane that appeared in the March issue of **MB**? No, it doesn't, but the Euler D-2 will really fly, and that #%**@¢@@$ Fokker Triplane Prototype that was intended for this month's article really doesn't want to fly. It's not that I didn't try to fly it, it's that no matter how hard I tried, it would not meet my standards for a publishable model.

With a rubber motor, it was tail heavy. When weight was added to the nose it would be too heavy to fly. When more motor was added it needed more nose weight, etc., etc., until the motor run was drastically reduced by the number of strands and the model was relatively violent.

The obvious solution was to install one of Bill Brown's superb CO_2 motors. By installing all of the components as far forward as possible, the center of gravity problem was solved. Pitch stability was satisfactory. Lateral stability was divergent and the model would slowly roll to the left while flying in a straight line. On low power takeoffs it would hit on the left wing and cartwheel. On higher powered flights it actually rolled inverted before it hit. Aileron would cure the power-on roll to some extent, only to be replaced with spiral dives to the right. Finally we resorted to an old trick and filled the cabanes with plastic, but obtained no significant improvement. As a last resort, the wings were rebuilt with dihedral. The directional stability became inadequate and the model would spin in unexpectedly. The amount of increase in rudder size, coupled with the dihedral, was enough to make Reinhold Platz turn over in his grave, so I gave up and looked for a WW-I airplane with more flying potential for this article. Best flight time with the Fokker, rubber powered, was less than seven seconds. With CO_2 power, best time was less than 20 seconds with a tail spin into the ground.

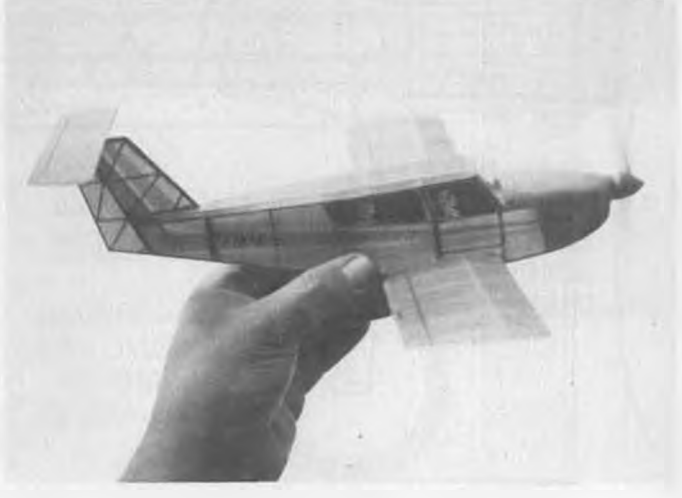
I'm reminded of a statement by a very experienced aerodynamicist who said, "The difference between an airplane and a helicopter is simply that an airplane wants to fly, and a helicopter wants to crash!" On that basis, I classify the Fokker Triplane Prototype Peanut I built as a helicopter. Forgive me, Frank, Stanley, and Igor.

The Euler D-2 is one of the few WW-I biplanes that was equipped with a rotary engine and that had a reasonable nose length. It also had a reasonable vertical tail size. The only changes from exact scale on the model are an increase in size of the horizontal tail and the addition of a small amount of dihedral. The model as built flew very well, and on its first outing managed to take second in the Flightmasters WW-I flyoff. The other models were all larger rubber models, so the Euler D-2 is able to compete fairly well.

The Euler construction methods follow pretty standard practice in almost every respect. The flight surfaces (wings, horizontal tail, and rudder) are built directly over the plans. The top wing is identical to the bottom wing except that there is a cutout at the center in the trailing edge. The fuselage is a box structure, and the sides are assembled directly over the plan. They are then removed from the plan, separated, and then cemented together at the aft end. Cross pieces are then added between the top and bottom longerons at each of the uprights. Use the top view of the fuselage to determine the length of each cross piece. The fuselage tapers from almost a knife edge at the aft end to a maximum width of the basic structural box at the back of the cockpit. From this point forward, the fuselage structure is the same width. Top formers are added at A, B, C, D, E, and F. Side formers are added at G, H, I, and J. The top decking is 1/32 sheet balsa (the raised portion of the decking directly forward of the

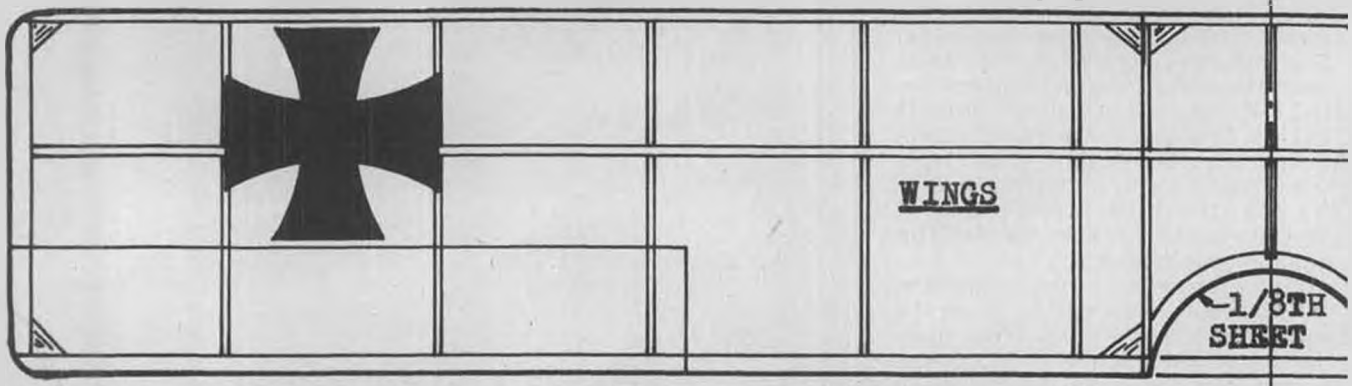
Continued on page 81

Walt's prototype Fokker Triplane gave him fits trying to trim it to fly, finally gave up. He calls it the "Fokker Flop".

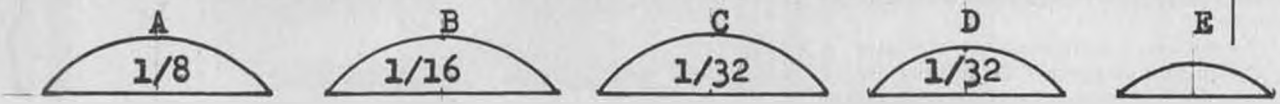


Next month's Peanut is something a little more contemporary, a Bellanca Aries that really performs well.

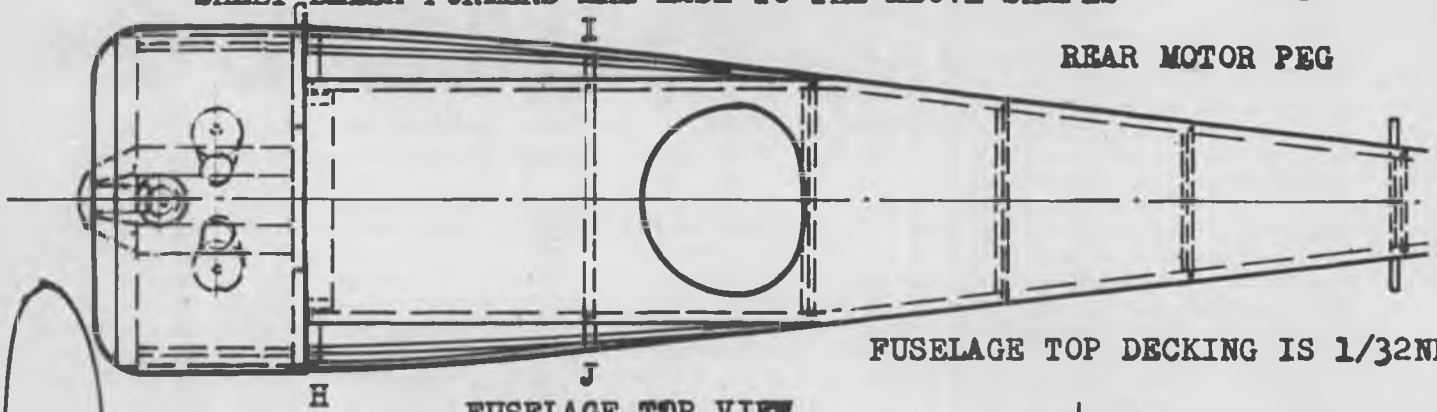
MAKE WING LEADING AND TRAILING EDGES FROM 1/16 BY 3/32 BALSA STICKS.



TOP AND BOTTOM WINGS ARE IDENTICAL EXCEPT FOR THE CUTOUT IN THE TOP



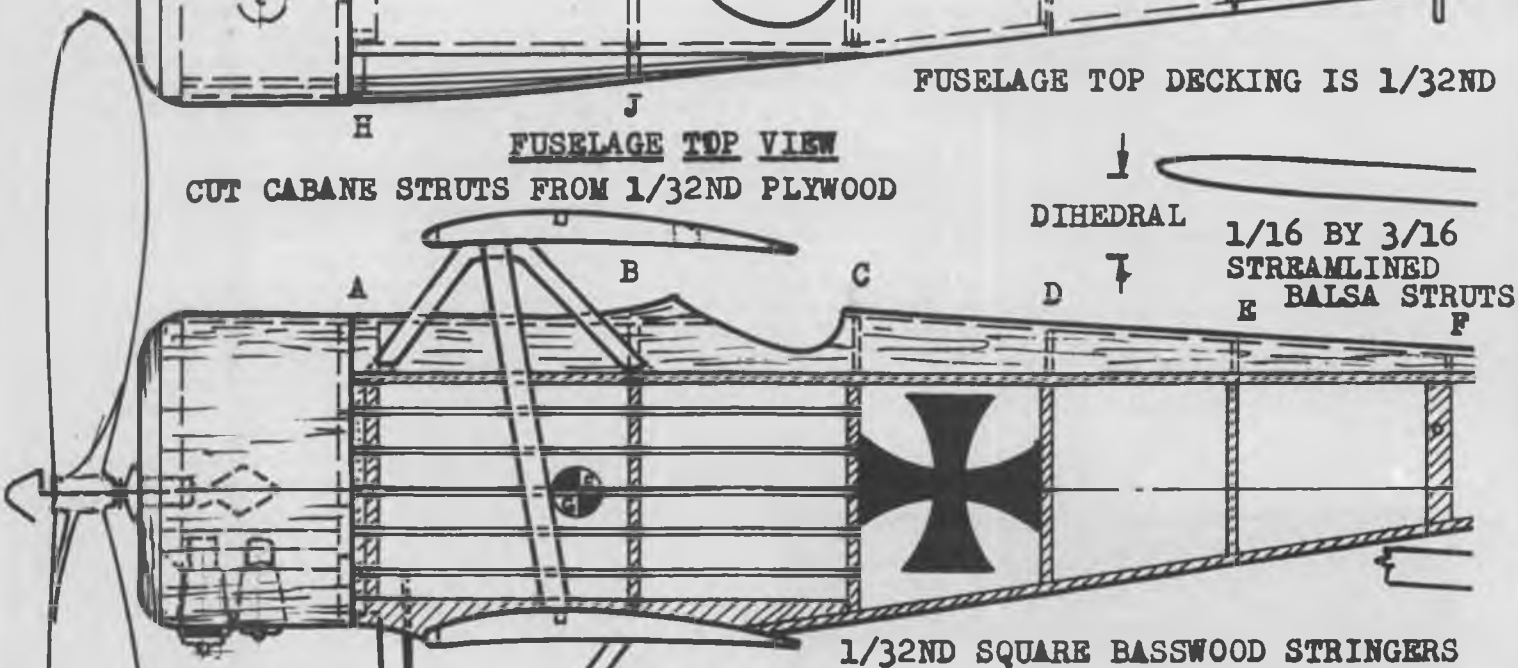
SHEET BALSA FORMERS ARE MADE TO THE ABOVE SHAPES



FUSELAGE TOP DECKING IS 1/32ND

FUSELAGE TOP VIEW

CUT CABANE STRUTS FROM 1/32ND PLYWOOD



1/32ND SQUARE BASSWOOD STRINGERS

PECK PLASTIC PROP AND THRUST BUTTON ARE USED.

SIDE VIEW

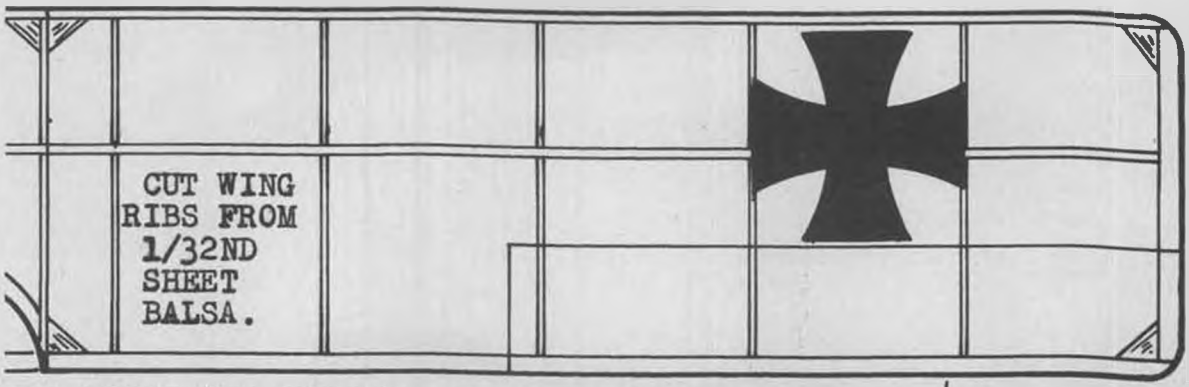
HUNGERFORD WHEELS ARE SUPERB ON THIS MODEL

BUILD TWO FUSELAGE SIDE FRAMES SQUARE. ALL UPRIGHTS AND CROSS UPRIGHTS AT A AND AT F ARE 1/16

THE ENGINE COWL AND THREE DUMMY BLOCK UNIT. MAKE IT REMOVABLE USE 1/16 BY 1/8 BALSA STICKS TO INTO THE FUSELAGE STRUCTURE AT

EULER D-2 A WWI BIPLANE PEANUT BY

USE HARD BALSA FOR THE LEADING EDGE.



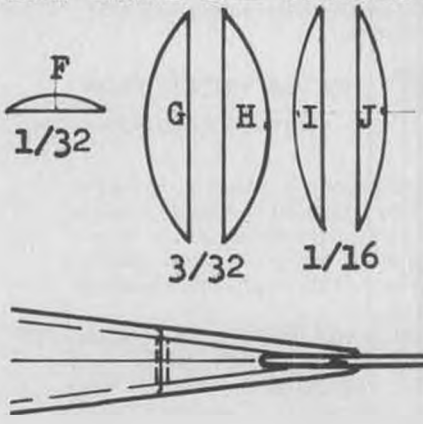
USE 1/16TH BY 1/8TH FOR THE WING TIPS.

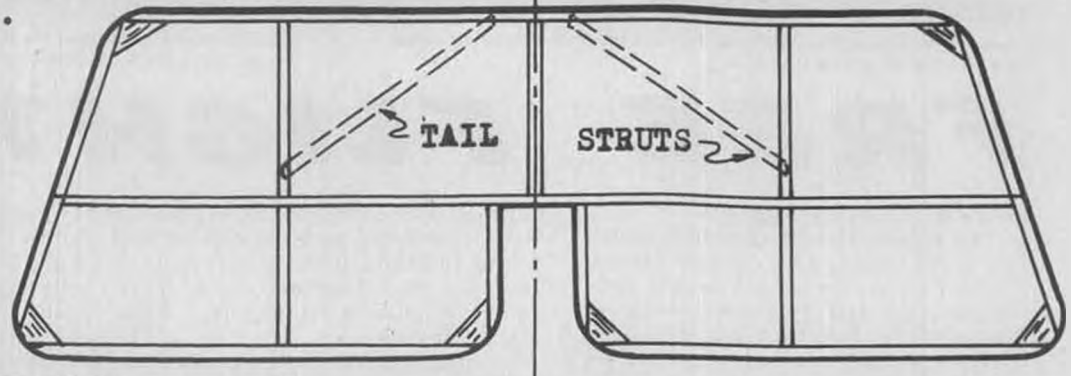
1/20TH SQUARE FOR WING SPARS.

1/16TH SHEET FOR ALL GUSSETS.

AILERON OUTLINES ON ALL WINGS.

WING ABOVE THE COCKPIT.

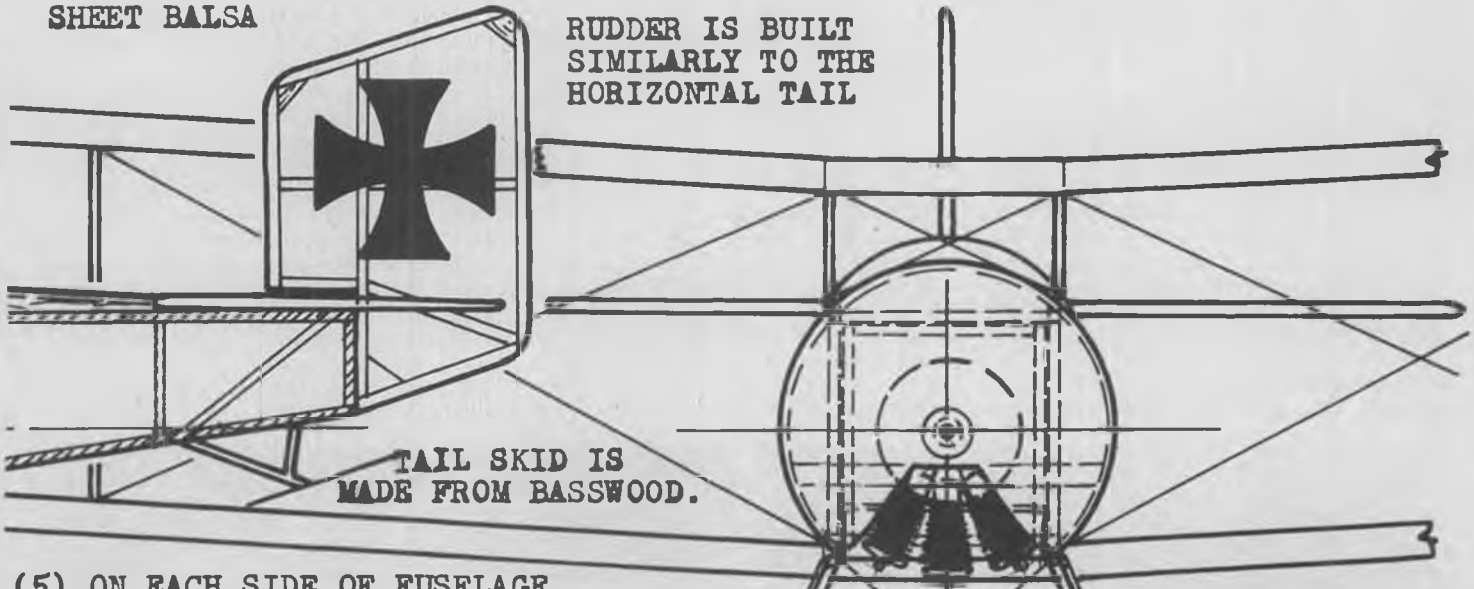




ASSEMBLE THE HORIZONTAL TAIL DIRECTLY OVER THE PLAN USING PIECES THAT ARE 1/16TH THICK BY THE DIMENSIONS SHOWN.

SHEET BALSA

RUDDER IS BUILT SIMILARLY TO THE HORIZONTAL TAIL



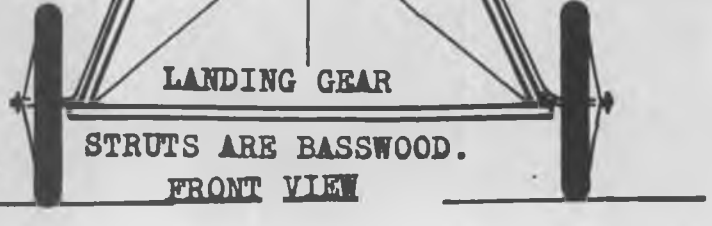
TAIL SKID IS MADE FROM BASSWOOD.

(5) ON EACH SIDE OF FUSELAGE.

OVER THE PLAN. LONGERONS ARE 1/16TH PIECES ARE 1/16TH SQUARE EXCEPT THE TH BY 3/16TH

CYLINDERS ARE BUILT AS A NOSE FROM THE FUSELAGE AT FORMER A. MAKE A PLUG FITTING SNUGGLY A.

LANDING GEAR WIRE IS CEMENTED INTO THE FUSELAGE, BUT NOT TO THE STRUTS.



STRUTS ARE BASSWOOD.

FRONT VIEW

Walt Mooney 02-03-79

Ken Phair firing up his FAI ship. His was the only flapper to make official flights at Taft FAI Finals.

Mike Achterberg finished his FAI model the day before the FAI Finals. Note the high aspect ratio wing.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

NOSTALGIA EVENT UPDATE

Last month, I wrote about the nostalgia event spawned by the San Valeers' Ralph Prey, for free flight designs published in the 1946-1956 era. It looks like this event has caught everyone's imagination, as these letters from Ralph show:

"I have received tremendous response to the Nostalgia event idea, and the fellows are getting their Johnson .29's and .35's out of the closet. They are also asking when the first contest will be, plus lots of other interest in the subject. The first big contest featuring the Nostalgia event will be the San Valeers Annual, May 5 and 6.

"With regard to your comment about other categories (I'd asked Ralph about engine runs for Category 2 sites. TH), such as 3-minute maxes, quite frankly we never gave it a thought. Everyone was thinking in terms of the AMA rules in effect at the date of the Civy Boys, and some even wanted unlimited fly-offs, or progressive flyoffs. I couldn't see that, and held for the same max in the flyoff. I know I'd hate to be in a flyoff and have to make an unlimited flight. I chase by myself and I just can't handle flights in thermals over 6 minutes. When Walt or Dave were flying with me and we had the big Triumphs, then it wasn't quite so bad. Even then, it can get hairy with two on a bike chasing an unlimited flight. Ask the Texaco fliers.

"I suppose that they (Category 2 fliers) could set any engine run they desired and do the same with the max, depending on the size of the field." (Bob Stalick has suggested 12 seconds hand launched and 15 seconds ROG or VTO for Category 2 Nostalgia events with 3 minute maxes, which sounds good for a start, considering the performance of models of that era.)

A week or so later, another letter arrived from Ralph, with further news:

". . .It's official, Nostalgia events will be flown at this year's U.S. Free Flight Championships! At the Association meeting last Saturday, I had visions of a selling job to other clubs to include Nostalgia. But instead, when I arrived, everyone was talking about what they were building for the event, and it was a foregone conclusion that it would be flown. I'm excited about it all! Got a letter from John Pond, with a list of plans that he has for Nostalgia eligible models. I'm putting out the Satellite this week and will include a list of eligible models. I also got a list from Bill Booth, Jr., who is all wrapped up in the event too, and like you, he pored through old magazines for designs.

"Nostalgia will be flown on Monday, May 28. All 3 events (1/2A, AB, CD) will be flown, with trophies through third place for each event. All age groups will be combined. I'll be the Event Director, so if anyone has any questions, you can refer them to me (4859 W. 97th St., Inglewood, CA 90301). The announcements for the USFFC will include a synopsis of Nostalgia rules.

"Now then, about your comment on the use of auto surfaces in Nostalgia models. They are acceptable *provided the original model used auto surfaces.* In the rules, we indicate that the model must conform to the original planform, and if the original model used auto surfaces, then it is perfectly legal to use them. (Fact is, the model would not be eligible if it *didn't* use them.) We wanted to rule out the use of auto surfaces on those models that were designed not to use them. I hope this clears up that issue.

Howard and Marty Phillips struggle with the honkin' O.S. in their Starduster at 1978 Power Bash.

Buddy Tenny at the Nats with his 1 gram FAI microfilm job. Note the built-up tailboom. Dave Linstrum photo.

"John Pond wrote that he is building Sal Taibi's Spacer with a Torp .23. Other models under construction are about 6 sizes of Civy Boys, numerous Ram Rod 250's from kits, a Ramrod 1000 with Torp .35, 2 Zeeks, and who knows how many others are in the planning stage."

From the description of all this activity down South, it would seem that the Nostalgia event is well and truly launched. The Willamette Modelers Club is probably going to run the event at our Old Timer Annual this year, so the idea is spreading.

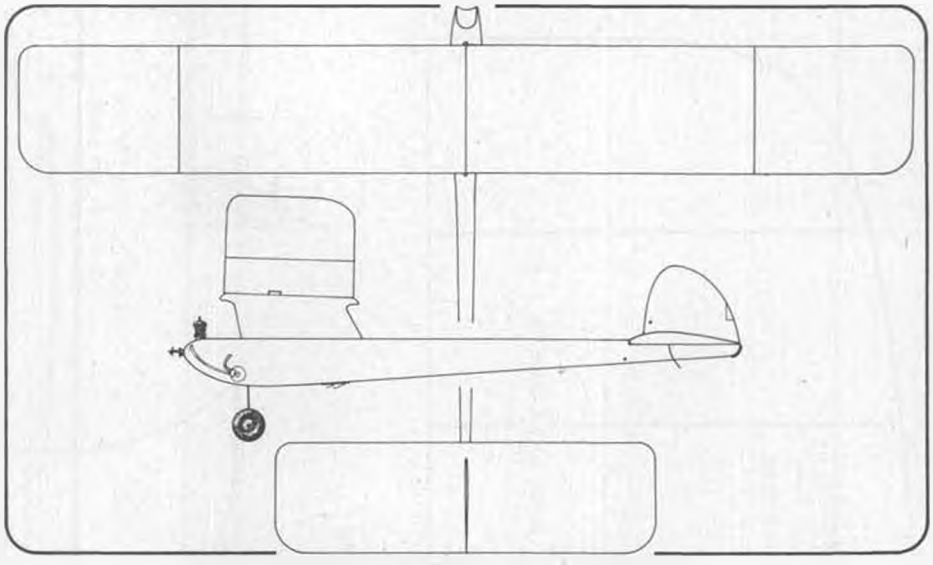
MULVIHILL, ANYONE?

Sandwiched in between Ralph Prey's letters was an arrival from Bob Meuser, also with information about a special event at the U.S. Free Flight Champs. He included a copy of the official Rules, Regulations and Qualification criteria for the Second Annual Intergalactic Unlimited Mulvihill Invitational Championships. This will be held on Saturday, May 26, at the ungodly (Meuser's words) hour of 6:00 to 6:20 a.m. This is a one-flight event, with no maximum flight time. Only model restrictions are that flying surfaces must be covered on both sides (I assume Bob means top and bottom), the rubber motors must be fully enclosed, and the model must weigh a minimum of 70 grams with rubber or 40 grams without rubber (contestant's choice of which weight he wants to meet). Timers may use optical aids.

Advance entry, mailed to the Event Director (Bob Meuser, 4200 Gregory St., Oakland, CA 94619), is advised. Just mail him $2. Be careful, however, that you meet the Qualification and Invitational Criteria: "The contestant, or a close relative or associate, must be a member of the species *Homo sapiens*. Contestants must be alive (i.e. not legally dead, according to the statutes of the State of California, and appropriate interpretations of the Courts). Exceptions will be considered, but must be approved by the Event Director, or someone else. Only those who meet the above qualifications are invited to participate, as are those who neither qualify nor fail to qualify."

Sounds like a high class of entry is expected.

Clarence Haught checks the engine run on his 1/2A bird at 1978 Power Bash.



MYSTERY MODEL FOR MAY

MYSTERY MODEL OF THE MONTH

This is an example of the older FAI models that would make an excellent entry in the Nostalgia event. It was designed by a former U.S. Team member, and originally flew with a Torp .15. The square lines make for easy building, and the construction article claimed that the model made beautiful ROG's. Got it now? Send your entry to the **MB** office to see if you've won a subscription with your guess!

CHEAP THRILLS REVISITED

About a year ago, I wrote about the possibility of cutting the costs of flying gas free flight by utilizing the older, cheaper engines that have been around for a while. Apparently, this started some people thinking, and Bob Stalick passed on to me a letter from Vince Ferrarese, of Michigan, who extended my thoughts to the smaller size engines (I hadn't realized that TD .049's were pushing the $20 price level; more, if you have any rework done). Vince says:

"I have one more aspect of this subject I want to present. Juniors and other beginners around here have Cox ready-to-fly models powered by the front half of a Babe-Bee (technically, the Cox 290 engine. TH). Properly broken in, these motors run well (considering cost, etc.). Goldberg makes a mounting bracket so those motors can be taken out of the Cox plane and mounted on anything. Without the Babe-Bee tank assembly, they are significantly lighter. Teamed with a Mini-pearl or similar model, and properly built and trimmed, this motor could compete with most of the Tee Dee powered logs usually entered by Juniors.

"I think it would be far more satisfying to a beginning free flighter to enter this kind of 1/2A ship than the usual 'Junior' event, hand launched glider. I won't bore you with my views on HLG, except to say it is probably the least 'beginners' event flown outdoors, and that includes

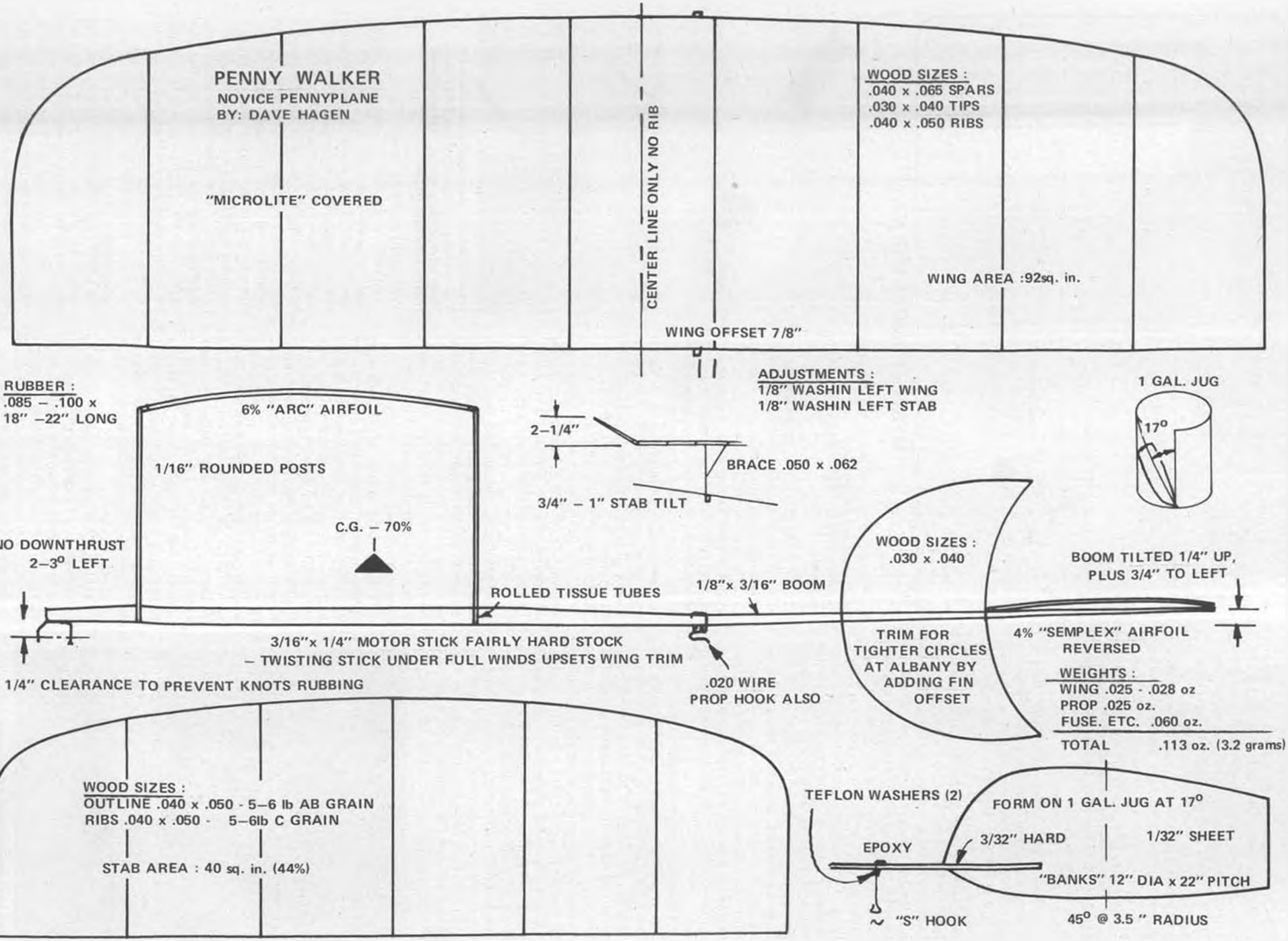
Doug Galbreath launches his Summerwind FAI model at ill-fated Hastings FAI Finals. Made team 2 years later at Taft with same model. Linstrum photo.

Wakefield and FAI Power."

I think Vince has an idea that might lead to a new gas event. Call it "1/2A Sportsman". Limit the engines to reed-valve types used in plastic ready-to-fly control line models since 1960, or plain bearing engines to .051 displacement with the exception of the TD and Holland Hornet. Use a 15-second engine run and 3-minute maxes. Have 5 flights so there's plenty of flying involved.

This kind of event would give the free flight beginner a real chance against the experts who might try it. It would provide a good power matchup for most of the kits that a beginner would be likely to run into on a hobby shop shelf: Goldberg's Blazer, Midwest's Fubar, Sig's Ramrod 250, Witchdoctor, and Sal Taibi's Starduster, to name a few. And the more modern, limited-circulation kits like Clemcraft's Okie Bird, RM's Maverick, or the Mini-pearl are about the right size for this amount of power.

Continued on page 95


PENNY WALKER
NOVICE PENNYPLANE
BY: DAVE HAGEN
"MICROLITE" COVERED
CENTER LINE ONLY NO RIB
WOOD SIZES :
.040 x .065 SPARS
.030 x .040 TIPS
.040 x .050 RIBS
WING AREA :92sq. in.
WING OFFSET 7/8"
RUBBER :
.085 – .100 x
18" –22" LONG
6% "ARC" AIRFOIL
1/16" ROUNDED POSTS
C.G. – 70%
NO DOWNTHRUST
2–3° LEFT
1/4" CLEARANCE TO PREVENT KNOTS RUBBING
2–1/4"
BRACE .050 x .062
3/4" – 1" STAB TILT
ADJUSTMENTS :
1/8" WASHIN LEFT WING
1/8" WASHIN LEFT STAB
1 GAL. JUG
17°
ROLLED TISSUE TUBES
1/8"x 3/16" BOOM
3/16"x 1/4" MOTOR STICK FAIRLY HARD STOCK
– TWISTING STICK UNDER FULL WINDS UPSETS WING TRIM
.020 WIRE
PROP HOOK ALSO
WOOD SIZES :
.030 x .040
TRIM FOR
TIGHTER CIRCLES
AT ALBANY BY
ADDING FIN
OFFSET
BOOM TILTED 1/4" UP,
PLUS 3/4" TO LEFT
4% "SEMPLEX" AIRFOIL
REVERSED
WEIGHTS :
WING .025 - .028 oz
PROP .025 oz.
FUSE. ETC. .060 oz.
TOTAL .113 oz. (3.2 grams)
WOOD SIZES :
OUTLINE .040 x .050 - 5–6 lb AB GRAIN
RIBS .040 x .050 - 5–6lb C GRAIN
STAB AREA : 40 sq. in. (44%)
TEFLON WASHERS (2)
FORM ON 1 GAL. JUG AT 17°
EPOXY
3/32" HARD
1/32" SHEET
"BANKS" 12" DIA x 22" PITCH
"S" HOOK
45° @ 3.5 " RADIUS

No, folks, it doesn't fly! This is the sophisticated ground-based C/L trainer developed and built by Obie St. Clair, the man who *really* invented C/L.

Arlie Preszler with one of his excellent stunt ships. Finish on wings is plastic film, but looks like paint, it's that well done.

PHOTOS BY AUTHOR

Control line

By "DIRTY DAN" RUTHERFORD

• In last month's column, there was quite of bit of material (a whole column, in fact) devoted to Dirty-Blasting the AMA and *Model Aviation* magazine. This month nothing will be said, except. . .

It seems that the leaders of AMA keep telling us members that we are the AMA. And that the AMA is charged with keeping its members informed of what the AMA is thinking and doing. Now, if we really are the AMA, why is it that none of the official AMA documents, including *Model Aviation*, see fit to include mention of the problems pointed out by members? To read the stuff coming out of AMA Headquarters, you would think that everything is rosy and just coming along wonderfully. A number of the newsletters I read each month say differently. When will these dissenting points of view come out of the UNS (Underground Newsletter System) and be dealt with in the open by our AMA's system of communications that presently seems to be used to keep us pacified instead of informed and involved?

N.W.S.R.

Yes, Northwest Sport Race one more time.

This event, originated and followed through on by Mike Hazel, has evolved into the most popular C/L racing event now flown here in the N.W. Before getting into details on how it is handled, it seems logical to include the complete set of rules we use.

NORTHWEST SPORT RACING RULES

1) It is the intent of this event to provide a racing class to the novice competitor in which he will be on a more equal basis, using sport type planes and engines which are easily available to all modelers.

2) Aircraft: Models shall be constructed from stock commercially-available kits. Kits shall be similar to the following: Mongoose, Flite Streak, Ringmaster, Banshee, Shoestring, Buster, Yak-9, etc. The kit shall be of the .35 engine size. Modifications to the model, such as reduced wing area, removal of rudder, etc. are not allowed. However, some modification may be made to the nose of the model in that material may be added or substituted for added strength. Landing gear construction is optional from what may be included in the kit. Landing gear requirements are: Minimum of one wheel, minimum size of wheel(s) shall be two inches. Models must ROG, except in the case where the event director may permit hand launching because of unsuitable flying site.

3) Engine: Limited to standard plain-bearing, single-bypass types. Maximum size is .36. No Schnuerle, PDP, or special

Continued on page 78

Photogenic Howard Rush, famous engine demolition expert and designer of the Nemesis II.

Joe Kall and his record-holding Formula 40. Inverted K&B .40 and half-pan construction.

Earl Moorehead learning to fly C/L on the ground-based trainer shown above.

Roger Lloyd, of Mesa, Arizona, launches his 1/2A Starduster 350 for a max. Most of the activity was in C/L.

Ken Kear, also of Mesa, Arizona, launches his .020-powered Super Starduster for an official in Sport Scale.

PHOTOS BY AUTHOR

SOUTHWEST REGIONALS

By JOE KLAUSE . . . Our 1/2A "Fuel Lines" columnist presents a mini-report on the C/L activity at the Southwest Regional Model Airplane Contest, an annual event that's always well attended.

● The dates: January 20th and 21st. The place: The airport at Buckeye, Arizona. The weather: Clear, albeit a bit chilly in the early morning hours. The bastion of contest activity was control line. There were 53 contestants who entered 130 events. That's not too shabby by any standard! In fact, a contingent of Texans came a thousand miles from the Dallas area. The Albuquerque, N.M. and Southern California areas were also quite well represented. Here are some of the results:

RAT RACE (5 Entries)
1) Bill Lee 5:06.7
2) Charlie Johnson 5:26.6
3) Phil Shew 5:40.2

SCALE RACE (12 Entries)
1) Bob Smedley 6:59.8
2) Les Pardue 7:11.8
3) Fred Malone 7:32.8

SLOW RAT (11 Entries)
1) Bill Lee 5:56.9
2) Larry Miller 6:12.0
3) Dave Braun 6:45.2

ARIZONA SLOW RAT (14 Entries)
1) Mike Gale 6:52.8
2) Dave Braun 6:55.7
3) Phil Shew 7:24.1

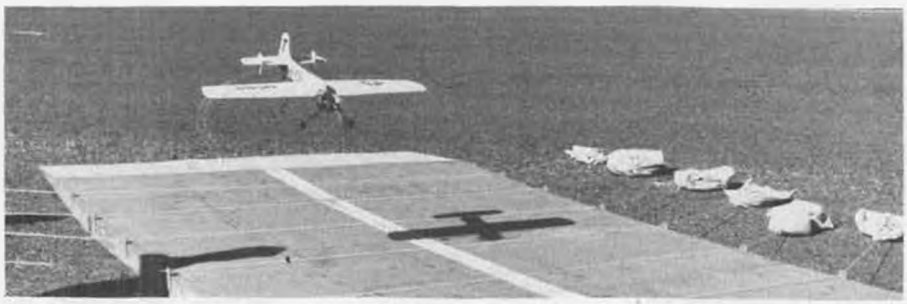
SOUTHWEST BIG GOODYEAR (27 Entries)
1) Joe Klause 6:48.6
2) Mike Gale 7:24.4
3) Rich Cunningham 7:35.6

PRECISION AEROBATICS (10 Entries)
1) Bob Whitely 557
2) Jim Armour 541
3) Paul Walker 515

PROFILE CARRIER (12 Entries)
1) Fred Malone 227.87
2) Bob Reynolds 218.79
3) Ted Edwards 212.38

Other events included Mouse Race, Slow Proto Speed, Sport Scale, Class I and II Carrier, and FAI Team Race.

In summary, it was a fine contest in all respects. As control line director Bob Reynolds said, "There were no conflicts, arguments, or cuss words that I heard. A most remarkable contest." ●



Chuck Wood's profile carrier ship about to snag a wire. Chuck hails from Clovis, N.M.

The S.W. Regionals must be rich! Look what they use for carrier arresting wire weights!

Bill Lee, C/L Speed columnist for *Model Aviation*, cranks away on the cantankerous engine in his Rat.

Gordon Davies, of Phoenix, Arizona, did a nice job on this O.T. Powerhouse. That's an Ohlsson .60 up front.

PHOTOS BY FUDO TAKAGI

DORNIER Cs2

By WALT MOONEY . . . Another obscure design from the Ol' Professor, this one for CO_2. As is typical with his models, it's a fine flier.

• Here is a CO_2-powered flying boat model that will consistently take off from the water unassisted and put in smooth, stable flights. The model as shown weighed two and a quarter ounces, and has been modified from exact scale in two ways to enhance its flying stability and hence its flight capability. It took first place in the CO_2 event at the Flightmasters Seaplane contest on two different occasions. Takeoffs are smooth and beautiful, and landings are a joy to behold.

The two deviations from scale are an increase in horizontal tail size and the addition of dihedral to a wing that was originally perfectly straight. These changes were made because it was felt that taking off the water with a nice-flying model was enough of a challenge without the added problem of having a design that was hard to trim.

The original model had a Brown Junior single-cylinder engine installed as shown on the plan. It works very well in warm weather, but because the tank is completely enclosed in the body in the interest of watertightness, it also has very little air to provide the heat needed to vaporize the carbon dioxide in the tank. As a consequence, in cool weather the model is not likely to give you one flight right after the other. It takes a little time to heat up the air inside the body between flights. A provision for ventilating the hull could reduce the necessary wait between flights, but if the model gets dunked by a big wave or by blowing over, the resulting wet inner fuselage will require a still longer time to dry out.

Two versions of the Dornier were built. The first was modified by Dornier with a longer nose and higher rudder, and both versions were modeled. Both take off well, but the longer nose and increased rudder area is a distinct improvement.

The pilot of the Dornier sat right behind the engine (how he saw anything forward from this position is beyond me, but in those days there was almost nothing else in the air, especially over the oceans, so maybe it didn't make any difference anyway). It does make an ideal place to position the filler fitting for the engine installation. It is strong, not too conspicuous, and is easy to hold onto while the fuel is being replenished.

Closeup of the nose on the Dornier. Note how the tank filler is hidden in the pilot's head.

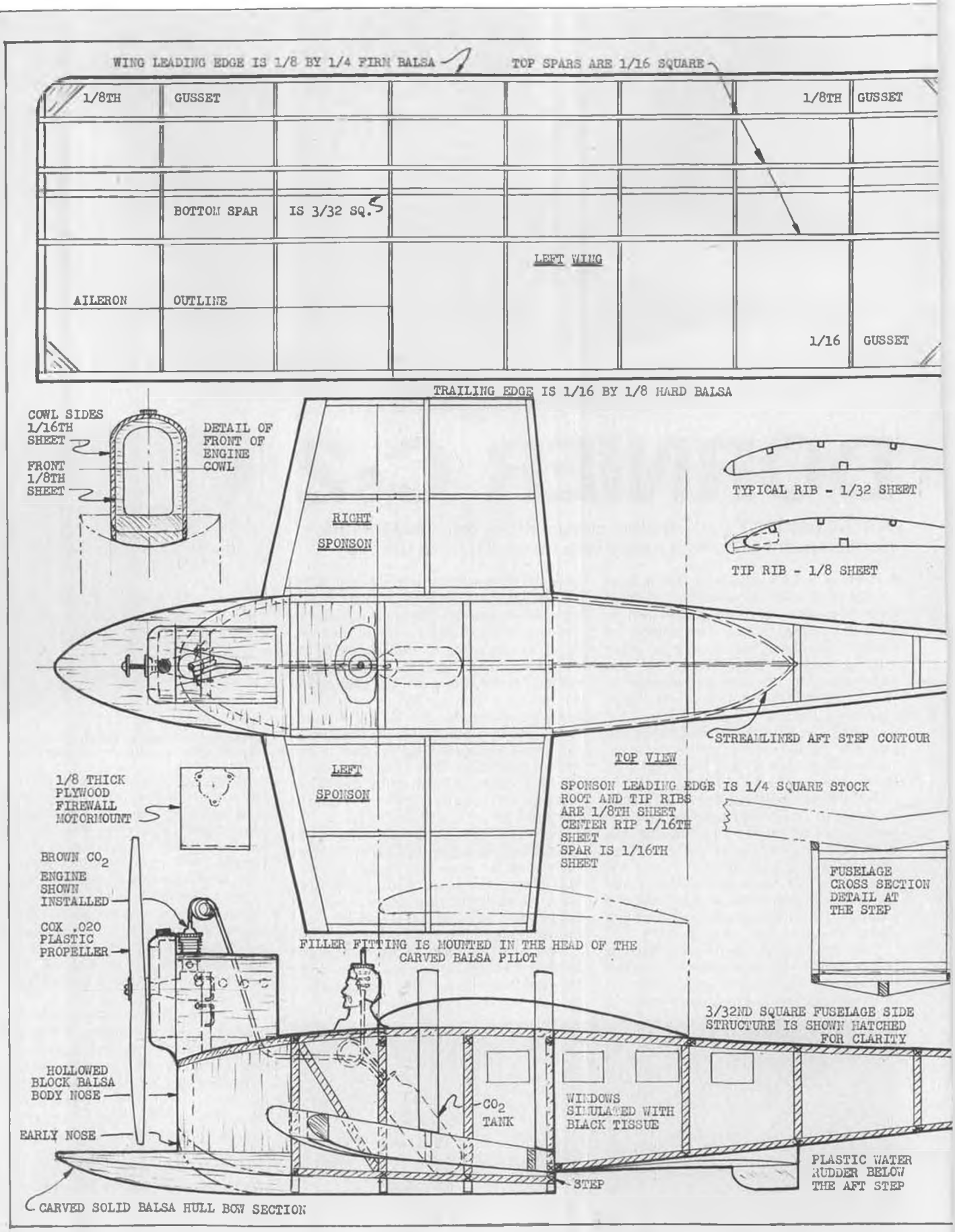
The propeller that was used for all the flights was the silver plastic Cox gas engine .020 propeller. This worked well, but I suspect a higher-pitch, broader-bladed propeller would work even better. Experiment and see what works best for you.

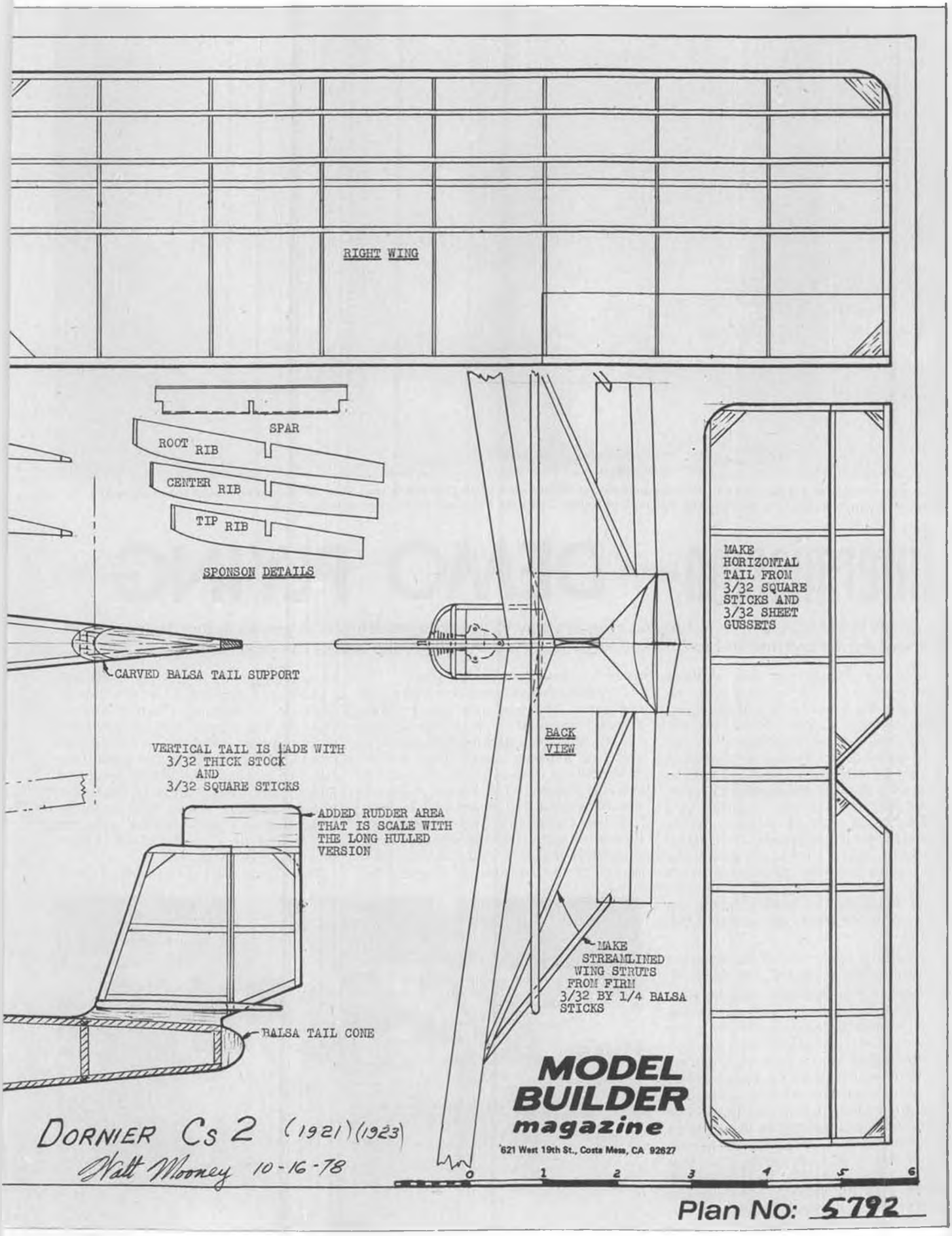
Constructing the structure of the model is very simple. Only a few details need special consideration. All edges of the bottom surfaces of the hull and other parts of the airplane that come in contact with the water should be sharp. DO NOT, I repeat DO NOT sand any of the bottom longerons, steps, or sponson trailing edges even a little rounded. Doing so will prevent the model from taking off. The above statement goes for *any* seaplane, not just this one.

The location and angle of the sponsons is important. The plastic water rudder is important also. A free flight seaplane that swerves during the takeoff

Continued on page 77

The later version of the Dornier has more rudder area and an extended nose, makes for improved takeoff and flight characteristics. Both versions fly very well.


WING LEADING EDGE IS 1/8 BY 1/4 FIRM BALSA
TOP SPARS ARE 1/16 SQUARE
1/8TH
GUSSET
1/8TH
GUSSET
BOTTOM SPAR
IS 3/32 SQ.
LEFT WING
AILERON
OUTLINE
1/16
GUSSET
TRAILING EDGE IS 1/16 BY 1/8 HARD BALSA
COWL SIDES 1/16TH SHEET
FRONT 1/8TH SHEET
DETAIL OF FRONT OF ENGINE COWL
RIGHT SPONSON
TYPICAL RIB - 1/32 SHEET
TIP RIB - 1/8 SHEET
STREAMLINED AFT STEP CONTOUR
TOP VIEW
LEFT SPONSON
SPONSON LEADING EDGE IS 1/4 SQUARE STOCK
ROOT AND TIP RIBS ARE 1/8TH SHEET
CENTER RIB 1/16TH SHEET
SPAR IS 1/16TH SHEET
1/8 THICK PLYWOOD FIREWALL MOTORMOUNT
BROWN CO_2 ENGINE SHOWN INSTALLED
COX .020 PLASTIC PROPELLER
FUSELAGE CROSS SECTION DETAIL AT THE STEP
FILLER FITTING IS MOUNTED IN THE HEAD OF THE CARVED BALSA PILOT
3/32ND SQUARE FUSELAGE SIDE STRUCTURE IS SHOWN HATCHED FOR CLARITY
HOLLOWED BLOCK BALSA BODY NOSE
EARLY NOSE
CO_2 TANK
WINDOWS SIMULATED WITH BLACK TISSUE
PLASTIC WATER RUDDER BELOW THE AFT STEP
STEP
CARVED SOLID BALSA HULL BOW SECTION



DORNIER Cs 2 (1921)(1923)

Walt Mooney 10-16-78

Plan No: 5792

The author's five-year-old son, Johnny, watches as his Super Sleek Streek climbs for the rafters. This photo gives an idea of the number of people who can be exposed to modeling by this type of flying. Site is the Pan American Center in New Mexico.

Intermission — DEMO FLYING

By JOHN WOMACK, JR. . . . A fun and effective way to promote modeling is to put on indoor flying demonstrations during halftime at local basketball games. As shown here, the results can be surprising!

• How many times has your airplane club tried to think of new ways to promote this great hobby of ours, but without much success? Our club, the Mesilla Valley Model Airplane Club, has tried putting on shows in the local shopping center mall and giving talks to a few service clubs. As you might expect, these efforts have not resulted in a noticeable growth of interest in the hobby by the townspeople. Then about two years ago, we hit upon something that seems to have promoted much public interest in the hobby. Our gimmick? Flying indoor planes during the halftime of the local college basketball games.

Our club is really a fun club and is into everything. We all fly U/C, F/F, and R/C. But here in Southwestern New Mexico, our spring weather is so windy that we can't fly much outdoors during the season. Since we are limited on our outdoor sport, we thought we might try our hand at indoor flying. But where to fly, and what? We were fortunate enough to gain permission from New Mexico State University to use its large Pan American Center sports arena, which has a 60-foot ceiling. For our model, we selected the Sleek Streek as modified by Bill Warner and shown in his article, "Super Sleek Streek" (*American Aircraft Modeler*, June, 1971). Since we are at 4,000 feet altitude here in Las Cruces, we changed the design a wee bit more for maximum performance.

Our first fun-fly turned out to be really fantastic. Most of our Super Sleek Streeks managed to drag the 60-foot ceiling. We were getting between one and two minutes consistently. We all flew until our arms ached from winding. We also discovered that it was more fun watching our kids fly than us adult clods.

Robert Liefeld, the club member who helped us get started in indoor flying, suggested that we try to fly our new planes at the halftime of one of the basketball games in the Pan American Center. We decided to let the kids fly while the adults (bigger kids) did all the winding. That Saturday afternoon in the empty sports arena we trimmed our planes for the big show that night. One concern was how the planes would be affected by the building being full of people and the heater blowers operating. But we knew there was only one way to find out . . . and that was in front of a crowd of thousands.

Then came the big moment. As half-

One of the members of the Mesilla Valley Model Airplane Club launching his Super Sleek Streek from the end zone. Note the photographer on the right.

Johnny Womack keeps an eye on his Pennyplane during a halftime flying demonstration. The crowd loved it.

Robert Liefield used a lot of hot air during one of the trim sessions before the game.

time approached, we had all the planes wound and the kids ready; we knew we would have to work fast, as we were allotted only ten minutes for the entire show. The moment the announcer finished introducing us, the kids were out on the floor turning the planes loose. Boy, was that something to see, 20 to 25 little planes going everywhere at once! And the crowd seemed impressed. There would be a cheer each time two planes came close to each other, and a cheer every time a plane bumped one of the lights on the ceiling. As each plane came down, we would chase it and rewind it so the kids could launch it again. An added touch came when the organist spontaneously began improvising music to match the different flights. And the hit of the evening came when my son, Johnny, the youngest flier on the floor, at the age of five, turned in the best flight of the night, much to the pleasure of the crowd.

When halftime was over, we were all dead tired from chasing and fast winding, but we were more than pleased with the results. First of all, our worry about how the planes would perform under adverse conditions was completely unfounded. But even more important, the crowd had been so entertained by the show that they requested another show during the second game that night, a show we had not planned for nor expected. However, we were glad to do another show that evening. This time the announcer informed the public about the kind of planes we had and sources for them. Robert Liefeld had the announcer report that the hobby shops in town would have available kits and simplified instructions for modifying them. Then we put on the show again, apparently pleasing the audience, judging by their cheering and applause.

None of us really had much of an idea what the effect of our show would be, beyond the entertainment we provided.

You can imagine our surprise, then, when by the following Monday, a few hundred Sleek Streek kits had been sold through the hobby shops and variety stores! Not one single kit could be found on the shelves of the stores that week! The hobby shops had so many requests for the plane and information about our club that we held a special meeting for the purpose of teaching new kids how to build the kit. The indoor flying show had stirred up more interest in our club and in the hobby than all the other activities in the past.

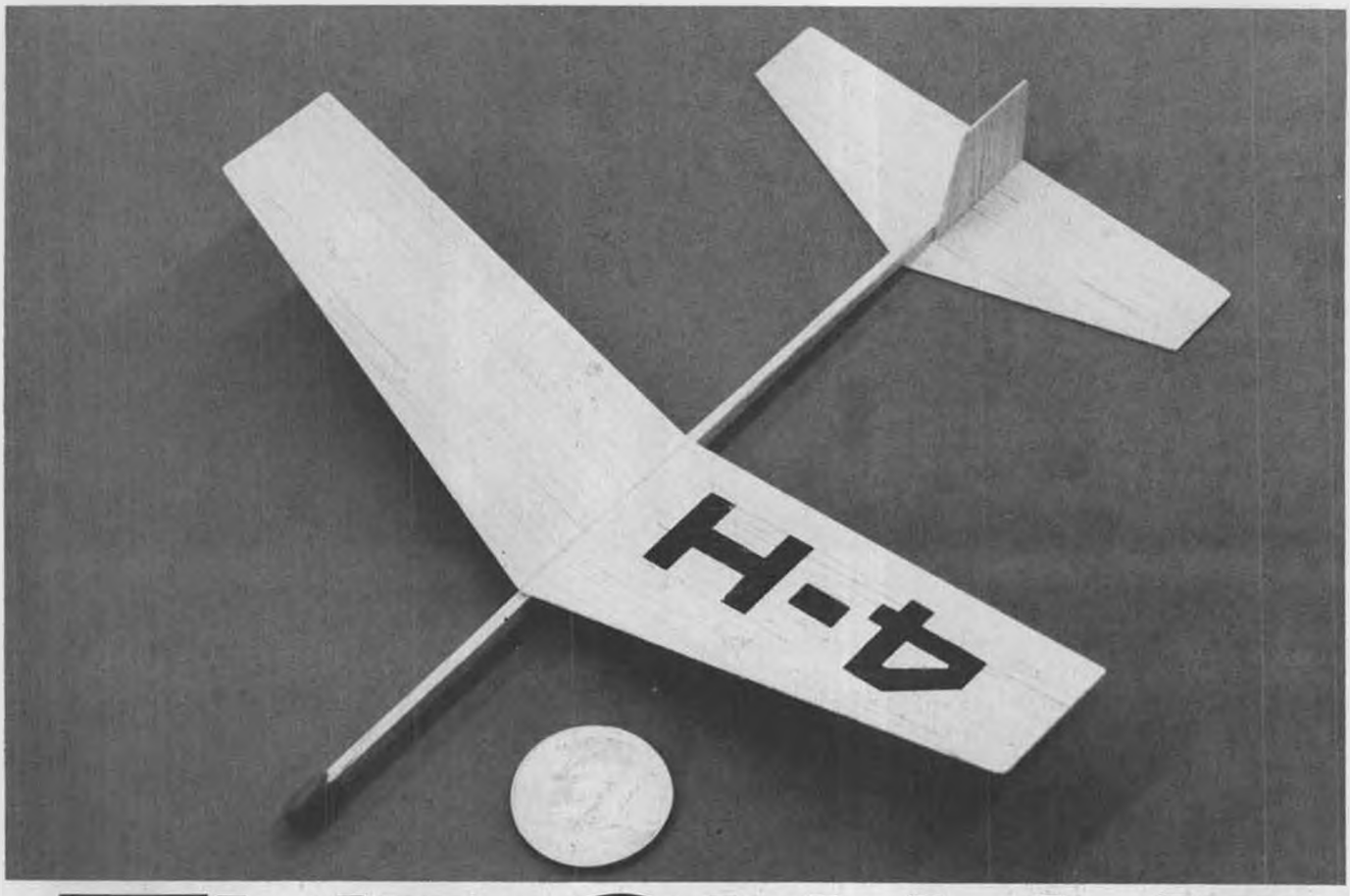
To our surprise, the next year, New Mexico State University asked our club if we would like to put on a flying show at several basketball games. No question, we agreed! For the new season we decided to fly the Sleek Streek again, plus a few of the so-called "Pennyplanes." Then came the task of building them. Can you imagine us U/C and R/C flyers, who are accustomed to building with rather large size wood, trying to build Pennyplanes? I won't go into the problems of heavy hands and too much epoxy; after a while, however, we got some of them built and flying. The shows that followed proved to be even better than the first. People couldn't believe

Continued on page 94

PHOTO BY JOHN DAVIS, LAS CRUCES SUN NEWS

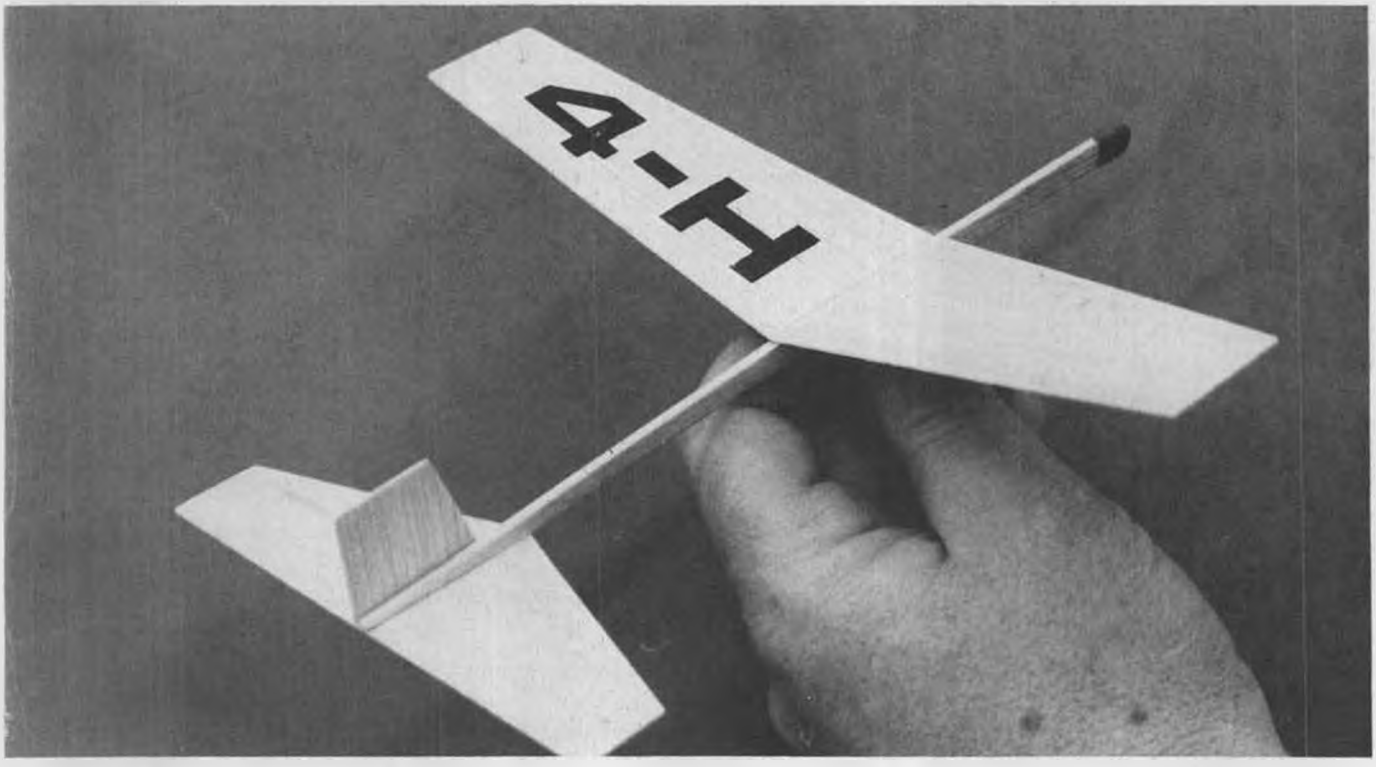
The basketball players might have had trouble finding the hoop, but the modelers didn't!

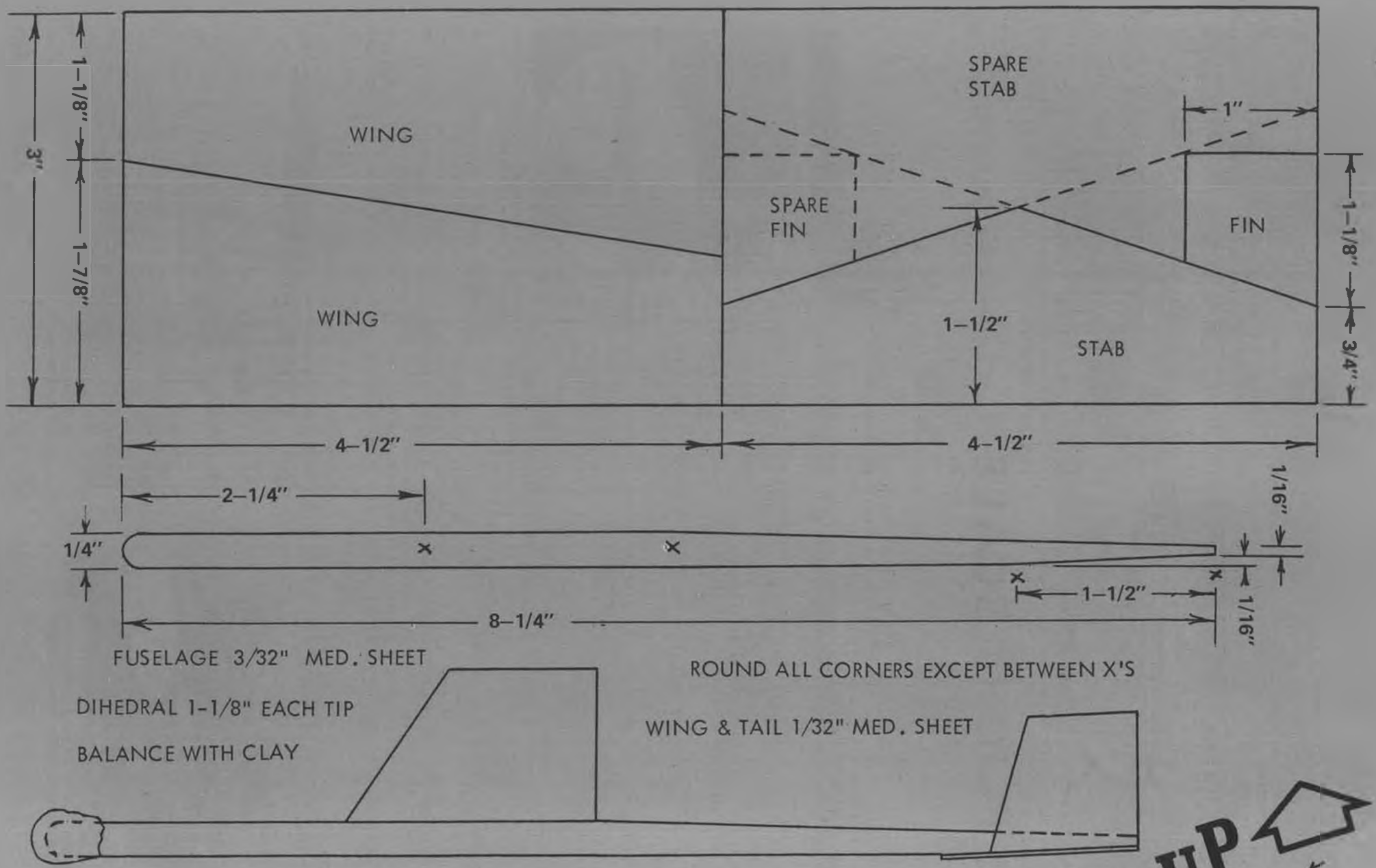
Johnny Womack is the picture of concentration as he launches his Super Sleek Streek.



THROW UP

By KEN SIMPSON . . . A 4-H Aeronautics Project named for the first and most repeated launch instruction given to young builder/fliers. So simple to build and fly, no written instructions are necessary.





Designed and drawn for the Ozaukee County, Wisc.,
4-H Aeronautics Project by Ken Simpson.

Throw UP

Larry Hutchens with his super-light Farman Mosquito. Plane did over a minute, was later destroyed by a gust.

Kingsley Kau's beautiful Waco E rubber scale job. Expertly finished, but a bit hard to get trimmed.

PHOTOS BY AUTHOR

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Last month, I discussed wing construction in some detail. Well, there are almost as many ways to attach wings to a fuselage as there are ways to build them. Let's discuss the most common ways, and a few that are not so common. Probably the least desirable but easiest to do is the butt fit. In other words, just gluing the wing half onto a fuselage side, be it for a high, mid, or low-wing aircraft. The disadvantage to this method is that usually, mid and low-wing aircraft seldom have any strut bracing. This means the butt joint has to provide adequate attachment and also maintain dihedral. In a prang, the wings are usually the first to come off. Another disadvantage to this type of attachment is that if the root rib of the wing is not perfectly straight, the joint to the fuselage looks awful.

If this system has to be used, here are a few pointers which may help ease things a bit. Whenever I have to attach the wings as mentioned, I prefer to use contact cement. Both sides are given an even coat of contact cement, then left to dry. The wing is carefully aligned, then pressed into place. When doing the other wing half, be certain to line it up exactly to the first one, because with contact cement, you only have one chance. However, it's easier if you insert a piece of wax paper between the wing and fuselage, attach the wing, say at the trailing edge to the fuselage, align it with the other wing, then slide the wax paper out gradually until the wing is firmly in place. (Incidentally, I prefer using Pliobond contact cement because I have found that it is not stringy like so many other types I have used.)

I choose to do it this way because if you use regular glue, you almost have to hold the wing in place until the glue dries. Pinning isn't advisable, since the pins will have to go through the covering. If you have a super fit, you can probably use Hot Stuff.

On gas models, the approach has to be different. A butt glue joint on a heavier model will certainly be disastrous in anything but a soft landing. It is best to use some kind of plug-in system. The tongue-and-box method is used frequently by the English in scale models. It is an ideal system from the standpoint that the wing can slide back or off in a hard crash, usually leaving everything intact. The disadvantage to it is that it is heavy and not necessarily the easiest to construct. Also, the wing coming back on impact could substantially damage the fuselage.

My favorite method is a plug-in type using wire and aluminum tubes held together by a rubber band stretched between the two wing halves. I'll go into some detail on how do to this with little effort, and accurate alignment. The

Russ Barrera's vintage ARUP rubber-powered flying wing from a 1930's plan.

example used will be for a biplane; that way, I can cover the installation of the center section to the fuselage as well. Even before starting the fuselage, which is always my starting point, I'll make a full airfoil template out of 1/16 plywood (see Figure 1). On this template I will

Expert scale modeler Jack McCracken's rubber-powered Jumbo Scale Hawker Fury, an excellent flier. Beautiful finish.

Fernando Ramos' B.E. 2e, powered by a Merlin .049 diesel. Another outstanding flier.

Bob Haight launches his electric-powered Lignel 20. Same model won 3rd in rubber at recent FM speed contest at San Marcos.

An excellent head-on shot of Bill Warner's "Madame Elijah" Gypsy Moth on a test flight. Rubber-powered ship flies well.

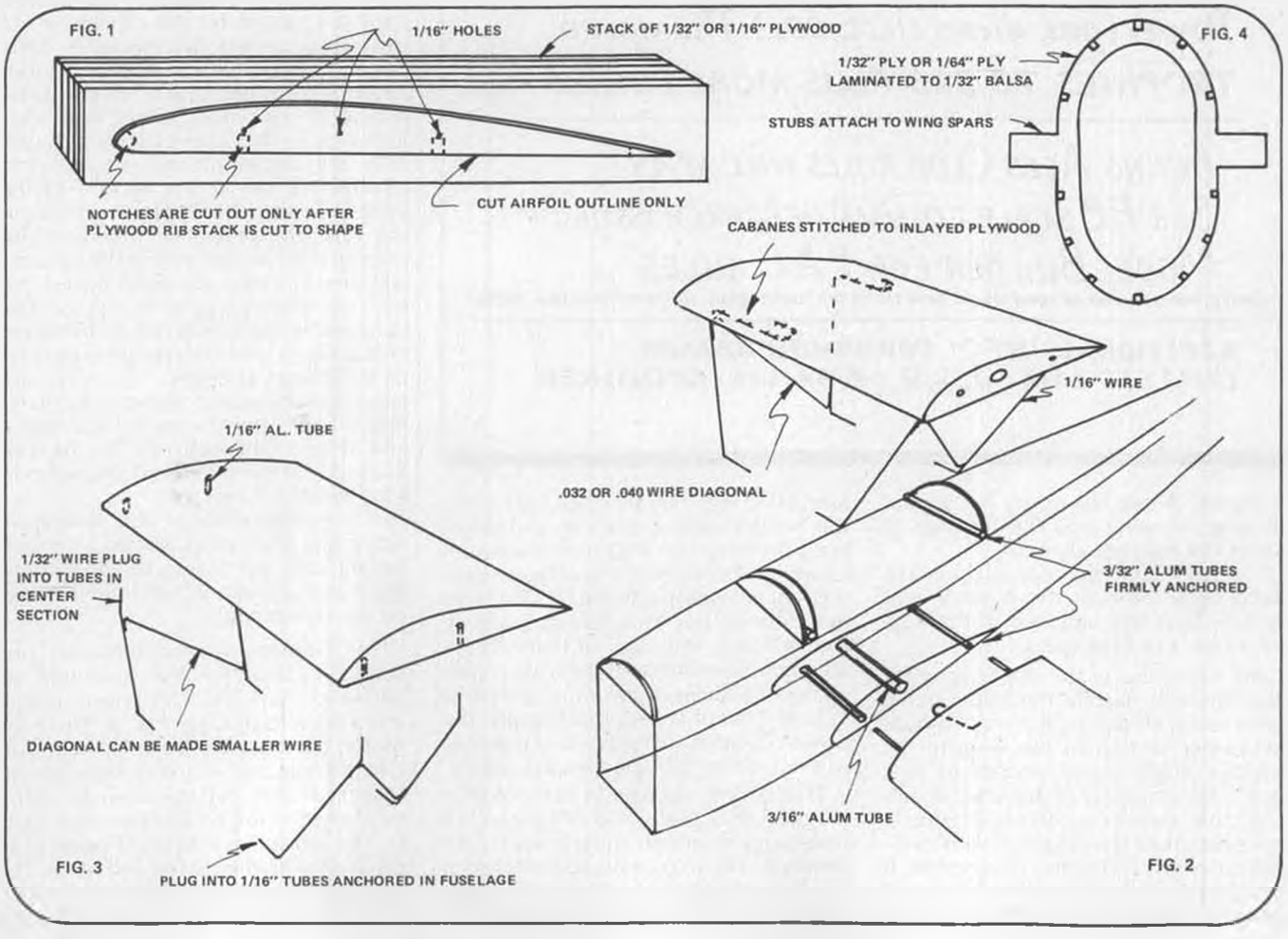
mark the size and location of both wing spars. I then center-punch a small hole above each spar and mid-way between the spars. Next, I cut six more blanks out of 1/16 plywood. These are stacked and taped together with the airfoil template on top, 1/16-inch holes are drilled where previously punched on the template, and 1/16-inch piano wire is then inserted in the two holes above the spars. This keeps the stack uniform while jigsawing out the airfoil outline only.

The original airfoil template is removed from the stack and the notches for the leading and trailing edges and spars are cut out. This will be used to cut out the wing ribs.

The next step is to make the two fuselage sides, building one on top of the other. While the two sides are still together, I figure out where the lower wings will attach onto the fuselage. (I prefer to set the lower wing at 0 degree incidence and the upper wing at a positive incidence.) Once I have established this position, I place the rib template over it and drill 1/16-inch holes where previously drilled in the template. These become pilot holes. The two holes over the spars are redrilled to 3/32 inch, and the one between the spars is redrilled to 3/16 inch. The respective size aluminum tubing will be inserted into these holes, with the larger hole used for the hooks and rubber bands.

The fuselage side can now be separated and framed. Before putting in the aluminum tubes, I reinforce the holes by placing some 1/32 plywood on the back side of the holes. The aluminum tubes are then Hot Stuffed into place. This system provides pretty darn good accuracy . . . when you plug in the wings, you'll know that they will line up with each other perfectly.

After the lower wings have been built, 1/16-inch rods are cut and bent (bent only if the wings have dihedral). These are wrapped and glued onto the top of the spars and given a liberal coat of glue



or epoxy. Before the epoxy has set up, I'll plug the wing into the fuselage to assure the rods are aligned.

The plywood ribs, cut earlier, are glued onto the root rib. A small wire hook is bent and attached in the hole drilled between the spars.

The treatment of the upper wing for attachment is exactly the same as the lower wing. However, the way I mount the center section of the wing to the fuselage might be of interest to you. One difficult aspect of biplanes is getting the center section properly mounted onto the fuselage with sufficient strength and correct alignment. If the cabanes are bent from wire and mounted permanently onto the structure, I find that they are constantly in the way while sheeting, sanding, and painting. I prefer to use 3/32-inch aluminum tubing anchored to the fuselage where the cabanes will attach (see Fig. 2). I bend the cabanes out of 1/16-inch welding rod, which is very easy to bend. These are then mounted onto the wing center section by lacing them onto panels of 1/32 or 1/16 plywood. Incidentally, the plywood panels are recessed so that they will not show through the covering.

The center section is temporarily plugged into place and "tweaked", if necessary, to assure squareness to the fuselage. The diagonals are soldered at this time, using either .032 or .040 piano wire. Then the cabanes are faired with balsa and sanded to a streamline shape. The center section is removed until it has been covered and painted. When it comes time for final assembly a couple of drops of Hot Stuff will hold the wires in the tubes forever!

Jack McCracken uses a variation of the above technique. He uses a small loop of wire which is mounted onto the fuselage or center section of a biplane at the point where the wing's trailing edge will come tangent to it. The wing has a small "Z"-shaped hook right at the trailing edge of the root rib. This hook slips into the loop on the fuselage. There are dowels to locate the proper position of the wing. The hook and rubber bands are located near the front of the wing. What all this does is permit the wing(s) to pivot back in the event of a crash. Since the wing cannot come off, there is no damage done to the fuselage. With biplanes, both wings flex back, saving what could be your prize-winning model. I've seen Jack's Staggerwing take a few hard knocks during the initial testing stages, and all he had to do was pop everything back into place.

Parasols are no different than biplanes, as far as wing attachment to the fuselage is concerned. They are handled pretty much the same way. However, if you are building a rubber-powered parasol model, then the following approach is the one I use. With the wing located above the fuselage, on a hard landing or in a crash, the fuselage will come to rest, but the wing continues to move forward. Therefore, using even hardwood alone for the cabanes is not desirable, unless the model is fairly small. I prefer to use wire and tubes again, but smaller in size. I'll use 1/16-inch O.D. aluminum tubing and 1/32-inch wire for the cabanes (see Fig. 3). The 1/16-inch aluminum tubes are firmly attached to the center section of the wing in a corner formed by the spars and the ribs. The same size tubing is also used in the fuselage where the cabanes will attach. Once the wires have been bent, they are plugged into place. The diagonal is then soldered in between. This last step is where you get quite a bit of additional strength. The wires are faired with balsa and sanded to a streamline shape. After the model is covered and doped, the cabanes can be Hot Stuffed into the tubes and the wings in turn to the cabanes.

The combination of the aluminum tubes and wire does not add enough weight to be a problem, but do without them and your model will shed its wings on the first prang!

For rubber-powered biplanes, one simple approach is the one used on Guillow WW-I kits. This system is easy and very effective (see Fig. 4). Once the model has been covered, the strut slots can be cut out and the interplanes inserted. The cabanes can be done similarly. The increased strength derived by the interplanes makes it possible to do away with the tubing and wires. The rigging also provides additional strength.

What can be done about mid-wing

rubber models, besides a butt joint? This type of model presents one of the most difficult problems going. It is impossible to join the two wing halves through the fuselage, due to the rubber motor running on the same plane as the wings. Therefore, this area becomes a very weak one in terms of being crash resistant. With the wing acting like a lever, any landing involving a wingtip usually results in the fuselage getting crunched. To help avoid having this happen, take a look at figure 5. Bulkheads of 1/32 plywood, made up as shown with the stubs on either side, will help the situation. These bulkheads should be situated so that the stubs will be tangent to the wing spars. The wings will not be glued only to the fuselage, but to the stubs as well. This makes a much better arrangement than just a butt joint . . . plus, you have the added strength of the plywood bulkheads. Again, don't let the weight deter you, because it won't be that much. A model built to a 1 inch = 1 foot scale should really use this set-up. It takes too long to make a good model, and very little to destroy it. Therefore, stack the cards on your side. Peanut-sized racing models can get away with it, but in my opinion, that's about it!

Next month I want to tackle fuselage construction. In closing, I have an interesting hint to pass along. At the last Flightmasters contest in December, there was a WW-I event, which was won by Bill Noonan with a magnificent Sopwith Dolphin. What made this model rather unusual was the lower wing. It had a symmetrical airfoil. Not scale, you say? You're right, but it will go unnoticed until someone points it out. Typically, biplanes need quite a bit of down-thrust in order to make them fly. By using the symmetrical airfoil on the lower wing, it has no lift. In other words, it is going along for the ride. The upper wing is doing all of the lifting. Nifty, huh?

Fulton Hungerford, maker of those marvelous spoked wheels, has a new listing of sizes and prices. If you are interested in the latest from this wizard, send him a stamped, self-addressed envelope. F.H. Wheels, 1770 Lilac Circle, Titusville, FL 32780. •

Dornier . . . . . *Continued from page 69*

run is just asking to get blown over and swamped. The model should balance a little less than an inch forward of the step.

The model must be waterproof if it is to survive very long as a seaplane. This means it must be doped. To keep the model from being warped by the shrinking dope, the dope should be plasticized. There are several plasticizers that can be used, but camphor used as a material for reducing the shrinkage of dope also seems to make it more waterproof with fewer coats. Dissolve the camphor in dope thinner and then thin the dope.

Finally, keep the model light in weight. This is important for any flying machine, but is especially so for seaplanes. Water

has 800 times the density of air, so a small increase in water wetted area can result in a large increase in water drag. Also, the spray pattern gets bigger with higher weights and can impinge on more and more of the model. Water droplets clinging to a full-size seaplane may not add a significant amount of weight, but on a model, oh my!

Have fun flying your Dornier. Where else can a grown man find an excuse to go wading? •

C/L . . . . . *Continued from page 65*

built engines are allowed. No intake or exhaust tuning is permitted. Standard mufflers which do not increase performance are allowed. Engines shall operate on suction feed.

4) Tanks: Must be fully external and forward of the wing leading edge. The tank must be on the outboard (engine) side of the fuselage and may not be designed so as to cowl the engine. No fast fills are permitted, maximum tubing size for tanks shall be 1/8-inch outside diameter.

5) Shut-offs, hot gloves: No engine shut-offs are allowed. No hot gloves or other electrical contact systems are allowed.

6) Lines shall be multi strand, .018 x 60 feet. Tolerance on length shall be plus or minus 6 inches. The entire control system shall be given a 35-pound pull test.

7) Standard race procedure will consist of preliminary heats of 70 laps with one pit stop, the four best times advancing to a Final Race, which will be 140 laps with two pit stops. Races shall be flown with at least two entrants, and not more than four entrants. The Event Director may conduct races differently on the basis of participation, or for special marathon races.

The AMA C/L Racing Unified Rules will serve as the basis for other rule requirements, such as model safety, entries, field layout, field safety requirements, and flying regulations.

8) It is assumed that the usual sportsmanlike conduct of Northwest competitors will prevail in the running of this event. The Event Director may disqualify any entrant he feels is not competing within the intent or spirit of this event.

The above set of rules works for us very well, as everybody involved knows why N.W.S.R. was originated and what we expect to get out of it. They are also aware of what we are trying to avoid . . . yet another highly specialized racing event.

We have had a couple of small problems . . . one guy tried using two 1-inch diameter wheels to meet the landing gear/wheel requirements, for instance. It was handled calmly, and the problem went away. Right now we have a couple of guys running K&B .35's (plain bearing version, *not* the 5.8's) without the intake restrictor. So far, they have had a notable lack of consistency, due to weak fuel draw, and it won't be long before they are asked to come back into line with the rules.

N.W.S.R. has worked for us for a couple of reasons. First, this is Combat Country, with most of us not being gung-ho racers. We have enjoyed some popularity in the racing events, but it was never long-lived. Rat got to be too much for a number of teams several years ago, and Goodyear was hot for awhile back in the S.T. .15 days, but got blown out when a few learned how to handle the fast Rossi .15's.

It just seems that we have a number of people who want to race C/L, but only as a change of pace from other events, so to go after any of the AMA racing events demands much more than can be had in return. So N.W.S.R. has been the answer to doing some racing on the side, with minimal investment in dollars and time.

Everything has its negative side, and with this event it is the fact that the models are so slow; to run over 80 mph is unusual. I have always enjoyed C/L racing, and the fast speeds was one of the big thrills, so to poke along at 80 per is really ho-hum stuff. Also lacking is the opportunity to stay up late at night working to get the last mph out of the racing equipment, whether it is working on the motor, building an NTP (New Trick Plane), testing plugs or whatever. To me, that is a real thrill in modeling, working to get the advantage, hoping to smoke 'em next time out.

But too often in the past I have worked to get that Dynamite Combination, only

to go to the contest and find four other teams ready to compete, a couple of them using Dark Ages equipment that is guaranteed to make flying in traffic the source of numerous horror stories for years to come.

I'll probably take some heat for this, but I can still remember several times when Gary and I won in Goodyear with times much faster than the second place team. In one of these instances, we seemed to unconsciously sink to the level of competition, me blowing a couple of landings and Gary not taking enough care when setting the needle. We still won, but did not function at all well as a team. It was a win that we could not be proud of; nobody on the field could run with us in the first place, and then we looked as if we had never flown together as a team, when in fact we practiced quite a lot. You can believe this or not, but the day would have been much more enjoyable if we had been up against a tough field, run as fast as we were capable of going, and come in a close second . . . this being written by somebody who does not count past first place when totaling results.

So N.W.S.R. is a favorite event of mine, as there is always a large field of entries, almost all of them capable of beating Gary or me if they pay a little attention to the basics of good starts, decent needle setting, and so on.

Another interesting aspect is that most anybody can fly the models, so we get an interesting mix of pilots, many not knowing exactly how to handle themselves in the middle of the circle. As the best way to learn is by doing, they pick up a lot of tricks in piloting without risking NTP's, either their own or those of other teams. In many cases, I take it upon myself to kind of watch over these new pilots, sometimes even going as far as to hold an informal how-to class in flying, right in the middle of a heat. You'd be surprised at how quickly some of our fliers, especially the younger ones, have picked up on whipping the plane to the pits, walking in tight circles, passing taller pilots, and more.

When the advantages and disadvantages to this racing event of ours are totalled, we come out ahead. We now have every active C/L modeler (and a few that are otherwise inactive) who has ever raced in a C/L event, or just considered it, now competing in N.W.S.R., if not at every contest then at enough each year to keep his hand in and enjoy some racing. Hard to argue with an event with that kind of draw, isn't it?

DRIZZLE CIRCUIT

Organized by Mike Hazel, this is a series of 5 contests held this winter and featuring (what else?) N.W.S.R. as the primary event. Flying sites around the N.W. were used, to give everybody an event in their backyard. At each contest, a secondary event was held, either Fast Combat, Mouse Race, 1/2A Combat, Goodvear, or Rat.

The neat thing about this series is that at each of the five races, N.W.S.R. really is the prime event and gets the most amount of time in the schedule. This is a departure from previous contests featuring racing events. In the past, when a racing meet was being planned, it seemed that the Rat guys wanted their event . . . same with the Mouse Racers, Goodyear fliers, and so on. So each meet would be made up of all the events, giving the guys who really wanted to race more events than they could be effective in and tending to dilute the entries in each event, due to some not being able to race in all classes so going for Goodyear, but not Rat, as an example. But by staging each of the races in the Drizzle Circuit with our universal racing event as the primary draw, all of the potential entrants go for N.W.S.R., which gives us a decent entry at all contests.

To give the entrants as much racing as possible, Mike came up with a new procedure on points and heats, as follows:

"Heat and Points Procedure: Every entrant will fly four 70-lap heats. Names will be drawn at random to determine which heat of the round the entrant will fly in. No substitutions will be made for heat draws, which may require some entrants to improvise for team members. This will be part of the challenge. Finishers in each heat will be awarded points inverse to their placing and number of fliers in that heat. Example: Four-man heat, first place is four points., fourth place one point. Note: Rule No.

25.10.3 from AMA Unified Racing Rules section will be enforced, so as not to excessively prolong heats. At the conclusion of all the rounds of heats, each entrant's points will be added up. The four entrants with the highest number of heat points will fly in a Final Race of 140 laps. The outcome of the Final Race will determine championship points, which are the ones that count at the end of the season. Championship points shall be figured on the basis of the amount of total entrants in N.W.S.R. at the contest. Example: 12 entrants, first place equals 12 points, subtract one point for each place down to fourth. In addition, all entrants, whether or not they flew in the Final Race, will receive one championship point for each heat that they finished with a score."

Such a system definitely gives everybody their money's worth, providing them with a full day of racing. At the most recent contest, held here in Seattle, we had 16 entries (low number, but late January is winter up here, after all!) and most everybody had plenty of racing.

The four chances in heat racing is not to be overlooked. You can blow a heat and still be qualified for the Final. At the end of two rounds I only had two second place finishes, but was still in pretty good position. At the beginning of my heat in the third round, an extremely stupid mistake on the part of an experienced C/L flier pitting for John Hammersley saw him almost take my accelerating model in the back of the head, the model going on over the top, crashing in the center of the circle. That put my day to a fine end, but Gary was in the same position, coming through the third round with all second place finishes. In the last round, we finally won a heat and with a string of seconds plus the one win, he was in the Final.

The Final saw experience win out, as Gary and I managed to bring his plane through in first place for the 140 laps. A couple of observations here. First, all of the entrants in the Final were pretty even, the series of heats resulting in a Final made up of teams with consistency being their biggest advantage. It was not possible to set a blazing time in one heat and then blow the rest completely and still make the Final. Second, the team running the K&B .35's without the restrictors found out the hard way about fuel feed, consistent runs, and a bit too much nitro in the fuel.

I know you'll laugh, but Gary's model is powered by an O.S. Max .35 . . . If that isn't enough to get you going, the engine had a new piston/cylinder set in it the day of the race and our main concern was to go just fast enough to do well, yet not screw up the new parts. For the Final it was leaned out just slightly, but still not to the WFO condition. If that isn't proof enough that most anything is competitive in N.W.S.R., you indeed are beyond hope.

If you are considering using a system of heats, as outlined above, there is another twist to throw in, something that I learned from racing R/C cars here in this area. What we do in the car races is to more of less randomly draw the first round, just as in Mike's system. But in the second round, scores from the first round are used to assign heat positions, the idea being to match the fast guys with other fast guys, middle-of-the-pack guys run each other, and those having problems going fast race amongst each other. As each round is completed, a running total of each racer's score is kept and is used to assign him a position in the following round. When all of the rounds have been completed, you still have the consistent guys going to the Final race. The neat thing is that the heat races in the second, third, and fourth rounds tend to feature more even, close competition as each heat is made up of those with similar scores. It isn't a whole lot of fun to draw a fast guy in each of your races; chances are he'll just blow you away. But if you are matched up with other competitors running at about the same speed, close racing is the result and it adds a lot to the racing action.

Yet another R/C car racing twist that I would like to see tried out, in conjunction with the above systems, is the idea of letting everybody compete in a 140-lap Final. In the cars, we refer to this as the ABC Main system, the A Main being the fastest, the B Main the next fastest, and so on down the line, with as many mains as it takes to get everybody in one. Such a system does take a bit more time, because there are extra Finals to run, but the whole idea is to get in as much racing as possible, isn't it? Why exclude the people who don't have the technique to be fast (yet) from another excellent chance to gain experience, that of competing head-to-head with other teams? If there is only one Final run, the fast get faster and those most needing experience watch or help time.

As unexpected result of using the ABC Main system is that the B and C Mains (Finals) can result in closer, more exciting racing than the A Main. There always seems to be a few racers at the very top or the very bottom; the bulk of the guys are bunched in mid-pack with equipment and abilities that are closely matched. Give these guys a Final to run in and chances are they will put on the best show of the day, maybe even learn a

couple of tricks that will see them crowding the fast guys out of the A Main at the next race.

Even though some of you must be groaning, especially those usually doing the work of running the contests, let me tell you that this system works extremely well in R/C car racing. In this area, as an example, we have one guy, Bob Welch, who can just run off and hide from everybody else . . . the guy is really very fast. Needless to say, Bob makes the A Mains. At the bottom of the A Main list you'll find my name, usually because I don't go real fast but *always* finish, win an occasional heat race and sometimes just plain get lucky.

An exception, of course, was the last race of the '78 season when my *wife* bumped me out of the A Main and down to the B Main . . . such things are hard to live with until the '79 season starts up.

The point of this is that without fail, Welch leads the A Main, usually from start to finish, and the race is not your basic nail-biter; it is obvious who is going to win. But the B Main and quite often the C Main is another story. These guys battle it out like you can't believe and never fail to put on the best race.

One of the advantages to making the A Main is that you get a chance to watch the action in the B Main! I see no reason why the same couldn't hold true in many areas of the country where there is sufficient interest in C/L racing to hold a meet in the first place. ●

Peanut . . . . . *Continued from page 59*

cockpit will be discussed in detail shortly). Five 1/32 sq. stringers are added on each side of the fuselage forward of station C.

Landing gear and struts follow standard practice.

Two items require more detailed discussion. These are the raised combing forward of the cockpit, and the engine cowling including the dummy cylinders. First, the area forward of the cockpit: After installing the 1/32 sheet balsa top decking and before cutting the cockpit hole, select a soft piece of A-grain balsa 1/8 inch thick and about 1-1/2 inches long, wide enough to cover the entire width of the deck. This balsa should be soft enough to wrap easily around the top contour of the decking. Cement the 1/8-inch thick piece in place on top of the decking with its aft edge at point C and its forward edge about 1/4 inch forward of point B. Now lay out the cockpit outline as shown in the top view and cut out the cockpit hole.Using a very sharp knife, carve the top decking to the proper shape. Use fine sandpaper to fair the edges of the 1/8-inch thick second layer of the decking smoothly into the first, but do not cut into the bottom layer.

The dummy engine and engine cowl are built as a unit and are used like a removable nose block. This is necessary to provide access for installing the rubber motor and to allow the motor to be stretched out for maximum winds. The cowl on the real airplane is cut out from the bottom up to a very small radius directly around the propeller shaft. A normal removable nose thrust bearing with a hole large enough for adequately installing and winding the motor is thus out of the direction. Instead, the whole cowl is made to plug into the front of the fuselage structure.

Cut out the back face of the cowl to the shape of your fuselage outside contour at station A. Remove 1/32 of an inch from its curved outer edge to allow for the wrapped sheet part of the cowl.

Cut a round rubber clearance hole in the back face, as indicated by the dotted line in the front view. Cut two forward cowl faces from 1/8 sheet balsa. Note the pie slice cutout in the lower quadrant, as shown in the front view. Make the hole in the front faces to accommodate the Peck-Polymers nylon thrust button or equivalent. Now cut two 1-inch long pieces of 1/32 sheet balsa from a standard sheet. Butt-glue these together so that they can be wrapped around the cowl back face and one of the cowl front faces. The cowl is left open at the bottom. Make sure the front and back of the cowl are parallel and the proper distance apart. Cement the most forward face in place. Fit a piece of 1/8 sheet into the rough cowl to provide a dummy motor support. Use a narrower second piece to simulate the bottom of

the engine crankcase and install the three dummy cylinders as shown. The real engine was a twin-row rotary.

The model should be covered with lightweight tissue in the normal manner. Don't be afraid to spend a lot of time with fine sandpaper before covering it. Probably the biggest cause of poor-looking covering jobs on a model is because the builder has become too impatient to get the model finished and neglects the job of completely sanding all the structure. After its been done, carefully inspect the entire structure for flaws before covering it.

The model in the photos was covered with white tissue. The fuselage was given three coats of very thin dope, and the wings and tail a single coat. India ink was used to indicate the control surface separation lines. Black Japanese tissue was used for the insignia. The cowl was painted with silver dope. Cylinders and tires are flat black. The propeller was painted a mahogany brown. A styrofoam pilot was carved and painted (only his head and shoulders), and using white glue, cemented in the cockpit. I like to see pilots in models.

For flying efficiency, I omitted all the flying wires. They are really draggy, and when the model is being flown they are unnoticeable anyway. It's a decision each model builder can make for himself. Personally, I like models that fly, and I suppose in this case I was overcorrecting for the pain of the Fokker debacle.

I hope all you Peanut enthusiasts out there enjoy these little obscure birds as much as I do. My next Peanut is a really clean, nice flying modern airplane, the Bellanca Aries. •

Safety . . . . . *Continued from page 29*

the plane can deliver. How about using the check-ride idea? Have someone who is a really proficient pilot give you a "check-ride" with that new model to make certain you can handle it. Put ego and pride aside and be certain that you and the plane do make beautiful music together. If you honestly find that you are not up to handling the plane, back into your personal "hangar" it goes until you've built up your proficiency to a sufficient level to have another crack at it.

HANDLING WEATHER MINIMUMS

While weather conditions are of crucial and major importance to any full-scale pilot, there are aspects of weather that we ought to consider and to which we should respond. Have you ever seen a pilot take off a radio controlled model into a 300-foot ceiling? I have. And it wasn't just one pilot, but a number of pilots who were matching their wits against the weather. Isn't it obvious that we ought to be flying only when we can see the model *clearly* and *distinctly* at any altitude that we can reasonably expect to be flying? Shouldn't we also be aware that a model looks different in the early morning that it will at mid-day or at dusk? Interestingly, dusk is one of the most dangerous times for full-scale piloting because shadows and land configurations change rather dramatically and call for revised judgments. The same is true in flying an R/C model.

Furthermore, we should be acutely aware of just how much crosswind we can handle in our landing. Frequently, the field is such that you have to bring it in from a certain direction, and we should be confident that we can handle the wind component safely. I have seen R/C pilots land practically head on into the pits or a crowd of spectators because they could only handle the plane landing straight into a headwind, giving little or no thought to the fact that the model might land right into people.

KNOWLEDGE OF AERODYNAMICS

Even the most casual full-scale pilot has a reasonable knowledge of aerodynamics and certain truisms that have developed concerning safe flight. For example, there's a statement that "low and slow" is a dangerous way to fly. Isn't that true of R/C models as well? "Low" means too low to save the plane in the event of misjudgment, and "slow" often leads to stalling out the plane.

Another of these full-scale truisms is that there is nothing more worthless to the pilot than runway behind you or altitude above you. Again, this holds true for the R/C pilot. We must be certain that there is sufficient runway and a clear path for the taking off of our

planes and sufficient altitude gained and maintained for safe flight.

In all, we should know how and when our plane will stall, the minimum speed necessary in a turn to prevent a stall, and especially, I believe, the use of throttle to control altitude and the proper approach speed for the particular take-off or landing.

LANDING TECHNIQUE IS CRUCIAL

For a student pilot of full-scale craft as well as a licensed pilot who wants to maintain proficiency, flying the pattern over and over again, doing touch-and-goes, is of great significance in the learning and building proficiency process. Shouldn't we as R/C pilots develop a good pattern tehnique with a recognizable crosswind, downwind, base, and final approach for our landings? Shouldn't we also know the proper "go-around" technique in the frequent event that we have to abort a landing for any reason? Every R/C pilot should know just what is going to happen to his or her model if called upon to immediately abort that landing and go around. How about practicing the go-around technique so that you know what is required of you and how the plane will behave; our full-scale brothers practice just that!

Additionally, full-scale pilots are taught to minimize corrections on the final approach; you should have the model set up on a final approach to landing which requires a minimum of correction by aileron, rudder, or throttle. If you have to make some dramatic changes in order to get onto the runway or get into a proper glide path, there is something wrong with your landing technique.

POST-FLIGHT INSPECTION

It is particularly important for us, because so frequently we are going to be taking off for another flight, to properly inspect the plane after each flight to make certain that nothing has come loose and nothing has gone wrong as a result of that last flight. From there, you work back into your pre-flight check list and are ready to go again, with safety and confidence.

In all of this, professionalism is the key. The Sunday fliers of full-scale and model craft are not excused from the concept of professionalism . . . that is, working at all aspects of your piloting to insure the highest approach, in terms of piloting technique and safety. Really, it's the only way to go. Consider this paraphrasing of a popular saying among our full-scale brothers: "There are old models and there are bold pilots, but there are few old models in the hands of bold pilots!" •

Fuel Lines . . . . *Continued from page 27*

lowering of the air pressure in the crankcase, and when the intake valve is opened, air rushes in from the outside. The secret is to keep the intake valve open as long as air keeps coming into the crankcase, but to shut it off before any of it is pumped out by the piston starting its downstroke. This is what the manufacturer strives to do when setting up his production machines. As the piston continues its downstroke, it compresses the captured air/gas mixture in the crankcase until the piston has traveled down far enough to expose the bypass ports in the cylinder wall, allowing the compressed crankcase gas mixture to escape into the cylinder area above the piston. As the piston now has also exposed the exhaust port, part of the now bypassing compressed crankcase gas goes right out this open port to freedom. The amount remaining in the cylinder area will be used for the next power cycle. The greater the amount of this remaining gas, the greater the power of the next firing stroke. Our goal is now quite clear; to capture in the cylinder area above the piston the greatest possible quantity of combustible vapors for the next firing stroke. To do this, we must remove any obstacle that may hinder the smooth flow of combustible vapors. These obstacles exist in the form of unfinished machined areas that the engine manufacturer finds impossible to correct without hand finishing, which, as mentioned earlier, is too expensive. This is where *you* enter the picture.

Disassemble your engine. Do this with care so as to not destroy the gaskets or mar critical working areas. Clean all parts, removing all gum and varnish. My favorite method is to use acetone for the cleaner or solvent and a metal-handle acid soldering brush for an applicator. For removing carbon from cylinder

heads and tops of pistons, I prefer a scouring pad obtainable in most grocery stores, which goes under the name of "Scotch Brite". This, with acetone, will remove about any type of foreign matter on or in your engine. The acetone, applied with the solder brush, is great for removing varnish from ball bearings as well as other hard-to-get-at places.

Do not attempt to clean plastic parts with acetone, as this stuff will attack most all but a few types. Use acetone with care, as it is very flammable and harmful to your eyes.

After a thorough cleaning, the next step is to remove those obstacles that prevent a smooth flow of combustible gases through your engine. Let's start with the crankshaft. Gases of all types prefer traveling through passages that are smooth and rounded and void of anything that might impede movement or create a turbulence. Almost all crankshaft intake ports are milled in such a way that the back end of the port (the edge nearest the crank) presents a very thick edge to the incoming fuel mixture. This is the first major obstruction that the incoming gas will encounter, and the first gas-flow obstacle you will have to correct. The tools I prefer for this operation are a No. 260 Dremel tool with a 1/8-inch diameter straight carbide bit, ATRAX No. A-1-D, Standard Cut (about $5.00). This bit is capable of cutting a hardened crankshaft in two with ease and is vastly superior to the miniature grinding burrs. When using *any* high-speed grinding or cutting equipment, I urge you to protect yourself with the proper safety equipment, i.e., safety goggles with side shields, gloves, etc. When cutting into steel with a high-speed carbide cutter, you get extremely fine steel slivers which will promptly discover the slightest bit of exposed skin around and will disappear into it, to your great discomfort. I don a pair of rubber gloves when doing this type of work (the type women use when washing dishes) which eliminates a lot of unnecessary agony later.

Because of the great possibility of the cutter touching a part of the crankshaft that it shouldn't, I recommend protecting such areas by covering them with a couple layers of masking tape. This is very important on areas such as the main bearing and the crankpin. Choose a work area that is well lighted and provide yourself with a comfortable chair or stool. I wear old clothes for this kind of work and wash them separately to keep the tiny steel slivers from contaminating other clothes. Now we are ready to start cutting away at this obstacle that is in the way of our incoming gas vapors.

If you are not familiar with this type of high-speed cutting, I urge you to practice on a scrap of steel or brass. Both hands should rest firmly on your knees for additional support and balance, otherwise the cutter will grab and ruin the whole thing. Take very small cuts until your proficiency increases. Use the tool exactly as you would a small grinding burr, being gentle but firm. Do not allow the cutter to touch the outer contour of the intake port, because the timing of the port would become altered. Work away at the sides and back area of the opening, leaving as smooth an air passage as possible with an edge thickness of from .010 to .015. To do the job properly, the cutter will have to be inserted into the port from the crank end, and you will soon discover how important the masking tape becomes.

After the cutting operation with the carbide tool is completed, you should impart a finshing touch using 320-grit emery cloth on a wood or metal dowel held in a drill press. This will produce a very nice finish through the center hole of the crankshaft. The spot where the obstruction was can be polished by reciprocating a thin strip of emery cloth through the intake port and out the center hole of the crank.

Next month: finishing the cylinder sleeve. •

ALDRICH

• A recent query we had concerned what fuels to use for a given engine, and the answer we gave has been bugging us ever since, in that we didn't really get into the subject very far. The fact is that many fliers use fuel containing more nitromethane than they need to do the job at hand.

Forget about racing now, for going fast is just what is says. What we are speaking of here is average flying requirements, such as sport, stunt, scale,

etc., and that are not flown with the smaller size engines. Joe Klause did an excellent job of covering the feeding of the little buggers a few months back.

We would guess that across the nation, the average size engine used is in the .35-.40 cu. in. size range. It is safe to say that 98% of all requirements for this engine size can be filled most adequately by a fuel containing no more than 15% nitro; and 75% of this by fuel with 10% nitro or less! Make no mistake; more nitro will run hotter in an engine than less nitro. Nitromethane flashes at around 96°F, as opposed to methanol at about 52°F. This would lead some to think that more nitro would run cooler. The fact is that nitro liberates more oxygen when it burns and therefore gives more power. Physics dictates that more power causes more friction and more friction delivers more heat. The only way there can be more power and less heat, all other things being equal, is to reduce friction.

This is why a smaller engine will run cooler on a given fuel than a larger engine, and it is also why a smaller engine can handle higher nitro fuel easier than a larger engine.

To illustrate the above statements, consider one of the best racing fuels ever, the old Ram formula, originally brewed up by the H&R speed team years ago. It is: 65% nitro, 18% lube, and 17% propylene oxide. Now, Husted and Roy are real experts in the fitting, setting, and running of an engine, and set national records using the above formula in engines up to .65 cu. in., back in the 1960's. Today this formula is still used by many in the 1/2A size engines for competition. And it will perform extremely well for those with only average experience in these SMALL engines.

For those who do not know, propylene oxide is an ignitor, and 17% in a large engine is asking for an instant engine kit, and one that's burned up to boot. As a general rule, a fuel that contains nitromethane and alcohol should not utilize more than 3% propylene oxide. Most sport fuels (15% nitro or less) use no more than 1% propylene oxide to promote easier starting and a better idle. The primary use for this highly volatile ingredient is to ignite the nitromethane and alcohol, and to say it burns HOT is an understatement.

Many feel that it's better not to even mention such chemicals, due to the likelihood of their misuse by the novice. However, with the radical inflation we have all experienced over the past year, many are going to be inclined to try to mix their own fuel.

In this light, we will lay a few words of caution on you about flammable liquids as related to engines and fuels.

Methanol and nitromethane are relatively safe to handle when used in an open area. Obviously, heaters and open flames of any kind should be avoided at any time with any fuel mixing. No smoking!

We repeat that propylene oxide is highly volatile and should be handled and used with extreme care. Ether, used in diesel or compression ignition engines, is just as dangerous. Ether has been known to detonate from only static electricity!

Another chemical to avoid . . . that is, don't use it ever, ever, ever . . . is nitrobenzene or oil of merbane. Oil of merbane is easily recognized by its "shoe polish" odor. Nitrobenzene is a highly cancer-producing agent, is accumulative in the bloodstream, and can be absorbed through the skin! This means that if one unit is absorbed today and another in six months later, you then have 2 units, and so on.

The last one we want to caution about is plain old dangerous . . . no, SUPER dangerous . . . GASOLINE. I would venture a guess that more people are injured due to the use, or misuse, of gasoline than any one other chemical in the world. With the rise in popularity of the big ignition engines to power the 1/4-scale size models, gasoline has come on the scene with a great deal more prominence of late. It should always be kept outdoors and away from areas with an open flame, such as a garage with a hot water heater.

We personally use gasoline only in our car, lawnmower, and Old Timer engines. In the instance that we do mix gas and oil for an Old Timer, it's only a quart at a time.

Above all, don't use gasoline to clean your engines, especially in the workshop, garage, or house. If a good detergent or cleaner such as Formula 409, Fantastic, etc., won't do the job, use a good slovent such as trichlorethylene. Most office equipment service people use this solvent, and a pint or quart can be obtained at little cost. We have also used methyl ethyl ketone (M.E.K.) and acetone, but they are flammable and should be used in open air. Again, no smoking!

Regardless of what is used to clean an engine, all the parts should be coated with a light oil. In the case of a water-based cleaner, don't let the parts stand a long time as the steel parts will rust and the aluminum parts will oxidize.

We recently have been using a new lubricant to oil our engines upon reassembly and after flying. It is made by a company with the unlikely name of Totally Dependable Products, Inc., Box 277, Zieglerville, PA 19492. They make two types which seem to be more than adequate: SS2, which is labeled "Gun Lubricant", and SS7 "Rod and Reel Lubricant". Both virtually eliminate rust. We bought ours at our local gun shop.●

Soaring . . . . . *Continued from page 36*

flying a 100-inch polyhedral NACA 4472 airfoil craft of his own design for the past four years. We wish him continued success.

An excellent book of general interest has just appeared on the scene. It's called *Model Aircraft Aerodynamics* (Model and Allied Publications, Argus

Books Ltd., 14 Saint James Road, Watford, Herts, England [$8.95]). The author, Martin Simons, has produced a definitive work. This book covers the entire theory of flight in relation to model aircraft and includes tables of optimum airfoil sections, scores of diagrams, and practical illustrations. After a chapter on fundamentals, he treats the factors affecting lift and drag, scale effect, and the boundary layer. Other chapters include basic model performance problems (reducing induced drag in terms of aspect ratio, planform, and twist), airfoil sections in terms of camber, turbulent flow airfoils, laminar flow airfoils, parasite drag, trim and stability, and finally flight control. These twelve chapters and the appendices cover two hundred pages. The book is clearly written and well worth your time and effort. Martin Simons was born in England in 1930, moved to Adeleide, Australia in 1968 where he is a Senior Lecturer at the University there. He flies full-scale sailplanes and edits the monthly magazine *Australia Gliding*, and is also active in radio control model sailplanes.

Two German publications are of particular value to those interested in the details of design. The first, entitled *Eppler-Profile; Der Fachschriftenreihe Modell-Technik-Berater, MTB-1*, contains technical details on many different airfoils at Reynolds numbers pertinent to model sailplanes. The second book, *Eppler-Profile; Grossegler-Hochleistungssegler - Spezial - Flugmodelle, MTB-2*, includes technical data and plans of some actual models as well as structural design techniques and equations for your own design. Both books are published by Verlag fur Technik und Handwerk, A. and B. Ledertheil, 757 Baden-Baden.

If you're into scale, you've got to have a copy of *Jane's World Sailplanes and Motor Gliders*, by Andrew Coates (published this year by MacDonald and Jane's Publishers Ltd., Paulton House, 8 Sheperdess Walk, London N1 7LW). Here is an authoritative source covering the current world of full-scale sailplanes. Each page presents a brief history and data on a different plane (including photo): manufacturer, first flight date, wingspan, length, wing area, wing section, aspect ratio, empty weight, max. weight, max. wing loading, max. speed, stall speed, min. sink speed, and best glide ratio. More than 170 planes are described. The book also contains the International Gliding Records for single seaters vs. multi-seaters and for men vs. women. For example, the altitude gain records of 42,303 feet and absolute altitude of 46,266 feet were set by P.F. Bikle (USA) in 1961. The goal flight record is held by H.W. Grosse (West Germany) for a flight of 765.4 miles in an AS-W17 in 1974. The winners of the FAI World Gliding Championships from 1937 to 1976 are also shown. In England this book sells for £6.95. •

Charger . . . . . *Continued from page 50*

line voltage to 25 volts and, important for safety reasons, isolates the charger/battery circuitry from the power line. The fuse is for protection in case of component failure. The on-off switch and pilot light in the primary circuit provide their normal functions. However, these two can be omitted in the interest of simplicity; just plug the unit in to operate it and pull the plug when you are not using it. Don't forget to connect the transformer primary lead directly to the fuse if you omit the switch.

The secondary is connected through a diode rectifier and a voltage dropping resistor to the battery. Note that the output and input leads pass through strain reliefs or rubber grommets to assure that they do not short circuit themselves to the metal case. Color coding or otherwise marking the output leads will help avoid mix-ups in polarity. If you do reverse the leads, you will *discharge* the battery at a rate of about 15 milliamperes, which is worse than letting the battery stand without a trickle charge.

BUILDING NOTES

There is nothing critical in the placement of the parts or the case you use. The case helps you avoid contact with the 115-volt line and physically protects the components. A small wooden enclosure will do as well. Solder all of the connections. Use resin or rosin core soldier. *Do not use acid core solder.*

Allow ample spacing of the parts to avoid accidental short circuits. Use a terminal strip to mount the small parts (diode and resistor) and to make connections that would otherwise have to "float" in mid-air. If this is your first electronic project, you should have no difficulty with it. If you are experienced in the art, you ought to be able to build all (or most) of it from your parts collection.

TECHNICAL NOTE

The best way to maintain a new or old battery is to use a sophisticated charger that senses the battery's terminal voltage and adds charge if this voltage goes below the full charge value. This type of charger can be connected continuously and provides a charge rate that is appropriate to the amount of discharge. The difficulty with this system is its cost. The "full charge" voltage must be measured accurately and the circuitry must be free of temperature problems; typically, the full charge voltage itself may vary with temperature. Further, the "appropriate charge rate" is not a linear function of the terminal voltage.

The simple, inexpensive system described in this article provides a grand improvement over the usual system of occasionally charging your batteries. If it is used from the start, with a new battery, it should produce results essentially the same as those obtained with a costly charger that senses the battery voltage and manages the charging rate accordingly.

PARTS LIST

DESCRIPTION	RADIO SHACK NO.
A/C Cord	278-1255
Hook-up Wire (No. 18 solid)	278-1291*
Battery Leads (No. 14 stranded)	278-1290*
2 — Alligator Clips	270-374
2 — Strain Reliefs (or grommets)	278-1636
Fuse Holder	270-739
Fuse — 1/4 Amp.	270-1270
SPST Switch	275-602
Pilot Light Assembly	272-705
Transformer (115:25-volt, 300 ma)	273-1386
Silicon Diode (50-volt, 1 amp)	276-1101
Resistor (1500 ohms, 1/2 watt)	271-000
Mini-Box (Case) 5-1/4 x 3 x 2-1/8	270-238
Terminal Strip (5 lug)	274-688

*Not critical. Use what you can find. A short length of "zip" cord makes a good set of battery leads, but color code them somehow for polarity. •

Halt-A ..... *Continued from page 51*

glow plug, and the nose of the crankcase. Put your finger on the crankcase (from the back!) and see if the vibration of the engine seems much greater than an inch or two back on the model. Thin (1/64) plywood doublers on the nose of a model can add a lot of stiffness, but you need a solid firewall and some gussets, too. Speed fliers don't fly metal-pan models just because they like to find places to do custom casting and machining; the rigid engine mount is a key to good performance.

Third, the fuel tank must have vent and fuel pickup lines well separated; baffles help a bit. The ideal tank is some sort of bladder which allows no air in the fuel at all. Pressure feed is not necessary, but it does help. You can use too much pressure, and then you need a special needle valve with finer adjustment. Tank vents can be angled into or away from the wind, sometimes either one works better; you have to experiment.

Fourth, the fuel tank should either be mounted very solidily to the fuselage or so well isolated that it doesn't get any vibration. Middle ground seems to get you in trouble with fuel foaming in the tank. Look for the fuel in the line to the engine filling up with bubbles as the engine leans out.

Fifth, engines with a given prop/glow head/head gasket combination have a particular range of nitromethane fuel they can use. For most combinations that a beginner is likely to be flying, 15% nitro should work well. On Tee Dees, use 30% nitro. Anything more or less, and you are on your own. I have heard of successful flying from 5% nitro to 70% on Tee Dees, but both of these were used by experts who have worked to get the right settings. Have you noticed how similar the words "expert" and "experiment" are? I doubt that it is a coincidence.

That's where the "Thou" comes in. When all else fails, read the instructions.

Break your engine in and learn to run it on a bench mount, where you can eliminate most of the variables. Be sure you have EVERYTHING right. "Good enough" generally isn't. When an engine goes sour on a model, try it back on the bench to cut down the things you have to check. Finally, don't be afraid to seek advice from fliers or hobby shop owners; they may see your problem instantly.

On to other topics. First, if you guys want to see neat airplanes in this column, you have to send me pictures. Get off your duffs and do it!

Second, if you want to hear about some specific topic, let me know. I may be slow (1 year is the record so far), but I do answer. Write care of the magazine. I'll be happy to do a Q&A thing in this column if you like. I'm here to serve, boss.

Third topic is aimed at all you manufacturers out there. It's mighty cheap advertising to get some notice for your products in this column. Just send a photo and specifications. Don't send products, I'm so far behind in testing now, I'm about to be lynched.

Scrounging through my files for interesting photos, I found a 1976 package with charming Linda Chabot holding a 1/2A Stik, kitted at that time by hubby George's GMC Models. This was one of the earliest 1/2A kits, and still will keep up with the latest models. I saw George do three rolls straight up with one once!

Second photo is the outside of an interesting gadget. It is a switch that pinches off the bladder pressure to the engine. Sad to say, I never got a chance to see the insides . . . anyone got some good ideas? I saw it used and it worked neat. Just push your thumb down the fuselage as the engine fires to start fuel flow, and it's easy to turn off if the fire goes out.

Third picture is Tony Naccarato, of T&A Hobby Shop in Burbank, California. He flew this sheeted wing unlimited 1/2A racer at a session at Valencia. As I recall, it was right up there with the leaders consistently. Tony is one of those guys who flies everything, and even worse, he flies everything very well and is a creative designer, too.

Fourth photo is of one of the niftiest 1/2A Stunt U/C models I have ever seen. It is a T-38 "looks like" in military camouflage. The wing was built up, it weighed 16 ounces (!) and flew very nicely at the '76 Nats. If the owner will contact me, I'll give the credit he deserves for this beauty.

Fifth and last photo is a bare bones shot of House of Balsa's Beechcraft Bonanza. Use of ailerons and elevator controls gets away from mixers to deal with that Vee tail. Don Dombrowski said it flies well with 5 channels, retracts and a Max .10, or 2 channels and a Tee Dee .049. The model makes a pleasing scale subject and gives good flying either way. •

Instructor . . . . *Continued from page 19*

the 1 by 17 inch strip contains only 17 square inches. The proper way to figure wing area is average chord times the span. The average chord can be found by adding the root chord and the tip chord together and dividing by two. Wing loading is normally expressed in ounces per square foot and is figured by dividing the area in square feet into the weight in ounces. For example, say your TBF has 1500 square inches (please check area using the above system) and weighs 15 pounds; 1500 square inches divided by 144 (square inches in a square foot) equals 10.4 square feet, and 15 pounds times 16 (ounces to a pound) equals 240 ounces. Now, 240 ounces divided by 10.4 square feet equals 23.07 ounces per square foot, and is a very nice wing loading for this type of airplane.

Aspect ratio is simply a ratio of span to average chord and is figured by dividing the average chord into the span. An example of high aspect ratio is the long-winged gliders, and an example of low aspect ratio is the Buster or Bonzo racing airplanes.

Keep those cards and letters coming to: Dave Brown, 8534 Huddleston, Cincinnati, OH 45236. •

1 to 1 . . . . . . *Continued from page 30*

usual fuss and rush to get in the air, and the fact that very often, the flight line crew was not involved in the static judging. As a result, there is no basis for comparison of the model at the two

times.

Some things noted over the years include a variety of items which are most critical and sometimes make the difference between a model being competitive or even flyable and not:

Scale engines or sections of engines and cowl being removed for cooling.

Completely different spinner shape and size.

Landing gear door covers removed.

The addition of the muffler after judging (or not added at all).

Different wheels.

There are other items many of you may have noted at times, however, the point is made. One further thought regarding the muffler should be made. Without getting into a discussion of the value of the rule or the effectiveness of mufflers versus cowling, etc., I'd like to point out a situation concerning mufflers which was brought to my attention some years ago at a national meet.

A representative for one of the other model magazines was preparing material for his editor on the models entered. In an effort to do a good job, he photographed each model and obtained rather detailed information about them following each one's static judging. In short, the model went directly from the circle to his hands. Almost 25% of those models did not have a muffler installed. Some of the models, when they showed up at the flight line later, had them added. Some still did not.

Once again, a very good argument can be made that the judges should not be influenced one way or another concerning the presence or absence of a muffler, therefore it made little difference. Or did it? Did one tightly-cowled engine sporting a home-fabricated muffler run hot and sag, possibly putting someone out of contention? Who knows.

The rules state that in Sport Scale, the maximum documentation allowed is six pages equivalent to 8-1/2 x 11 inches. Have you seen presentations that exceeded that requirement, or since they were just a handful of loose papers, you could not tell? There are those presentations which consist of a stack of unorganized materials stuffed inside a folder or just clipped together in a haphazard manner. Likewise, there are some that include everything except how often the pilot clipped his toenails.

But what happens with the well-organized, nicely prepared Sport Scale documentation that goes perhaps ten pages? Does your contest director ask the modeler to trim it to the required amount?

In conclusion, may I reiterate that in most cases cheating or purposeful mismanagement is not the problem. It is rather the sin of omission or the lack of adequate knowledge that results in problems developing. It is, I feel, not too much to expect that the event will be run in accordance with existing rules and regulations. It's the only fair way to go.

USING SOMETHING FOR A PURPOSE FOR WHICH THE SOMETHING WASN'T DESIGNED

A recent project brought about a need for a part that was not available. Under the wing panels of a Russian dive bomber under construction are two "rail fences" (dive brakes). Since they had to move through 90 degrees and had to lock against the full force of the slipstream, the linkage became important.

A solution to the problem would seem to be a retract gear mechanism. Since standard retract gear tends to be somewhat heavy, I casted about and lo and behold, Robart's 1/2A retract gear just happened to appear. The housings are quite light, operate smoothly, and lock in a down position. The "venetian blinds" mounted on the shaft look great. They haven't flown yet but *should* work (I'll let you know).

A servo or something like a Sonic cylinder can be used to move the linkage via pushrods or cable. The linkage should be set up so a pull movement is necessary to extend the "fence". This will help take care of strain on the linkage.

A NEW ANGLE

Have you noticed that from time to time, a strange thing happens somewhere between the three-view and the end product? Seemingly, little gremlins creep into the balsa and edges bulge, change directions, or lines just don't want to cooperate. Very seldom do you

have an opportunity to look directly at your subject at right angles. The three-view is drawn that way, however.

When the model is viewed from varying angles, you'll note that some outlines appear to be a different shape, when indeed they are not. Fuselage contours often fall into this trap. Perhaps the most noticeable is the wing outline.

An absolutely accurate outline, when viewed from the approximate 45 degree angle which develops when a person stands away from the model placed on the ground; will very often appear distorted.

In order to check the accuracy of your model, place your three-view in varying angles to match the model's position. I'm certain that this is not the most accurate approach, nor is it probably very original, but it was interesting to note how it worked with a model I am presently working on.

As the wing was completed, the shape seemed completely wrong. It is a rather complicated shape, with a straight leading edge to the engine nacelles and then tapers continuously from tip to root on the trailing edge. In addition, the center section is flat, with the dihedral running from the nacelle outboard.

I placed the completed wing over the projected outline and it matched. I even stood on a chair and viewed the fuselage-wing assembly from directly overhead. Looked right! I put the assembled stuff on a card table and viewed from the wingtip. Looked right! I put the thing on the floor and backed off. Looked *wrong!* Then the three-view was tilted and viewed from the proper angle, and presto . . . the angles all fell into the proper perspective.

If you haven't done it, try it.

LOOKING TO '80

It'll be Canada in '80 for scale buffs. As our Nats creeps toward us, you will want to consider entering your scale bird in the team selection program. As you prepare for this, make note of several items.

First, you will need to pay close attention to the Nats entry forms. There are cut-off times for entry and *also for turning in your model.* Every year problems creep into this procedure when individuals confuse late entry and turn-in times. *Read that Nats form!*

Secondly, read the rulebook. We covered that problem in earlier columns.

Thirdly, this year it would appear that we will be selecting a Sport Scale (Stand-Off) team of three members. This team will not receive official status at the '80 competition; hence, it will not receive financial backing. Attempts will be made, through such things as selling patches, etc., to provide whatever help possible. NASA is working on this at the present time.

In an effort to help you understand the nature of the presently "unofficial" FAI Stand-Off rules, they are provided for you in this issue. *Be aware that if the past team selection procedures are followed, the team will be selected using AMA rules.* It is important for you to realize this if this procedure is followed and you are selected. It will be necessary for you to make certain your model meets FAI specifications. There are significant differences between the FAI and AMA rules.

Check your AMA rulebook for model specifications for weight, engine size, etc., beginning on page 84. Recent FAI changes are not yet in effect; thus, you will be working with a 10 cc, 6 kg. limit.

SHORT SHOTS

Robart wheels with cross tread and straight tread with the printing on the sides are now available in all sizes from 2-1/4 to 4 inches.

The July 1 Scale event in St. Louis will feature participation by the local EAA chapter. Their meeting on the site will include some fly-in full scale aircraft.

"The difference between a novice and expert builder is simple to detect. The novice trims the piece of wood three times before it's too short to fit; the expert does it the first time."

* * *

FAI STAND-OFF SCALE RULES

OBJECT: To promote an event for interesting and practical flying scale model aircraft where reliability in operation is more important than extreme accuracy and expert workmanship, and in which static judging is simple and does not require detailed and expert appraisal of the model. These rules are intended to help beginners in the NAC's of the CIAM to become acquainted with the CIAM Scale rules and the way they are handled for competition.

Therefore, the flight program and judging of the Sporting Code, section 4, part 6, class F.4.B.C. are used as printed and are part of this proposal.

The static judging is adapted to fit with its K-factors those flight-programs and the relation between static and flight points (maximum available) are kept to the well-established ratio of 50:50.

MODEL REQUIREMENTS: Any model resembling a particular heavier-than-air man-carrying aircraft is eligible to compete, provided it is in accordance with the General Regulations for Model Aeroplane, Part One, of the Sporting Code of the FAI.

BUILDER FLYER: The competitor must be the builder of the model and must pilot it.

PROOF OF SCALE: To prove that the model resembles a particular prototype, some documentation is required.

Minimum documentation shall consist of a three-view drawing (published) or silhouette together with a maximum of three photographs of the prototype.

A selection of photos, showing the aircraft in front-view, side-view, and plan-view can replace the three-view drawing or silhouette of old-timer aircraft for which no drawings may exist.

Minimum span of the three-view documentation shall be 100 mm. For scoring under "color and marking", the color scheme must be proved by a color

print or photo or by a printed description. A Profile or similar publication is an ideal proof both for outline and color scheme. If no proof of scale material accompanies the model, only craftsmanship and flight points may be awarded.

STATIC JUDGING: Static judging shall be done at a distance of 3 meters from the model. Details not visible in flight (Dummy engines hidden in cowlings, cockpit interiors, fine surface details) are not to be considered in scoring the model.

Static scoring:

Fidelity to scale
(accuracy of outlines) ..... K = 5
General impression ..... K = 25
Craftsmanship ..... K = 15
Color and Markings ..... K = 20

BONUS POINTS: 50 points bonus shall be awarded to contestant if the model entered is his own (construction) design. As proof, the contestant should include his construction drawings in the scale presentation.

MEASUREMENTS: When processing the model, the basic measurements of span and length must be taken and ratios are to be compared with the drawings. Deviations of more than 5% shall be taken into consideration when establishing the score for fidelity to scale.

FLIGHT JUDGING AND FINAL SCORING: According to Sporting Code (6.2) Control Line, (6.3) Radio Control. Also, the general rules of Part Six 6.1, excluding 6.1.9.4 (documentation), are part of these rules. •

Hannan . . . . . *Continued from page 58*

different countries (including the U.S.). **Model Builder**'s own Peanut Postal contests have repeatedly drawn foreign participation, evidently overlooked by the August FAI committee members, who seem to confuse quality with size.

Any of our readers who may care to support the advancement of F/F Scale on an international basis may help the cause along by sending a letter (a 10-cent postcard would suffice) to: C.J. Vandenbelt, 2086 Kender Ave., Ottawa, Canada K1J 6J9.

Canada has not yet decided to include F/F Scale in its 1980 World Championships, but might do so if sufficient enthusiasm is expressed. Note that proxy-flying is permitted under FAI policy. Canadian readers could be especially supportive, by volunteering their services as proxy-fliers, judges, or helpers. Thank you!

JAPANESE PEANUTS

Rising sun entries are expected for this year's **MB** Postal Peanut event, thanks to publicity efforts by Ichiro Yamada, who persuaded the editor of Japan's *The Model Journal* to print an entry blank and contest description in the magazine. The more the merrier!

HOW'S THAT AGAIN?

Ed Carson, of Denmark, reported a unique present he received for Christmas, 1978: On the outside it was labeled "TWO PEANUT SCALES", but turned out to contain "two scaly peanuts", a gift from prankster American friends.

HOLIDAY CARD TO SAVE

Here at the Hangar, we received a novel card from the staff of Modernistic Models, sure to be preserved, since it featured a scale 3-view of the Standard E-1 biplane.

NEW AVIATION FILM?

Rumor has it that another epic production is brewing in Hollywood. Titled "Crackcase Oil", this flick is the story of a disco-dancer turned stunt pilot, and will star John Revolting.

NEW CATALOGS AVAILABLE

Peck-Polymers is offering a 1979 catalog, featuring a comprehensive array of items ranging from accessories and materials through complete kits, including one small R/C model. According to Bob and Sandy Peck, new products are being added to the line at the rate of 2 or 3 per month. We found new (to us) listings of an Embryo Endurance kit, mini-dethermalizer fuse, and imported plans as follows: from England, the Alan Callaghan designs; from France, the work of E. Fillon and J.F. Frugoli; and from Germany, the vintage productions of Benno Sabel. Additionally, the Pecks are stocking plans by Greg Thomas, and the famous Zaic yearbooks. One dollar will bring you a copy from: Peck-Polymers, Box 2498, La Mesa, CA 92041.

Micro-X products also favored us with its new catalog, available for $1.00 from Box 1063, Lorain, OH 44055. Featured are supplies, accessories, and kits, running the gamut from indoor "mike" types clear through R/C models. Specialty items seldom found in hobby shops include condenser paper, Micro-Lite covering (clear and silver), condenser paper cement, and ultra-fine bracing wire for microfilm models. Other items such as winders, thrust bearings, contest balsa, and rubber round out the presentation, as do the photographs of Sherry and Margie, the Micro-X pin-up girls!

SPRUCE GOOSE UPDATE

Howard Hughes' giant "white elephant" continues to concern the city of Long Beach, California (who wants to get rid of it) and the Air Museum of the West Foundation (who wants to save it).

The problems are, as usual, political and financial. The Long Beach Harbor Commission has already advanced approval for an oil terminal to be constructed on the present site of the flying boat hangar, and want the machine removed. Period.

Meanwhile, the opposing factions, representing the Air Museum of the West Foundation, Hughes' Summa Corporation, and various private individuals, are desperately casting about for an alternative location for the monumental wooden bird. Evidently, the systems used to control the humidity in the facility have already been turned off, bringing on the added possibility of structural decay, if delay continues.

A privileged few have been allowed to visit the craft, including Walter Cronkite,

Bill Pardoe, and Bill Noonan. (See, model builders ARE important people!). Unfortunately, cameras are still verboten, so we are unable to present tangible evidence of their visits.

Let's all hope some sort of quick solution can be found. How about making it into an AMA Museum?

EXTENDED SCALE

A few issues ago, Richard Allen, of Canada, advanced his thoughts for Extended Scale. His concept was to take an existing aircraft design and "update" it to a more advanced configuration. This month we are presenting a specific example, the Boeing P-26A, extended. Richard says: "Scale modeling is enjoying (I think) its second Golden Age. I'd like to see it really take off (pardon the expression) and hit some new highs (ditto). Being a relative newcomer to the whole scale model scene, maybe this has been done before, but I don't think so. It seems to me that there is going to come a time when every conceivable full-size aircraft will have been beautifully rendered in (model) size, and then what? That's why I suggested Extended Scale. I guess I've always been more of a builder than a flier, so it's not so important to me that my creations fly as well as look good. That criteria leaves the door open for just about anything: 1) I do, however, feel strongly about stick-and-tissue construction methods, allowing for some vacuum-forming. I think it's a character-building medium as well as being light and strong. 2) Perhaps Extended Scale shouldn't be a contest at all, but rather an exhibition, a collective release of pent-up aviation fantasy. 3) I would limit wingspans to 24 inches because I think that's a dignified size for the medium. 4) All entries *must* have pilots, made by the designers, preferably resembling themselves."

How's that for fresh thinking?

MODEL POLITICS AGAIN

Dr. Dzus envisions a new competition event for those who seem to prefer rules-argumentation to model building. He notes that some of the most vocal of the rules protestors/changers seldom appear at flying sites, let alone contests, with aircraft! Yet they would impose their wills upon the *active* model competitors. As an alternative, Dr. Dzus proposes a special category in which models will not be required. Each contestant will be furnished a pencil, clipboard, and regulation yo-yo. Brightly colored uniforms are suggested to add a festive note to what might otherwise be a dull occasion. Each would be prominently numbered, in case any spectators care to distinguish one participant from another, and naturally, printed programs would be available for scorekeeping purposes. A remote site would be required because of possible noise pollution problems, unless the entries were equipped with some sort of mufflers.

Dr. Dzus justifies the creation of this event this way: "Think of the advantages to true model builders and fliers, who will be able to enjoy their hobby unemcumbered by non-productive politicians!"

HISTORY ACCORDING TO SCOTT

Frank Scott, Dayton, Ohio, feels a tribute is long overdue to the world's very first model flier: "As can readily be confirmed by certain obscure cave-paintings in France, it was a cave man. He threw a sun-dried pterodactyl carcass over a cliff, and was astonished when it came back!" •

Sailplane . . . . *Continued from page 38*

does help keep a model airborne a bit longer than a stab that "lifts down".)

Harrumph. Now, I certainly hope that this little lecture will keep each and every one of you from thinking seriously of designing your Dream Soarer with a lifting stabilizer, and placing you CG *behind* your Center of Lift, the way those crazy free flighters do. I realize that I've advocated elsewhere an extremely rearward CG; but only back TO the Center of Lift, never behind it. And even then, I advocated it mostly for the efficient running of the FAI Speed Course, which is a thousand-foot-long downhill dash at a (hopefully) continuous angle to the oncoming air. And I cheerfully admit that when you move the CG back into the Center of Lift's territory, A) the elevator is going to get violently touchy; and B) if you're unfortunate enough to draw really bad air on the speed course, your flight time is likely to be even worse than if you'd tackled the course with a more conventional CG.

But enough about Center of Gravity, Thornburg. This is a *stabilizer* article. Stick to the point. Now that we're all convinced that we need a stab, just how big should we make it? And whereabouts on the rear of our airplane should we hang the thing?

Obviously, the size of stabilizer we need is going to be related somehow to our "tail moment" . . . the wing/stab gap we talked about last month. On most of the planes we examined (Aquila, Oly II, Paragon, etc.) the gap was around 1.8 to 2.1 wing chords, and we noted that the trend is to shorter and shorter tail moments in the newer designs. One

might suppose that the stab areas would be increasing to compensate for these ever-shrinking fuselages, but that doesn't seem to be the case. Stab areas are actually coming down right along with tail moments, as R/C designers move farther and farther from the old free flight parameters.

Thus, the "24-27% of wing area" figures we find in Zaic's *Model Glider Design* (copyright 1944, and 100% free flight oriented) now appear huge. Even the 20% recommended by Lister in *Sailplane Designer's Handbook* seems unnecessarily conservative: Tom Williams' "Viking" flies with a 15% stab, and my "Bird of Time" is down to 11%. And both of these planes have only 1.8 wing chords between wing and stab. In that same ballpark is the Austrian "Dassel," with a 12% stab and a 2.2 chord gap.

So we see that there's a lot of room for argument . . . and experiment . . . when it comes to stabilizer size. A Windfree has only an 11% stab, yet I've seen one landed in perfect control after losing half a stab in a mid-air. Of course, the Windfree has a comparatively thin airfoil, and that means its Center of Lift probably doesn't wander quite as freely as it might. Generally speaking, the higher the airfoil's mean camber, the shiftier will be its Center of Lift, and so the more area we'll want to design into our stab. The ideal, of course, is to have the smallest possible stab that will serve the purpose, but unless we're designing for all-out competition, why push the parameters? Just draw up a stab between 12 and 18% of the wing area, and you'll be safely within the current limits.

Where you place it on the fuselage can be even more important that its size.

Last spring, a few sharp-eyed critics noticed that the plane I flew in the California North-South Challenge (see September 1978 **MB**) wasn't really a Bird of Time at all, it was a BoT wing strapped to a slightly different fuselage and empennage. The stabilizer on this "new" design was articulated rather than all-flying, and it sat on the fuselage slightly lower than the wing. The entire fuselage and empennage was "designed", built, and test-flown in the two-day weekend preceding the contest . . . I just wanted a new plane to fire me up for the competition, and I knew it had to be simpler than the Bird if it was to be finished in time.

I knew I was taking a chance, lowering the stab into the wingwash that way; hadn't Williams raised the stab on his Windrifter since the early kits? On the other hand, Rick Walters got away with a low stab on his "White Trash", but then his tail moment was much longer than the Bird's. So just to be safe, I increased the stab area from 11% to 16%. After all, articulated stabs always seem to run a little larger than all-flying ones. This done, I headed for Bakersfield.

On the second day of the contest, I found myself about fifteen feet off the deck, inside one of those small, tight, turbulent desert twisters. Hooray! My kind of thermal! Time for some genuine New Mexico cowboy-style flying: cranked up on a wingtip, doing six-foot circles with a ten-foot plane, rocking and tossing around like a saddle-bronc rider! And right out in full view of everybody, in the deciding round of the contest! Now, what more could a shy, modest, retiring country boy ask?

Two circles later I stalled the plane and fell right out of the lift, and in fifteen seconds I was on the ground.

Now, no designer worth his weight in gum arabic will ever admit to pilot error. I suspected immediately that the problem was aerodynamic, so the following weekend I drove over into the Napa Valley, where drier, more desert-like thermals occur, and lo! I was able to repeat this nifty trick twice more in a single afternoon. Sure enough, the stab on this "improved" design was far enough down into the wingwash that it would occasionally blank out at very high angles of attack. "Occasionally" is too often for my taste. I gave the airplane away.

The moral here is two-pronged: either know your airplane well, or else design it a little more idiot-proof. For starters, keep the stab up out of the wingwash, especially if you're in the habit of riding thermals with full up elevator. And if you're really paranoid about stab blanking, you might want to go to a T-tail; the full-scale drag men tell us a T is cleaner than any other configuration except a V. The problem is, it must be kept light, because that much mass on top of a tail rudder tries its best to snap your fuselage in two during hard landings. And then I've heard folks swear that a T-tail is prone to getting blanked out during the launch. . .

MODEL OF THE MONTH

This month's three-view is the latest in the "Osprey" design series by Ray Hayes, of Fort Wayne, Indiana. Ray took his Ospreys down to the FAI Finals in Pensacola last September and turned in

the first decent (13.6 sec.) speed time of the contest. Here's what Ray says of the plane:

"The Osprey 900 was built to withstand the rigors of the FAI tasks. The use of wing blades in place of wires, and 1/4-inch square spruce spars on the inboard panels proved to be sufficient without a weight penalty. The fuselage is very strong, and will carry three pounds of ballast. (The 900 weighs 54 ounces without ballast, and has 900 square inches, for a wing loading of 8.6 ounces per square foot.)

"I tried to accomplish everyone's dream, namely an all-weather sailplane in the 100-inch class. In my area, we can have a multitude of weather conditions during a single day. Consequently, the airfoil and planform are designed for float as well as speed, and the flaps help accomplish this. The ballast box is extremely important. Since the airfoil will sustain a very high wing loading (it's 10.8% at the root), it becomes apparent that learning how much weight to add during different weather conditions will allow the ship to perform well in all conditions.

"For those of you who have not tried scratch building, I recommend that you give it a shot. The satisfaction of seeing your own creation do well is two-fold compared to flying a kit designed by someone else. Also, you will get more out of the hobby because you'll be putting more into it. Drawing a set of plans for your dream ship is not simple, but after you do it a couple of times it becomes easier, and very enjoyable. You may have an idea that could move soaring ahead of its present state, but if you don't put it down on paper and build it, we'll all miss out on the potential advancement."

Hoorah, Ray! I couldn't agree more! Anyone who'd like to look at Ray's plans for the Osprey can drop him a line at AMS, P.O. Box 9368, Ft. Wayne, IN 46809. •

Intermission . . *Continued from page 71*

how slow and long the Pennyplanes could fly. We heard some people swear that we had some kind of secret material, instead of strands of rubber. We wound the Pennyplanes to stay up only about three to five minutes; any longer flight, we felt, would bore the crowd. And of course, we lost a few of planes that strayed into the crowd and were grabbed and smashed.

When I am in the stores or on the street with my son, Johnny, people we have never met before will stop us and ask Johnny how he is doing with his airplanes. The results of all of this is that we are becoming known. We are getting many youngsters and adults started with the building and flying hobby as a result of watching us fly during the basketball halftimes. The main thing is that we are having a heck of a lot of fun, and at the same time we are giving the kids something to shoot for. This may give your club some ideas about how to promote goodwill in your town. •

Pylon . . . . . . *Continued from page 47*

board tubes used to roll the carpet up can be assembled to your desired length; they can also be painted easily (red-and-white combo is highly visible), and with proper care can be used for many races or seasons. The pylons can be held upright by using three heavyweight cords coming off a high point on the pylon and anchored into the ground.

Protective barriers should be provided for the flagmen working the pylons. The barriers should be at least 3/4-inch thick plywood and protect the workers on at least two sides. The workers on pylon No. 1 should have barriers in front of and behind their positions; the judge at No. 2 should be protected in front of, to his left, and behind him, as he is looking towards No. 1 pylon; the judge at No. 3 should be protected on all four sides if possible.

For a one-time race you'll also need to provide different colored flags for the No. 1 pylon flagman to indicate to the fliers when they have reached the pylon and can make their turns. If you'll be running more than an occasional race, it would be beneficial to invest in a shutter system for No. 1 . . . a future article will detail the building of an efficient set. Boating-type compressed air horns should be provided to the pylon judges on 2 and 3 for indicating cut pylons; the ones K-Mart sells work satisfactorily and are more than loud enough. (I can only imagine my neighbors dropping things when my kids unexpectedly try out the new ones I buy for our race.)

Protection should also be provided for the lap counters and starter, as the most satisfactory position for them to stand is just behind the starting line and between the center of the course and a line drawn from No. 1 pylon through No. 2. As an alternative, the lap counters can be placed off the course and in line with the starting line.

If you expect to draw spectators, have your groundspeople plan on roping or barricading the pit area from the spectators, but allow them to get close enough and have a good view of the pit operations. You want to separate them from the equipment but still not discourage them from watching what goes on in the pits. Provide an area for parking and assign people to control it. A table with an umbrella to provide some comfort for the person working this thankless task will make it somewhat easier to recruit volunteers. This is also a good place to solicit parking donations, should you decide to raise money in this manner. Asking for just a small donation doesn't offend people, and those coins can add up if you have a good crowd.

You'll also need to come up with a communications system for keeping the No. 2 and 3 pylon judges and the No. 1 pylon judge and the head lapcounter in constant contact during the race. It's necessary for all cuts to be called into the

head lapcounter so he can relay the information to the concerned flier and lapcounter assigned to that plane. The communications system also makes plane identification easier and insures that everyone understands the situation. A set of four walkie-talkies (not on R/C frequencies!) is probably the least expensive and easiest way to go.

Now, to the number of people required and their duties:

PROCESSING AND SCORING

This is usually a two-man job, particularly early on race day. They need to register the contestants, collect the entry fee, check for current AMA and FCC licenses; during the contest they'll also be posting and keeping track of the scores, sending out heat cards to the starting line, calling heats to the fueling and ready lines, and in general be the guys who keep the contest moving. I also suggest you safety inspect each aircraft when registering the contestants. You'll be surprised how many loose control surfaces, loose or missing bolts, and structurally damaged parts you'll find. A third person should be assigned this task if many entrants are expected.

STARTER

The starter's function is to get the races going, watch the overall race while in progress, and note the order of finish. When the fliers arrive at the starting line, he determines that they are in proper position as shown on the heat card, makes sure all fliers understand race procedures, have their equipment turned on, and make sure the start is fair.

LAPCOUNTERS and TIMERS

A head lapcounter should be appointed, and depending on the number of planes you plan to run per heat, that's how many additional lapcounters you'll need. Their function is to count the laps off as flown and to time the aircraft they're assigned to watch.

Flip cards are a good means of showing what lap each flier is on. They can be easily made of heavy posterboard if you don't plan on using them very often. More substantial ones can be made from light gauge aluminum. The cards should be numbered from one through ten consecutively. An easy means of using these cards during a race is to have them mounted on two large-diameter rings through holes punched in the tops of the cards. The rings are then mounted on a horizontal pole which the lapcounters will stand behind. The pole should be at such an angle that the cards will be readily visible to the fliers and their callers in the positions they will be actually flying the race from. The lapcounters should be numbered from 1 to 4 (assuming 4-plane heats) from left to right as the fliers will be looking at them.

The head lapcounter is charged with watching the overall race and helping to denote the winner; he is also responsible for assisting in notifying the fliers of any cuts and insuring the lap counters are performing their jobs correctly. If personnel are in short supply, the head lapcounter job may easily be eliminated and the duties given over to the starter.

NUMBER ONE PYLON JUDGE AND FLAGMEN

The flagmen's positions should be numbered 1 to 4 (again assuming 4-plane heats) from left to right as seen from the starting line. The judge is responsible for ensuring that his flagmen properly identify the plane they are flagging and watching the overall race.

The flagmen are responsible for signaling the flier of the plane they are assigned to when his plane has reached the No. 1 pylon and can proceed to make his turn. The flagmen are stationed to the right side of the pylon as seen from the pilots' positions. If actual flags are used as signals, the flagmen should hold the flags in an upright position until the airplane passes the pylon and then the flag should be smartly dropped below the protective barrier. Should the aircraft cut short of the pylon or turn back inside the pylon without going around it, the flagman should signal this cut by waving the flag sideways over his head. The flags should be kept out of sight below the barrier then until the aircraft rounds pylon No. 3 and should then be raised vertically again.

NUMBER TWO AND THREE PYLON JUDGES

The judges are charged with ensuring the aircraft pass around the outside of the pylons and do not cut. A blast on the air horn while simultaneously calling out the color of the offending aircraft and also pointing at it will make it easier for the lapcounter to identify the offending craft.

One other job you may want to assign someone if you expect many contestants is a transmitter impound security officer to prevent unnecessary handling of the transmitters and to ensure all transmitters are returned to the impound area and turned off.

Next month we'll cover actual race operation procedures and the mechanical means of setting up a matrix and the associated paperwork in running the race.

SPEAKING of races . . . if you have one planned, it's time to let us know. My address is 3727 Shepherd Lane, Ft. Wayne, IN 46815. Be sure to include info like date, place, type, etc.

See you at the races!! •

F/F . . . . . *Continued from page 63*

What would make this an interesting event would be the standard amount of power available to each contestant. There will be differences between individual engines, but there will be a spread of no more than 1000 rpm between the best and worst engine on the field. Contrast this to the usual 4000 to 5000 rpm difference between the "expert" TD and the poorest samples produced. One reason for this is that the reed valve has a limit to the speeds at which it can be run, which makes high-nitro fuels unproductive. With a constant level of lower power, the trimming problems of powered flight should be greatly simplified for the novice. I

repeat, this would make an interesting event.

I realize that David Benepe has proposed a Novice Power event to the F/F Contest Board, which is restricted to these reed-valve engines only. But his proposal incorporates too many restrictions on both the airplane and contestant to serve the purpose he intends. The models would be restricted to a minimum weight and size, for example. The size he selects would eliminate all of the kits I mentioned earlier (the Viking would be the only eligible kit I could think of), thus restricting the novice to scratch-building or designing, for the most part. It would also require more processing to insure that the model meets the size and weight restrictions.

To get around the fact that most power contests have no scales for processing, he would require the event to be held at every AMA-sanctioned contest. Contestants who entered this Novice event would not be allowed to enter any other event. This would eliminate experienced fliers who would want to try the event . . . and also the possibility of research and experimentation with new designs.

The final drawback to Benepe's proposal is the elimination of both mechanical timers and flight maximums. Both of these items are necessary to insure that the novice flier has an airplane to fly at the next contest! A 10-minute OOS flight may be awe-inspiring, but not to the Junior with little cash for another airplane!

Don't get me wrong. I'm not opposed to the concept of a Novice event, I just feel that there are too many drawbacks to the details of Benepe's proposal. The idea of an event for reed-valve .049 engines is great. But the 1/2A Sportsman event described earlier would serve the novice power flier just as well. It would also give the experts a cheap, "fun" competition event. Why don't a few clubs take a look at it and see if it meets their needs for an unofficial event at their future contests?

LUCKY MOODY CHECKS IN

Ole C.P. wants everybody to know that his Modelcraft Replica kits are still available, contrary to rumor. He's moved from Southern California to Yreka (makes it up to our WMC contests fairly regularly) and is still producing old-fashioned printwood kits of the Pacific Ace and 30-inch Soaring Glider. Even the errors in the original kits are faithfully reproduced! The Pacific Ace can be flown in P-30 or Old Timer Commercial Rubber competition classes, or just for plain fun. It retails for $4.95 plus $1 postage. The Soaring Glider is a perfect schoolyard flier for $3.95 plus $1 for postage.

You too can check in with Lucky at this address: 722 Lennox, Yreka, CA 96097.

THIS MONTH'S THREE-VIEW

When you spot a 3-view from your club's newsletter appearing in papers from clubs halfway across the country, it's time for it to appear in **Model Builder.** Dave Hagen is our resident WMC indoor fanatic. He's pushed our site record in EZB and Pennyplane up almost every time he's flown in the last few months. When he spoke at our Indoor Symposium, he recommended Pennyplane as the most logical event for a beginner to start with. He also recommended this Novice Pennyplane of his as a good starter model. Needless to say, it also currently holds our site record.

NORTHWEST FAI SYMPOSIUM

The Strat-O-Bats and Boeing Hawks were the hosts on January 13 to most of the Northwest's FAI fliers. The Boeing Recreation Center in Kent was jammed with free flighters seeking an escape from the winter doldrums. A variety of "experts" presented their ideas on both technical topics and practical hints. As a matter of fact, the theme of the Symposium this year seemed to be "how to get more out of your workshop".

Steve Helmick led off the parade with a survey of metalworking techniques with hand tools. Even though he works as a machinist, Steve doesn't possess lathes, milling machines, etc., and doesn't care to linger at work too long to use their equipment. So it was interesting to see what you can do with simple modeling hand tools (including a Moto Tool). His talk was especially informative when talking about tapping and drilling techniques. His advice: buy several of the smaller size taps and drills (hobby shops that deal in model railroad supplies are good sources for most model metalworking stuff), so when you break one you'll have a spare. He also stressed the necessity of using a lubricant and backing out the tap regularly to avoid breakage. (As a fellow who's managed to break 1/2-inch taps, Steve's an expert on the subject.)

One neat tip when laying out patterns on metal. Machinists normally use a blue layout fluid not normally seen in your local hobby shop. Steve says a permanent marker (such as Marksalot) will lay a nice even film of color on the metal without rubbing off. Then a scriber will mark out the pattern so you can see it easily against the color. I tried it, and it works great.

Keith Martin made a nice presentation on epoxy and fiberglass molding techniques. He brought out a couple of the prop molds used for making his FAI power props. One was made completely of epoxy (an aluminum-filled casting resin), but wasn't as durable as the other, which had an aluminum base.

Keith found that making props isn't a process where he can take out the molds and make 1 or 2 props as needed. It takes a while to get your prop-making techniques together, so he prefers to keep in practice by making them steadily, a couple of props a day for a solid month. He lets his props cure at room temperature for 7 to 10 hours, to prevent blade warpage and pitching problems.

The resins Keith uses are purchased from Richard Schley in Germany, since there is no comparably stiff resin available in the U.S. for the props, he feels. The U.S. resins (ask for a thin laminating

resin, if you want to try) are a bit too brittle.

Resins used for covering sheeted wings are more flexible. They are thinned with methanol, to put the thinnest possible layer of resin on the wings, since the strength comes from the cloth, not the resin. Keith's opinion was that clear Hobbypoxy or Superpoxy paint would work just as well as the exotic epoxy for attaching cloth (Doug Galbreath and Bob Stalick approve of this, also). One hint I picked up was to seal the surface of the sheeted wings with a couple of coats of thinned dope before applying the glass cloth. Sand the first coat, but not the second, so the cloth sticks better. The sealing keeps the weight down by not letting the resin penetrate deep into the soft balsa covering.

Jim Thornberry presented the results of his experiments with foam Nordic wings. His foam cutting rig and techniques came from the series of articles in the January to March 1978 issue of *Model Aviation*, which he feels is the best-detailed stuff on the subject. He uses a 4-amp, 18-volt transformer from Radio Shack (about $12) as his power source. It works well on his cutting bow with a length of Sig nichrome wire. A couple of alligator clips can be slid along the wire to regulate the cutting temperature.

Jim finds that thin undercambered Nordic wings are best cut with the undercamber first. Templates are made from 1/8 plywood, which must be sanded smooth along the edges to avoid snagging the wire. Cutting foam is a 2-man job which requires some practice.

The foam blocks are held down flat on the working surface with full lengths of double-backed carpet tape. Jim had his rig out and cut out a couple of surfaces in just about the time required to write this paragraph.

One of the big advantages of foam wings, Jim feels, is that it is very easy to cut out cores incorporating warps, variable airfoil sections, etc., without much complication. You just have to use suitable templates. One problem is the thin trailing edges of most A/2 sections, which makes it hard to cut out perfect cores, and which doesn't provide suitable resistance to warping. Jim had

trouble in the hot conditions at Taft with warpage at the t.e. on one of his sheet-covered wings. He thinks that he may just cut out the front section of the wing from foam (where there is reasonable thickness), and use a solid balsa trailing edge.

Next month, I'll continue with a description of some of the more technical presentations, the papers on Wakefield topics, and how to incoporate some kit manufacturing techniques into your own workshop. •

Mammoth . . . . *Continued from page 28*

personal gain, it will provide our competitors with just as much help, and generally, all modelers will benefit.

We have started to build test equipment especially for modelers' needs, in addition to some already in use. If you look at how S.A.E. standards are arrived at for testing small engines, you will see that it leaves no doubt that you will get the *same* results *every* time, regardless of when or where in the world you make the tests. The reason is obvious. For example, at each test run, records of the barometric pressure, air temperatures taken with both wet bulb and dry bulb instruments, and fuels used at the time of the test run, to mention a few, are taken at no less than 200 rpm increments. Fuel consumption is checked at these points as well. Also clearly stated are terms which preclude a "specially prepared" engine as to workmanship,

condition, and equipment installed. In short, every effort is made to ensure that you receive the product which performs as indicated by the specs.

If you look at accompanying charts A and B, you will see a simplified power curve and fuel consumption graph for the stock Quadra engine. In B, the gallon/hour is in USA gallons, not Canadian. Thankfully, a cc per minute is the same worldwide! The CBHP on the left stands for *corrected* brake horsepower, which means the actual observed readings obtained are adjusted by set formulae to compensate for many factors such as altitude, weather, temperature, etc. to ensure that ratings are not affected by "good" or "bad" days or the location of the test; in other words, a definite guideline or measurement which is repeatable time after time, with the same answers at the end of the test. Beware of any power chart which doesn't show the "C" or shows an "O" (observed) beside the BHP. It's amazing how good or bad you can make an engine look by not using a standard test procedure.

I had previously invited other manufacturers to send us their figures, but have not received them as yet. Please send them in for publication, but be sure to abide by the S.A.E. standards for small engines so that they have some meaning, or send us the engine and we will do it for you. You can be assured that it will receive a fair test according to S.A.E.

standards.

I mentioned new test equipment. In charts A and B, you will see the results under power absorbed and fuel consumed by a Punctilio 18 x 6 Airflow prop. Now things will start to make sense! Notice the amount of fuel and power required to increase the rpm from 7000 to 8000 (statically). Also notice the amount of increased fuel consumption it took to achieve these extra revs.

At this time we invite all prop manufacturers to send us *off-the-shelf* grade props from 16 x 6 through 24 x 10. At present, graphs can be provided to a limit of 4 CBHP.

Modelers intending to use geared or belt driven units on standard glow engines will now be able to get a pretty good idea of how their proposed engine/drive/prop set-up will perform without buying the wrong (for them) combinations. By using our published propeller power absorption curves for each propeller tested (note that they show torque requirements as well), plus Peter Chinn's test reports and graphs, you're well on your way. All that's left is to know the *exact* reduction ratio and the percentage of power loss per applied hp of the reduction unit. It's important to know this power loss because it can vary quite a bit. Remember, a prop drive *can't* increase your engine's hp; instead, it multiplies your engine's torque in direct proportion to the ratio of reduction (less the power loss in the drive), just as the transmission in your car does.

For example, by looking at graph A you will note that if you had an engine that developed one actual hp at 13,000 rpm at about 5 pounds of torque, you could swing the 18x6 Airflow prop at 6500 rpm with a speed reducer operating at 2 to 1 ratio (less the power loss in the reduction). However, if you had a racing engine that developed 2 hp at a much higher rpm but had the same *maximum* torque of 5 pounds *and used the same reduction unit* of 2 to 1, it could only do as good a job as the 1 hp engine swinging that same prop! Even then, if that torque peak was lower than 5 pounds *at the 13,000 rpm* mark, it would result in a mismatch of powerplant and reduction ratio *for the prop involved.* The result would be that the 1 hp engine would do a better job.

To recap, we can check engines of the Quadra type from 1 to 4 hp accurately to S.A.E. standards. We are not equipped to test standard model engines at this time. We can now test prop power absorption within the foreseeable speed range of 4000 to 10,000 rpm to the sizes of 16x6 to 24x10 in the patterns *as they now exist.* The last opens up an entirely new tool to modeling.

Now on the way is the equipment to accurately measure developed thrust, both statically and dynamically. When this equipment is complete, we will know not only how efficiently our props pull on a test bench but also the pull at various air speeds *and attitudes* ("P" effect). Initially, the dynamic thrust figures will be limited to 60 mph or the slightly higher figure of 100 kph, with all information suited best for Mammoth Scale. Preliminary tests have proven to be quite an eye opener.

Look at chart A again and project the power absorption curve at the same rate of increase to 9000 rpm. Now, assume that the thrust will increase at the same rate. Digesting this one, you would soon realize that increasing power to achieve this 1000 rpm increase is resulting in vastly diminished returns. It's possible that engineering effort would be far better utilized in changing the airfoil of the prop, especially if that none linearity also exists at or near the same rate at 50 mph air speeds. Surprising as it is, the Airflow props perform as well as any in the air at present, but I sincerely doubt that any make would be the answer close to optimum.

The same basic instrumentation and equipment can be used to check aerodynamic drag of various airframes at various airspeeds, and this will be very useful. An added feature would be the ability to check the point at which an existing or projected airframe appears weightless at different speeds and angles of attack (lift = weight). When thrust equals drag, you can't go faster or lift anymore. If you are contemplating making your own test equipment to check dynamic thrust, remember to provide a means for checking the air drag of the engine and movable mount at various proposed test speeds without the engine running first. The engine/prop combination will have to overcome a *negative* number of a pound or so first, due to air drag. You only have to put your opened hand out of the window of a car moving at 60 mph to see how much of a factor this would be. I'm sure everyone at **Model Builder** would like to see safety the number one factor in any test equipment. If you would like to see a future construction article on how to build test equipment of this nature and how the figures are arrived at, let the people at **Model Builder** know. They have always been a leader in model development, and I'm sure they would like to stay that way. At this point a lot of you may well ask, what's the point of all this? Why bother?

If you read the various descriptions of Mammoth Scale aircraft in different publications and see where a Quadra powered aircraft weighing 21 pounds in the form of, for example, a 1/4-scale Mustang has marginal flight characteristics, yet another aircraft equally bulky at 30 pounds and identically powered is aerobatic enough to suit anyone, you'll see why. Strapping both aircraft on this dynamic lift/drag device should tell us something. In the case of the Mustang, the power-to-weight ratio is in the

green. That leaves only lift-to-drag and power/thrust-to-drag ratios.

Many people don't realize that although efficiency goes up when you scale up a wing, so does the importance of the airfoil shape, how you rig the incidence of both wing and tailplane, and thrust angles. Starting with a correct CG position and warp-free wing, etc., these combinations can mean the difference between a dog and a doll. In the latest issue of *Monster News*, Lee Taylor refers to added power to help the dogs, yet in the same issue he indicates that the Hustler versus the Quadra demonstration wasn't all that dramatic, despite a 30% difference in size. This is partly explainable in that the Hustler engine is heavier, but I would suggest that the problem really lies in prop design/match to aircraft in both cases. I don't think either engine was showing its best potential.

In any case, Mammoth Scale aircraft, and soon boats, will provide a lot of room for experimentation. The old adage of "install a big enough engine and anything will fly" may be slightly true, but there is a heck of a lot of satisfaction in getting the best out of whatever you have.

Another consideration to take into account with any aircraft is the total installed weight and the weight of the fuel required to provide the flight times you are looking for. In the case of fuel, think about where it must be stored and the effect on the CG between empty and full tank. If you have a 32-ounce tank stuffed in the nose and your aircraft seems tail-heavy in the air, get it down fast, as it's not going to get better as the tank empties! If your engine is pump equipped, allowing extended fuel draw, consider positioning the tank closer to or under the CG. The more centrally you can mass the weight of the airplane, the smaller the control movements which will be required to maneuver it. Large control movements mean unnecessary drag that can prevent an aircraft from doing "clean" aerobatics on low power settings.

A new item which you may be interested in for Mammoth Scale is fiberglass floats, both the Edo and the Inverted Vee European type. The Inverted Vee has the same side profile, but requires considerably less power to get off the water. Other features are reduced spray, better steering (even without water rudders if the engine is going), and landing cushioned by air pockets on initial water contact. Hopefully, I'll have these at the Toledo show.

Please drop by our booth at Toledo and say "hello", and let us know what suggestions you have for 1/4-scale in general. If you are already producing products for 1/4-scale, don't worry if you feel they compete with ours. If they are good, modelers should know about them, and we'll help you tell them. ■

Outboards . . . . *Continued from page 49*

AMPS, an English manufacturer. However, as of this writing, that unit is very expensive and hasn't proven to be all that powerful. I've heard rumors that K&B is working on a 6.5 or maybe a 7.5 cc outboard, but I've never bothered to ask them, since I don't really want to see another outboard engine class added. That, of course, is a personal opinion. And even though I'm not sure about adding another class of model racing, I'd sure be one of the first to build a .40 or .60 size outboard tunnel if I had an engine available. This leads us into another interesting situation.

What would be the overall effect on model boating competition, should we someday find ourselves with three different (.21, .40, and .60) size model outboard engines? Applying the three engine sizes to the three different hull categories we currently race (hydroplane, monoplane, and deep vee) would generate nine new model boating classes. Assuming that the traditional inboard racing classes continue to grow at their present rates, it would be virtually impossible to conduct many of the racing programs as we currently know them. It is just possible that we may see model outboard competition take the same approach that the model scale unlimited hydroplanes have taken.

In many areas, a scale model unlimited hydroplane race is an all-day event, with no other classes being offered. This is what has happened up here in the Northwest. The sanctioning group for scale unlimited hydroplane racing in the Northwest, R/C Unlimited, has established a circuit of approximately a dozen different races just for the scale unlimiteds.

During the 1978 model boat racing season, three outboard-only events were held in this area and they were very well attended. There are those who believe that offering exclusive events for only one type of boat will tend to factionalize model boating and hinder the growth of the sport. On the other hand, there are those whose only interest is in one class of boats and who don't enjoy having to wait all day to get to run

their boat for only twenty minutes. I suppose both sides could be argued eloquently, depending on personal beliefs and interests. Since I've been one of the instigators of Outboard Only Days, I guess it isn't necessary to tell where my personal opinion lies. We live in an age of specialization. We see this in our everyday lives in countless situations. And we are becoming more specialized in our hobby activities as well, it would seem. When I first started in this hobby more than a dozen years ago, I'd show up at a race with five or six different boats. And I might add that I did a hell of a lot better racing two boats than I ever did racing the five or six.

It is also interesting to note that in many instances, the acceptance of outboard racing has been much greater among new model boat racers than the more established or entrenched model boat racer. This is not to imply that many experienced model boaters haven't begun running outboards. From my discussions with people all over this nation, I know that many experienced model boaters are racing the outboard events. But I've also perceived some reluctance both in my own area and around the nation to accept the idea that outboard racing should be given the same status as, say, deep vees or competition hydro. And much of this reluctance is based on the problem of how to work in more events for outboards in race events already crowded to the limit. Here in the Northwest, we were able to generate sufficient support to have the outboard class placed on our NAMBA District 8 Points' circuit. For us, this wasn't much of an added time burden, since district events have never exceeded 125 total entries. However, I can see where it would be extremely difficult for an outboard class to be added to district events in California, where they sometimes are looking at over 200 boats for a District 9 event. And so it has become a necessity to create special events just for outboards. I find it most encouraging and exciting that there are many new faces at these special events, because the idea of racing a model outboard does have a great appeal for beginners in this hobby.

Since I've been mentioning model outboard racing up here in the Northwest, please allow me to run on a little about our experiences. Without any doubt, we have done more organized model outboard racing in this region of the country during the last two years than probably any place in the whole world. If anyone cares to dispute this claim write the editor, but I really do believe that this is a fair claim. We have done a lot of model outboard racing out here. And we've learned quite a few things along the way. The first thing we discovered was that the outboard racing rules, as provided in the NAMBA Rulebook, were completely inadequate for what we wanted to do. So we wrote and continue to rewrite what we feel are rules more acceptable to our needs. During 1977, our first full year of model outboard racing, we followed the Stock Engine rule and allowed any hull type as long as it bore a resemblance to a full-scale outboard racing craft. We found two hull types most popular: tunnels and deep vees. But those of us racing tunnels didn't like racing against the deep vees and the wakes they created. It was also felt that racing two different hull types wasn't the way to develop a class of outboard racing. Since most of those who were racing outboard deep vees already had or planned to build a tunnel hull, we didn't have much opposition to our proposal to race only tunnel hulls in 1978.

During 1978, we kept the Stock Engine rule, defined hull type to tunnel, and decided to try a LeMans type start with engines running when the race started. Well, we immediately ran into two rather big problems. First, what is a tunnel? Everyone knows what a tunnel boat is. Sure, we all know. But did you ever see a definition of one of these critters written up anywhere? I thought I had the answer and wrote into the rules that we would just follow the definition as supplied by the American Power Boat Association, the governing body of organized full-scale racing. It would have been a great idea, only the A.P.B.A. doesn't even define what a tunnel is. They have a drawing and some size and weight limits, but no definition. Luckily, about halfway through the year, Jay Selby wrote a definition that would suit our needs. The next problem occurred when we had our first race and another

of my brilliant ideas, the LeMans start with engines running, proved to be somewhat less than brilliant. Disastrous, nerve-wracking, scary, and befuddling, yes. Brilliant it was not. But we were stuck with that type of start because we wrote it into our rules, and we can't change our rules except at a District meeting, and there wouldn't be another one until the end of the points' circuit. However, we are really learning about what it takes to have a successful outboard class. Since I wrote the rules, I'll take responsibility for the problems that were created. But we're getting things worked out and every race is running smoother. I've always liked that old saying, "Anyone can make a mistake; the trick is to keep from making the same one twice." Suffice it to say, outboard racing is very alive and really growing out here.

But what about at the national level? Although both model boating organizations give mention to outboard racing in their respective rulebooks, neither organization does model outboard racing justice, to my way of thinking. Since I do all my racing under the NAMBA banner, I'll address the outboard problem in that organization as I see it. Jay Selby, NAMBA's Outboard Chairperson, submitted a proposal for a new set of outboard racing rules to be voted upon by the NAMBA Directors. The vote ended up four in favor, four against, and NAMBA president Al Metelak elected to turn it over to a committee for further study. As a NAMBA Director, I voted in favor of the proposals. I was most interested in what there was about the rules that other Directors didn't like.

From the information I was able to gather, a big concern about the proposed rules dealt with the Stock and Modified Engine sections. Late in 1978, Don Coad, NAMBA's recorder and member of the Technical Committee, asked me to submit another proposal for a set of Outboard Racing Rules, based on our experiences in District 8. Knowing full well that the main concern was going to be the issue of stock engines, I elected to consult the American Power Boat Association Rulebook. This time I wasn't disappointed. In the section dealing with Outboard Performance Craft, there is an excellent description of what constitutes a stock engine for full-scale racing. Borrowing liberally from what the OPC rules concerning engines stated, I formulated a definition of stock and modified engines. Since NAMBA has defintions for the three main hull types (hydroplane, monoplane, and deep vee), these classes were incorporated into the proposed rules. Using many of the same ideas suggested by Jay Selby for tunnel boats, a new class was proposed, called Model Outboard Performance Craft Tunnel. This class could be dubbed "Sorta Scale," since the boats are supposed to resemble full-scale outboard racing tunnels. For this class, the engines would be Stock as defined in the proposed rules and have a maximum displacement of .21 cu. in. These proposed rules have been submitted to the general membership for consideration and suggestions. A decision on them will be made in August of this year at the NAMBA Nationals in Seaside, California. I would be most willing to send anyone who might be interested a copy of these proposed Outboard Racing Rules. Send a self-addressed, stamped envelope to: Jerry Dunlap, 6702 Mt. Tacoma Dr. S.W., Tacoma, WA 98499.

As can be seen, we are still very much in the formative years when it comes to model outboard racing. There is little doubt in my mind that model outboards will become one of the most popular forms of model boating within the next five years. We may not even have to wait five years. The model outboard is forcing us to take a serious look at our existing methods of conducting model boat racing events. That changes are going to have to be made to accommodate this rapidly growing facet of our hobby is a certainty. Model outboard racers are no longer satisfied to be treated as second-class citizens by the more established classes in the hobby.●

Plug Sparks . . *Continued from page 44*

(Flying Yankee) 0:34
13) Count Pisana (Polish Valor) . . . 0:25

STICK

1) Mike Mulligan (Cloud Chaser) . 2:31
2) Lonnie Cope (Cloud Chaser) . . 2:23
3) Mike Mikkelson (Gollywock) . . 1:42
4) Bill Hannan (Penaud) 0:58
5) Count Pisana

(Lidgard Ornithopter) 0:41

Ken Johnson is to be congratulated for this type of contest as it appeals to all, including flying scale fans. To top it off properly, prizes were six paintings and drawings donated by Mike Mikkelson, Ken Johnson, and George James. Other prizes came from Dick Baxter, Joe Bailey, and Bill Warner. Nobody went home empty-handed!

NOSTALGIA EVENT

This will probably be reported elsewhere, but it was no great surprise to this columnist when the Nostalgia event, (the event for pre-1956 models), as proposed by the San Valeers, took off like a comet.

Like the columnist has been preaching for a long time, most modelers are tired of those real dangerous high-rpm engines, very short motor runs, and a million or so flights necessary to win an event. When the Nostalgia event was first proposed, this columnist wrote to Ralph Prey, editor of the San Valeers newsletter, suggesting a few rules. Evidently, everyone else did too! The result has been such a wave of interest that the event has been placed on the calendar of events for the U.S. Free Flight Champs.

For those who fondly remember Hogans, Zeeks, Fu-Bars, etc., a try-out meet will be held by the California Eagles at Taft on March 11. Sounds like this may take off like the Old Timer events did when first introduced in 1960. Sounds like more fun!

QUICKIE NOTICE

For those fellows who still are interested in obtaining Spielmaker 60 engines, we have just been advised on a new address: Spielmaker Engines, 4690 Burlingame S.W., Wyoming, Michigan 49509.

As "Krazy Karl" Spielmaker sez, he didn't know that moving a hobby could be so heavy.

REPLICA ENGINES

In a long talk with Karl Carlson, who, in conjunction with Dick Dwyer, is heading up Replica Engines, Ltd., this columnist has been informed that they have a very ambitious program of engine production.

At present, a catalog is being printed up which, being the loose-leaf type, will allow the customer to add and delete items as announced by the firm. If you think we are kidding about ambition, Carl indicates the following production is contemplated: 1) Bunch Warriors: 100 plus; 2) Anderson Spitfires: approx. 1,000; 3) Spark plugs: possible manufacture of V1 and V2; 4) In the future, production of the Hetherington .15 and .19 engines is promised.

The Hetherington .23 will not be produced, as this is a very tough engine to fabricate (welded sheet metal parts) in any quantity. If anyone is interested in procuring the dies and necessary goodies to manufacture this engine, write to Karl Carlson, 14600 Ramstad Drive, San Jose, CA 95127. You too can become an engine manufacturer!

REGION II MECA COLLECTOGETHER

This one is the best, and no effort is being spared by Dick Dwyer to make it even better this year. Location will be the same, at the Rogers High School in Saratoga, California. So paste the date of April 14 in your hat and make plans to attend. You won't regret it!

CAL POLY ECHOES

Several months ago, we related a hilarious story on Bruce Chandler, who admits in a follow-on letter that he did truly short circuit the college, leaving the milking machines without electricity. Bruce says he was damn lucky he didn't electrocute himself or anyone else in the area. He states that another fellow got fooled by the same illusion of depth and did exactly what Bruce had pioneered.

The books were getting to Bruce something fierce at Cal Poly and he needed relief badly. So what else to do but build a large version of the Cliff Trainer . . . the C/L model he had soloed on back in 1943 in Oakland. (Bet some of you guys didn't know Chandler came from the San Francisco Bay area.)

Taking his wife with him, Bruce noted numerous sprinkler heads on the cow pasture that was liberally dotted with "meadow muffins". Bruce finally chose a clear spot at the end of the field near the chain link fence which had power poles at each end. What he didn't realize was that the chain link fence curved so as to allow the power lines to cut a line across the curve. This put the power lines inside the field!

Well, it didn't take long after takeoff to get the feel of the model and he decided to try some aerobatics. His first loop pulled up right between two 10,000-volt lines and shorted across the wings! Blue flame and sparks! Then the two power lines fell on the field, completely severed. Luckily, Bruce was using his old wooden U-Reely control handle and didn't even get a tingle!

After the big blue flash, what got to Chandler was that the model, now turned free flight, was coming across the field in a shallow dive. As luck would have it, the model barely missed his wife's head. As Bruce says, she was so petrified from the electrical short, she never even saw the model!

KOI

The King Orange Internationals continues to draw a few Northerners, ac-

cording to Terry Rimert. Some of the fellows who came down from the icy north were Gene Lapansie, Bill Hale, and John Hemphill.

Rimert reports there was a lot of hangar flying going on at this meet, but the boys had nothing to be ashamed of with John Hemphill's O.O.S. model winning the Old Timer event, with Gene Lapansie and his Brigadier a close second. As always, .020 Replica was a real contest, with Tom McLaughlin winning again. Bill Hale got nosed out by five seconds, while Russ Synder only got two real good flights to win third! In Rubber, Phil Hartman showed the way to go with his Lamb Climber "maxing across the board". Surprisingly, Bob Baker placed second with a little Whitman Parasol that lost only by seconds!

A bunch of the fellows got together later at Ron Sharpton's place for a real bull session. One of the main points in the discussion was brought out by Bill Hale, who stated Old Timer flying in his area has fallen off since the ban on glow engines. According to Bill, a lot of people can't buy original ignition engines. (Note: I don't wonder, at the prices they are asking nowadays!) Hale concludes by saying although many modelers don't have a real burning desire to fly Old Timers, they would if the spark-ignition-only requirements were lifted.

(Columnist Note: In spite of the general antipathy towards the use of spark ignition engines only, no SAM Chapter proposed a change in the rules that would again allow the use of glow engines in Old Timer free flight events. Is this a question of sitting on our hands and just complaining? Now is the time to start things moving if you want a change for 1980!)

SAM 7 SALLIES

According to the SAM 7 "Yankee" Newsletter (Carmen Botticello, Editor), the English boys who came across the pond to attend the New Jersey SAM Champs were certainly impressed with the contest fun, and in particular, the simple rules employed locally by SAM 7. (They allow glow engines.)

The British club has now close to 100 members, with another 50 yet to make up their mind about SAM. Chapter 35 (England) had a big discussion recently at their buffet dinner and business meeting regarding the National SAM rules versus the SAM 7 rules. The English are impressed with the SAM 7 fellows and feel that nationally, SAM has gotten a bit too complicated in the rules.

(Columnist's Note: This arises every time you attempt to make rule changes to control the hot dogs! In the last analysis, if we are truly flying for fun, who cares?)

Also worth noting in the newsletter is that six contests are scheduled for 1979! Talk about activity! For those who don't know about the meets, SAM 7 is presenting the first one, the Rocky Hill meet, on May 20; the second meet (Summer Outing at Rocky Hill) on July 1; third at Westover AFB on July 22; fourth meet at Rocky Hill on August 19; the East Coast O.T. Championships at Westover AFB, September 2; and to wrap up, the sixth meet at Rocky Hill on October 21. All meets are primarily Old Timer with a sprinkling of 1/2A and Flying Scale events included. For further information on these meets, write to Carmen Botticello, 30 Bluefield Drive, East Hartford, CT 06118. Or better yet, call (203) 568-5733.

COLUMN IDEAS

Received a letter from Ed Hopkins, of Fillmore, California, who feels we should run a column devoted to the design of a particular modeler, such as Shereshaw, Garami, Goldberg, etc. He raises this idea as he (along with many other newcomers) simply doesn't know what half of the designs look like. Worst part, Ed claims, is that very few pictures appear, as only a handful are built. (Columnists Note: We always try to run photos of little-known aircraft, as we do recognize this problem.)

The main point of this paragraph is to solicit comments from the readers. Do we want to continue with the present format? Or do we want to change, as outlined above? Or do we want a combination of the two, with a section similar to the "Engine of the Month" in which we would describe and/or print photos of models that are little known? Let's hear from you!!

THE WRAP-UP

Received a most interesting letter from Jim Flemming, of Banning, Cali-

fornia, who pretty well summarizes what the newcomer to SAM sees. (You would be surprised what the average SAM member takes for granted now!)

"Mr. Pond: First off, belated congratulations on your new office as president. You will do a superb job. Seems like a busy person is always able to do something extra.

"Am just a recent SAM member (No. 1813). The heart and soul is a modeler; just didn't belong to a club that would have me as a member.

"SAM has the right idea that flying should be fun. When our society has the idea that old is bad, this is bad. *Old is experience.* Many new achievements can be laid to your interests, such as the newer radios that are almost immune to spark interference, and the new shielded ignition systems that improve running qualities of old engines and add to the fun of flying.

"Reproductions of ignition engines (not to mention all the conversions) and new engines are now available. Although timer points were always a bearcat to produce and set, Otto Bernhardt and you have conquered that problem.

"Am just getting back to models in a small way. Had a stroke, so radio brings them back (what marvelous therapy!). To those watching TV while they cut out parts on the arm of your wife's favorite chair, the solution is to procure "magic" cutting mats generally found at most printing supply houses. Razor cuts just disappear from the surface. No lumps or bumps. It's great!

"Even though I'm only a slightly active participant, I look forward to more fun. As a matter of fact, I look forward to *any fun* in this modeling game.

"To wrap it up, I was proud when my wife called me a 'model' husband . . . until I looked it up in the dictionary to find model is defined as a small imitation of the real thing!"

Remember, gang, FUN is the word. Without it, we don't have a darn thing!•

Taylorcraft . . . *Continued from page 45*

area of just under 1500 sq. in., this translates to a wing loading of about 8 oz./sq. ft., which is a good weight to shoot for.

Quarter Scale R/C enthusiasts are probably already taking a close look at the plans. About the only modification necessary would be to beef up the structure and make provision for the control surfaces. Probably the best thing to do would be to get ahold of a proven design such as a Bud Nosen Piper Cub or Aeronca Champ kit and study the construction, then use the same basic construction methods on the T-Craft. A ready-to-fly weight of about 10 lbs. and a .60 size engine should be just right. (By the way, if anyone knows the name, and something about the designer of this model, please contact us. We'd like to give him proper credit.) •

Counter . . . . . *Continued from page 10*

Hot Stripe comes in blue, yellow, red, gold, black, and white. Each roll is 40 feet long and is available in 1/16, 3/32, 1/8, and 1/4-inch widths, at $1.98, $2.69, $2.69, and $3.69 respectively. From Top Flite, 1901 N. Narragansett Ave., Chicago, IL 60639.

* * *

Yet another goodie for model boaters is being released by Prather Products: an epoxy-fiberglass radio box. This well-designed unit fits the Prather 40-inch Deep Vee (which was described here last month) as well as other boats. The box features epoxy-fiberglass construction and includes two tinted lexan covers held on by no less than 38 socket-head screws (should only take half an hour or so to get the covers off!), plywood bulkhead, pine rails, and aluminum nut plates. The box is designed with a low profile receiver area for tuned pipe clearance.

All in all, the Prather waterproof radio box looks like a good way to avoid this dull but necessary construction job when building a boat. The box is Cat. No. 8100 and sells for $16.95. At your dealer or direct from Prather Products, 1660 Ravenna Ave., Wilmington, CA 90744.

* * *

Something new in the way of electronic gadgetry has just been introduced by Curt Sidles, of C.Sidles Co. Called the "Sono Beacon," this lightweight little unit plugs into an unused channel on your receiver (or can be paralleled with a servo) and lets out a loud, high-pitched squeal when the transmitter signal is lost. The Sono Beacon can be used for a variety of purposes, such as confirming that the frequency is clear before turning on your transmitter, reminding you to turn off the receiver after a flight, and performing an audible range-test. Also, if you fly out in the sticks, you can locate a lost or out-of-sight model just by turning off the transmitter and listening for the noise.

Curt was kind enough to send a Sono Beacon to us to test, and sure enough, it did just what the man said it would do. I wouldn't have believed that such a little gizmo could make such a racket. The unit can be loosely wrapped in foam rubber and stuffed just about anywhere in your model, but Curt says that for the best sound conduction, the Sono Beacon should be securely fastened to a bulkhead or other solid part of the model (two self-tapping screws are provided for this).

The Sono Beacon weighs about a half ounce and is not very big, as the photo shows. It is available with either Kraft or Futaba connectors, but by installing the proper connectors yourself, the unit can be adapted to any positive-pulse system, such as Cannon, MRC, Cirrus, RS, Sanwa, etc. Current drain is less than 5 ma at idle and less than 25 ma when activated, which is negligible. Besides,

you usually won't operate it for more than 5 or 10 seconds at a time anyway.

At $16.95, the Sono Beacon is darn cheap insurance. Order one direct from C. Sidles Co., 2655 Trieste Way, Fullerton, CA 92633.

* * *

Ever heard of Little Brown Jug Enterprises? This operation was started by Mort Shorr early in 1977, when he and fellow Bell Aerospace Co. workers were snowbound at the plant, waiting for the Great Blizzard to let up. He and a friend started making paper planes to pass the time, and had so much fun that the pair decided to form a company and publish a volume of *scale* paper airplane designs that could be made right from the volume's pages. Mort has sold a pile of the books since then, and three different volumes are now available. See his ad in the classifieds.

All 3 volumes are available and sell for $3.50 each. You can also get a sample paper plane (Spirit of St. Louis) from him for 35¢. Write to Little Brown Jug Enterprises, P.O. Box 180, Getzville, NY 14068.

* * *

The Smithsonian Institution Press has recently come out with two excellent books that all scale modelers will want to add to their collections. These books are the first in a series called "Famous Aircraft of the National Air and Space Museum." Each volume in this series deals with a different airplane in NASM's huge collection of historic aircraft and is divided into two main sections, the first covering the background and history of the aircraft, the second providing some of the details unique to that particular aircraft's restoration by NASM craftsmen. Both are well-written and are full of good detail photos that will make scale modelers drool. These are the kind of books that are hard to put down, once you get started. I know, it happened to me. I plunked myself down with the idea of spending a few minutes skimming through each one to get an idea of what to write, but it didn't work out that way. So you've been wondering why this issue of **MB** came out late? Now you know!

Volume 1 in the series is titled "EXCALIBUR III: The Story of a P-51 Mustang," and is about the P-51C which Paul Mantz flew to victory in the 1946, '47, and '48 Bendix races, and in which Capt. Charles Blair later made the first solo crossing of the North Pole. The museum spent almost 6,000 man-hours on the Excalibur's restoration, and the section on what was involved in that restoration makes especially fascinating reading.

Volume 2 is called "AERONCA C-2: The Story of the Flying Bathtub." Lovers of flivver-type lightplanes will go nuts over this one. The little-known C-2 was the forerunner of the well-known C-3 and looks quite similar, but at the same time has a charm and appeal all its own. The C-2 that was restored by NASM is the very first production C-2 that was built, and it's really interesting to read about the work that went into putting it back into the same configuration as when it first left the factory in 1930, the little plane having been modified over the years by subsequent owners.

Both books are paperbacks and sell for $4.95 each, which includes book rate postage. You can order them from Smithsonian Institution Press, P.O. Box 1641, Washington, D.C. 20013.

* * *

The Aptex Corporation has released a new knife and tweezer kit that should be of interest to all modelers. The set includes what appears to be an X-Acto type knife handle and 15 assorted blades, and three different types of tweezers: a 4-1/2 inch self-locking tweezer, a 4-1/2 inch tweezer with a slide locking mechanism, and a 4-1/2 inch fine-point tweezer. The locking tweezers can be used for holding or clamping parts while gluing or soldering, and the fine-point tweezer should be just the thing for delicate layout or assembly work, such as when assembling an electronics kit.

All of the tools in this kit come neatly packaged in a plastic storage case so you can keep them all together in one place. For a catalog showing this (No. 400 knife and Tweezer Kit) and other bench tools, including work holders, magnifiers, tweezers, and knives, write to The Aptex Corporation, Box 59, Bethel, CT 06801.

* * *

"What the ballpoint pen did for writing, the Loctite Gluematic Pen does for gluing." That's how Woodhill Permatex, a subsidiary of the Loctite Corporation, is describing its new glue/dispenser combination. The pen itself is a clever gadget that works on the same basic principle as a Leroy drafting pen. Touching the tip of the pen to the work surface pushes a plunger up into the pen body, releasing one drop of an extremely fast drying anaerobic glue.

If the word "anaerobic" throws you, go back and reread the excellent article by Eloy Marez in the October '78 **MB**. Simply put, anaerobics are those glues that set up in the absence of air. As such, *the glue in the Gluematic Pen will work only on non-porous surfaces,* such as metal, china, ceramics, leather, rubber, and some plastics. Don't write it off as a dud when it won't stick two pieces of balsa together. It's not intended to be a substitute for Hot Stuff or Zap or any of the other miracle glues we have today. Instead, it should be great for gluing metals, plastics, foam (test a small section first), and some of the other modern model construction materials . . . not to mention its use for doing quick household repairs. The wife will love it!

For information on price and availability, contact Woodhill Permatex, 18731 Cranwood Parkway, Cleveland, OH 44128.

* * *

A kit for one of the hottest .21 size

EMPIRE MODELS

Wrap Your Model
with
WHITE SILK
36" WIDE

$2.95
per yard

ASTRO FLIGHT

Kits	
ASW-17 Sailplane	82.75
Monterey Sailplane	31.75
Electra-Fly	17.75
Californian	51.75
Accessories	
Std. Hi-Start	26.25
HD Hi-Start	29.95
Astro-10 System	54.75
Astro-15 System	66.75
Astro-25 System	74.75

AIRTRONICS

Q-Tee	20.09
Square Soar	22.75
Gere Sport	36.55
Questor	31.95
Aquila St	63.95
Olympic II	45.75
Acro-star	82.49

BATTERIES

Nicads	
1.25 V 2 Amp	1.98
1.25V 7 Amp	2.95
1.25 V AA 500 MAmp	1.75
Sealed Lead	
12 Volt 1.9 Amp	14.95

BRIDI

T-10 Trainer	18.75
T-20 Trainer	29.95
RCM Trainer 40	37.49
RCM Trainer 60	44.95
RCM 15-500	29.95
RCM Sportster	29.95
Super Kaos 40	39.31
Super Kaos 60	52.49
Shrike Commander	138.95
Dirty Birdy 40	44.25
P-51 Mustang	97.49
T-6 Texan	97.49
Quickest 500	29.95
RCM Basic Trainer	29.95
Dirty Birdy	63.75
Soar Birdy	13.50

PICA

RC-2 T-28 B	69.95
RC-3 FW 190	69.95
RC-4 WACO F-3	69.95
RC-5 Duellist	72.95

DUMAS Sail Boats

Hobie Cat	8.45
Alcort Sun Fish	14.89
30 Star Class	36.75
45 Star Class	86.25
Bingo 50/800 Fiberglass	195.00
219 Lightning	15.75
"NEW" Dumas Huson	121.50
Etchells 50/800	163.95
East Coast 12 Meter Fiberglass	195.00
Probar Sail Unit	40.50

Dumas Hardware 25% Off Current List

DUMAS Scale

PT-109	29.85
Coast Guard Lifeboat	43.15
Tuna Clipper	35.25
Little Shelley Foss	32.00
Shelley Foss	58.85
Coast Guard 40' Utility	34.50
Dauntless	56.25

DUMAS Hydro & Deep Vee

AVL-1 Atlas Van Lines	8.65
AVL-40 Atlas Van Lines 40	41.65
Pay 'n Pak	29.85
Hot Shot Tunnel Hull	24.00
U-76 Hydro	39.35
DV-20CF Deep Vee 20 Competition Fiberglass	60.00
DV-40CF Deep Vee 40 Competition Fiberglass	71.25
DV-60CF Deep Vee 60 Competition Fiberglass	75.00
DV-10 Mahogany	8.65
Deep Vee 21	33.75
"NEW" Atlas Van Lines U-1	37.50
"NEW" Hot Shot 21 Glass Kit	52.50

MIDWEST CONTROL LINE PRICES SLASHED!

215 Magician 15	8.75	~~12.95~~
235 Magician 35	12.49	~~18.95~~
236 King Cobra 35	14.95	~~22.95~~
237 Mustang 35	14.95	~~22.95~~

E.D. TUNED PIPES

#1 (15-20)	17.25
#2 (29-40)	18.65
#3 Quiet (40-60)	21.75

FOX ENGINES

11600 15 Schn	19.56
21600 15 Schn R/C	26.56
21900 19 R/C	25.86
22500 25 R/C	21.60
13500 35 Stunt	19.56
13600 36	19.56
13700 36 BB Combat	34.96
23600 36 R/C	25.86
24500 45 R/C Schn	36.35
26099 60 BB Eagle R/C	48.95

Fox **Tanks Wheels** All in Stock
Mufflers 25% Off List

GOLDBERG

Ranger 42 ARF	19.16
Falcon 56 II	34.95
Sr. Falcon	44.75
Jr. Falcon	9.55
"NEW" SKYLARK 56 II	34.95
Jr. Skylark	11.95
Skylane 62	44.75

HUGHEY BOATS

20 Rigger	84.95
40 Rigger	92.50
19 Hydro	66.75

INTERNATIONAL PIPES

501 (15 Size)	14.95
503 (19-21 Size)	16.50
507 (40 Size)	17.25
509 (45 Size)	18.25
511 (61-71 Size)	19.25

K & B

6711 19	26.95
6712 19 R/C	33.75
8450 3.5 F Rotor	41.75
7860 35 Plain Bearing	21.95
7861 35 R/C	25.65
8600 5.8cc FF Racing	69.65
8380 3.5cc R/C	48.50
8382 3.5 cc Outboard	72.95
8011 40 R/C	42.25
8360 40 R/C Pump	60.49
9040 40 RSII Marine	72.95
6525 61 R/C	57.49
6535 61 R/C Pumper	74.25

LANIER

Comet II	43.95
Cessna	34.85
Pinto	34.85
Jester II	55.15

MARKS MODELS

Windward 72	25.80
Windfree 99	35.25
Bushwacker w/o access	35.25
Wanderer	15.69
Sunny	25.80
Windfree RTC	107.61
Wanderer RTC	53.77
Trainer 40 RTC	78.29

MIDWEST

106 Tri Squire	21.50
109 Lil Tri Squire	15.49
122 Das Lil Stik	22.25
125 Cessna Cardinal	21.95
126 Super Chipmunk	21.95
128 Sweet Stik	27.95
129 Cardinal Squire	57.49
130 Strike Master	49.75
131 Pitts Special	71.75
134 Attacker	27.95
Love Machine	32.95
AXIFLO40	35.95
AXIFLO049	29.50
Easy Flyer 60 Trainer	60.75
Heinkel He-162	53.95

SIG

Kadet	27.68
Kougar	35.60
Komander	30.50
Citabra	45.94
Chipmunk R/C	47.52
J-3 Cub	30.50
Clipped Wing Cub	30.50
Smith Mini Plane	39.60
Doubler II	19.80
Super Sport	15.84
Liberty Sport	50.50
Sig Minow	22.18
Cessna 150	55.44
Mustang Stunter U/C	22.18

STEVE MUCK

North Wind 40/60 Mono	44.95
Lil Lightning 21 O.B.	36.75
Bushwhacker 20 Hydro	82.50
Lil Northwind 20 Mono	42.75

SURE FLITE MODELS

J-3 Cub ARF	28.50
Spitfire ARF	28.50
7' Citabria	84.49
A7-A Corsair II	22.50
Baby Turkey	19.95

TOP FLIGHT MODELS

P-51 Mustang	46.35
P-40 Warhawk	46.35
P-39 Aircobra	46.35
P-47 Thunderbolt	63.95
SE-5A	46.35
School Master	11.60
Freshman Trainer	35.95

BATTERIES GALORE!
1.25 Volt NiCads

AA 500 MAmp **1.75** | 2 Amp **1.98** | 7 Amp **2.95**

12 Volt Sealed Lead 1.9 Amp **14.95**

WHITE SILK 36" WIDE $2.95 per yard

Want anything you don't see — call us!
CALL (602) 881-1257 FOR IMMEDIATE SHIPMENTS.
EMPIRE MODELS/DEPT. A/P.O. BOX 42287/TUCSON, ARIZONA/85733

POSTAGE AND HANDLING and insurance orders up to $5.00 add .95; $5.01 to $10.00 add $1.50; $10.01 to $20.00 add $1.95; $20.01 to $30.00 add $2.50; $30.01 to $40.00 add $2.95; $40.01 to $50.00 add $3.50; $50.01 to $80.00 add $3.95; over $80.01 add $4.50. Send money order or certified check for fast service. APO's welcome. Export welcome. Prices subject to change; some quantities limited. Note: some of the larger fiberglass kits are sent freight collect best way available. Reserve the right to clear checks.

(a) C.O.D. within 48 continental states only. Please add $3.00.
(b) Outside 48 Continental States add **$15.00** for actual postage and handling; excess will be refunded. Arizona residents add 4% sales tax.
(c) BankAmericard/Visa and Mastercharge welcome.

BRIDI
DIRTY BIRDY 40
$44.25

PAASCHE H-5
AIRBRUSH
Travelers Kit
33.95
Airbrush Alone
24.95

IDWEST
UPER CHIPMUNK
$21.95

MIDWEST

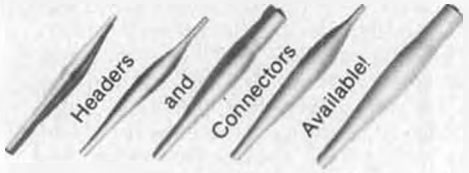
AXIFLO .049 $29.50
AXIFLO .40 $35.95

SPECIAL!
DEVCON 5-MIN EPOXY
40% OFF ALL SIZES!

C. G. FALCON 56 II
SALE PRICE
$34.95

Dumas
Hot Shot 21 Glass
$52.50

ED Tuned/Blown R/C Pipes



1	#2	#2Q	#3	#3Q
25	18.65	18.95	18.50	21.75

SPECIAL!
PEERLESS MAX R/C CAR $59.00

K&B and Fox
R/C Long Plugs
40% OFF!!
.84 EACH

Powerful 6 Volt Motor
Hi-Torque - Perfect for
Boats . . . $30.00 value
$14.95

Light your cockpit, running lights, wingtips with our clear Grain of Wheat 2-Volt Bulbs
Use 1.5 Volt Battery - Reg. .40 each
$1.80 per dozen
Limit 5 dozen per customer!

NEW!

$29.95 DUMAS QUICKIE 40
OUTRIGGER

Special of the Month

K&B
.40 R/C w/Perry Pump
$55.95

C.G. SKYLARK 56 MK II
$34.95

SCHUCO
WET BATT CHARGER
1.5 V./4.8 at 100 MIL. AMPS.
$5.20

NEW!
American Edelstaal
MACHINEX 5

DuBro
Prop Drive Unit
30% Off!!
(Eng. not incl.)

0-510-01 Lathe w/20" Bed	$319.95
1-510-01 Lathe/Drill/Mill Combo	351.95
5-110 3-Jaw Chuck	41.95
5-300 13 pc. Tool Set	23.95
All Accessories Available	

LANIER
JESTER II
$49.75

$69.95

WATCH FOR OUR 1979 R/C CATALOG! **Want anything you don't see—call us!**

EMPIRE MODELS

P.O. BOX 42287/TUCSON, ARIZONA 85733

**CALL (602) 881-1257
FOR
IMMEDIATE SHIPMENTS**

outrigger hydros around has just been announced by Mini Marine Racing Equipment. It's the "Hustler Mk II," and was used by Gary Preusse to set a new IMPBA speed record for the 1/3-mile oval (that's his boat in the photo). The Hustler Mk. II measures 31 inches in length and 15-3/4 inches in width, and should be just the thing for the .21 Class Hydro events. The kit features bandsaw-cut high-quality aircraft plywood parts and spruce stringers. An engine mount is included, along with machined aluminum sponson brackets (and mounting hardware) that allow for adjustable front sponsons. An additional running hardware package is also available.

Retail price of the Hustler Mk. II is $110.00 and it can be obtained direct from Mini Marine Racing Equipment, 542 N. Yale, Villa Park, IL 60181, or direct from G&M Models, P.O. Box 342, Broadway, IL 60153.

* * *

Serious electric R/C car racers will be interested in the new precision gears being offered by The Pipeline. These are instrument grade gears made of Virgin DuPont 501, and are claimed to have the lowest possible friction coefficient that current gear technology offers. The gears are available for any electric car using a 1/4-inch diameter round axle and are fixture drilled for either the Thorp rear hub or as a replacement gear for the Associated car. They are available in 44, 48, 52, and 56-tooth sizes.

Retail price of the gears is $2.75 each, or $4.95 each with the Thorp rear hub. The gears can be ordered direct from The Pipeline, P.O. Box 1868, Fremont, CA 94538. Be sure to mention where you read about them first!

* * *

That clean-looking sport model in one of the photos is a new kit from The Model Factory, called the "Pegasus." Talk about versatile! The Pegasus can take from 2 to 4 channels and can be built either as a glider or as a power model for .049 to .09 size engines. If that isn't enough, the kit can be ordered with one of two different wings; a trainer wing for maximum lift and slower airspeeds, or a sport wing for speed and penetration. Both wings are flat-bottomed and are hot-wired foam cores with balsa sheeting and cap strips. Wing kits are also available separately.

The rest of the airplane is all balsa, and the whole thing can be put together in short order. The kit has full-size plans and a 7-page instruction booklet that includes some facts about glues and foam wings. For the powered version, use the sport wing and a Tee Dee .049 or .09, or if you really want things to get wild, hang an O.S. .10 FSR on the nose. Pegasus was designed by Bob Lyons, who also designed the EOS 1/2A Stand-off Scale model that was shown at the 1978 MACS Show, and has a wing span of 48 inches (both wings), an area of 326 sq. in., and weighs 20 to 28 ounces, depending on the radio and engine used.

The Pegasus retails for $21.95 and is available at your dealer or direct from The Model Factory, 15907 Victory Blvd. No. 202, Van Nuys, CA 91406. Note: the kit normally comes with the sport wing. If you want the trainer wing, be sure to say so when ordering.

* * *

Good news from the people at Dumas is that they are coming out with all sorts of new goodies for model boaters. First off, there are two new outrigger hydro kits, the "Quickie 40" and "Lil' Rascal 10." The Quickie 40 is a wild-looking boat that can be run with racing engines of 3.5 to 7.5 cc displacement. It is 30 inches long, 18-1/2 inches wide, and features plywood-covered foam sponsons and a plywood main hull for quick building. Optional hardware kits available are No. 2321 for 3.5 cc and .40 cu. in. engines, and No. 2325 for 6.5 and 7.5 cc mills.

The Lil' Rascal 10, as you probably guessed, is for .10 size engines and was designed to give big fun for small bucks. This little cutie is 22-1/2 inches long and uses hardware kit No. 2333 (optional).

For those who like fiberglass hulls, Dumas is releasing a fiberglass version of its "Short Stuff" .10 size Deep Vee. This new kit is easier than ever to assemble (just join the deck and hull, and install the engine and radio), and retains all the performance characteristics of the wood Short Stuff. For .049 engines,use optional hardware kit No. 2314, or kits No. 2326, 2327, or 2334 for various .10 size engines.

Scale boaters will like the five new bronze props from Dumas. These propellers require a minimum of finishing and polishing and are available in both right and left-hand versions. They are all 3-bladers, have a 2-inch pitch, and range from 1-1/2 to 3 inches in diameter.

The last bit of news from Dumas is that new and improved speed controls for the Dumas 6 and 12-volt electric motors are now available. These speed controls provide variable forward and reverse speeds, and have a center "off" position for use with a standard R/C servo. For one or two 6-volt motors, ask for Speed Control No. 2022, or No. 2023 for 12-volt motors.

For price information, contact Dumas Products, Inc., 909 E. 17th St., Tucson, AZ 85719.

Workbench . . . *Continued from page 6*

and spirit."

MESSAGE FROM BILL NORTHROP

Last month we made the comment that although Walt Schroder had retired from M.A.N., we doubted that he would really retire from the hobby entirely. That comment was slightly tongue-in-cheek, for although negotiations were not complete at the time, only a few details remained before Walt would be

CLASSIFIED ADS

Non-commercial (personal items): Rate is 25 cents per word, with a minimum of $3.00. Commercial: Rate is 40 cents per word, with a minimum of $5.00. No mail-order discount house ads knowingly accepted. No advertising agency discounts allowed.
All ads are payable with order, and may be for any consecutive insertion period specified. Name and address free, phone number counts as two words. Send ad and payment to MODEL BUILDER Magazine, Classified Ads, 621 West 19th St., Costa Mesa, CA 92627.

COMPLETE KITS from Model Builder plans, John Pond, Sid Morgan. Catalog $1.00. Repli-Kit, P.O. Box 374, Inverness, FL 32650.

"HOW TO BUILD and fly 18 cutout replica paper aircraft. Easy, no glue required. Volumes I, II, III, $3.50 each postpaid. Free sample aircraft 35¢ postage handling. Little Brown Jug, P.O. Box 180, Getzville, NY 14068."

WANTED: Old model airplane engines and miniature gas powered race cars and all related items from 1935-55. Arthur G. Suhr, W218 N5866 Maclynn Ct., Menomonee Falls, WI 53051.

AVIATION MAGAZINES for sale. Model Aircraft Builder, Model Aircraft Engineers, Cleveland Modelmaking News, Air News, Early Pop. Aviation, Aero Digest 1929-1940, Flying 1941-1960. Many More. Large list $1.00 refundable with order. Donald Kirkpatrick, 1922 Ethan Way #31, Sacramento, CA 95815.

WANTED: New or used winder for Coupe, Wake, and Jumbo rubber. J. Moses, P.O. Box 129, Birmingham, MI 48012.

WANTED: Monogram Speedee-bilt kits unbuilt. Send list with prices. Ken Taylor, 5825 Lowell Rd., Everett, WA 98203.

OLD TIMER HANDLAUNCH GLIDER PLANS — Pre-1943, 15 different. Send $1.00 for listing and two sample plans. Bob Larsh, 45 South Whitcomb Ave., Indianapolis, IN 46241.

FF/UC SCALE PLANS. Peanuts, Walnuts, Hazelnuts, Rubber, CO_2, Gas. Modernistic Models P.O. Box 6974, Albuquerque, NM 87197.

.020 REPLICA KITS: PLAYBOY SR., STRATO—STREAK, BROOKLYN DODGER, SOLONG. FREE PRICE LIST. J & R MODELS, 5021 W. Sheridan St., Phoenix, AZ 85035.

WANTED: Old-Time spark-ignition model airplane motors, magazines and gas powered race cars of the 1930's and 1940's. Russell Stokes, Rt. 1, Box 73J, Keller, TX 76248.

SPEED EQUIPMENT — pans, dollies, torque units, Monoline equipment, basswood and Kansas Twister kits. Walter Brassell, 1615 N. Concord Rd., Chattanooga, TN 37421. Ph. (615) 892-5995.

1/4-SCALE PLANS for Twin Piper Navajo Chieftain. Span 114-3/4", length 94". Price $30.00. George Steenson, 22 Ramona Blvd., Markham, Ontario, Canada L3P 2E2.

FOR SALE: Spark ignition engines for the "Old Timer" movement. Note: these engines are *not* collector items. Complete with plugs and "aftermarket" timers. Send SASE for list of ten engines to, Dave Wilke, P.O. Box 188, Idyllwild, CA 92349.

HOBBY HORN, hobby specialties: Old Timer Kits, Big Red Rubber Bands, Y&O Props, Peanuts, Electrics, Accessories, Plans Scaling, and more. Bob Stiff. Write for free listing. Hobby Horn, P.O. Box 3004, Seal Beach, CA 90740. (714) 894-6223.

officially announced as a new member of the **Model Builder** Team.

To completely clarify the situation, because rumors run rampant during a significant change such as this, Walt has taken over as Publisher and Business and Advertising Manager of **Model Builder** as of February 15, while this writer will continue as Editor. Anita Northrop, after eight years of carrying two jobs . . . General Manager of **Model Builder** and operating a Century 21 Real Estate office . . . will, after a transition period, devote her entire business life to the Real Estate operation. Ownership of the company, which as of February 7, 1979, is incorporated under the name RCMB Inc., remains in the hands of Anita and Bill Northrop.

Beginning with the June 1979 issue, **Model Builder** will also be available on newsstands for the first time, increasing the circulation to 65,000, and although the cover title will become R/C Model Builder, the editorial content will continue with its general mix of R/C aircraft, boats, and cars, plus free flight and control line. The Peanuts? You bet! With the continual reduction in size of radio equipment, who knows, we may have to re-run them for R/C scale!

THINGS TO DO

Not much lead time on this one . . . The 7th Annual Mint Julep Scale Meet takes place on April 28 and 29, at the scenic Rough River Dam State Resort Park, Falls of Rough, Kentucky . . . 70 miles southwest of Louisville. Contest is sponsored by the Southern Indiana (!) R/C Modelers, with Dale Arvin as C.D. (phone 812-283-5719) and Don Childers (phone 812-283-7638) as Co-C.D.

Events include Sport Scale, split into two classes . . . for the expert, and for those who have never placed first or second in any AMA sanctioned stand-off scale contest of 15 or more contestants. There will also be scale and quarter scale fly-ins. Contact Dale or Don for more info.

* * *

The first ever N.S.S. SOAR-IN is scheduled for June 23 and 24 (rain date June 30, July 1), 1979. Organized by N.S.S. at its semi-annual board meeting in Orlando, Florida, December 29, 1978, the object is to establish a national N.S.S. Soaring Champion. Simultaneous contests are to be held in each of the 11 N.S.S. districts, with an entry fee of $15.00 ($5.00 discount to active N.S.S. members). Classes are under 100 inch, unlimited function, and over 100 inch, unlimited function. Task is 3 rounds of AMA II A Precision Duration (15 minutes add-em-up) landing option D. Tie-breakers are (1) highest average landing points for all flights, and (2) number of flights as a percent that are flown within 4 minutes, 50 seconds/5 minutes, 10 seconds. Watch "Sailplane" for com-

plete info and/or contact Contest Coordinator Dick Crowley at 16413 E. Stanford Pl., Aurora, CO 80015.

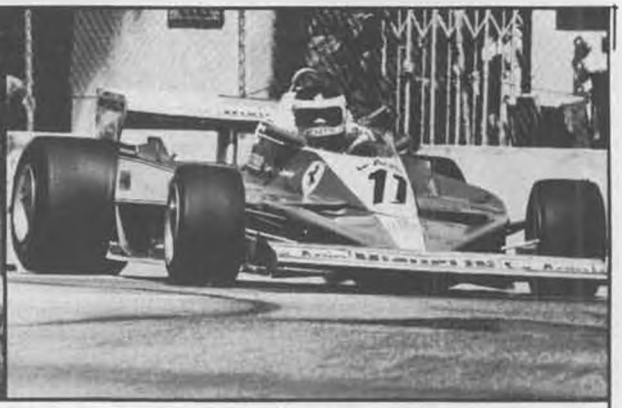
• • •

You might call it "Scale on a Big Scale," because the 6th Annual Texas Flying Scale Championships awards trophies through 5 places in FF Gas, FF Rubber, FF Peanut, C/L Sport, R/C Military Sport, R/C Civilian Sport, R/C 1/2A, and R/C Quarter Scale (or over 80 inch span). This will all take place on June 24th, at Sea Bee Park, Abilene, Texas. For more information contact C.D. Bob Oliveria, 1118 S. Pioneer, Abilene, TX 79605.
HMMM . . .

Ralph Warner makes instant R/C Air Boats. He also makes an instant R/C Outboard Boat and instant waterproof radio boxes for his instant R/C boats. Manufactured and marketed under the name Radio Controlled Models (RAM), 3631 N. Kedvale, Chicago, IL 60641, these molded plastic items are really nice. In fact, they're so nice, we don't tend to put too much credence in the following "P.S." which Ralph included with his last letter to us. We just figure he's been working too hard lately.

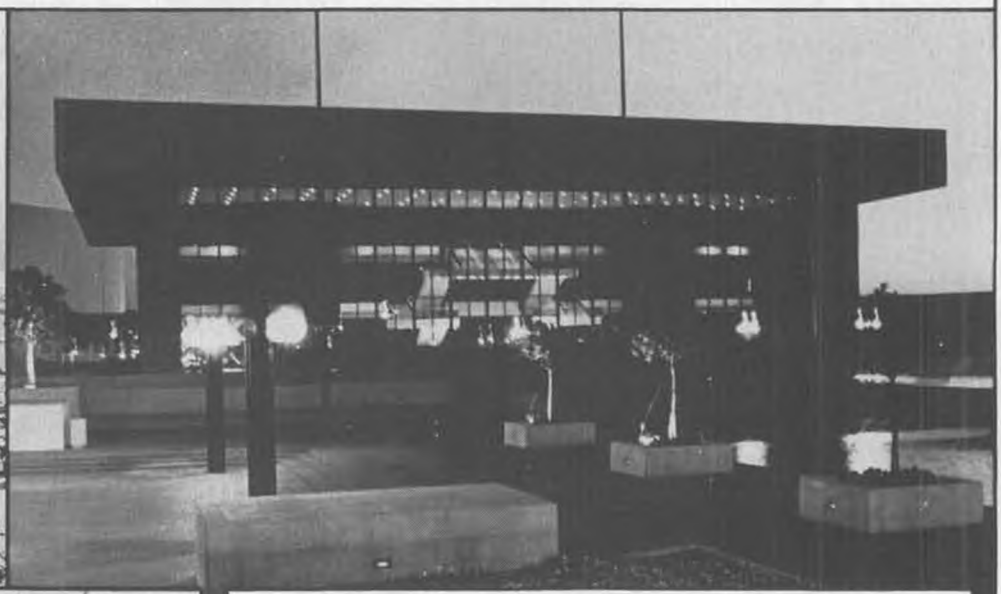
"P.S. It has come to my attention that some of our competitors are spreading the rumor that our boats are made from water soluble plastic. We wish to say that this is untrue (usually). It is only a coincidence that so many manufacturers of 2-channel radio equipment have invested in our company because of the increase in repair and replacement of these units during the past few years. Our chief product designer has a vast background of engineering experience, having spent several years with Ford Motor Co. designing Pinto fuel systems. His father was chief design safety engineer on the Hindenburg. His grandfather held the same position with the shipbuilding firm noted for their construction of the Titanic. Your cooperation in ending these unfounded rumors will be greatly appreciated." •

MACS MODEL & CRAFT SHOW



Save these dates . . . SATURDAY, APRIL 28 – SUNDAY, APRIL 29
For the 9th Annual . . . MODEL AND CRAFT SHOW!!

America's largest and most attended Hobby Show . . . RC Model Spectacular . . . planes . helicopters . cars . boats . gliders . . . plus U-Control . Free Flight . rockets . . . continuous Indoor-Outdoor demonstrations . . . on the beautiful outdoor lake and special indoor track . . . free rides on live steamers . . . one of the nation's largest modular railroad layouts . "HO" and "N" gauges . . . giant Hobby Contest . . . open to all hobbyists . . . over 200 awards plus special valuable attendee drawings.



It's all happening at the Long Beach Convention Center in centrally located Long Beach . . . on the beautiful Long Beach Harbor.

NEW! Byro Drive™

Patent Pending

Double the Thrust o Your .60 Size Engine

The Boost Quarter Scalers Needed, But Could Never Find!

FACTORY DIRECT

$89.95

Complete as shown
(including prop & spinner)

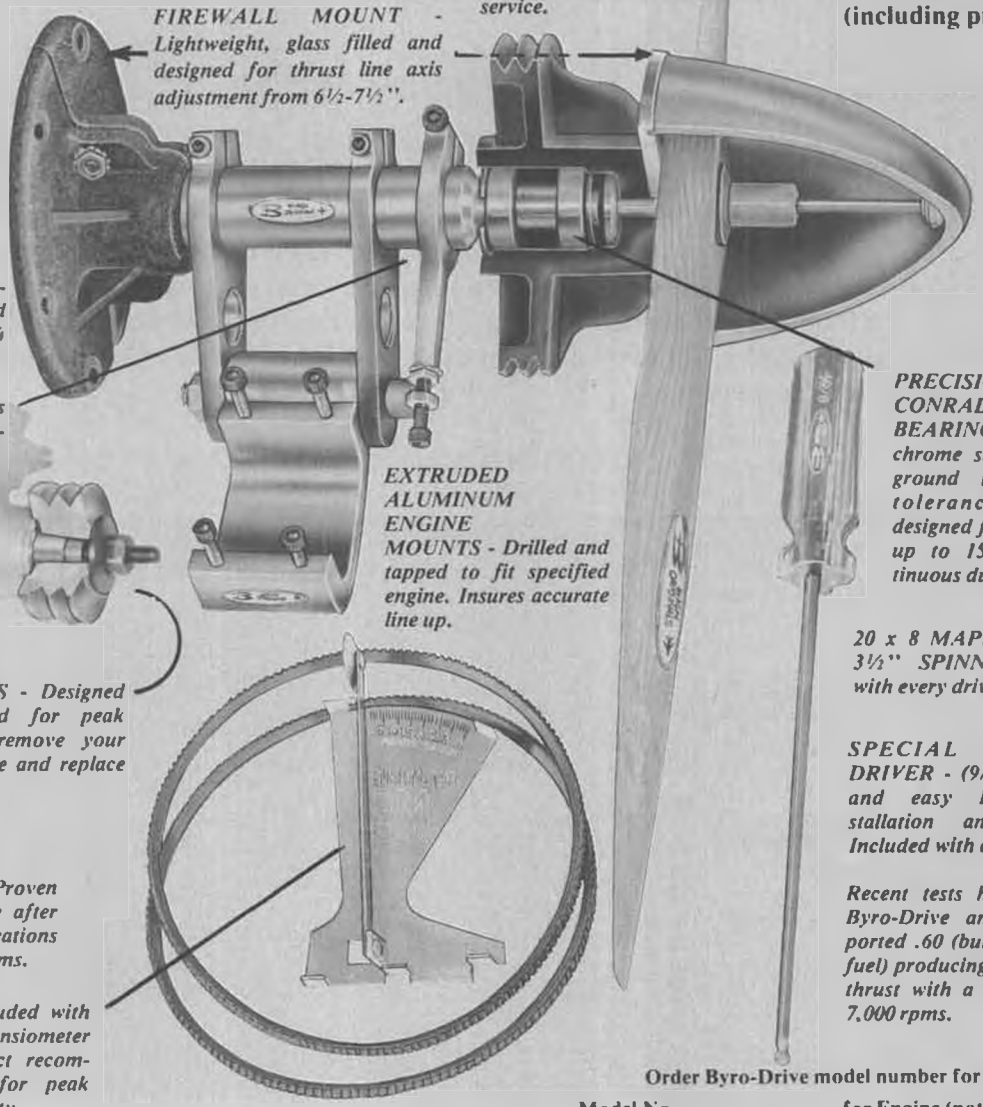
UNIQUE ENGINE MOUNTING - Allows a full 360 degrees adjustment around center support tube, plus positioning capabilities to locate the cylinder head either closer or farther from the center support tube. Great for locating engine and exhaust equipment beneath the cowl.

DURABLE 4½" NYLON FIREWALL MOUNT - Lightweight, glass filled and designed for thrust line axis adjustment from 6½-7½".

BALANCED 4" DRIVEN PULLEY - Injection formed, glass-filled and machined for dependable, vibration-free service.

WEIGHT REDUCTION BENEFITS - Complete Byro-Drive, including the prop and 3½" spinner, weights only 2¼ lbs.

BELT TIGHTENER - Offers ease of adjustment for optimum performance.



EXTRUDED ALUMINUM ENGINE MOUNTS - Drilled and tapped to fit specified engine. Insures accurate line up.

PRECISION CONRAD 1 1/8" BEARINGS - High carbon, chrome steel ball bearings ground to +.0000-.0002 tolerance. Originally designed for smooth service up to 15,000 rpms. continuous duty.

20 x 8 MAPLE PROP AND 3½" SPINNER - Included with every drive.

SPECIAL BALL END DRIVER - (9/64) assures fast and easy Byro-Drive installation and adjustment. Included with each drive.

PRECISION PULLEYS - Designed and perfectly matched for peak performance. Simply remove your engine's prop back plate and replace with Byro-Drive pulley.

POLY-FLEX INDUSTRIAL BELTS 1 pr. factory matched. Proven dependable and durable after years of tool shop applications requiring up to 20,000 rpms.

TENSIOMETER - Included with each Byro-Drive, the tensiometer will determine the exact recommended belt tension for peak performance and longevity.

Recent tests have shown the Byro-Drive and a Schnuerle ported .60 (burning 15% nitro fuel) producing up to 20 lbs. of thrust with a 20 x 8 prop at 7,000 rpms.

Order Byro-Drive model number for matching engine.

Model No.	for Engine (not included)
MFR-10	.60 & .65 O.S. Max, front & rear valve
RR-11	.61 & .65 Rossi, rear valve
RF-12	.61 & .65 Rossi, front valve
WFR-14	.61 Speed Webra, front & rear valve
TFR-13	X.60 Supertigre, front valve, rear exhaust
KF-15	.61 Kraft
HPFR-16	Silver Star or Gold Cup, front & rear valve
OPSR-17	OPS .60 Speed, rear valve

Thanks to **Byro-Drive** and its ingenious method of prop reduction, you can stop searching for that elusive method of powering your giant aircraft. And above are **13 good reasons** why. Forget about oversized and overweight gasoline and chainsaw engines with their abundance of vibration. Instead, place your trust with proven names like O.S. Max, Webra, Rossi and others* for superior engine performance and dependability. Then look to **Byro-Drive** from **Byron Originals** for the finest in high performance prop reduction. You'll like what **combining two winners** can do.

*Byro-Drive models for other well-known engines available soon.

BYRON ORIGINALS

VISA

master charge THE INTERBANK CARD

Send me_____Byro-Drive(s) Model No.(s)_____at $89.95 ea., plus $2.50 handling. (Iowa residents add 3% Sales Tax.)

Name _____

Address _____

City _____ State _____ Zip

☐ Visa # _____ Expires _____

☐ Master Charge # _____ Expires _____

☐ I have enclosed Chk. or Money Order for $ _____

☐ Ship C.O.D. (85c additional per pkg.)

Prices and specifications subject to change without notice.

Send to Byron Originals, P.O. Box 279, Ida Grove, Iowa 51445

MODEL BUILDER MAG. PAT'D APPL. FOR

big Pitts

BYRON ORIGINALS

Complete ARF Kit.

Includes all items needed to complete model as shown, including decals, color scheme templates and documentation for contest work. Prop and Spinner included with optional Byro-Drive prop reducer.

Exact 1/3 Scale Pitts S-1A

Wing Span: 68" Wing Area: 1400 sq. in. Length: 62"

Weight: ready-to-fly, less fuel.
***Under 15 lbs. with Econokote finish.**
***Under 17 lbs. with Epoxy/Fiberglass finish.**
(Optional glass kit available for $36.00).

Use the handy coupon below to place your order or call me for more information. 712-364-3165

Jimmy

Spectacular Flight Performance!

Thanks to its special pressure molded, foam airframe and the optional Byro-Drive, the Pitts S-1A from Byron Originals has overcome both the excessive weight and inadequate power problems of other quarter scale aircraft. See full page Byro-Drive ad about how you can increase the thrust of your .60 size engine by 100%.

FACTORY DIRECT PRICE

$188.00

Plus $8.00 shipping charges to any address in U.S. Items shipped by United Parcel Service.

NOTE: Although the Pitts will readily accept the various gasoline and chain saw engines presently on the market, their excessive weight, size and vibration render them less desirable.

Byron Originals
P.O. Box 279
Ida Grove, Iowa 51445

Send me_____ Pitts S-1A kit(s) at $188.00 ea. plus $8.00 shipping.
Send me_____ Fiberglass Covering Kit at $36.00 ea. plus $2.50 shipping.
(Iowa residents add 3% sales tax.)

Name _____

Address _____

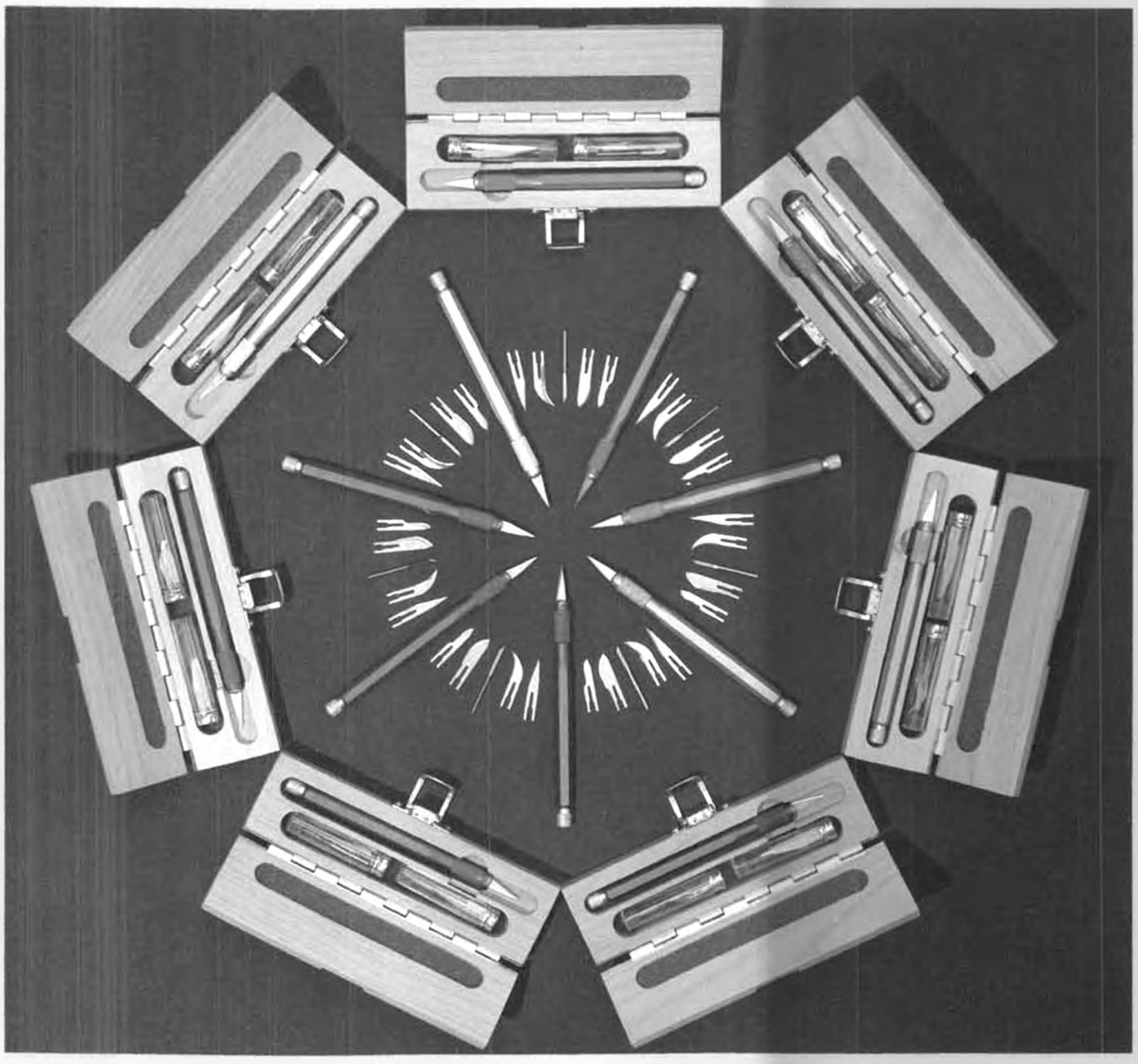
City _____ State _____ Zip _____

☐ I have enclosed Check or Money Order for $_____
☐ Please charge to Master Charge or Visa Account.

Master Charge # _____ Expires _____ Visa # _____ Expires _____
☐ Ship C.O.D. ($.85 additional charge per pkg.)
(Prices subject to change without notice).
Send to: Byron Originals, P.O. Box 279, Ida Grove, Iowa 51445.

master charge THE INTERBANK CARD
VISA

IN THE BEST CIRCLES, IT'S **über skiver**



A PRECISION INSTRUMENT FOR THE DISCRIMINATING MODELER

- *Safe, Rear Draw-Bar Clutch*
- *Precision, Instrument-Quality Materials*
- *Strong-Holding Advanced Collet Design*
- *Non-Rolling Hex Cross-Section*
- *Deeply Knurled, Non-Slip Grip*
- *Long-Life, Stainless, Surgical Steel Blades*

Available in seven satin anodized handle colors: silver, blue, red, green, gold, copper, 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 . . . . . $14.95
Individual handles (specify color) $5.95
Vial of 6 blades (No. 10, 11, or 15) $2.10
(No. 12 or 20) $3.30

See your dealer, or order direct.
Dealer inquiries are invited.
All direct orders sent postpaid in U.S.
California residents add 6% sales tax.

MODEL BUILDER PRODUCTS
621 West Nineteenth St., Costa Mesa, California 92627

Semi-big fun scale

Fokker D VII

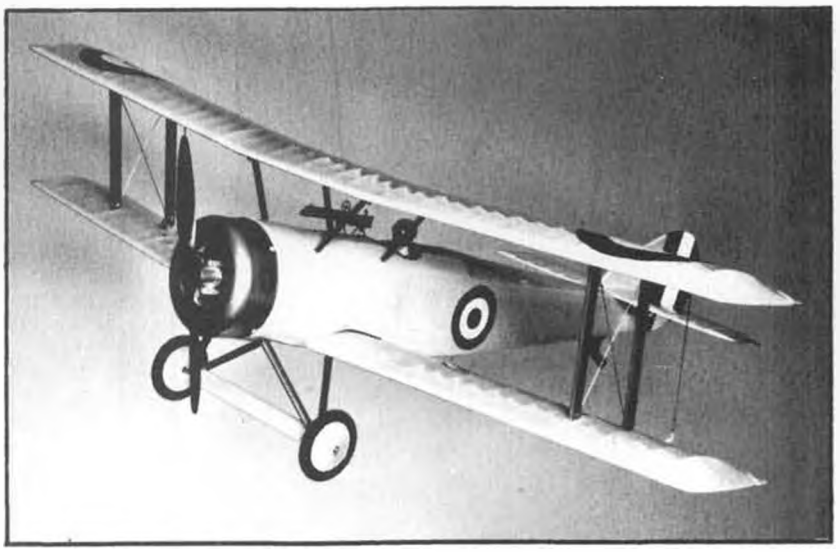
Quick build up
Kit OL781 $97.50

FOKKER DVII:
Engines .60 - .80
Wing span 72"
Wing area 1488 sq. in.
Weight 10 lbs.
4 channel radio required

Sopwith Pup

Quick build up
Kit OL792 $119.50

SOPWITH PUP:
Engines .60 - .80
Wing span 67½"
Wing area 1586 sq. in.
Weight 10 lbs.
4 channel radio required



KIT FEATURES:
- 2 full sized rolled plans
- step by step construction manual with photographs
- quality die stamped balsa parts
- machine cut hardwood parts
- machine cut and pre-sanded plywood parts
- preformed balsa blocks
- preformed leading and trailing edges
- preformed landing gear and cabanes
- heavy duty one piece ABS cowl

Accessories included:
- 5" scale wheels
- Scale machine guns
- Scale pilot
- Self adhesive decals

Hardware package includes:
- aluminum motor mounts, pinned hinges, snap links, control horns, nylon bolts, landing gear strap, socket head bolts and blind nuts, plus all necessary fittings.

See your dealer or order direct postpaid
Prototypes flew great with a K&B .61 and 14-4 prop.
Dealer and distributor inquiries invited

ORLINE

Orline Inc. • P.O. Box 12725 • Salem, Oregon 97309 • Telephone 503/792-3627
Manufacturing Plant: 11235 Portland Road NE Brooks, Oregon 97305

MRC'S NEW R/C GUIDANCE SYSTEMS...

QUALITY YOU CAN APPRECIATE AT PRICES YOU CAN AFFORD

When you buy a radio nowadays it's a whole new and sometimes confusing world out there. Radios boasting low prices often use economy components of low quality and wide tolerance. While high end systems often contain expensive features meant for only special applications. These radios don't always pack the value they promise.

Where do you turn? To MRC's new R/C Guidance Systems. We built them from the ground up with quality you can depend on and pricing you can afford. And because our 32 year reputation for advanced electronics rides on every set, you'll find components like mil spec gold plated pins and connectors and advanced C-Mos integrated circuit decoders standard equipment. While others may skimp on transmitter size, ours has been human engineered to fit large and small hands. Even our sticks, (open gimbal and semi open gimbal) are thoughtfully engineered with trim controls on each stick. And our receivers still carry their own lead out wires for ease of installation. That's MRC's style. A little extra value in every set.

Remember we're still the maker that range tests every radio system twice before it leaves our plant. We test the whole system, servos, receiver, transmitter . . . you can depend on it. And if you need service or have a question, we have a nationwide network of service centers to cater to your needs.

While keeping our standards up, sophisticated manufacturing techniques have helped us keep the prices down . . . to give you the best dollar-for-dollar value on the market.

MRC's new R/C Guidance Systems . . . it's quality you can appreciate at prices you can afford. See them at your hobby shop.

Two, three and four channel systems at sensible pricing.

MODEL RECTIFIER CORPORATION / 2500 WOODBRIDGE AVENUE / EDISON, NEW JERSEY 08817

In Canada: 3440 Pharmacy Ave., Scarborough, Ontario, Canada M1W2P8