MODEL BUILDER

volume 7, number 66 $1.50 JUNE 1977

ONLY ONE OF THESE LEADING TWO CHANNEL SYSTEMS HAS OPEN GIMBAL STICKS... MRC'S 772

Open gimbal sticks are usually found only on more expensive professional systems. The control potentiometer in an open gimbal stick is connected directly to the stick arm without linkages that introduce play. Every little motion of your stick is mirrored into an electrical change that actuates your servo for maximum response and total control.

And that's just the beginning of the differences between MRC's 772 and some others. To assist you in making your selection, we randomly chose two other systems† on sale at local hobby shops. Based on a comparison of these and ours, here are some other points you should consider before selecting a two channel radio.

	MRC 772	FUTABA* MODEL FP-2GA	COX/SANWA* MODEL 8020
Open Gimbal Sticks For Precise Control	Yes	No	No
D'arsonval Meter, Monitors Transmitter Battery	Yes	Yes	No
ITT Cannon "Centi-Loc*" Spring Action, Positive Contact Gold Plated Connectors	Yes	No	No
Double Tuned Front End Receiver	Yes	Yes	Yes
Lead Out Wires From The Receiver For Easier Installation	Yes	No	No
Largest Transmitter	Yes	No	No
Integrated Circuit Decoder Utilized In Receiver	Yes	Yes	No
Lowest Current Drain Receiver (No servos Connected)	Yes	No	No
External Servo Potentiometer Adjustment For Centering	Yes	No	Only Output Arm Is Adjustable
Length Of Warranty	1 Year	180 Days	6 Months

*A Registered Trademark of International Telephone and Telegraph Corporation * Registered Trademark

† Comparison of features based on R/C systems purchased November 1976

MODEL RECTIFIER CORPORATION 2500 WOODBRIDGE AVE. EDISON N.J. JERSEY 08817

VORTEX
MODEL ENGINEERING

HARDWARE and KITS

for r/c sailing

Mail order only, no dealers or distributors. For illustrated brochures describing all of our model yacht products, send $1.00.

Vortex Model Engineering
Department MB
210 East Ortega Street
Santa Barbara, CA 93101

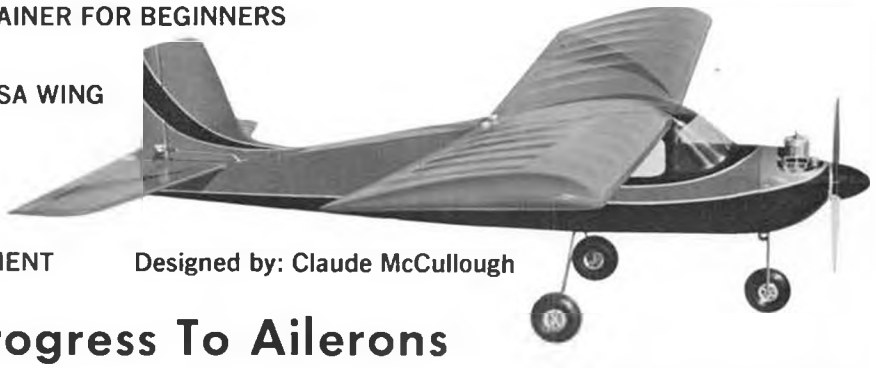
LEARN TO FLY RC THE SIG WAY

BASIC: Start With Rudder Control KADET

SIG
KIT RC-31
$33.95

THE IDEAL TRAINER FOR BEGINNERS

BUILT-UP BALSA WING

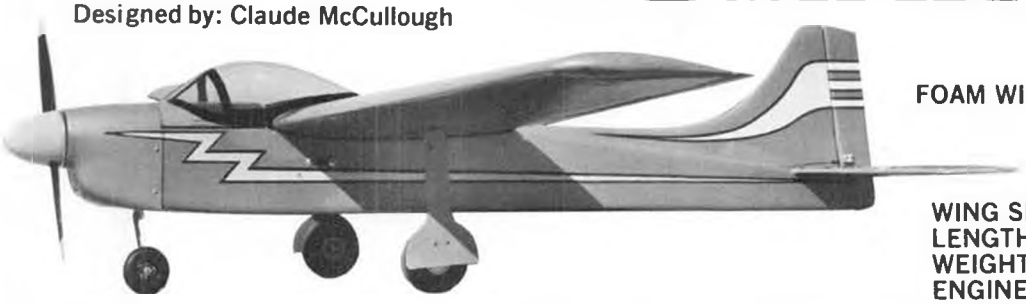


LENGTH: 42 In.
WING SPAN: 57 In.
WEIGHT: 4 Lbs.
ENGINES: .19 - .35 Cu. In.
UP TO 3 CHANNEL RADIO EQUIPMENT

Designed by: Claude McCullough

INTERMEDIATE: Progress To Ailerons KOMANDER

Designed by: Claude McCullough



FOAM WING

SIG
KIT RC-32
$39.95

WING SPAN: 62 In.
LENGTH: 44 In.
WEIGHT: 5-1/2 Lbs.
ENGINES: .35 - .50 Cu. In.
4 CHANNEL RADIO EQUIPMENT

ADVANCED: Move Up To Aerobatics KOUGAR

SIG
KIT RC-35
$42.95

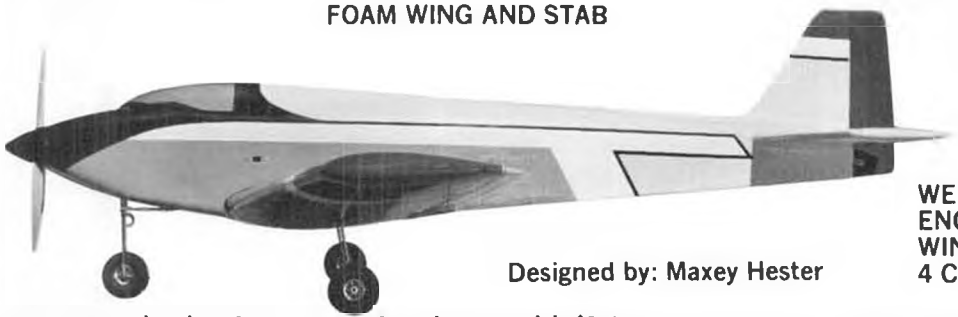
FOAM WING

ENGINES: .35 to .50
WING SPAN: 51 In.
WING AREA: 550 Sq. In.
LENGTH: 45-1/2 In.
4 CHANNEL RADIO EQUIPMENT

Designed by: Claude McCullough

EXPERT: For The Graduate Flier KOMET

FOAM WING AND STAB



SIG
KIT RC-29

Balsa Skin	Plywood Skin
$47.25	$51.65

WEIGHT: 6-1/2 - 7 Lbs.
ENGINES: .45 - .60 Cu. In.
WING SPAN: 67 In.
4 CHANNEL RADIO EQUIPMENT

Designed by: Maxey Hester

See your dealer first. To order direct add $1.00 postage in the U.S., $1.50 in Canada. No C.O.D.

SIG MANUFACTURING CO. . . Montezuma, Iowa 50171

R/C BOATING *at its Best!*

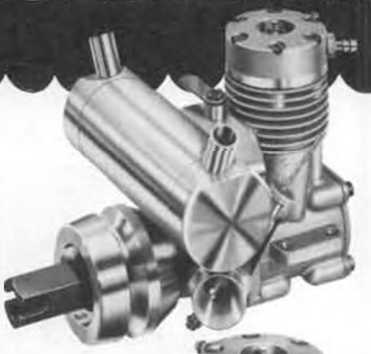
with K&B MARINE ENGINES...

K & B 3.5cc (.21) OUTBOARD ENGINE (not illustrated) Here's a tough, hot K & B 3.5cc engine . . . the first of its kind. Destined to set a pace others will follow! With ABC piston and liner, this water cooled competition engine is the ultimate in outboard engines. It offers the superior control characteristics of outboard drive.

It features: • Ball Bearings • Flywheel designed for cup electric starter • Close, simple steering and throttle linkage • Underwater pick-up • Integral cavitation plate and skeg • Tough transom mounting plate to withstand stress of flat-out racing.

K & B 3.5cc (.21) R/C ENGINE Designed specifically as a marine engine. Powerful, rugged and dependable. Will provide countless hours of high-performance operation. Easy to start, no break-in required. Precision machined U-Joint Nuts fit most existing ball drives.

Features include: • Efficient Muffler — under 90 decibels • ABC Cylinder and Piston • Ball Bearings • Water-Cooled Head • Rear Exhaust — Butterfly Throttle • Rotatable Case (center block)—permits changing exhaust from forward to aft position.



K & B 6.5cc (.40) RC/RS III MARINE RACING ENGINE A new all marine 6.5cc engine. Equipped with rear exhaust, rear rotor, and exhaust — butterfly throttle. It has been thoroughly tested in many R/C races.

Features include: • ABC Piston & Liner — for long life • Advanced By-Pass Porting • High Density Aluminum Die Casting — for greater strength • Water-Cooled Head • Ball Bearings • Rotatable Case (center block) — permits changing of exhaust from forward to aft position • Con Rod — bushed both ends.

K & B .40 R/C MARINE SPORT POWERPLANT An ideal, dependable, all-purpose engine. It has superb power, is easy to start and requires no break-in. For consistent peak performance in all marine engines fill the tank with K & B fuel. Your choice of six blends.

Features include: • Perry Carburetor • Water-Cooled Head • Balanced Flywheel • Precision-Machined U-Joint Nut — fits most existing ball drives • Install, start, and go-o-o-o-o!

K&B MARINE SPECIALTIES

HARDWARE

MOTOR MOUNT SET Die cast aluminum, complete with 5" Master Mount, Screws and Washers, and Insert Adapter for .40 or .60 engine. Inserts can be rail mounted in boats with confined engine placement areas.

DOUBLE RUDDER OUTDRIVE ASSEMBLY For .40 or .60 boats. Aluminum die cast. Complete with Master Bracket (designed with twin ribs for individual modification), 2 Rudder Pivot Brackets, 2 Retainer Plates and all necessary Mounting Screws and Washers. Also includes Adjustable Strut—with installed Olite Bushings, Pivot Pins — with Nylon Bushings, 3 Control Arms — with set screws and 2 Rudder Blades (2 ARB for .40, 3 ARB for .60). **The SINGLE RUDDER OUTDRIVE ASSEMBLY is the same as the above, except it only includes 1 Rudder Blade, Rudder Pivot Bracket, Pivot Pin and Control Arm.**

RUDDER ASSEMBLY Aluminum die cast. Available for both .40 and .60 boats. Easy to assemble. Comes complete with Mounting Plate and Screws, Pivot Bracket, Rudder Blade, Pivot Pin — with Nylon Bushings, and Water Pick-up — threaded and adjustable. The .40 and .60 Rudder are identical, except the .60 Rudder Blade is ½" longer.

Send for your K & B Catalog, "Matched Finish System" Handbook and Super Poxy Paint Chart. Include 25¢ to cover postage and handling. Address to Dept. SR .

K&B MANUFACTURING
DIVISION OF AURORA PRODUCTS CORP.
12152 WOODRUFF AVE., DOWNEY, CA. 90241

LONG TERM RELIABILITY:

"I'm still using my 1969 KRAFT Gold Medal Series System!"

In the confusing maze of advertising claims and prices, it is difficult for the newcomer to R/C to choose his R/C system. Often overlooked is the long term aspect of his investment. Read what Bob Aberle, an outstanding modeler, writer, and designer, has to say about his 1969 Kraft Gold Medal equipment:

"...It is now in its eighth flying season. Having been an amateur radio operator for years I got into the habit of keeping a detailed flight log. As of this writing I have accumulated about 700 flights on this particular radio system. A total of 15 models have used this equipment over the years. Many of my designs have been published and all clearly show my 'old time' Kraft System.

"Of particular interest is the fact that the system never once lost control or experienced any type of interference. I only suffered one crash in all those flights, and that was strictly due to pilot error. The system itself was undamaged. I replaced the original battery packs after approximately five years of service. On three separate occasions I needed a new motor in one of my KPS-10 servos. I've never had a single broken wire or any problem with the connectors. True, I do treat my system well and its present appearance is as good as the day I bought it. I have no reason to doubt it could last another eight years and I full well expect to prove it."

KRAFT SYSTEMS, INC.®

Write for free catalog
450 W. California Ave., P.O. Box 1268
Vista, California 92083 (714) 724-7146

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.
LSF 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-III R/C scale.
Al Vela's E-Z Boy 1/2A
E-Z Boy 1/2A, Al Vela.
Peanut Ford Flivver.
Fiberglassing 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 stand[illegible] R/C sport pv[illegible] scale.
Counterfr[illegible] ailless A/1 [illegible]ic.
Shoes[illegible] R/C QM.
Pear[illegible] aylorcraft on [illegible]ts, also big one.
Fairey Delta 3-views.

SOLD OUT

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( )	F/M 73	2.00( )	Jan. 74	o 1.00( )
Dec. 71	2.00( )	Apr. 73	3.00( )	Feb. 74	• 1.00( )
		May 73	o 1.00( )	Mar. 74	o 1.00( )
Jan. 72	o 1.00( )	~~Jun. 73~~	~~4.00( )~~	Apr. 74	o 1.00( )
Feb. 72	3.00( )	Jul. 73	• 1.00( )	May 74	1.00( )
M/A 72	• 1.00( )	Aug. 73	• 1.00( )	Jun. 74	• 1.00( )
May 72	2.00( )	Sep. 73	• 1.00( )	Jul. 74	o 1.00( )
Jun. 72	3.00( )	Oct. 73	• 1.00( )	Aug. 74	• 1.00( )
Jul. 72	4.00( )	Nov. 73	o 1.00( )	S/O 74	• 1.00( )
~~Aug. 72~~	~~4.00( )~~	Dec. 73	• 1.00( )	Nov. 74	o 1.00( )
				Dec. 74	o 1.00( )

Jan. 75	o 2.00( )	Jan. 76	o 1.50( )
Feb. 75	2.00( )	Feb. 76	o 1.50( )
Mar. 75	2.00( )	Mar. 76	o 1.50( )
Apr. 75	2.00( )	Apr. 76	o 1.50( )
May 75	3.00( )	May 76	1.50( )
Jun. 75	1.25( )	Jun. 76	o 1.50( )
Jul. 75	• 1.25( )	Jul. 76	o 1.50( )
Aug. 75	o 2.00( )	Aug. 76	1.50( )
Sep. 75	o 1.25( )		
Oct. 75	o 1.25( )		
Nov. 75	o 1.25( )		
Dec. 75	o 1.25( )		

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 20¢ 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

JUNE

1977

volume 7, number 66

621 West Nineteenth St., Costa Mesa, California 92627

Subscriptions $15.00 per year, $27.50 for two years. Single copies $1.50. Add $2.00 for postage per year outside of U.S. (Except APO). Add 75 cents for Canada and Mexico.

Published monthly by MODEL BUILDER Magazine, 621 West Nineteenth St., Costa Mesa, Calif. 92627. Phone (714) 645-8830.

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, Calif., and additional offices.

CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Taken about 18 years ago on 120 Anscochrome film (now called GAF), the colors are a little weak in this photo of Bill Northrop's quarter-scale Gipsy Moth, which is featured in the construction article beginning on page 12. However, the misty atmosphere, with the top left wing panel blending into the gray sky, seems to create a fitting mood for the scene.

"...THREE if by AIR"

(Letters to the Editor)

Dear sir;

As the editor of a publication devoted to modeling, you are in a unique position to aid a related enterprise. "Odysseys in Flight" is a non-profit organization (Federal Tax No. 11-2388774) well along the route to obtaining the U.S. Navy Aircraft Carrier U.S.S. Lexington (CVT-16) when it is decommissioned. Not only will the "Lexington" be preserved as a memorial onto itself, but she will provide the home for an exciting, functional, aero-space museum. A look at the list of our board of advisors will show the scope of our support and the interest in our project. We have firm commitments for display aircraft and material (including models) from just about everywhere. Soon, the aircraft that we enjoy modeling so much will be gone forever. Museums are the only practical way to preserve them for all. We have worked alone for years on this project, but are now at the stage where public acceptance and aid in funding are essential to our ultimate success. We are now appealing to the public to support us through donations (Tax deductible). Remember that a large battleship was emplaced as a museum through the donations of school children. We will gladly respond to any questions. As a life-long modeler, I ask you to print this letter for us. Any donations are appreciated and respected. Donations should be mailed to:

"Odysseys in Flight", Inc.
P.O. Box 229
Wantagh, New York 11793

Thank you.

James L. Smith
First Vice-President
Odysseys in Flight

* * *

Dear Bill:

Please send one plan No. 277-O.T. Berliner Joyce by first class mail.

This will be the second time around for me . . . built one in '36 with a Brown Jr. Flew without too much trouble.

If I recall it, Dale also said he had an 8mm movie camera on board. He certainly was way ahead of his time. Thanks for reprinting the article.

Frank Vaccaro
New Rochelle, N.Y.

* * *

Sir:

I am interested in building the "Grumman J2F-6 (Duck)". This plane appeared in your Jan. '77 issue in the 'Remotely Speaking' column (pg. 22).

The plane was built by a Mr. Charlie Smith.

Will your magazine be publishing his plans, or could I have his address so that I might write him?

Bob Ferber
St. Peters, Missouri

So far, Charlie Smith's J2F-6 has not flown satisfactorily, as it came out a little too heavy. If and when his revisions are completed, and the flight characteristics are improved, we will publish the construction article.

* * *

Dear Mr. Northrop;

I really think it is time that someone said something about the "Dragonfly" (Feb. '76) by Tex Newman.

I built mine in mid-1976, and promptly destroyed the first foot of the fuselage in a 400 foot wingless dive (first and last major error), rebuilt it in a week, and the airplane has been a non-stop ball all winter long.

I consistently get 30 minute flights out of 10 minute engine runs, it out-thermals my sailplane, and I have taught many people how to orient themselves with R/C. As a trainer, it is second to none; it is everything the byline said it is.

Mr. Northrop, as long as you keep designs such as the Dragonfly appearing on the pages of **Model Builder,** *you will always be communicating with the model builders.*

May I wish you and your magazine every success in the years to come.

T. Lyttle
Brentwood Bay, B.C. Canada

We understand that an Astro 10 electric powered version is flying regularly in this area, though we have not seen it. The Dragonfly is one of our most popular designs, and we are about to release Stick 'em Patterns, that will make it even easier to build from scratch. Watch the plans list for availability.

* * *

Dear Sir,

"Grey" should be spelled "gray." Quite some time ago a U.S. advertising agent wanted to be hoity-toity and used the spelling of the "colour grey" in his ad for "classe." Others followed suit. It reminds me of Major Grey's Chutney from India.

In England they say, "The colour of the aeroplane's tyres are charcoal-grey."

In this country we say, "The color of the airplane's tires are charcoal-gray."

The Red Coats have long since departed. As a Bicentennial Year resolution, let us be consistent and spell it, "GRAY."

Ask any paint manufacturer (except those specializing in antiquing).

Best wishes in the new year.

Robert C. Morrison

P.S. Don't let us mislead you, but tyres are blacke.

Not all tyres are blacke. The Blackburn monoplane, and some others of that era, used whyte tyres . . . so theyer!

* * *

Dear Sirs,

Please send me some information about your magazine.

B.C., Nashville, Tennessee

Our magazine measures 8-1/8 by 10-7/8 inches, unopened. It usually consists of 104 pages, plus cover. It weighs about half a pound. The cover is in color, and the inside pages are black and white. There are lots of pictures with captions, that sometimes belong to the picture they're under. It is published once a month, if everybody gets their material in on time, if everybody pays their bills, and if the creek don't rise (Sometimes our pants are pulled up above the knees to keep 'em dry).

* * *

Dear Sir,

I have read Bill Hannan's article in your March issue concerning CO_2 engines. I would like to point out that whilst it is not advisable to expose engines to heat or leave [them] on the back parcel shelf under the rear window, we at Telco had anticipated that this could happen. Accordingly we designed into our engine a "safety valve", and this you can easily try for yourself. The attached sketch of mine shows just where the 'O' ring is designed to "blow". If a seal goes at this point it is obviously easy to get at and will not be buried inside a model.

Just one of the many attentions to detail which help Telco to be ahead and the best on the market.

If the 'O' ring blows, simply unscrew the filler nozzle, allow the 'O' ring to shrink back into place and screw home the nozzle. Simple job taking a couple of minutes.

I am sure your readers would like this assurance.

D.J. Lee
Director—Telco Sales

* * *

Dear Mr. Northrop:

I just want to tell you how much I enjoy Model Builder in all its aspects. My tastes are very catholic when it comes to model building, so all the columns (well almost) are enjoyed. I heartily endorse the idea of a ships column, as I have built several operating ships, sail and power. I admit to a prejudice in favor of ships and seaplanes because of a World War II Navy stint, and the fact that I presently own and sail a 29 foot sloop.

The leadoff in "Over the Counter" is really unfair to the younger people. Those of us who were modeling in the 30's recognize the G.H.Q. Of course as the lead says, it is APRIL! At any rate, apropro of G.H.Q., I had the pleasure of building and flying an 8 foot monoplane together with the rest of the boys and one girl in the Model Airplane Club of James Madison High School, Brooklyn, New York. This was sometime around 1936-7. It was powered by a "Loutrel", which I understand was the original of the G.H.Q. The engine did put out with our hand-carved props. The ship was designed in committee by all of us . . . was constructed primarily of pine, and covered with dress silk from the Home Eco Shop. We flew it in back of the school on the athletic field. It was still flying when I left. As I recall, the faculty advisor was Mr. Crombie, of the Biology Department.

I also belonged to a club called TAMBE (The Airplane Model Builders Exchange). We built just about everything that might fly. Much to our surprise, some did, at our home field in Marine Park, and at various regional contests. The superb cover of the April '77 issue has given me new impetus for a large rubber scale job. Accordingly, I'm sending for the Puss Moth Plans.

Thank you for listening and for the enjoyment your magazine has given me.

Jess Sklarin
Massapequa, N.Y.

That cover brought about a rash of plans orders for the Puss Moth . . . and the floats. Fortunately, most everyone named the Moth when ordering (always a good idea as a double-check), because we misprinted the number as 1772 instead of 1722 in the cover story! A few ordered plane and floats without naming them, but who would want a Rat Racer on floats!

* * *

EDITOR, "Three if by Air",

As you can see by the letterhead, I am a retailer trying to help my customers. (And have been, for the past 26 years.)

Years ago there was another Hobby Shop in the area, but the owners didn't appreciate all the modelers' problems, and eventually it went 'kerflop'!

By the same token, today, I doubt if many of the model builders appreciate the problems of the retailer in a local situation.

When I started building and flying models, about 40 years ago, they were 10 & 25¢ models from the Dime Store. (That was all the model building supplies they had!) Unless I could talk my parents into driving 60 miles to the nearest shop, my only recourse was 'mail'. Both of these procedures left much to be desired. So I was very happy when the 'more or less local' shop opened it's doors.

After it closed (and I was older and had a little more money to spend), I had to go back to the 60 mile trek, or mail order.

Perhaps some of your readers have enough money to stock a hobby shop in their basement (more power to them), but most do not. If a glow plug burns out, or the ground raises to meet the prop too often, etc., etc., they are through flying for a week

or so, if there is no local shop.

I do 'Special Order' quite a bit, and am happy to do it, however, many times my distributor(s) doesn't have what I want. (The mail order houses are 'out of stock' many times also! I know, because I've called them, when I've been unable to get a special order).

Sometimes a customer will want me to order an odd-ball part, many of which are available only in dozen lots, or, are available from one source, minimum order $200.00. We have no answer for this! Does anyone!

I would love to have everything, everyone wanted, all the time! But this is a small town (4,000) and we would be unable to do anything but lose money. Because we can't stock everything (at discount prices), do your readers suggest we go out of business?

Most of our customers would just stop building! Multiply our small shop by about 10,000 (approx. number of shops in U.S., I read that somewhere.), and I bet the manufacturers would scream.

How would you protect the Sunday Flyer? Without the small local shops, they wouldn't be able to fly every Sunday! Where would they get their glow plugs, props, etc.? Order ahead!? How do you know what you are going to need? I order ahead, but we still run out of things! It's unavoidable! But our 'outs' are less frequent than those of an individual!

I'm sure the Mail Order houses don't want to drive any small shop out of business, because they are convenient and keep the builders flying. They would lose customers also. And yet, they get the cream.

If anyone has any suggestions on keeping both elements in business, I'll be glad to listen. With a prayer!

Thanks for listening!

L.B., Hobby Shop owner.

We were going to close this discussion, but so many dealers are writing in that we feel they should be heard.

* * *

Dear Bill,

This letter is an answer of sorts to K.G.'s anti-hobby shop letter in your February MB.

I would like to open the battle with my definition of "hobby shop." I feel the basic hobby shop fields, dating from the turn of the century, are model airplanes and model trains. Take a small shop, stock it well with either or both of these fields, and start working on model ships, cars, plastic models, and whatever else you build or create with your hands and your imagination. The shop should be staffed by people who are knowledgeable in at least one field, and interested enough to have basic knowledge in the other fields. This is my store.

Now my definition of "customer". The guy who waltzes into my store and tries to jockey my price on an RC set he just looked up in the latest discount ad, might find me a little cool and unhelpful. But if you're 12 years old and don't know how to paper your Ringmaster, I have a half a can of clear dope in back of the counter, and we'll clear a little space on a shelf.

Beware the imitators! Shopping malls across the country are filled with chromed and carpeted stores selling ready-to-run, ready-to-break models (!???). They call themselves hobby shops, but they don't know how to paper a Ringmaster! You can always tell the real hobby shop . . . the owner has patches on his pants and the employees are in the front window running the HO train. Stop in and talk for a while.*

Peter Cobb
Middlebury, Vermont

P.S. I'm his wife, and I can't tell you how many times I've waited-very impatiently-for upwards of an hour while he goes over plans or discusses techniques with a beginning builder of any age. On the other hand, he can be downright rude to the person who comes in asking him to fix a busted train engine bought at a discount house-after they took two hours of his time on the busiest Saturday before Christmas asking questions about trains vs. race cars, and the relative merits of different sets, scales, manufacturers, etc. (He can't stop me from sticking in my two cents' worth since I'm typing this letter for him!)

* * *

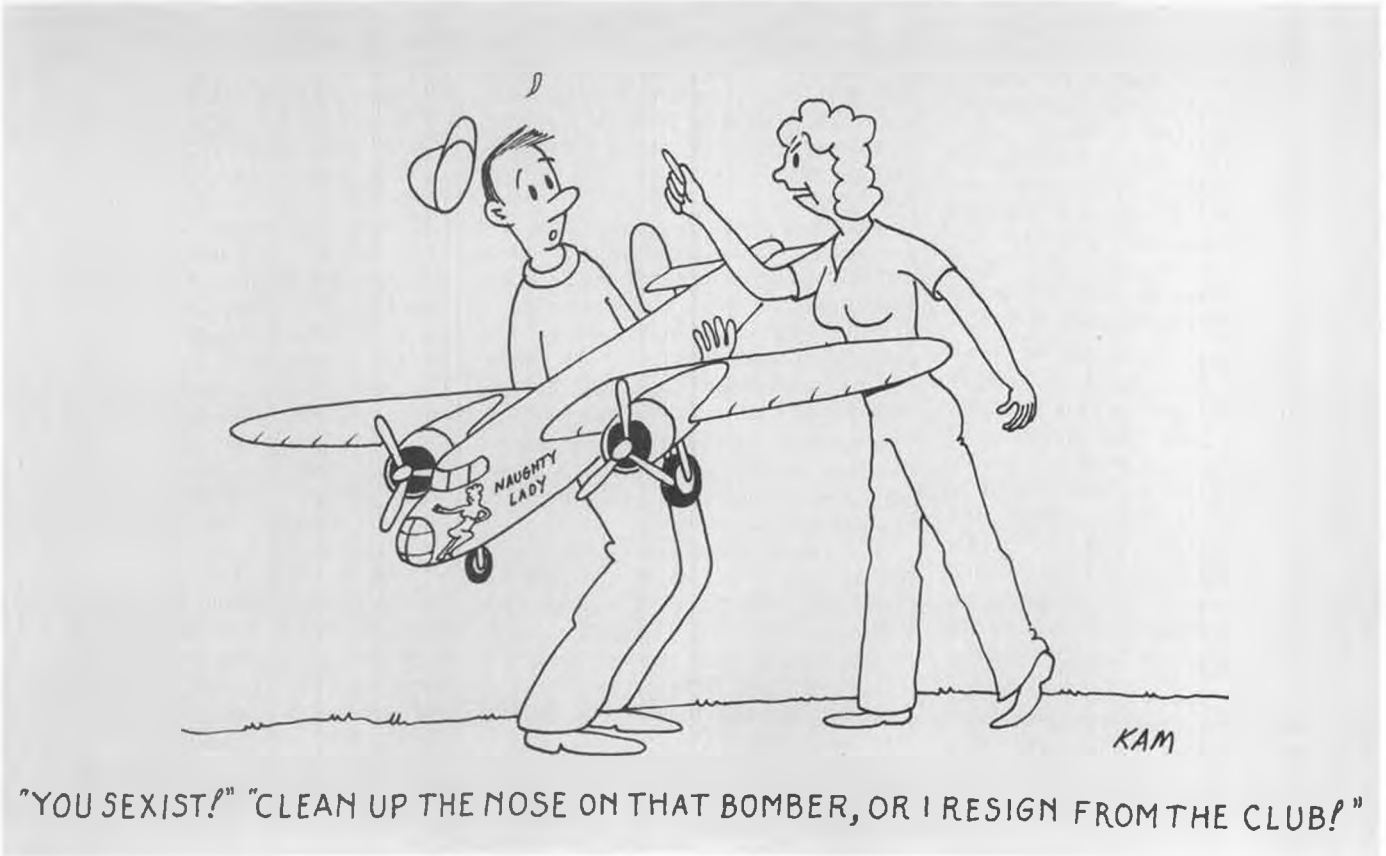
Dear Bill,

I may be a bit late getting into this question of Local Hobby Shop vs. Mail Order Mogul, but don't let that put you off.

The letter written by K.G. (February '77) raises a few interesting points. First, here in New Jersey the demise of the local hobby shops . . . six have disappeared from this general area within the past eighteen months . . . occurred not because of, but in spite of the growth in mail order nationwide. They were not so much under patronized as under capitalized. At a time when the variety of modelling products has increased in seemingly inverse proportion to the decline in real incomes, carrying all the lines is no game for the modeler cum shopkeeper. The amateur businessman simply cannot survive in that climate. The people with the money up front can, but even they can get their fingers burnt. As for advice, answers, help . . . it has always been my experience that "You pays your money and you makes your choice." Regarding K.G.'s assertion that: "When shipping is taken into account, the mail order houses are no cheaper." This is nonsense. I don't know who he's been ordering from, but the fact is it is just not true; unless, of course, you're just looking for a packet of pins.

Secondly . . . and this may offend . . . knowing what I do about the realities of running a magazine and the financial structure of special interest group publications, I find it very hard to picture any of them turning away an inoffensive and lucrative account on a "Save-The-Local-Hobby-Shop" campaign. Surely an air of unreality prevails at 621 West Nineteenth Street. I don't believe "Model Builder" is the unofficial organ of the retail hobby trade (What a hobby horse to be riding!). As K.G. rightly says, it's a Don Quixote crusade, and even if it were believable, hopelessly misguided. You've come a long way; you're fun to read and a valuable source of information. You didn't get that way by ignoring the modeller, but by giving him what he really wanted.

Robert Sell
Eatontown, New Jersey ●



"YOU SEXIST!" "CLEAN UP THE NOSE ON THAT BOMBER, OR I RESIGN FROM THE CLUB!"

Under the three snappy hats are (l to r): Walt Good, Tom Mountjoy, and Gordon Light. Under the stylish bonnet, Ginny Good. The year was 1946, and the airplane was Frank Zaic's well known "Floater" design. While Tom and Gordon ham it up for the camera, Walt and Ginny watch the rudder move under the mysterious command of radio control. Pic from T. Mountjoy.

from Bill Northrop's workbench . . .

DON'T BELIEVE IT UNLESS . . .

There is only one source of official AMA information, whether it's about the Nats, or any other matter that pertains to our modeling organization . . . and that source is AMA Headquarters.

A prime example of the confusion that can result when "official" information originates otherwise, and is then published in newsletters and magazines without having been cleared through AMA Hq., is the recent screw-up in specifications for exhaust pipes and propellers on Quarter Midget pylon racers at the 1977 Nats in Riverside.

Emanating, we regretfully admit, from a Southern California source, was a list of "Important Items" for Quarter Midget racing at the 1977 Nats. Item 6 stated, "Props–Only wood props allowed. Rework and/or modification of both blades *is acceptable* (our italics)." Item 7 stated, "Exhaust Extractor–The exhaust extractor can have a maximum length of 4.5 inches and must have a constant inside diameter. *No slot required* (our italics)."

Both of these items are in direct opposition to the official AMA Rule Book (Item 6) and to the majority consensus of the QM members of NMPRA and those racers who attended a QM meeting at last year's Nats in Dayton (Item 7). Also, though not official until January 1, 1978, the proposal to require a 1/4 inch slot in exhaust extractors (to hinder their augmenting capabilities), has been passed overwhelmingly by the Contest Board.

The aforementioned list has already been published in several racing-oriented newsletters, and most unfortunately, in a leading R/C magazine. Contrary to what we have just warned you about . . . to believe only what you read in official AMA releases . . . we must impress on you that these two very controversial items about props and extractors are **definitely incorrect.** Because of our relatively short lead time, we have been asked by AMA Headquarters (specifically John Worth) and Mike Atzei (QM Event Director at the '77 Nats) to make it clear to our readers that only modification to one wood prop blade will be allowed (obviously for balancing purposes), and that exhaust extractors must have a 1/4 inch slot running all the way from the end of the engine's exhaust stack to the exit end of the extractor.

Please pass this information on to anyone you know who may be racing QM's at the '77 Nats . . . and also remember that *any information* relative to the '77 Nationals, or any AMA matter, is only official if it comes from AMA Headquarters.

AT LAST!

For what seems like many years, and we don't recall how many, the AMA and MAAC Nationals have been occuring during the same week in the summer . . . a frustrating situation for many modelers, especially those near the appropriate portion of the U.S./Canada border, who would like to attend both affairs. This summer, the two Nats are separated by two weeks, with Canada's being July 16 through 24, and the U.S. being August 8 through 14.

For those Americans who would like to "do it in Canada", the MAAC Nats will take place at Huron Park (Centralia), Ontario. It's 20 miles north of London, Ontario, which in turn, is 125 miles from Detroit (southwest of London), or 125 miles from Buffalo (east of London).

There's a full schedule of competition in F/F, C/L, and R/C during the week, and AMA members are welcome to compete. Write to M.A.A.C. headquarters, at P.O. Box 9, Oakville, Ontario, Canada L6J 4Z5, for further information, and entry forms if you wish to enter some events.

By the way, Ray Pender, 9937 Forest Glen Dr., Montgomery, Ohio 45242, Phone (513) 891-1369, called to tell us that he will C.D. Old Timer competition at the M.A.A.C. Nats, on July 17, 18, and 19. This is a last-minute add-on, and not included on the official announcement and entry form.

Ray indicates that all of the events will be free flight, and will include Class A, B, C Cabin and Pylon, Rubber, and .020 Replica. For more details, and up-to-date information, contact Ray directly.

DUMB-DUMB AWARD

This month's Wire-Haired Cookie Pusher award goes to the city officials of Livermore, California. In a clipping from *The Argus*, a Fremont/Newark, California newspaper, sent to us by Dave Bruner, of Sunnyvale, we read that one Jim Harvey, of Livermore, was about to give up sailing his R/C Soling sloop in Lake Elizabeth. It seems that the city has decided that he should pay the same 50 cent launching fee that applies to the full-size boats! Jim was quoted as saying that "[If I do sail here again], I intend to launch from a point as far distant from the boat ramp as possible. If they must have their fee, then let them earn it."

Stay in there Jim. These officials will go down in history with the ones in early automobile days, who decreed that someone would have to run ahead of every auto, waving a red flag to warn the pedestrians and horses! Hmmm . . . maybe that one should be reactivated. It would sure help the energy crisis.

NO TICKEE, NO WASHEE!

For just about a year now, we have

Continued on page 102

OVER THE COUNTER

Peck-Polymers' "Baby Ace" spans 17-1/2 inches, for rubber or CO_2 power. Walnut Scale!

Carl Goldberg's non-finger-sticking "JET" super-glue.

• Carl Goldberg Models, Inc. has again come up with some clever solutions to everyday model building problems. The new Klett Flex-Point hinges are designed for the simplest possible installation, yet make it easy to fit control surfaces where they should be, extremely close to the fixed part. A web area combined with a barbed shank absorbs vibration and flutter, thereby eliminating the possibility of their working loose with the resulting disaster. Price is only $1.20 for 18.

The 90 degree nylon mounting brackets should fill a multitude of needs on just about every construction project. They can be used to mount hatches and cowlings on airplanes, hatches on boats, bodies on cars, and as pushrod guides; the uses are endless and will suggest themselves during your building processes. Four per package, with wood-screws, 50¢.

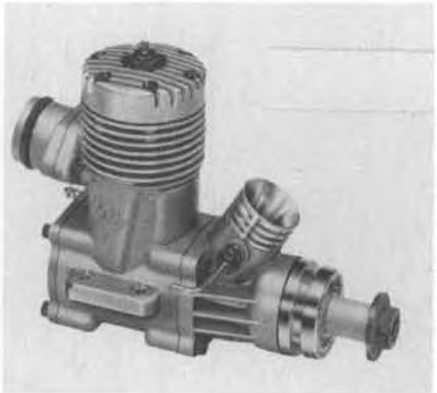
Small tools catalog from National Camera.

And we are all now familiar with the cyano-acrylates. But have you tried Goldberg Jet Super Glue? It is tailored specifically for modeling purposes; makes quick, hard, strong permanent joints. It is claimed not to stick your fingers together, leak, contaminate, or go bad in the container. Priced at $1.95 for the 1/4 oz. container, $2.95 for 1/2 oz., both with thick-wall application tube.

Now at your local hobby store. For more information, write Carl Goldberg Models, Inc., 4734 West Chicago Ave., Chicago, IL 60651.

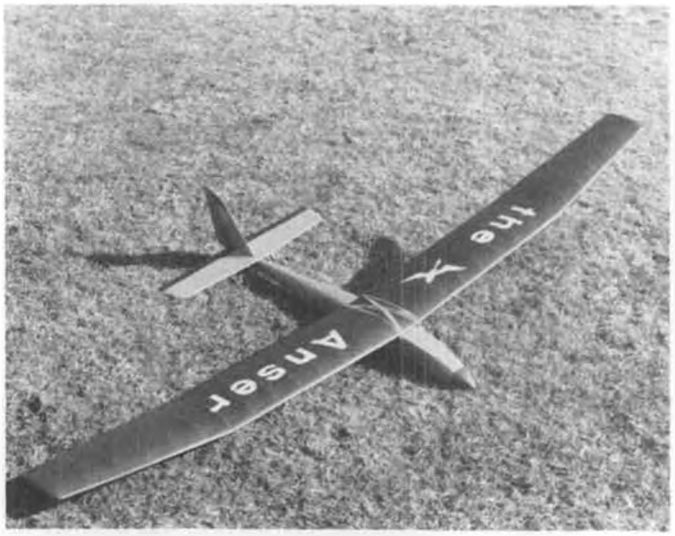
* * *

MRC-Enya's Schnuerle-ported 60XF-TV develops 1.7 hp at 16,000!



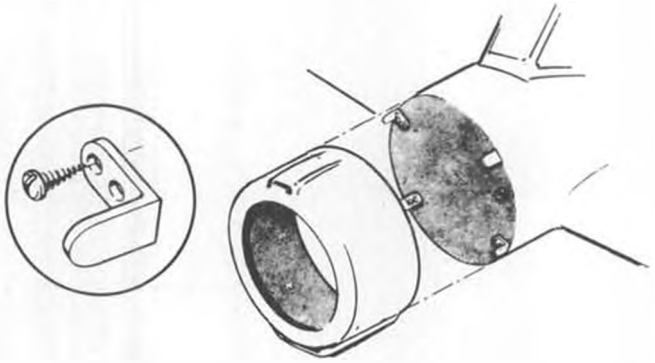
The K&B 5.88cc (.35) Front Rotor engine.

The K&B 6.5cc (.40) R/C Front Rotor engine.



MH Manufacturing's 72 inch span "Anser".

Sig's Flight Pack, for the beginner in 1/2A control line.

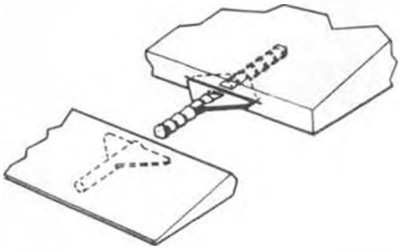


Nylon mounting brackets, 90°, from Carl Goldberg Models.

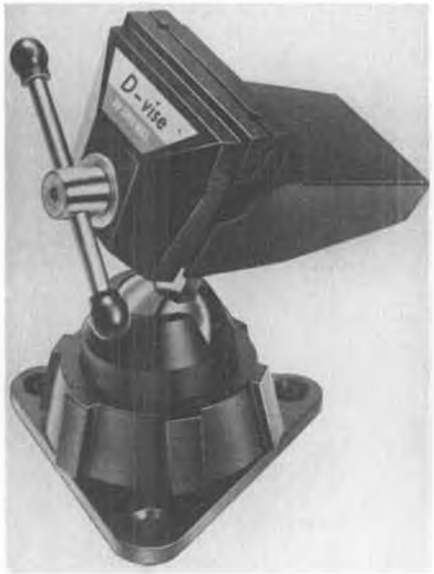
Electric R/C car speed control, by Electro Craft Systems, shown with Astro Flight Astro 05 motor.

Amongst the large assortment of engines now under production by Fox Manufacturing, are found 4 models of Schneurle ported .15's. Two ball bearing engines, No. 21698 for R/C ($50.95), and No. 11698 for C.L. ($42.95), are available, as are two bronze bushing models, No. 21600 for R/C ($32.95), and No. 11600 for C.L. ($24.95).

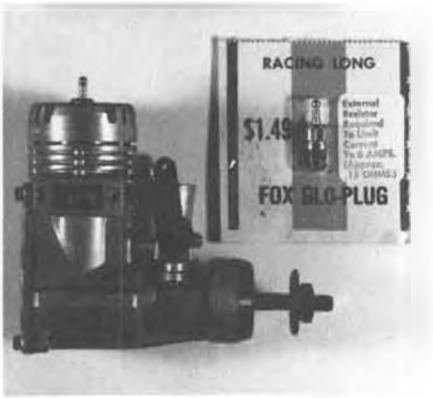
The engines are claimed to be the most powerful side exhaust .15's to be had, approaching the performance of the leading rear ported racing engines. They feature long life, ease of starting, and freedom from the problems that usually bother this class of engines; such as dying from a bubble in the fuel line, being



Klett Flex-Point hinges, from Carl Goldberg.

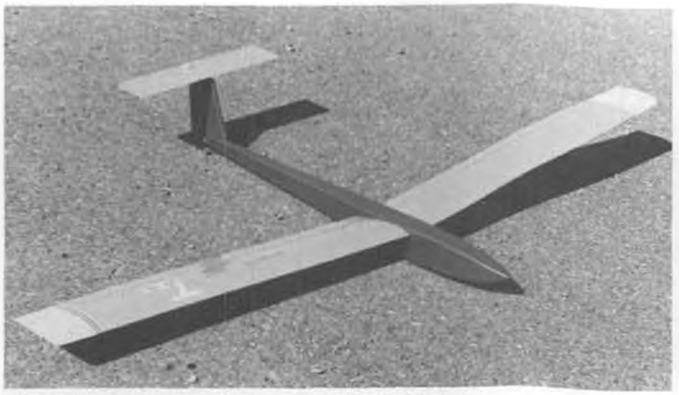


Model 2214 D-Vise, by Dremel Moto-Tool.

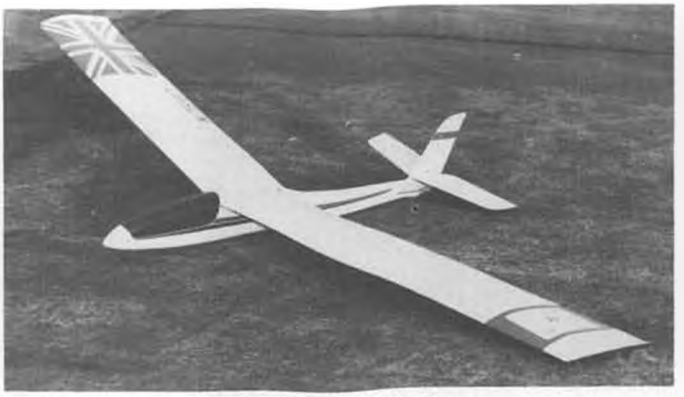


Fox .15 Schnuerle-ported R/C engine, with ball bearings.

Harry B. Higly & Sons' "Other End" battery clip.



T2, 75 inch span glider by Superior Flying Models.



Superior Flying Models' "Bunny", 73 inch span.

severely critical of over-lean or rich settings, or being affected by fuel surges resulting from violent manuevers. They are ruggedly built and will resist most crashes, but service and parts are readily available for those times when our luck runs out completely. In fact, Fox Mfg. will completely rebuild the worst possible basket case at never over 60% of the cost of a new engine.

Optional accessories available are its 90213 Silencer for $5.05, 90310 Tuned pipe Silencer for $15.95, 11620 Intake assembly for pen bladder at $6.00, and a large throat carburetor 21750 for $12.

See them at your local hobby shop, or write Fox Manufacturing 5305 Towson, Fort Smith, AK 72901.

* * *

Peck's Air Force has a new addition, a mouth-watering Baby Ace, the 'King of the homebuilts' in 17-1/2 inch wingspan for Walnut Scale rubber and CO_2 motors. Designed by Bob Peck, this kit is complete with photo instructions and 3-views, contest balsa, plastic wheelpants and propeller, tissue, plans, nylon thrust bearing, wheels, and the correct size rubber for flying. In fact, everything you need is here except your favorite sticky and a clear spot on your workbench.

Stock No. PP-15, at $4.25. Available at most hobby stores, or direct from Peck Polymers, P.O. Box 2498, La Mesa, CA 92041.

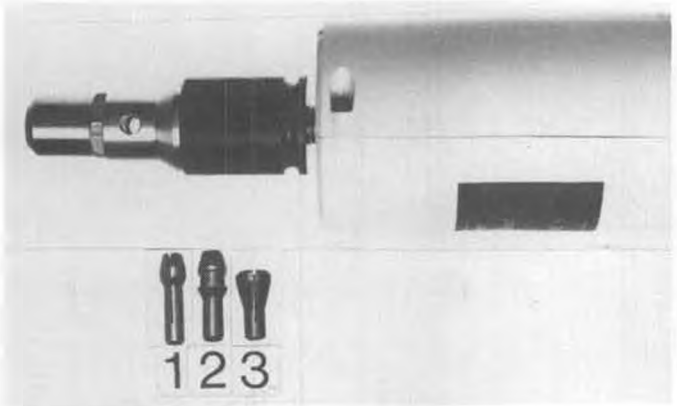
* * *

Continued on page 64

Boss-T, 120 inch span, by Superior Flying Models.

Rev-olution helicopter being flown by John Simone, Jr., American R/C Helicopters, Inc.

Three-cylinder .43 cu. in. radial engine by Wright Motors.



Drill adapter chucks for Astro Flight Mini-Starter, by Other Pottols Throttle Shop.

Piper Cherokee Lance, for .049 power, by Superior Flying Models.

PHOTOS BY BILL NORTHROP

DE HAVILLAND GIPSY MOTH

By BILL NORTHROP . . . A little ahead of the recent trend toward quarter-scale R/C models, the editor's Moth was campaigning in AMA Nationals competition about 12 years ago. We have presentable plans at last!

• The August, 1958 issue of Aeromodeller solved a problem for us. By that time, we had been into radio control for about three years. First there was a Berkeley-kitted version of Walt Good's Rudder Bug, followed by about five original designs, including the first three of a long string of biplanes. One of the bipes was a 40 inch span Great Lakes Trainer, which became our first published construction article.

All of the above were single-channel escapement, pulse rudder, or Galloping Ghost (pulse rudder and elevator) radio controlled models. This may seem unusual to those of you who have come into the hobby in the past 10 or 15 years, but in those days, single-channel dominated R/C about 10 to 1 over multi-channel, and digital proportional was unheard of.

Anyway, we felt ready to build an Ace R/C five-channel reed/relay radio kit, and operate it with a Bramco (who!?) five-channel transmitter that a friend was ready to sell (By the way, "channels" in a reed radio did one thing each . . . like right rudder was one channel and left rudder was another channel. So with five channels, you could have elevator and rudder, plus a sequencing escapement that was kicked by the fifth channel to select two or three throttle positions!).

That 1958 Aeromodeller issue featured an article and excellent scale drawings of the Gipsy Moth, a biplane designed and first built by De Havilland back in 1925. In fact, it was the first airplane built by Captain G. De Havilland, in collaboration with Major F. B. Halford, of the Aircraft Disposal Company (!). It was also, therefore, the first Moth, a famous name in aviation and De Havilland history. Actually, the first Moth was powered by the 60 h.p., 4-cylinder Cirrus engine, and was designated "D.H. 60 Moth." The later, 120 h.p. Gipsy engined Moth became the "Gipsy Moth". There was also a 5-cylinder radial "Genet Moth."

The Gipsy Moth was the immediate forerunner of an even more well-known De Havilland aircraft, the Tiger Moth. Basically a Gipsy Moth with the top wing moved forward, and then both wings swept back about 10 degrees to regain proper balance, the Tiger Moth was the backbone of military pilot training for England's World War II pilots. To this writer's mind, these two biplanes are the epitome of light horsepowered, personal aircraft, throughout the history of aviation.

Two things influenced our decision to draw up construction plans for a 3 inch scale model of the Moth . . . an engine, and a pair of wheels! About this time, Forster Brothers was making the .99 with a two-speed, ignition system. And about the same time, we came across a pair of 6 inch M&S Airwheels, made in England. What better excuse could a modeler want than to build an airplane to suite these items!?

The original drawings (which still exist) were made on the backs of blueprints brought from our engineering job. Several had to be taped together to accommodate the huge size of the fuselage. A flush-panel door was used for building the fuselage sides. At the

This photo, and the one at the top, were taken soon after completion of the Moth, in 1960. Sprung tailskid was later replaced by steerable wheel. Functional exhaust from Forster .99.

time, our workshop was a small laundry area off the family room. The door was temporarily set up on the dining room table while the sides were built. Later, when working on the fuselage in the shop, it was necessary to carry it into the family room in order to turn it around when we wanted to work on the "other" side!

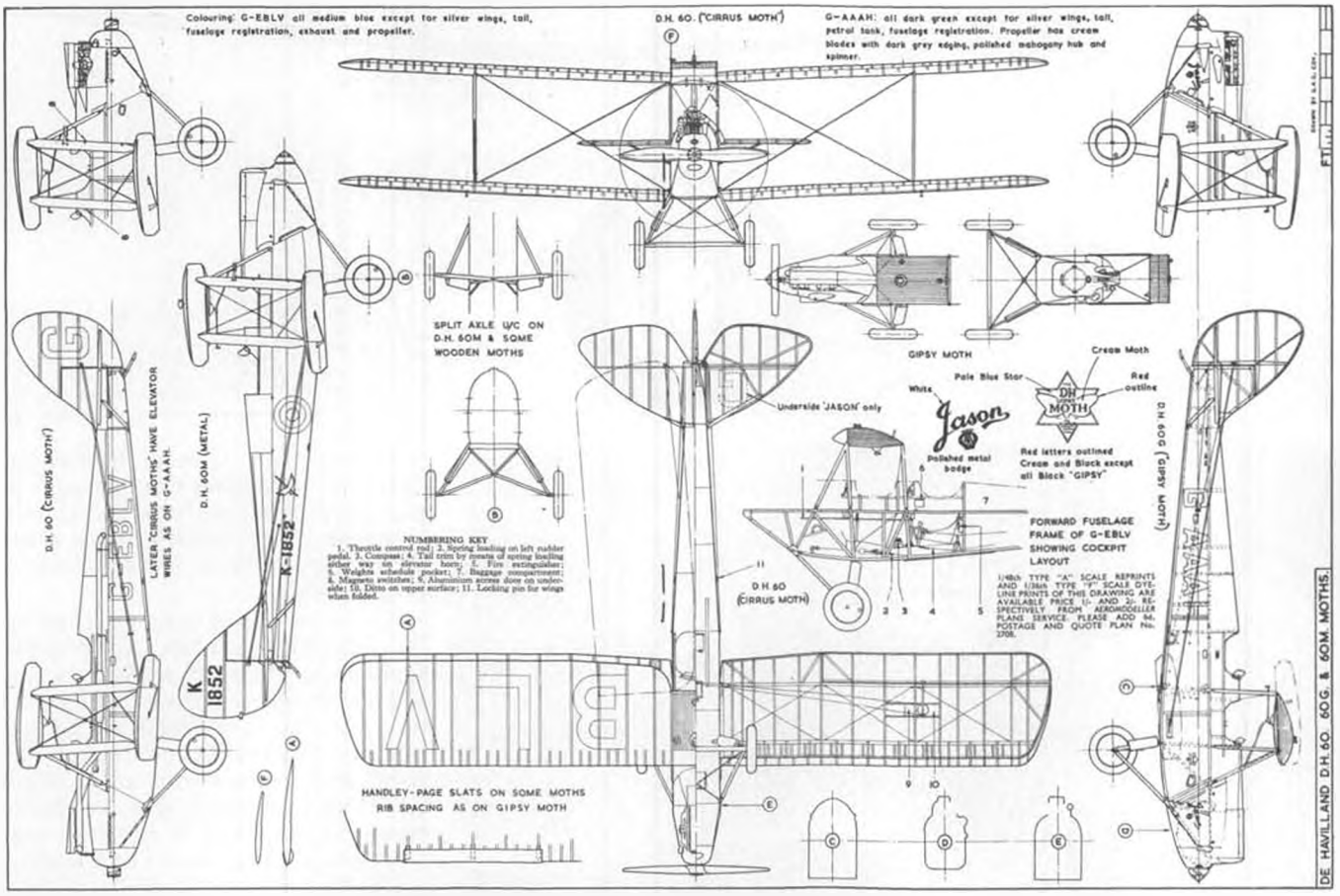
As work progressed slowly, while other models were being built and flown, it wasn't until sometime in 1959 that we were ready to purchase the engine. Forster had been advertising a trade-in deal . . . any old engine and 26 bucks for a new .99. But wouldn't you know it? When we finally wrote in to get ours, we were told that there were no more 99's available! After a fruitless search, for a new or used one, we again wrote to Forster Bros. and explained that we had this plane well on its way, designed around the .99, and now, no engine. Could something be done?

We received an answering letter that is still in our possession. In it, one of the brothers said that our letter was so plaintive that they couldn't turn it down, and they were assembling one last engine from available parts, to accommodate our drastic situation! Perhaps we can claim, with written proof, to own the last Forster factory produced .99!

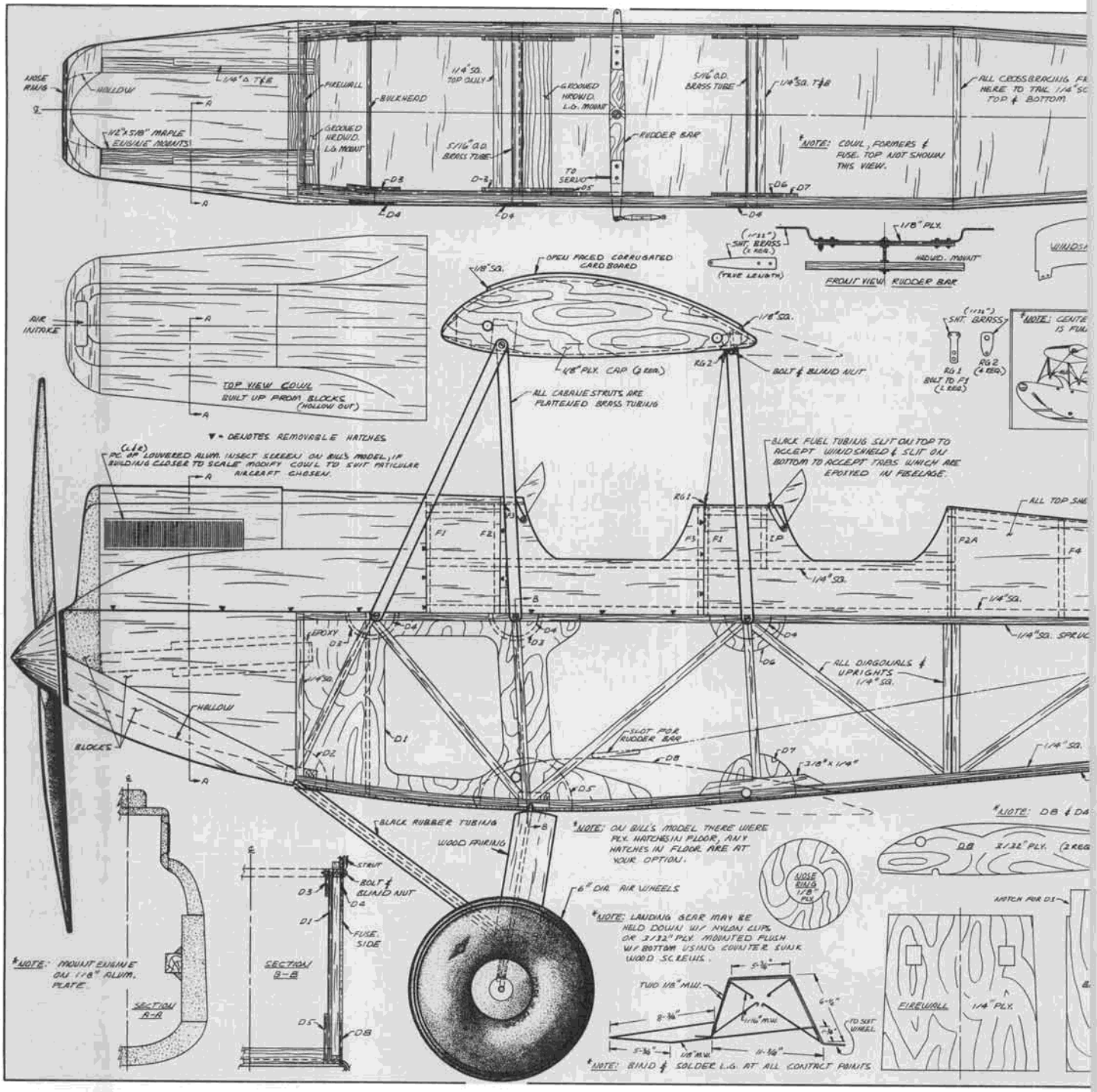
In 1961, the Nationals were scheduled for Philadelphia, only 50 miles or so

Completing Figure 8 at 1965 Willow Grove, Pa. AMA Nationals. All of flight was about this high off the ground. Every owner of the early Quadruplex system developed a strong left arm!

PHOTO BY BILL COONS



Reproduction of Gipsy Moth scale views from August 1958 Aeromodeller. These plans, in 1/48th and 1/36th scale, are still available from Aeromodeller. Write to Model & Allied Publications Ltd., PO Box 35, Bridge St., Hemel Hempstead, Herts, England HP1 1EE.

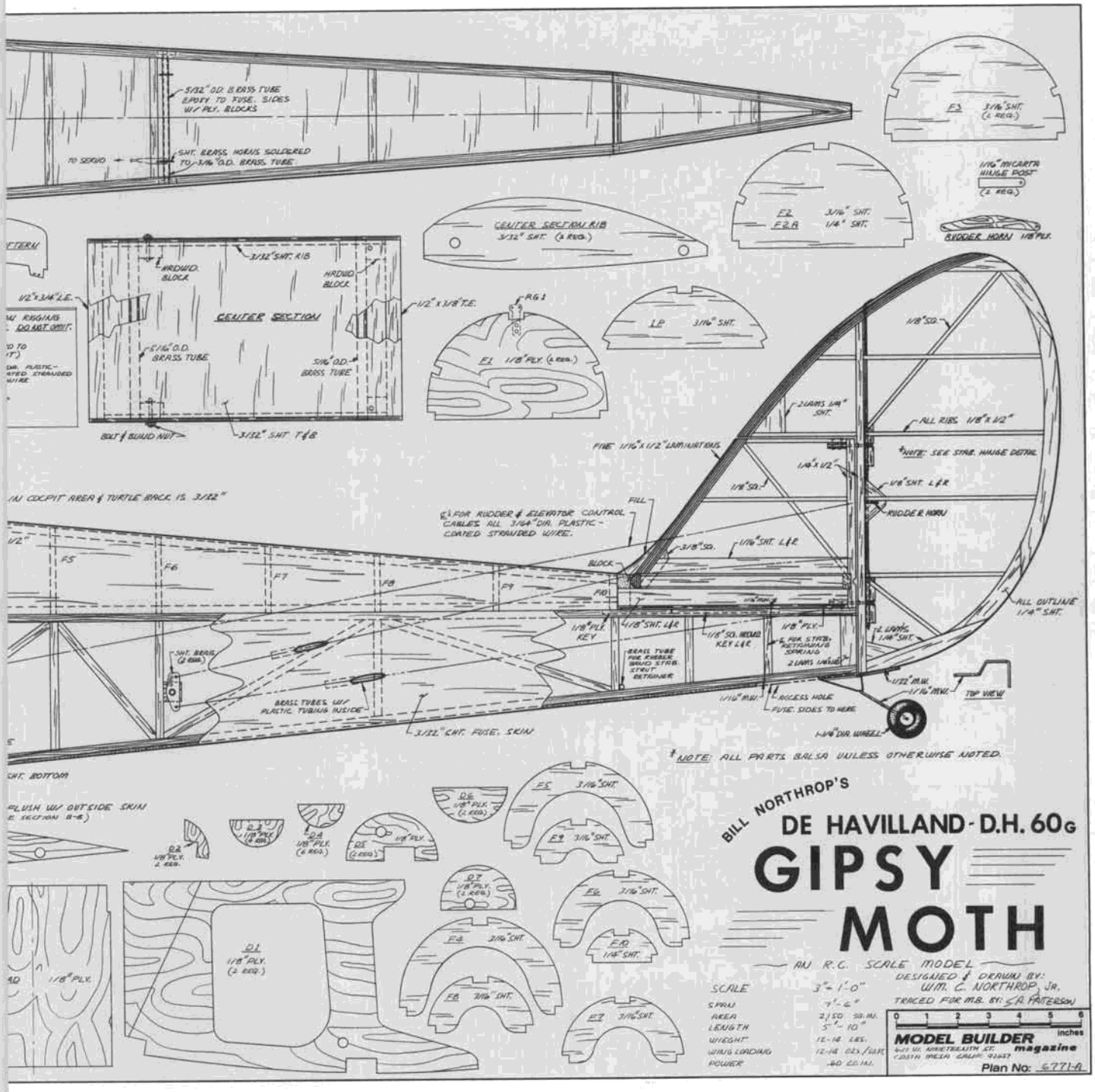


Another just-completed photo. Forster .99 was unable to get the plane off of a close-cut grass field . . . was later replaced by Fox .59 that powered very first "Big John".

from our home town of Wilmington, Delaware. We decided that, although we had always built and flown for our own amazement, that we should take a whack at the "Biggie" for our first competition. Sound familiar?

The plane was to exact scale outline, rib spacing, exterior construction appearance, etc., but we had painted and decorated it the way WE wanted it . . . not to any one particular full size aircraft. Consequently, our presentation stated that we finished it as we would do if we were restoring a real Moth. How's that for trying to pull a fast one?

To make a long story a little shorter, the Moth didn't fly in 1961 . . . probably very lucky for both plane and pilot. Only one test attempt had been

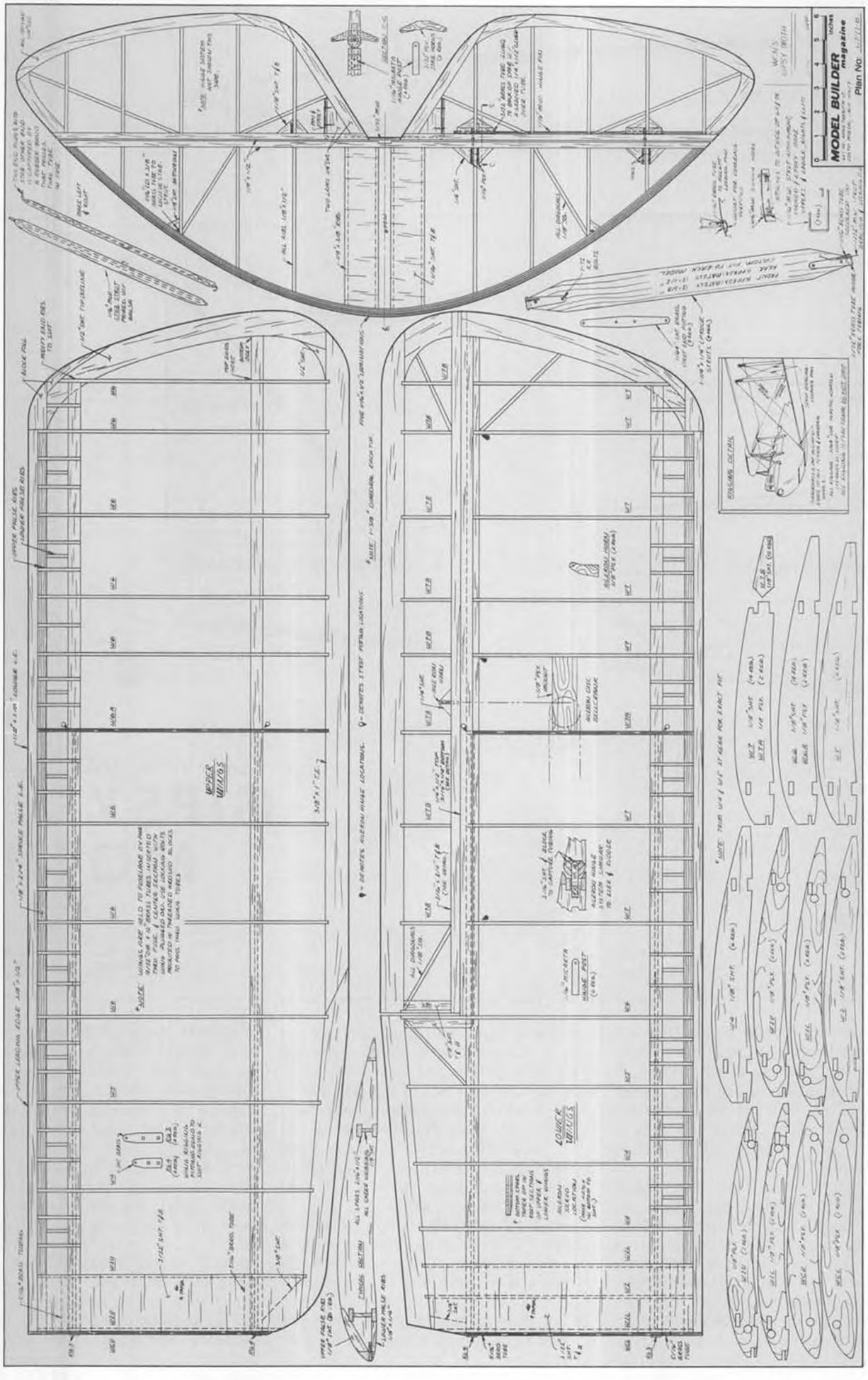


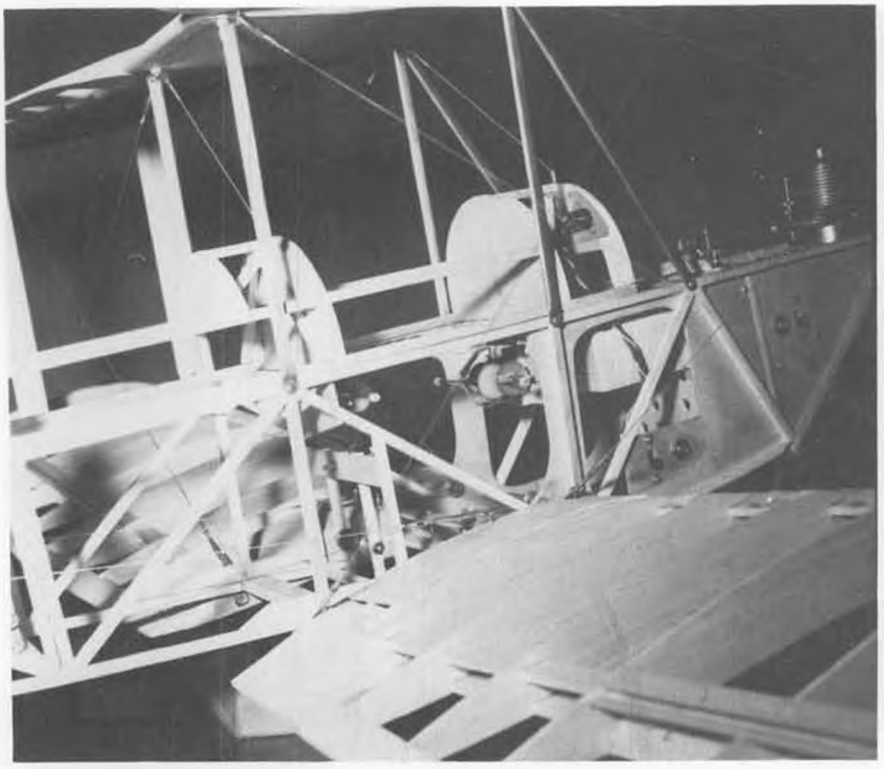
made prior to the Nats, and that was a stall on takeoff that caused only minor damage. Rebalanced and trimmed, it made one beautiful and realistic takeoff run at the Nats, only to have the ignition shut off a foot above the ground (Ignition coil was later found to have opened up).

By 1965, when the Nats again returned to Philadelphia (that old rotation system was really great, and the ideal way to give every modeler a shot at the "Big One" at least once every four years), we had a lot more flying experience under our belt, and had acquired one of Don Brown's great Quadruplex analog proportional systems. The big Forster, somehow unable to pull a 15 pound, 2400 sq. in. biplane off the ground, had been replaced by one of those amazing old plain-bearing Fox .59's. This engine leaked more fuel out through the front of the case than it burned above the piston (Duke said, "You don't want that bearing to run dry, do you?"), but it pulled the Moth around on a 12 x 6 (boiled) Grish nylon at just about scale speed . . . and realistically as the devil!

At the Nats, with a couple of sodium butysol tablets to relax the nerves, and old flying buddy, Graham Lomax, to handle and start the juicy Fox, we taxied out, poured on the coal, and am proud to say, put on a scale flight that brought cheers from the very large crowd that always assembles when the scalers do their thing. The whole flight consisted of takeoff, straight flight out, procedure turn, straight flight back, figure eight, touch-and-go, traffic pattern, and landing. The thing is, that it was all done at not over 25 feet of altitude! The Navy pilots, who were supposed to be judging, were instead, snapping pictures a mile-a-minute, and must have filled in the score sheets later. On the touch-and-go, the old Fox, loaded up from idling during the approach, luckily caught on when the throttle was opened, and as it belched out a huge cloud of blue smoke, the Moth hauled out after gently rocking gracefully from one fat airwheel to the other as it gained airspeed. The long cheer after that touch-and-go and was undoubtedly the peak award of our modeling career. We

FULL SIZE PLANS AND STICK 'EM PATTERNS AVAILABLE — SEE PAGE 104


MODEL BUILDER magazine
Plan No.
UPPER WINGS
LOWER WINGS



Initial control system was kit-built reed receiver with scratch-built servos based on Mighty Midget electric motors with clutch drives! Sprung hatches in outside skin gave access to switches.

Fuselage and tail framework. Fuselage sheeted with 3/32 balsa. Nylon covering over all.

placed third in Scale, and turned out to be the first recipient of the annual Sterling Models' Scale Achievement Award trophy.

The Moth picked up a 4th place trophy at the 1966 Chicago Nationals, and was then more or less retired. Everything but the fuselage is still intact to this day. The fuselage lost an argument with a shifting television set, when we U-Haul trailered it to Southern California in 1970.

CONSTRUCTION

The first step in construction is deciding what kind of a model you will build. For Sport Scale, you have everything you need on the drawings as shown. If you're going for Precision (AMA) Scale, the drawings are still good for scale outline, rib and spar spacing, etc., though the wing airfoil thickness was increased slightly to improve structural strength. Before getting too far into the finishing, however, you will probably want to do the usual researching for documentation, which will turn up details that can be added as construction progresses. As mentioned previously, the August 1958 Aeromodeller provides a great deal of information, if you can still find one. That is all we used for our presentation in 1961, 1965, and 1966, but things weren't as picky-picky in scale 10 to 12 years ago.

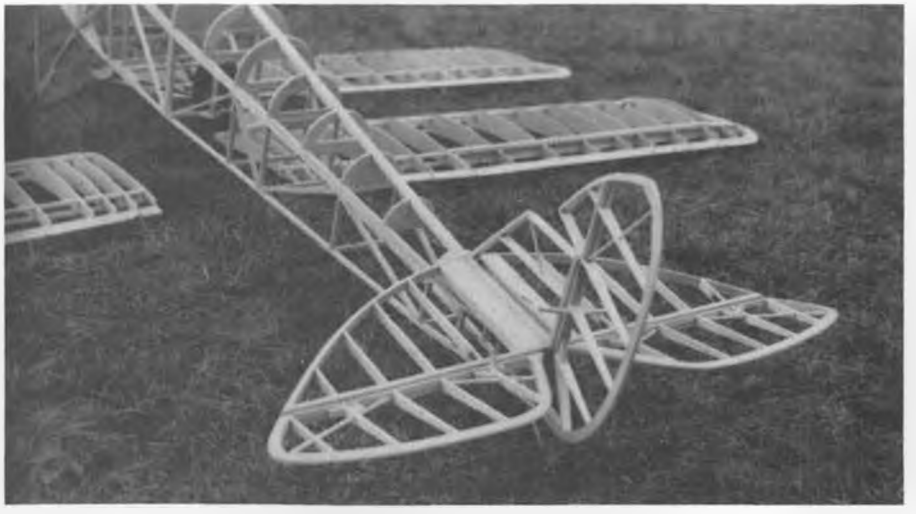
We'd venture to say that detailed building instructions for an airplane of this type are quite unnecessary. When we started building it back in 1958-59, we were looked upon as the typical nut who trys to build a B-17 with working windshield wipers for his first attempt at modeling and/or R/C. But let's just run through the basic parts and see what's in store. It's not really difficult . . . just big, and material consuming!

Our way of building airplanes has almost always been to construct the tail surfaces first. They are usually easy to put together, therefore getting them done makes you feel like you're making good progress. They also set the tone of the construction for the whole project, establishing size, amount of detail, and a feel for the quality you intend to impart to the entire aircraft.

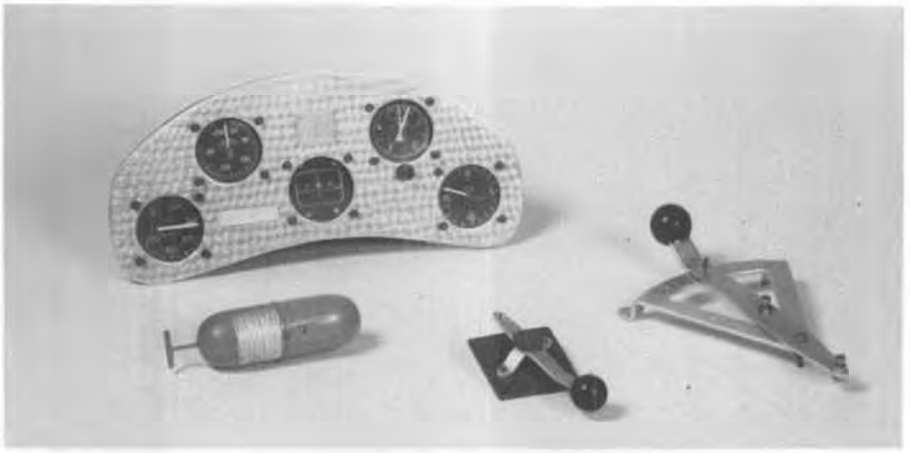
Just to prove that laminating is nothing new, maybe just in size, we used this method for the leading edges. Perhaps you might want to follow through with the trailing edges too, but as far as strength is concerned, fear not. The original model was covered with nylon, and that stuff really pulls!

The hinging system could certainly be simplified with today's ready-made products, but if your masochist tendencies dominate, the system shown certainly simplifies covering and finishing, with assembly coming last. Sections explain the set-up.

As the wings are supported by functional struts and rigging wires, there is no need to build them as though they were to be cantilevered. The joiners primarily locate the wings, and carry no bending loads. They will support the panels during rigging, but once the flying and landing wires become "strumming tight", the joiners carry sheer loads only, while the struts and wires do all of the work.



Tail surfaces are exact scale. Hinging system allows assembly after covering and finishing is completed. Deck is straight curve . . . can be covered with two sheets of wood.



Some cockpit goodies. Instrument panel was engine-turned using drill press and guide, with hard eraser for burnisher. Instruments behind a layer of plastic. Others include fire extinguisher, throttle, and elevator trim quadrant.

We made an aluminum rib template and punched 2 or 3 holes by driving a nail point into the template while resting it on soft wood. The resulting flash holds the pattern firmly in place while you cut out a rib. An hour or two in front of the T.V., with a cutting board in your lap, should get you a complete set of ribs.

All four panels are basically the same, except for obvious differences, such as left and right (!), and upper and lower (!!). Again, the ailerons are hinged in a fashion similar to the tail, and provide a nice closed-slot appearance . . . plus looking scale!

An interesting note on aileron differential: In keeping with our discussion in George Wilson's basic aerodynamics article in the March 1977 issue, De Havilland *really* went for differential. Cable from the control stick went out through the wing to a disc which was located flush with the bottom surface of the lower wings. The cable wrapped around the disc, in a groove, and ran back to the stick. Movement of the stick obviously rotated the disc. The aileron pushrod was mounted on the disc in such a location that full side movement of the stick would raise one aileron about 4 inches (at the trailing edge) and lower the other one by only a quarter of an inch! So much for down-aileron drag pulling the wing in the wrong direction!

To maintain realism, we would suggest using the aileron disc/bellcrank, but run a wire pushrod from the servo instead of a continuous cable! And speaking of servos, there's almost no way in the world to avoid using a servo in each lower wing panel for aileron control. Install the servo where indicated, with a removable sheet aluminum hatch cover on the bottom surface for access to the servo. Run the lead through a 3/8 inch diameter hole in the root rib, with a corresponding and matching hole in the fuselage side. The suggested ply hatch in the fuselage bottom provides access for connecting the leads to a "Y" connector from the aileron output of the receiver.

Incidentally, we flew our Moth with coupled ailerons and rudder, with rudder really doing most of the work. The ample dihedral makes ailerons almost unnecessary.

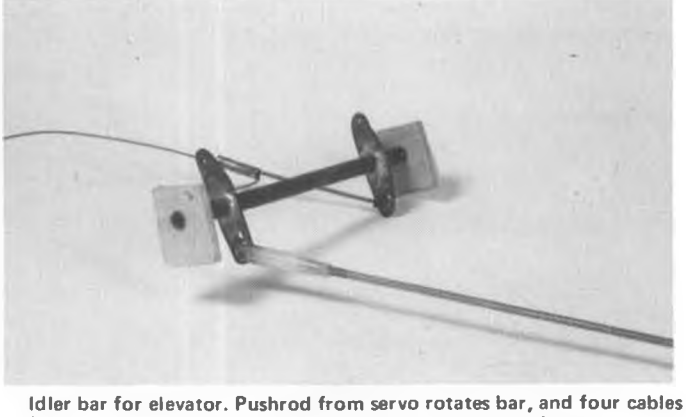
Now comes the fun . . . unless you couldn't resist temptation, and have already begun fuselage construction! After building the wings, you've probably already found a source of long wood, though there's nothing wrong with careful splicing. The main longerons of 1/4 square spruce are later covered with 3/32 sheet balsa, so any splice joints will be well reinforced. The ply doublers forward of the balance point need not be lightened by cutting away material, as the model will probably

Hinging system for ailerons . . . provides neat and scale-like closed gap, also more efficient.

need nose ballast due to the long tail moment. We carried our own wet-cell nickel-cadmium starting battery just behind the firewall. It weighed about 11 or 12 ounces, and balanced the model perfectly. It was permanently wired to the glow plug through a hidden slide switch. It was usually left on during the whole flight.

After framing up, and before covering with sheet balsa, the various attachment and control rigging devices are installed in the fuselage. Even if you don't go for Precision (AMA) Scale, using the scale rudder bar and outside cables is the most convenient method of controlling the rudder. Back then, we used stranded control line leadout cable for the rigging and controls. The size required for adequate strength was way below scale diameter, so we simply selected the wire for scale appearance. Nowadays, the best material is nylon coated stranded steel wire, which can be purchased from Lou Proctor (Proctor Enterprises), or possibly your local deep

Sled-type rudder bar. Ends stick through slots in fuselage side and cables are on outside. Pushrod from servo operates bar.



Idler bar for elevator. Pushrod from servo rotates bar, and four cables (only one shown) go through fuselage skin to elevator horns.

sea fishing equipment supply house. You'll be buying Lou's turnbuckles and other rigging fittings, so you might as well get everything from the same source.

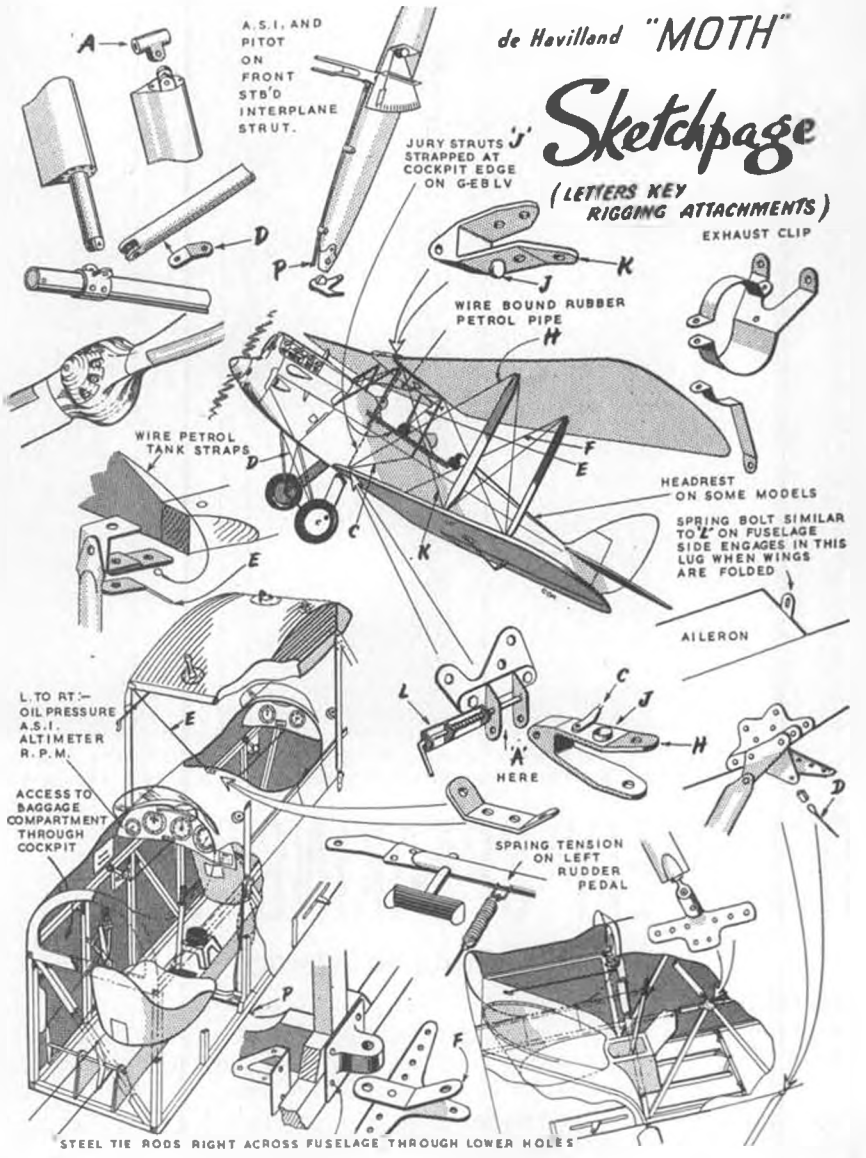
The elevator pushrod is located low in the fuselage and leads to an idler bar across the fuselage aft of the rear cockpit. The idler bar carries metal horns to which the inside/outside elevator cables are attached. Having the pushrod mounted low permits unobstructed detailing of the cockpit . . . if you care to go that way. We had fun making bit sheet aluminum quadrants for the throttle and spring-loaded elevator trim. Lord knows if there ever was an engine-turned instrument panel in a Gipsy Moth, but ours had one!

We have redesigned the nose somewhat from our original model. The Forster 99 engine's crankshaft centerline is about a 1/2 inch below the mounting lugs, so the bearers were relocated to accommodate the normal crankshaft/mounting lug relationship of today's engines.

Speaking of engines, don't get the idea that because the Moth weighs 15 pounds and carries over 2400 sq. in. of wing area, that a large engine is needed. That old Fox .59 did a fine job, yet it would be eaten alive by even a moderate, present-day .60! The best choice is an engine that will comfortably turn a 14 or 16 inch prop. The Fox couldn't, and it wasn't until we dropped to a 12 x 6, that the engine could "get it on". However, a 12 inch prop looked like a toothpick on the nose of the Moth.

The rather large removable cowl was layed up from various balsa blocks, and then carved to shape. The inside was only hollowed out for clearances and to allow for good air circulation. A magnetic cabinet latch and a couple of locator dowel pins took care of holding it in place.

Rigging the ship for a flying session takes about 15 to 20 minutes, once you get used to the system. After plugging in the wings, slip the struts into place and install the locking cross-wires. We used turnbuckles at the inboard end of the landing and flying wires. Once adjusted for proper alignment, safety-wire the flying wire turnbuckles, and don't ever loosen them. Install the flying wires first (the wings will sag slightly now, and the flying wires will slip into place easily). Now hook on the slackened landing wires, and begin tightening the turnbuckles until you get a little higher strumming note on them than you do from the flying wires. When adjusted, "safety-wire" the four turnbuckles with short lengths of Dacron string as used for 1/2A control line flying. Just cut 'em off when you're dismantling to go home.



Reproduction of "Sketchpage" from August 1958 Aeromodeller gives many helpful details for the modeler who wants to add realism to his model.

Bob Lopshire built his Moth from Elmer Nowak's plans as published in FM some years ago. By coincidence, Bob painted his in the same medium blue and silver that we used. A pretty pair!

It's a good idea to install 2-56 bolts in threaded hardwood blocks that will pass through the wing joiner tubes and lock the wings on. Engine vibration and bouncing around on the ground might encourage the wings to slip out on their joiner tubes. As the rigging wires terminate on the root ribs, they do not prevent the wings from pulling away.

Unless you've already participated in the growing interest for ultra-large

Continued on page 67

Skip Miller (another Miller!), of Boulder Colorado, World Champion of R/C Soaring. Skip flew a Lee Renaud designed Airtronics Aquila, using a Cox/Sanwa radio. He also put the US team on top, with Dale Nutter 8th, LeMon Payne 11th. Dan Pruss managed, Dave Thornburg towed!

'REMOTELY SPEAKING...'

R/C News, by BILL NORTHROP

PACHYDERM PYLON POLISHERS

As we mentioned a few months ago, it seems inevitable that, sooner or later, there will be a pylon event for every known model engine size . . . then multiply that by two for twins, and by two for front rotor and rear rotor, and by two for with or without Schnuerle porting, etc., etc.

Just in case you aren't already interested enough anyhow, Diane Morse is the Queen for the 1977 Multiwing Championships, Omaha, Nebraska, July 9 and 10. More info in text.

Why the trend for "Pylon Event of the Month"? Well, there's always a natural desire on the part of modelers to come up with new competition ideas. On the other hand, the only thing new about another pylon event is the size of the engine and/or plane. So what's the real incentive?

In our opinion, the instigators of a "new" pylon event are trying continuously to come up with something as yet undominated by the perennial hotshots. Depending on the popularity of a new racing category, it can remain "open" for varying lengths of time, and during that period, the not-so-hot flier has a feeling of competing with a fair chance of winning. Sooner or later, however, the "name" fliers begin to appear . . . and to win . . . and off we go in search of another engine size.

One of the consistent characteristics of each new racing event is the futile attempt to (1) keep the rules simple, and (2) keep it open for all fliers to have an even chance. There's only one way to accomplish both of these aims. Have every flier come to the contest without his equipment, write his name on a piece of paper and throw it into a hat, and let the CD draw out the 1st, 2nd, 3rd and so on winners.

Still, each time a new pylon event comes along, we all have hopes that it will somehow contain the universal elixer. And each time, though it fails to have the basic answer, a certain group

Bob Seigelkoff, C.B. Associates, and his quarter scale "Toni". Engine is a .60, and ship handles like pattern bird. Averages 2 min./10 laps.

For his proposed 1/4 size pylon racing event, Bob Seigelkoff's kit for Toni/Minnow/Ballerina/Filly is now available. Address in text.

of modelers stay with it and keep it going . . . not like R/C Clipper Cargo, which seems to have sunk out of sight under its own payload, without ever creating even a ripple of interest.

Riding in on the tide with the new popularity of quarter-scale R/C models, are a couple of interesting new category possibilities, which again, we have hope for. One such category has been put into a set of specifications by Bob Seigelkoff, of Hayward, California. We suppose our all-R/C magazine will quickly adopt these as its own, complete with its name, however, here are the basic requirements: front rotor .60 engine, quarter-scale Formula I aircraft only, weight 7 to 12 pounds, 4 inch diameter by 1 inch wide tires, 800 sq. in. wing area, wing thickness at root to be 2 inches, fuselage to be 6 inches wide and 11 inches deep at pilot position by 48 inches long, and 9-1/2 inches wide at cheek cowls.

Of special interest is the suggested competition: Stand-off scale judging, one round of aerobatics, and several rounds of racing, with separate awards for each event, plus the main award for best combined score.

Bob suggests a name like Formula 1/10cc., or Kong Racing, Quarter Scale Racing, etc. (How about Formula One Fourth or Formula 25?). For more details, write to Bob at 21658 Cloud Way, Hayward, Ca. 94545, Phone (415) 783-4868. Oh yes, and he has a 1/4 size Little Toni kit available right now, with Shoestring, Rivets, and Little Mike to follow. The Toni kit can also be modified into the Minnow, Ballerina, and Filly.

Jim Gager's idea of a class for 1/4 scale Thompson Trophy Unlimiteds appeals to us. Read about it in his Pylon column this month. We'd like to toss in an idea from R/C Scale Unlimited boat racing. To prevent everyone from

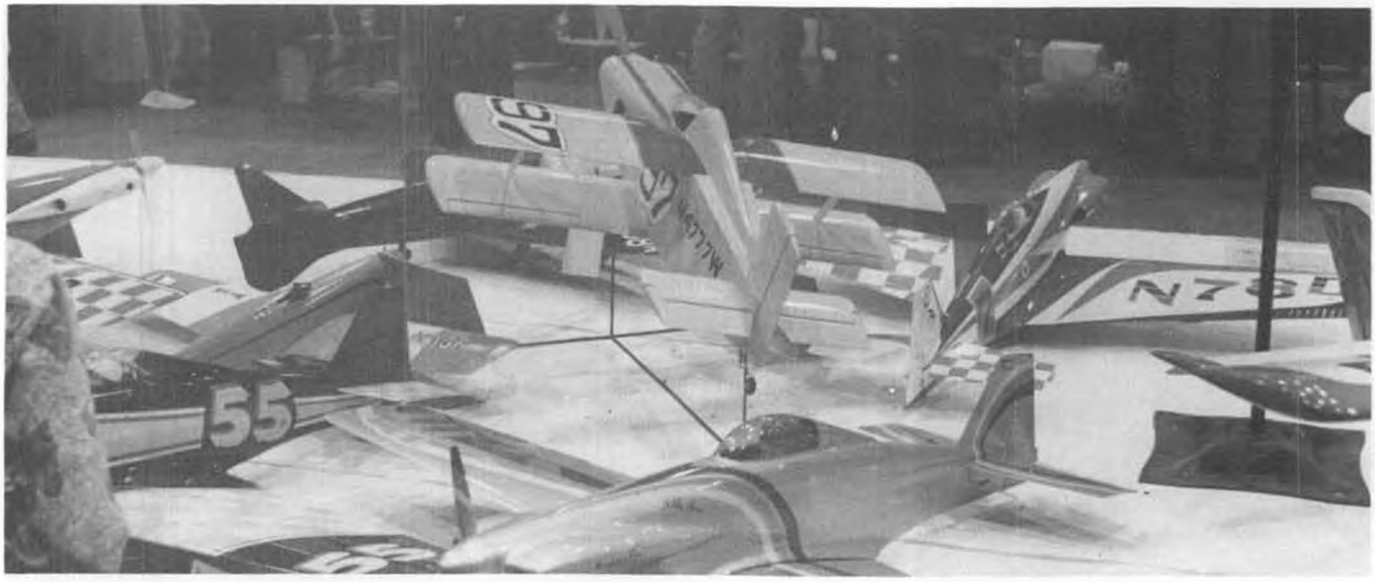
Continued on page 100

This CO_2 Brown twin powered 1/3 size Liberty Bell (Goldberg Sr. Falcon) "Mini-Bell" is controlled by Cannon mini 2-channel radio.

Glass bodied AT-6 is new kit from Bridi Enterprises. Southern California Scale Squadron is planning pylon event for it.

Mark Smith with new R/C bipe, kitted by Mark's Models, of course. MACS Trade Show photos on this page by Eloy Marez.

Jack Stafford with his new Comanche Twin. Complete MAC Show information in next month's issue.



A portion of the pylon model display at the Toledo R/C Exposition. Note the very nicely done "Hot Canary" bipe. Didn't catch the builder's name, but we'd like to know if, and how well, it flies. Let's hear from the owner.

PYLON

"GO FAST AND Turn Left!"

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

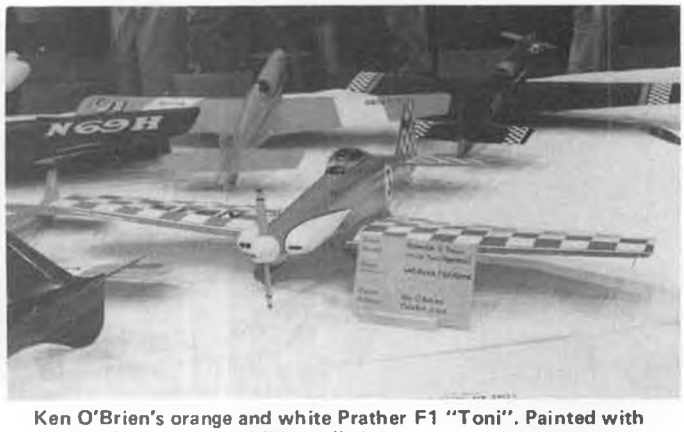
• *(The first portion of Jim's article for June has been deleted. It was a justifiably strong reaction to two special rulings for Quarter Midget racing at the 1977 Riverside AMA Nationals which had been issued out of California. One was to the effect that exhaust extractors would be allowed without a slot. The other would permit rework and/or modification of both prop blades. Just before going to press, we were personally involved in the discussion verifying that these two rulings have been very positively rescinded. A 1/4 inch wide, open slot will be required the full length of any exhaust extractor/deflector, and only wood props are allowed, with modification limited to one blade.*

QUARTER SCALE PYLON RACING?

For the past several months we've seen and heard rumbles of a new event of general RC interest. That is Quarter Scale aircraft. If I'm not mistaken, the idea was originated by and received initial impetus from our Publisher, Bill Northrop. From our viewpoint, it was just something for other RC'ers to do who weren't really with it by being in pylon racing (By the way; about 2 years ago, we built Bud Nosen's 1/4-scale Cessna 310 for a movie, and while it was fun and a terrific flyer, had it not been a commissioned job, I don't think I would have built it on my own.). Up until the very recent Toledo show, there still didn't appear to be any really interesting models being promoted for this new idea; mostly the high wing, slow flying, not very exotic types.

As we made the first tour of the display booths at Toledo, we ran across an outfit showing 1/4-scale P-51 Mustangs and a Waco bipe powered by .60 cu. in. pattern type engines with belt driven reduction to enable the use of a larger propeller (like the P-51's 4-bladed 20 inch diameter x 6 pitch) turning at approximately 6,000 RPMs. Well, this was more like it, and we could see some interesting possibilities opening up. We still weren't impressed or excited enough to deviate from our total committment of time and money to the racing game . . . yet. As we moseyed around and finally got to the Prather Products booth, we saw a sight that our English scale fanatic friend would say was "enough to make you wet your knickers". There, in all its orange and white glory, was a quarter-size Toni. Wow!!! While talking with Terry Prather, we found out that it was powered by a standard .61 pattern type engine without any extra gearing. Terry also informed us that its flying characteristics were very gentle. As I recall, the aircraft was built by a modeler other than Terry,

Bob Violett's very pretty Polecat, resplendent in various shades of red, yellow, and blue. Kit is becoming available at last.



Ken O'Brien's orange and white Prather F1 "Toni". Painted with automotive lacquer and "Imron" clear.

and it is not a prototype Prather kit. It does pose some interesting possibilities though, doesn't it!

We could actually start two new and different racing classes based on somewhat similar parameters:

Model Aircraft Requirements:

Class A - Models based on full-scale, 190 cu. in. Form I aircraft.

Class B - Any aircraft having competed in any type of full scale racing competition.

Rest of requirements same as 1/4-Midget.

Minimum Size:

Exactly 1/4-size of represented full scale aircraft . . . contestant to provide scale proof and means of allowing direct scale measurement.

Engines:

Class A - .61 cu. in. maximum displacement . . . rest of rules same as current AMA Q-M requirements.

Class B - .61 cu. in. maximum displacement . . . rest of rules same as Form I (specifically allowing extra gearing to prop).

Mufflers: Same as Q-M rules

Accessories: "

Propellers: "

Spinners: must follow outline and scale of represented full-size craft.

Weight: Ready-to-fly, 8 lb. min., 11 lb. max.

Fuel: 15% nitro to be provided by hosting group.

Race procedure and scoring: As per current Q-M rules, race horse starts.

Additional items not covered could be drawn from current Q-M and Form I rules. In the running of an actual race, you could probably run just one open class and allow Form I type aircraft to compete against the full scale unlimited type aircraft, if you so desired, or have separate class races.

Well, the above is just a thought banging off the pylons of our brain; it's only been a week since Toledo and we've not had a chance to broach this subject with many other racers, so we'll print it in hopes of getting your reactions and ideas. Let's hear from you. But while thinking about this, try to visualize a race between models ranging in wing span from 60 inches to 96 inches; the many wild full-scale aircraft that could be copied . . . Sea Furys, Mustangs, reworked Bearcats, Corsairs, Aircobras, P-38 Lightnings, F-86 Sabre Jets; it really could be fantastic.

Another view of pylon racer display at Toledo R/C Exposition. O'Brien's "Toni" in the foreground.

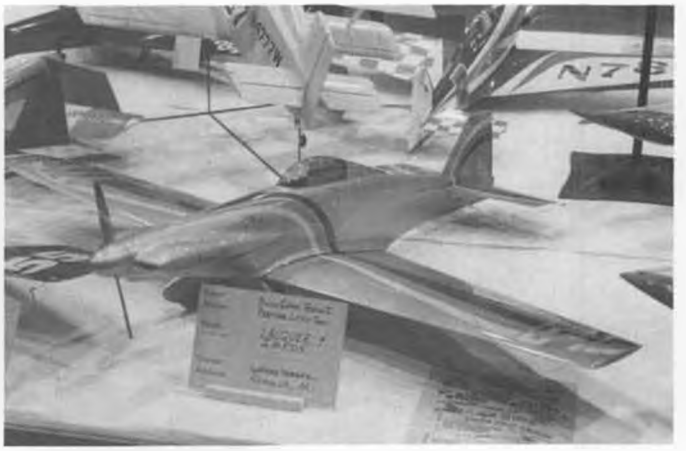
Bill Hager's Prather Formula 1 "Toni". Chocolate brown with yellow and orange trim. K&B Super Poxy. Ship was trophy winner, but Bill missed announcement, and trophy girl's kiss!

As long as we've mentioned Toledo, we'll stick to that subject for a bit. We didn't see an awful lot to interest those of us who are totally and only interested in pylon racing. The crowds were as thick as ever, which made it difficult to get around and see everything, so it's possible we might have missed something. Things we did see:

Prather Products, 1660 Ravenna Ave., Wilmington, Ca. 90744. Terry has come out with his own line of props that should make life easier for the Form I pilot. Available in 8.5 dia. x 7 pitch and 8.5 dia. x 6.5 pitch, of very stiff, rock-hard maple. The props appear to be very consistent in wood grading and workmanship from box-to-box, and while they require very minor touch up reworking, it will save all of us untold hours in time not spent coming up with a competitive prop. Make sure you read

Continued on page 67

How camera angle can fool ya! Three "Toni's" in Prather booth, (l to r) are Quarter Midget, Form 1, and quarter scale . . honest!



And this is Wayne Yeager's F1 "Toni", also Prather. Automotive lacquer and fuel-proofed with Imron polyurethane enamel.

Smoother Alouette flight from installing two cranks on stabilizer bar. See text for more.

John Tucker's Shrike Commander/Kavan/Ranger/What-have-you, as described in April issue. Latest modification is single-bolt blade attachment, which has several advantages. See text.

CHOPPER CHATTER

By JOHN TUCKER

PHOTOS BY AUTHOR UNLESS NOTED

• Recently, I've received quite a few requests to review the aerodynamics of helicopter flight and to touch on some flying techniques that are "old hat" to the more experienced chopper pilot, but which are relatively unheard of to the beginner. Since the subjects are very extensive in nature I'll try to throw in a word or two every now and then and hope it won't be too repetitious for you old timers!

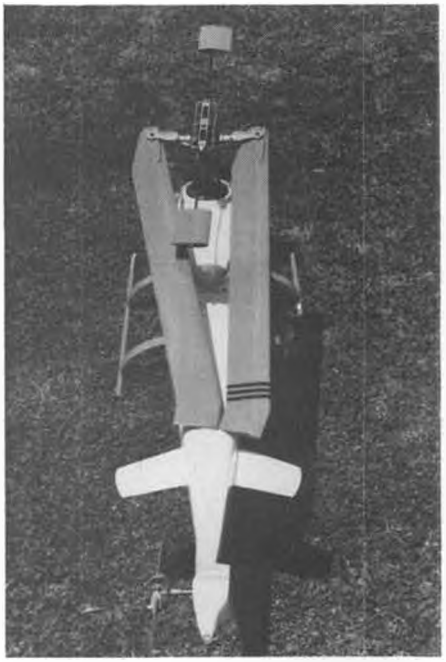
DOWNWASH

Rarely do any of the instruction manuals mention the phenomenon called "downwash", or "settling in your own downwash", however, one becomes acquainted with it very quickly at the flying field, at the expense of a crash. This condition of flight involves high vertical rates of descent, and the addition of more power produces an even greater rate of descent.

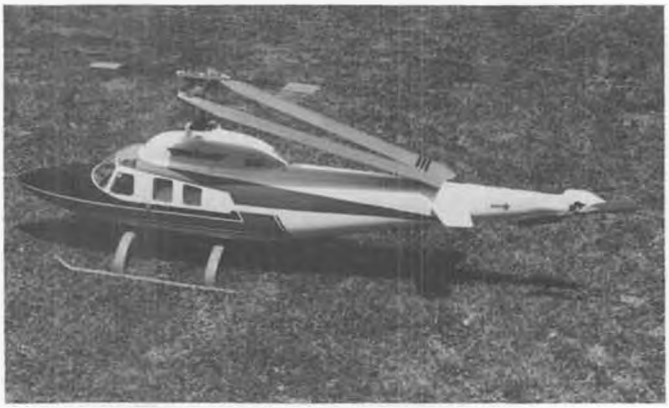
Actually the helicopter is descending in the column of air that has just been accelerated downward by the main rotor blades, hence the term "downwash". Once started, a vicious cycle takes the helicopter deeper and deeper into trouble. This cycle begins when the reaction of the downwash air creates a stalled condition near the center of the rotor disc, because of the high angle of attack. This loss of lift causes the helicopter to descend even faster, which, in turn, causes the stalled condition to move progressively outward along the rotor blades as the rate of descent increases.

To make matters even worse, the natural reaction of the pilot is to first try to stop the descent by increasing power or collective pitch, but this will result in increasing the stalled area of the rotor disc and further increasing the rate of descent. When settling in your own downwash, remember that the inboard portions of the rotor disc are stalled and cyclic control will be reduced to the point where it might be difficult or even impossible to affect a recovery by flying forward out of the condition.

For this reason, it is very important for



Blades on Shrike Commander/Kavan folded back. Note swept back tips, described earlier.



With blades folded and vertical fin removed, chopper is easier to transport. Single bolt also improves balance, avoids splitting.

Close-up show single-bolt attachment of blades on Kavan head. Big improvement without any apparent disadvantages.

Ultra-sonic cleaner, belt grinder, special tools box, and end of main workbench, appear in this entrance shot of John Tucker's shop.

Continuation of main workbench. Note strip lights, air conditioner, test instruments, TV, cabinets, and heavy tool board.

the pilot to recognize the onset of settling at the earliest moment so he can initiate corrective actions before it gets completely out of control.

Another common term for this phenomenon is "settling with *power*", which really means that the rotor system must be using some of the available engine power to produce the downwash column of air. Other conditions which may contribute are; deliberate high descent rates, high gross weights, low forward speeds, no wind, and hot days or high altitudes. Generally speaking, the chopper pilot will get into trouble whenever he attempts to hover out of ground effect (usually above 3 or 4 feet), or whenever he makes a steep approach with power but without benefit of wind or forward speed.

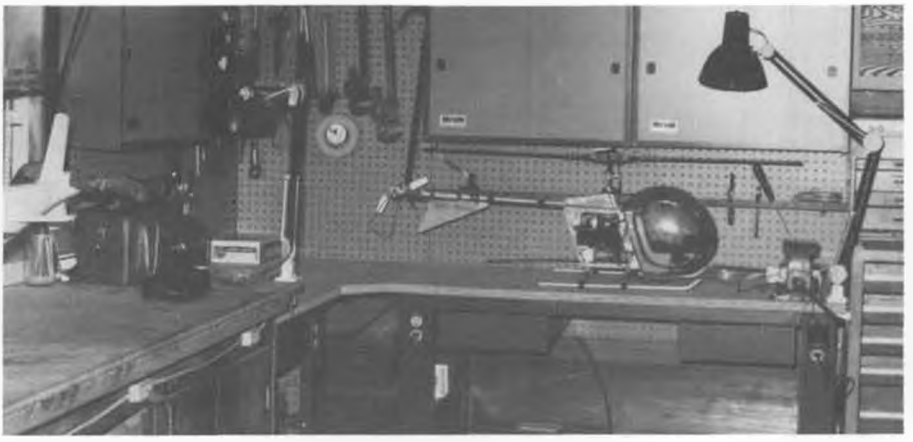
Recovery, if initiated soon enough, can be accomplished by simply applying full forward stick and increasing forward speed, thus flying out of the descending column of air. Sometimes, under critical conditions, a partial reduction of collective pitch might be necessary in order to reduce the blade stall and thus regain enough cyclic control to accomplish the required forward flight. Practice in this maneuver can be valuable in recognition and recovery techniques, if done with caution. Keep it fairly high in the beginning to allow enough time to get the chopper into forward flight before it hits the ground! And "sneak-up" on it instead of plunging right into vertical high-speed descents!

LETTERS

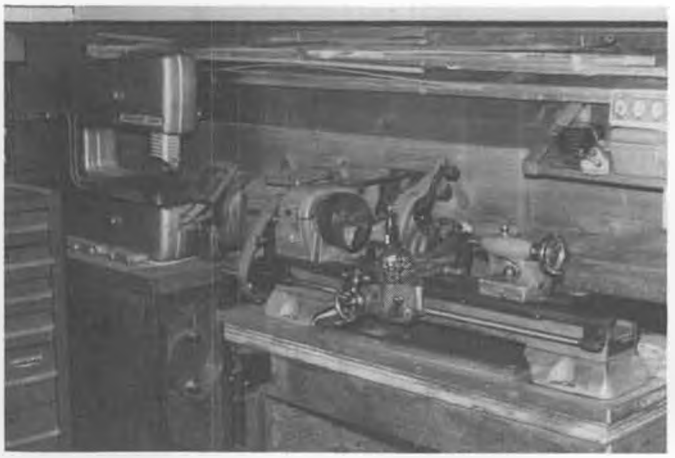
Dennis M. Holck, 18547 N. Jacktone Road, Lockeford, Ca. 95237, wrote me about those "funny looking mufflers" I mentioned in the March issue of MB, and he sez they are called "Helo-Balls" and are made by MACS Products, 8020 18th Ave. Sacramento, Ca. 95526 (916) 456-6932. Dennis has been in contact with the guys at the plant, and they plan to take measurements on the Jet Ranger and perhaps come up with one that has dual outputs which could be routed through the scale exhaust stacks! Man, wouldn't that be something! One of the local fliers used the Tatone plastic exhaust tubes and rigged them up to lead out of the Jet Ranger stacks . . . it really looked good with that smoke coming out! Let us know, Dennis, if you get it worked out, and I'll be the first to buy one.

Danny Floyd, 2585 Beeler Drive, S.W., Apt 21, Atlanta, Ga. 30315, writes to fine out if anyone has copies of "Model Helicopter News" they want to sell? To my knowledge Danny, only 3 issues were ever published, Jan/Feb

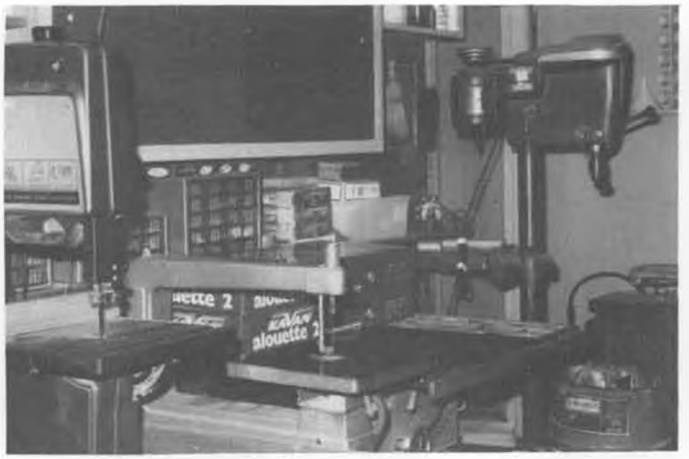
Continued on page 69



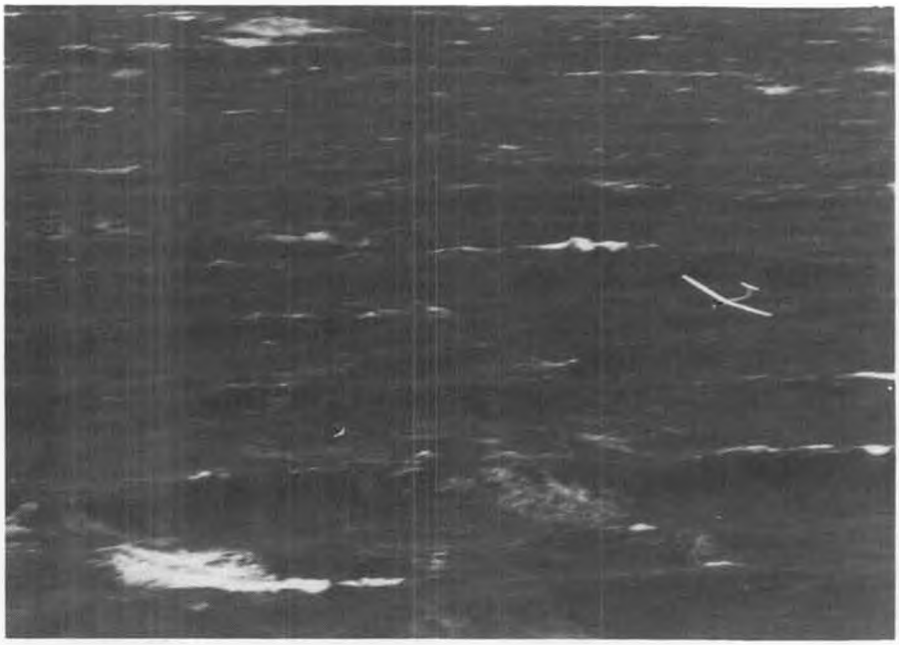
Precision bench, with cabinets over for lathe tools. etc. Note that there's pleanty of lighting in all important areas, as well as overall. Most important factor for good workshop.



Roll-around tool cabinet, metal saw, grinder, and Atlas lathe. This guy's ready for anything!



Woodworking bandsaw, jig saw, 10 inch table saw, floor drill press, belt sander, cabinets, and parts boxes. Where's the time-clock!?



Scotty Jenkins' high-speed sailplane skims low over the Pacific Ocean at Torrey Pines, famous full size and model slope site in Southern California. Ship easily exceeds 100 mph.

Scotty Jenkins in his heavy weather flying gear, complete with sandals!

R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY AUTHOR

• Scotty Jenkins only flies in heavy weather. "That's when you can stretch your bird to its limit." In his most recent flight, he launched his new-winged craft from the 350 foot Torrey Pines cliff out into a cold 30-knot gale. Note the towel wrapped around his hands (and the sandals, so typical of San Diego).

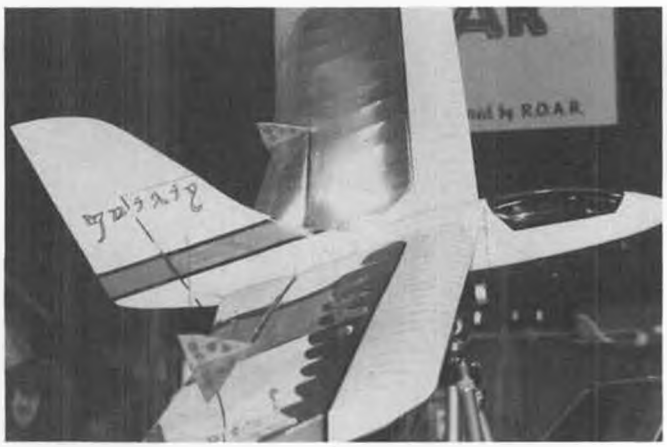
He flew in long swoops over the white-capped ocean, easily exceeding 100 mph. But then the sky darkened and the clouds descended to about 2,000 feet. In his second flight, he climbed for a high-speed pass toward the beach only to have the plane disappear into a cloud. He fully expected it to soon reappear, but it didn't. Later that day he found the remains in a remote area of rough terrain. Well Scotty, back to the bench!

The National Soaring Society and the San Diego Chapter of the American Institute of Aeronautics and Astronautics have jointly sponsored a series of five educational lectures on Low Reynolds Number Flight . . . you know, the kind of flying *we* do. The first of these, entitled "Birds Do It," was presented by Dr. Peter Lissaman. He covered the flying of a wide range of creatures and stressed the fact that the flying apparatus of each need not be explained in terms of aerodynamic optimzation.

"If an intelligent being from outer space observed man for the first time, he shouldn't argue that the hair on his legs must help him walk in some way." Evidently, insects have a distinct advantage in terms of the energy storing mechanism of their elastic exoskeleton. By analogy, you'd find it easier to do push-ups with a spring placed between your chest and the floor. Without this advantage, birds must expend energy to move their wings both up and down.

But birds have other advantages. They can modify their configuration, and even their airfoil, to meet the immediate need. Dr. Lissaman argued that the best airfoil for gliding is also the best airfoil for flapping flight. He went on to stress the fact that if the bird's wing is less than optimal for flight, we must remember that he uses this same wing for other purposes. It's his carry-along-sleeping-bag and he can use it to attract certain other desireable birds.

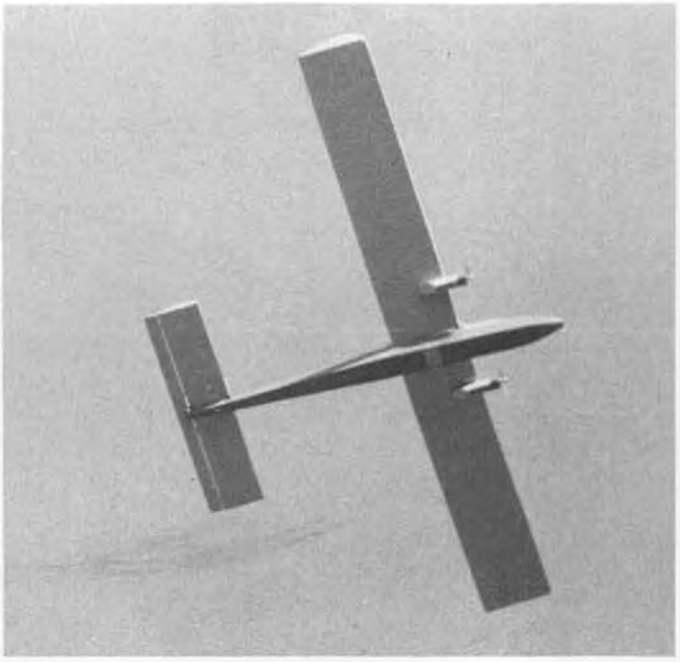
He described the flight control problems of various animals as they hover and perform sudden changes of course, then went on to analyze why migrating birds fly in a V-formation. He outlined evidence that the birds take advantage of each other's wake to mini-mize their energy expenditure in th



Ken Bates' trophy winning flying wing, on display at the Toledo R/C Exposition.

Ballast can be added to Ken Bates' flying wing sailplane for increasing speed and/or varying wind conditions.

Four foot version of Bob Simon's "Pipsqueak", with experimental wings with wider chord near tip. No conclusions as yet.



Steve Neu added two Astro Flight 02 electric motors to his Graupner "Dandy". No problem with synchronizing here!

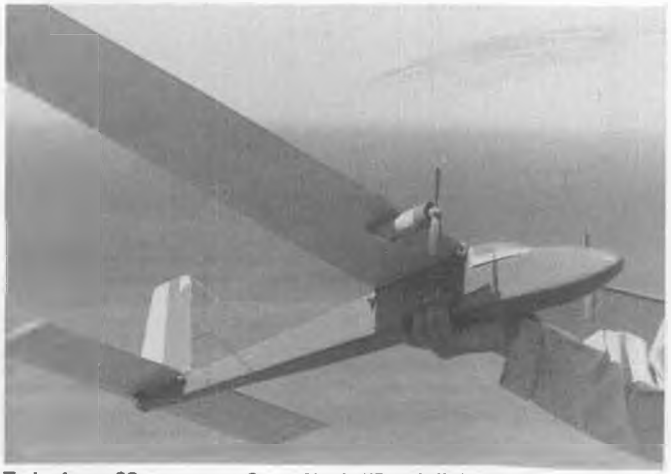
long distance flights. Lastly, he reviewed the dynamic soaring capability of the Albatross and similar birds. They can remain aloft in endless flight without flapping their wings simply by following a cyclic flight path which extracts energy from the windshear. He left us with a challenge to use this knowledge for RC soaring.

The second lecture, by Dr. Paul MacCready, concerned manpowered flight. He described his experiments aimed at capturing the Kremer Prize (currently valued at about $85,000). Here, the task is to fly over a 10-foot barrier, over half a mile, turn around a pole, return over the starting point, then fly in the other direction another half mile, turn around a pole in the opposite direction, then return over a 10-foot barrier at the starting point. This requires turning in both directions and at least two climbs out of ground-effect.

After a brief review of previous unsuccessful attempts, he described the "engine" and his proposed vehicle. A healthy human can provide about 3/10 horsepower for a period of half an hour. Dr. MacCready noted that most healthy individuals are about the same in terms of horsepower per pound, regardless of their weight. He recommends using an ergometer (a calibrated exercise bicycle) to get into shape, but noted that you stay in shape only if you keep practicing on a regular basis. The pilot-engine is about 2/3 of the weight of his entire aircraft system.

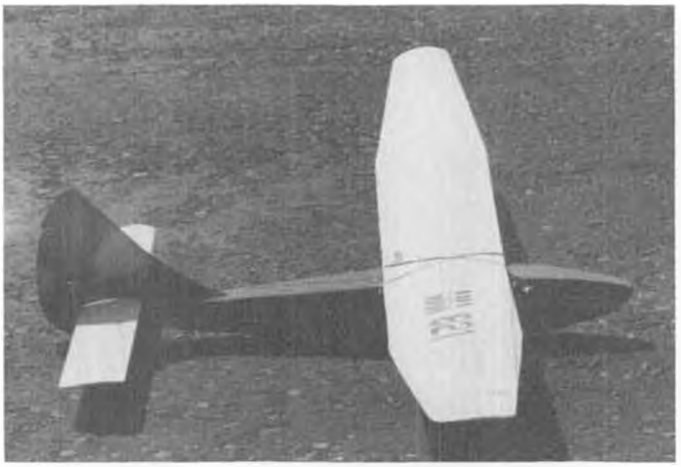
He then went on to describe the design of the aircraft configuration . . . his Gossamer Condor, a 90-foot mylar-covered wing supporting a bicycle frame and forward stabilizer propelled by an aft pusher propeller built up of mylar-covered forms. The pedals drive the propeller while the pilot guides the aircraft with his hands. He then described the many agonies of the development program. His clear-headed engineering and dogged persistence are bound to capture the prize. We wish him well in this effort.

The third lecture in this series covered the design of the ST-100 Cloudster . . . the new full-scale powered glider offered by Ryson, Inc. The fourth lecture described new aspects of ultra light flight, while the fifth and last concerned the design of airfoils to meet particular needs. Here Dr. Robert Liebeck, of Douglas Aircraft Co., described his recent work in this regard. He pictured the velocity profile as a function of distance on the surface of the airfoil cross-section, starting at the trailing edge and moving around past the leading edge and back to the trailing edge, with this distance being normalized to unity. Here the velocity on the lower surface is negative, passes through zero at the stagnation point, and is positive on the upper surface, ending at the same magnitude as the initial point on the lower surface. The coefficient of lift is the area under this curve. He then added other considerations as they relate to separation of the airflow and



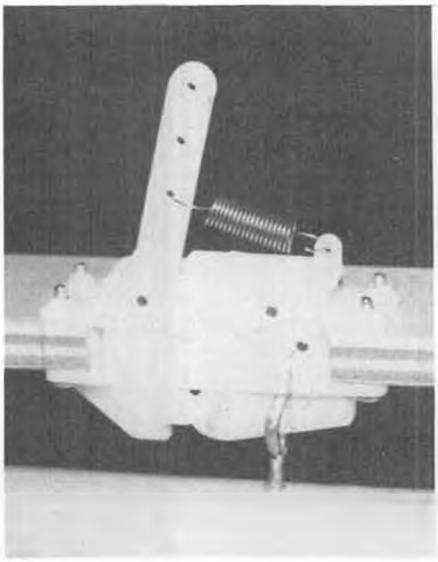
Twin Astro 02 motors on Steve Neu's "Dandy". Use power to get altitude, then shut 'em off and soar.

Bob Simon also went the electric route, with 2 Astro 05's in his Goldberg Skylark. Nose gear linked to rudder for "ground driving".

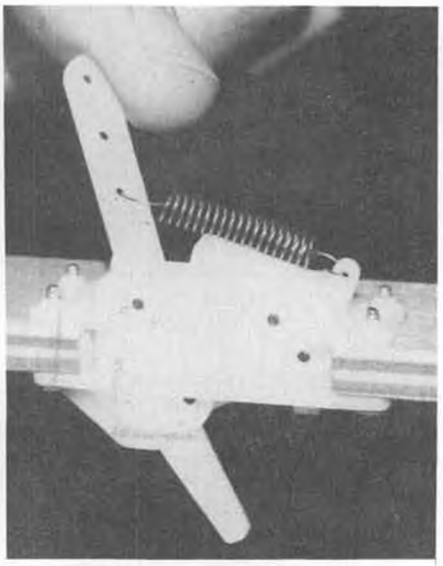


Over thirty years later than the photo on page 8, Floaters are still around! This one belongs to Paul Denson, still rudder-only.

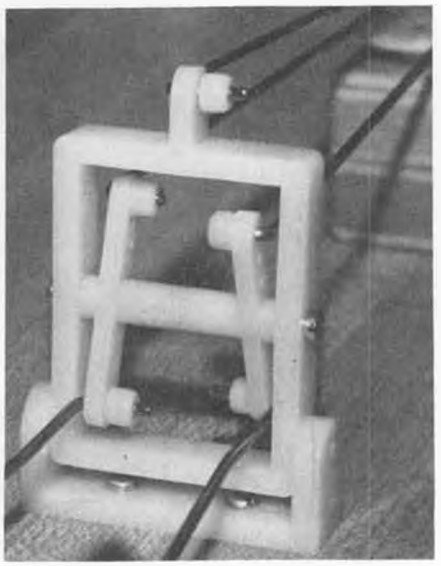
This is Frank's modern version of his Floater design. A little trimmer of fuselage but just as great in the air.



NAME, Inc. is marketing this positve capture, releasable towhook, shown in captured mode.



The NAME, Inc. towhook just after release.



Sturdy control mixer, also by NAME, Inc.

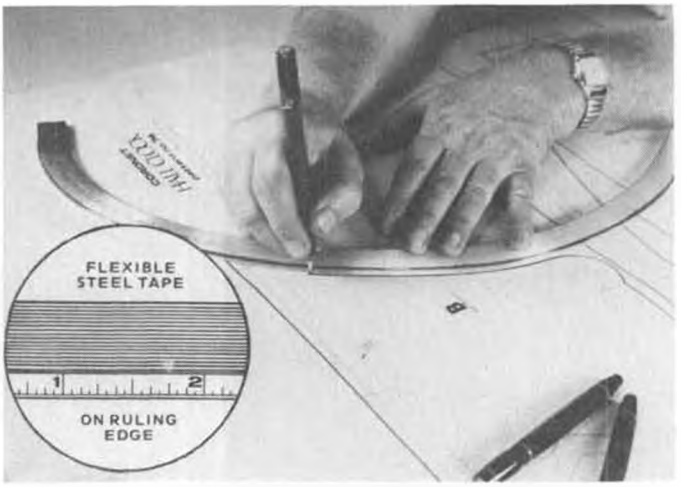
went on to point out how the particular airfoil can be designed to fulfill given specifications in terms of Reynolds Number, range of angles of attack, and so forth. He pointed out that the best airfoil in turbulent air is different from the best airfoil in laminar flow.

He then focused on low Reynolds Number problems, and pointed out the importance of this for very high altitude aircraft which operate at low speed for long duration (wherein the wing loading might be as low as 10 pounds per square foot). In essence, the best airfoil for our purpose reduced to a rather conventional shape such as the 4415 airfoil, or the good old Clark-Y. The last portion of his talk concerned the design of wings for racing cars, especially 2-element wings which doubled the effective weight of the car at 200 mph. This lecture series was well attended and the audience was enthusiastic throughout. Hopefully, we can have a similar series next year.

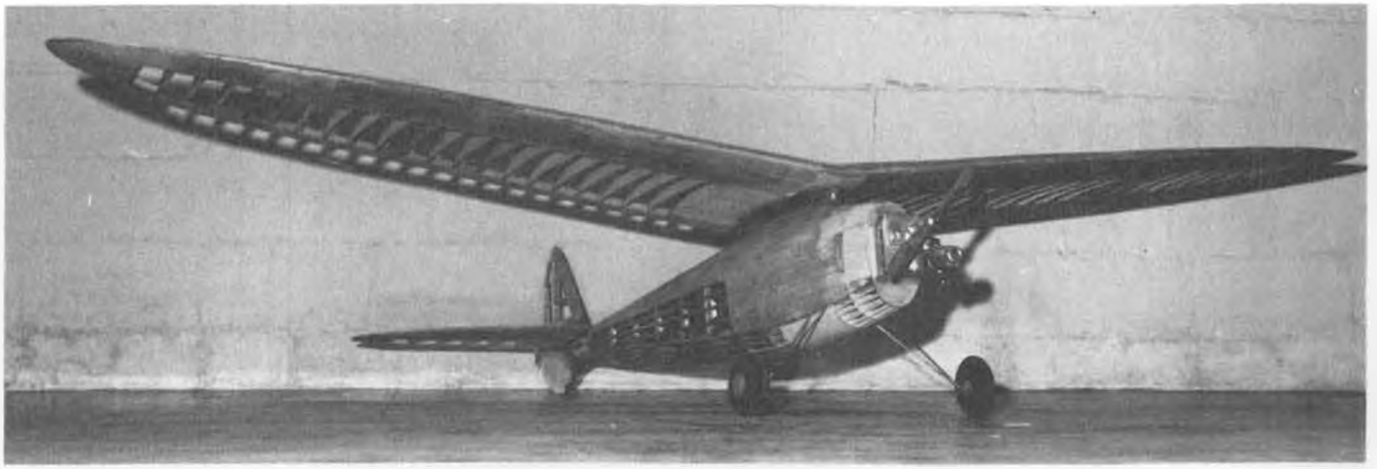
Steve Neu is experimenting with electric powered sailplanes. He added two Astro Flight 02 motors to his

Continued on page 71

Alex Mladeneo has combined the Windfree fuselage and tail, with the wing from a Windward (making the best of two accidents).



Flexible curve by Hoyle Engineering combines 14 interlocking channels of clear butyrate plastic with a steel measuring tape.



After 40 years, Mel Yates is converting his "Herky" to radio control. The Forster .99 originally used, has been replaced by a modern glow engine.

PLUG SPARKS

By JOHN POND

• Texaco! Every time this columnist hears that name being used, thoughts of huge, graceful flying models cross his mind. The Texaco Event, which was the first event devoted strictly to gasoline powered models, was responsible for firing the imagination of thousands of modelers.

Strangely enough, when the SCAMPS (Southern California Antique Model Plane Society) reactivated this marvelous old event, and contacted the Texaco Co., it disclaimed all knowledge of sponsorship! Having been responsible for the advancement of gas model flying and needing all the favorable publicity they could get, it was truly ironic that the Texas Oil Co. people passed up the opportunity to again put the name of Texaco upon every modeler's lips. *(When Goodyear stopped backing pylon racing, the name was changed to Formula 1. Texaco should get the same treatment. wcn)*

Probably the toughest break of all in reviving the Texaco Event occurred when attempts by Pond to obtain the original trophy turned out to be a day late. Upon talking to Frank Ehling, Technical Director of AMA, he stated he had just been down in the basement the day before, on a house cleaning program. Among the things thrown away was the original Texaco Trophy. Hence, there was no way to make an exact trophy appearing in the various model magazines.

However, the SCAMPS persisted and an excellent trophy was procured. The first contest was held at Taft in 1966, with Sal Taibi as Contest Director. The next ten contests in a row were run by Sal, who practically became a fixture. This year, however, Sal announced at the meeting, that he was going to fly. With volunteers at a minimum, the job fell by default to Al Heinrich, the SCAMPS' President.

But Al was equal to the occasion, starting the meet on time (6 a.m. in the morning) and wrapping up promptly at 10 o'clock. This "Dawn Patrol", as innovated by Sal Taibi, has become the standard way of flying the Texaco Event on the West Coast. In some respects, the columnist misses some of those beautiful flights which are generally in full view in the afternoon.

This year, Cliff Silva, who has been taking second place for so long, wrapped the contest up before it even started, coming in with a 35 minute flight at 7 a.m. Just to show this was no fluke, he also entered his Ehling Contest Winner and promptly put up a 26:12 flight. Of course, the Baby Cyclone powered Roll Berryloid Winner was by far the best flyer on the field. Cliff now has his Baby Cyclone running between 14 and 18 minutes on the alloted fuel. Whew!

Results shaped up somewhat like this:

1.	Cliff Silva (Roll/Baby Cyclone)	37:30*
2.	Jim Adams (Ehling/Bunch)	23:32
3.	Paul Hatzl (Westerner/Spitfire)	23:01
4.	Tim O'Meara (Scram/Cannon)	22:26
5.	Hugo Lung (Giant/Cyclone)	21:26
6.	Sal Taibi (Powerhouse/Vivell)	16:54

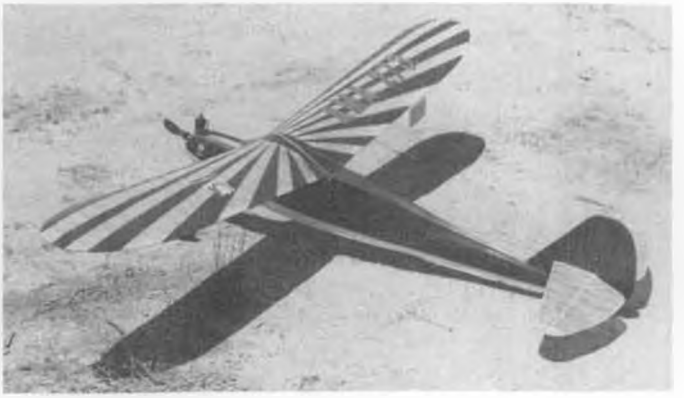
*** only one entry counts**

There were 13 actual paid entrants. Others, such as Pond, Bernhardt, etc., saved their money when their models refused to fly properly on test flights.

THIRD ANNUAL
R/C TEXACO CONTEST

Held in conjunction with the SCAMPS Texaco (as flying starts after the close of the free flight contest), SAM 21 staged

Tyro Products' Barnet Kernoff in action at the 1963 Stockton, Cal. Annual.



Very neat Whethers "Westerner" by Marc Tackett, of the SCAMPS. Dig those wild sunburst stripes!

The Jayhawker Sundusters at Monticello, Minn., 1947 Nationals (l to r): Jack Jella, Vern Guyer, John Busley, Roy Edwards, Dick Johnson, and Bill Wellborn. All still kicking, too!

Ignition conversion of the OS 60 four-cycle engine by the SCAMPS' Jim Dean. Rear timer geared to fire every other crank revolution.

its Third Annual R/C Texaco Meet. Given a few more years, this portion of the meet will start to gather whiskers.

Like the SCAMPS meet (13 entries), the SAM 21 contest only featured 10 entries. This was partially due to the lack of attendance by SAM 21, SAM 25, and SAM 27 members. Too many contests up north, plus the threat of weather, deterred many modelers from driving several hundred miles south.

Despite all warnings up north, the weather was one of those fantastic days everyone likes to talk about. Starting in the morning with 16 minute flights, times gradually improved until they hit a high around two in the afternoon.

Strategy flying (or sandbagging, if you want to call it that way) was the order of the day. As previously noted, times were improving all the while, until Phil Bernhardt came in with a flight of 33 minutes. This precipitated a rash of flights, with Otto Bernhardt getting off first, followed by Pond and Adams. When the lift broke up, the final standings were in the order of takeoff.

Phil Bernhardt had real tough luck, as the watch (Pond's natch!) stopped after ten minutes in the air on his second flight. Upon bringing the model down to try another flight, the ignition pack went dead. With dear old Dad (Otto) winning, that car ride home was filled with all sorts of moans and groans from son, Phil, as to how lucky can you be, etc. etc.

Actually, after the first big lift broke up and the contest came to a close, Woody Peterson was flying in fantastic lift that simply wouldn't quit. Naturally, this always happens on unofficial flights! Results shaped up like this:

1.	Otto Bernhardt (Lanzo)	40:01
2.	John Pond (Lanzo Stick)	38:59
3.	Jim Adams (Laurie Exp.)	38:35
4.	Phil Bernhardt (Powerhouse)	33:35
5.	Bob Dittmer (Miss Philly VI)	25:35
6.	Woody Peterson (Powerhouse)	23:34
7.	Tom Bristol (Flamingo)	23:05
8.	Paul Forrette (Long)	12:02

Reason for listing most of the entries was to show the modelers interested in R/C Texaco just how close the times were, and what to expect in the way of competition. One thing for sure, Jim Adams proved (as Leo Weiss did in 1935) that you don't need a big floater to win. With the carefully streamlined Laurie Model (see Jasco Year Book 1938), the airplane was able to penetrate the breeze easily and soar as good or better than the big ones.

To summarize, both free flight and radio control events, the emphasis appears to be on engine economy, as witnessed by the use of Baby Cyclone engines in the original event. Ignition converted glow engines were almost universally used in the R/C Texaco. However, it has been proven by Don Bekins and Bob Von Konsky that Anderson Spitfire powered models are also a real threat!

ENGINE OF THE MONTH

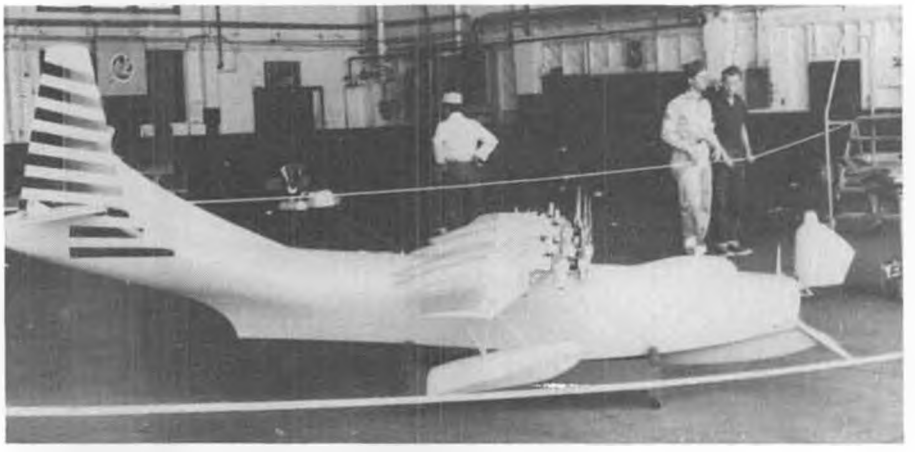
In the early days (as today), California and particularly Southern California, was a hotbed of modeling activity. With such a tremendous interest, this served as an excellent development and test background for weeding out the engines that simply didn't have it.

Among the more successful engines in the south, were the series of motors put out by Bunch Mfg. Co. This month's motor, the Tiger Aero, was probably the culmination of development by Danner Bunch, as it was an excellent ringed engine.

According to the brochure issued by the Bunch engineers (Broughton, Bunch, et al), extra performance was obtained by using ethyl or high octane gasoline. With a compression ratio of 7-1/2 to one, the recommended fuel was 16 ounces of ethyl gasoline to 8 of castor oil, with one ounce of ether to make the ingredients blend (Acetone also has the same effect).

Modelers would do well today to review this mixture, as several of the "hot dogs" are using this combination with excellent results. Of course, they are not running around telling everyone their secret. Also, they are going this combination one better by using 3 to 1 and 4 to 1 mixes, utilizing "Blenzoil" for lubrication (Blenzoil is available at your local motorcycle shop).

The Bunch people found better lubrication at the main bearing could be



Larger version of the General Dynamics (then Consolidated) R/C model using four Ohlsson & Rice twins. Seen at Westover AFB, by Sears McCorrison.

Very rare sight. A Comet Clipper with nicely cowled engine. This one by Tom Brennan, of SAM 27.

Remember this Holland Hornet version? Would make an excellent engine for Class A O.T. R/C assist models.

obtained by cutting a spiral groove in the bronze bearing. This effectively gave a force feed (from the crankcase pressure) resulting in better lubrication and smoother running. This resulted in claims of .44 horsepower at 8500 rpm, using a 12 inch propeller. This approached the magic figure (in those days) of one horsepower per cubic inch of displacement.

With the introduction of the Tiger Aero engine, the Bunch Company launched an intensive advertising campaign, with one full page being devoted to reports of winners using Tiger engines.

My good friend and bosom buddy, Charlie Werle, was responsible for popularizing the use of Tiger motors in Jim Walker Fireballs (normally equipped with Ohlsson 23 engines), when he scored a clean sweep at the California State Fair Championships, winning the precision, speed, and acrobatic events. The writer was lucky to be present and aid in the victory. No question about it, the Tiger Aero engine in a Fireball made a great performer out of this Jim Walker design.

Of course, it didn't hurt a bit when Bud Warren and Dean McMillan won the speed and acrobatic championships, respectively, at the First Official Speed and Acrobatic Competition for Controlled Gas Models at the Lakewood Stadium in Long Beach, in July of 1941. Also about this time, the Bunch engineers assisted Dean DeGonia in setting a World's Endurance Record of 3510 laps at the Southern California Gas Model Airport (sometimes called Gotch Airport). In short, the Bunch people were busily pushing a good product and a new fad, controline flying.

Bunch Tiger Aero engines were officially announced in the June 1940 issue of Model Airplane News, priced at $16.50. A ten-page catalog, costing 20¢, titled "Bunch Gas Model Engines", was offered to all modelers interested in updating the performance of their engine. Of course, being a Bunch publication, the emphasis was on their products, but, by and large, a good number of facts could be gleaned from the booklet.

Interestingly enough, one of the early cartoons in the Bunch Co. advertisements depicted another modeler trying to start a motor saying, "I wish he'd shut off that screaming Tiger. We can't hear our engines run." Believe it or not, that saying has persisted to this day about a "screaming tiger". However, this has degenerated to include about any hot running motor that makes a lot of noise.

For the technically minded, Tiger Aero engines featured a bore of 7/8, stroke, 3/4, and overall height of 4-1/4 inches. Cylinder and head was steel, with the intake, by-pass, and cylinder manifolds welded to the cylinder to eliminate the faults and leaks resulting from bolted parts appearing in the early Ohlsson and Baby Cyclone motors. Displacement was .45 cu. in., with a nominal rating of 1/5 to 1/4 horsepower. As noted previously, more horsepower was obtained with correct combinations or propeller and high octane fuels. Bunch was also one of the first manufacturers to introduce a small ignition coil which later lead to the successful Aero Spark Coil (no relation between companies).

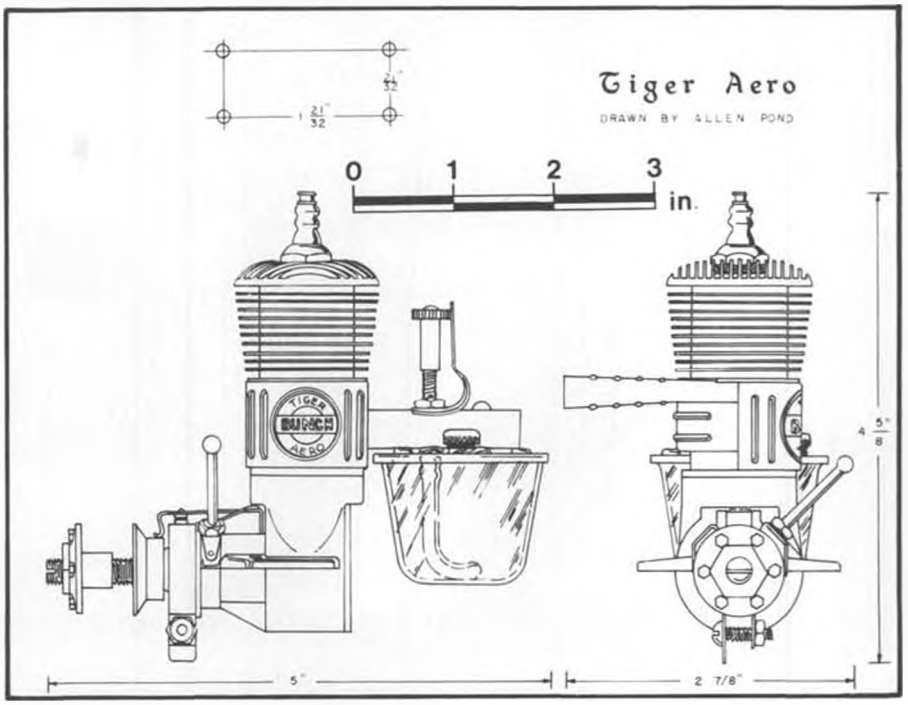
JAYHAWKER REUNION

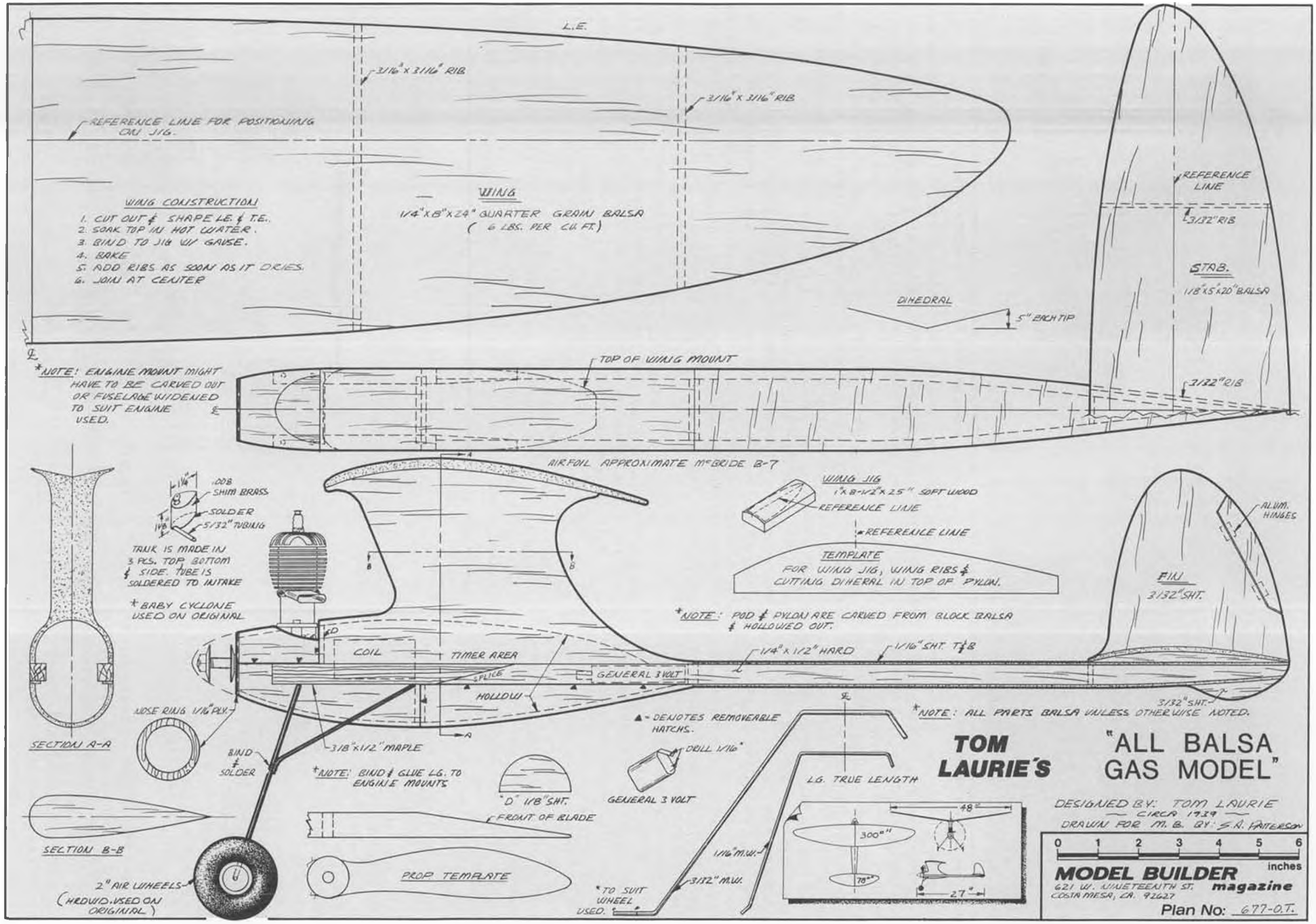
The photo appearing in this column was taken at Monticello, Minnesota during the Nationals in 1947, August to be exact.

The picture of the intrepid "Jayhawker Sundusters", who made that trip, brings back a lot of good memories for Jack Jella, now located in Salinas. Jack is the proprietor of Air Trails, Inc., an airplane express shipment concern.

After reviewing the picture, Jack is issuing the call for all Jayhawkers to come to the SAM Champs at Las Vegas, June 28 thru 30. During this time, Jack

Continued on page 72




L.E.
3/16" x 3/16" RIB
3/16" x 3/16" RIB
REFERENCE LINE FOR POSITIONING ON JIG.
WING CONSTRUCTION
1. CUT OUT & SHAPE L.E. & T.E.
2. SOAK TOP IN HOT WATER.
3. BIND TO JIG W/ GAUZE.
4. BAKE
5. ADD RIBS AS SOON AS IT DRIES.
6. JOIN AT CENTER
WING
1/4" X 8" X 24" QUARTER GRAIN BALSA
(6 LBS. PER CU. FT.)
DIHEDRAL
5" BRK TIP
REFERENCE LINE
3/32" RIB
STAB.
1/8" X 5" X 20" BALSA
3/32" RIB
*NOTE: ENGINE MOUNT MIGHT HAVE TO BE CARVED OUT OR FUSELAGE WIDENED TO SUIT ENGINE USED.
TOP OF WING MOUNT
AIRFOIL APPROXIMATE McBRIDE B-7
.008 SHIM BRASS
SOLDER
5/32" TUBING
1/4"
1/8"
TANK IS MADE IN 3 PCS. TOP, BOTTOM & SIDE. TUBE IS SOLDERED TO INTAKE
* BABY CYCLONE USED ON ORIGINAL
WING JIG
1" X 8-1/2" X 25" SOFT WOOD
REFERENCE LINE
*REFERENCE LINE
TEMPLATE
FOR WING JIG, WING RIBS & CUTTING DIHEDRAL IN TOP OF PYLON.
*NOTE: POD & PYLON ARE CARVED FROM BLOCK BALSA & HOLLOWED OUT.
ALUM. HINGES
FIN
3/32" SHT.
COIL
TIMER AREA
SPLICE
HOLLOW
GENERAL 3 VOLT
1/4" X 1/2" HARD
1/16" SHT. T & B
3/32" SHT.
*NOTE: ALL PARTS BALSA UNLESS OTHERWISE NOTED.
SECTION A-A
NOSE RING 1/16" PLY
BIND & SOLDER
3/8" X 1/2" MAPLE
*NOTE: BIND & GLUE LG. TO ENGINE MOUNTS
▲ - DENOTES REMOVEABLE HATCHS.
DRILL 1/16"
GENERAL 3 VOLT
"D" 1/8" SHT.
FRONT OF BLADE
SECTION B-B
PROP TEMPLATE
2" AIR WHEELS (HARDWD. USED ON ORIGINAL)
*TO SUIT WHEEL USED.
1/16" M.W.
3/32" M.W.
LG. TRUE LENGTH
48"
300"
78"
27"
TOM LAURIE'S
"ALL BALSA GAS MODEL"
DESIGNED BY: TOM LAURIE
— CIRCA 1939 —
DRAWN FOR M.B. BY: S.A. PATTERSON
0 1 2 3 4 5 6
inches
MODEL BUILDER magazine
621 W. WALNUT 17TH ST.
COSTA MESA, CA. 92627
Plan No: 677-O.T.

Tom tilts the model so you can see the graceful elliptical curves in wing and stab.

TOM LAURIE'S.....

• All Balsa Gas Model •

This time, as explained in the text, we have a complete construction article for The OLD TIMER of the MONTH. Better late than never!

"Dear Mr. Laurie:

Thank you for resubmitting your "All Balsa Gas Model" article.

We still would like to publish this, but due to unforeseen circumstances, we still have a quantity of material on hand.

We are returning this therefore, and if you would care to send it to us again in about 3-4 months, we will endeavor to accept it then.

Very truly yours,
Charles H. Grant
Editor"

(The above letter was mailed on Dec. 22, 1939, but somehow, Tom never got around to returning the material for another try at having it published. Recently, it turned up while he was rummaging through some memorabilia, still in the brown manila envelope, with five 3-cent stamps for First Class mailing from New York to Ft. Wayne Indiana, Tom's home at the time.

Never being one to completely give up, Tom, who now lives in Newport Beach, California, brought the complete article, as originally submitted to Charlie Grant, then editor of Model Airplane News, to our office, and said, "It's just a little outdated, but maybe you'd like to publish it."

So, here it is, only 37-1/2 years later. We've printed the article without any updating or modification (except for italicized comments). John "Daddy Warbucks" Pond has put his O.T. blessings on the design, based on the clearly dated envelope that contained the original article material. wcn)

The small gas model presented here is an efficient model for the smaller line of gas engines. The design, having been influenced by the indoor variety of models, is very stable. The model has a tight spiral climb and a very flat glide. I believe it will make a very formidable entry for the coming contest season. The outstanding feature of the model is the all-balsa construction of the wing and tail assembly. This type construction may sound difficult, but it is not.

The little ship is very simple, but a careful study of the drawings and instructions will be very helpful. The extra time required for making a full size drawing will be more than compensated for during the building of the model. The drawings are very easily made since the ones in the magazine are already half size *(Well, not this time, but we've done the full-size drawing for you. wcn)*

Perhaps something should be said about motors at this point. I used a "Baby Cyclone" in my model, but any of the smaller motors will be satisfactory. The weight is a fraction over one pound, so any of the 5/8th motors will be able to fly her. The installation of other

Continued on page 91

Here's Tom (a little younger, but not much thinner than he is today, the lucky bum!), holding his all sheet balsa gas model in launching attitude. Span is 48 inches.

PRODUCT$ IN U$E

ELOY MAREZ builds and tests the MRC/Tamiya Porsche, 1/12 scale electric car, controlled by the 2-channel MRC 772 radio system.

• First and foremost, I would like to state that I am an airplane bug, and have been even before my first flight in a Fleet biplane, in 1944. Twenty-four years and close to 10,000 hours as a USAF radio operator didn't cure me, and I am still ready to fly anywhere, anytime, even if lately most of it is commercial Greyhound type flying. Now and then, however, I am able to work in some fun flying, such as last year's aerobatic flight in a friends Starduster, and more recently a real unique experience in the Goodyear blimp.

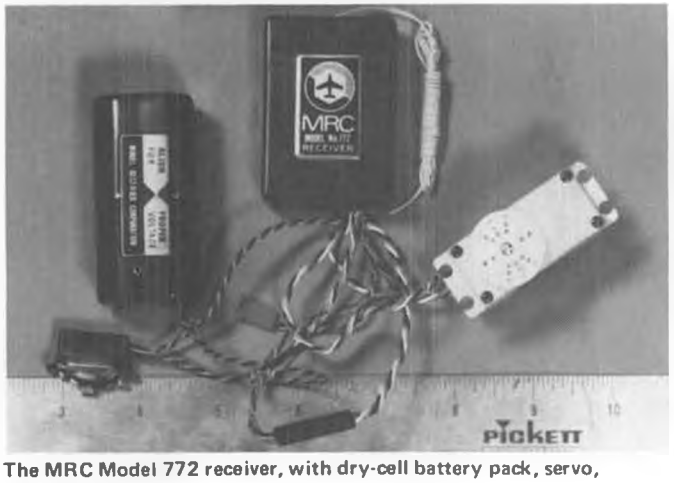
Cars? Well, to me, cars are a necessity, but strictly that, and useful only in getting from point "A" to point "B", especially if point "B" is an airfield, full-size or model. But there are some automobiles that are more than that, the rare ones that, by pure design and looks, are more than just mere transportation . . . the ones that bring out the dreamer, the Mario Andretti in you. The Porsches, among a few others, have always done that to me, and when I saw the first color picture of the MRC/Tamiya Turbo RSR Type 94 Porsche R/C model, a development of the 930 Turbo car, I immediately took a close look at both the budget and building schedule. Here is a Porsche I can afford, and the schedule has been bent so many times . . . what is once more?

As pictured, this is a faithful replica of the Kremer Racing Team auto, sponsored by the Vaillant Company, a manufacturer of air conditioners and other large items. It is done in a very pleasing color scheme, which has added immensely to my enjoyment of this little machine.

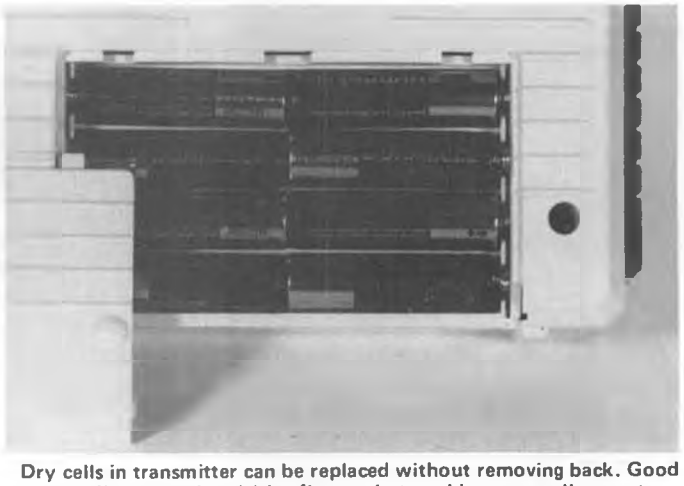
The MRC/Tamiya Porsche kit is the result of another successful marriage in the MRC family. MRC, or Model Rectifier Corporation, its full name, needs no introduction as one of the countries foremost importers, manufacturers and distributors of highest quality products, including engines, airplanes, helicopters, and R/C systems, as well as accessories of all types.

Tamiya Plastic Model Co., of Japan, is known throughout the world as one of the foremost manufacturers of plastic model kits of exacting quality and almost unbelievable fidelity to scale. The Porsche kit follows in the traditions already established by both companies.

This little brother Porsche, in 1/12th scale, is 370mm (14.5) inches long, including the spoiler. It weighs 1.2 kg (2.6 lbs). The chassis is made of light, rugged duraluminum, and incorporates a coil spring suspension system. The wheel base and width are adjustable so that other 1/16 scale car bodies may be installed, if desired. The wheels are molded from ABS plastic, and are fitted with tough semi-pneumatic tires. The variable gear assembly incorporates stainless steel shafts, in phosphor bronze bearings and Delrin gears. Four different gear ratios are possible (19.4, 15.5, 5.8, or 4.7:1) so that you may make a choice of highest speed, best drive-battery life best performance with either rechargeable or dry cells, or slow speed



The MRC Model 772 receiver, with dry-cell battery pack, servo, and on-off switch.

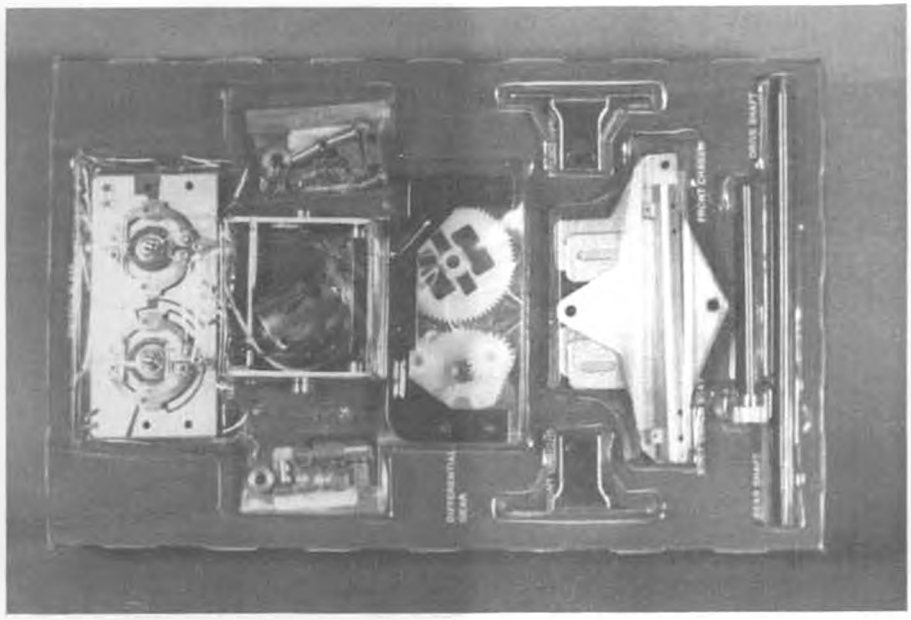


Dry cells in transmitter can be replaced without removing back. Good way to discourage inquisitive fingers that could mess up alignment.

for indoor fun. The motive power comes from a Mabuchi RS-360G electric motor equipped with radio noise suppressing capacitors. The body is made of impact resisting plastic, and is equipped with a piano-wire bumper firmly attached to the chassis.

As received, the Porsche is set up for using "C" size dry cells, which, with the gears set for economical drive, will give you a top speed of 7 km/h (4.3 mph) and a battery life of 50 minutes. Rechargeable nickel cadmium batteries, with the gears in high speed positions, will give a top speed of 18 km/h (11.2 mph), also with a 50 minute operating time. You will find that driving this little car is so much fun that 50 minutes it not long at all, especially since you will find your non-R/C friends not at all adverse to trying it, and in fact will give you a hard time getting it back. Dry cells are far from economical; nickel cadmiums are the only way to go. The latest word from MRC is that they have a power package consisting of 1800 mah nickel-cadmium batteries, charger, connectors, and instructions, all for $29.95. Admittedly, this is much higher than the cost of four dry "C" cells . . . even the best quality alkalines. But in the first month or so of use, you'll be even, and from then on can consider that you are driving for practically nothing.

On to assembly. At first glance, it'll shock you, starting with the fact that the kit comes in a much larger box than expected. But there is a good reason, one being simply to properly protect everything on it's long journey from Japan to you, and the other being that the parts are packaged in separate boxes, bags, and blister packs, in the order in which they will be used. So instead of one big container full of all the small hardware with it's problems of identification, it is fed to you a bit at a time, as you use it. Everything you need is there, including wrenches and grease for the gears.

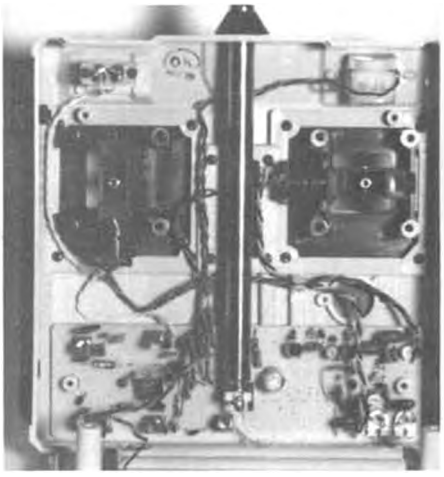


Parts are divided into separate bags and compartments, and are grouped in the order that they **will be used during assembly . . . avoids confusion** and identification.

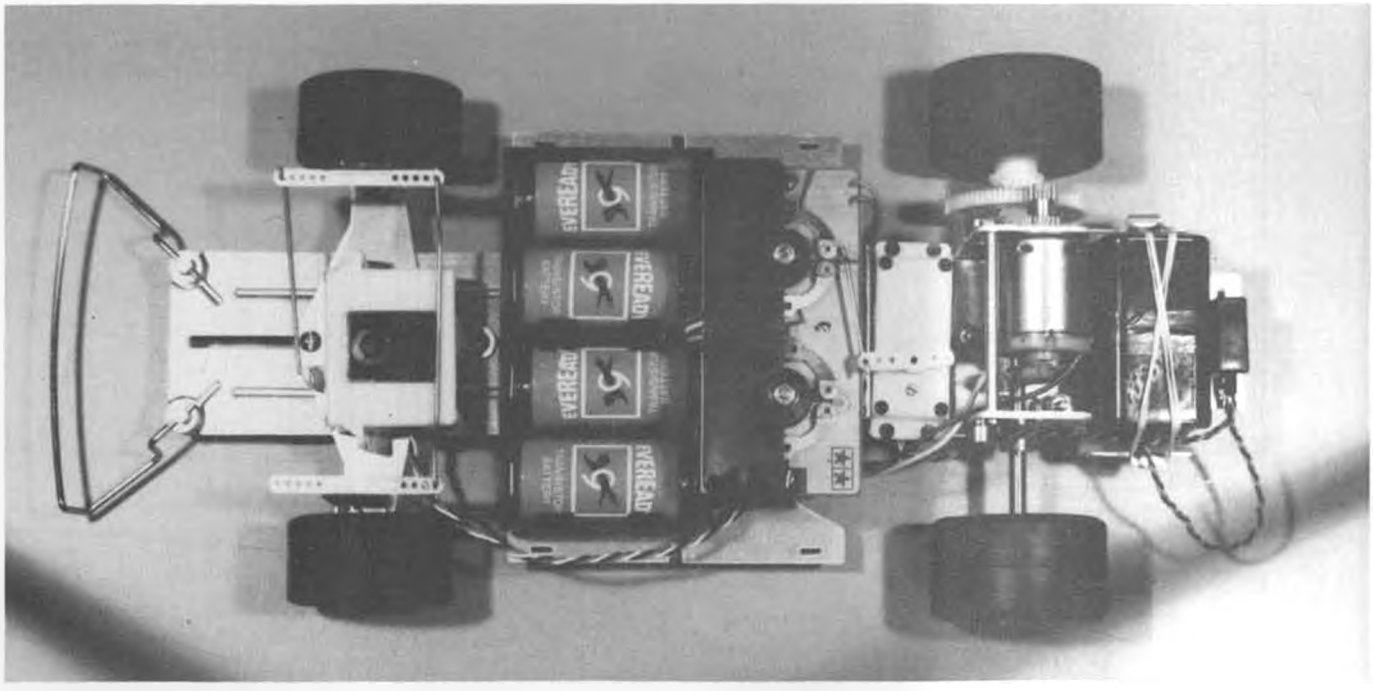
You'll be somewhat shocked also if you expected a two or three-piece car . . . this one you assemble from the chassis up, and it takes a lot of bits and pieces. However, as assembly progresses, you can see the reasons behind the design and assembly procedures, and it really isn't as difficult or time consuming as first expected.

To begin with, the 16 page manual is as complete as it can possibly be, and it takes only the ability to read to be

Continued on page 85

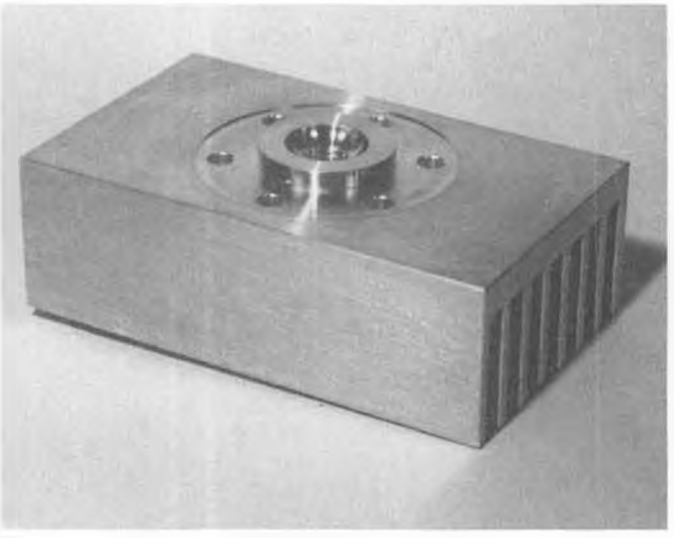


Inside of transmitter. Batteries are in isolated compartment built into the back cover.



Completed chassis, ready for body installation. Drive batteries shown are dry 'C' cells. A rechargeable nickel-cadmium pack, with charger and connectors is also available . See text for further information.

The K&B 21 (3.5cc) engine, with McCoy muffler and heat sink head.



R&A heat sink head for K&B 21, by Associated. It has same hemi-head shape as stock K&B head.

R/C AUTO NEWS

By CHUCK HALLUM

• Well as you can see, this month's article is about the K&B 3.5cc (.21 cubic inch) engine, and the parts available for it. There is one heck of a lot of stuff available for this engine already, even though it's only a year old. And, of course, I can only tell you about the aftermarket equipment that I know about If I've left out equipment, let me know.

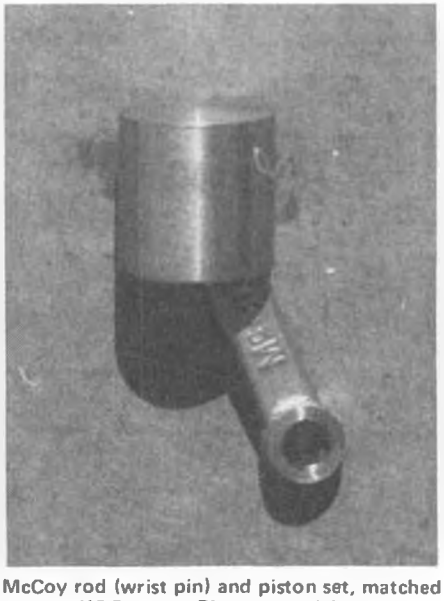
First let me get into items that you have to have to run the K&B 3.5 in cars . . . mufflers and heat-sink heads. Three mufflers are available in the U.S. that meet ROAR standards, and they are: McCoy, Thorp, and Tatone (Addresses of all manufacturers mentioned are given at the end of the article). The McCoy K&B 21 muffler is of cast magnesium, to get the weight down. The Thorp muffler is equally light, using machined and spun aluminum parts welded together. The Tatone muffler for the K&B 21 is cast and machined aluminum, but I haven't see one here in Southern California. When I watch cars on the track with the Thorp and McCoy mufflers on them, I can't really detect any difference in performance. Some people prefer the McCoy mufflers because they've heard it's good for a couple of hundred RPM on the top end. I use a Thorp muffler on my formula car and a McCoy on the road car.

Associated and McCoy both have good heat-sink heads with an internal hemi-combustion chamber. Performance of both again appear to be equal on the track. Which one you choose is probably going to be based on the head shape you prefer. The Associated R and A head is rectangular, the McCoy is round, and is taller, to get the cooling surface area up. There must be more, but these are the only ones used in Southern California.

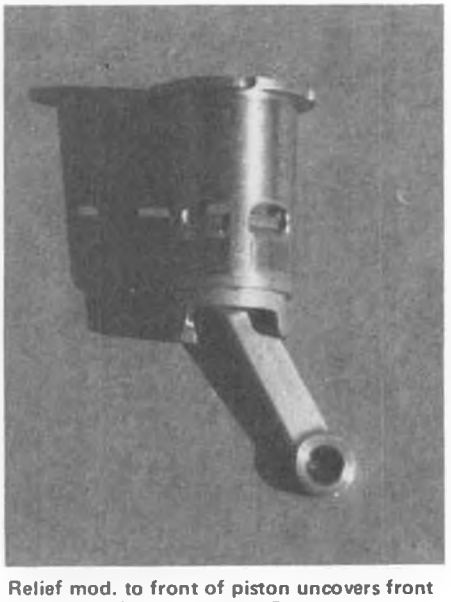
Now let's get to the inside of the engine. There are a couple of things that have to be done, K&B seems to think everything is OK, but anyone who has run a box-stock K&B 21 for car racing purposes knows different. If nothing is done, the wrist pin and piston and rod end wear excessively . . . then ZAP . . . the engine is gone. Some people replace the wrist pin with a McCoy pin of slightly larger diameter . . . and this seems to alleviate most of the problem, or at least make the engine last longer. However, most of the people here replace, at least, both the wrist pin and rod. Both McCoy and Associated have replacement wrist pins and rod sets for the K&B 21.

For better reliability and possibly a tad more performance, because of the piston head shape, a few racers also

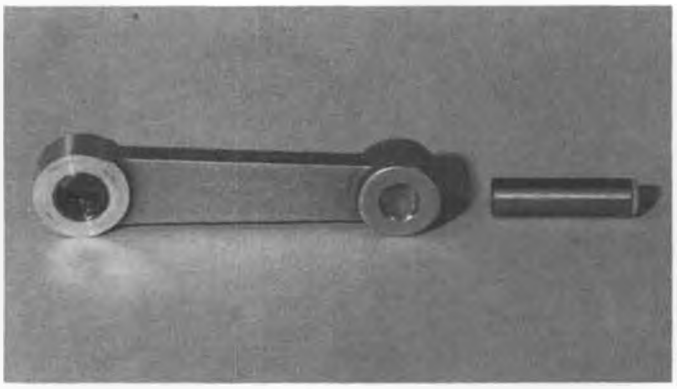
Machined aluminum replacement rod for K&B 21, by RPM, with dual holes at crank end.



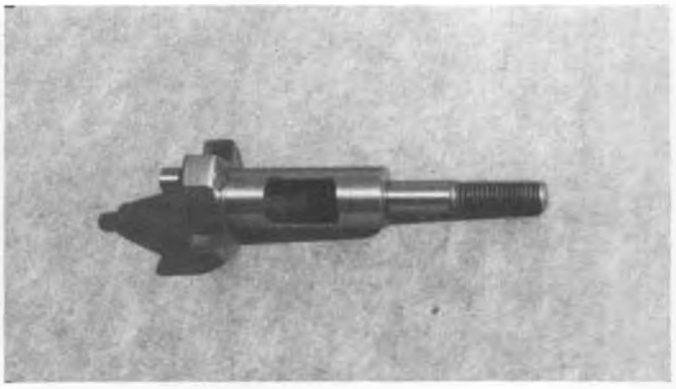
McCoy rod (wrist pin) and piston set, matched to your K&B sleeve. Piston top slightly convex.



Relief mod. to front of piston uncovers front intake transfer passage at B.D.C.



R&A connecting rod and wrist pin for K&B 21, by Associated.



Replacement crank by McCoy is hardened and beefier than stock item.

install the McCoy piston. But in Northern California, the racers seem to replace the rod and just provide for better lubrication of the blind end of the wrist pin (per Dave Richardson, of RPM). To improve the lubrication in the blind hole in the piston, first slip some brass tubing in where the wrist pin normally goes, as a guide for a drill.

Drill a small hole (about .063 dia.) through the piston wall . . . now some lubrication flow can get in the blind wrist pin hole. An additional lubrication hole, about 0.031 dia., can be drilled from the bottom side of the piston into the blind hole (the McCoy piston has this). Probably better lubrication is the most important thing, then a proper fitting wrist pin, next, a better rod, and finally, the piston. I know I'm going to use those additional lubrication holes.

The final internal replacement part is the McCoy crankshaft. If you've ever worked on the K&B 21 crank, you know how soft is is. Dick McCoy's replacement crank is hardened and appears beefier. The hardness should improve the wear characteristics. As far as I know, the timing of the replacement crank is identical to the original.

Well, that's it on the inside. The only external part specifically for the K&B 21, and other super-torque and power engines, that I know of, is the HRE air pump flywheel. When the air pump flywheel is used in conjunction with a ventilated clutch bell, air cooling is provided so that the clutch should not overheat. The air pump is a centrifugal type and pumps when the engine is running, whether or not the car is moving. Clutch slip can be used as required to control power oversteer.

Now for a quick summary of recommended engine modifications . . . which have been stated in previous articles (except one). The modifications are: 1) replace the wrist pins with a slightly larger-than-stock wrist pin; 2) provide holes in the blind wrist pin hole in the piston for better lubrication (new suggestion); 3) relieve the bottom of the piston to open the front transfer ports at B.D.C.; 4) taper and radius the outlet end of the crank shaft bore; 5) radius the back of the crank intake port; 6) sharpen the sides of the crank intake port, but do not change the timing; and 7) pack and contour the front of the crank bore with epoxy. These mods should be sufficient for most racers. However, if you're going to use a 61 pumper size carb, or lots of nitro all the time, then you might want to replace the connecting rod as well, with one of the stronger ones available.

As far as I know, the K&B 3.5 is still the highest HP engine through the complete RPM range. Other 3.5cc Schneurle engines now showing up in cars are the Super Tiger and OPS. Both of these engines are down a little on HP through the full rpm range, as compared to the K&B, in out-of-the-box condition. But this may not be all bad, because all of these engines put out more power than a very strong Veco-McCoy. The slight reduction of power of the S.T. and OPS means that on slightly slippery tracks, they will be competition with the K&B and will be easier to drive, hence will win races. Besides, when more experience is gained on the S.T. and OPS, I'm sure the power will come up. In base conditions, the S.T. looks the strongest mechanically, then the OPS and K&B. The OPS is about the same length as the old workhorse Veco, and has a convenient rear facing exhaust. Both the S.T. and OPS are true Schneurle ported engines, with three cylinder intake injection ports, two side and one front. The K&B is a modified Schneurle ported engine, having four cylinder intake injection ports, two side and two front. This porting difference may be the reason for the bottom power of the K&B. Time will tell how this race will come out. I'll give you further reports on these engines as I see how they're coming along.

Here is a list of the manufacturers addresses for components mentioned above:

K&B Mfg. (1)
12152 Woodruff Avenue
Downey, Ca. 90241

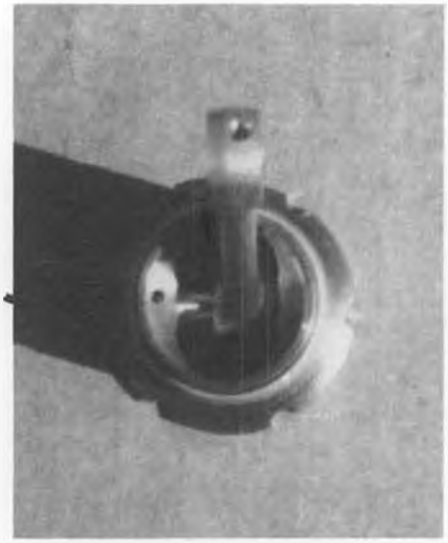
C&H Inc. (Dick McCoy) (2,3,4,5,6)
10767 Monte Vista Avenue
Ontario, Ca. 91761

Associated (2, 4, 5)
1928 E. Edinger
Santa Ana, Ca. 92705

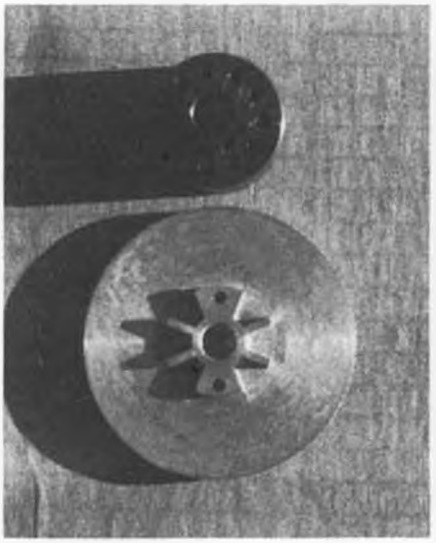
Thorp Mfg. (3)
1655 E. Mission Blvd.
Pomona, Ca. 91766

Tatone Products (3)
1209 Geneva Avenue
San Francisco, Ca. 94112

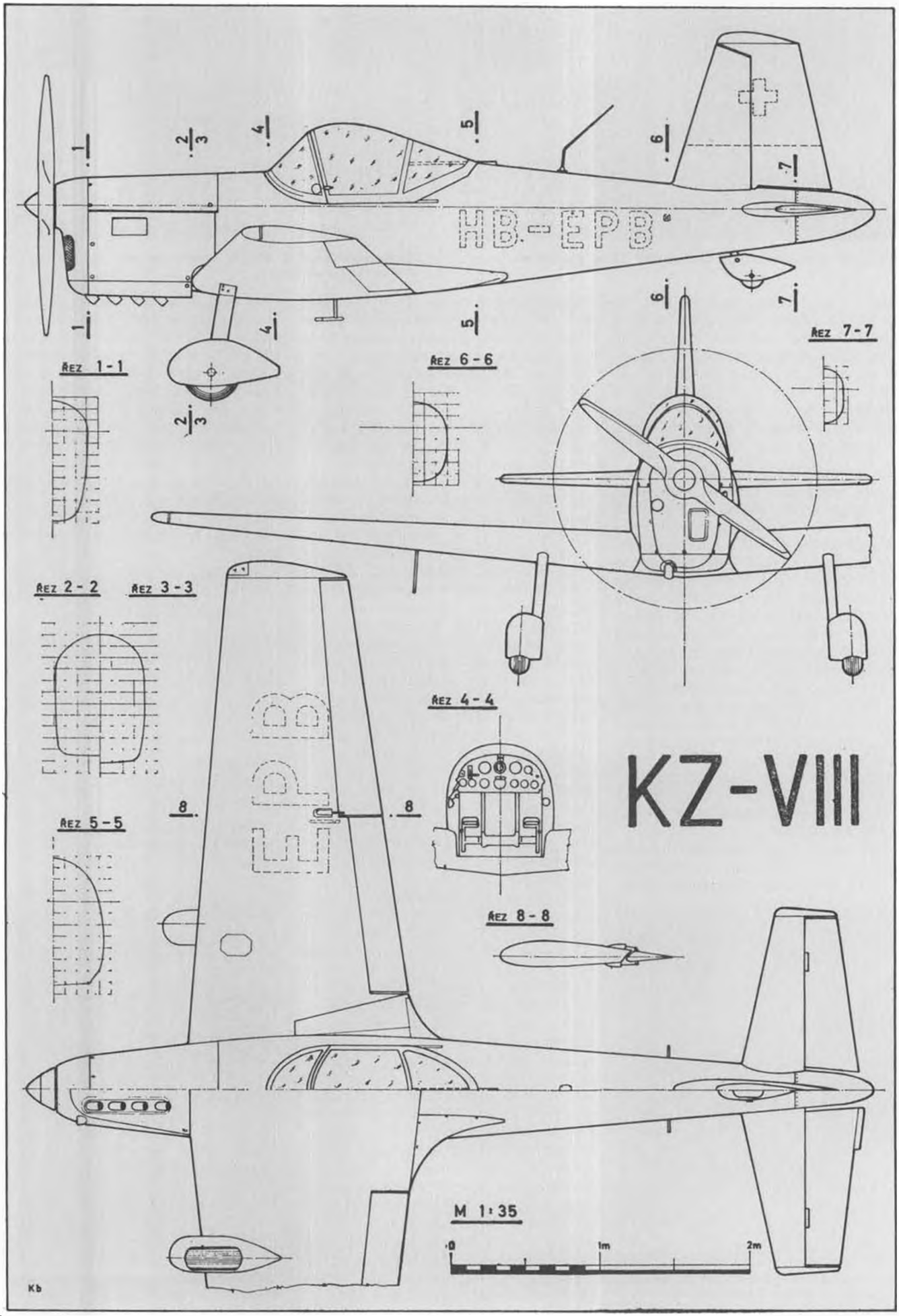
Continued on page 98



Extra lube oil hole to blind wrist pin hole in McCoy piston. Drill from bottom side.



Air pump flywheel and ventilated bell will keep K&B 21 clutch cool . . . by HRE.


HB-EPB
REZ 1-1
REZ 2-2
REZ 3-3
REZ 4-4
REZ 5-5
REZ 6-6
REZ 7-7
REZ 8-8
KZ-VIII
M 1:35
0
1m
2m
Kb

STRICTLY SAIL

By ROD CARR

PHOTOS BY DOUG BARRY

• From the rapid-fire camera of Doug Barry we can take a look this month at another informative series which documents a light air windward leg at a Richmond MYC 50/800 Regatta. Doug's comments, which accompanied the photos, have been liberally borrowed, as well as his analysis of the wind location and structure during the period in question. The almost complete lack of wind riffles on the surface of the water makes Doug's interpretation invaluable, and explains a number of occurences which would otherwise remain confusing.

PHOTO NO. 1

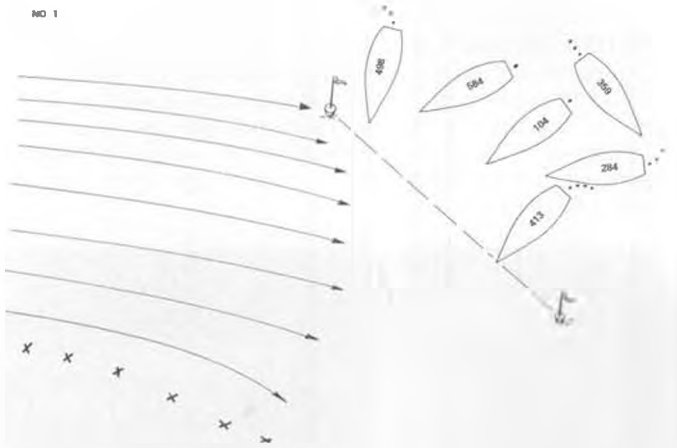
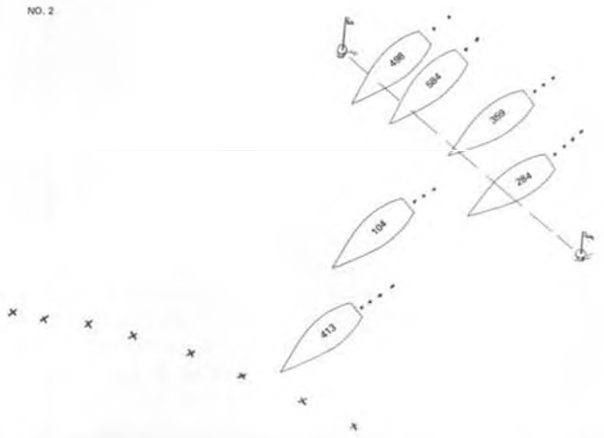


PHOTO 1–"START": At the gun, 413, WARRIOR, with a heart on its jib, has observed the guidelines for a good start, i.e., a) no one to leeward, b) maintaining momentum, c) at the line at the gun. The wind available was definitely stronger near the starboard end of the line, as shown by the wind stream arrows being closer together. There was a definite "edge" to the flow as well as a decrease in velocity toward the port side of the course. Whether the edge was caused by the flow lifting off the water or never moving any farther laterally to port is not obvious to me, however the former seems more likely.

PHOTO NO. 2

PHOTO 2: Every boat has started, and the clear air advantage of 413 is obvious. At this point, the boats like 498 and 584 should have made it very clear to everybody to leeward of them not to tack in their water. This would have to be based on relative speeds, but the tactic should have been to force the whole fleet down into the bad air, and tack yourself at the last minute.



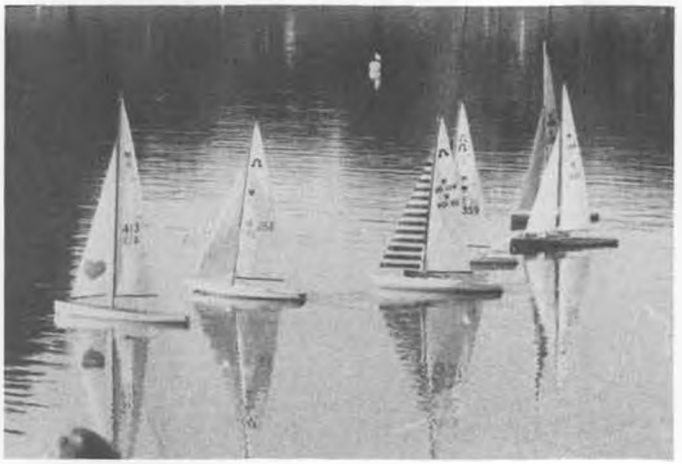


PHOTO NO. 3

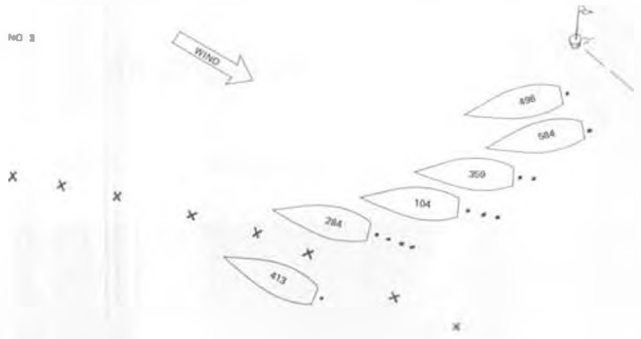


PHOTO 3: Boat 413 was so pleased with his start that he sailed right out of the main wind stream and is now caught in the swirly edge. The three SOLINGS are trying to stay closer to the center of the course, and have been able to tack, gently, but properly, in front of 584 and 498. So no foul could be called by the latter.

PHOTO NO. 4

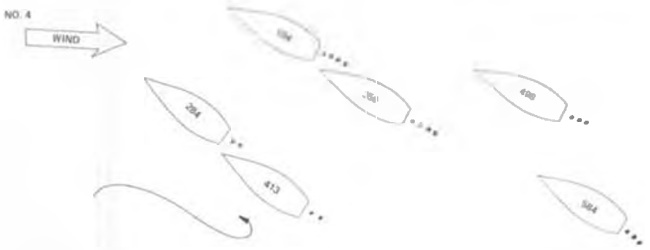


PHOTO 4: Boat 284 has overtaken and passed 413, but in so doing, has herself come too far from the main wind. Both boats seem to be trying to wing their jibs, which can be explained if an errant turbulent puff has put them on a momentary run. Boats 104 and 359 are moving well, and look like they are feeling a gust which has yet to reach the two last boats in the string.

PHOTO NO. 5

PHOTO 5: Boat 284 has reached the gust and is falling off to pick up way. No. 498 is forced to bear off in order to fill his sails with the wind deviated by the SOLINGS in front and to weather of him. Boat 584 is feeling the "snow fence" effect of the boats to weather of him, and it is possible that the wind has not yet descended to his level after having lifted over the other boats. Boat 413 still seems to be caught in the doldrums, but is bearing away to starboard in preparation for the air that he sees the other sailing in.

PHOTO NO. 6

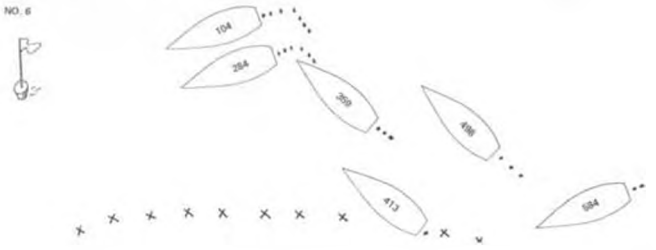


PHOTO 6: The two leading boats have tacked onto the layline, followed closely by the third place boat and 498. Meanwhile, 584 has tacked to clear her air, and 413 is still wallowing on the edge of the main wind flow with no way on. No. 359 is pinching up to get as far to weather as possible in hopes of having an overlap before the two boatlength circle from the mark is reached.

PHOTO NO. 7

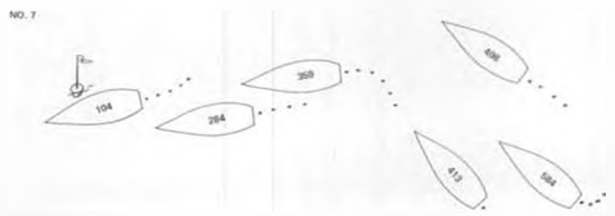


PHOTO 7: Boat 104 is rounding the mark, 284 is following, and 359 has not established an overlap, so will have to keep clear as she rounds. 498 has not yet tacked, possibly due to not having much way on, and the skipper is holding on to see if he can get a puff to help him around. Neither 413 nor 584 appear to make too much headway, though the latter is contriving to overtake 413 to weather.

PHOTO NO. 8

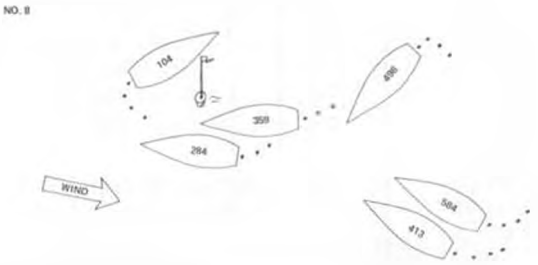


PHOTO 8: No. 104 has rounded and reaching away from the mark. 284 is rounding up and should be hollering for 359 to stay clear, since he had not established a proper overlap. 498 has tacked for the mark, covering 413 and 584, which may have been his strategy all along. And 584 has hardened up and is moving past 413.

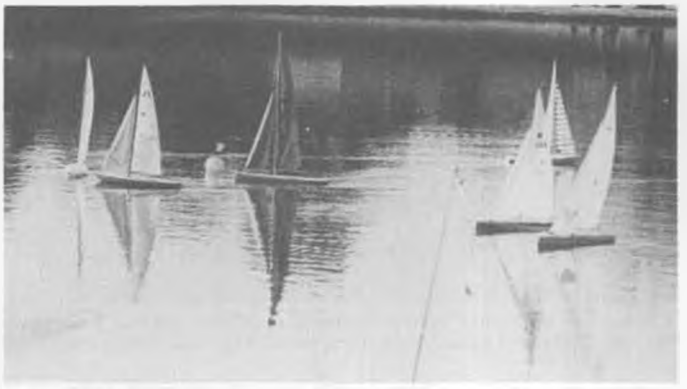


PHOTO NO. 9

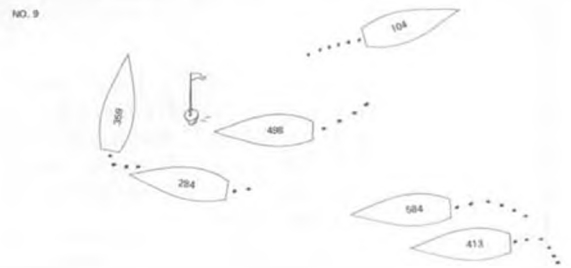


PHOTO 9: No. 104 is long gone, pursued by 359, who has successfully prevented 284 from rounding. For this, 359 should get its 2 foul points. But coming on strong, having sniffed the wind that is pushing 104 so well, is 498, on the lay line and with plenty of way on. 584 and 413 are continuing their ballet, and I can't tell whether they are responding to the local wind, or each other, in their gyrations. I do know that in light air, the only way to get a boat moving is to reach off a bit with the sails cracked, this allows the gentle breeze to make it through the slot and lets the sail shape fill out.

PHOTO NO. 10

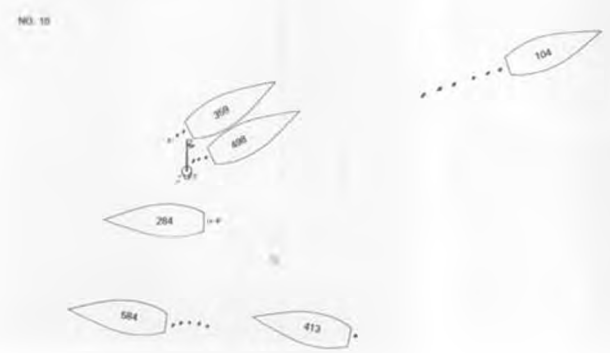


PHOTO 10: Boat 498 rounds the mark and slips inside 359, who is hampered somewhat by a lack of momentum due to her tight turn at the mark. 284 is bearing off in order to pick up enough speed to tack, though she might have been better off to gybe around. 584 has finally filled away and will be in good shape to tack for the mark depending on the future path taken by 284. 413 has fizzled out again, trying to point too high with sails strapped in, and has slowed to a crawl. Doug said that the first three rounders of the weather mark, were all able to get around the leeward mark before any of the other three were able to make the windward mark. This gives an indication of the importance of clear air to boat speed.

Continued from page 98

The completed Dumas Deep-Vee with twin OPS 60 engines. Fiberglas hull was specially reinforced by factory to handle twins. Hull is designed for single 60's, not twins, in its stock form. Watch for future report on running tests.

PHOTOS BY AUTHOR

R/C POWER BOATS

By BOB PREUSSE

• Twin engine boats are not new to the R/C scene. There are a handful of real hydro enthusiasts, such as John Bridge (past I.M.P.B.A. President), who have perfected the twin-engine concept. There is no finer sound in boating than that of John's "Lead Sled", with its whining gear box, as it accelerates down the chute. At the end of last season, I thought the twin concept might prove very interesting in a "Deep-Vee" hull; a design that may prove to be competitive with hydros in the unlimited type races.

The boat selected for this project is the .60 size Dumas scale model competition Deep-Vee. The competition series deep-vees are fiberglas hulled, and come in three engine sizes: .20, .40, .60. Instructions are included in the kit, as well as plywood bulkheads and engine bearers. It is an outstanding boat for the beginner because of the complete hardware kit and excellent instructions. The experienced boater will appreciate its smooth-running characteristics and scale-like appearance.

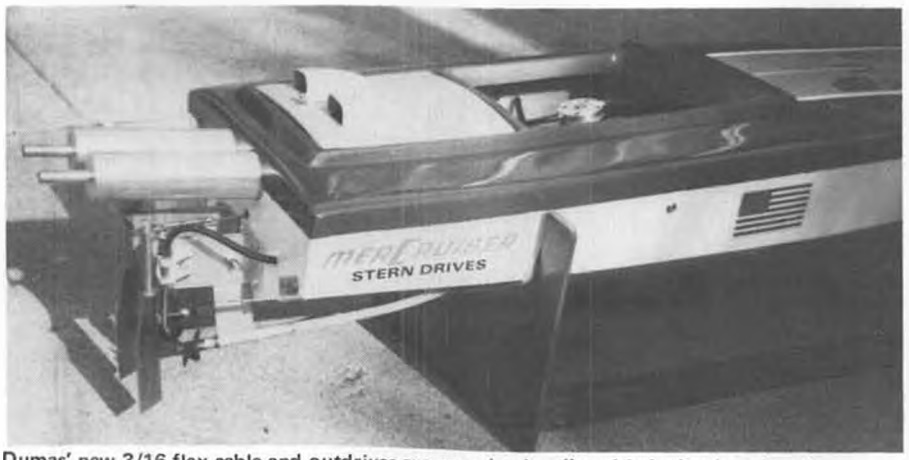
For your information, Dumas Products, Inc., 790 Park Avenue, Tucson, Arizona 85719, has a complete line of fiberglas and wood boat kits, and hardware packages.

The Dumas .60 competition Deep-Vee is 45 inches long, with a beam of 14.25 inches. I felt it would be beneficial to have a custom hull made for this project. Two OPS .60's would be too strong for the standard hull. So, Jay Brandon, President of Dumas Products, provided a special hull with an extra 32 oz. of fiberglas to give the added strength. Furthermore, the added weight is an advantage to a competition boat in the reliability department, provided the boat only loses marginal acceleration out of the turns. I want to make it clear that the Dumas Deep-Vee is designed for one .60 engine, so if you go the twin route, don't blame the manufacturer if you have difficulties. The reason I selected the Dumas boat is that it seems to be the best fiberglas hull on the market that has real potential for handling twin .60's.

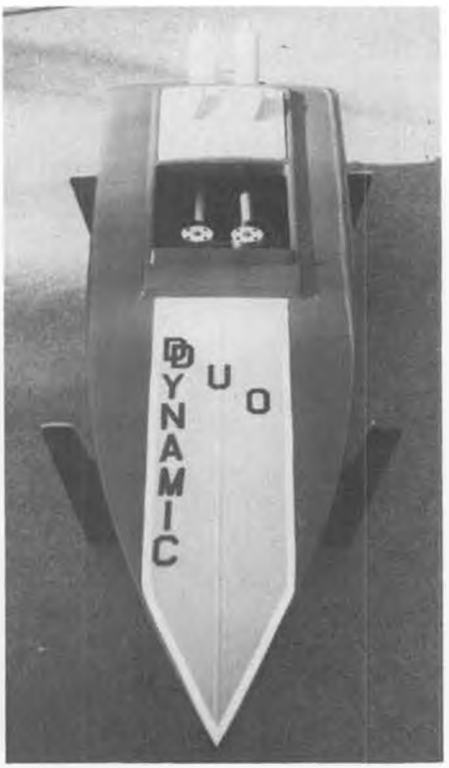
The hardware kit available from Dumas includes their new 3/16 diameter cable and flexible nylon stuffing box.

The outdrive system features an adjustable stainless steel strut with needle bearings. The rudder is mounted on the end of the strut, in a housing with oilite bearings. The best feature in this set-up is the adjustability of your shaft angle and rudder angle. Initially, I will try 3° drive-shaft angle. Also included are: rudder arm, rudder, water pick-up, 8-32 and 10-32 cap screws, washers, and lock-nuts.

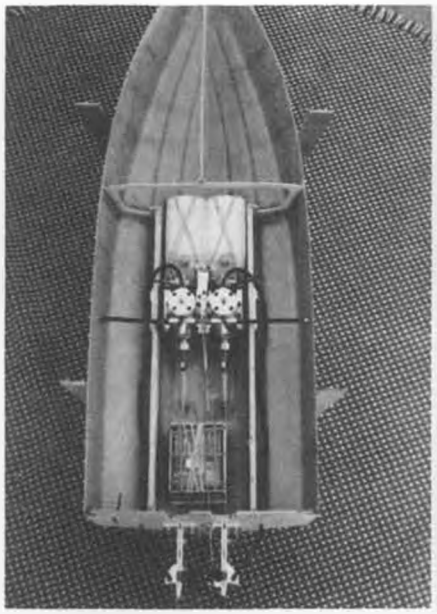
The initial construction is the location and set-up of the entire drive-train,



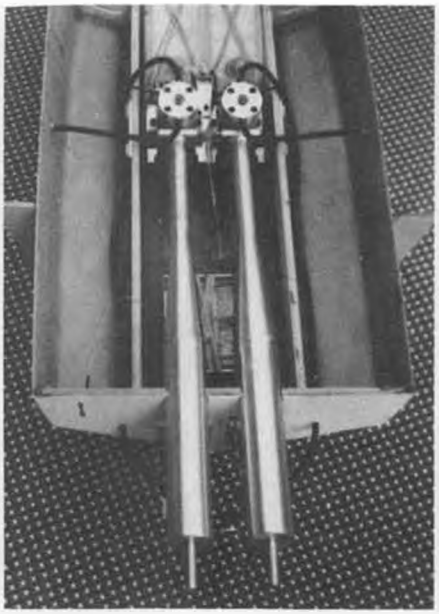
Dumas' new 3/16 flex-cable and outdrives are completely adjustable in depth and angle.



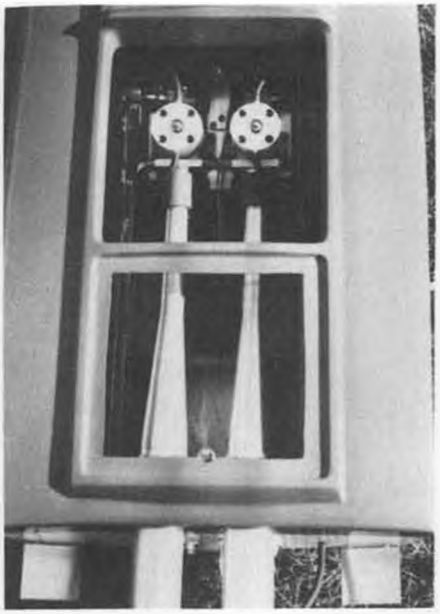
Dumas Deep-Vee 60 is 45 inches long, really ought to move with push from piped OPS's.



Overall view of equipment installation. Radio box offset to facilitate straight linkages.



Close-up shows tuned pipes and water line installations. Manifolds also water cooled.



Pipes run through top of radio compartment. Note International Products stabilizers.

including the engine mount and bearers. The engine mount used was provided by Octura Models, P.O. Box 536, Park Ridge, Illinois 60068. Octura has a new line of extruded aluminum engine mounts for twin-engine installations. The mount I used is unmachined and will accept .20's, .40's, or .60's. Another version is designed for gearing, with the aluminum center section for the jack shaft. The mounts are very sturdy and have a black anodized finish. I found that there is ample material on the ends of the mount to drill and tap for mounting to the engine bearers. Octura's new mount should pave the way for more boaters getting started with twin installations.

The engine bearers are 3/8 inch plywood and extend 22 inches from the transom. Since I installed Dumas' new 3/16 inch cable drive system, the angle of the Octura mount was not critical to the drive train. So the angle of the mount was established to accommodate the exit of the OPS tuned pipes through the uppermost area of the transom.

International Products, Inc., 217 East Washington St., Sunnyvale, Ca. 94086, makes an excellent assortment of pipes, adapters, water-cooled heads, and many types of boat and engine hardware. I installed two of their OPS .60, 12° water-cooled adapters (exhaust manifolds). Since the tuned pipes require about 4° angle to exit through the upper area of the transom, the Octura mount was actually installed with 8° angle on the engine bearers.

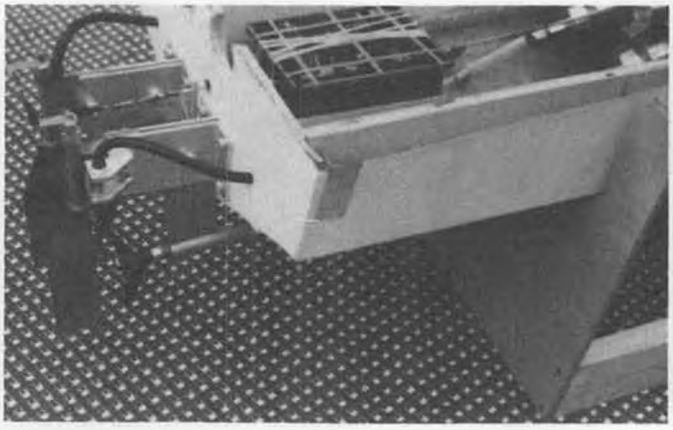
The water-cooled adapters are needed in most deep-vee hulls and closed cowling boats. You do want the tuned pipe to get hot, however, excess heat from the pipe moves right back to the crankcase, causing the engine to overheat. Unless the tuned pipe is exposed to a continuous stream of cool air, you might have problems. Thus, International Products designed a very efficient water-cooled adapter to absorb the excess pipe heat before it returns to the crankcase. Many of the scale unlimited boaters are using the I.P. adapters with good success on the unlimiteds with cowled-in pipes. They also have a 20° adaptor, which could be used if more angle were needed.

International Products is a very progressive company in the matter of boating hardware. They seem to develop new products every month. They have two different .60 pipes. The long-small diameter one is more suitable for deep-vees, as the expansion chamber works better at a lower RPM. The standard .60 pipe is for high RPM or surface prop hydros. They also make assorted tie-down clamps for the pipes, which make mounting and pipe installation very easy.

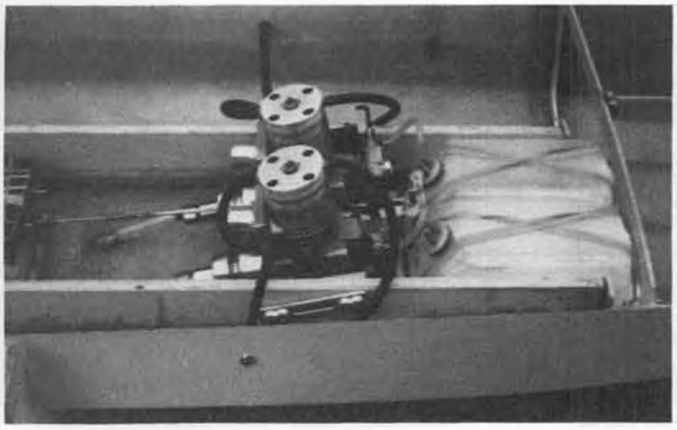
Another new product by International Products is a super-strength, slow-cure epoxy glue that works well on a polyester resin surface. It is ideal for installing bulkheads and wood engine bearers in a fiberglas boat. The glue is not brittle, yet it sands easily. Write International Products for its complete line of products.

The next step in construction is to glass in the engine bearers and front bulkhead. Follow the Dumas instructions on the proper way to glass in the wood pieces. Considering the extra strength desired, I cut the front bulkhead from 1/8 inch plywood. I also installed a lengthwise 1/8 inch plywood deck-

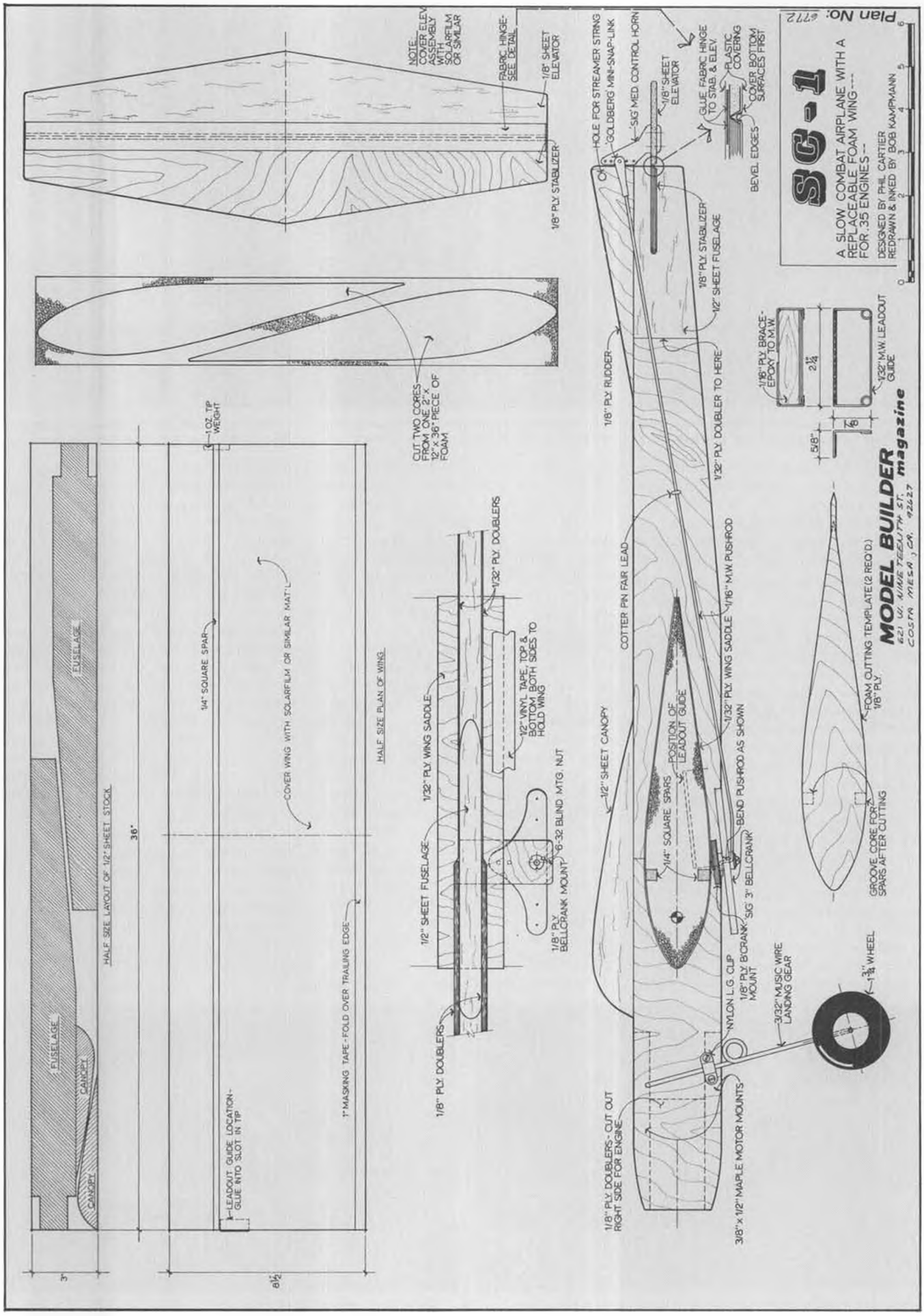
Continued on page 84



Close-up of Dumas outdrives and cooling water lines. Note water-proof box for receiver and servos.



Close-up of engine installation shows flex-cable stuffing box and 16 ounce fuel tanks.


SG-1
A SLOW COMBAT AIRPLANE WITH A REPLACEABLE FOAM WING---
FOR .35 ENGINES--
DESIGNED BY PHIL CARTIER
REDRAWN & INKED BY BOB KAMPMANN
Plan No: 6712
MODEL BUILDER magazine
621 W. MINETEENTH ST. COSTA MESA, CA. 92627
HALF SIZE LAYOUT OF 1/2" SHEET STOCK
FUSELAGE
CANOPY
36"
1/4" SQUARE SPAR
1 OZ. TIP WEIGHT
COVER WING WITH SOLARFILM OR SIMILAR MAT'L
LEADOUT GUIDE LOCATION - GLUE INTO SLOT IN TIP
1" MASKING TAPE - FOLD OVER TRAILING EDGE
HALF SIZE PLAN OF WING
3"
6 1/2"
CUT TWO CORES FROM ONE 2" X 12" X 36" PIECE OF FOAM
NOTE: COVER ELEV ASSEMBLY WITH SOLARFILM OR SIMILAR
FABRIC HINGE - SEE DETAIL
1/8" SHEET ELEVATOR
1/8" PLY STABILIZER
1/2" SHEET FUSELAGE
1/32" PLY WING SADDLE
1/32" PLY DOUBLERS
1/2" VINYL TAPE, TOP & BOTTOM, BOTH SIDES TO HOLD WING
1/8" PLY BELLCRANK MOUNT
6-32 BLIND MTG. NUT
1/8" PLY DOUBLERS
HOLE FOR STREAMER STRNG
GOLDBERG MINI-SNAP-LINK
SIG MED CONTROL HORN
1/8" SHEET ELEVATOR
GLUE FABRIC HINGE TO STAB. & ELEV.
PLASTIC COVERING
COVER BOTTOM SURFACES FIRST
BEVEL EDGES
1/8" PLY STABILIZER
1/2" SHEET FUSELAGE
1/32" PLY DOUBLER TO HERE
1/8" PLY RUDDER
1/16" PLY BRACE - EPOXY TO M.W.
1/32" M.W. LEADOUT GUIDE
2 1/4"
5/8"
1/2" SHEET CANOPY
COTTER PIN FAIR LEAD
1/16" M.W. PUSHROD
1/32" PLY WING SADDLE
POSITION OF LEADOUT GUIDE
1/4" SQUARE SPARS
BEND PUSHROD AS SHOWN
SIG 3" BELLCRANK
1/8" PLY DOUBLERS - CUT OUT RIGHT SIDE FOR ENGINE
NYLON L.G. CLIP
1/8" PLY BICRANK MOUNT
3/8" X 1/2" MAPLE MOTOR MOUNTS
3/32" MUSIC WIRE LANDING GEAR
3" WHEEL
1 1/8"
FOAM CUTTING TEMPLATE (2 REQ'D.) 1/8" PLY
GROOVE CORE FOR SPARS AFTER CUTTING

Author/designer Phil Cartier, with an SC-1. Serviceability certainly exceeds good looks.

Tank is uniflow vented for consistent runs. Engine is home-brew "McFox" 34.

Instantly detachable landing gear has shock absorbing coil for smooth landing in grass.

SLOW COMBAT SC-1

By PHIL CARTIER . . . Combat in any form is a rough game. The best "weapon" is one that is expendable , easily pirated, or quickly repaired.

• The SC-1 is for real combat freaks like me . . . and you, if you're reading this article. The SC-1 is as sturdy, trouble-free, and easy to build as possible. It cuts out many workshop hours of building and re-building practice planes. I was hooked on combat the first match I flew. In my first contest, I flew fast combat over asphalt. Lot'sa luck and a little skill got me second place. Ever since, it's been a tough job keeping enough planes in one piece to fly competition and still get in a few practice matches. Now, with the SC-1, I can save the super-competition eggshells for contests, and still practice.

The main feature of this design is a replaceable foam wing. Ordinary vinyl tape holds the wing in place in the fuselage saddle. It takes only minutes to replace a mangled wing. As a bonus, the foam wing is much easier to build and lighter than a balsa wing. The weight and time saved go into making the fuselage as crash resistant as possible.

The fuselage has nearly full-length plywood doublers. Slow combat planes always break just behind the wing, so it makes sense to reinforce this weak spot before the crash. The motor mounts extend forward nearly to the propeller. This helps protect the engine and keep it out of the dirt. The external controls don't look too neat, but they're very practical. After a crash, it takes only a glance to check out the controls and spot any damage.

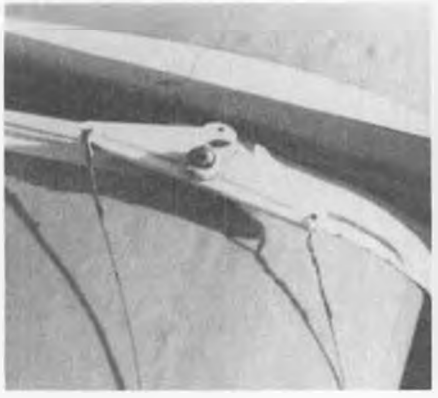
I'll frankly admit, the SC-1 is not the flyingest slow combat design. A Mongoose or a Spider will go a few MPH faster, and turn a couple of feet tighter. They also are expensive to build and break into many, many pieces in a crash. The SC-1 has it all over them in consistency and durability. Half-a-dozen people in our club have built SC-1's. They all fly the same, and they keep on flying long after the super-competition jobs have bitten the dust. So, build a couple of SC-1's for Sunday afternoon dog-fightin', and get the practice you need for combat flying.

A couple of the pictures show a unique slow combat engine, a McFox 34! I had a Fox 36 which ran well, but vibrated terribly. A McCoy 35 sleeve was turned down to fit into the Fox case. A new head with a squish band and a cone-shaped combustion chamber was turned out, along with a new rod. The piston is stock McCoy, with the skirt filed slightly to clear the crank. It has the low vibration of the McCoy and the light weight and good power of the Fox. Since I wasn't sure it would even run, I'm really happy that it's turned out to be one of my better slow combat engines.

I'll just highlight the key points in the construction. Most of the building is conventional and not critical. Just do whatever you are used to for things like horns, hinges, glue, tank mounts, etc.

Start construction with the wing. You'll need it to work on the fuselage. Either learn how to cut foam, or find someone to do it for you (Wing cores and complete kits for the SC-1 are available from me on a first-come, first-served basis. Write Phil Cartier, 3314 Russell Ave. N. Minneapolis, MN. 55412, and send a stamped, self-addressed envelope for details). Foam cutting isn't difficult. It just requires some practice, and a couple of pieces of special equip-

Continued on page 83



Extremely simple outside bellcrank mount.

Leadout guide. Leadouts can be threaded through when changing wing.

Looking a bit ratty after a full season of combat, this SC-1 is still ready to go, upon call.

Team Manager of the "Flying Tigers", Roger Spindler, holding one of Ed Bridant's planes. Pits for son Mike, and other Tiger members.

George Cleveland (with plane) and crew prepare for match. Gift wrapping paper, applied with paste, over foam, is latest Combat rage.

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY AUTHOR UNLESS NOTED

• This feels really strange. For the very first time since I started doing this column, I'm sitting down to type at ya' and don't have a jillion things to write about.

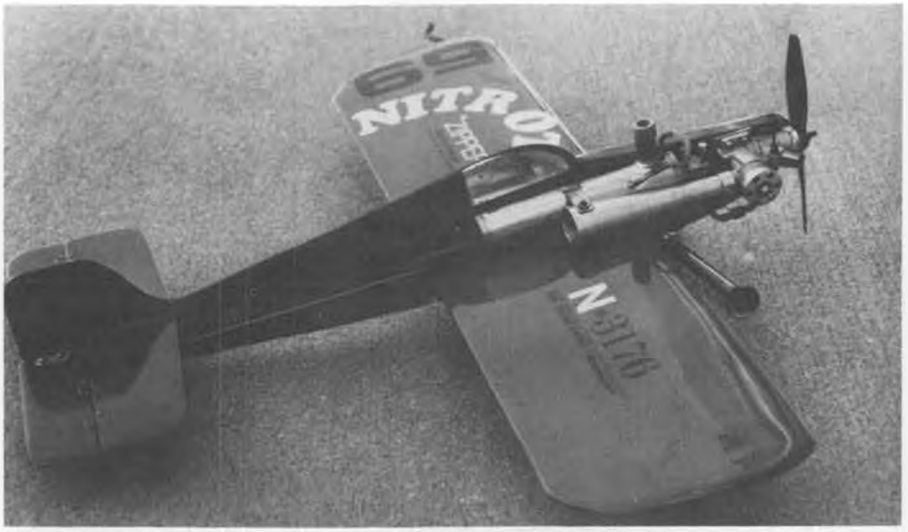
It's not that there isn't anything significant happening, or that I'm running out of material, it's just that I've been very busy with my job lately, am getting ready to move into a new house in two weeks, my car died the other day (the 223,000 miles showing on the speedo may have something to do with that), and we are in the Combat season hot 'n heavy already . . . and me with only a couple of competitive planes around presently.

So I just haven't had time to think out what to put into this column. No problem, let's just talk about a couple things that quite frequently bother me.

First up is the common comment "First I flew some F/F, then moved up to C/L, and finally graduated to R/C". You wouldn't believe how that gets to me . . . or used to. That kind of statement used to bother me, but then I started noticing that the people uttering such ridiculous utterings actually didn't know anything at all about either F/F or C/L. When these people are questioned, it usually turns out that their total involvement in F/F was a

Pat Willcox, '76 Nats Combat CD, gives the impression that it wasn't much fun at all . . . which is probably the truth.

Mike Tallman must be tuning engine or he'd be long gone by now. "Good ol' boy" Marvin Denny. All pics on this page by Rich Lopez.



Bill "Moose" Allen's "Badyear" . . . a Kilsdonk designed "Zipper". FV Rossi with megaphone, Rat tank, titanium gear, Kilsdonk shut-off, Kelly glass prop, Hobbypoxy paint and deco by Bill.

1/2A Gas they never did get to fly right, an HLG that wouldn't transition properly, or some Scale rubber-power piece of foof that would better serve as a paper weight, rather than as an example of one's "mastering" of a very difficult phase of model building.

Their background in my favorite way of flying model airplanes is just like their F/F experience . . . they haven't even scratched the surface, let alone mastered it enough to be able to claim they have "graduated" to anything but ignorance. In C/L, they have probably flown a Cox R-T-F (Plastic Nasty), or a Lil' Wizard. Maybe they have "gone all the way" (?) with a .35-powered profile Stunter that got smashed on every other flight while they convinced themselves it was impossible to fly upside down, and that anybody claiming to be able to do so was a liar.

I have done a considerable amount of F/F building and flying myself, and although I have had some success at it in both contest work and in good ol' sport flying, I hardly feel that I have mastered it. And even if I did feel I had mastered the F/F events, I would hardly regard F/F as a stepping stone to either C/L or R/C. F/F is a style of model flying that is complete within itself, and one that still absolutely fascinates me. I continue to be as involved in F/F as I can be, and am no stranger at F/F contests held here in the N.W.

I guess the bottom line for me and F/F is that I have done enough of it to recognize that it is a very difficult, challenging, and exciting way to fly models . . . and that I will never completely master it, so it will continue to be very interesting to me.

Shucks, I'll go ahead and say it right out. F/F modeling, without a doubt, incorporates more of the true model builder's techniques (building skills, flying skills, etc.) than any other branch of modeling. That ought to make Stalick happy, even though that is not the intent of this soap-box stompin'. With F/F being so full of challenges, why is it that people make the "I moved up to . . ." statement? I don't know why either. A more honest thing to say would be that their interests changed, and I can accept that, as we are all individuals and one type of modeling can hardly satisfy everybody.

As F/F can't be the end for everybody, neither can C/L, but I'm all for eliminating this "lower class" stigma that has been assigned to C/L flying in general. As mentioned in the past, I'm involved in many modeling activities and am very familiar with all aspects of F/F, C/L, and R/C. For me personally, I have found C/L flying to be the most enjoyable by a long way, and C/L Combat in particular to be the most demanding of all C/L events. So I concentrate on Combat, not because it is regarded as the ultimate by the masses, but because I like it best.

And many fans of C/L flying feel the same way. They've tried other events and hobbies, but have found their niche in C/L Stunt, Racing, Carrier, Combat, Scale, or whatever. The important point here is that many C/L fliers are not working their way up some magic ladder that has R/C in blazing neon letters placed at the top. Indeed, the majority of true C/L enthusiasts feel they are already at the top of the ladder, basking in neon light from the letters "C/L", as they look *down* on the ninnies out doing their R/C thing. Of course, this is just the type of attitude I am against, so I won't expand further upon it, but it would certainly shock many R/C people to know how many C/L fliers have tried R/C only to find that C/L is where it's at *(to them. wcn)* and come right back to it, or at the most, to occasionally fly R/C for Sport, coming back to C/L when contests, honkin' motors, beautiful airplanes, sophistication for the sake of sophistication, and the undefinable thrill of controlling a model with a direct, physical connection that gives instantaneous response, allowing one to more fully control his model than will ever be possible with a magic box, calls out to them. *(What'd he say! wcn)*

Just like you, I read the mags from cover to cover, and isn't it funny all the development and marketing that goes into the latest, super-zoot radios that offer fast servos, smaller servos, better stick action, more proportional control, etc? The C/L flier already has a control system that is faster, more proportional and smaller than anything that will ever be devised for R/C. When flying C/L, you are in direct control of the model with a control system that is proportional to the ultimate and as quick as you are. A magic box, stuck in-line someplace, removing the wires, can only

Continued on page 80

Arlie Preszler's stunt ship has switchable landing gear to suit surface. This one's for grass. Access hatch is in his left hand.

And here's Arlie's hard surface landing gear for the stunt ship. Very neat. Arlie to stunt CD at '77 Nats, we believe.

The "Spirit of St. Louis II", reproduction belonging to the San Diego Aero-Space Museum. In this photo by Warren Shipp, it stands at Lindbergh Field, San Diego's commercial airport, not very far from where the original "Spirit" first flew.

ON LOCATION WITH THE "SPIRIT II"

Actor/Pilot Cliff Robertson stands in front of the "Spirit II" for Bill Hannan's camera.

• Late in April, we were privileged to attend the filming of a special documentary, commemorating the 50th anniversary of Charles Lindbergh's solo transatlantic flight. Standing in for the original aircraft was the "Spirit of St. Louis II", star of the famous San Diego Aero-Space Museum collection. Constructed by Tallmantz Aviation, this machine was purchased by the citizens of San Diego, where the first "Spirit" was fabricated, back during 1927. For about eight years, it has reposed quietly, the center of attraction for thousands of visitors to Balboa Park, where the museum is located.

However, its long retirement was interrupted when American Airlines decided to sponsor the commemorative film, at nearby Lindbergh Field. The

Cliff Robertson interviewing John Van der Linde, Chief Field Mechanic for Lindbergh's original "Spirit", while standing in front of "Spirit II".

"Spirit II", was dismantled (itself a formidable task), removed from the museum, and delivered to the airport. In charge of this task was antique aircraft and engine specialist, Jim Appleby. Jim played a role in "The Great Waldo Pepper" movie, and now produces World War I aircraft reproductions at Flabob airport, near Riverside, California.

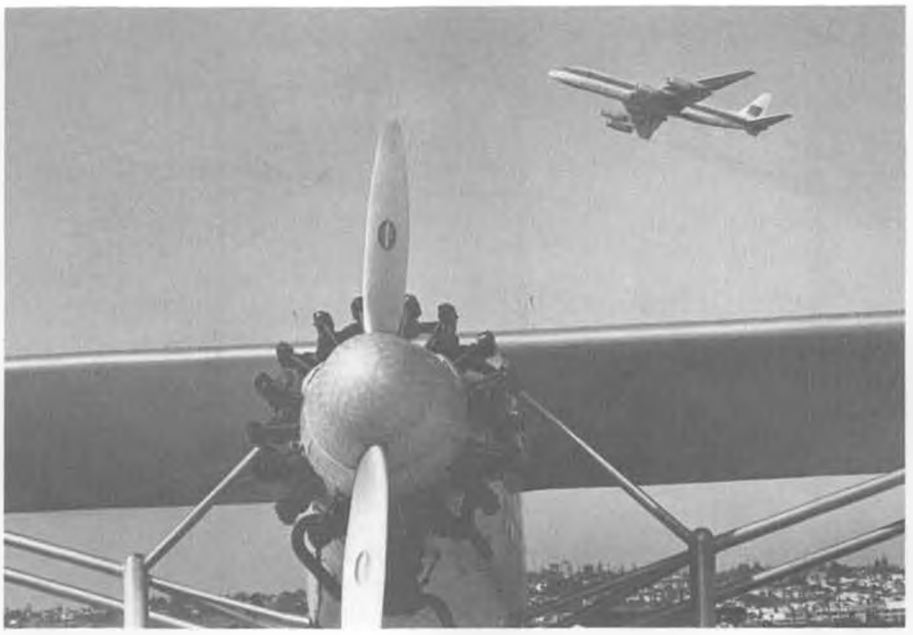
After the production crew arrived with their equipment, filming . . . or more accurately, electronic taping, began. Narration duties were ably handled by actor/pilot Cliff Robertson. In addition to being an enthusiast, Cliff has his own collection of aircraft, which includes such exotic machines as a Spitfire, so his choice to conduct this show was a logical one.

Representing the original "Spirit", was John Van der Linde, who had been the chief field mechanic for Lindbergh's aircraft, and he proved a fine conversationalist, while being interviewed by Robertson. Conditions were difficult, since the regularly scheduled jetliners, which land and depart every few minutes, simply overpowered the sensitive recording equipment, causing the need for many retakes. We gained a fresh appreciation for the amount of patience required in the acting profession. The hours are long, the standards meticulous, and the number of variables involved almost overpowering at times. Yet, Cliff Robertson not only remained calm, but made it a point to assist Mr. Van der Linde, as well.

Between takes, we had a chance to talk with Cliff. He said that during his boyhood, he had lived in nearby La Jolla, and frequently bicycled to Lindbergh Field to "hang around and watch" the many activities taking place. And we were delighted to learn that his early interests included the building of solid and rubber-powered model airplanes! When asked if he would like to fly the "Spirit II", he replied "I'd love to!", without a moment's hesitation. However, Colonel Owen Clarke, Executive Director of the Aero-Space Museum, pointed out, that while the aircraft was able and the pilot willing, insurance for even a single flight would have cost about $100,000! A disquieting comment upon today's economic state of affairs.

The next "take" involved placing the "Spirit II" in front of an American Airlines DC-10, especially diverted for the occasion. We assumed some pushing would be involved, but no, to our astonishment, Appleby and his crew simply propped the long-dormant Wright Whilrwind engine, and it started immediately and ran smoothly, except for slight popping upon acceleration. Incidentally, this particular powerplant is actually older than that of the original "Spirit", making its willingness to run all the more remarkable.

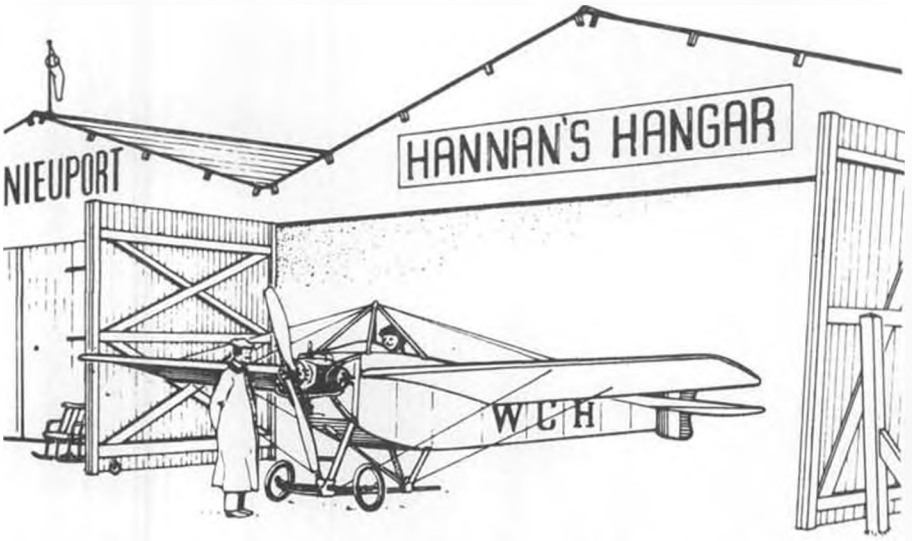
Cliff Robertson was given the opportunity of taxiing the machine for a short distance, an experience guaranteed to bring out the Walter Mitty in any enthusiast! The close proximity of the DC-10 seemed to shrink the size of the "Spirit II" dramatically, and provided a striking demonstration of progress. Yet, it was the "David" that easily commanded the most interest and respect, as compared with the "Goliath", and we were amused to hear one of the production crew say "O.K., we're finished with the DC-10, take it away."



Brief summary of 50 years of aviation in one photo by Bill Hannan. Actually, the continual air traffic made the interview session a series of numerous retakes. Present doesn't stop for Past.

This is only a portion of the crew and associated paraphernalia assembled for the production of the short special documentary commemorating the 50th anniversary of Lindbergh's solo flight.

Warren Shipp's camera catches our "on-the-spot-reporter" in the act of catching Cliff Robertson and John Van der Linde during their interview. Cliff was allowed to taxi the "Spirit II".



. . . . If you improve a model enough, eventually it will crash!

WONDERFUL NEWS!

We are very happy to report that prominent Frence model builder, Jacques Pouliquen, previously thought to have died, is in fact, very much alive. Evidently, since he had been in a prolonged coma, and virtually given up for lost, an error in translation gave the impression that he had passed away. Although still unable to speak, he has recovered to the extent that he is able, with help, to walk. We are certain that his many international friends wish him all the best, and an early return to his favorite hobby!

PLANES OUTPULL POLITICS

About one million spectators have visited the National Air and Space Museum of the Smithsonian Institution since its opening in July of last year. By comparison, only about 170,000 have visited the White House.

CO_2 UPDATE

Our article about CO_2 engines elicited a surprising reader response, and a number of new inputs. Phil Koopman, a marketer of the British "SHARK", points out that the engines are now furnished with mounting screws, and in the absence of factory oiling instructions, Vintage Aero is supplying its own information sheets.

Engine expert Peter Chinn, writing in Aeromodeller, states that his test example SHARK had a measured displacement of .0764 cc, somewhat larger than that of either the single-cylinder Brown or the British TELCO.

We had criticized the thin wrench supplied with the TELCO, and are pleased to report that a thicker tool is now being supplied, which should make speed adjustments easier to perform.

Several clubs have added CO_2 events to their contest calenders, including a number of INDOOR categories. Indoor scale CO_2 classes seem to have originated some years ago with the Las Vegas Vultures, and have proven more popular as engines became more readily available. The newly-formed "Scale Staffel", of San Diego, has proposed tank size limits as follows: 3.3cc maximum for single-cylinder engines, and 6.6 cc for twins. Both scale and non-scale events are scheduled.

NEITHER RAIN NOR SLEET, ETC.

We had expressed surprise that no photographs appeared in any of the magazines of Tom Stark's electric-powered Fokker, which won free flight "gas" scale at last year's Nationals. Two

Very practical trophy awarded Walt Mooney by the Camarillo Flying Circus for CO_2 win. Engine instantly removable for use in model.

readers wrote in to explain . . . Russ Brown: "The reason for no F/F scale photos was the lousy weather. Dark, gray and rain."

And Frank Scott agrees: "In defense of the magazine (photogs), I must say that I would not have taken a camera out into that weather . . . it was raining so hard that even in the CL Mouse Race circles, a lot of gas engines just wouldn't keep running (Except for my son Chris' win, it would have been an awful day.)"

CORRECTION!

And speaking of last year's Nats, Rolfe Gregory took us to task regarding the Lacey M-10 win records. Seems Rolfe's M-10 placed First at the '76 Nationals, not Second, as reported. Sorry!

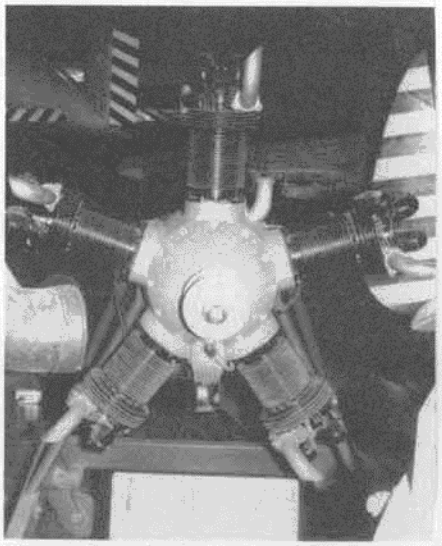
DEARBORN RECOGNIZES MODELS

A recent Ford Motor Company advert for Maverick autos features two model aircraft. A family of four are pictured with a typical VTO type free flight gas job, while in the background, a young

Continued on page 96

Scale model builder Cedric Galloway with his original DeForrest one-tube radio, still working properly after 50 years.

"Two Relics" (caption by Mrs. Carl Goldberg). Original "Whizzer" C/L model, designed by C.G., control design by Louis Garami.



Kinner K-5 engine in the San Diego Aero-Space Museum. Meteor stacks curve up and over the space between rocker boxes.

This little ship has all the requirements for being an excellent flying model, lacking only the unpretty barn-door wings of the Lacey and Fike, with the obvious increase in area.

PHOTOS BY AUTHOR

GENERAL WESTERN P-2-S "METEOR"

By AL LIDBERG . . . Here's a model that should fly well no matter what size you build it. So after you finish this peanut version, why not blow the plans up to the old Jumbo size?

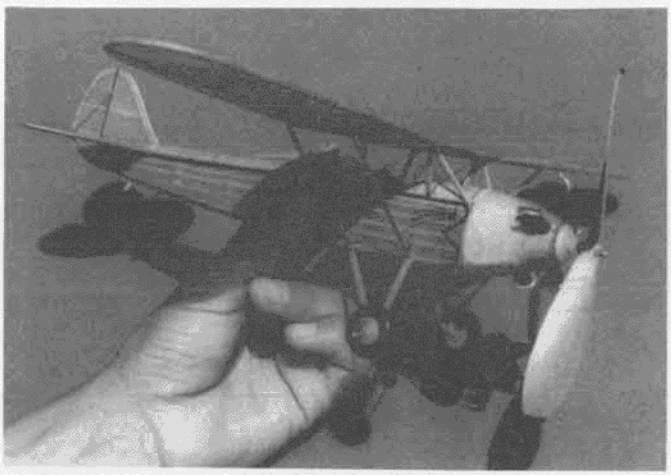
• Born in Burbank, California, in 1930, the General Western P-2-S Meteor is a rare but nicely proportioned plane which did not survive the depression. It carries the lines of that short-lived breed, the sport parasol. Only 6 planes were constructed, so it is not too surprising to learn that none have survived. The Meteor makes a fine model subject and an especially fine Peanut scale project. Each plane carried the Kinner K-5, so we have a chance to model a simple radial engine which does not require a great amount of time, but adds so much to the model.

A number of scale references are available concerning this plane. They include MODEL BUILDER, Nov. '74 and AIR CLASSICS, Oct. '75; both of which contain photos, history and Peter Westberg drawings. Details on the Kinner engine are not that easy to find, however, as most magazine photos of engines are not too clear. Fortunately, I did locate a book reference, the AIRCRAFT YEARBOOK FOR 1937, which included a general shape and dimension drawing. Soon after, I found a Kinner K-5 engine on display at the San Diego Aero-Space Museum. More recently, MODEL AVIATION, June '76, published an illustration of instrument panels probably used in the Meteor. Based on that arrangement, I cut some instrument faces from advertisements, rubber cemented them to an oval drawn on paper, and then reduced the size, using a Xerox machine.

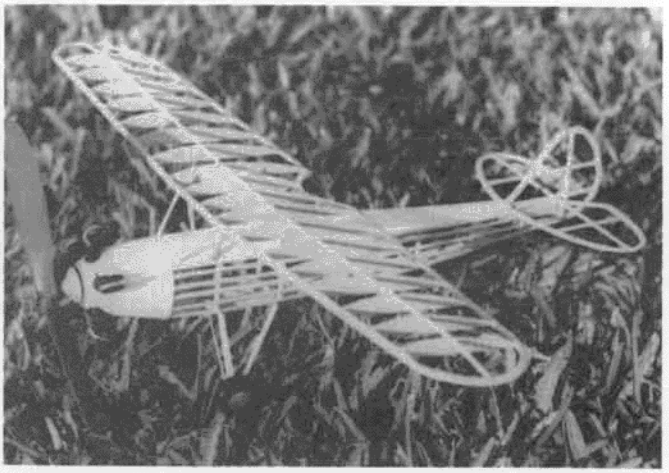
Construction of the Meteor is fairly conventional, but there are a few opportunities to try out some new methods and materials. The fuselage is made from 2 side frames built up of 1/16 sq. balsa, joined on the bottom by crossbraces and on the top by formers. Add the side and bottom formers near the nose and then cut out the side and bottom stringers. You'll find it easier to attach the landing gear to the fuselage before gluing on the stringers, so go ahead and bend the 2 wire landing gear parts to shape. The main gear wire is glued or epoxied behind the upright near former B1g, and the rear legs are attached just in front of the next aft crossbrace. Bind the gear wires together near the axles with thread and epoxy.

The bottom and side stringers may now be added. When dry, the stringers should be sanded (in a lengthwise direction), maintaining the basic egg shape shown by the formers. The

Continued on page 89



Propeller size is not the greatest for takeoffs, but sure does a lot for the flight performance of this cutie parasol.



"What are you doing in that cornfield!?" Framework photos are best taken on a smooth background, as this photo proves.

Scrap balsa lift strut mounts

Main strut sockets

(double size)

Sec Wa

Reg. no. 3/4 high, 1/2 wide

Spar 1/32 x 1/16

Leading edge 1/16 x 3/16

Wa Wa

1/16 sq.

Laminate flying surface curved edges from 3 layers of 1/32 x 3/32

Trailing edge 1/16 x 3/16

1/32 Sheet

Strut rib – trim from T.E. to fit others.

Pin for motor peg

1/32 Ply

Nylon bearing

Side stringers – cut 8

Bottom stringers – cut 3

Balsa cyl. head

front

Double size

1/16 alum tube stacks

Williams 3/8 scale cyl

1/32 x 3/32 Bamboo

Cylinder locations

True length of struts

NC12294

A B B B B B C D E

C.G.

Wooden nose button

As Bs

Ab Bb Blg

Lift strut base

File card fairings

Balsa

Bamboo

A B C D E

Rear ldg. gear

Side view

.015 wire

Main landing gear

Extends to aft end of rudder

METEOR

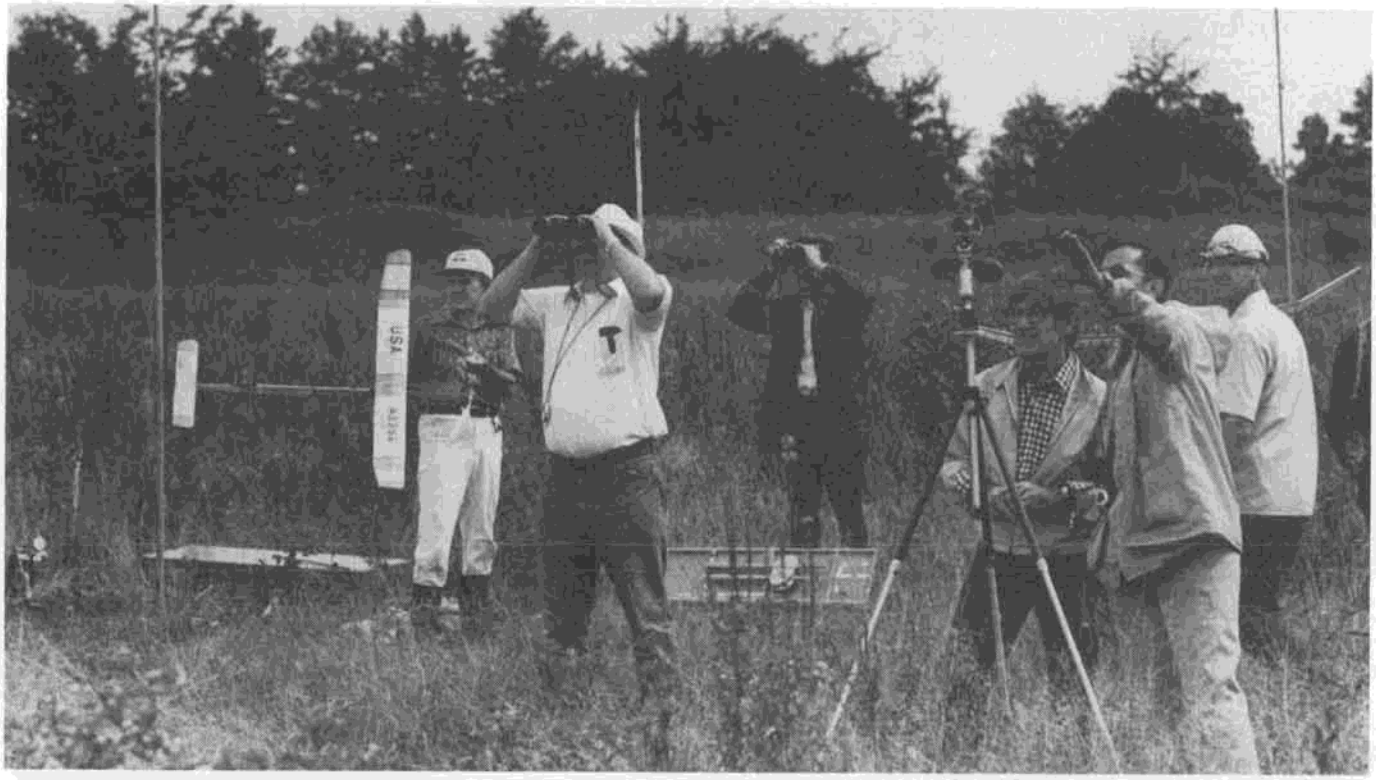
Instrument panel

Side markings

Peanut Scale
GENERAL WESTERN
1930
METEOR

DES. & DRN. by
A. A. LIDBERG

7/76



"Well, we THOUGHT we were watching your plane, but it just landed on a TV antenna and started cleaning itself!" PHOTO BY BOB GUYLAS

FREE FLIGHT

By BOB STALICK

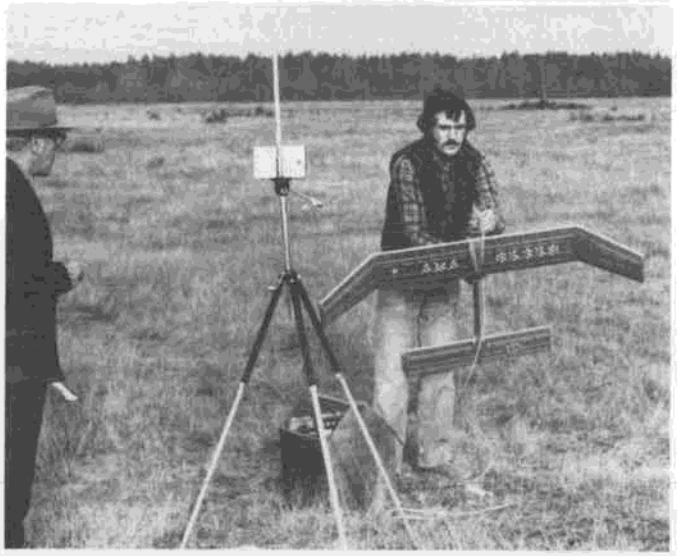
• So, there you are looking out the window at the sunlight, wondering where the winter went . . . with all of those plans you had made to get yourself ready for the flying season. What did you accomplish last winter. Part of a gas model fuselage get finished? How about that stack of A/2 ribs in the corner of the bench? Well, it's June, and maybe the best thing to do would be to dust off those models from last year (or were they built way back when?). It's not too late to finish them up. But get with it. Speaking of getting with it, let's do.

DARNED GOOD AIRFOIL: Gard-6509

Whenever you take a look at the Wakefields in use today, it is not uncommon to run across the note: "Gard Airfoil." John Gard has apparently developed a section which is much in vogue, as well as very successful for today's highly developed rubber models. In looking back through some older Free Flight Digests, I happened across this airfoil and thought that the readers would enjoy some of the comments which John submitted to NFFS.

". . . The dual turbulators have proved beneficial in reducing sink rate and giving greater latitude for trimming to lowest sink without experiencing abrupt stalls when the section is upset by gusts or turbulent conditions. I first used the section on my A/2's, with the dual turbulators, in 1964. Performance was so improved I decided to build my Wakes using the same section with the chord reduced from 5-1/2 to 4.32 inches. I was not disappointed in this decision. Frank Parmenter and Fred Pearce used this

Ron McBurnett (see item about rib-cutting jig) preps his all sheet balsa 1/2A design which is heavily influenced by current FAI trends.



Dennis Rauschert tunes the Rossi in his Rambunctious prior to a official at the Misery Meet. John Mace stands by with stop watch.

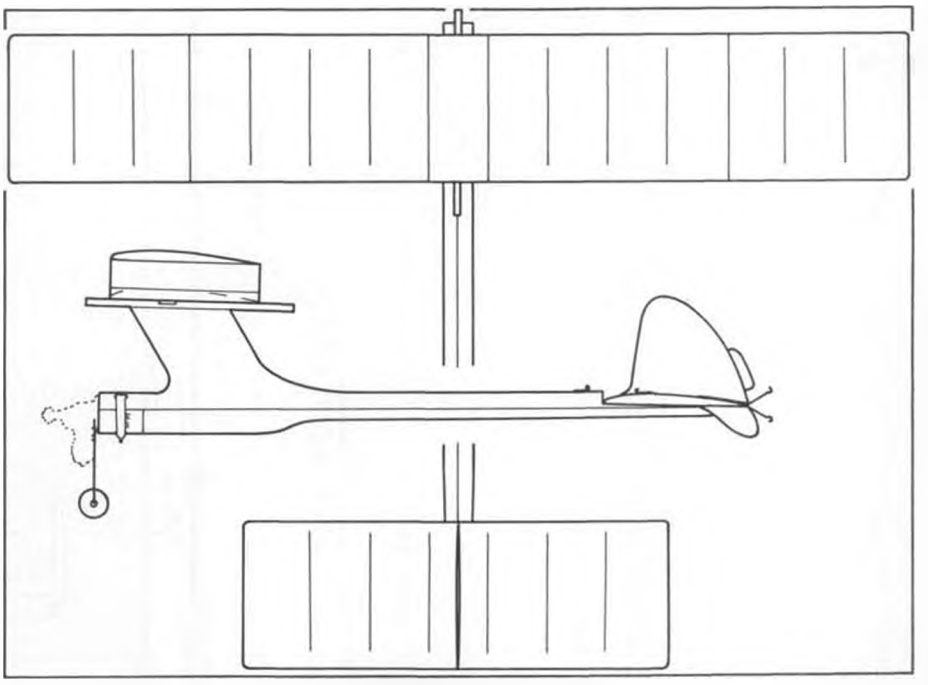
section and the dual turbulators on their No. 1 Wakes which they flew at Albuquerque. Both were convinced the section was an improvement over any other section they had used.

"The key to the combination is the addition of the second turbulator positioned on this airfoil at "t" max. It evidently trips the boundary layer again after the air reattaches to the section between the first turbulator and second turbulator, thus delaying separation from the upper surface and limiting center of pressure travel. This could explain improved performance and the docile stall characteristics of the section."

So, there you have it . . . one of the better Wakefield airfoils in use today. Give it a try on your next one.

JUNE MYSTERY MODEL

Here it is, one of the earliest of the 1/2A models. Sporting a Cub .049, it was descended from a long line of larger and very successful free flights. Identify this model and send your answer to Bill N. (gracious editor), and he will reward you with an honest-to-gosh **Model Builder** goody.



JUNE MYSTERY MODEL

JUNE THREE VIEW . . . Susie II

The Northwest's Ernie Linn has been flying models for quite a long time, first as an active Midwesterner, and more lately as an active member of the Boeing Free Flight Hawks. Although at first glance the Susie II would look to be similar to the Starduster, it is somewhat different in the use of the under pylon for added stability, and the use of the Texas style wing and stab rib construction made popular by Dick Mathis. This style of wing construction allows for a light but rigid structure, while being easy to construct. So, if you are one of those people who procrastinated the building projects through the winter months, try the Susie II. With a bit of Hot Stuff and a week on the building board, you could have this one ready to go next weekend.

SPAR LOCATIONS IN FREE FLIGHT WINGS AND STAB

In a recent issue of the Satellite, edited by Ralph Prey, he presented the following explanation. Study Sketch 1 while reading the explanation and it will make more sense.

"Being a scratch builder by nature, I have, through the years, come upon many ideas by observing how other well known scratch builders try to make the most efficient use of the balsa wood in the structure. I thought you would like to benefit from my observations and also think about some of the ideas of such well known builders as Sal Taibi, the Hunters, Toshi Matsuda, Larry Conover, Carl Wheeley and others . . . so look at the sketch and I'll run it through the gears.

"A. Try to make spars using a combination of different sizes to make a "T" shape. One piece can even be spruce, laminated with Hot Stuff. If a "T" shape would give you problems at a dihedral joint, then make an "L" shape which will give one flat surface for doublers.

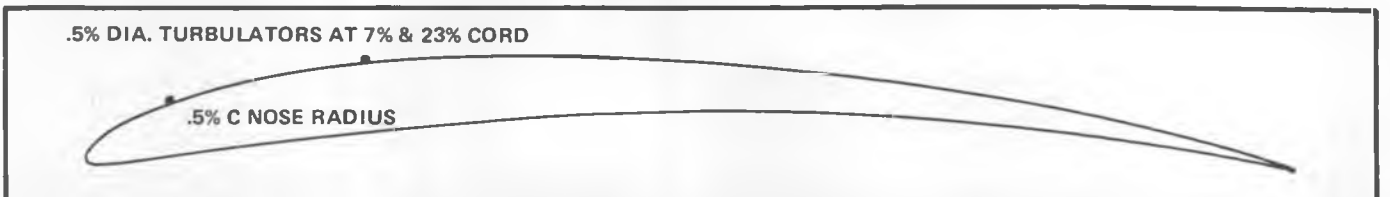
"B. *Avoid* a single large cut-out in a rib for a spar. Invariably the rib will open up at the cut out when the surface is covered and taut by the doping process. This will result in an uncurable warp.

"C. Make all cuts exactly the same size as the wood used for the spar. You will note that the cut-out shown is not square to the size of the spar, and there

PHOTO BY DAVE LINSTRUM

David Hartman, David Hartman, with his "Square Eagle" P-30, with which he took 1st in Jr. Unlimited at KOI meet last December.

DARNED GOOD AIRFOIL – G-6509

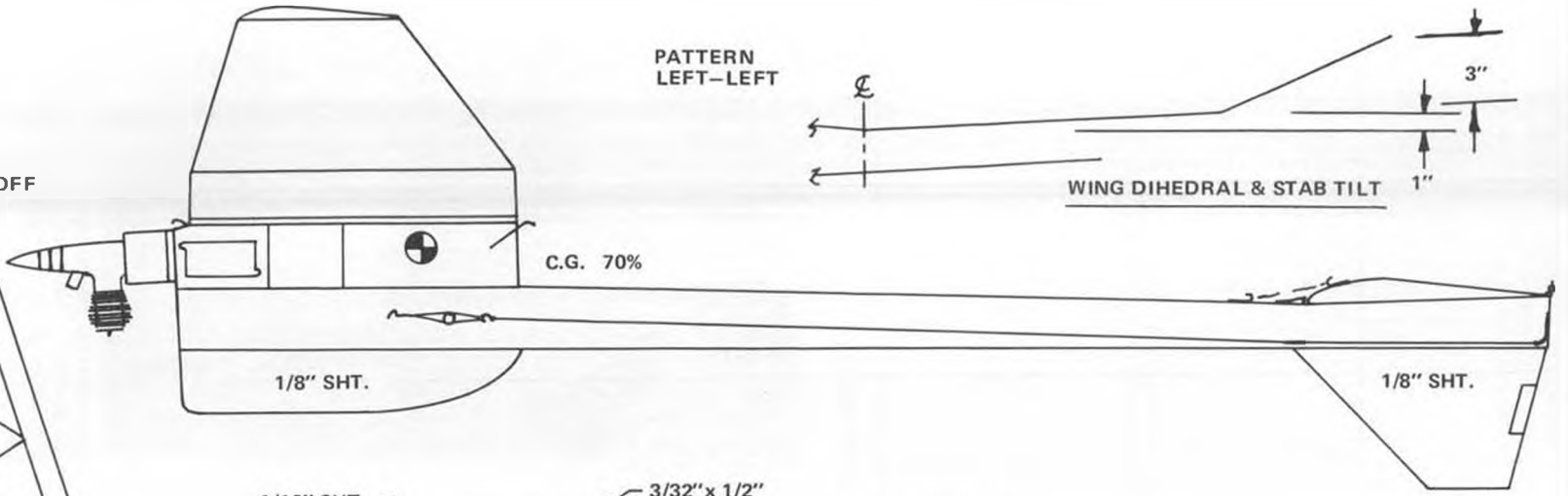


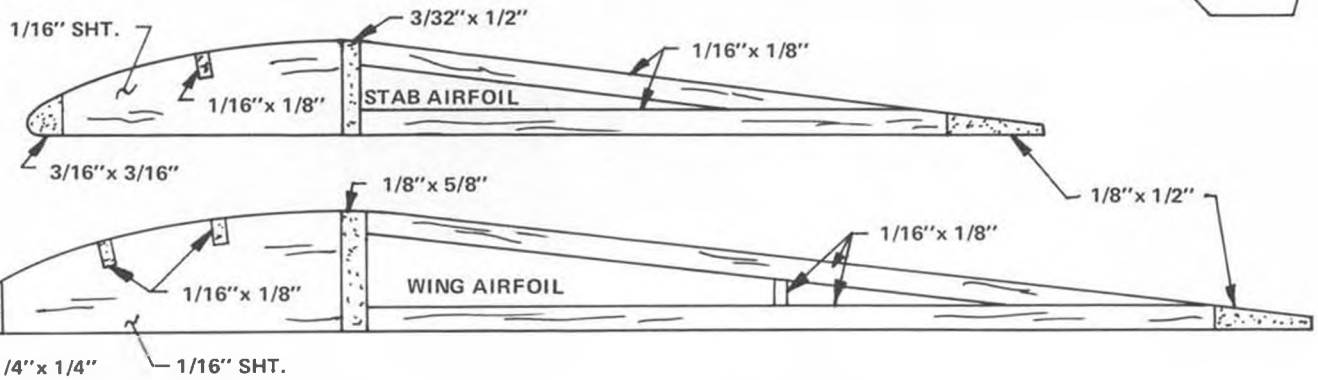
STATION	0	5	10	20	30	33	40	50	55	60	70	80	90	100
UPPER	0	4.2	6.1	8.25	8.95	9.0	8.9	8.45		7.6	6.25	4.7	2.75	0.4
LOWER	0	0.6	1.2	2.3	3.25		4.0	4.35	4.4	4.35	3.9	3.0	1.75	0

WING INCIDENCE - 0°
STAB INCIDENCE - −2°
THRUST - SIDE 0° DOWN −3°

PROP 6-3 COX
TIMER 1/2A TICK-OFF

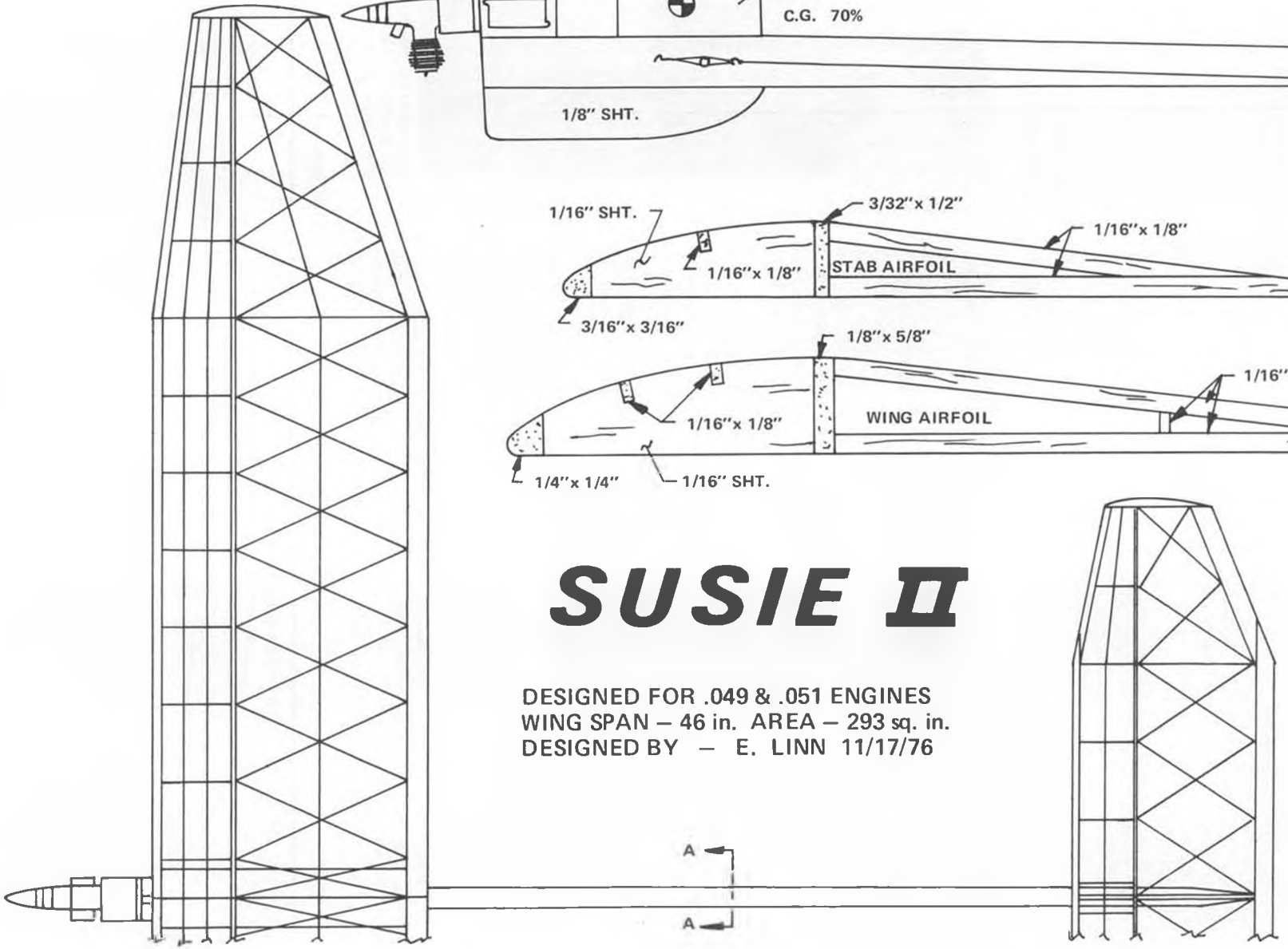
PATTERN
LEFT–LEFT

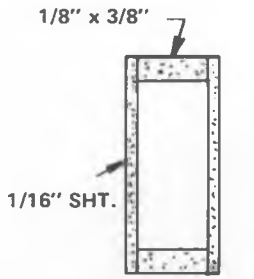




SUSIE II

DESIGNED FOR .049 & .051 ENGINES
WING SPAN – 46 in. AREA – 293 sq. in.
DESIGNED BY – E. LINN 11/17/76





SECTION A–A

SAP

are gaps between the rib and the spar. Here again, the oversize will cause the rib to open up or bend at the cut out and cause an unwanted warp.

"D. Use a sharp knife or cutting tool when making cut-outs. Any tears or jagged edges are asking for warps. Besides causing a poor joint, it looks like Hell! Some modelers have sanded cutouts rather than using a knife . . . use whatever works for you, but make it fit snugly.

"E. When using turbulator spars, try to use wood sizes that are not too broad; you are looking for an edge, not a flat surface to break the airflow. Also, pick wood sizes that are not square. A rectangular shape has more strength when used as a turbulator with the small edge exposed to the airflow. Also note that the cut-out in the rib is such that the turbulator fits the same shape as the wood size so that none of the edge of the turbulator is sanded off when finishing the wing. Not only does this make a cleaner edge, it makes a stronger turbulator between ribs. *(In other words, install spar perpendicular to rib surface. wcn).*

"F. An example of how not to cut a rib for a spar or turbulator. It shows how the original square size of the spar or turbulator will be sanded off to shape the airfoil, resulting in a thinner edge on the forward edge of the surface and results in a weaker spar turbulator.

"G. A piece of wood laminated to the leading edge at the lower surface not only makes a stronger leading edge, it eliminates the pucker of tissue where the rib joins the leading edge at the lower surface."

RIB CUTTING JIG

For lazy or practical model designers and builders, cutting ribs can be a real drag. The usual answer is to use rectangular planforms so that each rib is identical. Occasionally, someone will design one of those ships with the neat elliptical planform or with a slick double tapered wing and stab. The usual plan either gives you around 15 to 20 different size rib patterns to copy, or tells you to use the root rib and the tip rib for templates and carve and sand all other ribs to match by stacking balsa sheet blanks between them.

Now, both of these methods are fine, except the first one takes forever to cut those ribs out, and the second one is difficult to do because, handling a bunch of rib blanks in one hand while cutting and sanding with the other, is not much easier than lining up a dozen worms for morning inspection. So, what to do? Well, fellow club member, Ron McBurnett has come up with a jig that makes this chore easy. The sketches (2 through 5) show how to set the jig up. This jig is for flat bottomed airfoils only. Basically, what is required is that you cut out the root rib from

FIG. 1 SPAR LOCATIONS IN FREE FLIGHT WING & STAB.

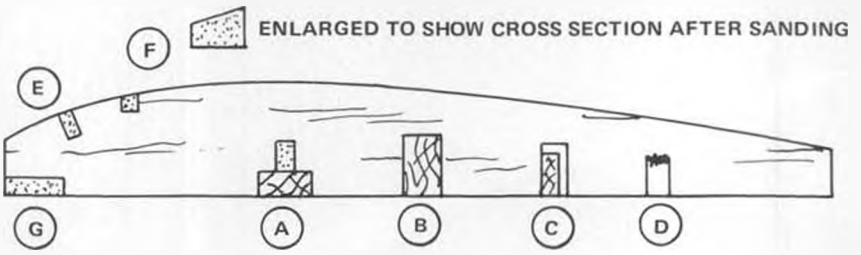


FIG. 2 RIB CUTTING JIG

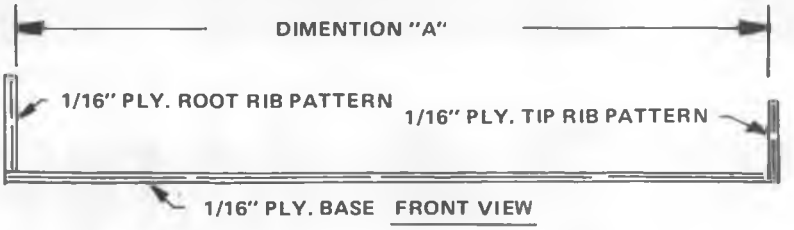


FIG. 3

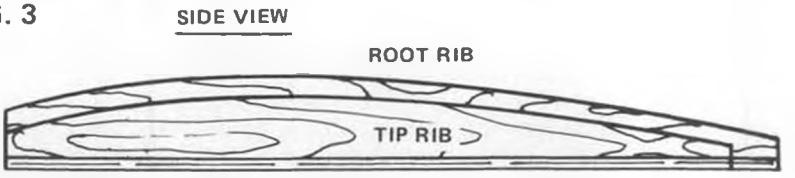


FIG. 4

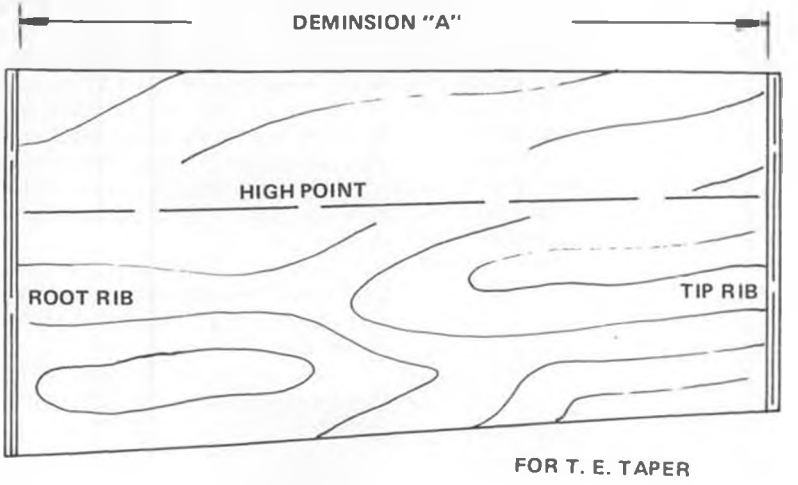
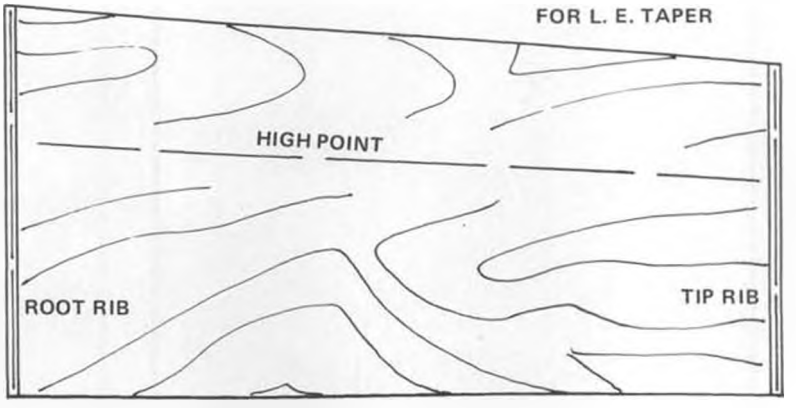
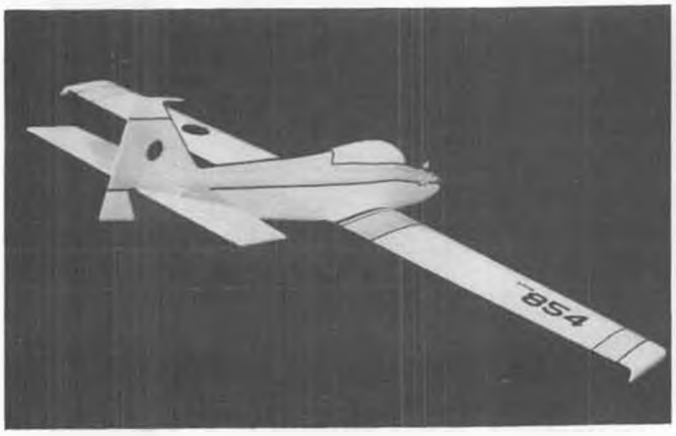


FIG. 5



1/16 or larger plywood, and do the same with the tip rib. Dimension 'A' in the sketches is determined by the thickness of the balsa you plan to use and the number of ribs to be cut. Example: if you want 16 ribs of 1/16 balsa, then dimension A will be 1 inch. Simply cut a

Continued on page 78



Ace R/C's "Mach None".

"Baby Dragon Fli", by Techni-Models.

The 1/2-A SCENE

By LARRY RENGER

• A revolution which started around ten years ago, broke into open rebellion in 1973. I'm speaking, of course, about the revolution in R/C flying with the advent of high-performance 1/2A aerobatic models. There had been very few multi-channel models published for .049 engines, and an occasional photo of others, but the big break-away began with ACE R/C's "Pacer" kit. With this model, a manufacturer was putting his money (yes, friends, introducing a new kit costs a whole bunch of greenbacks) on the line, betting that the interest in practical sized R/C models was there. Radios had gotten down to a reasonable size, and of course, Cox's Tee Dee .049 packs a real punch in the power department.

The "Pacer" was a huge success, and it alone caused a noticeable rise in sales of Tee Dee .049 engines! ACE then followed on with the even better "Mach None". Everybody and his brother has now had a go at producing a 1/2A Aerobatic kit. The list of manufacturers is beginning to thin as some of the "garage operations" drop out of sight, however.

Now that radios are again beginning to shrink, models which originally were flown with only aileron and elevator control are beginning to show up with three and four channels, complete with steerable nose gear.

To be successful, a 1/2A Pattern model must be light in weight, but even more important, it must be aerodynamically very clean. An .049 just doesn't provide the oomph to haul a brick through the air. Most of the more recent kits feature slimmer, more contoured fuselages, and often, custom-cut foam wing cores.

The "older" kits are still excellent performers, and generally easier to build, but there is a visible performance difference.

Listed below are the kits which are designed especially for 1/2A aerobatic flying:

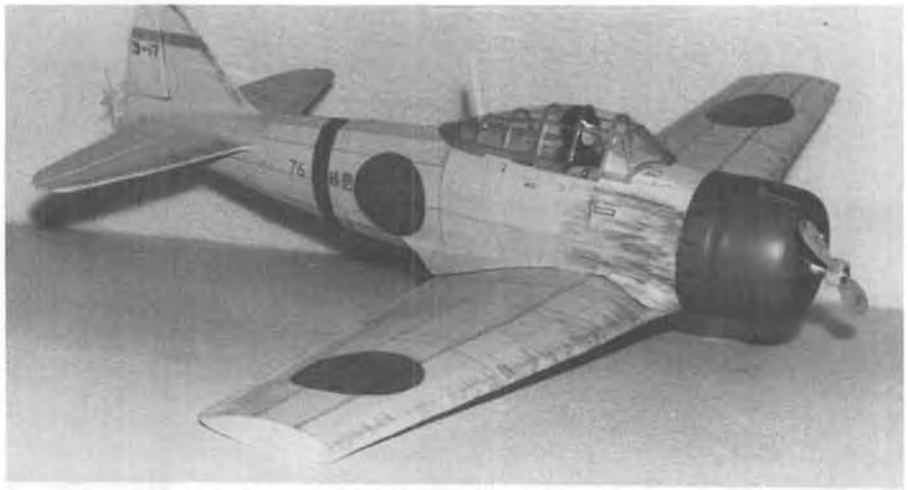
ACE R/C P.O. Box 511 Higginsville, Mo. 64037	Pacer Mach None
Cathedral Models 3 Apache Road McComb, Miss. 39648	Baby Stik Hot Rock Baby Banshee
Hobby Shack 18480 Bandilier Cr. Fountain Valley, Ca. 92708	Stardust Rickey Rat Lil' Toni Tiny Ace ARF 1/2A Laser 1/2A SST
GMC 7349 Rindge Playa Del Rey, Ca. 90291	1/2A Stick 1/2A Chaos Lil' Miss Norway
Mile Hi Models 4805 Baja Ct. N.E. Albuquerque, N.M. 87111	Joy Stick
R/N Models 37755 27th St. E. Palmdale, Ca. 93550	Shu-OFF
Sure Flite P.O. Box 6497 Buena Park, Ca. 90672	Baby Birdie Baby Birdie ARF Baby Turkey
Techni Models P.O. Box 9382 Glendale, Ca. 91206	Mini Bar Fli Mini Dragon Fli

In addition to this list, a number of 1/2A R/C aerobatic models have been published in the magazines, but not kitted. Perhaps some brave soul out there will compile a complete list and send it to me to publish. Just in the last two years, there was the:

Joy Stick	RCM 4/75
1/2A Chaos & 1/2A Stik	RCM 7/75
1/2A SST	RCM 8/76
Cheetah	RCM 10/76
Fireball	RCM 11/76
Cannonball (.020)	F.M. 7/76
BD5	MAN 9/75
Eyelash	MAN 1/76

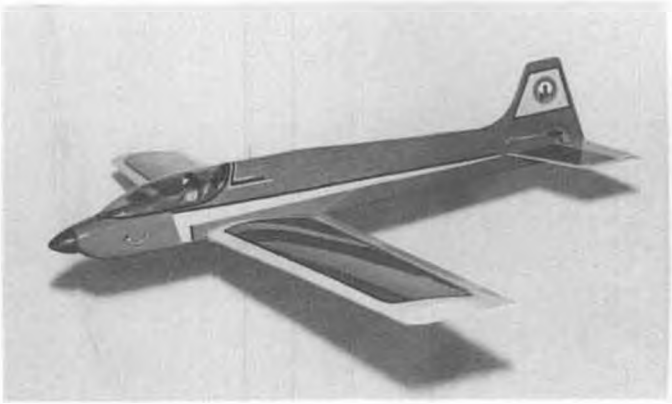
For aerobatic flying, most people find that a stock Tee Dee and 30% nitro work well. Propellers are often 6 x 3 Cox Competition, but the smaller, lighter models go even better by dropping to a 5 x 3 Cox Competition. Higher nitro content fuel adds power, but hurts in the fuel consumption.

Electric starters are much the vogue, though I have found that the real secret to good Tee Dee starting is to take 3 batteries and wire them in parallel.



A6M-3 "Hamp", from Sterling kit, Tee Dee .02 powered, with Ace Pulse system. Balsa inserts in fin must be removed to obtain stable flight (!). Allan Schanzle, Gaithersburg, Maryland.

PHOTO BY ALLAN SCHANZLE



GMC's Half-A "Miss Norway".

Ron Wittman's 1/2A aerobatic model is a scratch-built, using four channels. Has steerable nose wheel. Flies well at 31 ounces.

This high amperage source for the glow plug lets you flood the engine a bit, while still getting it to kick over on a hand-start.

When hand-starting a Tee Dee, you must flip the prop very sharply, as the crank porting depends a bit on air ram velocity, and there isn't much crankcase compression at low speed. In view of this, lightly sandpaper (400 grit) the trailing edges of the prop so you don't get cut.

When using an electric starter, keep an eye on the fiber spacer between crankcase and drive washer. If this wears down too far, the crankpin will machine aluminum off the backplate and those chips can cause all sorts of problems if they get trapped between piston and cylinder . . . Ugly, Ugly, Ugly!

Two electric starters are made specifically for 1/2A use, the ASTRO FLIGHT "Mini Starter", and the Fusite GloBee "Stinger". The Astro retails for $15.95, and of course, you then need a 12-volt battery to go with it. The GloBee "Stinger" is a self-contained unit that will give about 100 starts from rechargeable, built-in batteries. Introductory price is $34.95. I don't own an electric because this combination comes to about the same cost as a new kit and engine, or an extra servo, but there have been times when I have, in desperation, borrowed electric starters to run the flood out of an engine, so they have some real advantages.

Early in the development of 1/2A aerobatics, the Pacer featured a coupled rudder and aileron setup. This has dropped out of favor because people would rather do a clean 4-point roll than a halfway spin. When I built my Pacer, I added the coupled rudder, but disconnected it after a few flights. Looking back, it would have been interesting to hook it up in reverse as an experiment. Now you just go with another channel, of course. Since I have a few kits in my possession, I'll review them for you.

GMC "1/2A-STICK": ACE foam wings, saw-cut parts. Includes preformed landing gear wire, engine mount, and control horns. This is a scale-down of the classic "Ugly Stick" style. Normally, it is flown rudder and elevator, but can be modified for ailerons. Performance can range from docile to astounding, depending on control settings and nitro content of your fuel. I have seen one do three rolls straight up!

Pilot "Stardust": A fully built-up model featuring fantastic saw cutting on ribs and all other parts, vacuum formed canopy, formed landing gear (tail dragger) and control horns and aileron links. This is a very graceful airplane, and sports a really good, almost symmetrical airfoil. This kit represents a real value, as you get a light, well-designed model, which should perform extremely well. The light-weight structure would give you the margin to add one or two-channels beyond its normal aileron and elevator control.

Pilot Tiny Ace: This is the hottest of the three 1/2A ARF models imported by Hobby Shack. The fuselage is vacuum-formed and assembled, the wings are fully built-up structure, completely assembled. All hardware is included, except wheels and tank. This model has a flat bottomed airfoil, but I have seen it fly inverted nicely anyway. Outsides are noticeably more open than inside maneuvers, as you would expect. All surfaces are pre-covered, and final assembly just doesn't take all that long. You can use a Black Widow .049, but a Tee Dee .049 is what really makes this plane reach its potential.

Techni Models "Baby Dragonfli": Scaled down from one of Phil Kraft's competition designs, this is an outstanding kit. Parts are not only saw-cut, they are labeled! The wings are another excellent feature, they are custom cut from very light foam, not the heavier molded variety. Engine mount, hardware, a vacuum formed canopy and landing gear wires are included. Plans are full size, and an instruction manual with numerous photographs is included. With this model's size, weight, flowing lines and airfoil, it's going to be a screamer.

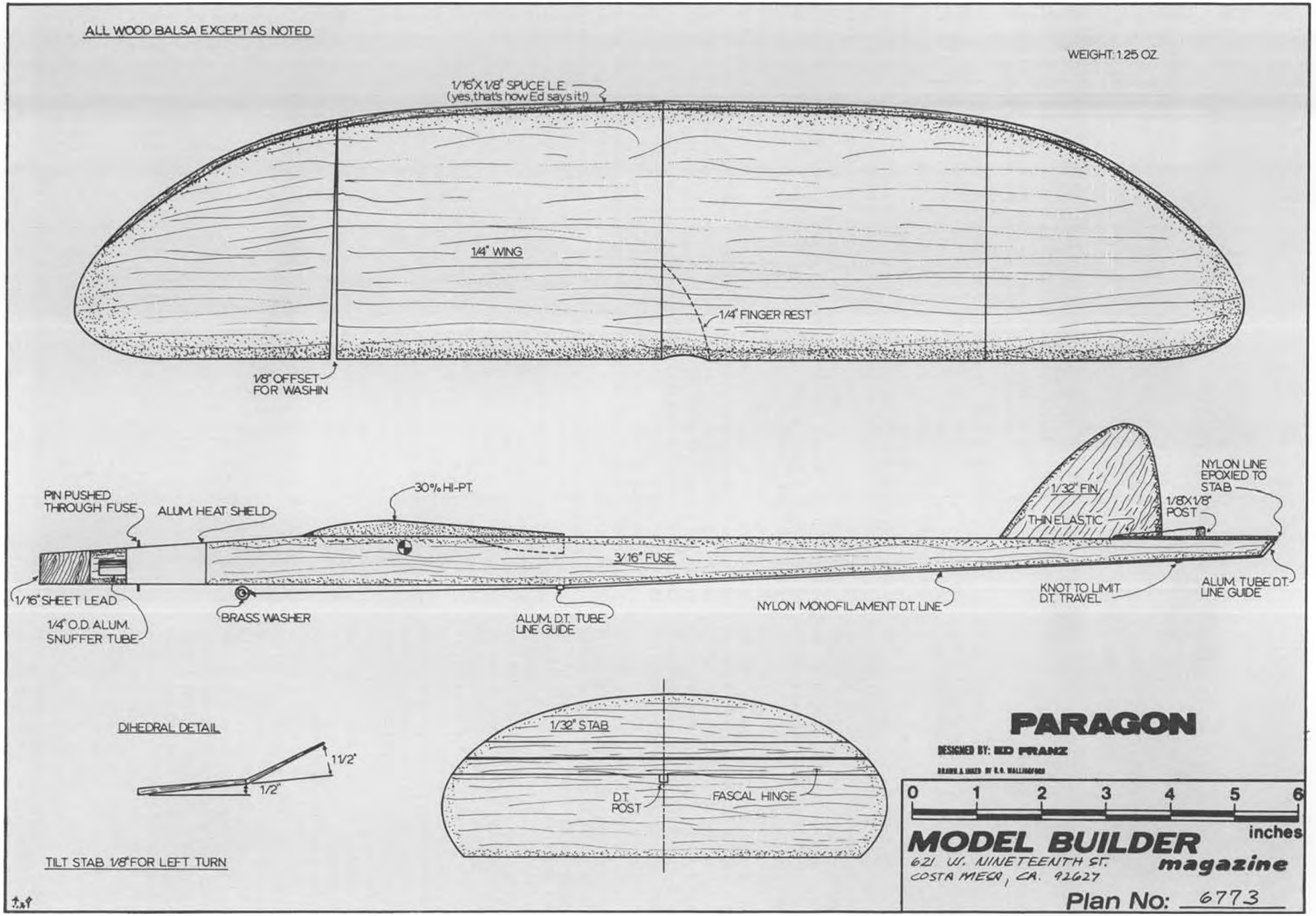
Hobby Lobby's "1/2A Shoestring": I considered holding off on this one until I do a column on Pylon Racing, but with its tapered wing, it isn't legal in most places. This kit is unique. The fuselage is all vacuum-formed plastic parts, which you quickly assemble, and the wing is molded *sheet* foam wrapped over a spar. This technique was one I developed originally for Cox's Super Stunter control-line model. The completed model is very clean and attractive. Weight is comparable to most of the models this size, because of the very light wing construction. Considering the price, performance, and quick construction, this one is a winner.

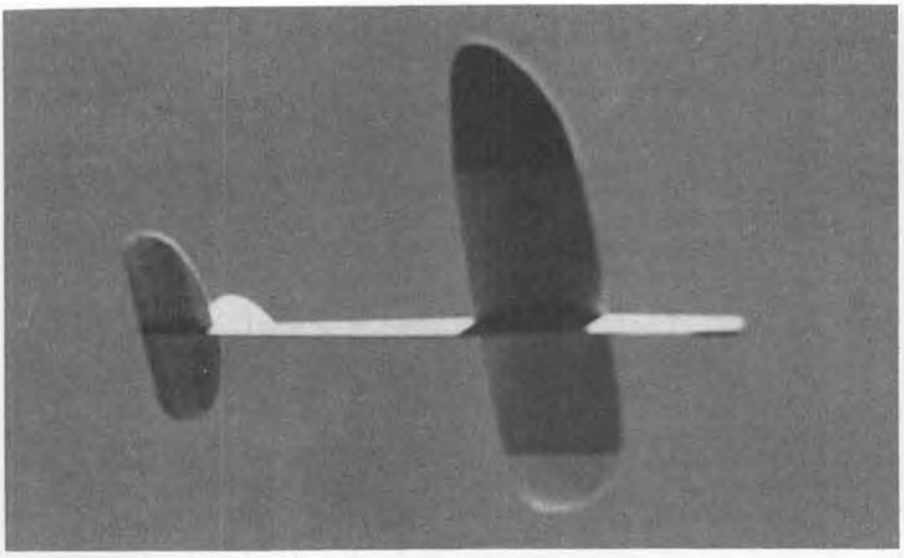
Hobby Shack "1/2A Laser": This model represents a strikingly different approach. Not only does it feature a fiberglas fuselage, but it is a high wing

Continued on page 93

Junkers JU-87B from Guillow kit, Tee Dee .02 power, Ace Pulse system. Finished in North African color scheme. Very stable, flies as though on a string. Another by Allan Schanzle.

PHOTO BY ALLAN SCHANZLE


ALL WOOD BALSA EXCEPT AS NOTED
WEIGHT: 1.25 OZ.
1/16"X 1/8" SPUCE L.E.
(yes, that's how Ed says it!)
1/4" WING
1/4" FINGER REST
1/8" OFFSET FOR WASHIN
PIN PUSHED THROUGH FUSE
ALUM. HEAT SHIELD
30% HI-PT.
1/32" FIN
NYLON LINE EPOXIED TO STAB
1/8"X1/8" POST
THIN ELASTIC
3/16" FUSE
1/16" SHEET LEAD
1/4" O.D. ALUM. SNUFFER TUBE
BRASS WASHER
ALUM. D.T. TUBE LINE GUIDE
NYLON MONOFILAMENT D.T. LINE
KNOT TO LIMIT D.T. TRAVEL
ALUM. TUBE D.T. LINE GUIDE
DIHEDRAL DETAIL
1 1/2"
1/2"
1/32" STAB
D.T. POST
FASCAL HINGE
TILT STAB 1/8" FOR LEFT TURN
PARAGON
DESIGNED BY: ED FRANZ
0 1 2 3 4 5 6
inches
MODEL BUILDER magazine
621 W. NINETEENTH ST.
COSTA MESA, CA. 92627
Plan No: 6773



PHOTOS BY AUTHOR

The author/designer with one of his Paragon hand launch gliders. It's easy to build.

THE PARAGON

BY ED FRANZ . . . Hand launch glider is a tough event; the quality and quantity of competition is high. This glider can literally put you on top.

• Hand launch glider competition here on the West Coast is probably the toughest you will find anywhere. As an example, at a recent contest in Sacramento, Steve Geraghty had six maxes and came in second! If that isn't tough competition, I don't know what is.

The newest entry into these contests is my Paragon. The Paragon, while being fairly easy to build, has all the performance you will need to hold your own at any contest. It was designed to be thrown super high, and still be able to ride any lift available. Like all high performance gliders, it is equipped with a D.T. On all of my gliders, I now use a pop-up stab D.T. I have found it is the safest way to get your glider back.

Now that you have read this, and are thinking of all the other gliders you have built, why don't you try a Paragon and see what you have been missing? You will not regret it.

CONSTRUCTION

WING: Find some nice, light wood for the wing. If you are lazy like I am, try to find some light, Sig, four-inch tapered stock. If you can find some, you have a lot less carving and sanding to do. If you can't find any, or you like to carve and sand, glue some one and three-inch stock together with Titebond. Pin this down to your workbench and let dry. I usually do this in the evening, and let the wing dry over night.

When dry, mark the wing outline and dihedral joints on the bottom of your wood. Cut out wing and block-sand the leading edge flat. Now you can glue on the spruce leading edge with Titebond. Pin down to your workbench and let dry. It is worth the extra work to put it on, as it keeps the leading edge from getting all nicked up.

Before you start to carve the airfoil, let me say a few words. The airfoil on the plan is the one most people use. You can use that one, or you can use the one I use. On my gliders, the high point of the airfoil is at 25% of the cord, and the leading edge, instead of being sharp, has a 1/16 radius. I prefer this airfoil, I think it has a little better glide than the other. However, use what you wish.

Now carve down your wing, thinning out the tips to about 1/32. Carve and sand the wing until it is fairly smooth, then put it aside until time to finish.

STAB: Find yourself some light B grain wood, making sure that it is warp free. Cut it out and sand to shape. Airfoil it slightly; also thin out to the tips. Now you can mark the separation line on the bottom of the stab. Put the stab with the wing, and start on the rudder.

RUDDER: Use the same wood as you used for the stab. Cut out and sand to a symmetrical airfoil and put aside.

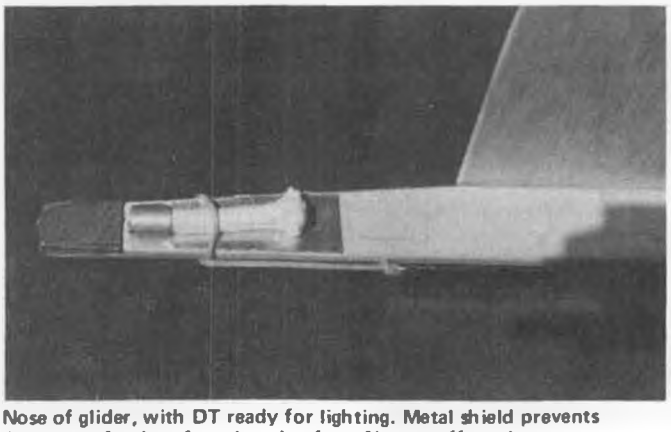
FUSELAGE: Find the hardest balsa wood you can; needless to say, it should be warp-free. Cut it out, and taper the back of the fuselage to about 1/4 x 1/8. Don't bother to round off the corners too much, as it weakens it and does not save much weight.

Now let's finish all of this raw balsa.

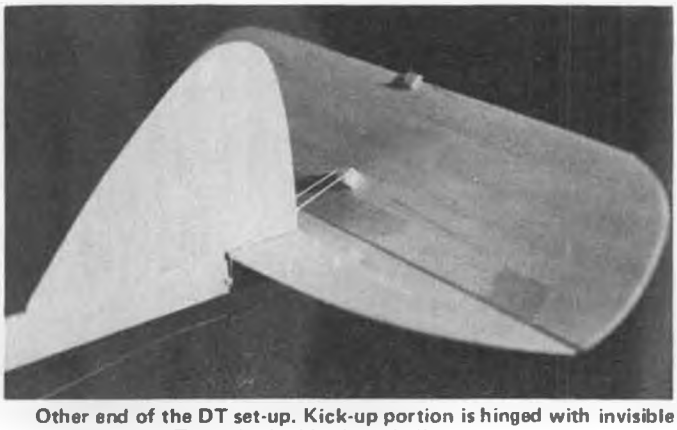
FINISHING

WING: I have tried just about all the finishes around. I have settled on four coats of thinned nitrate dope. Now I know some of you will say that I don't use enough dope, but I think that the

Continued on page 77



Nose of glider, with DT ready for lighting. Metal shield prevents damage to fuselage from burning fuse. Note snuffer tube.



Other end of the DT set-up. Kick-up portion is hinged with invisible mending tape. Travel limited by knot in line.

MODEL ROCKETRY

By DOUGLAS PRATT . . .

● The traditional beginning of the contest year is the Pittsburgh Convention, held in March, in (where else) Pittsburgh, Pa. This year was the twelfth annual Pittcon, and was a rousing success, as always. Attendance exceeded the 100 mark, the launch was rained (and mudded) out, all major manufacturers were represented, and everyone went for two days without sleeping . . . in other words, it was just like the last eleven Pittcons.

Lonnie Reese hooks up a Black Brant for the feature launch at last year's Pittcon. It was cold and windy. Bob Kaplow photo.

Thanks, tinged with amazement at their endurance, must go to the Steel City Section's two capable organizers, Elaine Sadowski and Kevin Barkes. This pair has been responsible for the last few Pittcons, and never fails to turn out a smoothly-run convention, through the use of much personal effort and expense. Kevin particularly, was run ragged, since, while organizing one natural disaster, i.e. the convergence of a horde of spacemodelers on an innocent Holiday Inn, he was a major part of planning for the anticipated flooding of the three rivers that run through Pittsburgh; a task that involved twelve and fourteen-hour days, seven days a week.

Liftoff of the FSI Black Brant, using "Thunderbolt engine for power. Flight estimated at 4,000 feet, where it went into cloud cover!

The usual Discussion Groups were a well-attended feature. There were 32 to choose from, and topics ranged from Plastic Model Conversion and similar competition discussions, to the "How to Increase NAR Membership" forum run by the NAR Membership Committee chairman, Dick Nelson. Al Celetti, chief icicle of Canaveral North Associates (Lewiston, Maine), discussed Research and Development as a competition event. Al has placed in R&D in the last

Continued from page 94

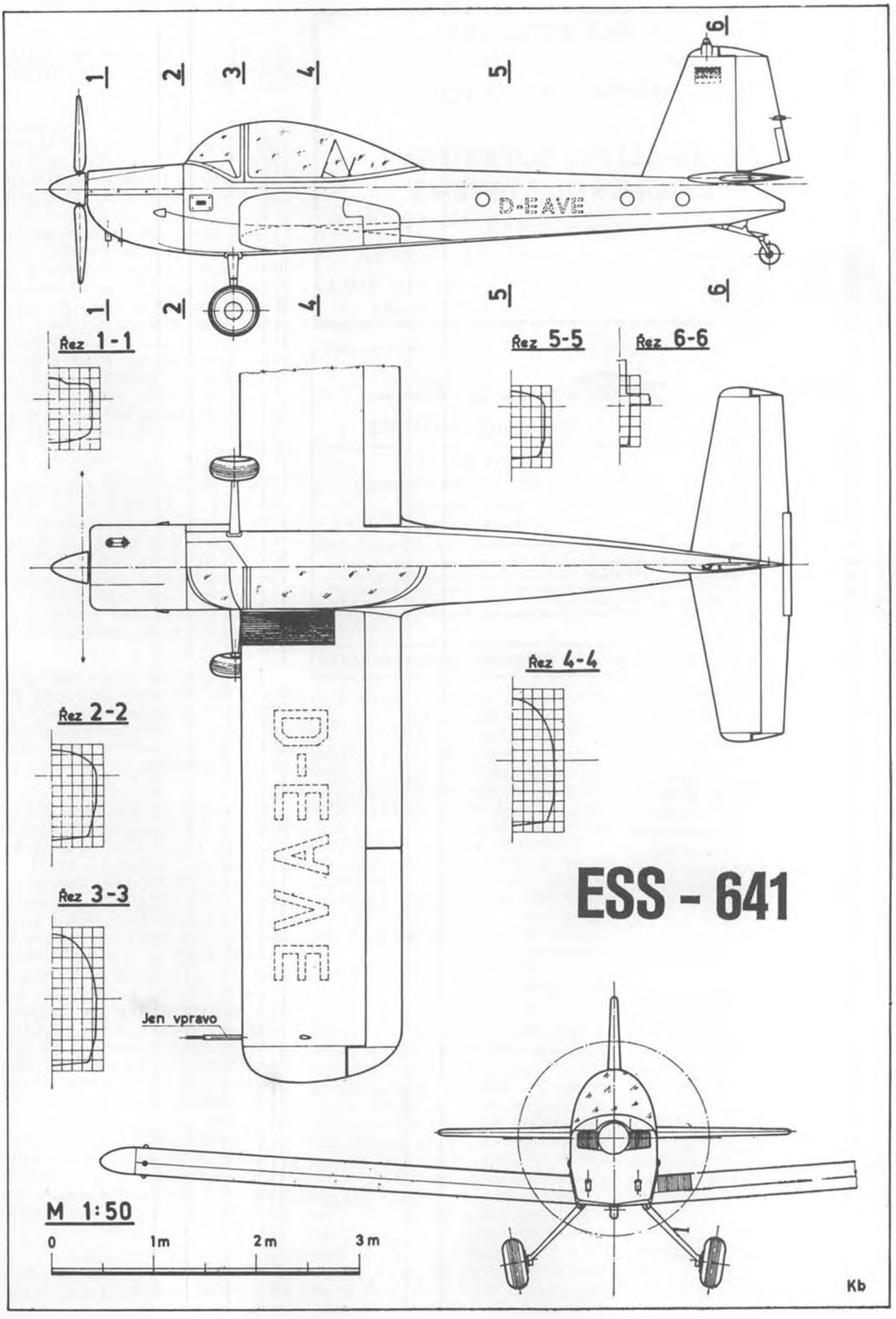
The Starlab, a weird new kit offering from Estes. Note tiny "space shuttle" that clips into engine mount for display. Darlson photo.

The new Centuri "Super C" engine. Reputed to give 25% better performance in heavier birds it has been designed for. Don Carlson pic.

Don Carlson, Model Rocketeer editor, left, and Lonnie Reese of FSI, at HIA Show.

Also at HIA Show in Houston; Dane Boles,of Estes, left, and Centuri's Grant Boyd.

Estes received this award at HIA Show in recognition of educational programs.


1
2
3
4
5
6
D-EAVE
Rez 1-1
Rez 5-5
Rez 6-6
Rez 4-4
Rez 2-2
Rez 3-3
D-EAVE
Jen vpravo
ESS - 641
M 1:50
0
1m
2m
3m
Kb

Counter . . . . . *Continued from page 11*

MRC-Enya's entry into the super-power .60 class is a very impressive-looking Schnuerle ported 60XF-TV, reported to develop 1.7 horsepower at 16,000 rpm. It boasts a ringless hand-lapped piston and chromed aluminum cylinder sleeve assembly for maximum life and durability. A hemispherically shaped combustion chamber is claimed to allow extremely efficient fuel use. Further features are twin ball bearings and a throttle-type carburetor with automatic mixture control.

Late word is that this is the forerunner of a new breed of Schnuerle ported MRC-Enya engines, to include a 19X and 40X, both to be available in the very near future. Keep an eye on the MRC ads, which are always current and informative.

The 60XF-TV is priced at $149.98, and on its way, if not already in stock, at your local hobby store. Or check with MRC (Model Rectifier Corporation) at 2500 Woodbridge Ave., Edison, NJ 08817.

* * *

Beginner's in 1/2A control line have all-of-a-sudden had life greatly simplified for them with the appearance of Sig's Flight Pack, containing everything, with the exception of the glow plug battery, needed to start and fly 1/2A control line models.

Included for the $4.95 price are; adjustable control handle, Dacron flying lines, line connectors, a pint of Peter Chinn contest glow fuel, filler bulb, glow plug clip, wire and terminals, and illustrated instructions.

The battery terminals, of closed-ring design to prevent slippage from the terminal, are available separately at 4 for 25¢. The fuel bulb, in a special 3/4 oz. size as required for the small engines, complete with tubing, is also available separately at 89¢.

All from Sig Manufacturing Co., Montezuma, IA 50171.

* * *

With the recent addition of seven new models, K&B Mfg. now has 20 . . . count 'em . . . 20 different engines in production. What is equally exciting is that they are all of current, up-to-date design, full of the features for which K&B engines are already well known, plus being backed by the best in service and parts availability.

The seven new engines include: 3.25cc (.19) Front Rotor, 3.5cc (.21) Front Rotor, the 4.9cc (.29) and the 5.8cc (.35) Front Rotor, all for free-flight or controline; the .35R/C for the Sport Flyer; the 6.5R/C (.40) Front Rotor with Perry Carburetor and the 6.5cc (.40) Front Rotor for free flight or pylon racing.

All are presently available at your local hobby dealer, and are manufactured by K&B Manufacturing, 12172 Woodruff Ave., Downey, Ca. 90241.

* * *

Are you looking for a trainer sailplane? Look no further. MH Manufacturing has the "Anser" for you. This 72 inch, 495 square inch slope and thermal soarer weighs in at 21 to 23 ounces, for a wing loading of 6 oz./sq. ft.

It is designed for performance and fast easy construction, claimed to go from the box to the flying field in one week of evenings. All work is done on a flat surface, and all sides, ribs, rudder and fin are machine cut balsa. The hardware package is complete with push rods, horns, clevises. Rolled plans are included as are complete instructions.

Only $29.95, at your local hobby store or direct from MH Manufacturing, 2623 Honolulu Ave., Montrose, Ca. 91020.

* * *

ADC (Applied Design Corporation), 738 Penn St., El Segundo, Ca. 90245, which recently lost the guiding hand of its founder, William 'Bill' C. Nielson with his passing on Jan. 9, 1977, has announced continuation of the product lines as established. Expansion will continue as products are developed and according to market demand and response.

Now being operated by members of the family who originally assisted Bill, ADC manufactures and distributes hobby and craft tools, household conveniences, and Jewel-Stripe striping tape, sheets and letters/numbers.

* * *

For electric car R/Cer's, a new and improved speed control has been introduced by Electro Craft Systems, 924 Ferngrove Dr., San Jose, Ca. 95129.

Known as its PSC-9FR "Competition Model", it is a completely solid state device, enclosed in a rugged plastic case which has been competition tested in such events as the 1976 ROAR National Championships. Smooth, powerful control of forward speed, with rapid acceleration and a dynamic brake, are features, A built-in voltage regulator supplies power to the radio system, eliminating the space and weight normally used by the receiver battery. It is of small size, only 2-5/8 x 1-1/2 x 5/8 inches.

It is priced at $54.95, and is part of a complete line of parts and accessories, including complete electric cars available from Electro Craft. Full information is as near as a 13¢ stamp. Be sure and mention MB when you write.

* * *

A number of interesting new articles have just been introduced by the makers of the "Dremel", as we all call it, but which is more correctly named Dremel

CARL GOLDBERG

KLETT

new FLEX-POINTS!

INEXPENSIVE! MAKE EASY FITTING JOINTS!

SIMPLEST INSTALLATION EVER!

actual size

DESIGN ADVANTAGES:

Simplest possible installation—Drill 1/8" holes, and apply epoxy.

Easy to get ailerons very close to wing for maximum effect.

Web area combined with barbed shank absorbs vibration and flutter permitting the hinge to flex only at the hinge line.

Web provides visual axis alignment.

RK5 18 for $1.20

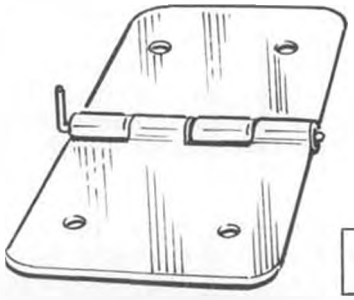
A common, flat Polypropylene hinge has the tendency to flex a certain amount beyond the hinge line. Constant stress and vibration could in time widen the hinge slot, causing a loose control surface and possible flutter.

The new Flex-Point hinge, with the round barbs extending close to the center of the hinge, will permit the hinge to flex only at the hinge line where it is supposed to flex.

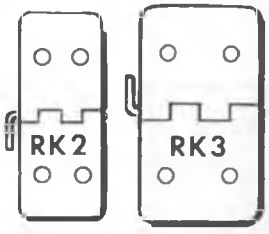
MADE FROM VIRGIN POLYPROPYLENE–The "Living Hinge" Plastic

KLETT PINNED HINGES — THE WORLD'S FINEST!

actual size



- Minimal friction! No binding or clicking from mold flash!
- Close fitting pin and hole minimizes play, vibration and flutter!
- World's highest quality and used consistently by the best fliers!



MADE FROM NYLON

RK2 needs only a knife slit to install—it's so thin.

RK3 can be installed with the CG Hinge Slotting Kit.

RK2-7 Small .....7 for $1.10
RK2-15 Small .....15 for $1.95
RK3-7 Regular .....7 for $1.25
RK3-15 Regular .....15 for $2.35

All KLETT Products are DEPENDABLE—INEXPENSIVE—Easy to INSTALL

SAFETY DRIVER

Safety Driver sockets down onto screw head — can't slip off and damage your wing. Takes round or binder head screws.

For 1/4" Nylon Screws SD1—98¢

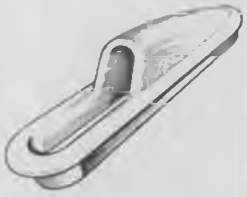
For #10 Nylon Screws SD2—98¢

AILERON & ELEVATOR HORN BEARING

If you like precision fits, ask to see the KLETT Horn Bearing. Superior to others, it reduces play, and has a thin tapered tab to facilitate entry into a slot, and holes for glue.

AB4—4 for 75¢

AILERON PUSHROD EXIT



A beautiful fairing where the aileron pushrod exits your wing. Easy to install. Made from natural nylon.

PEG3—2 for 69¢

HOODED PUSHROD EXIT GUIDE

For 5/64" Wire PEG1-H 2 for 69¢

For 1/16" Wire PEG2-H 2 for 69¢

REGULAR PUSHROD EXIT GUIDE

For 5/64" Wire PEG1 4 for 75¢

For 1/16" Wire PEG2 4 for 75¢

ALL ITEMS AVAILABLE IN CANADA

For best service, see your dealer for items you want. If not available, write direct. Add 50¢ per item ($1.00 outside U.S.) Minimum order $1.

MANUFACTURERS

All our accessories are available at excellent O.E.M. bulk prices.

CARL GOLDBERG MODELS INC.

4736 WEST CHICAGO AVE. • CHICAGO, ILLINOIS 60651

CARL GOLDBERG MODELS, INC.
4736 W. Chicago Ave., Chicago, IL 60651
I am sending 35¢ for 12 pg illustrated Catalog with Basic Explanation of R/C Equipment and Radio Control Definitions

Name _____

Address _____

City _____

State _____ Zip _____

'Moto-Tool'. These additions to the already extensive line of small tools for the modeler and craftsman are a work holder, called the Model 2214 D-Vise, and a special holder for the Moto-Tool that adapts to the D-Vise base.

The D-Vise features V-grooved 2-1/2 inch capacity removable jaws, which can be replaced with customized ones for odd-shaped work. Soft pads are also include for protection of delicate objects and finishes.

The sturdy die-cast parts move on precision machined slide rods, guaranteed to apply equal jaw pressure. The jaws travel 1/16th inch per turn of the handle. For added stability, the vise can be mounted to the work bench or work surface.

The three-point base has a ball swivel and twist-lock ring to permit fast and instant positioning and locking. Work, or the Moto-Tool in the new holder, can be positioned at over 180 degree tilt and 360 degree axis.

Various combinations are available in addition to the basic Model 2214 D-Vise; Model 2215, D-Vise and Moto-Tool holder; Model 2216 vise head and adapter plate for mounting to a drill press, and Model 2217, Moto-Tool holder and D-Vise base.

For information on these and all Dremel tools, write Dremel Division, Emerson Electric, Co., P.O. Box 518, Racine, WI 53406.

* * *

Harry B. Higly & Sons, Inc., manufacturers of a small but select line of model products, has turned its attention to "The Other End" in the belief that it has been somewhat neglected by all of us.

"The Other End" is a device used to rapidly and conveniently connect the glow plug leads to the power source. This should eliminate accidental shorting, as the leads are not connected when stored. It consists of a special clip, reminiscent of a clothes pin, and special terminal nuts. Two sizes are available, one for the standard dry cell and one for the Fusite 'Fireplug'.

Only $1.49 at your local shop, or check with the Higley's at 433 Arquilla Dr., Glenwood, IL 60425.

* * *

Basic Aeromodelling, a book by R. H. Warring, published by Model & Allied Publications, is described as "A complete manual for beginners and experts alike on the art of building and flying model aircraft".

In this case, it is rubber powered models, which are thoroughly covered in all possible details in this 176 page, 20 chapter, soft cover book. It takes you from the balsa forests, through the use of tools, to adhesives, rubber motors, covering and flying. It has chapters dealing with fuselages, wings and tailplanes (empennages) only, with more specialized chapters on the use and working of foam, plastic coverings, and even soldering.

This is the type of book that would have saved all of us countless hours in our beginning days, and which should be purchased by or for a beginner even before he starts his first kit.

For further information, contact Argus Books, Ltd., Argus House, 14 St. James Rd., Watford, Herts, England.

* * *

No Virginia, you don't really need a three-cylinder engine for your triplane. But it is an interesting looking powerplant just the same. Three cylinders, in a rotary configuration, for a total displacement of .43 cubic inches, and a six inch diameter, which works out to a scale of 2 inches to the foot. It is claimed to easily turn an 11/6 propeller.

We will bring you more information as it becomes available. In the meantime, it you can't wait, drop a self-addressed stamped envelope to Wright Motors, 33412 Center Ridge Rd., No. Ridgeville, Ohio 44039.

* * *

What's a nice company like National Camera Supply doing in a place like this? Well, they have something that few of us will be able to resist . . . free, an 80 page, 8 x 11 tool catalog, chock full of tools and items of interest to all modelers, craftsmen, technicians, repairmen of all kinds of small devices, and yes, even a few things for camera fixers. Actually, it seems to have started as a supply house strictly for camera servicemen, but it must have become obvious before too long that the small precision instruments needed by them are also valuable to lots more of us.

National Camera how has a Pedometer, in case you care to know how far you had to walk after that errant free flight. They have various space-age adjustable tools and small tool sets that will result in an immediate loss of weight in your field box, because of the large number of tools replaced. It has precision micrometers for engine rebuilders, precision tweezers for Peanuters, various cleaning solvent dispensers, and dusters for all of us. Electronic instruments and soldering tools for the R/C tech and experimenter are available, and if you have trouble seeing that miniature servo amp PC board, you need National's 7X illuminated magnifier.

It is all here in National Camera's "Flasher", free for the asking. Just tell them MB sent you.

National Camera, 2000 West Union Ave., Englewood, CO 80110.

* * *

Who or what is "The Other Pottols Throttle Shop"? Well, they must not

be the ones you thought, but the other ones, who have just introduced a line of precision machined engine accessories for model boaters. These include venturis, exhaust throttles, and heads, the latter two water cooled. The throttles are designed to give you smooth, quick response and complete engine cut-off, and are machined from aircraft quality aluminum. Prices range from $38 to $55.

The 'Other Pottols' also have an extremely clever adapter for using Dremel collets in the Astro Flight Mini-Starter. This gives you a not previously available capability to drill sand and saw at the field or lake. The Astro Starter works from any 12 volt battery, and is also available from this source for $24.95. The collet adapter is priced at $9.50.

The "Other Pottols" will accept requests for information, prices . . . and even orders . . . at the Other Pottols Throttle Shop, P.O. Box 992, Saratoga, Ca. 95070.

* * *

A full line of R/C helicopters is now available from one of the youngest, but by no means the smallest U.S. helicopter manufacturer. Spearheaded by the young man who at one time could claim to be the nation's youngest R/C helicopter flyer, John Simone Jr., American R/C Helicopters, Inc. has it all together for rotary wing fans.

The basic offering is the .40 size Rev-olution, a helicopter for the beginner, yet capable of advanced maneuvers in the hands of an experienced flyer. It is priced at $199 without engine; $239 with K&B .40 and "Superr-Quiet" muffler; and $239 with OS .40 FSR and muffler.

Once over the basic learning steps, a Hughes 500 fiberglas fuselage is available, and can be added easily and relatively inexpensively, at $84.95, including all hardware.

If large size ships are your choice, the Rev-olution II is for you. This .60 size ship, with all the features of the small machine, is available as a basic kit for $269; with K&B .61 and "Superr-Quiet" muffler for $339.

The "Superr-Quiet" muffler is available also separately, at $14.95 for the .40 size, and $18.95 for the .60. Floats too, can be had for $19.95, including mounting hardware.

Available at your dealer's or direct from American R/C Helicopters, Inc., 23811 Via Fabricante, Suite 102, Mission Viejo, Ca. 92675.

* * *

Superior Flying Models, of Auburn, Washington, has thrown its hat in the kit building ring. Presently in production and available, it has three gliders and one Half-A sport scale, all for R/C.

SFM's 'Bunny', designated as a beginner's kit, spans 73 inches, and weighs in at 24 oz., for a 6 oz./ft. wing loading. The kit is complete with machined wood parts, all hardware, spruce spars, dowel reinforced leading edge, and detailed plan sheets and a booklet entitled; "Soaring, the Gentle Art". Price is $38, postpaid.

Next in line is the T2, 75 inches and 28 ounces of fun for the more experienced glider flyer. It incorporates coupled ailerons and rudder, and flaps coupled to the stab. Included for the $44 price are all machine shaped parts, and a complete hardware package, including the flaperon mixer.

The big one is the Boss-T, 120 inches and 35 ounces for two or three channels. It also uses coupled ailerons and rudder, flying stab, and trailing edge flaps. Selected materials, complete hardware, and machined parts are featured with this one also.

For the power fan, SFM has it's Piper Cherokee Lance, quick to build and easy to fly with a mild .049. It features a rugged all-wood structure, including pre-shaped balsa parts, spinner, tank, and Tatone engine mount. Even a paint scheme is suggested on the enclosed super-sharp plans.

The span is 37 inches, area 225 squares, and a flying weight of 20 ounces. Price: $25.

Please be sure to mention MB when you write to Superior Flying Models, 4027 So. 275th Pl. Auburn, Wa. 98002.

•

Gipsy Moth . . *Continued from page 19*

R/C scale models, flying the Moth will be an experience you'll always remember with distinct pleasure. Flight is smooth and unhurried, so realistic in scale speed that you almost feel as though you're not really flying it at all . . . that the plane just happens to be going in the same direction that you're trying to urge it with the transmitter. Once you apply throttle and begin taxiing out to takeoff position, you are no longer dealing with a model . . . there is a quarter-size aircraft at the other end of the radio system you hold in your hands.

•

Pylon . . . . . *Continued from page 23*

and follow the instruction sheet included in each box of props. As we mentioned last month, they are coming out with a Q-M version of their "Little Toni". The finished version and the proto kits they had on display looked very good, and were of the same high quality we've come to expect from the Prather people.

JZ Products, 23018 S. Normandie, Torrance, Ca. 90502. Zinger Props . . . as far as we could tell, their props weren't specifically produced for Q-M racing, but their size range and shape leads us to believe they will be competitive

observations is that on a one-piece version of the model, it helps to have small hands when it comes time to install your radio equipment (We flew a modified version of Jack Stafford's "Ricky Rat" for several years, and liked its one-piece construction, even with the attendant transportation problems.). Their fiberglas work is of the highest quality.

DISPLAY MODELS

Very few racers entered in the competition. I really don't understand this, as the usual racers, both pilot and aircraft, are so much better in workmanship and finish than scale, pattern, sport, etc. aircraft, that it would just seem natural that they would show up at this show.

Nothing new in finishing techniques, just the standard epoxies and "Imron" paints.

WILL MONEY RUIN RACING?

We had a call recently from a club that is sponsoring a pylon race this year, and they were concerned about making it an attractive and desirable contest from the competitors' standpoint, in hopes of getting a large turnout. They wanted our opinion of whether they should offer fairly large money prizes, or go with merchandise prizes. Well, since they had the money wired, I suggested that they offer cash prizes. Our club started doing this several years ago, and the reception by contestants has been very favorable. It does raise the question of whether accepting cash prizes could constitute a form of payment which might give rise to cries of professionalism in the sport . . . not that it's not already here to some extent. The alternative is to either buy or solicit donations of merchandise prizes.

There are several drawbacks to merchandise prizes, though. One primary drawback to soliciting prizes is the manufacturer. I had occasion to talk to the Director of Marketing for one of our larger hobby manufacturers recently, and the subject of these donations came up. He stated that beginning early in January of any given year, the calls and letters requesting donations started, reaching their peak in the late spring months of 16 requests a *day!*

Most of our manufacturers are interested in promoting our hobby, and helping to provide stimulus for competitors and helping ease the financial burden of the hosting organizations. But, with the increasing amount of contests it becomes a burden on the manufacturer to provide a meaningful prize to every soliciting club. And how would they decide which organizations should have these donations if they couldn't provide them to all who requested them? And then, with a donated prize the sponsoring club hasn't any control over the type of prize (except in a minor way, in being very selective in which manufacturer they solicit) to be given out. If the

props. Our observations show them to be of high quality hard wood, of the proper stiffness, and of high quality that should require very little reworking.

K&B Mfg., 12152 Woodruff Ave., Downey, Ca. 90241. Again, as we mentioned in our last column, K&B has converted its 6.5 Rear Rotor engine to a new front rotor engine. We received a copy from K&B since our last column, but have not as yet run it. We did install it in a plane that was being built for the RR version, and had no trouble making the conversion. As is to be expected, the high quality standards of K&B are evident upon examining the engine (Personal opinion: K&B's changes should reopen the engine battle between them and the reworked Tigre, and we racers will be the ones to benefit. So make your choice and we'll find out which is best out on the race course.)

Rev Model Prod., 430 Kay St., Addison, Ill., 60101. They are producing a Q-M Lil' Toni kit. Every time we went to their booth to get more info, they were swamped with people, so our information is therefore sparse. Please write them for further information.

Bob Violett Models, 26516 Aiken Dr., Clarksburg, Md., 20734. Bob's finally gotten production going on his very exciting and competitive Form I "Polecat". Offering a very complete kit, the "Polecat" can be built either as a one or two-piece airplane. One of our

winning contestant has been around the competition scene for any length of time, he probably has most everything he wants or needs, and therefore will probably sell his winnings for whatever he can realize out of them, so as to buy something he really desires, or to simply defray some of his competition costs.

Of course, the problems of getting donations from the manufacturer could be eased by the sponsors purchasing the prizes. This would enable the sponsors to give prizes specifically tailored to the pylon racing enthusiast. There still is a strong possibility that the winning flyer might not have a need for the prize and would still dispose of it in some manner.

Well, what do *you* think, Mr. Manufacturer? . . . Mr. Contest Sponsor? . . . Mr. Contestant?

Cash prizes sound good to us, following that famous old saying . . . "When in doubt, give money!"

No new announcements of upcoming races have come this way, so check our May column for racing dates and places.

•

Choppers . . . . *Continued on page 25*

'73, Mar/Apr '73, and May/June '73, and they are real collectors items by now, I'm sure. I do have those copies in my file, but wouldn't part with them for anything less than a Jet Ranger kit, ha! Perhaps someone will have extras and let you know they are available. Thanks for the letter anyway.

Another good letter comes from Thomas F. Totten Jr. of Saratoga Hobbies, Inc., 285 Broadway, Saratoga Springs, NY 12866. He tells us of his two buddies, Mark Simpson and Bill O'Conner, and their brave attempts to master the helicopter hobby. Between them they have built and flown the DuBro Shark, Micro-Mold Lark and now are modifying the Kalt Baron, with a Revolution in the mill. Tom also said he had problems with the flexible main rotor plate on the Baron until he stiffened it by adding a sheet of K&S .032 brass. He must have read my column of last year cautioning about the same thing! Ha!

The final letter for the month comes from George Croker, 1340 Greenview Drive, La Habra, Ca. 90631. "I got into R/C choppers about 1 year ago, with a Heli-Baby. I found it to be an extremely sturdy and well-built model. After I learned to hover, I equipped it with a Kavan Gyro and the fun really started . . . what a difference! Had to sell my Heli-Baby (needed money for my new Jet Ranger). What a beauty! It has to be the ultimate in R/C models. The machine is equipped with expert rotor blades, gyro, wash-out, fuel warning system and blinking lights. My biggest problem now is that when I go flying, it attracts such a crowd that I spend so much time talking instead of flying."

BITS AND PIECES

Many times in the past I have recommended to Jet Ranger builders that they should throw away the metal blade tongues that come with the kit and substitute 1/8 plywood tongues in their place. Their only purpose is to provide a means for aligning the blades, when installed, by adjusting the screw-in studs on each side of the tongue. Unfortunately, if the rotating blade strikes an object, the metal tongue will split the blade from end to end. For this reason, the plywood inserts were recommended, in that they would break off under the same circumstances and not split the blades.

Now, I'd like to go one step further for the experimental soul who doesn't want to be bothered by it all. A couple of years ago, while visiting the Kavan flying field in Germany, I noticed the test pilots were using the blades without any tongues at all! Now this is not something really new, since a lot of the early scratch-built choppers used a single bolt attachment for their blades, with the thought of safety in mind. For some reason or other, I had resisted conversion to this configuration for a long time, but finally decided to try it.

I found that the secret of success in using this method is to tighten down the attach bolts just enough to hold the blades firmly when you exert a one or two-pound pull on the mid-blade area...

but not tight enough to prevent the centrifugal force of the rotating blades from causing them to seek their own aerodynamically balanced position. Before starting up, I always adjust the individual blades so they are reasonably in balance, then let them go for broke! And it works without a hitch or glitch! No more split blades or broken plywood inserts, or balancing studs. It's a simpler way to do it, and the convenience of "folding" the rotor blades for transportation just can't be beat! See the fotos for a better idea of how it looks.

I have also mentioned that the Alouette II would be much smoother in flight if you installed two cranks on the stabilizer bar (shaft) and ran two push-rods to the swash plate instead of just one. I sorry but I forgot to give you a picture of that, but will have it in this issue in case you haven't already figured it out!

While we're on the Alouette subject, a couple of builders have asked how to firmly attach the aluminum longerons tc the rear engine box plate. Seems that no matter how much cement is used, or how tightly the tubes are clamped in place, the longerons manage to slide out during a hard landing. I cured that problem once and for all by drilling No. 30 holes in the rear plate so that I could insert M2 x 16mm PK screws through the holes and into the ends of the longerons. This really strengthens the entire tail boom assembly. I used a small piece of tubing (plastic/brass/aluminum) in the clamps to act as an alignment guide for a smaller drill, and made the preliminary holes from the clamp side . . . then turned it over and finished drilling to size from the other side.

FINAL APPROACH

I still think it is a good idea to show pictures of the builders and their workshops, in MB, so to promote a little interest, I'll take you on a guided tour through mine (as though I haven't had enough tours on my vacations!). I'm very proud of my little shop and the tools I work with, and I'm sure you are proud of yours. So, follow the example and send me some of your favorite photos and basic info and I'll do the rest.

My shop is attached to the rear of the garage and was added especially for that purpose. Although it is only 10 x 26 feet, it is almost adequate for the three of us (my two sons and I) to work in comfort. The main work bench is about 15 feet long, and has a window along most of its length for good light. Strip fluorescent lights on the ceiling and over the bench provide excellent illumination. "Luxo" swivel lamps are spotted around the shop for the close-up work areas. It gets pretty hot during the summer, so I installed two window air conditioners for cooling. The general lay-out is pretty well shown in the photos, but I'll list my power tools anyway, since some are not shown in the pics. The pride and joy of the shop is my 6 inch Atlas metal-turning lathe, with all attachments, such as center rest/follower rest, milling attachment, tool post grinder, 6 headstock/tailstock chucks, collets, misc. bore and cutting tools. I also have a metal band saw and additional wood band saw, a 10 inch tilt arbor table saw, jigsaw, post mounted grinding and polishing wheels, combination belt and disk grinder, ultrasonic cleaning table, floor model drill press, precision bench drill press, belt and disc sanding table, 4 inch jointer, wood lathe, 6-wheel lapidary table, Moto jigsaw, etc. Of course, I have the usual collection of powered hand tools, such as drill motors, Moto tools, Skill saw, sabre saw, etc. Hand tools and machinists tools are kept in tool boxes and roll-around cabinet. Oh yes, I forgot to mention a metal shear, bending brake, and manual arbor press. That should about do it. *(We don't see a kitchen sink in the photos, but wouldn't bet there isn't one! wcn)*

OK, that's my shop, now lets see yours soon . . . and send personal data so I can write it up!

•

Soaring . . . . . *Continued from page 28*

Graupner Dandy. No problem in synchronizing these engines. They start and stop together for a gradual climb into effortless soaring when you reach an acceptable altitude.

Bob Simon is never satisfied. He came up with the three-foot span, nine-ounce, two-channel sailplane called the Pipsqueak. It flies quite well for its size and is remarkably maneuverable (tight spins and sharp snap-rolls). Now he's experimenting with a four-foot wing with extra wide cord in the outboard panels. I've flown this ship with both wings and personally prefer the three-foot span. But each to his own. On another kick, Bob put two Astro Flight 05 engines on his Skyhawk. The nosewheel is coupled to the rudder and this permits taxiing and ROG performance. It all looks very real until you watch Bob perform some wild maneuver at three-foot altitude . . . but that's the joy of model flight.

Alex Mladeneo has combined the good features of the Windward with those of the Windfree, and added a wheel to boot. This mongrel is a reconstruction after some previous damage we don't want to talk about. The resulting creature is notably beautiful, flies well, and is reinforced with plywood to make certain that this ship isn't a candidate for another reconstruction job in the near future.

Jim Hoyle, of Hoyle Engineering Co., Fillmore, Ca., has come up with an exceptional drawing instrument, an adjustable curve and steel measuring tape combined into one instrument. With this device, the designer can quickly form the required curve, draw the line, and measure the distance along that line. The body of the instrument consists of 14 interlocking channels of clear butyrate plastic and a steel measuring tape located in the outermost channel. It stays in whatever shape you choose. Here's just the tool for designing your own fuselage or airfoil. It comes in different lengths and is a worthwhile investment for those who take "scratch built" to mean "right from the pencil point."

Jim McNerney suggests using Energine cleaning fluid to clean your transmitter case. "It's made my Kraft transmitter look like new." He cautions, "Keep the cleaning fluid from any transparent material, such as a meter face, since it will cloud the transparency." Thanks for the tip, Jim.

You know, sailplanes need not be unusual to be appreciated. Take, for example, Paul Denson's recreation of the original free flight Floater, as designed by Frank Zaic, circa 1942. Paul's model is rudder only, but it takes little to make this into a two-channel favorite. In numerous ways, this craft was the prototype for many of today's contest winners. Then there's Frank's more modern version of the Floater . . . a joy to watch in its effortless flight. And note the grace and beauty of the Magnum 12 as it climbs skyward on launch. Perhaps the essence of our hobby/sport is the intrinsic beauty of these creatures seemingly suspended in space.

This year's Toledo Show was well attended. Ken Bates introduced a new 100-inch flying wing (with under-wing spoilers). Here's a real beauty. Ballast can be placed in cylindrical holes aft of the canopy. Jim Simpson, of NAME, Inc., is marketing an excellent lightweight (15-1/2 oz.) delta wing aircraft suitable for aerobatic R/C soaring flight. He calls it the Vulcan. He also displayed a releasable towhook (with positive capture) and a very sturdy mixer. Chuck Anderson displayed a total energy sensor designed to indicate lift and disregard "stick lift." A single closed end sensing tube protrudes upward with the small hole on the aft side. I need just such a device.

There was an exhileration in the air when the news came through that the U.S. Team won the International R/C Soaring Championship held in South Africa. In fact, our Skip Miller also won the top individual spot. CONGRATULATIONS!! to our team and to Jim Simpson, Senior V.P. of the National

Soaring Society for the team selection that lead to this success.

By the way, the latest issue of *Sailplane,* journal of the National Soaring Society, is a directory of soaring sites. Join now so that you can pick up a copy before you go on your summer vacation trip. ●

Plug Sparks . . *Continued from page 31*

hopes to hold a reunion consisting of a good time with emphasis on reminiscing, renewing old acquaintances, and making new friends.

If you are a Kansas boy, Jack would enjoy hearing from you about this proposed reunion. Drop Jack Jella a line at Air Trails, Inc., Salinas Municipal Airport, Salinas, Ca. 93901. If you want, call Jack at (408) 422-7846 and lettum know you are coming!

SAM RAMBLINGS

Latest telephone call from Tim Banaszak, S.A.M. Secretary Treasurer reveals many new deals and goings ons. The Toledo Weak Signals Trade Show went off simply great, and the SAM Static Display of Old Timers was no exception.

Tom Barnes, Contest Director of the Static Display Competition, employed several unique judging factors to arrive at a winner. The models, of course, were judged in fidelity and workmanship. Tom also used a system of competitiveness based on present SAM rules. Judging the model on estimated flying, Tom came up with a multiplying factor. This gave a definitive ratio of flying ability to craftsmanship.

Well, in less time than it takes to tell it, Chester Lanzo won the event with his replica of the Lanzo 1937 R/C Stick model equipped with an Ohlsson .60 engine. Joe Beshar, our SAM Prexy, came in second with a Brooklyn Dodger that was rigged up with a timer to turn on the set AFTER the power portion of the flight. Powered with a Forster 29 (R/C throttle), the clockwork timer not only shuts off the motor but, also turns on the radio. Here is a most interesting way to overcome that horsepower race! As the author demonstrated (by losing his model at Lakehurst) this is quite possible, and adds a lot more zest to the contest.

To wrap up the contest, a Gladiator (builder unknown) won third place. Fifteen entries graced the rolls. Three trophies and two plaques were awarded to the winners. Tom Schoneau of M-N-M Models was the sponsor, and gained fourth place with his kingsized Sailplane.

A Struhl Taylorcraft came in fifth. Next year should be even better!

The latest postal contest, with Ed Novak of SAM 7 doing the Contest Director work, will be a Compressed Air event. Entry fee will be $1.00 per entry, and all flying reports shall be based on the period between June 15 and October 15. Nice thing about this postal meet is that you can enter as many times as you desire.

Backing up to the Toledo Show, Joe Dallaire showed up at the static display with (of all things) a monokoted 9 ft. Dallaire Sportster. If brother Frank were only alive to see the fun!

Herb Wahl had a booth and was exhibiting the latest Wahl-Brown as announced in the last issue of Model Builder. The "new" Brown engines are essentially the same as the original Brown Jr., so are well worth the asking price of $139.00. Write to Herb's Model Motors, P.O. Box 61, Forksville, Pa. 18616, for particulars.

Probably the saddest face at Toledo was worn by Clarence Andre, as his beautiful (both workmanship and flying ability) ship was heavily penalized in the judging as he did not bring any authentication for proof of design to judge for conformity, etc. Tough!

Other SAM News is that the old GRIMES Club, now called MAM (Michigan Air Modelers) is staging two O/T contests at Hastings, Michigan, this year. This is a meet for the hardy, as your model can possibly end up in the river, woods, or lake. Shades of the old days!

Tim also reports that SAM is now 1500 strong, and "we" are now the second largest modeling group in the USA. SAM is the biggest group within the framework of AMA. Let's not lose our clout by splitting up as advocated by some extremists.

ENGINE CONVERSION COMMITTEE

As reported in "SAM Speaks," the official publication of SAM, Al Hellman, Chairman of the "Converted-to-ignition" glow engine committee, has come out with a series of recommendations to be voted on by the membership for incorporation into the present Old Timer Rules.

The writer cannot praise Hellman and his 16 member committee too highly for the prompt and effective action. It is simply amazing to this writer that in the short span of six months, a complete agreement could be reached, particularly when you see the makeup of the committee, running from Bob Hunter (a real hot dog!) to Danny Shields (a old timer purist) to Tom Bristol (a progressive R/C old timer).

What the proposal recommends, in brief, is a new series of engine displacements for the standard engine classes for those glow engines that have been converted to ignition. The original ignition engines will continue to be regulated by the old displacement size rules. Here's what the sizes for converted engines shapes up like:

CLASS A	0—.150 cu. in.
CLASS B	.151—.250 cu. in.
CLASS C	.251—.400 cu. in.

As one can see, the sizes of converted engines has been reduced by as much as 30%. This, hopefully, if passed, should place all engines on an equitable basis.

In addition to this, the writer also notes that two more proposals have been advanced, to wit: Glow engines shall be prohibited in *basic* SAM events, and (2) Diesel engines shall be banned from all *basic* SAM events. To this columnist, this is truly ironic, as Old Timer flying got started with over 60% of the modelers using glow engines when the first Old Timer contest was held by the Stockton Gas Model Association back in 1960.

As interest grew in Old Timers, more and more of the active modelers turned to ignition. This sport has grown to the point that most of the modelers have forgotten how they first started and are now insisting the newcomer plunge into this old timer game using nothing but antique engines. Can't say this does much to encourage the newcomer who wants to use what engines he has available. As I said last time, anytime you make something real restrictive, you'll end up with it all alone! End of soap box.

THE GREAT WHODUNIT MYSTERY

The writer is a hot dog; first and foremost. If something new comes out, he is the first on his block to try it. It is for this reason, the columnist always loads up on the latest item.

The hot glow engines first being used in Old Timer R/C was no exception. He had acquired a $1000 worth of Webra Speed engines, Torpedo R/R, etc, etc. So when the vote was taken on the reduction of power for R/C models, it was no great secret this proposal would be resoundingly defeated. However, the committee in charge, while admitting the negative vote, did decree the new power loading rule, thus eliminating the writer's (and many others) investment.

In conversations with the committee, the writer was led to believe that the president, Joe Beshar, exerted considerable influence to have the rule change enacted. When this column referred to Beshar as the author of the 225 sq. in. per tenth of cubic inch engine displacement, Joe indignantly demanded a retraction of this. So be it. However, to this day, the writer still doesn't know who voted for the proposal. Whodunit?

However, that is not the point the columnist was trying to make. Too often, in our capacity as officers of SAM, we get tired of arguing and bickering over minor points and sometimes arbitrarily decree such and such will be the order of the day. We should never lose sight of the fact that SAM, in spite of shortcomings, is an organization made up of modelers who have definite ideas of their own and wish to express their opinions by letter and/or vote. Under no circumstance should an arbitrary decision be made contrary to the wishes of the majority.

Had enough soap box? Here's an ironic twist. With the new displacement regulations as recommended by the Engine Conversion Committee, the columnist is again hung with at least ten unusable engines. Good thing, he flies R/C. He can use them there!

HELP IS ON THE WAY!

President Beshar, disturbed by some of the modelers who prefer things exactly as they were in the forties, has called for an early conclave of the SAM officers (by mail) to give consideration to an idea of making certain *basic* events as pure as the most ardent old timer fan would want. This is only in the talking stage, contingent on the Engine Conversion vote results, but, if passed, this columnist looks to further refinement of the present events by proposals to be submitted at the Annual SAM Business Meeting.

SAM 7 YANKEE

Latest SAM 7 Yankee newsletter reveals the contest schedule for SAM 7 consists of a May 22 Spring Rally at Rocky Hill, Conn. (now history). On July 21, they will stage their Mid-Summer Clash at Rocky Hill, with Henry Struck as C.D. Events will be: Class A Cabin (0-.24) Class BC Cabin (.25 and up) Pylon Gas, SCIF Cabin, SCIF Pylon, Rubber, Rubber Flying Scale and Peanut Scale.

To wrap up the season, SAM 7 will present the 1977 East Coast Old Timer Championships (Free Flight only) at Wendover AFB, Chicopee, Mass. All O/T events as listed in the previous contests will be held.

According to Sears McCorrison of SAM 16, who offered to run the R/C events, there was only one R/C event offered, so only three contestants showed last year. Truly a shame that the Eastern Championships have had to abandon this phase of the hobby.

FLORIDA FLASHES

Just received a nice letter from Terry Rimert who reports the Jacksonville gang had a contest at Bunel, April 3.

Although it was a small contest by comparison with the K.O.I., Tom Tibbs won the .020 Replica and combined ignition/glow events. Brighton Barron took second in O/T (Doesn't this guy ever wear out?). He even has his 78 year old wife shagging models for him. There must be a fountain of youth elixis in the airplane dope, as this couple really shows the way to do it.

Phil Peach got a second and third, while Jay Hicks wrapped up the last 3rd place in .020 Replica. Terry grouses about the old timer movement needing a shot in the arm. Well, those things sometimes happen, with Ron Sharpton involved in Little League baseball and Gil Cockran in the hospital from a heart attack. However, Gil is a rugged guy and sez watch out at the next contest!

Next biggie in Florida will be the Rebel Rally. We'll try to have some pics on that one!

AMPS AMBLINGS

Latest information from Jim Persson, AMPS President, is that the amalgamation with the Northern California Free Flight Council (NCFFC) and use of their field, is the best thing that could have happened to the old timer movement in Northern California.

The recent NCFFC meet at Sacramento, on March 6, showed some great times being turned in. If you didn't "max-across-the-board" in your particular event, you simply didn't win. As Persson sez, "now that we have this great field, let's all turn out. No excuse for not flying now!"

An interesting development that came out of the last AMPS meeting was the idea to combine the North-South meet and the Stockton Annual. The rationale here being that the schedule is now so badly crowded with O/T contests, any more would be redundant. How about that? Too many O/T contests! Never thought these tired old eyes would see the day!!

SAM 21 & SAM 27

Between the two SAM Chapters in Northern California, a terrific schedule of O/T R/C contests have been listed. When the SAM 27 contest at Santa Rosa and the SAM 21 meet at Elk Grove got blown out, the competitors got some breathing space. Contests have been coming thick and fast.

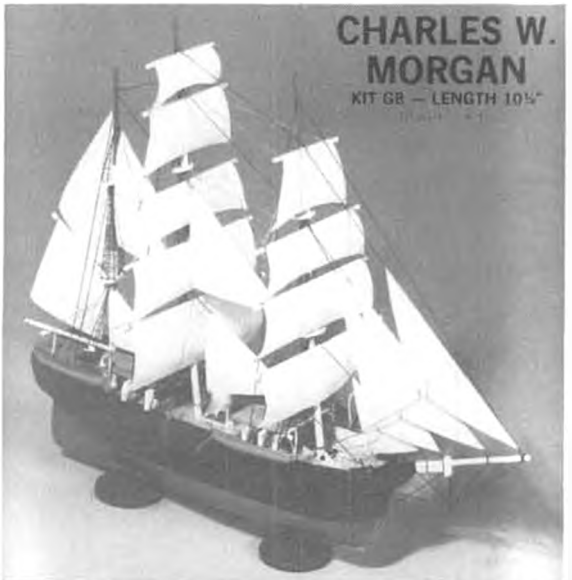
Probably the most successful to date was the SAM 21 meet at the Smith Ranch, in Marin County. This new site, acquired by SAM 21 Prexy Don Bekins, proved to be just the field for the Bekins family, as Don and son, Lawrence garnered the majority of the prizes in Limited Engine Run and Texaco Events. In .020 Replica, however, Bob Lee repeated his win, using his reliable So Long equipped with Ace Galloping Ghost type radio gear.

Bob has now taken a good lead for the year-end prize of a Cannon Airborne pack to be awarded to the high point man in the .020 R/C Replica Event.

In a review of the last three contests, Don Bekins has been a holy terror with his Anderson Spitfire powered Lanzo Record Breaker, winning three Texaco Events in a row with times like 29:23, 18:56, and 24:32. Whew! As president of SAM 21, Don is setting an excellent example for the newcomer, being fairly new to the old timer game himself.

Noted at the recent SAM 21 Blow-out was Karl Tulp's Dallaire Sportster, with an OS-4 cycle engine converted to ignition. Otto Bernhardt, up from Gardena, took a special interest in tuning the motor. On a 14-6 prop, the engine ran great, but when the motor

THE TALL SHIPS ARE COMING!



THEY'RE EASY TO BUILD

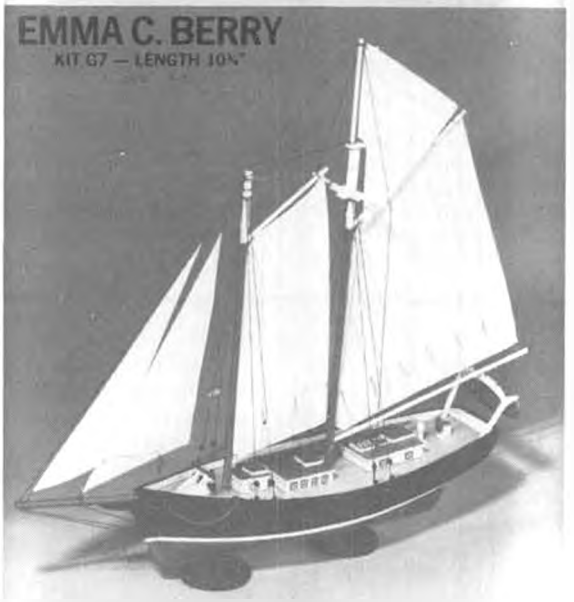
We know it seems unbelievable, but its's true. New techniques in the heretofore difficult rigging installation and ratline making, are simplified so that almost anyone can produce a craftsman-like job. Density selected prime balsa wood is a real pleasure to work with, and the step-by-step plan is clear,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

- **CARVED WOOD HULLS**

THEY'RE COMPLETE*

With machine carved hulls, that require only a little trimming and sanding. Kits include many finely detailed cast metal fittings (as required for each kit) such as Life Boats, Windlass, Anchors, Steering Wheel, Water Cask, Lights, Screw (propeller), Ladders, Compass, etc. Black and Tan rigging line, Printed CLOTH Sails, Decals, Display Pedestals and much more . . .

*Dry Kits paint and cement not included



THEY'RE HISTORIC

Sailing out of her home Port of New Bedford Mass., the square rigger Charles W. Morgan sailed further and killed & processed more Whales than any other Whaling Ships of her time. Today it is for ever enshrined in all its glory at Mystic Seaport Conn., were it can be boarded and its history relived. The Emma C. Berry is one of the oldest commercial sailing ships in American Documentation. Preserved in excellent condition it can be visited and enjoyed at Mystic Seaport Conn. Emma was launched in June 1866, Slooped Rigged. Further details can be obtained from Mystic. Originally the U.S.C.G. Sailing Bark Eagle was built for the German Navy. It was acquired by the U.S. Coast Guard in 1946 and has been used as a training ship since then for Future Officers; Carrying 200 cadets. For further details write to the U.S. Coast Guard.

- **CLOTH SAILS**
- **CAST METAL FITTINGS, ETC.**

THEY'RE UNIQUE

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

THEY'RE ONLY

6.95 ea.

Sterling MODELS INC.
PHILA. PA. 19134 U.S.A.

AND THEY'RE AT YOUR DEALERS NOW

GET OVER AND SEE THEM . . . START YOUR ENTIRE KIT!

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.)

- ☐ 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.

Name _____

Address _____ City _____ State _____ Zip _____

was throttled back, was that a beautiful idle! Loren Schmidt, thoroughly impressed, immediately hollared 'foul' and vowed to have these engines outlawed. Got to admit, they are economical on spark!

HOT STUFF—KINGSIZE!

Bob Hunter (and Bill too!) is the most enterprising entrepeneur of all, as witnessed by the receipt of two 2 oz. bottles of Hot Stuff. If you, the modeler, have been building like mad with this glue (as I have), this will be the answer for not running out of glue. This should also appeal to the thrifty, as the bottles are considerably cheaper by the two ounce lot. If you don't think so, remember, there are 28 grams to an ounce. So don't let misleading ads about the amount of grams you are receiving in a package deceive you.

Bob further states he is putting together a Buccaneer using Hot Stuff exclusively. For those who have had second thoughts about using this cyanoacrylate glue on big models, do like Bob does, don't worry! Actually, the columnist finds that brushing each joint with alaphetic glue (or white glue) as a followup, helps reassure the builder it won't come apart easily.

DECALS, DECALS!

Larry J. Vance, of the VAMPS (Vegas Antique Model Plane Society) sends in his latest idea for decals. He has successfully reproduced all the original decals of the early motors.

Each sheet comes with nine decals suitable for putting on your model, the engine box or just about any place you decide on. The engine decals include the original decals of Dennymite, Super Cyclone, Forster, Ohlsson, Atwood Champion, and two decals of Texaco and Champion.

Larry hopes to sell these at the SAM Champs at the price of three for $5.00. May sound a little high, but if you figure 27 decals, then the cost for each decal is less than 25¢. For those fellows who can't wait until the SAM Championships for the decals to make their appearance, you can write Larry Vance, 5066 Cindy Way, Las Vegas, Ca. 89102. Send five bucks and be the first on your block to have the engine decals.

P&W SCORES AGAIN!

Gene Wallock, the "W" of P and W, announces two new partial kits added to his excellent line. The original Buccaneer should find favor with the modelers, as it is a little simpler than the Super version, and a shade smaller in wingspan, by 6". (Makes it easier to pack in your car).

The Trenton Terror, which is a 1/4 sq. and 1/4 sheet special, comes complete with all formers, ribs, and plywood pieces. Where firewalls are called for in his kits, Gene also provides these.

Those modelers interested in economical kits will do backflips over the $11.00 and $9.00 prices for the Buccaneer and Trenton Terror respectively. Of course, you have to purchase your own stringer wood, but most of us would rather do this anyway. You can always get excellent wood from Sal Taibi (Premier Balsa) or Mike Taibi (Superior Balsa), and cut to extra lengths, too!!

THE LAST LAUGH

Good natured, likable Sal Taibi has always been the center of many stories of old, but it is always refreshing to find, in these modern times, there are anecdotes growing out of this era.

Sal, as everyone knows, flies most any form of free flight gas, and night events at the U.S. Free Flight Championships were no exception. Like all the rest of the competitors, Taibi employed a motorcycle to recover his model.

On one night flight, imagine Sal's surprise, when watching the model and traveling at a pretty fair clip, a barbwire fence loomed up out of the darkness. Sal was pretty badly scratched up by the barbs and flew no more that night.

Next year (according to the anecdote), Sal was using his car to chase, when he met an obstruction that required him to abandon the car and continue the chase on foot. Being conscious of the drain on the car battery, Sal turned the lights off on his car, stopped, got out, and

continued the chase. Upon retrieving the model in the pitch black darkness, (it was equipped with the usual flashlight bulb) Sal was unable to retrace his steps to the car, having left no lights on at all! Sal found the car the next morning.

Ask Sal sometime why he doesn't engage in night flying anymore. Haw!

•

Paragon . . . . . *Continued from page 61*

unfilled grain acts as a turbulator. All I know is that the gliders glide good enough for me, and they get as high as any other glider . . . Case closed.

It is best to finish the wing totally before you cut it apart. This way, you can use the sanding block all the way to the end, and there is less chance of gouging the wing.

When your wing is dry, and sanded smooth, you can cut it apart and put in the dihedral. Don't forget to cut in the wash-in on the left panel. It is important, if you don't want your plane to spiral dive in a hot thermal. Use five-minute epoxy for the joints. When all the joints are dry, put the wing aside once more.

STAB & RUDDER: Give both parts one coat of thin dope, and sand smooth. Now you can cut apart the stab and hinge it. I use Scotch tape. It holds just fine and is cheap.

FUSELAGE: Give it two coats of dope, and sand smooth.

FINAL ASSEMBLY

First glue on the stab. I use Titebond for this. You could use Hot Stuff if you are in a hurry. Be careful not to glue down the rear of the stab. Once it has dried, glue on the rudder, making sure it is straight; a crooked rudder is a death wish! When that is dry, glue on the wing. Use five minute epoxy for the job. I hold the wing and the fuselage in my hand while they are drying. Make sure everything is straight, or you will have problems later when you go to trim out the plane. Now glue on the finger rest. Find a dowel that fits your finger, wrap it with sandpaper, and sand out a finger rest that fits you well. I use one of 1/4 inch trailing edge stock; it is already tapered, so you only have to do a little sanding. Now you can hook up the D.T. As you can see from the plans, there is not much to it.

One thing not shown on the plans is an 1/8 square of plywood where the ten-pound monofilament comes through the top of the stab. Epoxy the monofilament to the plywood and not the balsa, if you don't, the monofilament might pull through the balsa.

Pop-up the stab to 45°. That has proved to be the best angle for a safe and quick D.T. Make sure the stab pops up every time. There should be no problems hooking up the D.T. If there are, just keep looking at the plans and the pictures, it should be clear. If you still can't figure it out, you're beyond help! Add on the snuffer tube and aluminum plate and add lead to balance . . . epoxy all of these on. Now that you have finished your Paragon, let's go out and fly it.

FLYING

Try to do all test flying on a calm day, you can't tell much on a windy day. Try a few test glides. It will most likely glide straight. You will have to give it a lot of left rudder *(what about the "death wish"? wcn)* to get the turn . . . you will think you have too much rudder, but trust me. Now try a low power throw, the straighter up you can throw, the better. What ever you do, don't throw side-arm. Let me explain. Under a high-power launch, the stab lifts a little and gives a good power pattern if thrown straight up. If thrown side-arm, it does a nice roll into the ground. All of mine have flown right off the bat. The only adjustment ever needed was about 1/32 of up elevator. If the glider looks like it's spinning in a thermal, take out a little bit of rudder or add a little wash-in.

A FEW WORDS OF WISDOM

No matter how good your glider, it won't max without a thermal . . . not even a Paragon can do that. If you have any hope of winning a contest, you will have to learn how to pick thermals.

And the only way to do this, is to practice. Get out and practice all you can in all types of weather. Contests are rarely held on warm, windless days. If you only practice on warm windless days, you are going to be in a lot of trouble on a cold, blustery day. Like they say, practice makes perfect, so practice, practice, practice!!!

Drop me a note, care of **Model Builder,** and let me know how you are doing with your Paragon. Special thanks to all my friends who helped me get this article together.

Good luck with your Paragon, and remember my slogan, "Paragon, the shape of things that max." Thermals! •

F/F . . . . . *Continued from page 57*

piece of 1/16 plywood to this dimension, plus the thickness of the two plywood ribs. Hot Stuff the two plywood rib templates on top of each end of the 1/16 plywood base. Cut the balsa blanks to rough size and insert all of them into the space between the two plywood templates and begin carving and sanding them down.

Some variations in setting up the jig are possible. If, for example, the model you are building features a swept back leading edge, you can set it up as shown in Fig. No. 5. If the wing has a swept forward trailing edge, set the jig up as illustrated in Figure No. 4. My own preference is to put in a couple more blanks than are called for in the wing, as this allows for some "fussing" with the finished ribs in order to make them fit. One of the difficulties with any kind of rib made using a method similar to this is that the leading and/or trailing edges are slanted and will need to be sanded down. Consequently, some of the ribs will be shorter than necessary . . . that's why putting in a couple of extra blanks will prove a sound idea. With this system, you can cut out a complete set of ribs for one half of the wing with one "whack", and complete the other set in just twice the time.

Who knows, with a little bit of practice you might be cutting ribs because it's fun to do!

FAI TEAM READIES FOR DENMARK

By the time you read this, the A/2 team representing the U.S.A. at the 1977 FAI F.F. World Championships has been selected (At least, since this is being written two months earlier, it is hoped that the A/2 team has been selected!). Under the direction of Team Manager John Lenderman, our 9 representatives will be assisted by a number of other active US competitors. We wish them the best of luck in their competition in this bi-annual Free Flight Olympics.

P-30 KIT

Last month, we commented upon the staging of the P-30 rubber event at the 1977 California Nationals. Several P-30 designs have been published and at least one kit has been on the market for awhile. Now, Blue Ridge Models, of 222 Governor's View Road, Asheville, N.C. 28805, the makers of the fabulous Coupe de Ville kit, have announced their "Square Eagle" P-30 kit. The kit includes band sawed, notched and sanded ribs and fuselage sides; pre-drilled nose block, formed prop shaft, a 9-1/2 inch Peck Polymers prop, black line plans, instruction booklet, Japanese tissue, all hardware, and FAI rubber strip. All of this for $5.00 plus postage (Postage will be $1.00 for one to four kits). All wood is from Superior Balsa and features excellent C grain balsa.

MOVING . . . MOVING . . . MOVING

It seems to be a fetish with some free flight correspondents. Peripetetic, they say. Dave Linstrum, MAN's free flight scribe, came back from Saudi Arabia last year and looked around the U.S. for some kind of gainful employment, but now finds himself heading back . . . this time to Athens, Greece.

Bob Stalick, who writes this column, moved down to the University a year ago, and will be returning to the more familiar 1120 Shady Lane, Albany, Or. 97321 address on July 1, 1977. So, all of you who are sending your club newsletters to the current address in Eugene, Oregon, are asked to revert to the previous address with your next issue. *(Lots of luck. In spite of extra notices, MB still gets newsletters addressed to the office we left a yeur ago! wcn)*

THE HISTORY OF THE 1/2A FREE FLIGHT MODEL REVISITED

Some time ago, I asked for some assistance from the readers of this column. A large number of people responded with needed help. We had requested information about various Nationals winners in 1/2A gas over the years. Now, the article is nearing completion and some other kinds of information are needed. To be specific, the

following:

A picture or 3-view of the 1950 winner, 1/2 Wild Goose; a picture or 3-view of Dick Everett's 1951 Dallas Nationals 1/2A Gas winner; a picture or 3-view of Wally Short's AWOL design.

In addition, Jack Oxley won the 1953 Nats with an original that at one time held a number of AMA records. A 3-view or photo of this model is needed. In 1955, Bill Fox won first at the Nats with an original. A three-view or picture of this model is needed.

Information on the next several years is amazingly complete, until 1966. If you have a copy of the 1967 Air Trails Model Annual (which features the 1966 Nats), I would appreciate it if you could Xerox the page which contains the 1/2 A winners and send it to me. The same is true of the 1967 Nats (which is featured in the 1968 AT Annual). This time the event was won by Bill Davis. I have no information about what kind of model Bill flew to his winning time.

In 1969, Harry Grogan won first place, but no information about the model is available. A three-view or picture of the model (with Harry) would be appreciated. Finally, Norman Poti won at the 1975 Nats, but nowhere can I find any information about what model he flew. Again, a picture or 3-view would be appreciated.

Finally, I know the rules changed from a required 3-point V.T.O. to a one-point V.T.O., but I don't know the year it took effect. If you have any of the above information . . . or if you are one of the winners, I would appreciate hearing from you. What will you get for your efforts? Well, I will repay any expenses and you will be listed as one of the sources for the information.

Besides, you will be chronicled in a study which looks to be quite comprehensive at this stage.

Send any information to Bob Stalick, care of **Model Builder** Magazine. And thanks in advance.

CONTESTS OF NOTE . . .

THE BMA SCHOLAR

Every year for the past 7 years, the Boeing Management Ass'n has sponsored its annual BMA Scholarship meet. This year is the 8th edition of this excellent contest. It will be held at Kent, Washington on July 9 and 10, and the following events are scheduled:

CONTROL LINE
1/2A Profile Proto
Control Line Scale Racing
Stunt
Profile Navy Carrier
Combat Slow Combat

FREE FLIGHT
1/2A Gas
Unlimited Rubber
Outdoor Hand Launch Glider
Outdoor Peanut Scale
Towline Glider

Indoor Hand Launch Glider
Indoor Easy B
SPECIALTY
Rocket-Streamer Duration Class I
Rocket-Parachute Duration Class I
Rocket-Sparrow Boost Glider
Radio Control Open Class Sailplane
Radio Control Standard Class Sailplane Design Craftsmanship

The rules are:

1. Anyone less than 19 years of age as of July 1 of the current year may enter.

2. AMA/NAR or other appropriate licenses must be held, and all appropriate rules of these organizations apply.

3. Contestants may enter any number of events; but not more than three events in any one category will be scored for the scholarship award (e.g., free flight, control line, specialty).

4. Points will be scored on the basis of 25 for first, 20 for second, 15 for third, 10 for fourth and 5 for fifth in each event. The contestant's best scores in four events will be combined to determine the scholarship winners. Trophies will be awarded to the three highest scoring contestants in each event.

More information can be secured from Larry Lang Jr., 13825 S.E. 141st. Renton, Wa. 98055.

For the readers of this magazine, it should be pointed out that Dirty Dan Rutherford almost always attends this contest. This may provide you with one of the few opportunities known to living man to see a living legend (It pains me to say that).

Well, that about wraps it up for another month. Keep them cards and letters coming folks, but remember the new address.

See you all next month. ●

C/L . . . . . *Continued from page 47*

screw things up as far as I'm concerned.

That brings us to the oft-repeated pro-R/C comment, "But you guys can't do rolls, besides being limited to going around in circles". Well, they're right, our C/L planes can't do rolls (or at least shouldn't be rolling!), and we are limited to a certain line length. My response is that to be able to do rolls is hardly worth giving up the already mentioned direct controlling of a C/L plane. And flying in a limited hemisphere is more of a challenge than a handicap. Do you see R/C guys capable of doing maneuvers where the *top* of the maneuver is 65 to 70 feet high? In C/L, a vertical figure eight, with the top at about 65 feet and the bottom at 4 feet, is easily done with even a Sport profile model, let alone a competitive Stunter. And, of course, today's Combat ships will do two or three vertical figure eights stacked on top of one another in that limited airspace. The AMA C/L Stunt pattern, done by a competent Stunt flier, is guaranteed to raise the hair of any R/C guy. There is enough to do while flying a C/L plane, that the inability of our planes to do rolls and other such nonsense is never desired, let alone missing.

Besides, many R/C guys simply fly around in circles anyway! An example: While flying C/L one time last year, some bozo on his way to the R/C area stopped by and looked things over. He and I got to talking and he mentioned that he liked C/L flying, but got tired of going around in circles. I was testing Combat planes, so I asked him how many level laps he had seen me do per flight. After a little thought, he had to admit that I had done very little as far as going around in a circle. When I test Combat planes, I might do only three or four level laps per flight and quite often only do one total . . . 1/2-lap after launch and then wring it out, 1/2-lap after the engine cuts and into the landing.

Later on I went down to the R/C area to see what was going on and here was our guy doing his R/C thing. And guess what he was doing? That's right, he was flying around in big circles, doing an occasional loop. He was doing exactly what he says is an unattractive feature about C/L flying, all the while thinking he had graduated to a superior form of model flying. Rather than having graduated, he had instead taken up remedial flying, R/C style.

One of the other misconceptions that R/C folk have about serious C/L fliers is that we fly C/L because we can't afford to fly R/C. That is the most ludicrous thing I have ever heard of. I fly C/L because I prefer it, not because I can't afford R/C. A top-notch 5 or 6-channel R/C set comes cheaper than the handful of new Fast Combat motors I just bought for the '77 Combat season. Granted, I probably have more motors than I really need, but the fact remains that the money I spend on Combat flying each year would outfit me with all the foof necessary to be a bucks-up R/Cer.

Way back when, R/C was the expensive side of the hobby, to be sure. But R/C system prices have come way down, while reliability has gone to a quite high level. Any serious C/L flier has an investment in his hobby that, at the very least, equals that of the serious R/Cer and outstrips by far that of the R/C Sport flier.

I *do not* feel that dollars spent in any way equates to the amount of fun one can have. But it is quite evident that many R/C guys do. To them, I can only say that maybe they ought to consider moving up . . . to C/L, of course.

I'm not trying to alienate the many fine R/C fliers who read this column and have an appreciation for what C/L is all about. I'd just like to do my small part as far as straightening out

erroneously conceived notions that R/Cer's in general have about us enthusiastic C/L fliers. And I also must And I also must say that I (as well as many other C/L folk) have an appreciation for what can be done with an R/C plane.

With the above in mind, and for the benefit of those just breaking into modeling, I say that you haven't participated to the fullest extent possible unless you try as many of the different aspects of modeling as possible.

When looking for a particular kind of modeling to get into, look at them all with only your own interests in mind. If F/F looks good, get into it. If C/L activity seems very healthy in your area, check it out. And if you think R/C is where you fit, by all means get an R/C set and join in. Just don't muddle around waiting to "graduate" and by all means try to never be so wrapped up in your favorite activity that you can't look at what others are doing and learning from them. To this end, I'm sure you'll find good ol' **Model Builder** to be a real help, as WCN seems to be able to month after month fill these pages with a wide variety of modeling disciplines, all of which can at one time or another give you an idea that will apply to your favorite brand of flying. The fact that WCN himself has only flown a C/L plane once (and it was a plastic hunk) bothers me some, however . . . *(Correction. I've only flown C/L once since it became known as "C/L", "U/C", "Ukie", "Yo-Yo", or what have you. Back in 1936 . . . when Atwater-Kent was big in radios . . . I was flying rubber powered models on string. Getting tired of only 5 or 6-lap flights, I removed the rubber and prop, and added some nose weight. To get a decent circle radius, I put 10 feet of line on an 8 foot fishing pole. With plane attached, it could still clear the ground if I held the pole vertically overhead. With a whipping technique, I could fly the plane as long as I could stand up; shooting touch-and-go's and getting some pretty wild overhead maneuvers. If the plane got into trouble . . . up with the pole, and it was guaranteed to miss the ground. As far back as that, I discovered the need for out-turning the rudder, learned that I should start off downwind, and developed the trick of stepping back when the line went slack. wcn)*

Now I am going to jump on the case of many C/L fliers, just to make most of this month's readers immediately flip to another part of the magazine.

For those of you still with me, let's consider this. R/C is the big thing right now, in consumer dollars spent, and in new goodies coming from the manufacturers. Many of the new items are marked "R/C" in big letters, so I feel that many C/L types simply ignore piles of really usable stuff, just because they feel it's for R/C and not for C/L. This is really wrong. If you'll take a few minutes to look over current magazines and the shelves of your local hobby shop, you ought to be able to come up with several neato things that will make life much easier for you. If you only come up with one or two things, you are either very current, or aren't looking hard enough.

I'll give you a start by going over a few things I have come across that are meant for models other than C/L, but do the job for us.

The best combat props I have ever tried are the new Pylon Racing props from Top Flite. I am using the 8-1/2 x 6-1/2 numbers full-blade, while Rich Barsher and Norm McFadden are cutting them to 8-1/4. Although made for Pylon, these props really work on a Combat ship. I'm using them full-blade to get as much disc area as possible to haul my rather large (494 squares) planes. Rich and Norm cut them to get more RPM from their Foxes, and don't need the disc area that I do as their planes are down around 400 squares.

When tying a balloon over a bladder, it is recommended that the bladder be lubed first. I use rubber lube from Peck Polymers, and it works great. If I didn't fly Peanut Scale, I might have never come across this product . . . are you beginning to see why I said to never be so wrapped up in one activity that you can't learn from others?

When starting to cut foam a few months ago, I got nichrome wire from a hobby shop, plus I checked with as many R/C fliers as possible (even stooped to asking Bob and Kathy Root) on how to go about cutting foam. A few simple questions saved me hours of experimentation.

The Dirty Dan Dial-A-Turn has already seen the light of day in my Dirty Beaver and Cheater Slow construction articles. The items used to construct the DD D-A-T are straight out of R/C city (or, in this case, Rocket City).

Tom Knoppi just dropped off his Team Racer for a coat of clear epoxy. Instead of the usual pushrod, he is using the cable-in-a-tube system normally used in R/C planes for motor control, and it looks much easier to install in the confines of a TR. Tom is also using a DuBro Ball-link to connect the pushrod (cable) to the bellcrank. An item in the most recent PAMPA n/l shows that Keith Trostle is also using the Ball-links

in his latest Stunter. Keith says they work great, offering bind-free linkage that is easy to hook up, plus offering ease of adjustment.

Every so often, I need to glass portions of a plane, most usually a Racing plane. The neatest way to do it is to tack the glass cloth in place with Ambroid and then to trim off the excess. With the cloth held in place by these thin beads of glue, it is then a very easy thing to apply resin or epoxy. I picked up this tip from the R/C Soaring column in **Model Builder** back when this really interesting guy used to do that column. His creative style of writing was much better then mine, and WCN probably knows who I'm talking about. Sure do miss his style and flair.

Terry Prather's Prop Pitch Gauge is very useful, especially to anyone involved in the Racing events. The price may at first seem a bit much, but it looks plenty cheap when you try making your own.

How about Hot Stuff? The entire modeling world has gone nuts over this glue, but if you had been paying attention to the F/F boys, you could have been using it for almost two years before everybody else caught on to it. And thanks to the thousands of R/C guys using this glue, it now sells for $3.50 a package, instead of the original price of $8.00. *Thank you,* to my friends in R/C!

For those people trying 1/2A Stunt, Fourmost Racing Products has three motor mounts that are really trick. Designed for 1/2A Pylon, of course, but just the thing for that new mini-stunter. The AirFlo mount is the latest, and looks a lot like a pan cut off short and with a bulkhead added behind the motor. Check 'em out.

I guess that is enough to make my point. Just pay attention to what "the other guys" are doing and it is sometimes possible to advance the state of the art in your particular event by doing nothing more than copying (adapting) some of their tricks.

NICKNAME CONTEST

This was really fun for me, I kept getting all these really weird letters in the mail from people with the most outrageous of nicknames. But nobody had a better nickname than that of "Flipper and Whipper", belonging to Phil Shew and Les Pardue, a Racing team from someplace down south. I've considered awarding prizes like band-aids for Flipper and a new pair of tennies for Whipper, but will resort to the usual freebie sub to MB.

NEW CL-RPM ADDRESS

Russ Sandusky, the guy working his fingers to the bone in an effort at getting the C/L Racing Pilots and Mechanics organization going, sends along a note saying that there's been a change of address. From now on, send all correspondence to: CL-RPM, 1122 Plaza Circle, Joppa, Md. 21085. If you want to join CL-RPM, which will help to promote C/L Racing in general and help you in particular as you'll be getting organization's n/l, then send $7.00 to the above address. Don't you wish you'd joined back when I first told ya about CL-RPM and the fee was only $5.00? Actually, even the $7.00 seems to me to be a reasonable fee. After all, it only equals a couple of glass props or a few plugs.

LOSE ONE, GAIN ONE

From Mike Hazel comes word that NASA (North American Speed Association . . . or, as MWH puts it, Non-Active Speed Association) has folded up. Small wonder, in my mind. The Speed guys are real shut-ins; I've tried to get in touch with a few and very rarely get a response of any kind. But now a new special interest organization is starting up and it's special interest is Navy Carrier. Going by the first issue of the n/l, I seem to be the last to be notified (don't be bashful, Ted!), but I guess I never have been much in the world of go-fast-go-slow . . . punch-a-hole-in-the deck.

The Hi Low Landings n/l is put out by Ted Kraver, 1212 E. Manhattan Drive, Tempe, Az. 85282. Send Ted $5.00, he'll sign you up and you'll be

getting the n/l. Best of luck to Ted, he is asking for an awful lot of work.

STRENGTH IN NUMBERS, LET'S ALL HANG TOGETHER, ETC.

In C/L, we now have 5 special interest groups doing their thing. This is super, as all of the groups are having a very significant impact on their own events. But isn't it about time to consider consolidating all of these groups into one big one . . . a large band of C/L fliers interested in their favorite event and yet ready to help when C/L in general needs a big stick?

The F/F guys already have this in their National Free Flight Society (NFFS). Back a few pages, I said that we ought to be aware of what others are doing. Here is the perfect example, let's let the F/F guys show us how to set up a national organization and then get on with it. It's the next logical step for our special interest groups, and the sooner we consolidate, the better.

GET READY TO GRAB YOUR BLADDER

I'm convinced that many didn't really believe it when we announced that we would be giving away Phase Linear speakers and an amp at the '76 Bladder Grabber Combat Meet. But we did, to the shock of many.

In '77, we will be having *two* Bladder Grabber contests, and the ante has been bumped up considerable. At *each* of this years B/G's, we will be awarding a complete Phase Linear system . . . speakers, amp and pre-amp, to first place. Prizes for second, third, etc. have not been determined yet, but count on about $4,000 worth of top-notch stereo equipment, modeling merchandise and cash to be handed out at each contest. How's that grab your bladder?

The first B/G will be held in June or July . . . we haven't picked the date as I write this. If you're interested, drop me a note and I'll send you a contest flyer. The second B/G will be held in September, and I'll have a definite date on it in the next issue or so.

If you do come to either B/G, be prepared to *fly*. It took 8 rounds to win in '76 and will no doubt take 9 or 10 to win in '77. Condor Legion-style double-elimination, of course. Is there another way?

NEW DIRTY ADDRESS

By the time this issue hits, I'll be moved into a new house, so maybe I ought to give you the new address. Try: Dan Rutherford, 4705 237th Pl. S.E., Bothell, Wa. 98011. •

SC-1 ..... *Continued from page 45*

ment. Once you learn how, the time and money saved will make you ask yourself, "Why didn't I do this earlier?" Since books have been written on the subject, I won't go into it now. Pick up RC Modeler's book on foam cutting, or get a friend who has done it, to show you how.

The best material for the wing is styrofoam beadboard insulation from a lumber yard. This is usually available in several sizes. Get a piece 2 inches thick, by 2 ft. by 8 ft. Using the hot wire, cut out four 1 ft. by 3 ft. blocks. Each block gives two wings when cut according to the diagram on the plans.

The spar slots can be cut several ways. For a large number of cores, set up a radial-arm saw with a dado blade. If you're only doing a couple of cores, make a narrow sanding block to sand the slots to shape. With a yardstick taped to the core as a guide, the slots can be sanded to shape in just a few minutes. By whatever method, make the slots slightly undersize so that the spars fit snugly. Glue the spars in place with aliphatic resin glue, and allow to dry. Sand the core smooth with No. 100 paper on a large block. Cover the wing with Solarfilm or one of the other low-temp, plastic coverings.

Epoxy the motor mounts and doublers to the fuselage. When dry, drill holes for mounting the engine, tank and landing gear. Mark the location of the wing, using one of the cutting templates. Saw out the wing opening. Make the cut-out exactly on the previously marked line. This provides just enough clearance for the wing saddles. Notch the bottom

of the cut-out for the bellcrank mount. Temporarily tape the saddles to the tip of the wing. Epoxy the saddles and bellcrank mount into the fuselage, using the wing to line things up. When the glue has cured, remove the wing. Put a layer of fiberglas and epoxy all over the bellcrank mount area. Add the canopy and rudder. Sand off all the rough spots and finish with dope, epoxy, or your favorite finish.

Now it's time for final assembly. Bolt on the bellcrank and hook up the controls. Slide the wing into the fuselage. If it is not a snug fit, put several layers of masking tape on the centersection of the wing. Square up the wing and tape it in place. The best way to apply the wing tape is to just lay it into place. If it is stretched during application, it will tend to pull back later on. Bolt on the engine, landing gear, and tank. The beast is now ready to fly.

At this point, I'm going to pontificate (!) a little bit for the benefit of those new combat flyers out there. You seasoned veterans are excused . . . Go giggle in the corner or something.

There are two main ingredients for successful combat flying. One is a dead reliable, tried and true airplane, engine, and pilot. The other is practice. The SC-1 is a sturdy, easy-to-fly plane. It will keep you in the air. Pick any of the readily-available plain-bearing 35 engines. Learn its idiosyncracies, and you'll have a reliable engine. The hardest part is the pilot. Make every flight a practice flight. Don't diddle around. Find the combination that will give you one or two-flip starts. In the air, learn to fly with both hands. Learn to do loops, lazy-eights and wing-overs without looking at the plane. And above all, fly practice matches . . . Not blood-and-guts, go-for-the-kill, but just friendly tail-chasing. Fly with everybody you can. Get used to watching your opponent without piling your own plane in. But most of all, remember that this is a hobby and have fun!

Keep 'em flying. •

Power Boats . . *Continued from page 43*

support, from the center of the bulkhead to the nose of the hull. This helps give the deck extra strength. A side note for later construction . . . when attaching the deck, spot-glue a piece of heavy yarn to the deck support. Before attaching the deck, juice up the yarn with resin; once cured, the center of the deck is anchored in place.

The shaft centers of the outdrives are mounted 2.75 inches apart (same distance between the centers of the Octura mount) and 1.5 inches from the running surface of the hull (not the keel). The outdrives are mounted with 8-32 cap screws, with tee-nuts installed through a 1/4 inch plywood transom doubler.

Now that the engines and outdrives are in place, you can install the cable and nylon stuffing-box. On my deep-vee, I installed a 1.5 inch long piece of brass tubing for a stuffing box. The nylon tube is then slipped through the brass tube and sets into the streamlined collar on the Dumas strut.

The rest of the assembly includes fuel tanks, radio box tray, antenna, and water lines and fittings. These installations can be done to suite your own tastes.

Make sure the fuel tanks are mounted below the carbs so that your engines don't flood. Also, the throttle linkage required a parallel nylon bellcrank so that I could get opposite movement (one carb was reversed so that both arms face inward on the center line). For more info on this installation, see page 61 in the September, 1976 issue of **Model Builder.**

The final phase is attaching the fiberglas deck. Obviously, the deck is the last step, because it is much easier to install all hardware in the open hull.

Now you're ready for some fun at the pond. Because of the length of this article, it will be continued in an upcoming issue of **Model Builder.** We will review the OPS .60's and cover our test runs at Lake Ida. So keep reading MB for more details.

•

Products . . . . . *Continued from page 35*

assured of success in this project. The manual includes really basic information on R/C in general, including sections on safety and operational behavior. All of this information is accurate, current, and just detailed enough to interest the novice, but not so technical that it is boring or impossible for the non-technician to understand.

The manual takes you through step-by-step assembly of all sub-sections of the car, with no tricks or hard-to-understand sections. All the hardware is metric, but not difficult to identify, as each step is accompanied by line drawings of each piece referred to in that assembly step. In fact, each piece; hardware, plastic, or whatever, is shown in the drawing, each clearly identified and referred to by a letter and number. For complicated assemblies, such as the rear suspension, accurate and clear exploded views and cutaway drawings leave no room for doubt or error.

A full page of the manual is devoted to drawings of the plastic sprues, the 'trees' from which all the pieces grow. Each sprue is assigned a letter, and each piece is given a number. As you proceed, and the instructions call for piece A2, for example, it is easily located on sprue "A", part market number 2.

Assembly of the body went just as

fast and pain-free as assembly of the chassis. You will need two kinds of adhesives, one of the regular thick plastic model cements, and one of the 'weld' type of liquids, such as Microweld, by Krasel Industries, or Plastic Weld, by Plastruct, Inc. They are available anywhere that plastic models are sold.

As with all plastic models, some caution has to be used during the application of the plastic cements, as excessive quantities will squeeze out of a joint and run, causing distortion of the finish. In most cases, it is possible to hold the body so that any runs that occur are on the inside. One of the steps during construction has to do with strengthening the body by cementing plastic sheets in a couple of places, and the application of epoxy between the joints on the inside. I decided that RTV, clear, would be easier to apply, would probably adhere better to the plastic, and would be every bit as strong in this application. This I did, pushing it firmly into all crevices and smoothing it with an alcohol-dipped finger. Light Bacardi seems to work best, but regular drug store rubbing alcohol also keeps the RTV from sticking to your finger. We later tested it the hard way, as one of my non-R/C friends drove the Porsche full bore into a concrete curb, with absolutely no damage except a slightly misplaced bumper.

A section of the manual, also full of diagrams and drawings, details the radio installation. You can't really go wrong, even if completely inexperienced.

At about this point, you will run into the one glitch that has crept into the system. Some of the advertising and product information that has appeared about this car states "two forward, and two reverse speeds", while some of it says "two forward and one reverse speed". The manual shows installation and transmitter stick movements for one reverse speed. I found, during the actual radio installation, the two reverses are in fact possible, if desired, by slightly increasing the amount of control movement applied to the speed/direction switching device. I decided that I really didn't need two speeds in reverse, and set it up for just the one. In actual driving, I have since confirmed my original opinion.

The speed and power direction control is accomplished with a printed circuit board and wiper switching device, which comes fully assembled and wired. In use, it is connected to the throttle servo. As the control stick is moved forward, two cells, in the proper polarity for forward movement, are connected to the electric motor, and you are moving in slow forward. As the stick is moved further forward, all four cells become connected to the motor, and high speed is achieved. If the stick is moved back, from neutral, the battery polarity is then reversed, resulting in reverse travel. In my setup, only two of the cells are used, for slow reverse travel.

The section of the manual devoted to painting and marking tells all about how to accomplish this, and how and where to place the 'Vaillant' markings as received. The body is molded in the proper green color, so only some trim has to be painted if you choose to stay with the same scheme. Naturally, any color or combination can be chosen, in which case any of the paints for plastics are compatible and may be used.

It will be pretty hard to go wrong, but let's face it, Murphy's Law is not at all selective. So in case you wind up with the car going backwards when it is supposed to go forward, or some similar malfunction, a section on Trouble-shooting is part of the manual. This section is also fully diagrammed, with all points identified so that only a few minutes should be required to locate and correct any fault.

The price of the dream Porsche RSR model is $49.95, complete except for radio, and batteries of your choice.

As previously reported (MB Dec. 1976) my one experience with an MRC R/C system was, and still is, 100% successful. Except for running into a rock on landing one time, definitely my fault, the airplane is still around and has accrued an impressive amount of flying time. So it wasn't a hard choice to make

when it came to what two channel system should go into the Porsche; it was to be the MRC 772.

But let's take another look at this particular choice. This is a hundred dollar radio ($99.95 to be exact), less nickel cadmium batteries. In other words, this is not the cheapest radio around, and this particular application does not call for the ultimate in reliability or performance. All things considered, if this was the only planned use for this R/C system, one of the cheaper units would be adequate.

Certainly, an older used radio could be obtained if one is not already available. The four-wire, non-bridge type servo systems are around in great quantities, many of which are in semi-retirement and surely adequate for this use.

For you dyed-in-the-wool competitors . . . we realize that we are not talking about you or your requirements. Competition with 1/12th scale electric cars is already taking place, and is bound to increase. As in all competition, the reliability of all the equipment is most important. What we are talking about is fun-driving at the nearest parking lot with your kids and friends.

But knowing me, this radio will sooner or later wind up in one of my two-channel 1/2A airplanes or gliders, where reliability and performance are more important. So it was opted to go for the higher priced spread, including the MRC rechargeable receiver batteries and charger, available as an option for $19.95. The transmitter is being operated from alkaline batteries, which provide enough operating time so as not to require replacement frequently enough to hurt the budget.

In design and construction, the MRC 772 is quite similar to other MRC "full house" R/C systems. The transmitter is one of two plastic housed units presently available, the other one is the four channel 774. The cases are attractively molded from black and off-white plastics, in comfortable 7 x 6 x 1-7/8 inch dimensions, and 1 lb., 9 oz. weight. The average current drain is 90 ma, and it is available on all of the 72 mhz frequencies, with a .005% frequency tolerance. The frame time is 16 milliseconds; the neutral time is 1.8 milliseconds. Operating range is from too cold for comfort (-10°F) to too hot for comfort (+150°F).

The 772 Transmitter is a two-sticker, in what is known as a Mode One configuration, "turn" on the right stick, and "up/down" (forward/reverse in this application) on the left stick. While this mode is definitely in the minority as far as number of users in this country, there are some of us who think this is the only way to fly. The controversy will always be around, and crops up now and then in the model press. We Mode One'rs can point with pride to the fact that some of the world's championship flyers use this mode. In all photos of Hanno Prettner with his transmitter, it appears to be of this mode; I have not personally seen him fly. Phil Kraft has not done at all badly for himself with the mode, and Ron Gilman, fastest time Formula One record holder, is also a Mode One flyer . . . Not to mention minor personalities such as yours truly. Anyway, if you haven't tried it, don't knock it, it works.

The gimbals themselves are all plastic, of open-gimbal design. Nothing new or exotic is apparent or claimed for them, just a smooth operating, clean centering stick. There are a couple of features worth mentioning however. One is an externally adjustable stick tension for both sticks, the other is the option of a self-centering or positionable left stick *(The latter for those with Mode Two tendencies. Amen! wcn).* Instructions for both are included in the manual.

The transmitter uses eight "AA" cells, which are installed through a secure, but easily-removed hatch on the lower rear of the case. Easy-to-see polarity markings are molded into the battery holder to insure proper installation. Instructions and cell type recommendations are included in the manual.

A two-color, easy-read battery condition meter is installed on the front panel. Proper monitoring of this little

handy will save launching your pride and joy with a low battery.

The superhet, double-tuned front end, 455 kc I.F. receiver weighs 2 ounces, and is 2.3 x .9 x 1.7 inches in size. It is rated at a selectivity of 3 db down at 6 kc, and a sensitivity of 3 microvolts for full control. The frequency tolerance and temperature operating range are the same as the transmitter, and the 36 inch antenna is supplied.

The receiver is also pretty standard as far as design and construction goes. It is of single-board construction, uses an IC for decoding, and is enclosed in a rugged plastic case that should protect it fairly well in case it needs protection all of a sudden. It is matched to its companion transmitter, and no further adjustments are necessary or recommended.

Two types of servos are available with the MRC 772, my choice was the MR-10, designated as a 'wide application' type. The MR-10 is 1-3/4 x 7/8 x 1-3/8 inches in size, weighs 1.7 oz., and has an output of 27.4 in./oz. The amplifier operates at 6.4 ma during idle, which is a very economical value. The output is of the rotary type, with a stop-to-stop travel time of .7 seconds.

The slightly smaller MR-60, which is also available, measures 1-1/2 x 3/4 x 1-1/2 inches and weighs in at 1.4 oz. The power is 32 in./oz. with a 7.9 ma idle amplifier current. It is slightly faster, with a .6 second travel time, and is also of the rotary output type.

The MR-10 servo, designed around 16mm motors and a single board IC amplifier, is ruggedly built, with thick cases and gears. One feature I especially like about the MRC servos is that, space permitting, they use completely assembled pots, in lieu of the pot element and wiper combination that can be really troublesome if the design and assembly are not done properly. In this servo, another extra is included. The pot shaft peeks through a hole in the top case, and adjustments in centering can be made with a small screwdriver. This is an easy way to put in some control differential, or adjust engine idle, for example.

The airborne, or in this case, "groundborne" system weight for the receiver, two servos, battery, and switch harness is just 9 ounces.

As received (before conversion to nickel-cadmium batteries), for the receiver a rugged battery case with thick walls and plated spring contacts is provided. Cell installation is simple, fast, and should not present any problems at all.

An important feature of this system, as in all MRC radios, is the use of gold-plated twist pin connectors, developed by ITT (International Telephone & Telegraph Corporation) Cannon. Considering the size and weight limitations, this is as good a connector as we have seen. They share one thing with all plugs; you can't chin yourself from them, or shouldn't yank on the wires when disconnecting the various units. With some common sense and care, you can forget connector problems with these.

The 772 manual includes sections on installation, and operational checks and maintenance, all of which are recommended reading. A one-year warranty on materials and workmanship becomes effective upon receipt of the warranty card, and a number of Factory Authorized Service Centers have been established throughout the U.S., in addition to home base in Edison, NJ.

In summary, we consider the MRC 772 well worth the asking price, and it has operated perfectly during it's installed life in the Porsche RSR. We realize that the range requirements are not as stringent as they are in airplanes, but it certainly gets its share of bumps and shocks in this application. When the time comes to find it a new home in a flying machine, I will do so without any qualms as to it's ability to operate satisfactorily in that environment.

While it will never replace my airplanes, the Porsche/772 combination has been fun, and certainly more relaxing than Quarter Midget racing. The manual includes some suggestions for drag or slalom racing, both indoors and out, which should certainly add to the fun possible. Even the uninitiated will attempt this model, while most won't touch your airplane at all, and we feel that such a vehicle certainly has value as a trainer to help get the 'left-right' practice that is so important in nearly all R/C model applications.

The quality is there in both of these items . . . they should be considered for *your* budget and building schedule!

•

Peanut . . . . . *Continued from page 51*

stringers will be very thin near the tail, so don't press too hard.

The entire top and front portion of the fuselage is to be covered with bond paper, simulating sheet aluminum. Sand the formers and check their alignment, so that individual pieces of paper may be used; from the fin forward to the rear cockpit; to cover all the 'B' formers; to cover the top and sides of the fuselage between the first 2 formers; and to cover Ab to Bb and Bb to B1g. Start the paper covering from the tail and the overlaps will contribute a bit of scale appearance. A smoother job will result from covering the Ab to B1g panels before doing the top and sides.

Make up a noseblock to the approximate shape and cement to front of the fuselage. Cut a flat, for keying purposes, into an old-fashioned wooden nose plug (chosen more for it's shape than it's traditional function) and make up the 1/32 plywood ring with a matching hole. Glue the ring to the noseblock, and when dry, carve and sand the assembly to shape. Then, drill out the hole in the wooden nose plug to fit a Peck (or similar) nylon bushing. With a little care, and using a hand powered drill, you can drill the hole to produce a few degrees of down-thrust and just a suggestion of right-thrust.

Make up the simulated Kinner K-5 engine by starting with Williams Bros. 3/8 scale cylinders. As shown in the photos of the real engine, the barrel fins are to be cylindrical, so the tapered fins of the plastic cylinders need some work. I found that the cylinders would thread onto a 2-56 screw a few turns, so I used the screw for a mandrel in a Moto tool, and trimmed the cylinders down using an Uber Skiver blade for a lathe tool. I put the Uber knife into a bench vise and brought the turning cylinder up to the blade. Use the second fin from the bottom as a diameter guide, and there will be enough material remaining to allow light sanding. The plastic fins seem to melt easily under the sandpaper, so don't press very hard.

Make up the cylinder heads by cutting the basic front view head shape into a piece of 1/4 sq. balsa about 3 inches long. Then, cut off individual pieces for each of the 5 heads and trim to the shape of the side view. A few minutes with an emery board sanding stick will produce a reasonable looking head. Attach the heads to the cylinders with 5-minute epoxy, and then give each head a coat of flat black enamel.

Form each exhaust stack from 1/16 aluminum tubing. File or sand a point on the base end of each stack and make a tapered hole in the left front head bumps. Use 5-minute epoxy for the stack-to-head joint, and add a small fillet of epoxy at the base of the stack. Other engine details visible in the photos can be added, if desired. Drill 5 holes in the noseblock for the cylinders and attach them with 5-minute epoxy.

Make up the tailskid from a scrap of bamboo or spruce and glue it into a notch in the center stringer. An extra cross brace and a fillet of glue will make sure it stays on.

Make up patterns for the wing tip, center section cut-out, stabilizer, and fin from cardboard. Rub bar soap on the edges of the patterns to minimize glue sticking. Laminate these edges with 3 layers of soft 1/32 balsa which has been soaked in water for a few minutes to make it more pliable. Titebond cement works nicely for holding the laminations together. Maintain tension on the strips as they are wrapped around the cardboard forms, and clamp in place with scraps of balsa. If you only succeed in breaking the strips, look for softer wood and try again. You can make the strips more limber by rolling a pencil across the flat sides while the wood is wet. Some crushing of the wood may be evident, but the glue and lamination process will compensate for a few breaks. One tip in working with laminated pieces . . . sand the glued-up piece while it's still on the form. The piece will usually adhere to the form just enough to allow a few minutes of sanding. All the exposed surfaces can be sanded while on the form, and it's much easier to do than later on when the piece is glued into a structure. You may also want to try the very thin basswood strips available from the railroad counter at your hobby shop. These strips are extremely pliable and can be used alone or in conjunction with balsa strips.

When the laminated pieces are ready, lay out the stabilizer and fin, using 1/16 sq. for the remainder of the structure. Lay out the wing leading and trailing edges, tips, and center section. Don't let the double tapered wing

throw you. Notice that only one rib pattern is shown. Cut 18 ribs to the shape of the pattern, omitting the spar notches. Begin construction by fitting the center section ribs, cutting from the trailing edge portion when necessary. moving out to the tips, cut and fit each rib. Shape the ribs by sanding in a chord-wise (fore and aft) direction. The ribs-should be evenly tapered so that a single piece of tissue can be used to cover the top surface between the cabane strut ribs and the tip ribs. When the ribs are properly shaped, lay a straight edge on the top of the wing to mark the spar notches. Cut the notches and cement the main panel spars in place, omitting the center section spar for a few minutes. Cut the leading and trailing edges, and sand in a small bevel for dihedral, which is to be 1/4 inch per side. Prop up the tips and add the center spar. Cut the cabane strut sockets from some 1/8 sq. and cement to the strut ribs. Add some 1/16 sq. pieces for the lift strut mounts.

At this point, the whole model can be sanded smooth and covered. Mine is done in grey domestic tissue, simulating the aluminum dope finish originally applied to NC12294. The domestic tissue works pretty well dry, using clear dope as an adhesive. Three pieces of tissue will work best on the top of the wing center section, and the fuselage will require quite a few pieces due to the stringers. The tissue can be shrunk with steam over a teakettle and seems less prone to warpage that way. Give each part of the model one coat of thin, plasticized dope (nitrate with about 10 drops of castor oil per ounce, or Sig Lite Coat butyrate).

The cockpit cut-outs can now be made, and some small electrical wire insulation can be split and used to simulate a leather padded edge. Black tissue decorations for the registration number, side strips, and control surface hinge lines can now be added. I used some press-on lettering for the word "METEOR" on the fuselage sides. For the registration numbers on the fin, type the number onto a piece of Magic Transparent tape, temporarily stuck to some waxed paper. Cut a small rectangle containing the number from the tape and stick it on the fin. A 12 pitch typewriter will crowd the numbers together better than a 10 pitch.

The struts on my model are made of bamboo, which I have recently rediscovered. The strength of bamboo in small sections is really amazing. A convenient source for bamboo is as near as your supermarket or the old bamboo pole out in the garage. The Oriental Foods section of our neighborhood store offers a package of 10 inch long barbecue skewers at 100 for 49¢ (they are not marked 'bamboo'). The skewers are nominally round and split nicely to form smaller or flatter sections. Start splitting by trying to separate a piece into two equal halves. In this manner the bamboo has less tendency to split before the end of the piece is reached. Experiment with the splitting for a few minutes and make up some 1/32 x 1/8 strips for the struts, and some 1/32 round strips for the stabilizer braces and the landing gear. Shaping of bamboo can be done quite successfully by scraping as well as sanding. Cut the cabane struts to length and notch the fuselage top paper for them. The struts should seat on the top longeron. Make up a jig to help hold the struts at the proper angles until glue or epoxy has set.

Before the wing is attached, it would be a good idea to drill the small holes for the center section rigging. This can be done with a cut-off needle in a pin vise or hand drill. You may also want to try burning small holes with a red-hot needle or piece of wire. Now, try the fit of the wing to the cabane struts. Looking at the wing/fuselage assembly from the side, there should be just a suggestion of positive incidence in the wing. When satisfied with the position, attach the wing with 5-minute epoxy.

Make up a prop shaft to fit the nylon bushing. My model has a 4-3/4 inch Kaysun prop, with the blades scraped to thin them and to balance the prop. For a prop like the Kaysun, which doesn't have a freewheel catch built in, epoxy a very small (no. 2) lockwasher to the front of the hub to serve the purpose. Make up a motor from a loop of 3/32 rubber. Check the motor and prop shaft for free running. You may have to trim a bit of the inside of the noseblock or the cylinder bases out of the way.

Glue the stabilizer and fin in place. Make up, cover, and attach, the small fairings for each side of the fin. Make the landing gear fairings from file card stock. These are to be epoxied onto the outside of the wire, and will look better if given a shallow crease lengthwise from the wire side, before installation. This will make them look more like a shaped tube than flat card stock would normally allow. Add some very light wheels, either of balsa or the open-backed variety sold with ready-to-fly rubber models. I used the open-backed plastic, with a piece of card stock filling the hold. For a more realistic looking hub, I used some thin aluminum sheet scrounged from a printer. Put a knife-like edge on one of the points of a set of dividers, and the dividers can be used like a compass to cut circles from the aluminum. Make up at least 4 circles . . . 2 for the insides and 2 for hub covers. The convex surface for the hub covers can be produced by using a spherically shaped tool like a marble or the round end of a tire pressure gage to press the aluminum disk into some cardboard. Moving the tool out near the rim of the aluminum circle will take care of the wrinkles that formed early in the process.

Heat form the landing gear braces from the small round bamboo stock, using the heat from a light bulb or small soldering iron. The shock cord covers are shaped from 1/16 x 1/4 x 1/4 balsa. Push a pin through them, lengthwise, and then slide them over the upper end of the bamboo braces. Attach the braces with epoxy.

Two more small bamboo strips are used for the lower stabilizer braces, with thread used for the upper side. Now, put in the wing rigging, which is simply a pair of threads at each of the

two main cabane struts. Rather than tie knots in the rigging, I just fed the thread through a pair of holes and then hung clothespin weights on the loose ends to keep the thread tight. A small drop of glue or epoxy will attach the thread to the inside of the strut, and when dry, the thread is cut on the outside of the strut and another small drop of glue used to seal the hole. Make up and install the lift struts, attaching them with 5-minute epoxy. Thin, flat, silver grey enamel can be used to cover all the bamboo.

Check the model to make sure that the wing is parallel (or at a slight angle) to the top fuselage longerons, and that the stabilizer has about 1/32 negative incidence (leading edge lower than trailing edge). The wing, stabilizer and fin should be steamed free from warps, although 1/32 washout can be steamed into each wing panel for some beneficial effects.

Check the balance point, which should be about 1/3 of the way back from the leading edge of the wing. My model required a bit of clay at the tail to offset the weight of the large prop. Try a few test glides and some low-powered flights. Start with 50 or 60 hand winds and observe the effects. Shim the noseblock with some punch-card stock, as needed. Some slight warping of the stabilizer and/or fin may be needed for fine trim.

When you see the Meteor flying with it's exposed cylinders, and the pilot able to see and be seen, perhaps you'll agree that the 30's was indeed part of aviation's Golden Age.

By the way, the fin and stabilizer areas have not been altered, with a bit of additional dihedral and the flying prop being the only deviations from scale. ●

Old Timer .... *Continued from page 33*

motors requires very little change in construction.

FUSELAGE

Select two pieces of very hard 1/4 x 1/2 balsa (or spruce) for the main longerons. Splice on the 3/8 x 1/2 motor mounts. Place the three cross pieces of longeron material and pull the stern together *(Note: fuselage may have to be wider to suite your engine. wcn)* Taper the underneath of the longerons as seen from the side-view and then cover the rear section with 1/16 sheet balsa. See section C-C for clearness.

The next step is the landing gear. The main member is 3/32 steel wire. After it is bent to shape, it is bound to the longerons with thread and glue. File a couple of nicks in the wire so the thread will have something to hold to. The rear member is made from 1/16th steel wire, and it is formed after it is bound in place to the longerons. Bind the two landing gear members together with soft wire and solder. I used hard wood wheels; but I would suggest air wheels for ordinary flying and test flying. The airwheels lower the center of resistance and thereby steepen the glide. Two brass washers soldered on each side of the wheels hold them in place.

Next drill four holes in the motor mounts and mount the motor. Now let us proceed with the ignition as shown on the drawings. I used a "General" 3-volt battery as shown on the drawings. I have found these batteries very successful. The ease with which the ignition wires can be attached and the mounting of the battery itself make this type battery very desirable. Drill a 1/16 hole in each contact and solder an eyelet on the end of each ignition wire and attach to battery with two small bolts and nuts. This makes changing batteries at the airport very easy. The battery fits between the longerons snugly as shown on the drawings. I used a dural timer of the extended arm type. Attach four pieces of dural 1/4 x 3/8 to each corner bolt of the timer. Insert the timer between the longerons and place a small wood screw in each of the dural tabs. The coil and condenser are strapped in place and the ignition is complete.

Select a piece of balsa 2 (or wider) x 4-3/4 x 9-1/4 inches for the wing mount or pylon. Carefully lay out the side-view and cut to shape. A band-saw will simplify your work a great deal. Now lay out the front-view as shown in section A-A and cut to shape. The bottom is left as it is. Top of the pylon is shaped as shown by the dotted line in the top view. Now cut a template tor the dihedral angle from stiff cardboard. Cut the dihedral angle in the top of the pylon or wing mount, checking carefully with the cardboard template. This is probably the most difficult and important step in shaping the mount. The strength of the wing depends on the joint you make at this point. Now cut to streamline shape as shown in section B-B. Sand carefully and hollow out as shown by the dotted lines. Now glue former "D" in place and then glue the pylon in place on the longerons.

There are three other parts to the cowling, the first piece fits around the motor and completes the upper cowling. It is just spot-glued in place. The lower cowl is in two pieces, the rear portion is removable and it is held in place with transparent sticky tape. The front section is cut to shape and hollowed out and glued in place. Former "E" is now cut from 1/16 plywood and glued in place.

Sand the whole fuselage assembly and give it four coats of dope. Rub each coat in with your fingers and sand between coats. The fuselage is now complete.

WING

Select a piece of white pine or similar soft wood 1 x 8-1/2 x 25. Shape this board to the McBride section. This can best be done by first cutting a cardboard template to the McBride section. Lay this section off on each end of the board. Now plane off the excess and sand very smooth. The accuracy with which you shape this board will determine the closeness your wing will conform to the McBride Section. *(Another, and easier way to build this jig was explained in Ron Roberti's "Volare" A/2 article in our April '77 issue, or Fernando Ramos' "F/F Scale" article in our January '77 issue. wcn).*

The wing is constructed from quarter grained (or the best you can get) balsa. This wood should be about 6 lbs. per cu. ft. in weight, but if it is unobtainable, use the lightest balsa you can obtain. A small block plane is a very handy tool in shaping the wing. Two pieces of balsa 1/4 x 3 x 24 are required for the wing. Eight inch wide balsa is hard to procure, so you will probably have to glue two pieces together. This is easy to do, but it requires some very careful workmanship. After straightening the two edges to be joined, apply plenty of glue and rub together. Now place the wood on a straight or flat board to dry. Some heavy weights will come in handy in holding the wood down while it is drying. Now lay out the shape of the wing and cut both halves at once. Shape the leading and trailing edges and taper the whole wing towards the tip. Sand the entire wing with several grades of sandpaper. Now take one half of the wing and place it top down in a pan of hot water. Let it soak for a few minutes and then place it on the wing form. Wrap the wing to the form with 1/2 inch wide gauze and place in an oven to bake. I would advise leaving the wing on the form for about ten hours after removing from the oven. After removing the gauze, sand the upraised grain while the wing is still on the form. Next, remove the wing from the form and glue the two ribs in place "immediately". Dope three times, rubbing each coat in with your fingers and sanding between each coat. The other half of the wing is completed in the same manner.

Block each tip up 5 inches and sand the center edges so a perfect joint may be obtained. Cement the two halves together and hold in place with pins. Give this joint several coats of glue, being very careful to keep the blocks under the tips all during this operation. The glue should extend outward for a distance of about one inch. The wing is now complete.

STABILIZER AND RUDDER

A piece of balsa 1/8 x 5 x 20 is required for the stabilizer. The stabilizer is made in the same manner as the wing, and on the same form. The position of the stabilizer on the form is shown on the plan.

The fin is made from a piece of 3/32 balsa. Carefully round the leading edge and taper the trailing edge to a point at the rear. The movable portion of the fin may now be cut and hinged with two small pieces of aluminum. Carefully shape the bottom edge of the fin to the shape of the upper curve of the stabilizer and glue in place. Two pieces of 1/8 balsa (soft) may be glued on each side of the fin, where it joins the stab and later sanded to form a filet.

ASSEMBLY

The success of the model depends upon the accuracy with which you assemble it. The stabilizer and rudder are first glued in place on the fuselage. The lower fin or skid is now glued in place. It is made from the same material as the rudder. Now give the wing a thick coat of glue and place it on the pylon. Several pins will help hold the wing in place while it is drying. Again may I say "check the wing for alignment", because the model is fast and any "misalignment" will really show up when you fly it. *(Some 2 inch wide gauze around the joint should add reassuring strength. wcn).*

The gas tank shown in the drawings is for a "Baby Cyclone" engine. It is soldered up from .008 shim brass. The 5/32 tube slips on over the intake tube, thus affording an ample gas supply for the straight-up flying the model does. A piece of 1/8 inch wide sheet brass fastened under one of the motor lug bolts and soldered to the tank holds it in place.

The propeller is shown on the drawings full size. It is carved from gumwood and has about 3/32 undercamber. I recommend the following of this design very closely.

The model is now complete except for painting. All-balsa construction lends itself very nice for finishing. After you have painted the model, give it a couple

of coats of Simoniz. You are now ready for a test-hop.

Select a field with some nice deep weeds for test-hopping the little ship. After gliding the model several times to determine whether she is balanced o/k, I would advise hand launching of the model on its first few flights. My model had a tendency to stall when the circle was enlarged. I did not use any off-set in the thrust line. My model circled with the torque both under power and in the glide. Well fellows, I hope you have as much fun with your model as I had with mine. •

Half-A . . . . . *Continued from page 59*

design with twin vertical tails. The fuselage is very smooth and has been gel-coated, so preparation for finish is minimal. The wings are custom cut foam cores over which is laid leading edge planking and cap strip ribs. The airfoil is not quite fully symmetrical, but close enough so that inverted and outside maneuvers are as good as insides. Wing tips and vertical tails are die-cut, all other parts are sawn. Aileron links, elevator horn, and nylon wing hold-down hardware are included. I have seen a Laser fly, and it is smooth, maneuverable, and really fast. I have heard that it is even being raced competitively.

ACE "Mach None": This is the sister ship to the one that started it all, ACE's "Pacer". The Mach None represents an improvement in several areas, however. The most important item is the addition of an 1/8 square spruce spar to the center portion of the wing. My Pacer's wing was visibly "mushy" after a year of flying (and a few crashes). Second, a single-wheel landing gear has been added to the design. This cushions the landing significantly, for those with hard runways. Third, the carved canopy of the Pacer is replaced by a two-piece vacuum-formed canopy and turtle deck. These moldings are of unusually high quality. Of course, both kits feature tapered ACE foam wings, all saw-cut wood parts (very accurate and neatly done, too), and some hardware. I had an immense amount of fun with my Pacer, and expect the Mach None to give even more entertainment. Just as a side note, I flew my Pacer with a muffled Tee Dee .049 on 15% nitro fuel most of the time. It would still do a nice vertical roll from level flight. High nitro, a bored venturi and pressurized fuel should be mind boggeling.

SOCIETY OF ANTIQUE MODELERS

MEMBERSHIP APPLICATION

I hereby make application for individual membership in the Society of Antique Modelers.

DATE REC'D.

NO. _____
DO NOT WRITE IN THIS SPACE

NAME _____ BIRTH DATE _____ YEARS MODELING _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

Please check if you belong to any of the following:

A. M. A. _____ NO. _____

M. E. C. A. _____ NO. _____

S. A. M. CHAPTER _____ NO. _____

Note: Membership includes 15% discount on one year MODEL BUILDER Magazine subscription. Give S. A. M. No. when subscribing.

Enclose Membership Dues of $3.00 and send to:
Society of Antique Modelers
1947 Superior Avenue
Whiting, Indiana 46394

In making this application for membership to the Society of Antique Modelers, I agree to abide by the rules set by the Society and realize that the goals of S. A. M. and the Old Timers movement are to encourage participation above competition and is dedicated to the preservation and reproduction of vintage model aircraft.

Signed _____

GMC's "Little Miss Norway": As with all of this line of kits (1/2A Stick, 1/2A Chaos, 1/2A Quick Stik), the box contains saw-cut parts, molded foam wing, and most of the necessary hardware. This model is unique in that it features a built-up turtle deck and molded canopy, to give those beautiful "Miss Norway" lines. My model isn't complete yet, but with the basic model built and film-covered, you have only 7 oz. of weight! Engine and tank are about 3 ounces, so if you used the lightest available 4-channel radio, it would still be way under 20 ounces, even if you add landing gear. Obviously, the model is built to fly, not crash, but that is the way to go for your top-of-the-line model. George Chabot (The G.M.C. of G.M.C. Models) has carefully designed each succeeding model in his line to be lighter, in order to give higher performance as his expected customer's skill level improves. With very light weight, you can use a larger (6 x 3 rather than 5 x 3) prop for more pulling power, and fly through maneuvers at a moderate constant speed, rather than using the airplane's inertia to carry it through after building up high speed in level flight. Climb rate and vertical maneuvers should improve drastically too. I can't wait to get mine in the air! •

Rocketry . . . . *Continued from page 62*

few NARAMs, and is renowned as the inventor of a digital self-actuating launcher (since it's so cold where he is, apparently you have to keep moving to keep warm, or your finger could freeze to the launch button!). Dottie Galloway, longtime NAR Contest Board official, discussed the running of contests; her long experience in organizing many of the most successful East Coast meets made this an excellent group. Greg Smith, chairman of the NAR Film Committee, held a group on "Modroc Movies". This is a tricky subject, as any amateur who has tried to capture one of his models on film can tell you. Greg is extremely well-versed, due to much experience. His committee now has several rocketry-related films available for sale or rental to clubs and groups; included are coverage of several Pittcons, an MIT Technical Convention, and the last two NARAMs. Several of these are on sound-striped Super-8 film, so they include sound and narration. You can request more information through NAR HQ, P.O. Box 725, New Providence, N.J. 07974.

The MIT crowd was there in full force, and a discussion of their forte, "Radio-Controlled Boost Gliders," was well-attended. These guys build their own receivers, and use the smallest servos available. Sailplane freaks, take note; rocket power might be just what you need to get a ship into a thermal somewhere. In any case, the guys from the MIT Rocket Society have had many successes with their systems, including several in Spot Landing.

Other groups included a session on "Model Rocket Clubs", chaired by NAR President Manning Butterworth; "Electronics" with Bill Cadwallender, who showed his usual flair in adapting IC technology to rocketry uses; and "Beginning Contest Rocketry" by Jeff Flygare, author of the "Getting Started" series published by the Model Rocketeer.

The Board of Trustees held both a Meeting and an Open Forum at the Pittcon, so there was a lot of discussion about several important problems facing the NAR. The major one is the insurance situation. If you are a NAR member, you've already been officially informed that the AMA's insurer has decided to get out of the hobby insurance business, and canceled the AMA policy as of March. NAR's insurance being a rider on the AMA policy, this means no insurance for the NAR, either. Seems that AMA managed to get more insurance, at some obscene increase in rates, but the new insurance company would not insure model rocketry. This in spite of the fact that the NAR insurance ran eighteen years, and not a single claim was ever paid! Insurance is definitely a seller's market, so there's no point reasoning with one company . . . you try to find another . . . and that's what the NAR is trying to do. But even with our unbeatable safety record, it's been very, very hard. There is a frustrating lack of people in the insurance business who have ever heard of spacemodeling, and if you say "rocketry" to them, they think you're talking about things that blow up. If I sound bitter, I am; there's no justice in the situation, and to someone unacquainted with the facts, the fact that the insurance policy was canceled looks bad.

It was suggested that, since NAR has never needed the insurance, maybe it's unnecessary; but the undeniable truth is that having insurance got us a helluva lot of cooperation from school boards, service groups, landowners, and the like. The Trustees are fully aware of the value of NAR insurance, and are actively seeking a new insurer. They are also actively encouraging all interested parties to submit suggestions in locating an open-minded insurance company; letters should be sent to NAR HQ, with the envelope marked Attn: Manning Butterworth. They will be forwarded posthaste.

It was also announced that Don Carlson, the man who's been doing such a fine job of editing the Model Rocketeer, will be resigning that post

come September. Don has really been busting his seat to get the Rocketeer done, and his efforts have shown well and been well-received; but no one can blame him if he's had his fill of such a monumental task. It's like we professional writers say, Don; writing for a living is nice, but now and then it's nice to eat, too. In any case, Don's style has done a great deal for the Rocketeer, and he has the gratitude, I'm sure, of anyone who has read a copy. The editorship will probably pass to the harried Publisher, the above-mentioned Kevin Barkes; but if you feel that you might like to take a swing at editing the NAR's magazine, write to Kevin and tell him about it; the poor guy has enough to do already. Kevin's address is 4428 Greensprings Ave., West Mifflin, Pa. 15122.

The Trustees are committed to hosting the International Spacemodeling Championships in the USA in 1978. They were originally planned for 1977, but funding failed us (ah, that old, sweet song!), and they had to be put back a year. This is an extremely important meet; it would not be an overstatement to say that the future of rocketry as an internationally-qualified competition depends a great deal on how the USA hosts this meet. Of greatest interest at this point is the announcement that members of the USA International Team are going to be chosen through a flyoff this year, rather than by committee. In the past, the ability to come up with air fare to Czechoslovakia was the main requirement for membership. However, as the '78 Internats are scheduled for Dayton, Ohio, it is assumed that more people will be able to make it, so team membership is being opened on a competitive basis. The Internats Flyoff will be held the Saturday after NARAM-19, which would be August 6, at the NARAM-19 field in Kansas City. Trustee Mark Bundick is in charge of organizing this event (thank God I don't have to do it . . . I'll probably have been ridden out of town on a rail following NARAM-19). His address is Rm. 743, International House, 1414 E. 59th St., Chicago, Ill. 60637.

Speaking of NARAM-19, I'm pleased to report that plans are coming along smoothly. Thanks to a report in Centuri's newsletter, the Rocket Times, applications have been rolling in. It is strongly (!) suggested that you get your request for application in EARLY . . . our final room reservations have to be in 30 days before the event, and anyone who applies late may find themselves either sleeping on the street, or paying high-season prices at some other hotel. Schedules and applications are now available, so send your requests to Douglas R. Pratt, 9010 East 87th St., No. A-2, Raytown, Mo. 64138. Including a stamp for return postage will earn you the title of official Nice Guy.

There will be ten events flown at NARAM, and contestants may enter any or all of them; the fee is the same. The events are: Scale, R&D, Class D (1/2A) Boost Glide, Class 3 (C) Rocket Glide, Class 1 (A) Parachute Duration, Class 3 (C) Streamer Duration, Predicted Altitude, Class 5 (E) Super Roc, Pigeon (D) Eggloft, and Mercury Dual (E-two eggs) Eggloft. Next month's column will include a run-down on rules for all of these events.

We are trying to make NARAM-19 a fun event for everyone, contestants and observers. Plans include a speaker from NASA, and hopefully a design engineer from LTV Aerospace to discuss the Scout satellite rocket, a popular scale subject. Incidentally, after the NARAM is over (providing there's anything left of me) I have promised WCN a feature article on building a Scout, complete with a set of LTV blueprints. It's also a candidate for MB's Full-Size Plans Service.

NARAM will also feature the annual

NATIONAL SOARING SOCIETY

NSS No. _____

Name: _____

Address: _____

_____

Phone: _____

AMA No. _____ LSF No. _____

Membership type: _____

Dues _____

MAIL TO:
Dr. Larry Fogel, President
1591 Calle De Cinco
La Jolla, Calif. 92037

Donation _____

Total

New membership ( ) Renewal ( )

MEMBERSHIP APPLICATION

DUES ARE AS FOLLOWS:

Individual: $10.00 Family: $15.00
(Any Senior or Open AMA member and any of his immediate family who are also AMA members.)

Junior: $5.00 (Any Junior AMA member)

Each member or family automatically receives a subscription to the society publication SAILPLANE, starting with the dues an
first issue published after payment of dues and continuing thereafter through the membership year.

Dues are payable prior to December 31st of each year for the ensuing year.

In the event a member joins during the dues year, he shall submit dues as follows: between Dec. 1 and June 30, full annual fee; between July 1 and Nov. 30, one-half the annual fee. Members joining during December of a year shall also be members of ensuing year.

business meeting of the Trustees, and the traditional Trustee's Open Forum. In the past, Forums have been limited to an hour, and other events have been scheduled near them; this year, most of an evening is being kept clear for this important event. No concerned NAR member should have a legitimate excuse for missing the Forum. We will also inaugurate the first annual NARAM Liars Contest, an evening of whoppers told by contestants and judged by a panel of modelers who have, shall we say, forfeited their amateur standing in this area. *(If NARAM is anything like the AMA Nats, the liars contest could be going on all week of the contest, day* and *night! wcn)* ●

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

couple appear with an R/C pattern model.

OLDTIMER MODELS

Jim Noonan's latest catalog features a host of rare goodies, such as model books, twin-pusher plans, scale drawings, bamboo, bamboo paper, condenser paper, teflon thrust washers, goldbeaters' skin. propeller blanks and many other hard-to-find items. A stamped envelope to Oldtimer Models, P.O. Box 18002, Milwaukee, WI 53218, will bring you a copy.

PILOTS WITH PERSONALITY

Dona "Burnelli" Adams, granddaughter of the famous aero-engineer, has produced a series of flying scale model pilots for the Thomas Studio. Each represents a particular individual, and present offerings include the heads and torsos of Ed Heath (two different variations), Clyde Cessna, and Jim Church. These pilots are vacuum-formed from lightweight plastic, and may be easily painted for great realism. For additional information, contact Gene Thomas, Box 681, Melville, N.Y. 11746, enclosing a stamped, addressed envelope. Please mention **Model Builder** magazine when writing.

GOOD OLDE DAYS

Some years ago, Jonas Josselson wrote in to mention the fact that he played recordings of old radio shows during his model building sessions . . . thus generating the atmosphere of his youth. Sort of a time-machine. This month we feature a photo of Ced Galloway, master modeler, now retired from Lockheed Aircraft. Ced says: "I used to build R.O.G.s and twin-pushers while listening to this radio. I bought it second-hand in 1926. I stayed *glued* to it while reports of Lindbergh's flight progress were broadcast. After 50 years, it still works, and I'm still building model airplanes. The radio is a DeForrest single-tube, battery powered set."

THE WRIGHT IDEA

Herb Kelly favored us with a copy of an early Wright Company letterhead, with both Wilbur's (President) and Orville's (Vice-President) names on the heading. We thought their cable address especially apt: "WRITOPLANE".

FLYING WINGS AT THE NATS

An added attraction at the forthcoming California AMA Nationals will be the 11th Annual Northrop Flying Wing Contest, according to Carl Hatrak, who will jointly C.D. the affair with Dave Jones. Classes will include R/C and F/F (Rubber, Jetex, Gas and towline glider). Bring a "wing" and enjoy this fine, traditionally low-pressure fun event!

JOHN O'LEARY REPORTS

The first of a series of six Peanut Scale and indoor hand launch glider contests was held at the Burnsville Senior High School late last year. The somewhat unusual aspect was the sponsorship, which was by the PISTON POPPERS control-line club, and the Minneapolis Model Aero Free Flight Club. "Despite the poor turnout, the enjoyment quotient ran very high. No sunburns, wind problems, officiating hassles, or peat bog fires were reported . . . The free-flighters from MMAC showed no demonstrable edge in flying skills over their brethren who fly on wires, the Piston Poppers. Indeed the P. Poppers,

notably Dale Mendenhall (Cougar) with a high single flight of 40 seconds and Terry Taylor (Lacey M-10) showed us how to achieve consistent flights, by placing 1st and 3rd respectively . . . The implication of this contest for the free flighters is clear. Our U-Control buddies beat our pants off, both in Peanut and hand launch!"

PEDAL POWER PROGRESS

We had the pleasure, this month, of attending two lectures dealing with the subject of man-powered flight. One was presented by Taras Kiceniuk Jr., and dealt with his "ICARUS" ground-effect machine, photos of which have appeared in this column. Two well-known model builders, Bill Watson and Dave Saks, have contributed a great deal toward the enterprise, and the slides and films shown gave one a great appreciation for the staggering amount of effort involved, both in the construction, and sheer physical exertion required. Thus far, the ICARUS has only made short hops, but exhibits great stability. Work continues in hopes of improved performance. The red, white, and blue (Solarfilm covered) machine ranks easily the most colorful of all the MP aircraft seen.

The other lecture concerned the "GOSSAMER CONDOR" (Richard Miller called one of his first hang-gliders the "Conduit Condor", after the material used in its structure). The "Gossamer" is the brainchild of long-time model builder Paul MacCready, assisted by Peter Lissaman, Paul's sons, and others. Resembling a giant microfilm model, the machine represents a truly radical departure from previous MP craft. It is of canard configuration, spanning some 95 feet, and featuring 1/2 mil clear mylar covering over the 1,000 square feet of lifting surface. Wing loading is a fantastically low .2 lb./sq. ft.! In prototype form, the machine featured single surface covering, ala indoor duration models, over ribs spaced something like six feet apart. This contrasts markedly from most MP wing structures, with their ultra-complex, closely-spaced ribs. The chain-driven pusher propeller of 12 feet diameter revolves at a mere 110 rpm, and propels the craft at about 8 miles per hour, truly a dream-like effect, enhanced by the sheer transparent "no visible means of support" appearance. As MacCready put it: "The shadow seems more substantial than the vehicle".

Stalling speed is about 6 miles per hour. Piano wire bracing goes "from everywhere to everywhere", yet contributes only fractionally to the drag, considering the slow speeds involved. When asked about controlling the craft during its first tests, MacCready replied: "It was not difficult . . . it was impossible!" However, solutions were found, and the now much-modified machine has made numerous flights, with at least four different pilots. It has exceeded the 10 feet altitude required in competing for the Henry Kremer prize, and covered distances of about 1/4 mile. Recent modifications include a new double-surfaced wing and other changes, which would seem to place the Gossamer Condor in serious contention for the prize.

We were pleased to note a number of other model builders in the lecture audience, including one who has yet another, and very different sort of MPA well under way. We look forward confidently to seeing great achievements in this most exacting undertaking.

GOLDBERG MODELS TO MUSEUM

Carl Goldberg, now a firmly ensconced Californian, recently placed three historical models in the custody of the Russ-Craft Model Museum. Included are the original Zipper, the original Sailplane, and the original Whizzer control-line model. According to Russ Barrera, curator, the Zipper will be completely restored, while the other models will be displayed in their present condition. Russ also points out that the museum will soon be relocated in Northern California, probably near San Jose.

CANARDS, ANYONE?

We noticed a seemingly curious definition for the word "canard" as

applied to tail-first aircraft, in another magazine recently. A query sent to French aviation enthusiast / writer Georges Chaulet brought the following reply: "The word CANARD has 5 meanings in French: 1. A duck . . . like Donald. 2. A newspaper. 3. False news; a lie (for instance we'll say: Le canard a lance un canard. That is, "The newspaper published a false new" (sic). 4. A pusher airplane. 5. A piece of sugar wet with rum. This last Canard is the best one!" ●

Sailing . . . . . *Continued from page 41*

In retrospect, we see that though at the gun, 413 looked like she had the best start, in reality, 498 and 104 were able to sail wisely, keeping in clear air and keeping their boats moving by using as few tacks as possible. I will be the first to admit that Monday morning quarterbacking is easy. Also, I'm sure you will be able to find many witnesses who have seen me pull the same mistakes as we have observed here. Maybe we can get Doug to catch this author at the wrong end of the line, and I can do some self-analysis for the benefit of all.

I would be more than happy to have an opportunity to see similar series from your regattas. All it takes is a somewhat elevated vantage point, and a camera lens in the 50 to 100 mm focal length range. Shoot fast, and take some notes. We can all learn much from these sometimes painful vignettes.

Questions in care of **Model Builder,** or when accompanied directly with a stamped, self-addressed envelope, to 7608 Gresham St., Springfield, Va. 22151. ●

R/C Auto . . . . *Continued from page 37*

RPM (5)
5070 Golden Drive
San Jose, Ca. 95129

MRC (7)
P.O. Box 4658
Irvine, Ca. 92715

1. The basic engine & parts

2. Heat Sink head
3. Muffler
4. Wrist Pin
5. Connecting rod
6. Piston/Crankshaft
7. Air pump flywheel

Now for some bits and pieces of info that interest me. The San Diego R/C Car Club is having a race this month that is really great. Bill Steele, the club president, told me about it a couple of weeks ago. I don't know who's idea it was. The race is called a PRO-AM race. The idea is to team an experienced racer with a beginner, then have a race using the beginner's car only, with the beginner running 75% of the race and the hot dog pro running 25% of the race. As you can see, this forces the pro to spend some time with the beginner to get his car working right. The teams were picked by placing the beginner racers names in a hat and the pro driver's in another hat, then drawing one name out of each hat. Awards for this race are pop, beer, pretzels, chips, etc. for everybody, and a little partying after the race. Everybody wins the same thing, but the race winners get the satisfaction of having done the job the best. I'm sure all participants will learn quite a bit and have lots of fun . . . so everybody wins.

Here in the Orange County R/C Auto Racers Club, we have been having heated discussions about driver and engine classes for several months. Right now, in our Southern California Series races, we have seven classes. Even at big races, this seems to be too many, drawing only a few (2-4) entries in some of the classes, and running the races quite late. We have three super-stock or restricted engine driver classes, and four open engine driver classes. The OC ROAR discussions are an attempt to recommend fewer classes, but to retain the classes (both driver and engine) where the interest seems to be. So far, the discussions have been very inconclusive. In general though, the conclusions seem to be to have restricted engine classes favoring the beginner drivers, and open engine classes favoring the more experienced drivers.

I personally think that all of these problems concerning driver classes, etc., come about because R/C cars only have 5 competition-oriented events and people. If a racer feels completely outclassed, or told he has to use one engine, he can easily lose interest. Who knows what the best solution is? I sure don't. If you have any ideas or comments about this problem, bend my ear, I'd like to hear your side. I'm sure this will probably come up again at the annual ROAR meeting at the NATS, so let's

get some ideas going before then. Write to me at P.O. Box 4658, Irvine, Ca. 92716. Here's one final thought . . . let the people who are interested in running in the classes in question makes most of the decisions. ●

Remotely . . . . *Continued from page 21*

modeling the same boat (or airplane), a registry is kept in each district, and when you're deciding which boat (or airplane) you're going to build, you check to see what's available in the full size racers that aren't already under construction. That way, each race is sure to have a variety of aircraft designs and colors, though P-51s will probably dominate.

One other idea is being promoted by the Southern California Scale Squadron, which is pretty good in an idealistic way, but won't get too much support from industry. This event is for T-6's only (North American AT-6 or SNJ), a popular Reno Air Race category. However, the current aim is to strongly equalize the competition by specifying Bridi Enterprises T-6's and K&B Veco front rotary .61's without pump . . . no other brands. As we said, a great idea on a local level, but not for a nationwide class.

Getting back to the Formula 25 . . . er . . . 1/4 Scale Formula I aircraft. The models built so far, handle like good pattern ships and take about 2 minutes to make 10 laps on a Formula I course. From a commercial standpoint, they're a good investment, as unlike the super-hot .40 powered Formula I plane, which is only built by those who intend to race, the Formula 25 can be used for Sport Scale, general fun-flying, and even some respectable pattern work. Biggest drawback is the high cost risk. Pylon ships have to be considered somewhat expendable . . . the life expectancy is limited . . . not by poor flying, but just by the rigors of closed-course racing, where four planes can often be rounding a pylon within a wingspan of each other!

We're looking forward to spectating the first race of these biggies!

WHAT'S *YOUR* FUN?

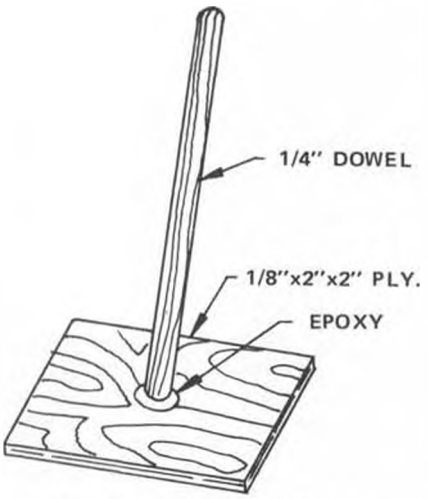
Over the years, all sorts of interesting fun-fly events have been developed. Some require skill, some require luck, and some are a combination; but essentially, they're nearly all events in which most active club members can compete on an even level . . . whether it's the pattern flier and pylon racer with a weekend off from sanctioned contests, or the Sunday fliers who are normally content to stay at the home field every weekend.

Most every club has its favorite fun-fly events, and the Seattle Radio Aero Club (SRAC) has decided to take on the task of lumping all of these ideas together and making them available to everyone. "We are going to collect, compile, condense and contribute a compendium of corny contest cockpit contortions, which we will lovingly call *The R/C Fun-Fly Catalog,*" says SRAC President Bill Westphal.

We think the idea is just great, and urge all clubs to contribute their favorite event or events to the cause. Send them to Project Manager Wayne Nodland, 9909 - 227th Pl. S.W., Edmonds, Wa. 98020, phone (206) 776-7740.

Two favorites of our Delaware R/C Club, from the 1960's, were the "Doughnut Drop" and the "Hidden Spot".

The Doughnut Drop requires a supply of fairly stale doughnuts (stale ones stay together better under strain and the contestants are less apt to eat them before finishing the event!), and a dropping device that any modeler can easily make . . . no need to supply 'em. Simply insert and epoxy a 6 inch length of 1/4 inch dowel into a hole in the center of a 2 inch square of 1/8 ply, so the inserted end is flush with the bottom side of the ply. This "launcher" is strapped to the top of the airplane, dowel pointing up, with rubber bands around the fuselage, or with the bands that hold the wing in place. Of course, the object is to slip a doughnut onto the dowel, then take off and attempt to unload the "bomb" onto (or into!) a target.



DOUGHNUT LAUNCHER

A couple of hints: Doughnuts can get surprisingly aerodynamic as your plane builds up speed for takeoff. We've seen many of them "shinny" up the dowel and jump off before the plane gets airborne! Tilting the dowel a little forward takes care of this.

Once you get it to stay on, it can be quite a trick to get it off! Centrifugal force will keep it on in a loop; rolls have the same problem. We've seen 'em stick like glue during inverted flight. The

best trick seems to be kinda similar to a low-level bombing method developed during WW II to prevent blowing off your own tail. The pilot came in directly on target, pulled up into a loop before reaching the target, released the bomb when the nose was vertical, rolled out at the top, and was going back in the direction he came from when the bomb hit and exploded.

In the doughnut version, you come in low over the target and continue *past* it, then pull up into a half loop, come back toward the target inverted, and *before* you reach it, shove full down! The resulting outside half-loop flings the doughnut off the dowel and toward the target. Try it. It's fun!

"Blind Spot" is pure luck, and in this day of sophisticated landing and taxiing back to the pits before running out of fuel, it may be a little old-fashioned.

Before the fun-fly, one trusting member would select a spot on the takeoff and landing strip portion of the field. The method was to mark a simple sketch of the strip with two dimensions to a spot . . . no need to even go out on the field . . . and seal the sketch in an envelope. Each flier was then given three nails and three tags on which to write his name. At the end of any flight of his choice during the fun-fly, he could stick a marker in the ground where his plane came to a dead-stick stop. At the end of the day, the envelope was opened, the "spot" located, and the nearest marker had the name of the winner. If you landed on the strip, you had just as much chance as anyone else to win!

BIPES UP!

For the fifth year in a row, the annual National Multiwing R/C Championships will take place in Omaha, Nebraska, on July 9 and 10.

The instigator of this affair, Olie Olson tells us that "We'll be offering a couple of thou. in trophies, engines, and kits again this year, and expect the turnout to be bigger and better than ever."

There are 3 contestant classifications in aerobatics: Omaha Sportsman, for contestants not desiring to enter the other 2 classes, and who have not placed 4th or better in any AMA sanctioned event, including Fun-Flys; Omaha Advanced, limited to AMA Novice, Advanced, and Expert Class fliers who have not placed 3rd or better in any AMA sanctioned pattern competition within the past three years; and Omaha Unlimited Class, for anyone not entering either of the other two classes.

There will also be an AMA Sport Scale event, again, of course, for multi-wingers only. And finally, there is the High Noon Barnstorming Event, a single 5-minute flight with absolutely no holds barred . . . as long as it doesn't endanger the life and limb of the flier or the audience.

For more details on this one and only exclusive Bipe meet in the country, write to Olie at 6111 Maple St. Omaha, Nebraska, 68104, Phone (402) 551-4662.

SUMMER'S BIG SHOWS

While the R/C aerobatic world watches, the United States will select its team for the FAI R/C Aerobatic World Championships. On Saturday and Sunday, June 25 and 26, our three 1975 team members, the 10 highest from the 1976 Nats (not counting said team members), and 20 other top U.S. fliers (selected by point system), will compete with each other to select the 1977 U.S. Team. A few days later, that team will enter into competition with at least 20 other teams, each representing a foreign country, to determine the individual and team World Champions for 1977. One thing nice, the U.S. Team won't have far to travel in order to attend the World Champs . . . both events are taking place at the same airfield in Springfield, Ohio, the site of the free flight and R/C soaring events for the 1976 Nationals.

It's going to be a busy and eventful 12 days for this writer, and many others who are involved in both affairs. We will be Chief Judge for the Team Trials, and the following USPJA (U.S. Pattern Judges Association) members will be scoring: Dick Austin, Ralph Brooke, Sam Crawford, Bill Johnson, Dave Lane, Bob Reuther, Larry Sartor, Whit Stockwell, Bob Upton, and Julie Woods, with John Byrne and Howard Crispin standing by.

On the following week, we assume the duty of Judging Director for the World Championships, and will conduct briefings and judging practice with the foreign and domestic judges who will be scoring the World Championships . . . all acquaintances from our past W/C experiences: Jim Edwards, USA; Geoff Franklin, United Kingdom; Dave Henshaw, Canada; Camille Gerard, Luxembourg; Don McKenzie, South Africa; Acke Johansson, Sweden; Loris Kanneworf, Italy; Heinz Freundt Austria; Juhani Sederholm, Finland; and John Dible, Ireland. Reserves include Harold Becker, Germany; Arthur Hofer, Switzerland; J. Merory, Yugoslavia; and Dick Austin, U.S.A.

It will be interesting to see what effect the 1977 Team Selection Program has on the results. Obviously, there are many unknown factors involved, but this will undoubtedly be the first time a team was ever selected, for any kind of world event, just days before the contest. Will the members be as "up" for the W/C as for the team trials? Can they

hold that competitive edge after the climax of winning a position on the team? What will be the effect of having most all of our foreign competitors watching as we make our selection? Whatever the results, the above factors will certainly get a lot of attention as the Monday Morning Quarterbacks do their replay of the action! ●

Workbench . . . *Continued from page 8*

been patiently sending reminders, particularly to club newsletter sender-outers, that Model Builder moved its offices from Box 4336, 1105 Spurgeon, Santa Ana, California, to its present location in Costa Mesa. Also, the Post Office branch in Santa Ana couldn't cope with the complicated (?) process of forwarding our mail to Costa Mesa, when we moved, and began immediately to stamp our mail with the familiar "Moved-No Forwarding Address" (can you believe it!). So . . . our only choice was to keep the old P.O. Box open, otherwise some non-discerning readers might think we had folded.

Well, we're still picking up about twenty to thirty pieces of mail a week in Santa Ana, and most of it is club newsletters. In an effort to cut this down, we're taking the direct approach . . . newsletters, *and requests for merchandise (subscriptions), donations for contests,* are simply being thrown out. As Hallmark says, "If you care enough . . ."

THE GREAT GHQ ENGINE HOAXES . . . by Eloy Marez

We don't know if the first GHQ engine hoax was ever reported as such in the model press back in it's day . . . Or if it was even considered to be one. Let's face it, none of the pre-WW II engines were the "engineering triumph" that the GHQ was advertised to be, though they were all better. And considering the fact that modelers in general were not as knowledgeable, successful results could hardly be expected in all cases.

But through the years, and even with the slow communications in those days, the GHQ must have established itself as a big piece of junk, and worse. If you did answer one of the full-page GHQ ads that appeared in the old mags of the late 30's, you received either a completed or kitted engine that really didn't look bad for it's generation. But what neither the looks nor the ad told you was, that while it was designed to run backwards, (clockwise), it really didn't run at all! Or, if reports are to be believed, if you did manage to get it started, it used up all of it's lifespan long before it used up it's first tank of three-to-one gas and oil fuel. It was a bummer, and we assume that fact eventually became known well enough to cause the demise of this "progressive manufacturer".

The Second Great GHQ Engine Hoax, presented as an April Fool joke in our "Over the Counter" column for April, proved without a doubt one of my pet theories . . . that in addition to the many other skills required to be successful and happy in this disaster-prone hobby of ours, a person has to have an over-sized sense of humor.

When we first got the idea of another 'first' for the model press, an April Fool's article, we soon had second thoughts . . . and third, and fourth, et al. How many readers are going to be really offended? Could we possibly hurt someone, other than just in a momentary imagined manner? How many guys are going to punch WCN in the nose? *(Hey, leave me out of this! wcn)* Everything had to be considered. And we decided to go ahead.

The subject was arrived at fairly rapidly. The excellent example shown in our photo was located in Ray Downs' engine collection, and arrangements were made to borrow it for a photo session. As things progressed, another thought reared it's ugly head. The old timers out there would catch on fairly fast, but what about the younger generation who couldn't know about the GHQ? We might be the cause of some real dejection to some young person out there who saved his snow-shoveling money all winter for an engine, only to find out that some dirty *&4$! was pulling his leg. After some discussion, we agreed that any young modeler who is seriously considering the purchase of an engine of this displacement is no dummy, would suspect it because of the price, and would understand and enjoy the whole thing.

So away we went. Except for the first paragraph, where we tried to tell all without saying anything, the rest of the words are almost verbatim out of GHQ ads from bygone days . . . Then we sat back and waited . . .

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

THE ULTIMATE IN FREE FLIGHT AIRCRAFT SPARROWHAWK, unlimited rubber, CONDOR 800 MK/2 B-C-D. 3 H/L gliders. HOBBY FAIR ENTERPRISES, stamp for catalog. Also in stock, R/N, 4/K, FAI, SIG, Electric, Peanut. LOOK FOR US AT THE NATS. HOBBY FAIR, 7212 Vassar Ave., Canoga Park, (Los Angeles) Ca. 91303.

COMBAT FLYERS – NEED A PLANE? Bumblebee II - fast combat, $8.75 p. pd. SC 1 - S1. com. trainer, $8.75 p. pd. GOTCHA - A.R.F. fast combat, $19.95 Send S.A.S.E. for complete information The CORE HOUSE Box 300A R.D. No. 2 Palmyra, PA 17078.

Best '76 and '77 FAI rubber, Filati, WAKE/COUPE Aluminum Tubes, Fiberglas Nordic tail booms, Torquemeters, silk, Japanese tissue, Silkspan, Airfoils books, Engines. "CHE" HOBBIES, 10900 Eastwood Ave., Inglewood, Ca. 90046.

MODEL AIRPLANES PLANS. Peanut, Walnut, Hazelnut, Rubber, CO_2, Gas. S.A.S.E. for list. Modernistic Models, P.O. Box 6974, Albuquerque, New Mexico 87107

IGNITION ENGINE DECALS: Reproductions of O&R, Forster and others. Three sheets, P.P. for $5.00. Larry Vance 5066 Cindy Way, Las Vegas, Nevada 89102.

WANTED: Davies Charlton "BAMBI" diesel engine, .008 displacement. State number of hours run and price. Grey Blanton, 3425 Pontiac Drive, Columbus, Ga. 31907.

FLYING PEANUT SCALE: Vought "Vindicator", Smith "Miniplane". Plans $1.50 each. The best. R. L. Stearns, 514 Holden St. Raleigh, N.C. 27604.

OLD TIMER Rib, Former and Outline Kits for the SAILPLANE, ZIPPER, MK I CLIPPER, POWERHOUSE, KORDA, RANGER, SO-LONG, PLAYBOY JR, PLAYBOY SR, and MERCURY. All parts machine cut. Send for free brochure. P&W Model Service, P.O. Box 925, Monrovia. CA 91016.

WANTED FOR CASH: Old spark-ignition engines, parts and plane kits. Russell Stokes, Rt. 1, Box 73J, Keller, Texas 76248.

AERO ERA Rubber Scale. 17 printed Peanut plans. Illustrated catalog and sample plan $1.00. Aero Era, 11333 North Lake Shore Drive, Meguon, Wisc. 53092.

IGNITION ENGINES: The entire O.S. Max line of fine engines is available converted to ignition engine operation. These engines are eligible for OLD TIMER competition and are the very finest obtainable anywhere. We also offer a complete line of ignition accessories, i.e., coils, timers, condensers, etc. Send for free 1977 price list. 77 Products (Otto Bernhardt), 17119 So. Harvard Blvd., Gardena, California 90247.

WANTED . . . To fill out M.A.N. collection: Jan, Feb, Mar, Aug, Dec 1936 - Aug 1937 - Mar 1938 - Nov 1939 - Mar 1940 - Dec 1941. When writing, state condition and price. AVAILABLE: One each Sept, Oct 1940 - Aug, Sept 1941. Can we trade? Bill Northrop, 621 West 19th St., Costa Mesa, Ca. 92627, Phone (714) 645-8830.

WANTED: Megow Model 10¢ kits, solid and flying. Continental solid 10¢ kits. W. Winicki, 29 Church Road, Great River, N.Y. 11739.

New Line of PEANUT SCALE flying models. The Gere Sport, P-47D, PT-19 and others. Catalog 35¢. Gene Dubois Models, P.O. Box C, Acushnet, Mass. 02743.

The day the issue came out was the day the phone calls started. The first one was from a very business-like gentleman in Connecticut, at which point I was telling myself that maybe it wasn't such a good idea after all! This man wanted to know where in New York he could get his GHQ. I explained . . . and waited . . . after just a long enough pause to get me really worried, he started to laugh . . . And kept on, at which point I was really glad to join him. He kept saying, "That's really dirty", but he was also saying, "That's a real good one". He signed off still laughing, and undecided as to whether to tell his friends or let them bite.

That sort of set the trend. The first letter came from Mr. Bob Washburn, of Kent Hobbies, in Kent, Washington. I wrote back, and explained. His answer came soon after, quoted here in part:

INDEX TO ADVERTISERS

"Yes, you got me. My wife and I had a big laugh over the incident. We engine collectors know how bad the GHQ was. It is for this reason that they are scarce. People just threw them away because they were so bad and cheap. I don't have one in my collection, and when I saw an offer like that, I responded as any good alert MECA *(Model Engine Collector's Association. wcn)* member would".

All of the phone queries have ended in a happy note. We'll be getting letters in answer to our letters for months, the way it looks, but are no longer concerned, as everyone has accepted our little funny in the spirit in which it was offered.

Many of the letters and calls were of an "I know you are not serious, but just in case . . .", nature. No one was going to pass up a chance that we might *not* be kidding. One reader in Michigan wrote; "The 1936 GHQ was notorious for not running in either direction. But if this is not an April Fool's joke, find enclosed . . . etc."

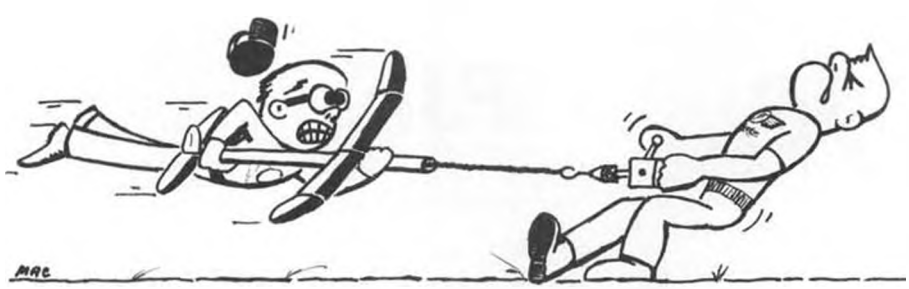
From Indiana; "If this is no joke, I gotta be the first kid on the block to have one of the GHQ engines. Just in case it is a joke, return my check with "Fooled Ya" written across the face in bold red letters."

A report from Denver: "They certainly were the epitome of worthlessness."

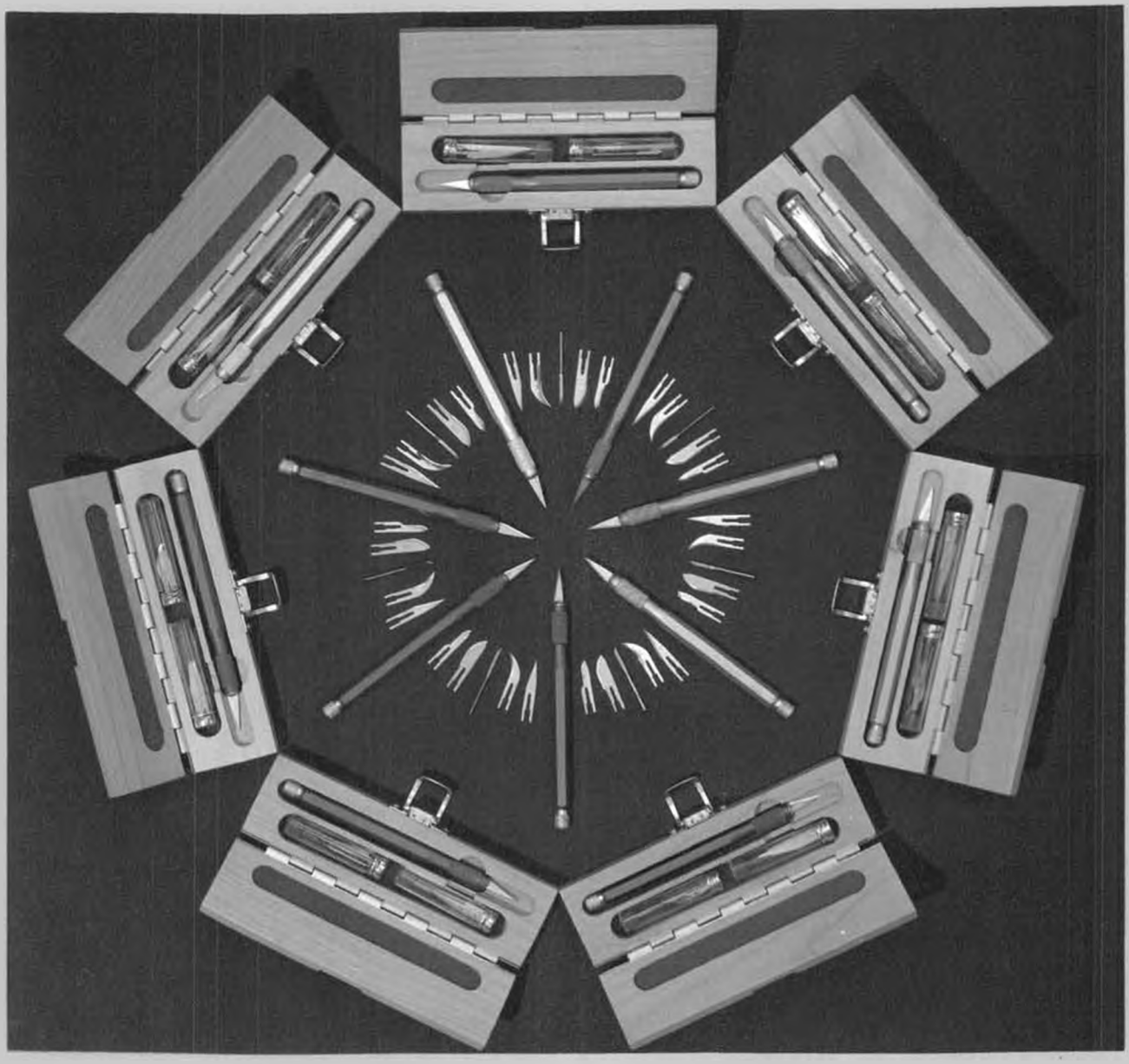
Then came the backlash . . . the sharpies who caught on to it and were getting back at us. One aero space engineer reported success in getting it approved for use in the B-1, and wanted 16,000. Another reported having Paul White standing by ready to rework his for use in a Kavan Jet Ranger. Dirty Dan wanted some for his new combat design. Another alert collector asked for a timer assembly for his OK Super Cub. According to him, anyone who could drag GHQ's up out of the past, should not have trouble with a simple timer assembly.

Yes, we feel it was successful . . . at least as far as getting a lot of us to laugh . . . and not only here at MB. As started earlier, I've always felt a sense of humor helps. I remind myself of this every day, when as a result of the GHQ, our secretary dumps triple the volume of mail on my desk.

And ha, ha, ha! I remember this fact when, after doing our "Over the Counter column for over a year, beating the bushes for material, and good photos, and trying to present the information in other-than-the-usual stereotyped, "Once upon a time there were three little pigs" manner, most of the GHQ letters still come in addressed: "Dear Bill! Ha, ha, ha! ●



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 anodized handle colors: silver, blue, red, green, gold, copper, violet.

Complete set in fitted hardwood case; includes uber Skiver, together with two vials containing six No. 11, six No. 15, one No. 12, and one No. 20 . . . A total of 14 blades $12.95

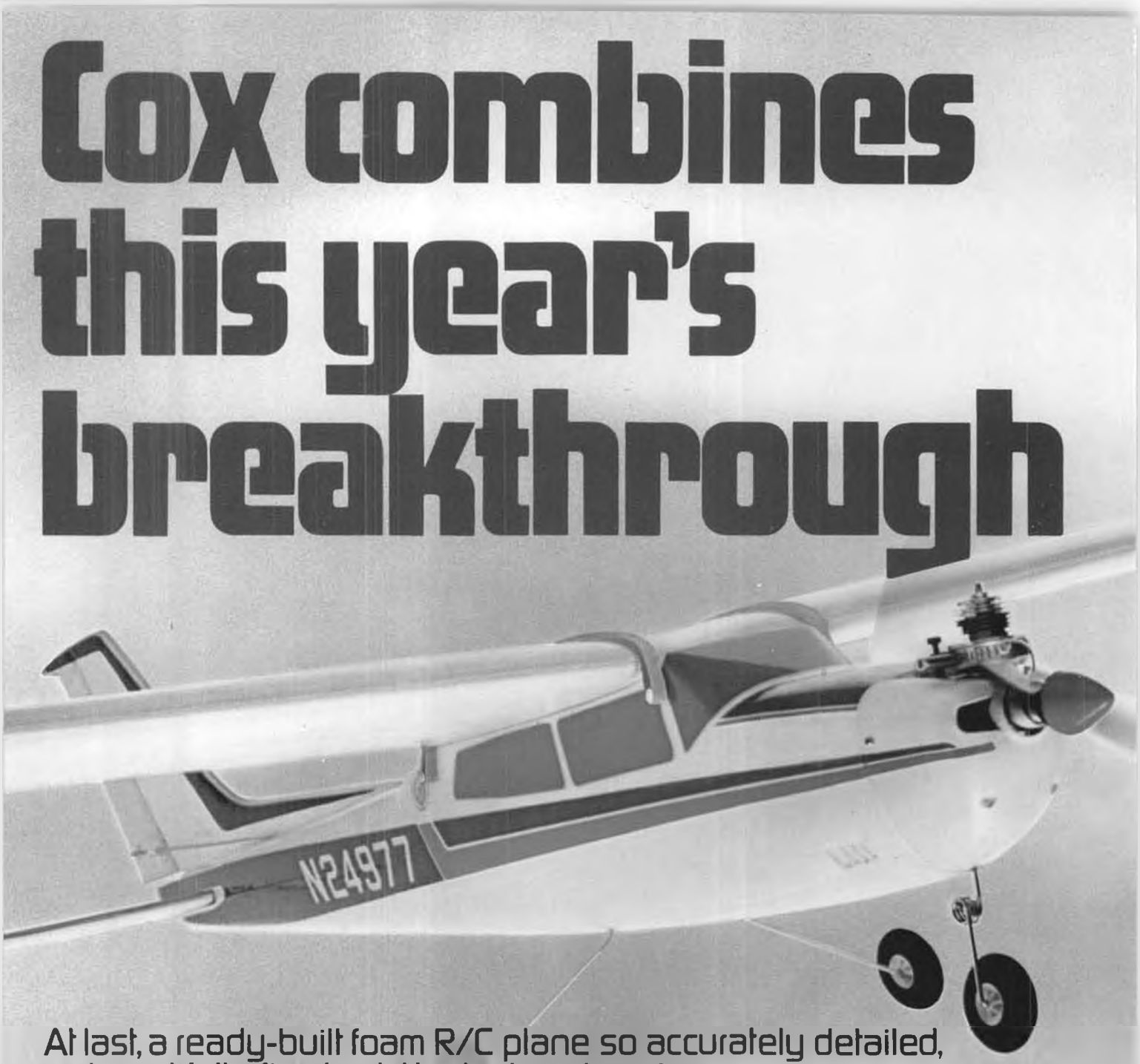
Individual handles (specify color) $5.10

Vial of 6 blades (No. 10, 11, 12, 15, or 20) $2.10

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

Cox combines this year's breakthrough



At last, a ready-built foam R/C plane so accurately detailed, so beautifully finished, it looks hand made.

Prefinished Inside and Out. Outside, the 36-inch wingspan Cox Cessna Centurion represents a triumph in quality foam finishes. A beautiful high-gloss, fuel-proof paint covers the plane. What's more, this precision scale model comes with all the authentic Cessna Centurion trim and markings. The rudder and elevator are already hinged, the push-rods are installed, and even the on-off switch mount and antenna restraint are premolded.

Inside, this incredible plane has premolded compartments for the battery pack, receiver and servos. "Snap In-stallation" of the revolutionary 2-channel Cox/Sanwa 8020 takes only minutes. (Radio sold separately—see other page.)

Premounted Quiet-Running Cox Engine. The Cox Cessna Centurion is powered by the famous Cox .049 engine; premounted at precisely the right angle. There's a spring starter for quick, easy starts and a muffler for populated areas. You even get an authentic Cessna spinner.

We've made it as easy as possible. With no special construction skills, spend a few minutes getting it all together and you're ready to fly a very special R/C plane. So if you want to spend your time flying, not building, the ready-built Cox Cessna Centurion is ready for takeoff. It's an R/C plane for under $50 you can be proud to fly and proud to show.

with last year's revolution.

We fractured the 2-channel price barrier, kept up the quality and sold out in '76!

The incredible Cox/Sanwa 8020 is loaded with quality, reliability and features you can't get anywhere else, yet sells for under $90! This extraordinary digital proportional 2-channel radio has been getting impressive reviews in the R/C and model magazines. Its ease of operation is recommended for new R/C hobbyists, yet it's advanced enough for the more experienced flyers who require sophisticated equipment.


(ACTUAL SIZE)

Check These Exclusive Features:

Dual sticks with ratcheted trims provide precise control with excellent reliability.

Transmitter includes two LED indicators to monitor battery strength and transmitter power.

The receiver incorporates a voltage regulator for increased reliability and stability, as is used in the more expensive 3-, 4- and 6-channel Cox/Sanwa systems.

Available on 72 and 27 MHz frequencies assigned for R/C models by the FCC. All 27 MHz systems feature plug-in crystals for quick frequency change.

Furnished complete and ready for use, except for batteries. Includes transmitter, receiver, two micro servos, battery box and switch harness, frequency flag and servo tray.

When you combine a breakthrough in ready-built R/C planes with a revolutionary low-cost 2-channel radio, you're bound to raise some eyebrows and save some money. Fly it and see.

Plane and Radio Sold Separately.

COX

COX/SANWA RADIOS,
AIRTRONICS KITS, COX ENGINES.
WHEN YOU FLY WITH COX,
YOU FLY WITH THE BEST.

Cox Hobbies Inc. /A subsidiary of Leisure Dynamics, Inc
1505 East Warner Avenue, Santa Ana, Calif. 92702

THE R/C CAR THAT'S NEITHER TOYISH NOR TEMPERMENTAL...JUST SOLID FUN

MRC-TAMIYA'S ELECTRIC PORSCHE TURBO KIT **PERFORMANCE NOT PROMISES** Move into high gear with this MRC-Tamiya solid, radio control special. It promises performance, it promises fun, it promises reliability . . . and it delivers. Not one of those go-one-way slowly toys, nor a flash-on-the-track you keep adjusting every spin. This one's got spunk, spirit and you can depend on it because it's from MRC-Tamiya. It's the new dimension in R/C car enjoyment with big performance features, powerful electric motor and stand up engineering that will last.

ENGINEERING EXCELLENCE . . . Set the gear ratio you want (there are four ranging from 4.6/1 to 19.4/1). Run it indoors, outdoors, in the driveway, den, street or yard. This Porsche is complete with two forward and two reverse speeds. It includes realistic rear suspension as well as semi-pneumatic-type rubber tires that take to rough and smooth surfaces like a cat. And its proportional steering offers command control.

Depending on your preference, you can power it with rechargeable nickel cadmium batteries, or with four dry cells. And for strength and durability you can't beat the strong ABS plastic body or the rugged Delrin gears. The little things have been considered, too, like lightweight, adjustable frame to accommodate different body designs; shock absorbing front end; differential gear for road hugging cornering. And for your convenience, the kit includes double face tape for mounting R/C gear, extra screws and washers for emergency and even extra plastic for reinforcing, repairing or customizing your Porsche.

See the MRC-Tamiya Porsche Turbo RSR electric car at your hobby dealer. Then do a little wheeling and dealing for the fun of it . . . with a real R/C car.

TAMIYA

MODEL RECTIFIER CORPORATION
2500 WOODBRIDGE AVE. EDISON, N.J. 08817

SPECIFICATIONS:
Length: Over 14"
Width: Over 7"
Gears: Four

Speeds:
Two Forward
Two Reverse