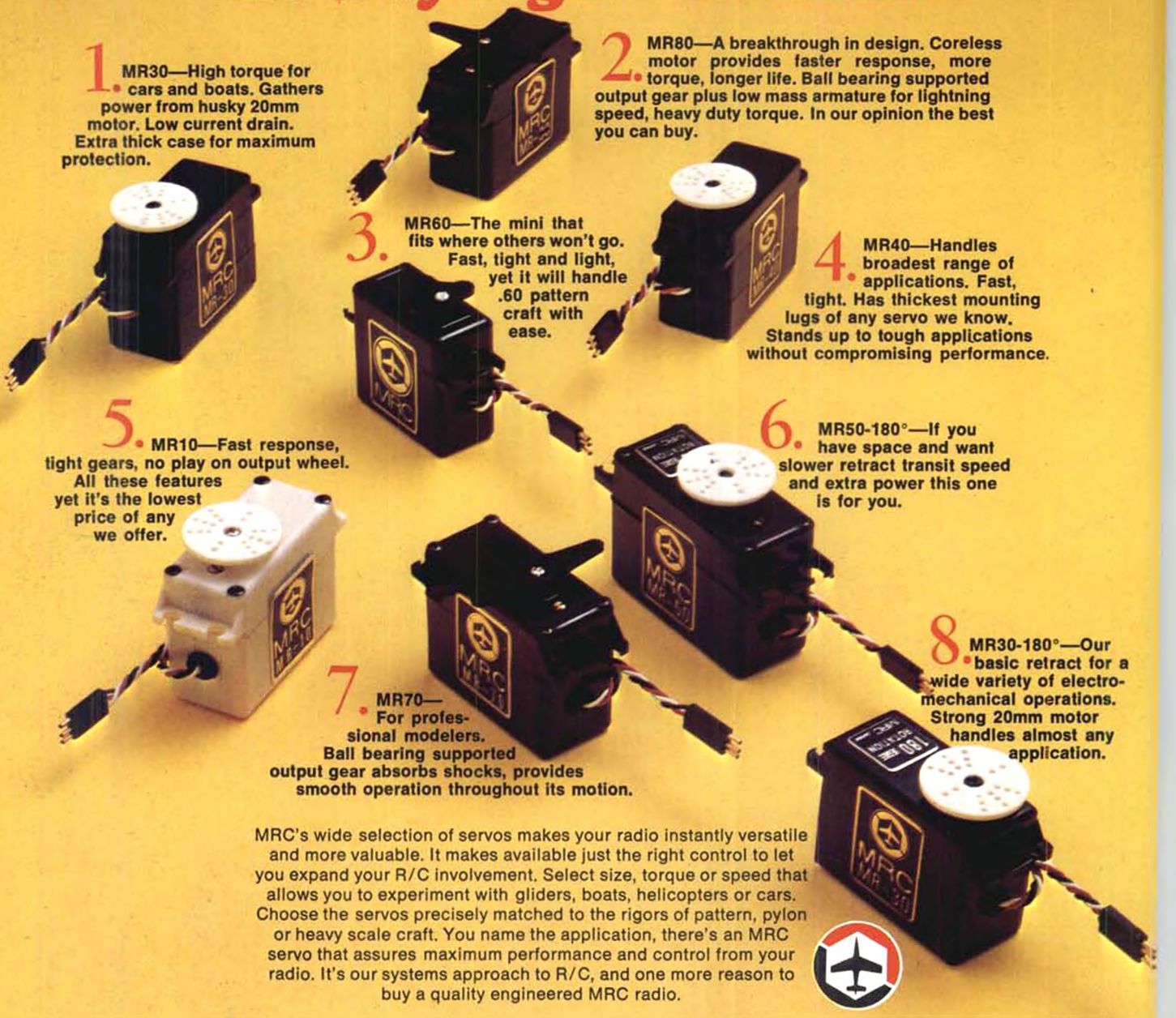
MODEL BUILDER

volume 8, number 74 $1.50 FEBRUARY 1978

8 powerful, fast and little reasons for buying MRC radios.



1. MR30—High torque for cars and boats. Gathers power from husky 20mm motor. Low current drain. Extra thick case for maximum protection.

2. MR80—A breakthrough in design. Coreless motor provides faster response, more torque, longer life. Ball bearing supported output gear plus low mass armature for lightning speed, heavy duty torque. In our opinion the best you can buy.

3. MR60—The mini that fits where others won't go. Fast, tight and light, yet it will handle .60 pattern craft with ease.

4. MR40—Handles broadest range of applications. Fast, tight. Has thickest mounting lugs of any servo we know. Stands up to tough applications without compromising performance.

5. MR10—Fast response, tight gears, no play on output wheel. All these features yet it's the lowest price of any we offer.

6. MR50-180°—If you have space and want slower retract transit speed and extra power this one is for you.

7. MR70—For professional modelers. Ball bearing supported output gear absorbs shocks, provides smooth operation throughout its motion.

8. MR30-180°—Our basic retract for a wide variety of electro-mechanical operations. Strong 20mm motor handles almost any application.

MRC's wide selection of servos makes your radio instantly versatile and more valuable. It makes available just the right control to let you expand your R/C involvement. Select size, torque or speed that allows you to experiment with gliders, boats, helicopters or cars. Choose the servos precisely matched to the rigors of pattern, pylon or heavy scale craft. You name the application, there's an MRC servo that assures maximum performance and control from your radio. It's our systems approach to R/C, and one more reason to buy a quality engineered MRC radio.

Send $1.00 for our 44 page, color R/C products catalogue, complete with photos, reviews and technical information.

	Type	Torque	Idle Current	Size L x W x H	Weight	Case Material	Approx. Transit Time
MR 10	Wide Application	35 in./oz.	6.4 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Nylon	.6 sec.
MR 30 STD.	Hi Torque	48 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.7 sec.
MR 30 Reverse	Hi Torque	48 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.7 sec.
MR 30 180°	Retract	54 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	
MR 40 STD.	Standard	36 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.6 sec.
MR 40 Reverse	Standard	36 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.6 sec.
MR 50 180°	Retract Hvy. Dty.	58 in./oz.	10 MA	2 x ⅞ x 1½	2.13 oz.	Glass Nylon	
MR 60 STD.	Mini	32 in./oz.	7.9 MA	1½ x ¾ x 1½	1.4 oz.	Glass Nylon	.6 sec.
MR 60 Reverse	Mini	32 in./oz.	7.9 MA	1½ x ¾ x 1½	1.4 oz.	Glass Nylon	.6 sec.
MR 70 STD.	Ball Brg.	36 in./oz.	5 MA	1¾ x ⅞ x 1⅜	1.8 oz.	Glass Nylon	.6 sec.
MR 70 Reverse	Ball Brg.	36 in./oz.	5 MA	1¾ x ⅞ x 1⅜	1.8 oz.	Glass Nylon	.6 sec.
MR 80 STD.	Ball Brg. Coreless Motor	50.5 in./oz.	5.8 MA	1¾ x ⅞ x 1⅜	2.1 oz.	Glass Nylon	.5 sec.

MODEL RECTIFIER CORPORATION • 2500 WOODBRIDGE AVENUE • EDISON, N.J. 08817

CARL GOLDBERG

NEW! SMALL FLEX POINT HINGES FOR 1/8" BALSA—BY KLETT

YOU ASKED FOR IT!!!

Modelers not only accepted our REGULAR FLEX POINT HINGE, but asked for small ones for 1/8" balsa. So—— *HERE IT IS!*

DESIGN ADVANTAGES:

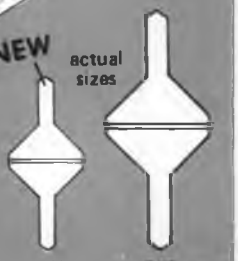
Simplest possible installation—Drill holes, and apply epoxy.

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.

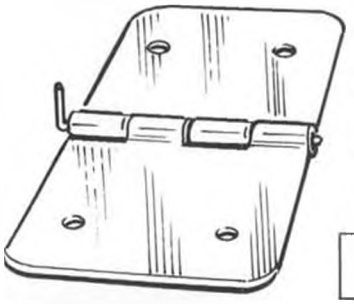
Web provides visual axis alignment.

RK4 SMALL 18 for $1.20
RK5 REGULAR 18 for $1.20



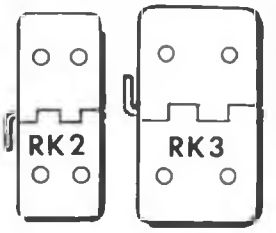
MADE FROM VIRGIN POLYPROPYLENE–The "Living Hinge" Plastic

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 $1.85
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¢

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For 1/16" Wire PEG2 4 for 75¢

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Out Of The Skies Of History
Chance Vought F4U-1A
CORSAIR

Kit FS-36
Wing Span 36"

$29.95

36" Stand-Off Scale R/C Model

About The Airplane:

The prototype XF4U-1 was first flown on March 29, 1940. The Corsair was to become the most important Naval Attack Fighter of W W II, and remain in production for 13 years, yet its first service trials had ended in failure in its chosen role. It did not reach maturity as a great fighting machine easily. It gave notice that it was to be flown and tested at all times like a true racing stallion, and was an airplane for inexperienced pilots to reckon with. Because it was an advanced design—and had a new and untried high horsepower engine the Corsair required many perplexing and difficult flight tests and service changes before assuming the role of the Navy's first line fighter.

The Chance Vought Corsair had a service life spanning two wars, performing every conceivable mission possible for a military flying machine. The Corsair had a 15 year life span of battle victories unequaled in the annals of aviation history. Vought ceased production of the F4U-1 Model on Feb. 2, 1945 with the delivery of the 4,996th airplane. In air-to air combat the Corsair had destroyed 2,140 enemy aircraft with the loss of 189.

The Corsair's distinctive whistling war cry, caused by the wing root inlets for engine air, earned it the nickname "whistling death" among the Japanese.

The Corsair's most unique feature was the bent (gull) wing which was necessitated by the most powerful engine ever installed in a piston engined fighter, coupled with one of the largest props in the world. Thus the inverted gull-wing permitted the short, sturdy landing gear required for carrier operations.

The first combat unit to receive the Corsair was VMF-124 and the first 12 machines arrived at Henderson Field on Guadalcanal on Feb. 12, 1943. On Feb. 13, VMF-124 demonstrated their superiority over the Wildcat by escorting PB4Y-1 Liberators all the way to Bougainville. The following day they saw combat for the first time, and the inexperienced Corsair pilots were badly mauled by some 50 Zeros. Two Corsairs, two Liberators, two P-40s and four P-38s were lost in this "Saint Valentine's Day Massacre", but the Corsairs soon gained superiority over the Japanese which was never lost. VMF-124 was subsequently credited with 68 kills against a loss of four aircraft and three pilots. Within six months, all Pacific-based Marine Fighter Squadrons had been re-equipped with the Corsair and the list of aces and the airplanes legend began to grow.

About The Kit:

Designed expressly for 2 channel R/C with plenty of room for just about any R/C up to 4 channel miniature units. Maintaining top quality and simple construction, (even the inverted gull wing), all Balsa and Plywood parts are accurately die cut. Hardware Package including R/C Hardware, full-size step-by-step Plans and a flat finish Decal sheet for Major Gregory "Pappy" Boyington's Lulubelle as it appeared after the Oct. 17, 1943 raid on Kahili Airfield, Solomons. Recommended engine sizes for maximum performance .09 or .10. Minimal performance achieved with stock .049 or .051 Tee Dee. Diesel conversion of Tee Dee Engines is suggested.

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

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

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THE WORD IS GETTING AROUND . . . . .

KADET - FIRST CHOICE FOR BEGINNERS

New! CHECK LIST

If your Kadet kit does not have this check list, send a self-addressed large size stamped envelope and we will send you a free copy.

During the past year, the Sig Factory Fliers have been teaching a group of modelers from the surrounding area how to fly RC with Kadets. We found many small things, often taken for granted in kit directions as being too elementary to mention, are really essential information to an absolute novice at the hobby. This turned out to be particularly true in preparing a model for the first flight. Notes were kept on things our students did wrong or didn't understand while building the model, installing the radio equipment and making their first flights.

From this practical experience, a comprehensive check list has been prepared. If the Kadet builder will go down the list and verify each item before flying - just like a careful pilot does a walk-around inspection and runs his check list in full size aviation - we feel the chances for successful flights are greatly improved. Additional building tips are also provided with this check list.

Another improvement in the kit is a completely new plastic wing tip. The old one was hard for an inexperienced builder to fit in place and was heavier than necessary. The new wing tip slips easily over the end of the wing for a neat, finished appearance.

WHY RUDDER CONTROL?

Some expert fliers think beginners should learn to fly by starting with an aileron-controlled model. Maybe this will work out if an instructor pilot is available to make the takeoffs and landings and stand by every minute of a flight, ready to take over if the student gets disoriented, until his pupil gets skilled enough to manage by himself. But this process takes a lot of flights. Most beginners do not have someone willing or able to spend so long a time with them.

We think a stable, rudder-controlled model is a lot less likely to get a novice into trouble from overcontrolling or not controlling. If the flier freezes up momentarily and can't decide what to do next, a flat bottom sectioned, high wing model — like the Kadet — will right itself, or partially do so, if the sticks are allowed to snap back to neutral, giving him time to think. Most aileron-controlled models need immediate and proper corrective control movement to make them recover, an automatic reaction that a beginner has not yet developed.

Many club instructors and hobby dealers have told us that two or three check-out flights on a Kadet are sufficient to allow a student to practice fly and learn without constant attention. And we know of modelers in isolated areas, with no one to help them, who have taught themselves to fly with the Kadet.

So remember—you may dream of darting around the sky with a sleek P-51, but first you must have some flying time with our boxy buddy, the dependable Kadet. It's the standard trainer-nationwide!

In club newsletters across the country, the Kadet continues to be the most recommended trainer for RC novices. But perhaps the biggest boost comes from the word-of-mouth advertising of those who have learned to fly on the Kadet. They tell their flying buddies to get the Kadet and the list of many thousands who have successfully soloed grows longer.

Designed Specially For Rudder Control---Not A Compromise.

From the number of Kadet-like trainers now appearing on the market it is obvious that other kit companies have gotten the word also! And some of our competitor friends are advertising their 4 channel aileron trainers as suitable for rudder control on three channels. An aileron trainer converted to rudder will never be as good a trainer for the beginner as the Kadet, which was designed---from the start ---for rudder control.

SIG Kit RC-31 $34.95

And, of course, every Kadet kit has a copy of this Building & Flying manual, fully illustrated with construction photos, detailed isometric drawings and step-by-step directions. Also included: Big full-size plan.

WEIGHT: 4 Lbs. LENGTH: 42"
ENGINES: .19-.35 WING SPAN: 57"

New!

In appreciation of the steady increase in Kadet sales, we are adding a further improvement to the kit - a strong, heavy-duty injection molded cowling.

The molds for the plastic wing tips have recently been redone for lighter weight and improved fit of the tip to the wing.

SEE YOUR DEALER FIRST! TO ORDER DIRECT, ADD $1 POSTAGE UNDER $10, POSTAGE FREE OVER $10. NO C.O.D.

SIG MANUFACTURING CO. . . Montezuma, Iowa 50171

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

Vol. 2, No. 7 $2.00

June 1972

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

Vol. 2, No. 8 $3.00

July 1972

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

Vol. 2, No. 9 $4.00

August 1972

Bonzo standard R/C sport pylon scale.
Counterfeit Sailless A/1 [illegible].
Shoestring 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

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				Aug. 76 to date each	1.50( )

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

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MODEL BUILDER

FEBRUARY

1978

volume 8, number 74

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

CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Larry Wolfe, owner of Jet Hobby Hangar, Lakewood, California, and his partner, Dave Lindsay, have developed this Stand-Off scale ducted fan powered Mirage III. See page 22 for story and more details. The 35mm Kodachrome transparency is by Dick Tichenor, using a Nikon set at f11 and 1/125 sec.

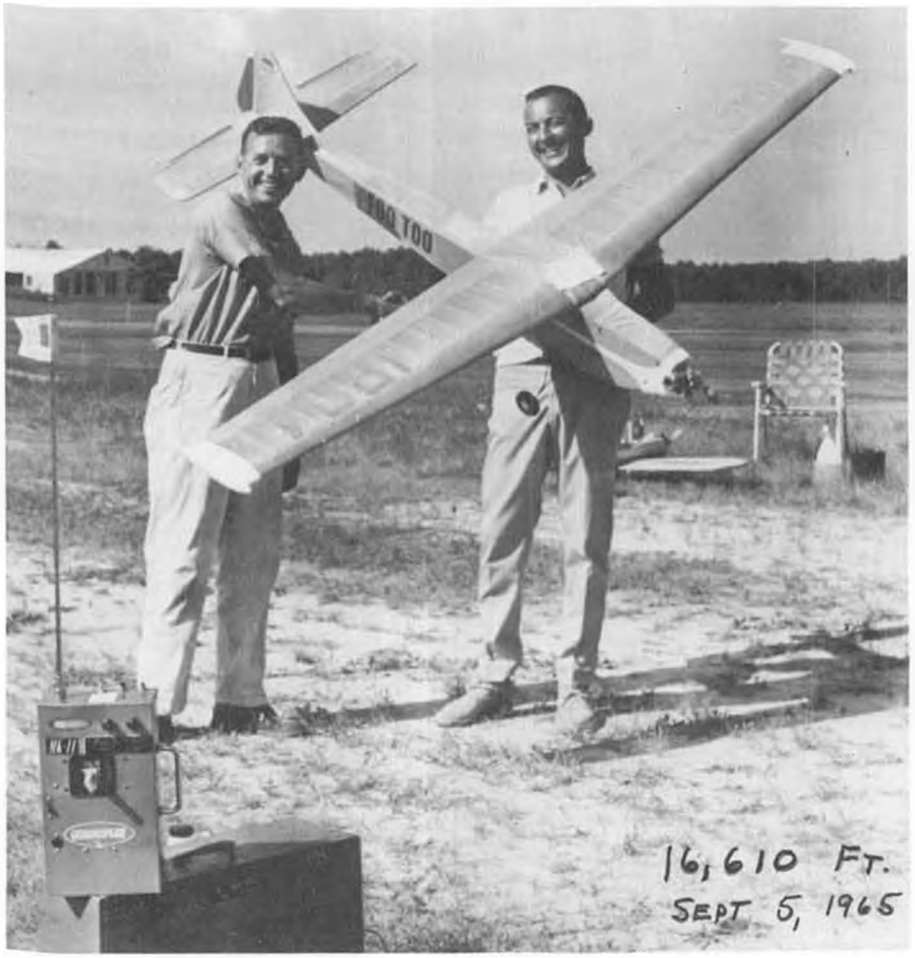
from Bill Northrop's workbench

• The cover of next month's issue may confuse some of our readers . . . unless they happen to see this. The date on that cover will read "March/April."

Fear not, faithful followers, we are not skipping a month. It is simply that we have decided to quit fighting the establishment . . . which decrees, "Thou shalt publish monthly magazines one month (or more) ahead of the cover date."

Cover dates are kinda ridiculous. The timing of the material inside (if it's news) is what really counts. We've often been tempted to date all covers with "Current Issue". However, that's not playing the game. So from May on, we'll be just like the rest . . . the May issue will come out the first of April, though to reach the East Coast in time, it will be mailed about March 15. This means that advertisers and writers have to have their material to us by the first part of February. See how simple it is, now that we're going to play their silly game?

There's really more reason to this rhyme than you think. Beginning with the May issue . . . you know . . . the one that's going to come out in April . . . and used to be called April? The May issue will mark the beginning of a significant increase in page content in **Model Builder**. We are expanding our R/C coverage, with a fine array of new feature articles by widely known and respected authors.



Whatever happened to . . . ? About 10 years ago, we sold our old, reliable Quadruplex radio, which was used to capture the world altitude record in 1965 (above), and also to place third in Scale at the '65 Nats. Last month it came home, when wife, Anita, bought it back from the original buyer, Don Harding, Brookhaven, Pa., not since used, and ready for fresh batteries.

Before our control line and free flight readers get upset, please be assured that we are *not* going to reduce our coverage in these areas. The *ratio* of R/C to C/L and F/F will change, but there will be no less material.

Watch your hobby dealer's magazine rack for the first expanded **Model Builder**, due to come out around April 1 . . . and that's no joke!

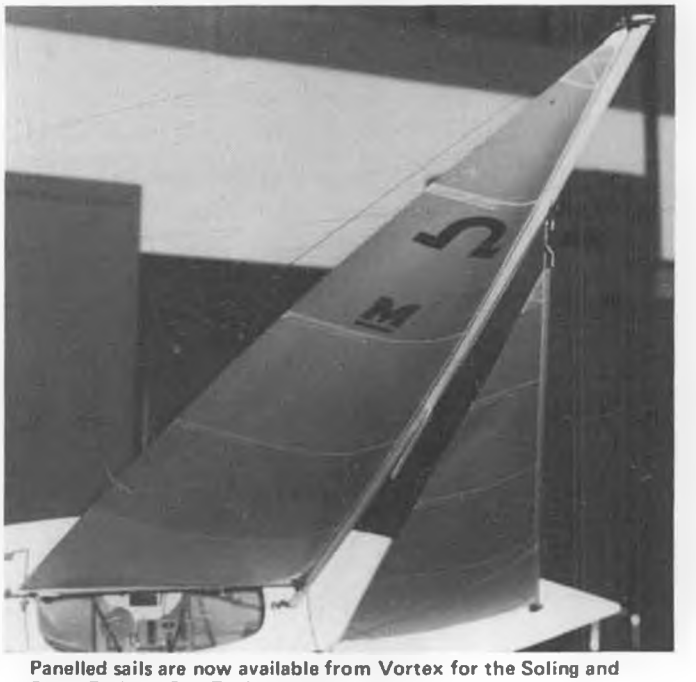
FAI SCALE

Somewhere on the "Workbench" page you'll find a design for the patch to be sold in support of the 1978 FAI R/C and C/L Scale Teams. These red, white, and blue patches will be on sale

Continued on page 110

OVER THE COUNTER

The new Kraft KPS-18 servo makes a Mallory pen-size "Duracell" look like a doorbell battery! This photo is exact size.



Panelled sails are now available from Vortex for the Soling and Santa Barbara One-Design.

• I knew better, but I still had to ask my friends at Kraft Systems if the new KPS-18 wasn't really a batch of servos that had fallen into some liquid and SHRUNK. You'll think so too, the first time you see this .514 x 1.47 x 1.103 inch beauty. You'll also think it's empty; the weight is only .582 ounce.

With the companion KPR-7L receiver and a 225 MAH battery pack, the total system weight for four channels is only 5.69 ounces, and 4.53 for two channels.

The KPS-18 is rated at 13 oz. in. of static torque, and takes .6 seconds to operate over its 100 degrees of movement. Both arm and wheel outputs are supplied.

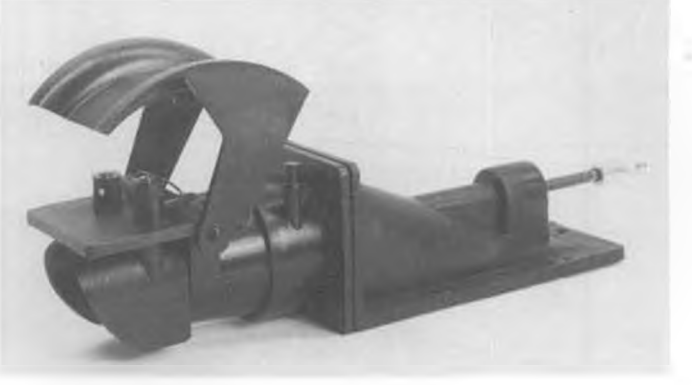
Look for them at your nearest Kraft dealer, or if you can't wait any longer, have him contact Kraft Systems, Inc., P.O. Box 1268, Vista, CA 92083.

* * *

Maybe I impress easily, but I always get a good feeling about a company when I learn that it has come out with an improved version of something that already does the job and has earned a good name for itself. And when this is done with no price increase, it is really news.

In this case, it is Vortex Model Engineering, which has redesigned the sails for both its Soling-M and Santa Barbara boats. Instead of the one-piece sails previously manufactured, the sails are now paneled. This design is claimed to allow the sail to hold a more efficient shape under all conditions.

New wheels from Fox. Smooth hub sizes go up to 6 inch diameter, for those Mammoth Scale models.



Water jet propulsion system for R/C boats, from MRC.

Nick Ziroli, with his HE-162 Heinkel, kitted by Midwest Products. It uses the Midwest Axiflo RK-40 ducted fan kit for motivation.

The Rossi .65 marine engine.

Other changes to the jib are as follows; foot has been rounded, tack attachment and luff sleeve have been redesigned, seam tapering has been changed, method of finishing leach has been changed from hemmed to hot-knifed, and area has been decreased.

The mainsail has had the tack attachment changed, eyelet for Cunningham tension adjuster has been added, seam tapering has been changed, method of finishing leach has been changed from hemmed to hot-knifed, shape of lowest panel has been changed by adding a taper dart in the luff so that there will be more camber near the foot, and area has been slightly increased.

The Soling-M sails are designed to cover both the Soling One Design Class and the 50/800 Class, for which sails are measured in slightly different ways. The Santa Barbara sails are legal for Santa Barbara One Design Class competition.

Available only from Vortex Model Engineering, 210 E. Ortega St., Santa Barbara, CA 93101, which will gladly send you information about these new sails or its complete line of model sailboat kits and accessories, upon request.

* * *

Fox Manufacturing Co., so well-known for so many high quality model supplies, has just dropped two more goodies on us. In this case, they are aluminum hub wheels, in two styles.

One is a light-plane type spoked wheel, featuring cast aluminum hubs which are claimed to be truer running, more resistant to wear, and not damaged by fuel or heat from a soldering iron, as when soldering on retainers. They are available in sizes from 1 to 4 inches, in 1/4 inch increments.

The other is a Cub-style smooth hub private plane series, featuring a machined polished hub. They will be priced slightly higher than the cast hub wheels, but have all the true running and durability features. They are available in 1 to 4 inch sizes in 1/4 inch increments, and from 4 to 6 inch sizes in 1/2 inch increments.

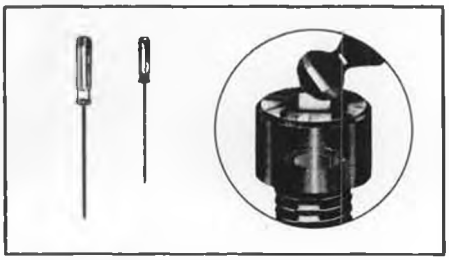
Both styles feature the same tire, which is realistic in proportion and pattern, and which has a scale tread. They are made on Fox-designed machines, using a variation of rotational molding, resulting in almost perfect material distribution and balance.

Look for them at your dealers, or inquire directly from Duke at Fox Manufacturing Co., 5305 Towson Ave., Ft. Smith, AR 72901.

* * *

The Italian magazine, Modelistica, describes it as an R 65 RC RV MARINO a risonanza. Cilindro e tubo di scarico con raffreddamento ad acqua. Carburatore RC con regolazione miscela in acqua. HP 3.50 a 24.500 rpm.

What does it say? It says that if you



Allen head bolt wrenches for 4-40 and 6-32 sizes, by Du-Bro.

The Anderson Kingfisher for Sport Scale . . . and water, from Champion Model Airplane Co.

are an R/C boater, that boat in front of you is probably running a Rossi 65 Marine. It is described as having a tuned pipe muffler, with the cylinder and exhaust manifold being water-cooled. The R/C carburetor can be servo-adjusted, while you are in the water, and the horsepower rating at 24,500 RPM is 3.5.

As all the Rossi engines, it is very impressive looking externally; rugged as well as precisely manufactured. Schneurle ported, of course, though non-ABC, as the Rossi thinking seems to be that the ringed piston is better for marine uses. It comes complete with flywheel and coupler, and even the proper type of Rossi plug. In addition to the normal high speed needle valve adjustment, the carburetor features an idle needle valve, and a servo-operated mixture control.

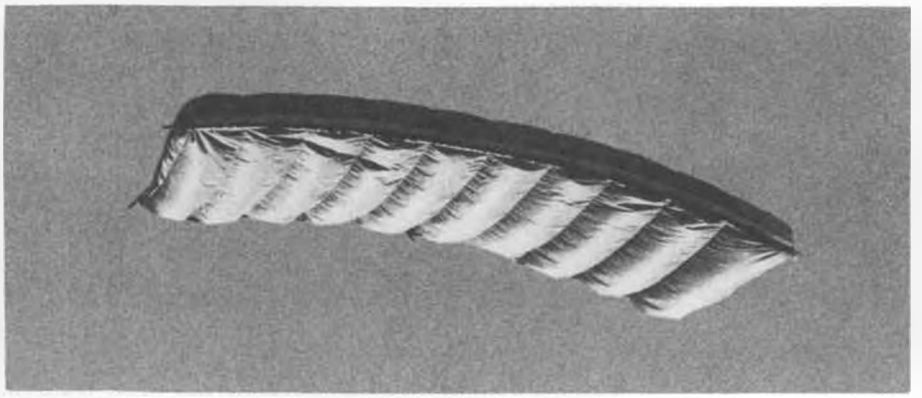
It is priced at $192, and is available in limited quantities only at this writing, so get your name on the list early. Some are on hand at Kustom Kraftsmanship, P.O. Box 2699, Laguna Hills, CA 92653. Dealer inquiries should go direct to the importer, Bill's Miniature Engines, 1325 Carol Dr., Memphis, TN 38116.

* * *

If you have been aching to try a ducted fan R/C, maybe the new Heinkel-62 from Nick Ziroli and Midwest Products Co. is just what you have been waiting for. It certainly appears to be an easy way to learn the peculiarities of these power plants without complicating things by burying one in the middle of a critically heavy and highly wing-loaded machine.

Midwest's HE-162 is reported to offer realistic flight performance using its Axiflo RK-40 ducted fan kit. The kit consists of a balsawood fuselage and tail assembly, with a balsa-covered foam wing. A vacuum formed canopy, formed landing gear, and an authentic decal sheet are included.

A fleet of scale sailing vessels, by Replica Seacraft.



You wouldn't believe it if we told you. Look it up in the text!

Described as very stable and easy to fly, this new R/C challenge spans 56 inches at 7 pounds, and requires any four-channel radio.

Already enroute to your dealers, from Midwest Products Co., 400 S. Indiana St. Hobart, IN 46342.

* * *

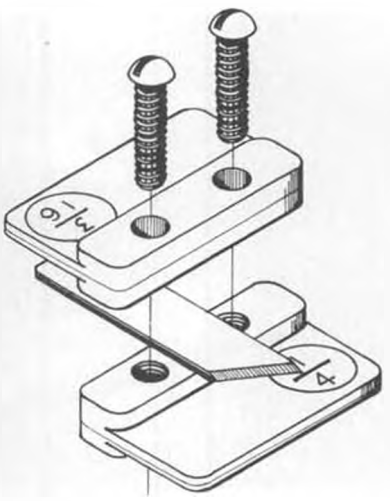
Model Rectifier Corporation has just released information on its new water jet propulsion system for R/C boats. Named the MRC-Turbo-Trol, this new jet pump comes complete and ready to run. It requires only coupling to a .40 to .60 engine, and installation in the boat of your choice.

The steering vanes which control boat direction are part of the unit, as is a thrust reverse with which the boat can be backed up at a controlled speed.

The Turbo-Trol is made from what appears to be filled or reinforced nylon, and comes complete with rotor, ball-bearing supported shaft, and all the necessary installation and

Continued on page 108

Hobby finishing accessories, by Testor Corp.

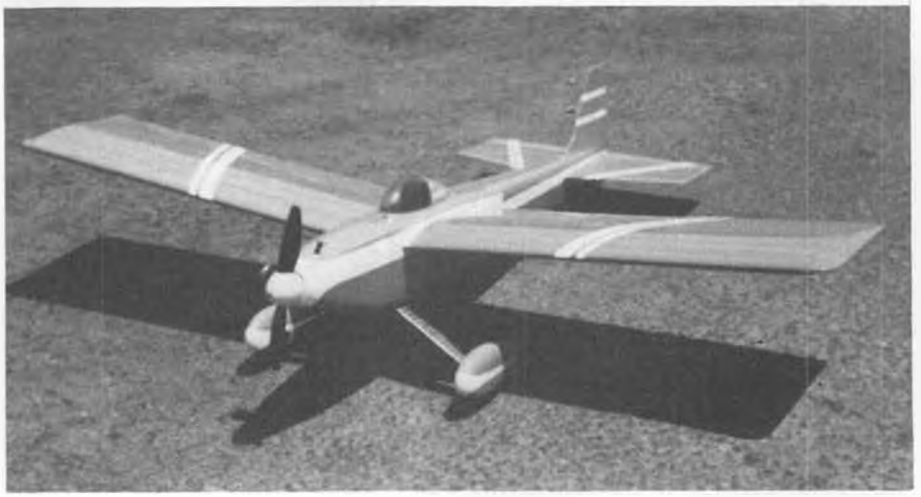


Hinge slotter by Fourmost.

Centuri's "Power System Outfit".

L'IL DUBLR

L'IL DUBLR



By BRAD SHEPHERD . . . This two-for-one Half-A R/C model "doubles" as a speedy pylon racer or as a snappy sport flier. It's all in the choice of wing, and both types are included on the plans.

• The lil' DUBLR was designed for maximum enjoyment of RC flying with a minimum of investment in money and building time. My goal was to have a versatile model that would fill the bill for those who like small models, have a limited budget, and enjoy different phases of flying RC. It can be built as a combination sport/aerobatic and racing model with just a little pre-planning, or, it can be built either way for fun flying or strictly racing. Study the plans and go over the building sequence before starting, and decide which type model you would like from your efforts.

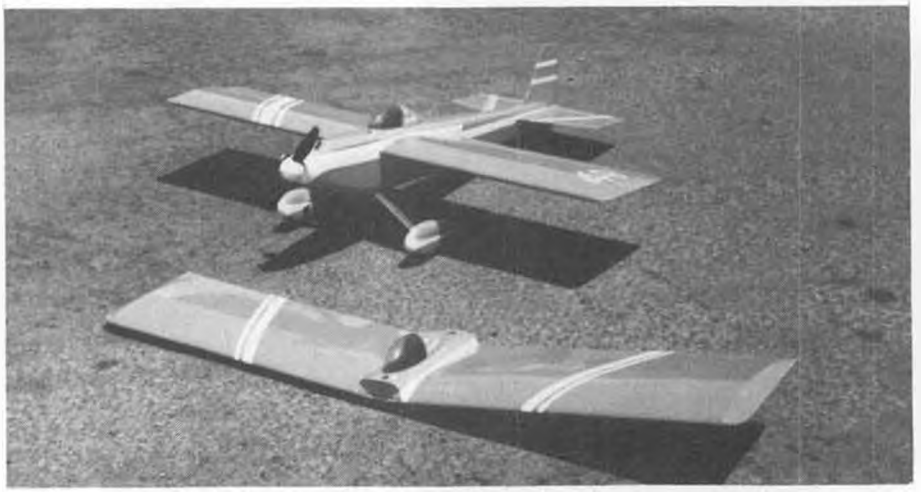
A combination model can be built by switching a few plywood parts and building another wing and fuselage top to go over the second wing. The rudder push rod is locked in the equipment compartment when going to ailerons, and the correct propeller must be installed.

If there are no races to go to, bolt on the sport wing and enjoy the 'wild blue yonder'. If you are at a race and things are not going your way, bolt on the sport wing and forget about the races. If you would like to go 'full house' with the big wing, I suggest the dihedral be reduced to 1/4 inch under each tip. Cut 1-1/4 inch off the lower part of D3 and it can be used as a tip jig if you build it this way.

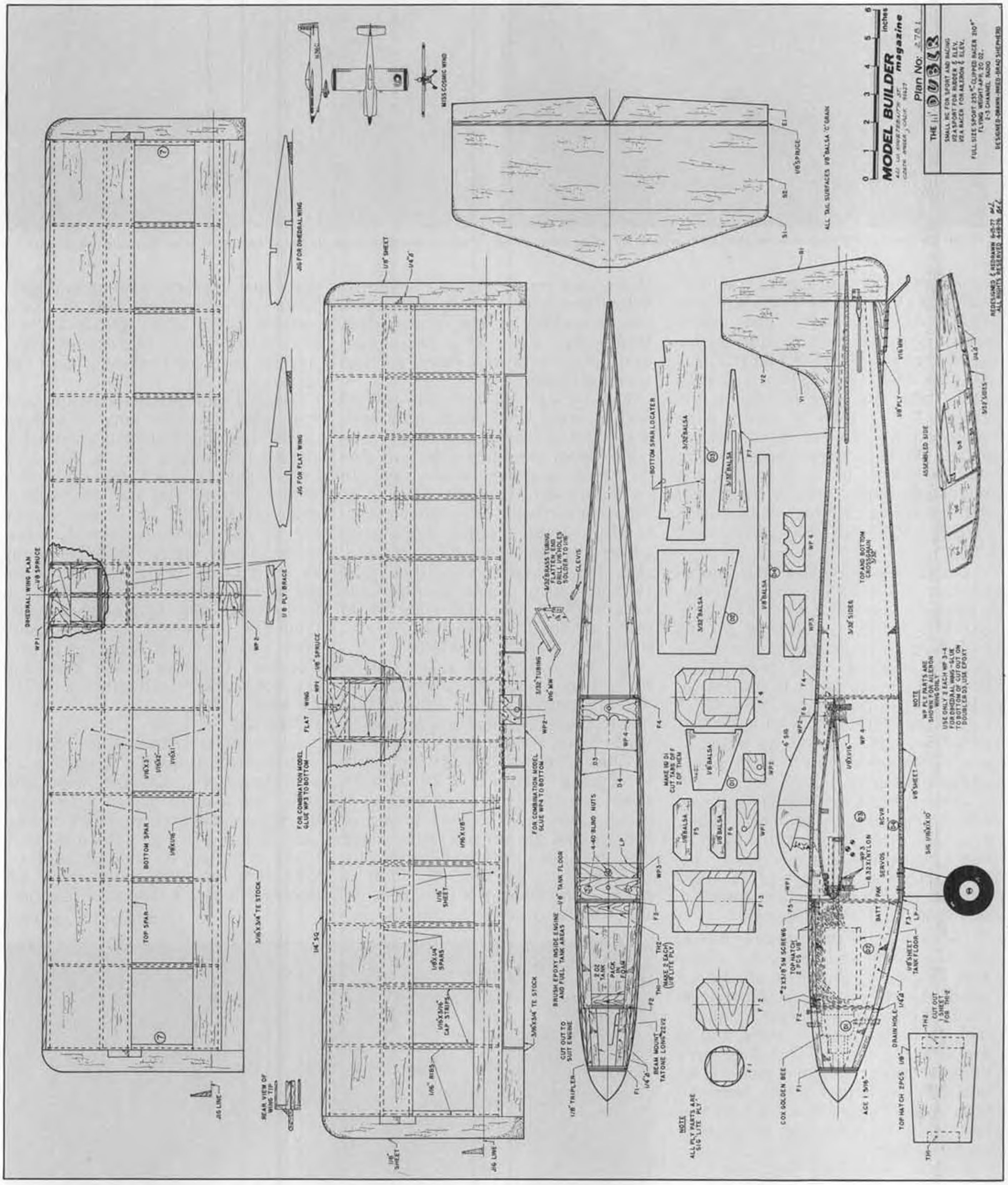
The model is not a six-hour project where you build a box and bolt the wing on, but the little extra time and effort produces a fairly realistic model that you will enjoy.

SPORT WING

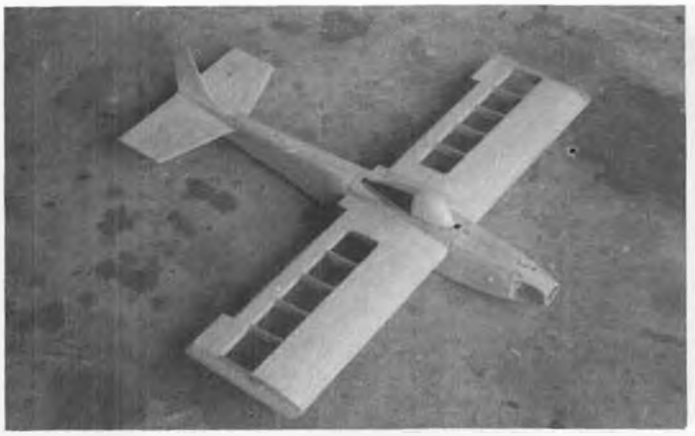
When constructing the sport version of the lil' DUBLR, the two panels of the dihedral wing are built upside down over the plans. Pin top spars for each panel to plans, butting against each other at the centerline. Pin 3/16 x 3/4 T.E. in place for use as a 'jig'. Glue ribs in place,

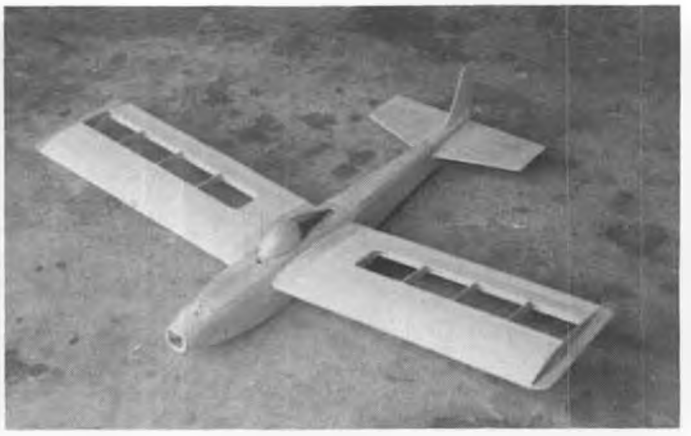


With two wings available, this little Half-A'er "doubles" as a competition (racer) and sport model. Sport wing has dihedral . . no ailerons.



FULL SIZE PLANS AVAILABLE — SEE PAGE 112





At the bare structure stage, we see the Dublr with both wings being fitted. You can build just one or the other, or set it up to make use of both.

pinning to spar and the TE 'jig'. DO NOT GLUE CENTER TWO RIBS IN PLACE AT THIS TIME. Glue bottom spars in place to ribs, butting together at centerline. DO NOT GLUE BUTT JOINT. Glue 1/16 x 1/8 x 16 inch strips on edge of two of the 1/16 x 1 x 16 inch TE sheets. Note side-view on plans of wing section. When dry, glue these sheets to ribs, butting against the rear of ribs and butting the ends of each sheet over the centerline. DO NOT GLUE THE ENDS TOGETHER. Pin sheets until dry..

Glue 1/4 sq. leading edge pieces to each rib on the panels, butting together at center. DO NOT GLUE BUTTED ENDS. Lay 1/16 x 2 x 16 inch leading edge sheeting in place over the ribs and check for fit. When fitted, glue these sheets to the 1/4 sq. ribs, and bottom spar. DO NOT GLUE BUTTED ENDS AT CENTER. Glue the 1/16 x 3/16 cap strips in place. Remove panels from plans and unpin the TE 'jig'.

Cut out the D3 fuselage doublers, which are used for dihedral 'jigs', and pin directly over rib No. 7, matching up the spar marks with the plans. Pin a scrap piece of TE stock to plans over center section as shown on the UPRIGHT 'jig' position.

Using a long flat sanding block, carefully sand spar ends, LE sheet, and TE sheet, to proper angles for good fit over centerline. Pin panels in place directly over plans to the D3 'jig', at the bottom spar ends, and to the scrap TE 'jig'. Glue 1/8 Lite ply dihedral braces to spars; glue the LE and TE also. Trim 1/8 inch from the front edge of spar cutouts on the two remaining ribs, glue ribs in place in center section.

Remove wing from 'jigs', and 'jigs' from plans. Pin the long TE 'jig' back in place. Pin one panel at a time over plans, resting and pinned down to the 'jig' and bottom spar. Glue the 3 inch wide LE sheeting to the 1/4 sq. ribs and top spar. Glue 1/16 x 1 x 16 inch TE sheet in place, glue cap strips and center section sheeting. When this is dry, unpin and repeat the procedure on the other panel. When dry, unpin wing from plans and glue bottom center section sheeting in place.

Cut 3/4 inch TE stock into two 16 inch pieces, sand bevel into ends that meet at center section, pin one panel down at trailing edge and glue the stock to panel. When dry, pin other panel down and glue stock to it. Trim some sheet away from center section at the leading edge, trim center ribs down until WP1 fits good, glue 1/8 spruce to ribs, then glue WP1 to spruce, LE and the ribs. Glue WP2 in place. Glue 1/8 sheet tips in place and let dry thoroughly.

BUILDING THE FLAT WING

Pin the bottom 1/8 x 1/4 spar in place over plans. Pin the TE stock 'jig' in place on line as shown. Glue ribs in place, pinning to spar and TE stock 'jig'. Glue top spar to ribs.

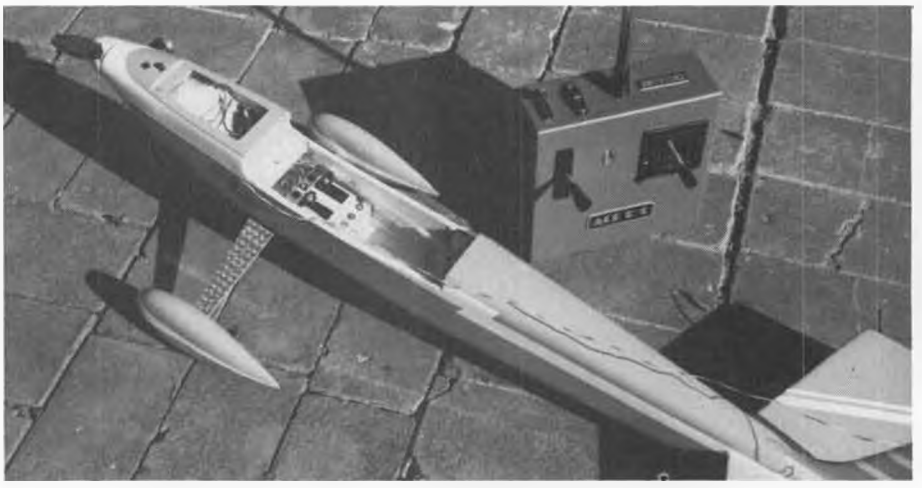
Glue 1/16 x 1/8 x 29 inch strip to edge of 1/16 x 1 x 29 inch TE sheet, as shown on side-view of plans. Glue this TE sheet to top of ribs, butting the strip to back end of ribs, and pin in place. Glue 1/4 sq. LE stock to cutouts in ribs. Pin in place. Trim the top 3 inch wide LE sheet for a good fit at the 1/4 sq., then glue in place, pinning until dry. Glue center section sheet in place and the 1/16 x 3/16 cap strips. When dry, remove from plans, turn over, and pin in place to the 'jig' and top spar.

Fit and glue bottom sheeting and cap strips, using the same procedure as the top. Fabricate the aileron fittings while this is drying. Cut and install the TE stock pieces at the center section and the tips. When dry, gouge the TE out at the aileron fitting locations so the linkage works freely. Epoxy the 3/32 tubing in the cutouts, being careful not to get glue on the wire. When dry, fill in the voids with balsa putty or filler. Glue the 1/8 sheet tips in place, sand entire wing smooth with fine paper. Cut and fit ailerons at this time, but do not install until after wing is covered.

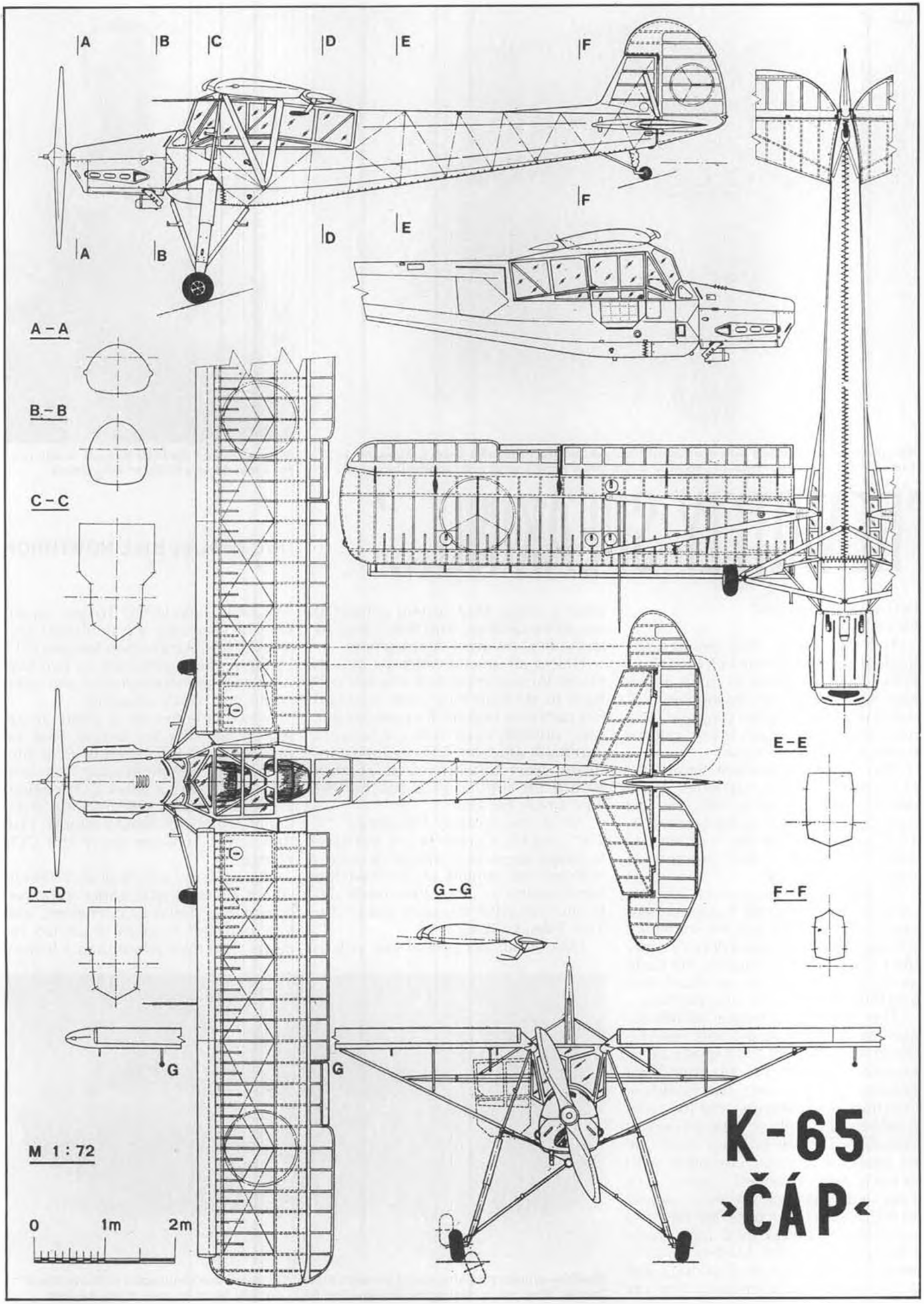
FUSELAGE

Lay fuselage sides out on a 3/32 x 3 inch sheet, using the thrust line as a reference point to locate wing and stab. Use a piece of 1/8 x 1/4 strip to get the gentle curve at aft end of side. Carefully cut side out, and using a ballpoint, lay out another side from matching wood. Lay out doublers with a ballpoint, using one

Continued on page 72



Ace radio installed as far forward as possible to counteract tail-heavy situation . . . still needed nose-weight. Author recommends plastic films in place of heavier fancy paint finish.


A
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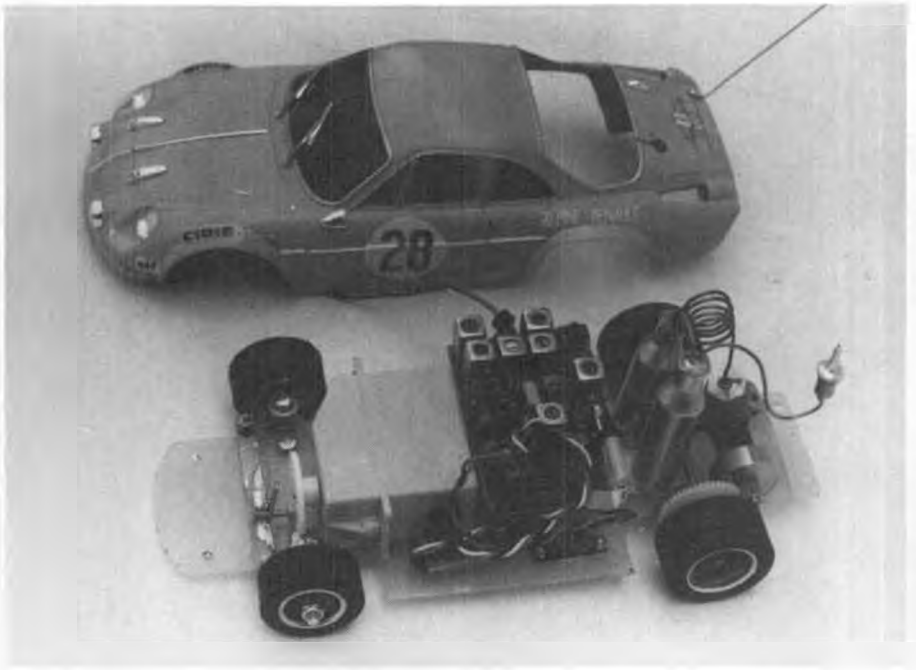


You just *thought* you had seen everything! Masayuki Suzuki installed a Shark CO_2 engine in this 1/20 scale "Alpine Renault", added 2 tanks, and a Futaba servo and receiver (less case).

Masayuki palms the little Renault. It will run for a minute on a filling of CO_2 charge.

'REMOTELY SPEAKING...'

R/C News, by BILL NORTHROP

WHAT A REVOLTIN' DEVELOPMENT!

The late actor, William Bendix, popularized this phrase in "The Life of Riley", and it comes to mind as we hear the latest news from the Paris FAI meetings. Adopting the proposal for a new set of pattern rules is fine, but the timing couldn't be worse!

The AMA R/C Contest Board just completed a two-year rules cycle period, and several of the changes coming into effect as of January 1, 1978, are based on the "current FAI rules". Problem is, the "current FAI rules" just changed!

One AMA proposal which was just passed is to change the Expert maneuver schedule to the full FAI schedule, just like the Masters schedule . . . only the FAI schedule is not now the same as it was when the board voted! And you think that's bad? Consider this. . .

The new FAI schedule, which according to AMA rules, will now be flown in all Masters and Expert pattern contests, consists of two rounds of Schedule A maneuvers, two rounds of Schedule B maneuvers, and then two final rounds with a pick-it-yourself schedule. Try *that* on your local one or two-day contest, complete with Novice and Advanced classes, plus Sport and Precision (at last, a proper name) Scale. Obviously, the new FAI schedule will be just great at the World Championships, the Masters Tournament, maybe the Nats (shudder!), and a few other special contests. For any other average AMA pattern contest, it would be disaster. And that brings us to the next revoltin' development. . .

Unless an official AMA decision is made, local competition officials will have to develop their own modified FAI pattern schedules for contests that can't possibly cope with the 6-round minimum situation. The resulting confusion from differences of opinion would be similar to a teacherless First Grade fire drill.

As of this writing, December 29, 1977, the R/C Contest Board will have to make some fast official decisions without the benefit of membership participation . . . not too much different from what it usually has to do.

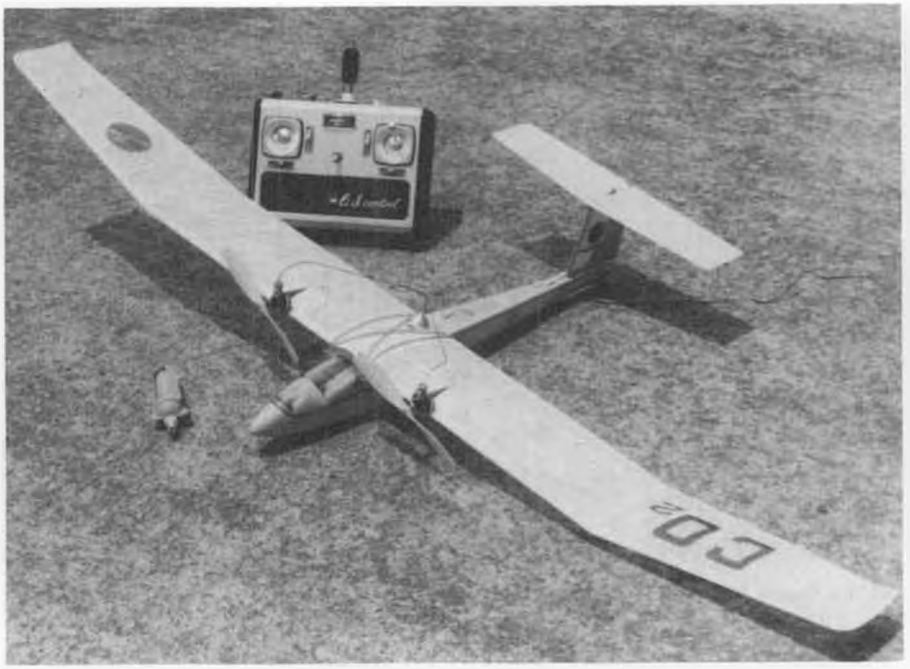
THE SMALL OF IT

One of our occasional pen pals is Masayuki Suzuki, of Tokyo, Japan. Over a year ago, we published pictures of his 39 inch-span Sterling B-17 Flying Fortress, powered by two Cox .010 engines (inboard only) and radio controlled. Pretty amazing!

Now come two more pretty amazing creations by Mr. Suzuki. First, he has installed R/C steering in a tiny 1/20 scale "Alpine Renault" car, and powered it with a Shark CO_2 engine! This little mouse speeds along at 10 km/hr (6 mph) for about a minute. Two fuel tanks in series carry the CO_2 charge.

Masayuki has also built an 1100mm (about 43 inch) span glider, powered it with two Telco CO_2 engines, and has managed to cram in an OS receiver, two mini servos, and a battery

The CO_2 cylinders sticking out of Suzuki's little R/C Renault are reminiscent of World War II Europe, when many cars carried propane fuel tanks on their backs because of gas shortage.



"He's not through yet, folks!" Another of Masayuki's R/C CO_2 accomplishments is this twin Telco CO_2 powered R/C glider. Not one, but two servos go along for rudder and elevator.

Here's Masayuki with his OS R/C guided CO_2 powered glider. Span is 1100 mm.

pack, to come up with a total weight of 210 grams (7.4 ounces).

With the new Kraft KPS-18 servo (with receiver and battery to match), there's no telling where this shrinkage will stop!

ON THE OTHER HAND

With a smug smile, we're watching the popularity of oversize scale (Hmmm . . . compared to what?) grow in leaps and bounds. The term "Quarter-Scale" seemed OK at first, but with the variety of prototype sizes from which the big models are being scale, 1/4 scale, or 3 inches to the foot, is a bit confining. With descriptive words instead of finite ratios doing so well in Peanut and Jumbo scale, we'd like to put in a bid for a modified version of our own original name, Mammoth Classic Scale. Bowing to the apparent desire of modelers to scale anything, regardless of era, we will simply remove the word "Classic" (thought this continues to be our favorite aircraft era), and will hereinafter refer to the bigguns as "Mammoth Scale."

With that problem settled, we turn the discussion over to our assistant, Dick Tichenor, who, properly primed with the correct adjective will now tell you what's new on the. . . .

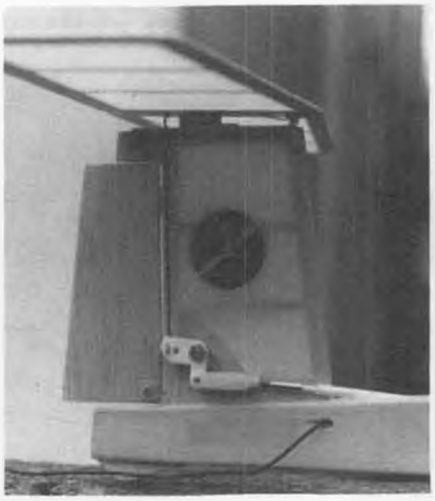
MAMMOTH SCALE SCENE

We have picked up the following news item information related to Mammoth machines from Ron Shettler's Quadra Newsletter:

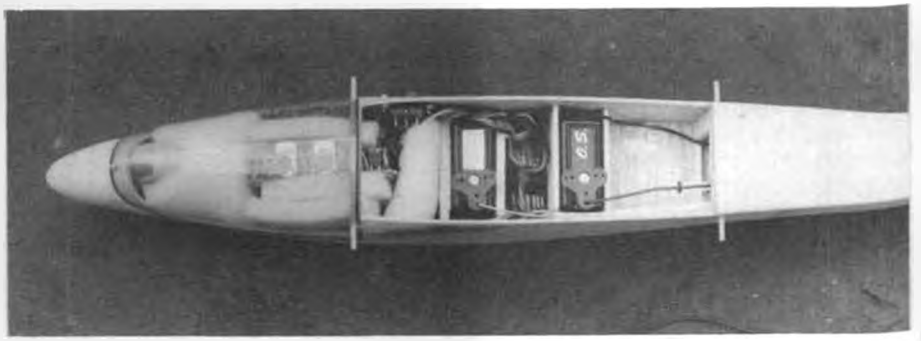
Several Mammoth kit prototypes are now flying, and these well-engineered models are designed around the larger engines, such as the Quadra. They should be in full production before too long.

E.W.H. Specialties, 2208 Stonegate, Arlington, Texas 76010, is developing a high wing cabin "Could be Scale" aerobatic trainer and sport model. It features functional struts, has rough field capability, and room for all sorts of gadgets: cargo, cameras, glider tow mechanisms, etc. Also in the works is a 1930's era biplane, fully rigged, and sporting a fully cowled inverted en-

Launching for another silent powered flight.

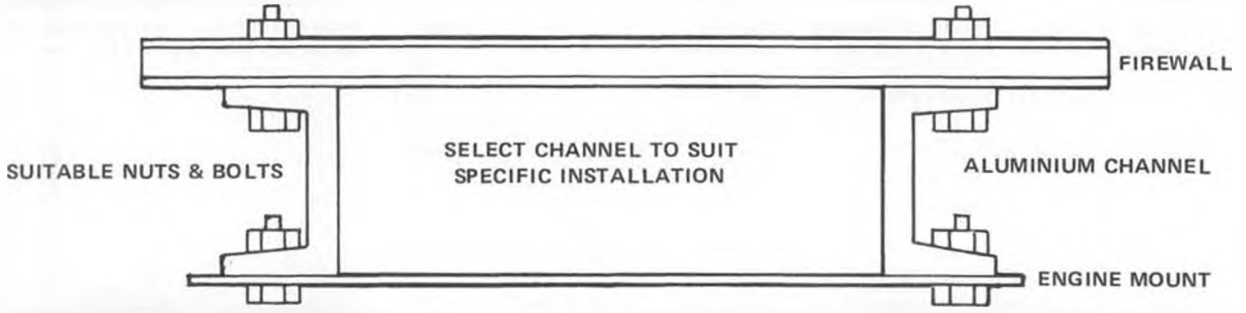


Original rudder was apparently not large enough. Note pivoted flying stab, control link.



OS mini servo installation in Masayuki's glider. Total weight is only 210 grams.

A Nosen Gere Sport biplane lifting off the runway at Mile Square Park, Fountain Valley, California. Built and flown by Brad Langdale, it is powered by a Roper 1.5 cu. in. engine.



Dick Phillips, Prince George, Canada, published this sketch in his "Super Scale News". Suggested by Jim Crawford, of Hamilton, Ontario, it is a sturdy engine mount for the Quadra, and possibly some other big engines. We'd suggest leveling the beveled legs of the channel where the nuts or bolt heads rest so they mate to a flat surface. Otherwise, the bolts will be bent when tightened, weakening the installation. Dremel tool will do it.

gine. Things like false ribs in the open structural wing, and smoke provisions, add character to this antique type aircraft. E.W.H. is also marketing a carb linkage and a fuel tank for the Quadra.

Toni Clark, of Practical Scale (producers of fantastic Tiger Moth and BE-8 kits) is preparing four new kits of Quadra power size. These are a J-3 Cub, a fully aerobatic Citabria, a Tiger Moth, and a Zlin trainer. Toni is planning several plan/semi-kit/full kit arrangements. They will be available in the U.S.A. from Technisales, Inc., 17835 Sky Park Circle, Suite E, Irvine, CA 92714.

Jim Davis Models, in England, will soon release its new Mustang, with big, heavy-duty retracts. Jim did the cross-channel bit with a Mammoth Spitfire model, which should well qualify him for the big stuff.

Shaped and hollowed spruce leading and trailing edges are being developed by Vince Sterba, of Seattle, Washington. Availability, sizes, prices, etc., to be announced soon.

Blue Max, of Switzerland, is working on a nose gear for the Mammoth. Also in their activity is a variety of related hardware suited to the larger aircraft. Again, more information will be passed on when available.

Robbe, of Germany, has a new wing connector that was designed for larger gliders and is suitable for joining the wing panels on the Mammoths. Ron says they make a positive connection, are spring loaded, have no slop, and he has them in stock.

Punctilio has its new propeller machine turning out 18 x 6 props. Beside their Super Thrust design, they have another blade pattern called Air Flow.

Continued on page 110

"I TOLD YOU NOT TO STRAP THAT DARN THING ON TOP!"

Members of the southern California "Hover-Lovers" club (l to r): Charlie Gilbert, Dr. Rich Smith, Curtis Croker, George Croker, Mike Yamashiro, and Larry Keppel. Choppers a nice solution to the flying space problem.

CHOPPER CHATTER

By JOHN TUCKER

PHOTOS BY AUTHOR UNLESS NOTED

HELLO, HELI-BOY!

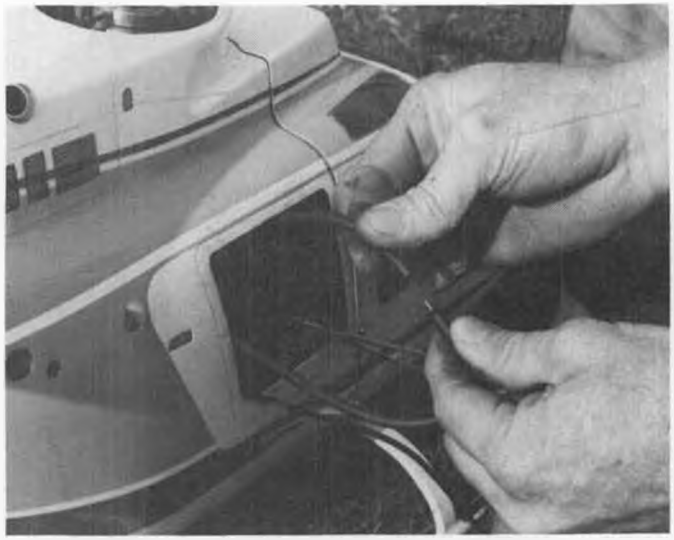
A spectacular new aerobatic R/C helicopter is now burning up the skies in Europe. This very capable chopper is another brainchild of Dieter Schluter, generally recognized as the "Father of R/C Helicopters", and whose manufacturing plant is located in Frankfurt, Germany. Many will remember him for his Bell Huey Cobra design, in addition to the Enstrom, Gazelle, and Heli-Baby kits. The quality and design features are unusual, even by today's standards, where excellence is pretty much the rule. Dieter will introduce the Heli-Boy in the states during the early part of 1978, and the kit is estimated to retail for under $300.00.

Last month, during a limited demonstration tour in the U.S., Dieter payed a short visit to sunny Southern California and, with his wife Heidi, spent two days at the home of **MB** editor, Bill Northrop. Unfortunately, I couldn't get by until I dismissed my college class at 10 p.m. the second evening . . . by then it was very dark and foggy, so we didn't get a chance to fly the Heli-Boy! I did, however, manage to shoot a roll of film and discuss the various flight characteristics, while examining the little jewel.

Performance-wise, I was convinced the Heli-Boy would loop and roll right off the workbench without extra modificatins, and that's something we've seldom been able to do before! Dieter explained that a typical routine goes something like this, "From level flight, Heli-Boy is pulled up into a hammerhead stall-turn of 540 degrees, and after leveling off at low altitude, a slow roll is executed just above the ground. From here, it is pulled up into a complete loop and back around again for a half-loop with Immelman turn, followed by a half-roll with a Split-S on the recovery! Of course, Cuban Eights, normal and reverse, are a part of the usual routine".

George Croker flying his Kavan Jet Ranger, at La Mirada Park, athletic field. Nice close-cut grass flying field.

Hover Lover's masct "Peppi", and his master, Curtis Croker, age 12, with his Revolution I.



Rich Smith shows how to "split" starter belt prior to flight.

Baby Ranger lifts off under the radio command of Dr. Rich Smith.

Now that sounds like the kind of machine a guy can use to vent his frustrations! I can remember, many years ago, while I was touring the U.S. giving air show performances in my Starduster prototype, I used to workout in a Hughes 269 helicopter, just for the fun of it. I often wished I could roll and loop the Hughes, but had to be content with precision pattern maneuvers. Perhaps, with the Heli-Boy, I will be able to do the next best thing . . . fly through those dreamed-up maneuvers with my feet firmly planted on terra firma!

Technically, the Heli-Boy is, in many ways, constructed much like the Heli-Baby, in that it has a basic two-sided aluminum frame sandwiched around an aluminum tail boom. From this point on, however, the differences begin to show up. The first striking feature that caught my eye was the engine starting cone mounted above the transmission and ahead of the main rotor shaft. I've never cared too much for the starter-belt concept on our usual choppers, and have enjoyed the novel "Starter Cone" feature of the Kavan Jet Ranger and Alouette machines. On the Heli-Boy, you simply hold the starter parallel to the main rotor shaft, turn it on, and push down! No more belts to get your fingers caught in, and no more tipping the machine sideways or upside down to get it going!

Heli-Boy, as it comes in the kit, is a trainer type machine with a simple cabin assembly attached to the front end to give it form and protect the electronics up front. For the scale-nut, there is a beautiful "tip-to-tail" fuselage option designed as an exact copy of the Bell 222. This fuselage can be attached very quickly for a change in looks at the flying field. All-up weight of the trainer version is 4200 grams (9.26 lbs.), with a main rotor span of 1.3 meters (4'-3"). Installation of the Bell 222 fuselage option will add 400 grams (.88 lbs.) to the overall weight (How 'bout all that metric data . . . I didn't throw it in to conform to the international metric system . . . I just happened to get it that way from Dieter).

Other outstanding features of the Heli-Boy include a collective pitch rigid rotor system with collective and engine throttle mixing. Tail rotor mixing with collective pitch changes also occurs automatically. The new rotor head is completely different than anything you've seen before. Actually it's a combination of the Bell and Hiller systems, which together provide the ultimate in controllability. Dieter jokingly calls this the "Biller" system, ha! (The effectiveness of this type of control has been demonstrated for years in the Kavan choppers). Dieter also called special attention to the absence of any interaction between collective and cyclic controls, which means maximum efficiency of all control inputs. Incidentally, the swash-plate is lifted, during collective pitch changes, by a four-point lifting system which eliminates any tendency to "float".

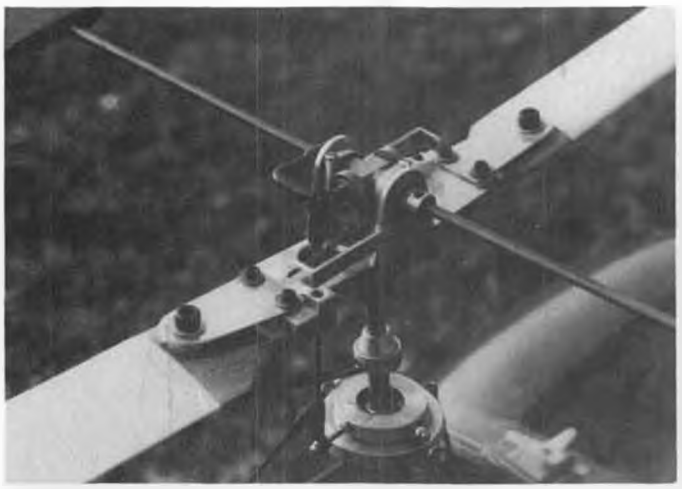
The power system on Dieter's Heli-Boy is the Profi .60 Schneurle ported engine. A 1/2 liter fuel tank is provided in the kit . . . this is sufficient capacity for 30 minutes of normal flight, or about 20 minutes for all-out aerobatics. Dieter's Profi sported a tuned pipe exhaust . . . this does not come with the kit . . . Dieter is only experimenting with it, and says it does increase power a bit, however, it doesn't appear to be a useful addition to the chopper.

Very soon, we'll have a construction feature in **MB**, and at that time, you'll get all the info needed to spark your interest in an aerobatic R/C chopper that was not designed for the expert only!!

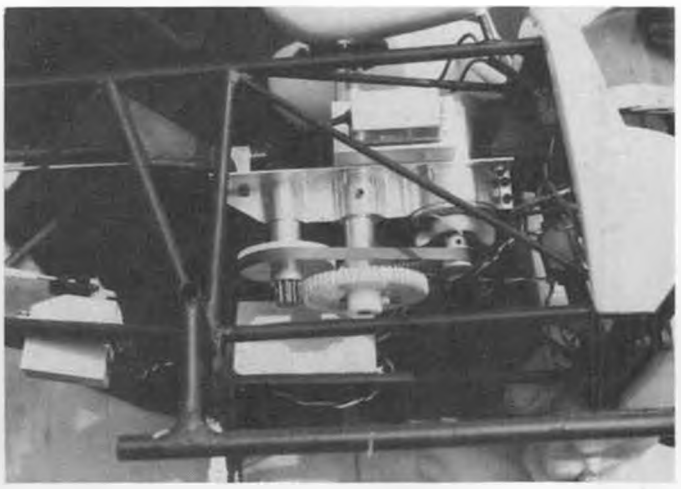
CLUB NEWS

Larry Jolly, manager of Hobby Shack's Buena Park store, with his looping Revolution II.

Another member of Hobby Shack "family", Rich Keppel, with his Revolution I.



Charlie Gilbert's modified rotor head on Revolution I. Music wire shafts are installed for centering of the teetering head.



Gilbert's latest experiment in electric choppers. Astro-Flight motor, Bell 47G helicopter. He's getting closer!

This last week, I was privileged to visit two local flying sites, and watch the antics of a bunch of Heli funfliers in the L.A. area. I was amazed at the progress of a great number of so-called "beginners", whom I remember from this last spring's M.A.C. show. At that time, they hadn't even completed their "birds", but now they are flying around as though they *were* birds! It just proves what a good club relationship can do in helping the beginners get over those first flight frights! The experts devote much of their time to helping trim the new choppers and generally overseeing the test flights. If you haven't found a group to fly with yet, keep looking around . . . they're out there, and willing to help.

HOVER LOVERS

The first group I visited meets every Sunday morning around 9 a.m. at the La Mirada Park (southeast Los Angeles area). I call them a "group" since they didn't have a name last week. . . In the meantime, when they found out their pictures would be in **MB** magazine, they decided a formal name would lend much dignity to the club, so I got a phone call mid-week from Charlie Gilbert, who informed me they are now known as the "Hover Lovers". It seems very appropriate, since they are all wholly absorbed in their hobby.

George Croker showed up with a whole stable of toys, including one of the best finished Jet Rangers I have ever seen! Also included was a Revolution 1, to which he had added an Alouette main rotor system. The marriage of the two products made for an excellent performer . . . smooth, with lots of zing! Accompanying George was his son, Curtis, age 13, who one day is going to be a champion helicopter flyer. Curtis has been interested in choppers for less than a year, but you should watch him hover and fly his Revolution 1 as though he has been practicing for years! The third member of the party was the club mascot "Peppi", who ran around all morning, sitting up and begging for a chopper of his own!

Charlie Gilbert brought his Revolution 1 with a modified control head . . . unfortunately, he didn't get off the ground because of techical problems, but he did show off his latest project, a Bell 47G electric powered chopper. If you'll remember from previous issues, Charlie has been pioneering electric helicopters for some time, but this one is the real thing. I'll cover it separately in a future issue, for lack of space this time. He also has provided modified control heads for many of the other members (He makes 'em in his workshop at home).

Next on the list was a real pro, Dr. Richard Smith, who has been flying only 2 years (this last year, as a real expert). Rich has 3 Revolution 1's, and one has Charlie Gilbert's Ranger fiberglass shell installed. This little machine is a real bomb in flight, and Rich is just the one to put it through its fantastic paces. Charlie, after watching this demo, I'm going home and start work on *my* Baby Ranger!

Mike Yamashiro, an 18 year old college student, who works part-time for Hobby Shack, brought out his Revolution 1 with expert rotor blades. I had to leave before he flew, however, I was told he does a fine job of hovering and flying large circles around himself. Mike started with helicopters only 2 months ago.

Toward the tail-end of the morning, a couple of late-shows demonstrated more expert flying. Rich Kepper came with his Revolution 1, but I was unable to see him fly . . . technical problems again.

The surprise of the day came when Larry Jolly, manager of Hobby Shack

Continued on page 73

Dieter Schluter's latest helicopter is this Bell 222. Many new features are described in text.

The trainer, or sport-bodied version of Schluter's Bell 222. He demonstrated its aerobatic capabilities at Las Vegas T of C.

Going back to September 11, 1977, the winners in Formula I at Toledo (l to r): Bill Hager, 1st; Barney Polzin, 4th; Bob Mellen, 5th; Dave Keats, 2nd; and Wayne Yeager, 3rd. Wonder what that field looks like right now?

PYLON

"GO FAST AND *Turn Left!*"

By JIM GAGER

PHOTOS BY AUTHOR UNLESS NOTED

Happy Thanksgiving!

Yeah, I know . . . at the time you're reading this it's way past "Turkey Day" (the eating kind, not the flying kind), but this is being written over the holiday break and it appears tht we racers do have something to be thankful about. We'll cover it in detail in a minute (or two, depending on how fast you read), but let me give you some personal feelings about why I'm so up on this recent happening.

During the racing seasons that I've been writing this column, I've pushed the NMPRA very strongly, as I believe it is a necessary and beneficial organization for the promotion and recognition of racing. However, the organization's performance has been lacking and somewhat less than open, and many ill feelings have been created by policies of some of the recent officers . . . so much so that I had made up my mind that, unless there were some drastic changes made, while I wrote this column, there would be no further support of the NMPRA, and possibly some campaigning against it.

Now, what precipitates all of the above is a letter I received from George Zink (former Q-M veep and general spokesman for Q-M) after the recent election of Bob Smith, from California, as President of the NMPRA for 1978. George's letter follows:

"Hope you got my last MARA Times newsletter. I was very interested in knowing what course Bob Smith had planned for QM. I wrote him and asked some tough questions which I think most of the QM racers would have asked him. Bob wrote back with some very encouraging answers and asked me to be editor of the new QM section in the News Release. Bob is willing to put things out in the open

Static judging at Sept. '77 Toledo affair. Gets to be a tough job, with so many beautifully finished aircraft. Photo by Art Arro.

Dave Keats' Big Arts' LR1A. It won Formula I at the 1977 Canadian Nationals. Photo by John Kilsdonk.

and to give the members an accounting of their money and how many members fly QM. I think it is a good thing for QM, and it should attract QM racers into NMPRA. I believe QM racers only want a fair deal with NMPRA, and that QM needs a national organization to survive.

"I am sending you these two pages of material in the hope you can find room to print them in your column in **Model Builder**. Of all the columns dealing with racing, I think yours is the one most read by QM racers, and I want this to get wide coverage."

NMPRA AND QUARTER MIDGET

The year 1978 may well be a turning point in the acceptance of NMPRA by QM racers. Bob Smith, NMPRA's new president, is setting a new policy designed to attract more QM racers. What's more, Bob is willing to openly prove this fairness.

I. *The 1978 NMPRA newsletter will contain a new QM Section and it will have its own QM editor (See following article).*

II. *The assets remaining after joint expenses will be divided on a strict percentage basis. If 600 members are interested in Form I and 400 in QM, the remaining assets will be divided 60% for Form I and 40% for QM. Members interested in both are to be counted in both.*

III. *An accounting of the money spent and the membership interest will be given in the NMPRA newsletter.*

IV. *Skeptical QM members may send their 1978 dues to the QM section editor ($10.00, payable to NMPRA).*

My personal opinion is that this is a very fair offer to QM racers, and it should go a long way to dispel that old bug-a-boo of NMPRA being for Form I racers only. With the backing of this national organization, the event in which QM racers have invested all that time, money and effort, can survive and prosper. If you still believe it's not worth those $10, why not write me.

QM SECTION IN NMPRA NEWS RELEASE

As editor of the new QM section, I am aiming to do the things an editor can do to make the News Release attractive to QM racers.

For example:

We have made plans to print the race schedules of the clubs and circuits holding QM races in '78. The idea is to get this information out to the members so they might contact the CD and go to the races. Early schedules can avoid intra-area race conflicts and make more racing available to the fliers willing to travel.

We plan to print every race result we get. It may be on a reduced print, but they will all be there.

We plan to print those helpful hints and tips along with articles about racing and QM in general.

There will be a letters-to-the-editor column to air those beefs and stir up interest to get things done.

Winners at the Signal Seekers' 1/2A Pylon Race (l to r):Barney "The Hat" Polzin, 1st; Denis Summer, 2nd; and John Kilsdonk, 3rd. Kilsdonk photo.

We will have 3 or 4 pages to an issue and 10 issues a year, so there is a lot of space to fill. We do have back up articles in hand concerning props and drag, and I guarantee the Form I boys will learn a few tricks from them.

If you can think of anything else you would like to see, let me know. George Zink, Editor, QM Section, 80-28 222 St., Jamaica, NY 11427, (212) 464-3160.

After reading the above, I couldn't believe that such a good selection could have been made without seeing a statement of policies prior to the election (we lucked out, I guess; Q-M & Form I alike), so I called Bob just to satisfy myself before changing my commitments. Bob reiterated his feelings and expounded on 'whys' and 'wherefores' of said feelings, which we'll not get into here, but just to say that things look good for all racers. So let's all give it one big push by signing ourselves up, get one of your buddies to sign up . . . have him get someone else to sign up . . . etc., etc., and give Bob a strong backing to put his policies into effect. Everybody . . . Q-M and Form I alike.

You Q-M guys should especially be really pushing to get your membership up. Believe it or not, there are still some hotshots who don't want Q-M to be a part of NMPRA and are doing everything they can to defeat the event. Bob needs our support, so get your dues in and let them know what event you fly! DO IT NOW!!

On the question of whether to try running some FI races with 15% nitro fuel during 1978, Bob Smith informed us that the poll run in the NMPRA newsletter came out approximately 60% against low nitro and 40% for it. The surprising fact (at least to me) was that the fliers out East voted against it almost 4:1. We outlined our reasons for going low nitro in a previous column, so we'll not repeat it again, but, guys . . . low nitro has nothing bad going against it, and I think we've made a mistake not going with it. However, the vote was close enough to warrant a continuing effort to change, so don't give up.

A LITTLE OF THIS AND THAT

In case you're not currently reading our mag from cover to cover, please let me enlighten you. You're missing some entertaining and occasionally interesting reading if you're passing up the Control Line column by Dan Rutherford. If your vocation happens to fall in the sciences of sociology or psychiatry you might find the column a revelation.

A call from Vince Galuori up Seattle, Washington way, informs us that pylon racing is really starting to come into its own once again in that

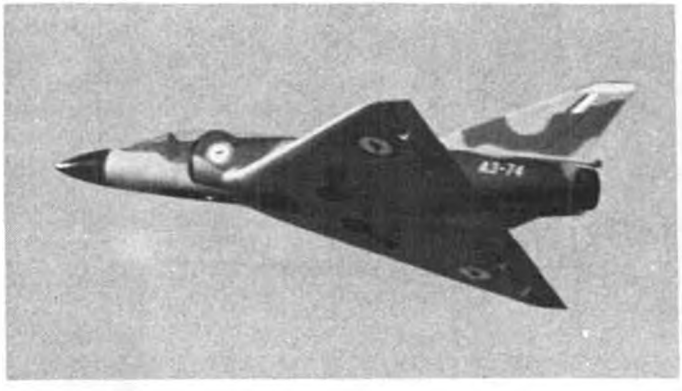
Continued on page 106

Barney Polzin's Prather Toni, powered by Prather ST X-40. Also has Prather-type paint job. Kilsdonk photo.

Dave Lindsay (left) and Larry Wolfe are the co-developers of the Mirage III, one of the most exciting ducted fan R/C models to date.

COVER STORY *DUCTED FAN* *MIRAGE III*

By DICK TICHENOR . . . The Mirage III, designed by Larry Wolfe and Dave Lindsay, has been convincing southern California modelers that ducted fan models are practical, along with their spectacular performance.



Flight sequence photos show takeoff angle (upper right), fly-by, and landing approach. It would have been nice if the pilot had been aboard at the time these shots were taken at Mile Square Park air strip, Fountain Valley, California, near MB's office.

Photo at left shows clean lines of the Mirage III. Black and white shots were taken during early flight testing. Model is now flying as shown on the cover. Fan unit location in delta design is a natural for proper CG location. Camouflage and markings are of the Royal Australian Air Force.

• The list of modelers who are enjoying impressive performance from ducted fan powered models of their own design is increasing nicely. Larry Wolfe and his partner, Dave Lindsay, have taken the lead in the ducted fan activity in Southern California.

The thrill of experiencing a good flight from a jet type aircraft seems to justify the tinkering and trial and error activity that we have seen over the last few years. There is no black magic involved; it is, basically, correctly arranging the aerodynamic and mechanical forces to make the model fly properly. The aircraft industry struggled through a similar development period with jet aircraft following World War II. So did Orville and Wilbur in 1903.

Larry's Mirage III, shown here, is the third model of this particular design that Larry and Dave have developed. A major factor in their developing a jet type aircraft is their desire to make a model available for sport flyers to build and enjoy. The model shown has logged approximately 40 flights at the time of this writing, and has been flown by several members of the Southern California Scale Squadron.

Their Mirage III is a stand-off-scale model built to 1/10th scale. It has a 47-inch span, and a takeoff weight of 10-1/2 pounds, which includes 16 ounces of fuel. The fuselage is a lightweight fiberglass/epoxy shell. The wing is a balsa covered foam core structure that houses two 8-ounce fuel tanks. The tail surfaces are built up of balsa.

The model is equipped with a Rom Air retractable landing gear system, and uses a Kraft 6-channel radio for control.

The Scozzi Turb Ax I ducted fan unit is powered by a K & B 6.5cc front rotor free flight engine that has been fitted with a Perry pump and carburetor. Engine performance has been excellent, using a 10% nitro fuel. Ground run-up is slightly above 22,000 rpm, with takeoff run at about 20,000 rpm. A tuned pipe muffler is installed, which allows the model to be flown from the noise-controlled fields in California.

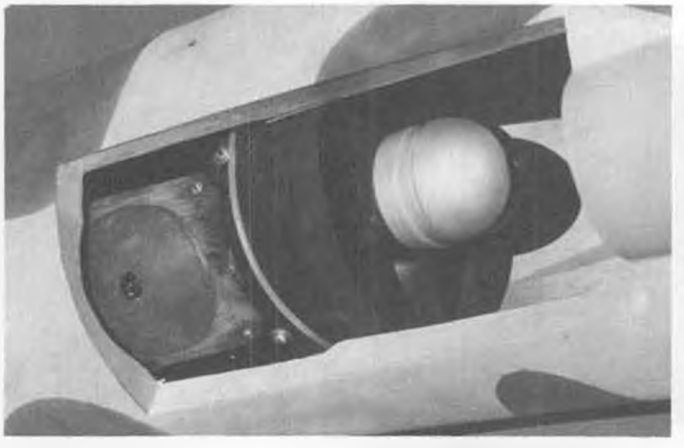
Several engine/pipe/fuel combinations have been tried and the equipment listed above has proven to be the most practical. Incidentally, this engine set-up has a remarkable low-speed idle capability with a full range of throttle response.

Air ducting of ample area, that is short and unobstructed, leads directly to the fan shroud. A 1/64 plywood tail pipe extends from the aft end of the shroud through the tail end of the fuselage. This clean air duct system has contributed greatly to the fan efficiency.

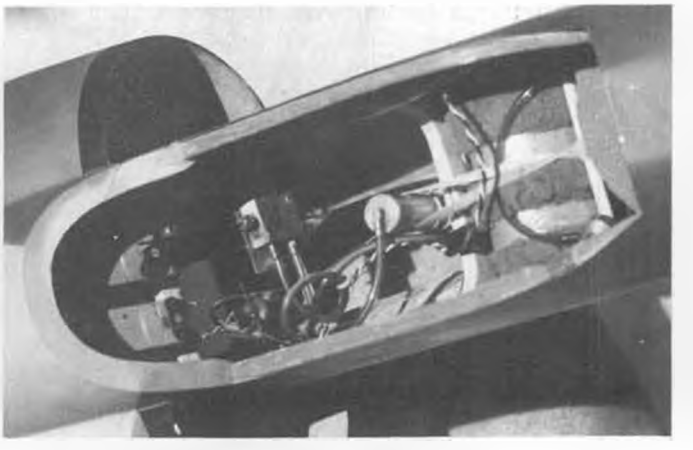
Even though the Mirage weighs 10+ pounds, it is quite maneuverable. Loops, inside and outside, are entered from level flight, and exit at the same altitude. Rolls are straight and smooth. Stalls are gentle, with no tendency to fall off in either direction. High speed passes have been estimated as well in excess of 125 mph. Landing approach is rather slow and solid. The overall performance is generally comparable to a modern .60 powered pattern aircraft.

The performance did not happen without the experimentation mentioned at the beginning of this article. For instance, the proper ground angle and thrust line position had to be matched with the landing gear location to allow rotation and takeoff. When airborne, it must fly straight and level with the takeoff trims in the same positions at both high and low speed flight. There were numerous adjustments of the tail pipe location and of the landing gear installation. Careful analysis of the problems and

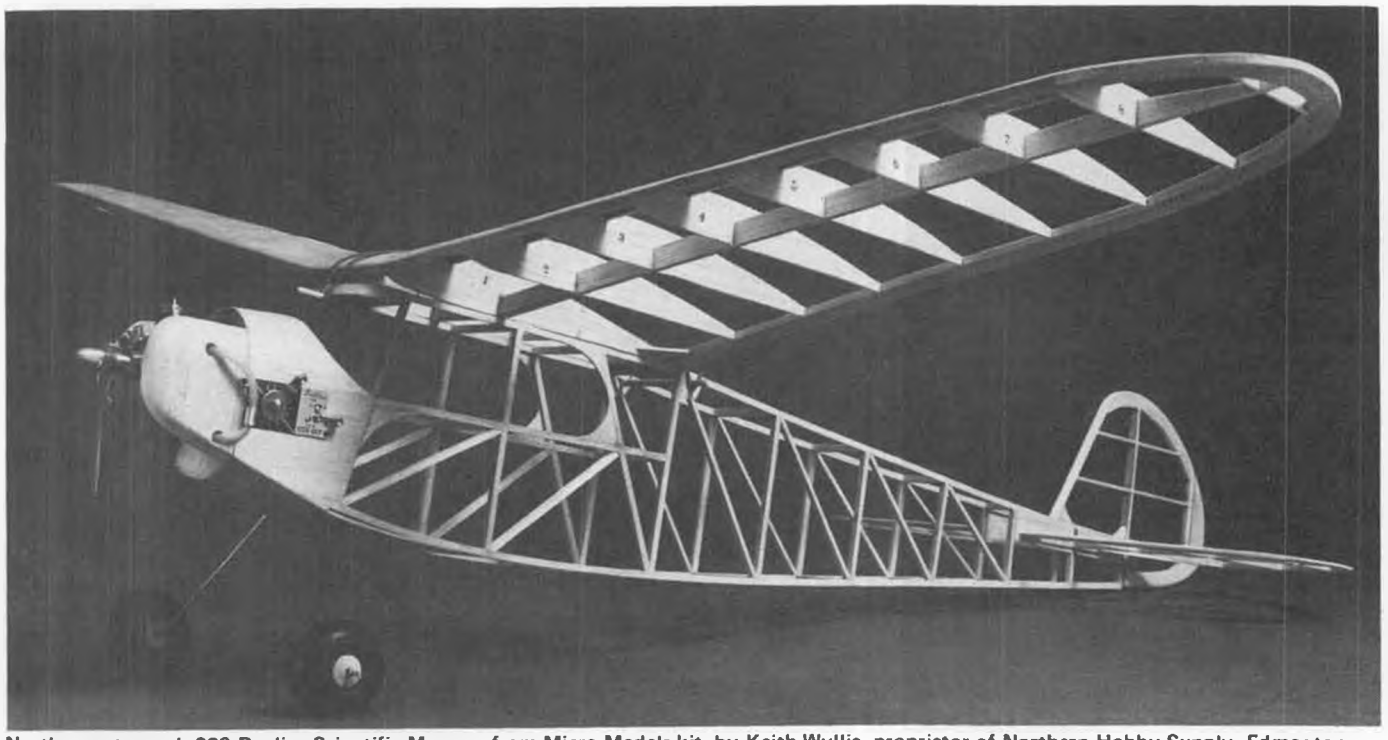
Continued on page 87



Blunt spinner was an early experiment. Standard Scozzi spinner is now being used. Hot engine can be hand-started by flipping spinner.



Rudder and retract equipment is located in cockpit. Canopy and engine hatch are retained with surgical tubing.



Neatly constructed .020 Replica Scientific Mercury from Micro Models kit, by Keith Wyllie, proprietor of Northern Hobby Supply, Edmonton, Alberta, Canada. He picked up the kit at last year's Toledo Exposition Swap Shop.

PLUG SPARKS

By JOHN POND

• Texas Tea Time! That's what we are going to call the column this time, as most of the writeup is being directed to the boys in Texas and just what they are doing in this Old Timer kick.

Full credit for the Texas report should be given to Helmer Johnson, of SAM 29. SAM 29, incidentally, is a schism of the Ft. Worth Thunderbirds, and for that reason, O/T radio control enjoys tremendous popularity.

Helmer reports enthusiasm is running very high for old-timer radio assist. Johnson sez the Yankees in the East can call it that, but in Texas, the old-timer meets are publicized as RADIO CONTROL MEETS. Nothing like calling a spade a spade, not a blankety blank shovel (if you know the joke).

The Texas Pride Tournament, sponsored by the Ft. Worth Thunderbirds and SAM 29, was a most unique contest, with the emphasis on fun events. This meet featured Antique Class, Old Timer Class, Sailplane Task IIA power modified (known as the Add-Em-Up Event), and the infamous "Chicken" Event.

The Antique and Old Timer Class Events formed part of the "Add-Em-Up" portion of the contest. No cross-entering was allowed, ie., if you have a 1938 (antique) model, you can't turn around and enter it in the Old Timer Event. (Some guys will do anything to win a trophy.)

The "Add-Em-Up" Event is worth consideration by other SAM Chapters when putting on a contest. The object of this event is to obtain a total of 15 minutes exactly from three flights, with no flight points given over seven minutes on any flight. Thirty second engine runs are the rule of the day. As Helmer puts it, ten seconds after engine cutoff, the contestant will be required to put the engine control to full throttle. If the motor is still running, of course, you have an over-run. This does not mean you can keep your engine running at full power past the 30 second engine cut-off time. (I have heard of Philadelphia lawyers, but what about these Texas sharpies!)

To continue with the description of the event, flights over seven minutes on the first two flights will cause you to lose one point per second over. Furthermore, if you fly over the target time (three-flight total of 15 minutes), you will be docked one point per second. Bonus points consist of 25 for the model landing in the circle, and if you happen to stop in the middle of the landing circle, you will get a six-point bonus. How about that!

To really round out the fun, the Contest Director is also empowered to award special 6-pack bonuses for various other type landings; good, bad, dumb, you name it. This also

Powerhouse and "Powerhut" were both built by Bob Oslan, the little one being the prototype for his Cal Aero Models kit. Bob converted big one from free flight model. He's a SCAMPS.

Jane Johnson with Steve Kowalik-designed "Miss Arpiem", built from April '77 MB plans. ST .23 power, EK radio. Ft. Worth, Texas.

Helmer Johnson built the beauty of them all, Shereshaw's Custom Cavalier. HP .61 power, EK radio, 8-1/2 lbs. Super glide.

ALL TEXAS PHOTOS COURTESY OF HELMER JOHNSON

goes for unscheduled flying feats, such as Ted Kafer did recently on the coast in flying his model upside down without the tail!!

Had enough? Well, the best is yet to come, with the Chicken Event. Here, you have thirty seconds to trim the models out. Then you put the transmitter down (or hand it to the timer so it won't get stepped on), and the watch is started. The model will be clocked as long as it is "hands-off". Once you chicken out (name of the game), the watch is stopped. However, for the real big gamblers, the model must land on the field or designated area. Ten minutes will be considered a "max" flight. The 25 point bonus applies to those models stopping in the landing circle.

As an interesting sidelight, watches are stopped at 30 seconds and *re-set* for the balance of the flight. I can hear some hollars now if there is some delay in clicking the watch. Haw! Regardless, it seems like a simple method of getting rid of having to record the engine run time.

Helmer Johnson proudly points out that the first Texas Pride Tournament brought out 31 entries, with 19 in antique and 12 in old-timers (that's a switch, as the O/T models are generally much more popular). Most all models use three channel; rudder, elevator, and motor, and the entire flight is controlled with the exception of the Chicken Event.

The Thunderbird Field is located on the shore of Lake Benbrook, southwest of Fort Worth (what a natural for O/T hydro!). Interestingly enough, the contest had no sandbagging, ie., waiting for favorable lift, because of the constant urging on the P.A. system to get out and fly.

Another good facet of this contest was trophies to fifth place. As Helmer points out, they gave 23 trophies (four events plus high-point trophies for Antique, Old Timer, and the best female flyer). This does pick up more entrants, as many fellows do not care to enter when they see the top places already taken by the experts. With hardware available, it is surprising to see the interest.

Worst part about this contest was the influx of the Norman family into radio control. Holy Mackerel! If they do to R/C what they have been doing to free flight, namely cleaning up, this is going to be a real scramble for trophies. Only goes to prove that radio control is not really taking over. It all depends on what type contests are being offered and the incentive to compete. Remember, it's all fun!

Results of the Texas Pride Tournament looked something like this:

ANTIQUE "Add-Em-Up"	
1. Ed Trice	829
2. Bruce Norman	797
3. Jim Smith	735
OLD TIMER "Add-Em-Up"	
1. John Rimmer	945
2. Bill Slater	906
3. Jim Smith	866

Edd Alexander, Fort Worth, Texas, and Shereshaw Cumulus, a real floater. Fox .45 and EK radio.

RCM's Chuck Cunningham, with his OS .40 powered Powerhouse. Uses EK radio. Fort Worth, Texas.

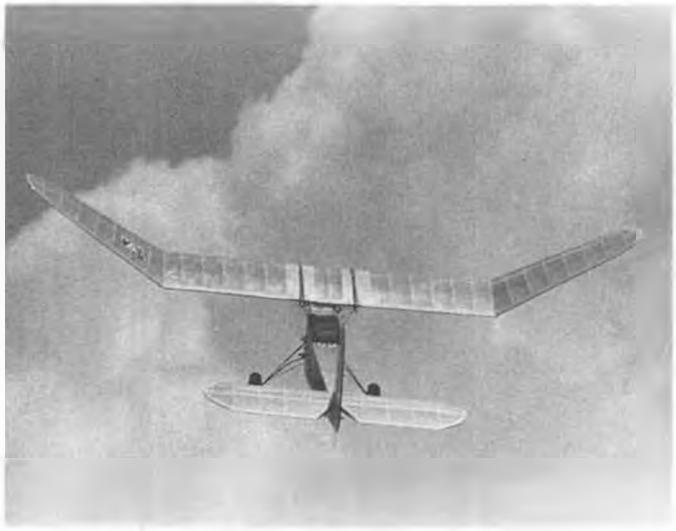


Photo 1. Up, up, and away! Jane Johnson's Lanzo Record Breaker gets away beautifully.

Photo 2. Jane Johnson at the controls of her EK radio, guiding the Lanzo. Note League of Silent Flight patch. R/C soaring and OT alike.

CHICKEN ANTIQUE

1.	Bruce Norman	699
2.	Gerry Krause	468
3.	John Rimmer	456

CHICKEN OLD TIMER

1.	John Rimmer	751
2.	Bill Slater	682
3.	Jim Smith	606

High Point Man: John Rimmer (a true old timer!)

PLANESMAN REGIONAL CHAMPIONSHIPS

While we are talking about Texas and the activities down there, we should acknowledge the big free flight meet held on September 3rd and 4th at Pyramid Acres, located west of Fort Worth. The weather was perfect and thermals fantastic! Nobody left without getting all the flying he wanted. To spruce things up a little, AMA President, Johnny Clemens, was on hand to award the trophies. Nothing like putting a little class in the joint.

Bruce Norman is becoming practically unbeatable as he is so dedicated to old-timer flying. In this meet, he won Class ABC Combined O/T, third in .020 Replica, and first in ABC Cabin. He then entered three O/T R/C events, taking seconds in Limited Engine Run and Antique, and winning the Texaco Event. How about that? Bruce Norman must have been the most tired modeler on the field.

Quite a few "furriners" showed up for this meet, as several modelers came from Memphis, Tennessee. As Bruce put it, "We're glad they came, in spite of their hauling away a lot of hardware." Due credit should be given to Mike Birdwell for running things smoothly at the O/T Tent, as well as finding time to win several trophies.

Needless to say, Bruce Norman was top man for the Open Championships. My nomination for top man would be Frank Huffman, Contest Director, who, with all of his assistants, put on one tremendous meet. Understand plans are for an even bigger and better contest next year.

Houston, Texas OT winners (l to r): Helmer Johnson, 1st; Jane Johnson, 3rd; and Bob Elliot, 2nd. All flew Playboy Seniors with EK radio. All used ST or OS .35 engines.

Bill Hickman with his Buzzard Bombshell, Fox .36, EK radio, and Eddie Jackson with his 1935 Dennyplane, OS .25, EK radio. Both are from Benbrook, Texas.

HOUSTON FREE FLIGHT MEET

Had enough on Texas yet? Well, we couldn't close it off without a report from Bruce Norman on the Houston club doings. This club formed from the remnants of the Langley Field Brainbusters, who moved to the Houston Space Center and are still quite active.

For a change, Bruce sheepishly admits the boys took him this time, as the best he was able to come up with was three thirds. How the

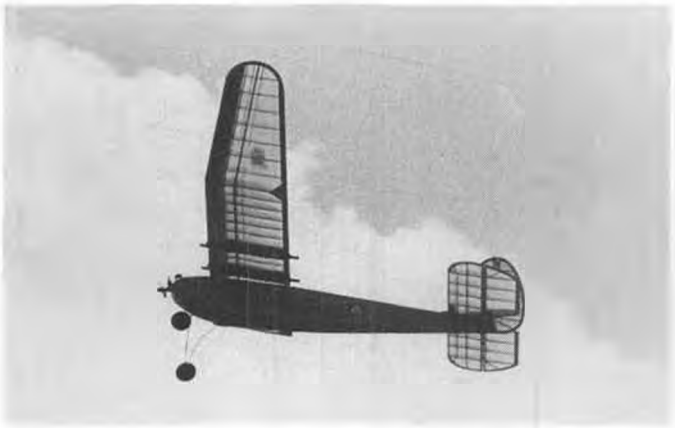


Photo 3. Jane's Lanzo doing its thing. This ship is one of most popular for fuel allotment competition.

Photo 4. Jane Johnson does a victory dance after landing in the circle for bonus points. A perfect flight!

mighty have fallen! Even Leslie (wife) beat Bruce this time!

Among the winners, it was noted that C.C. Johnson (Slick Stick fame) placed in Coupe D' Hiver. Old modelers never die, they're too busy flying!

ENGINE OF THE MONTH

The first three or four years after the closing of World War II was a real bonanza period for engine manufacturers. All the money that had been pent up during those four war years burst like a dam, and anyone who had the remotest form of a model airplane engine could go into business.

Of the many "garage" type operations, Dewitt and John Ross started playing around with Vivell 35 parts and came up with a twin that ran creditably. From this humble start, the Wasp Twin evolved in 1944-45. The early advertisements were actually photos of the first prototype, featuring many hours of handwork.

The earliest advertisement appeared in the July 1946 issue of Air Trails, at the interesting price of $35.00 (Ohlsson 60 Custom sold for $21.50). Claims were made of rpm up to 10,000 although the best recorded speeds in any tests were about 7,800 rpm.

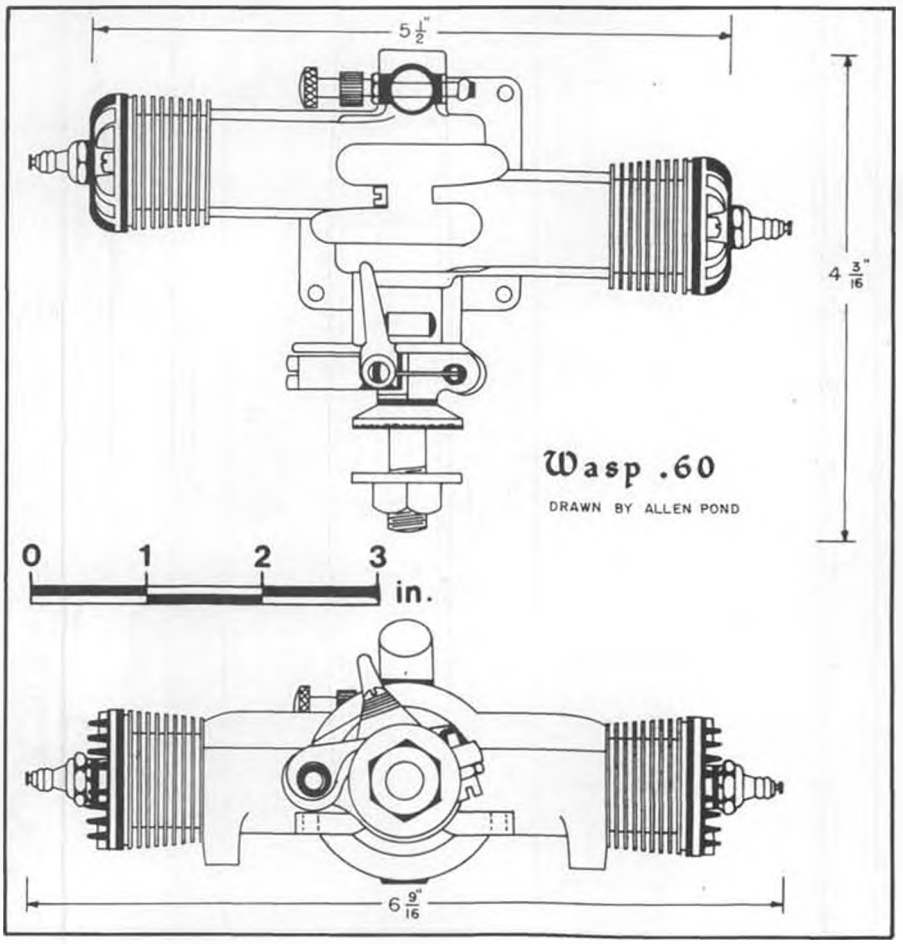
According to some of the more prominent collectors, the first dozen or so engines featured five screws in the cylinder head. The later production models were all six-screw type, with black crackle finish on the crankcase.

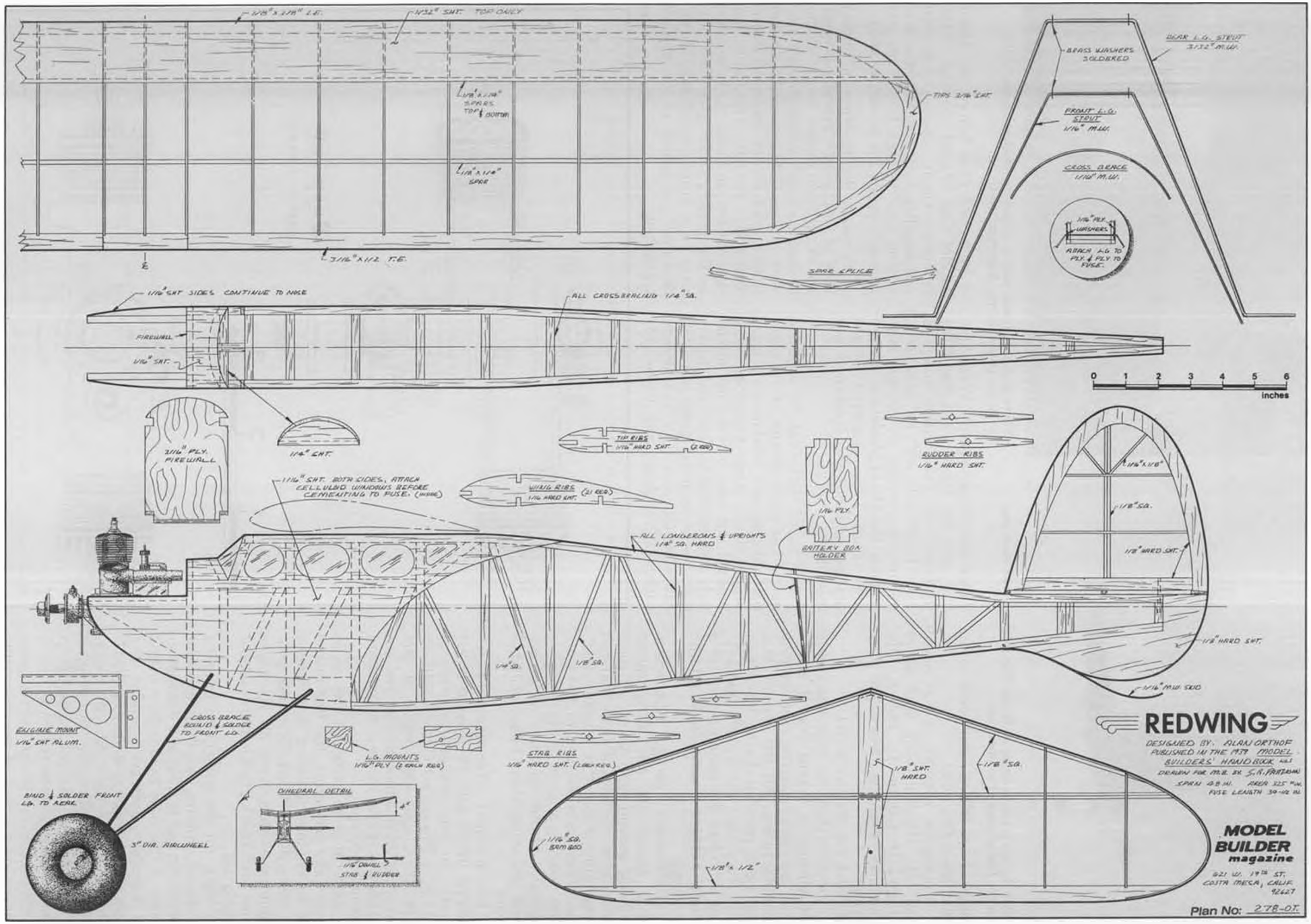
While on the subject of opening announcements, Model Airplane News did not feature any announcement of this new twin until a listing of engines appeared under the GMCO advertisement in July 1947. Almost a year later! Shortly thereafter, Air Trails gave the engine a complete technical write-up in their series of engine reviews.

Of course, the Wasp Twin engines underwent a series of improvements called the "Super-Wasp", Wasp Special, and the Scout Twin, the latter intended for mail-order business only. Eventually, with the glow plug making big inroads on ignition type engines, the Micro Model Co. offered the Scout Twin (painted bright orange) without the ignition timer assemblies.

The Super Wasp can be regarded as the last gasp attempt of the company to put their product on a good selling basis. Some variations were brought out later (not for the model industry), hoping to catch the market for a self-contained generator unit. Alas, the Ohlsson 1.35 had already captured this phase, and it was only a matter of time before the Micro Model Co. ceased to exist. Interestingly enough, several fours were put together (very similar to the Ross Engine Co. history), but never progressed beyond the prototype stage.

As usual, the problem of uneven flow of fuel to each cylinder plagued the Wasp Twin design. In an attempt to create a motor where the cylinders were an equal distance from the fuel intake, the direct opposed Super Wasp was created. Naturally, one side always ran hotter than the other, as the fuel is taken into the crankcase in a counterclockwise direction from the action of the rotating crankshaft.



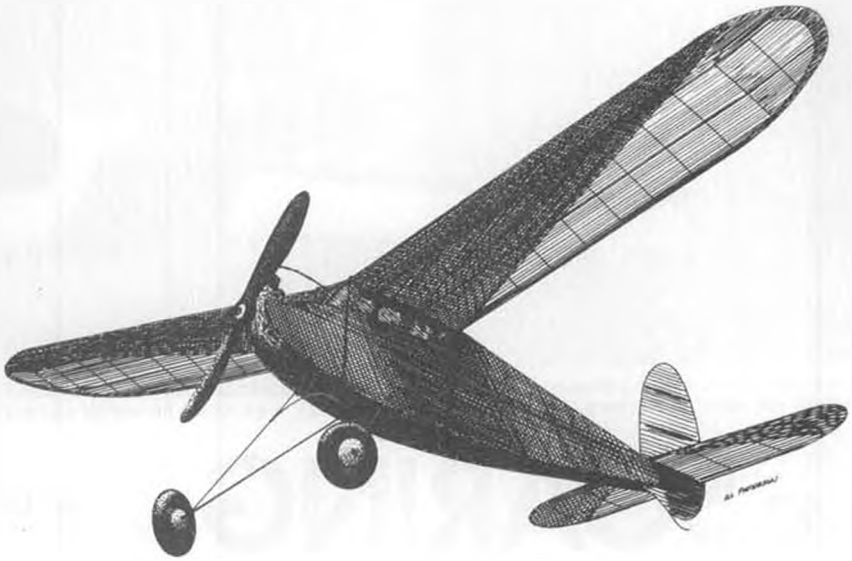

1/8" x 2 7/8" L.E.
1/32" SHT. TOP ONLY
1/16" x 1/16" SPARS TOP & BOTTOM
1/16" x 1/16" SPAR
TIPS 3/16" SHT.
3/16" x 1/2 T.E.
BRASS WASHERS SOLDERED
REAR L.G. STRUT 3/32" M.W.
FRONT L.G. STRUT 1/16" M.W.
CROSS BRACE 1/16" M.W.
1/16" PLY WASHERS
ATTACH L.G. TO PLY & PLY TO FUSE.
SPAR SPLICE
1/16" SHT. SIDES CONTINUE TO NOSE
ALL CROSSBRACING 1/16" SQ.
FIREWALL
1/16" SHT.
0 1 2 3 4 5 6
inches
3/16" PLY FIREWALL
1/16" SHT.
TIP RIBS 1/16" HARD SHT. (2 REQ.)
1/16" SHT. BOTH SIDES, ATTACH CELLULOID WINDOWS BEFORE CEMENTING TO FUSE. (INSIDE)
WING RIBS (21 REQ.) 1/16 HARD SHT.
RUDDER RIBS 1/16" HARD SHT.
1/16" PLY
BATTERY BOX HOLDER
ALL LONGERONS & UPRIGHTS 1/16" SQ. HARD
1/16"x1/16"
1/16" SQ.
1/16" HARD SHT.
1/16" SQ.
1/16" SQ.
1/16" HARD SHT.
1/16" M.W. SKID
TAILGATE MOUNT 1/16" SHT. ALUM.
CROSS BRACE, BEND & SOLDER TO FRONT L.G.
L.G. MOUNTS 1/16" PLY (2 EACH REQ.)
STAB. RIBS 1/16" HARD SHT. (LEAVE REQ.)
1/16" SHT. HARD
1/16" SQ.
BIND & SOLDER FRONT L.G. TO AXLE.
3" DIA. AIRWHEEL
DIHEDRAL DETAIL
4"
1/16 DOWEL'S STAB & RUDDER
1/16" SQ. BRM WOD
1/16" x 1/2"
REDWING
DESIGNED BY: ALAN ORTHOF
PUBLISHED IN THE 1939 MODEL BUILDERS' HANDBOOK
DRAWN FOR M.B. BY S.N. FRIEDMAN
SPAN 48 IN. AREA 335 SQ. IN.
FUSE LENGTH 39-1/2 IN.
MODEL BUILDER magazine
521 W. 19TH ST.
COSTA MESA, CALIF. 92627
Plan No: 278-OT.

OLD TIMER Model of the Month

Text by: Bill Northrop

Redrawn by: Al Patterson

Alan Orthof's "REDWING"



● *"Ship is balanced by moving wing back and forth on top of the fuselage."* Other than a warning that flying surfaces must be lined up and free from warps, the above warning constitutes the entire set of trimming instructions for this very basic 1938 design by Alan Orthof, published in "MODEL BUILDER'S HANDBOOK NO. 1", copyright 1939.

With a structural design and outline very reminiscent of Herb Greenberg's famous Red Zephyr, the "Redwing" is an extremely simple model to build, and no special hints are needed. Designed around the popular Ohlsson "23" engine, the wing has about 325 sq. in. area on a 48 inch span. If you're in a hurry to get an Old Timer gas job together, this is it. ●

The connecting rods in this case were not aligned, but remained straight, with one behind the other. The designers of the motor evidently did not realize that a dynamic couple would be set up this way and would create a serious weakness.

This was evident when the firm attempted to produce a glow engine. The engines ran very unsatisfactorily, with connecting rods constantly "going out". Later on, bronze rods were substituted to help alleviate the problem, but only to a small degree. No question about it, the glow plug sounded the death knell of still another engine.

For the technically minded, the Wasp Twin weighed 10-1/2 ounces and came with two Champion sparks, but no other ignition accessories. A bore of .740 inches and stroke of .702 gave a piston displacement of .60 cubic inches. Height was 2-1/4 inches, length 4-3/16, and width was 6-9/16 (just right for a scale Piper Cub!).

"Tent City" at the 1947 Nationals, in Minnesota. A little different from the plush motor homes and campers seen at the Nats these days! Photo by Brad (Li'l DUBLR) Shepherd.

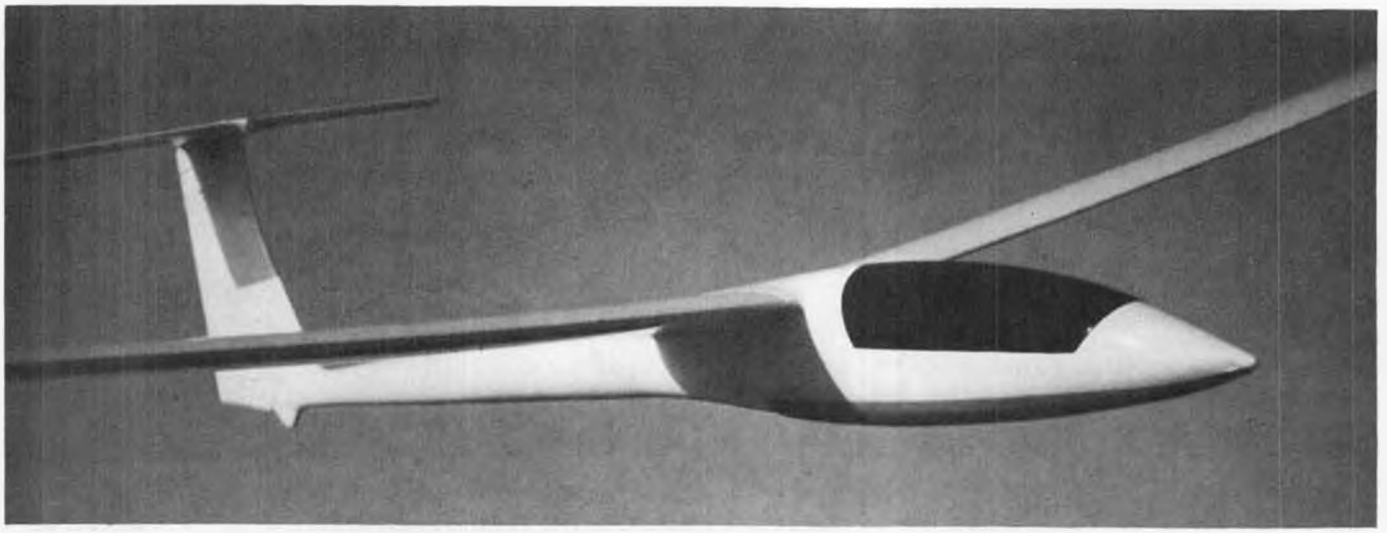
Crankcase (as noted before) was aluminum alloy, with each cylinder and one-half of the lower case as an individual unit (the two cylinders, when fitted together, were properly offset for connecting rod bearing clearance).

Pistons were stamped steel, hardened and ground to a high finish. An unusual feature of the two-piece I-beam connecting rod was the fact that it had a lower cap reminiscent of full-size automobile practice. The bearing caps could be removed

Continued on page 87

Wally Wallick, with Dooling powered speed ship, at the 1947 Minnesota Nationals. Brad Shepherd photo.

West coast ukie stunt fliers at the '47 Nats (l to r): Don Gulotta, Bud Jamison, Jack Gilroy, and J.C. Yates (Madman himself!).



Major portion of this month's Soaring column is a discussion by Scott Jenkins on his techniques and equipment used to slope-fly during stormy weather off the coast of southern California. This is his Wasp-21, with which he carried out these fascinating experiences.

R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY AUTHOR

• Congratulations are in order to Alex Mladineo, who won the 1977 LSF tournament . . . that's the one held simultaneously at ten sites around the country, involving 483 contestants . . . a real demonstration of flying ability.

Alex was born in Santiago, Chili, 37 years ago. He never received birthday presents . . . you see, he was born on December 26th. In 1959, he came to the "land of opportunity" with an eye on electronics. His first job was loading trucks, but soon he found his way into thin film technology . . . in the heart of electronics.

Some four years ago, Alex joined the contingent of those taught to fly sailplanes by Kelly Pike. He joined the Torrey Pines Gulls and has taken part in every possible contest in the last three years. He placed third in the 1967 LSF (with a standard class Windrifter). This year he's flying an Aquila. Both of these planes were built by Roger Taylor, and Alex goes out of his way to credit his friend for their construction. I can personally testify to his unselfish tutoring of new fliers. Here's a fabulous coach. He's married and has three children. His youngest (Marco, aged 13) is now starting the "contest circuit". Alex has his eye on the FAI International Championship. That contest will probably take place in this country in 1979. Here's wishing him the best of success.

Just had a chance to chat with Scott Jenkins. You remember, he designed the Wasp-21, a remarkable high-speedslope cruiser first shown in the June 1976 issue of **Model Builder**. The conversation focused on his rationale for that design. Wanting to share this with you, I asked him to jot down his thoughts on the subject, thus the following commentary:

"It's the weather, the moods of nature, that gives the personality to any soaring day. And, among those held fondest in memory, are the days of storm with howling winds and low black clouds. These days come to California most frequently in late fall and late winter, brought by Pacific storms spinning off the stationary Aleutian low in the Gulf of Alaska. These low pressures frontal systems are often accompanied by upper level troughs that march one after another down the western coast of Canada and the United States. Upon reaching California, the winter gales slam the cliffs and sea bluffs with furious winds, sometimes up to 60 mph, beginning from a southwesterly direction and slowly shifting northwesterly with the passage of the frontal system.

Alex Mladineo, 1977 LSF Tournament winner. Contest held simultaneously at 10 sites in U.S.

"After all the toil of construction during so many stolen late hours, it is frightening to soar in these powerful winds above a cold grey sea ravaged by huge whitecaps. But, here is a chance to challenge the strength of nature. You streak through the wind then negotiate a rotor in landing. The day ends as one last ray of light fades on the horizon before the incoming rain squawls. At home, the flight continues behind your windburned face, warmed by wine and hot food, while the storm rages on, outside in the darkness. It was, indeed, a bold flight, yet the firelight still glistens on bone-white wings unmarked by adventure, because of your skill.

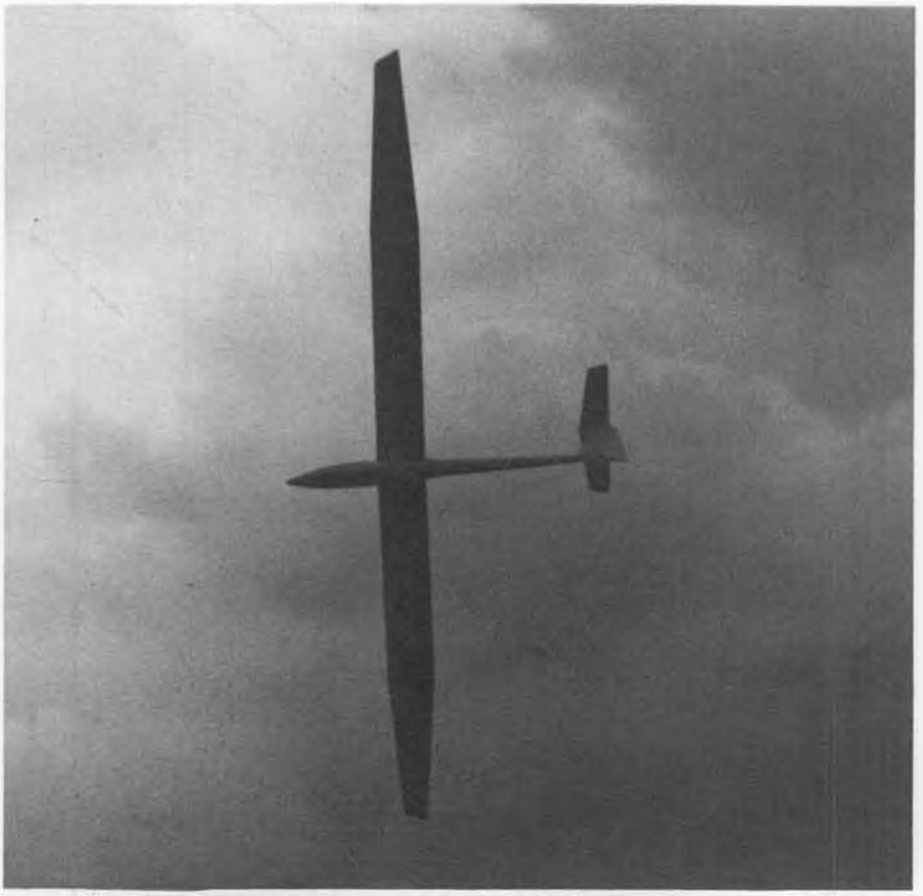
"Such high cruise speed capability is the aim of the Wasp-21, a sailplane designed to carry a high wing loading and minimize drag. In fact, this design has used a wing loading of 20 oz./ft.^{2} in slope lift conditions ranging from marginal 10 mph seabreeze to 60 mph storm winds. Wing loadings in excess of 26 oz./ft.^{2} have not been used, but seem even more appropriate for high performance under intense conditions. At first glance, these loadings seem excessive, yet they are within the natural scale limitations for efficient soaring. Figure 1 compares the wingloading per total weight of the W-21 with those of some birds that regularly soar. The straight line at slope 1:3 corresponds to the similarity law of

19th century physicist, Von Helmholtz.

"To organize our thinking towards minimizing drag, it is helpful to identify the most important contributions to the total drag. Among these are: 1) the induced drag due to the downwash off the finite span wing, 2) the form drag due to the shape, 3) the skin friction drag due to viscosity, 4) the intersection drag, and 5) the drag due to leakage or ventilation. Each of these contributions should be reached in order to favor our high speed L/D . . . our other design objective. Those factors which contribute most to the total drag (and also profoundly influence L/D) are the induced drag and form drag.

"The induced drag is particularly large with high wing loading, or when pulling high angles of attack through maneuvers. Its origin is in the system of vortices formed in the vicinity of the wing tips. These vortices trail out behind the wing in expanding corkscrew like motions. They impose a downward velocity component (downwash) on the air flow in the immediate neighborhood of the wing, thereby reducing the effective angle of attack, so that the lift is tilted slighted backward. Thus, a component of the lift is retarding the forward motion of the wing. The higher the wing loading, the greater the lift necessary for flight and the greater the component of lift resulting in drag.

"Because this undesirable consequence of lift originates at the wing tips, a two-dimensional wing without ends, that is one of infinite span, has no induced drag regardless of the wing loading. Though this is not a practical alternative, the next best solution is to separate the wing tips as much as possible by using a high aspect ratio (span/average chord). A number of authors have disclaimed the advantage of high aspect ratio wings on RC sailplanes, but always in connection with thermal machines operating at low wing loadings. However, among the large soaring birds in nature, both of these 'design philosophies' are in evidence, but



The Wasp-21 streaks by, under a solid overcast of heavy storm clouds off Torrey Pines, just north of San Diego, California.

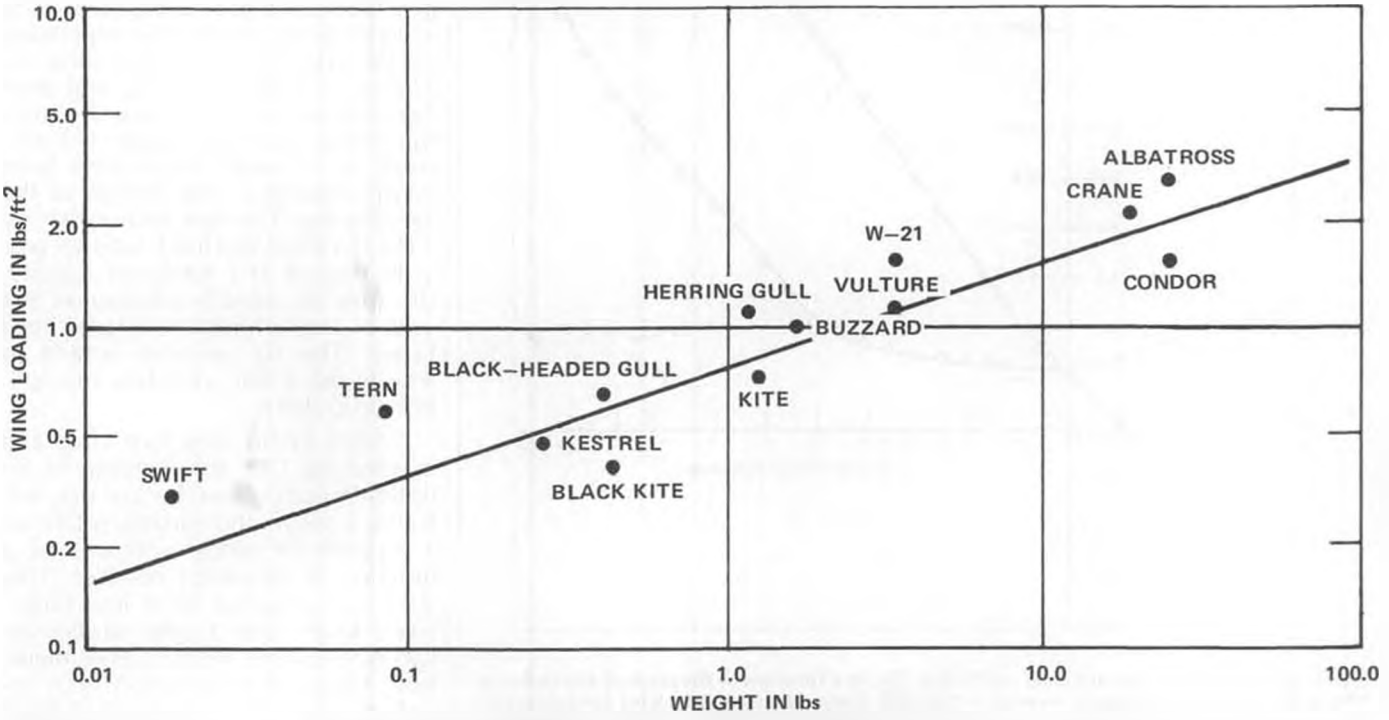


Fig. 1: Log-log plot comparing wing loadings of soaring birds with that of W-21. Data taken from von Karman, Th., 1965, AERODYNAMICS; Selected Topics in the Light of Their Historical Development. Cornell University Press, Ithaca, New York. 203 pp.

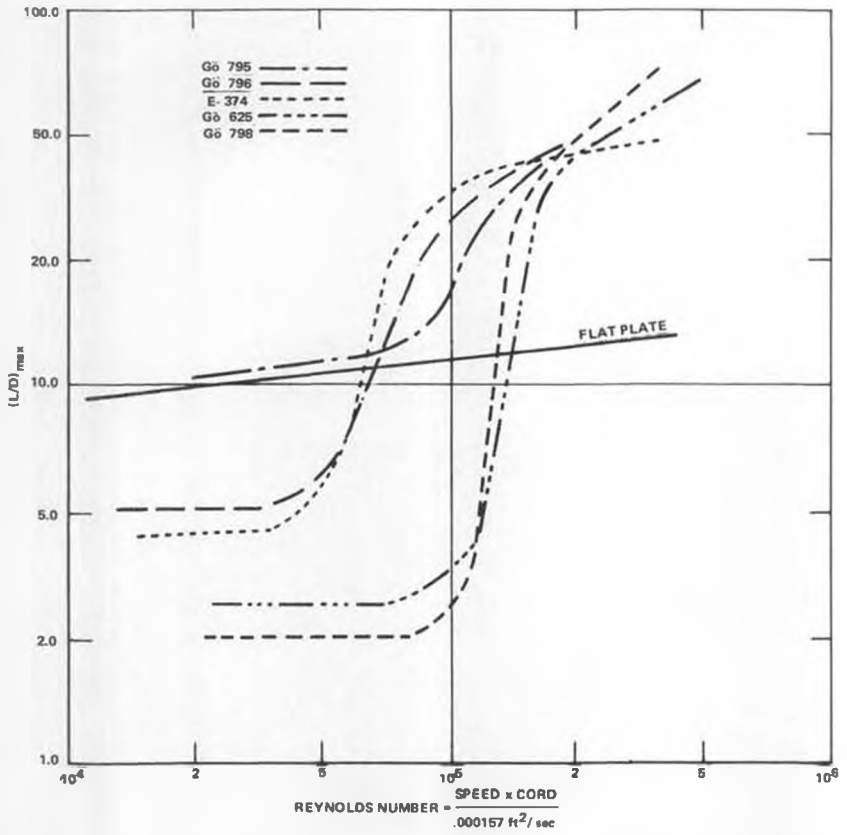


Fig. 2: Log-log plot of the maximum L/D against the Reynolds number of the E-374 airfoil and several other popular sections. Data taken from: Eppler, R., AERODYNAMISCHE VERSUCHAANSTALT GOETTINGEN, Rpt. No. 57/AO8., and from: McMasters, J.H., "An analytic survey of low-speed flying devices . . natural and man-made", PROC. 2nd INT. SYMPOSIUM TECH. & SCIENCE LOW SPEED & MOTORLESS FLIGHT., Cambridge, Mass., September 1974.

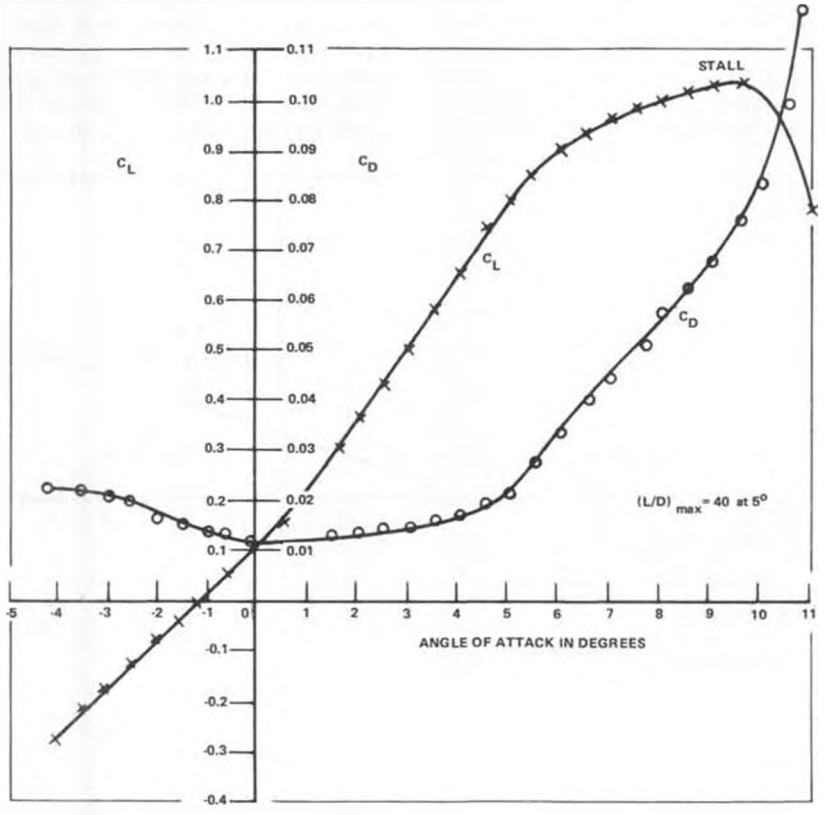


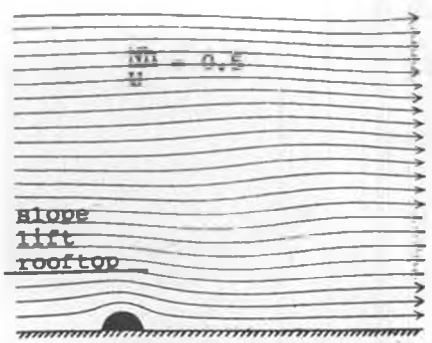
Fig. 3: Lift coefficient, C_L, and drag coefficient, C_D, as a function of the angle of attach for an 11% E-374 airfoil at a Reynolds number of 100,000. These data were calculated for zero turbulence level wind streams as reported in Eppler, R., AERODYNAMISCHE VERSUCHAANSTALT GOETTINGEN, Rpt. No. 57/08., and from: Thies, W., HANDBUCH fur den MODELLFLUG. A. u. B. Ladertheil, Baden-Baden, p. 50.

are specific for two vastly different soaring conditions. The California Condor has a wingspan of 9.8 ft., a wing loading of 21.8 oz./ft.², and an aspect ratio of 6.0. It soars at low cruise speeds in small radius turns on inland thermal lift. On the other hand, the Great Albatross, which is commonly found soaring in high speed arcs above ocean swells or in strong wind shear close to the water, has a wingspan of 11.5 ft. It carries more than twice the wing loading of the condor, with 44.6 oz./ft.², and uses an aspect ratio of 17. The high aspect ratio wing of the Albatross may have evolved in view of a performance advantage significant enough to outweigh its greater fragility and vulnerability to injury. The W-21, with an aspect ratio of 21, was designed for soaring conditions very similar to the natural habitat of the albatross.

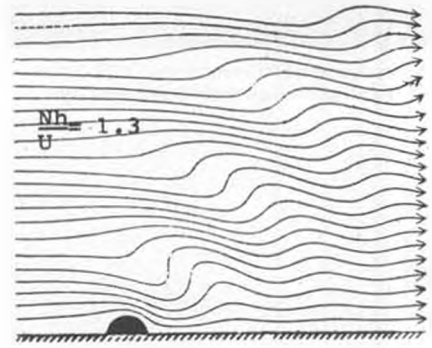
"Because of their extreme wingspans, about 80% of the frontal area of a soaring bird is due to the wing. Consequently, reducing the form drag of the wing can make a significant difference in the total drag. The most obvious way to accomplish this is to reduce the frontal area as much as possible by using the thinnest wing consistent with structural integrity. A substantial savings in form drag is realized at high speed, where the angle of attack is low by using a mildly cambered, semi-symmetrical airfoil. Highly cambered flat bottom and undercambered sections do not develop the small lift coefficients of high speed flight until negative angles of attack. In this orientation, the geometry of highly cambered wing sections gives rise to flow separation on the under surface of the wing, resulting in large form drag and poor high speed L/D. For these reasons, three thin, modified Eppler 374 sections in a double taper plan form were selected in the design of the W-21 wing. The root section has an 11% thickness-to-chord ratio to provide flexure and torsional rigidity, thinning to an 8% section at the end of the inboard constant-chord taper. The tip section fattens to 9%, to make the wing less susceptible to tip stalls.

"When minimizing form drag and maximizing L/D, the question of an optimum size must be considered. Figure 2 shows the maximum L/D for a number of airfoil sections as a function of Reynolds number. This data was obtained from low turbulence level wind tunnel studies on two-dimensional sections and, therefore, show no contribution from induced drag. The maximum L/D is generally found to improve with increasing chord size or increasing

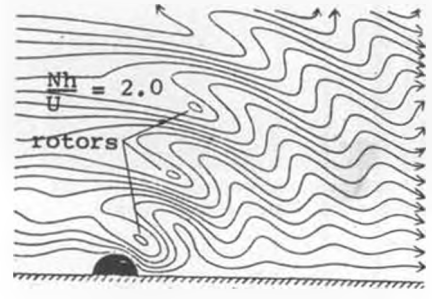
Fig. 4: Streamline pattern for stratified flow with constant vertical density decay over a semi-circular obstacle. Calculated flow assumes no friction, no upstream disturbances, and a constant velocity in the approaching flow. From: Miles, J., "Waves and wave drag in stratified flows", Proc. 12th Int. Congress Appl. Mech. Stanford Univ., Aug. 1968. Applied Mechanics, New York, 1969.



(a) Flow pattern typical of high wind speeds or very weak stratification. Nh/U=Russell number, where N is the buoyancy frequency= 0.01 hz, h is the height of the obstacle, and U is the wind speed in the approaching flow.



(b) Flow pattern with lee waves radiating to altitudes many times the height of the ridge line.



(c) Lee waves grow with increasing Russell number until they over-steepen and break, resulting in rotors and strong turbulence up to great altitudes.

flying speed, with a catastrophic drop in L/D below Reynolds numbers of 50,000 to 100,000. This crisis in L/D lies very close to the scale regime of a bird or an RC sailplane. For this reason, many authors urge that chord dimensions of thermal sailplanes should exceed 4 inches. Below 50,000 in Reynolds number in the laminar wind tunnels, the boundary layer over airfoils is also laminar, but prone to separation behind the high point on the upper surfaces. Separation results in large form drag, preventing the L/D from exceeding 5. At higher Reynolds numbers, the boundary layer becomes turbulent and remains attached on the upper surface due to the higher kinetic energy content of the turbulent boundary layer. Even though the turbulent boundary layer increases skin friction drag, the dramatically smaller form drag which results from avoiding separation is reflected in an abrupt rise in the maximum L/D. The E-374 airfoil is seen to be particularly good in not exhibiting an L/D crisis until very low Reynolds numbers. This is explained in part by the comparatively sharp leading edge of this airfoil, provoking early transition to a turbulent boundary layer, thereby displacing the L/D crisis to a smaller Reynolds number.

"The L/D crisis is displaced to even smaller Reynolds numbers than is indicated by the wind tunnel data in Figure 2 when these same sections are flown in a natural wind field. Turbulence levels in the moving atmosphere can become quite intense, particularly during storm winds, and this environmental turbulence stimulates premature transition in the boundary layer over the wing. However, environmental turbulence seriously increases skin friction drag because the turbulence is no longer confined just to the boundary layer. To minimize excessive skin friction, particularly at high speeds in a storm, it is desirable to minimize the wing area and maintain a smooth surface.

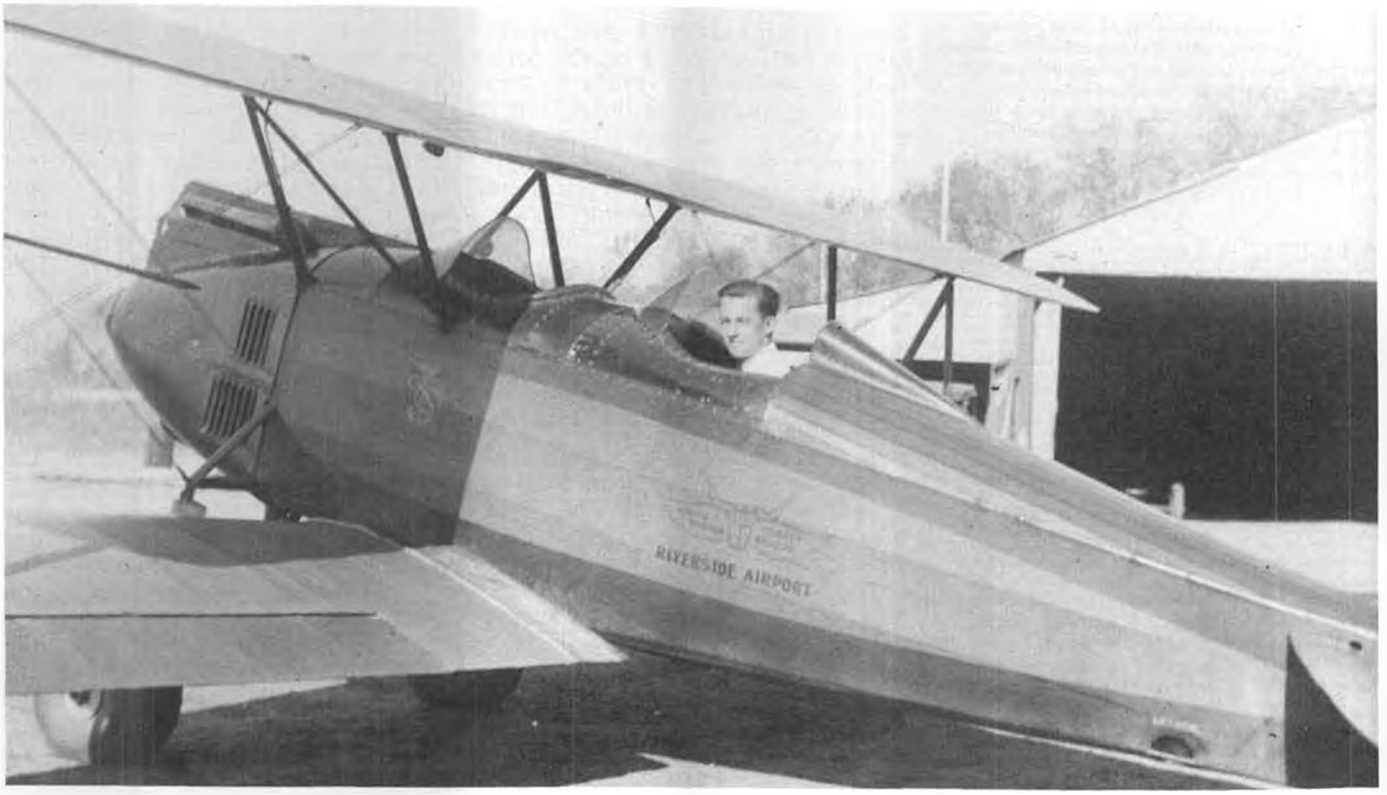
"When taken with the requirement for a high aspect ratio, clearly the optimum size would result from the smallest possible chord dimension that would not exhibit an L/D crisis close to or above stall speed. That this may be accomplished by exceedingly small wing chords is demonstrated in nature by efficient high speed soaring birds such as the swift and the tern. Nearly five years of pressing the practical limits of this idea has resulted in the present W-21 wing of only 483 in.^{2}, whittled down to 5.5 in. at the root section and 2-3/4 in. at the tip, relying on a high cruise speed to keep the Reynolds number up and the effects of a sharp leading edge and environmental turbulence to supress the onset of the L/D crisis.

"The use of ailerons on the small chord wing for roll control was ruled out because of the likelihood of the hinge line causing flow separation and leading to onset of the L/D crisis. Furthermore, wing flexing with thin high aspect-ratio geometries makes ailerons prone to binding and high speed flutter from gust loading. Instead, the W-21 relies on a slight polyhedral wing geometry, together with a coordinated rudder for banking and turning. The junction angle at the center section is 5.0°, while the junction angle between the inboard and outboard tapers is 0.5°.

Though these values are small, Figure 3 shows that the thin, sharp leading edge E-374 airfoils stall at a rather low angle of attack for about 10°. Thus, only small junction angles are required to generate enough lift imbalance when yawing with rudder to bank the wing. These small junction angles also allow good yaw damping and roll stability at high speed. Excessive amounts of poly-

Continued on page 98

"ASIDE FROM ITS OBVIOUS USE, IT'S A GREAT THERMAL DETECTOR!"



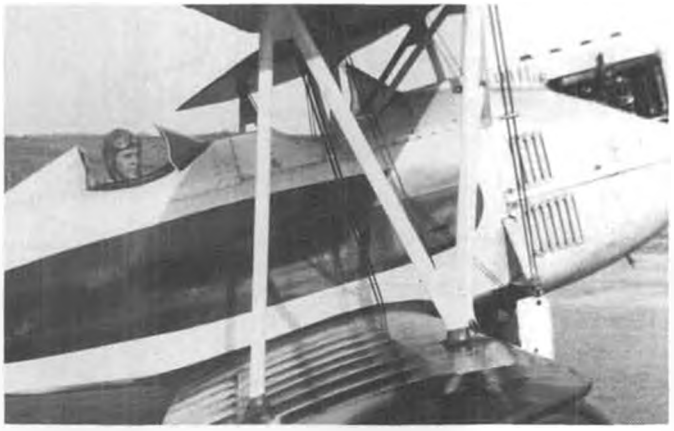
Nick Karstens, who drew the excellent perspective cut-away of the Great Lakes, pages 36 and 37, in the back seat of Roman Warren's 2T-1A at Riverside, California. Nick earned his time by riding a cowpony around the field to herd the critters off the strip during takeoffs and landings.

Great Lakes Trainer 2T-1A

(Conclusion)

by PETER WESTBURG

Just to confuse things, the 1931 GLT, with larger fin/rudder and rounded cowling, was still called the 2T-1A. Performance was not as good as earlier model. Note trainer wing skid.



Ced Galloway in his GLT. His NC856K is subject of the plans. Standard colors were orange and black. Ced's was orange and cream.

Sold to Clem Wittenbeck in 1936, Ced's ship was refinished in black and white. Airshow pilot Clem did outsides and low inverted passes.

NC856K

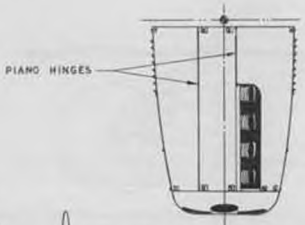
UPPER RIGHT WING

WING REGISTRATION

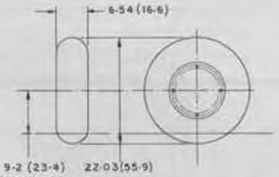
LETTERS & No.'S ARE 16-0 (40-6) X 24-0 (61-0)
4-0 (10-2) SPACING, 4-0 (10-2) BRUSH STROKE

NC856K

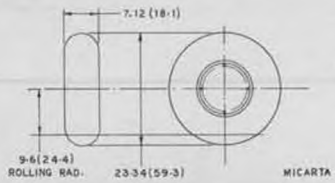
LOWER LEFT WING



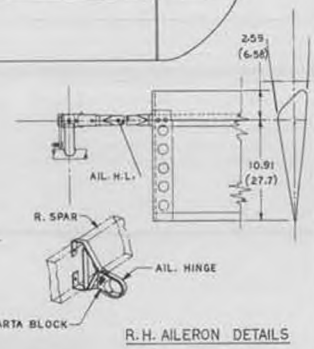
COWL FASTENER



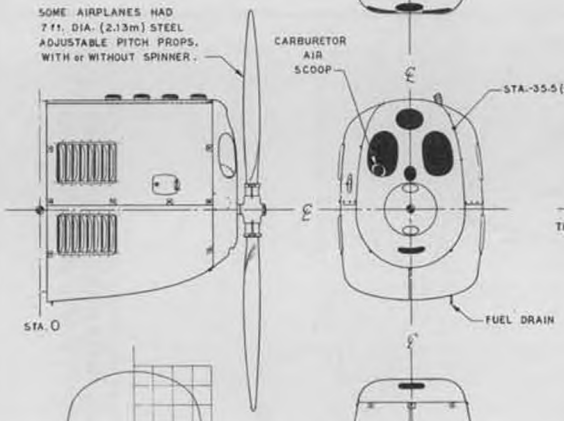
6-50 X 10 LOW PRESSURE TIRE

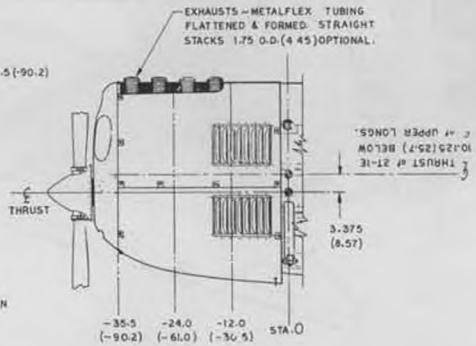


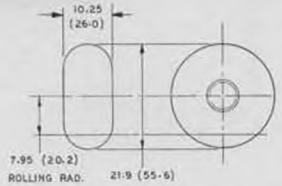
7-50 X 10 LOW PRESSURE TIRE



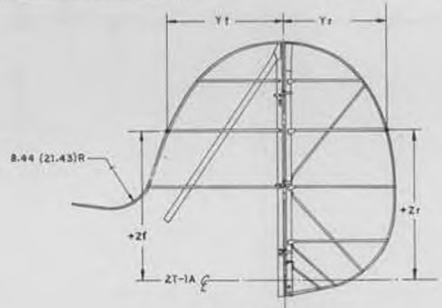
R.H. AILERON DETAILS







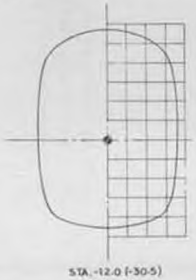
22 X 10-4 GOODYEAR AIRWHEEL



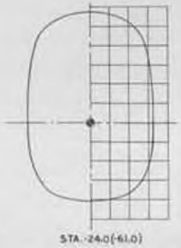
1931 2T-1A & 2T-1E "BIG TAIL"

Yf		Zf		Yr		Zr	
in	Cm	in	Cm	in	Cm	in	Cm
0	0	-3.563	-9.05	0	0	-3.35	-8.51
* 28-6.25	72-7.1	19-5.0	49-5.3	16-8.8	42-8.8	1-6.9	4-2.9
* 24-3.13	61-7.6	31-2.5	79-3.8	* 22-2.5	56-5.2	8-3.75	21-2.7
* 18-1.25	46-0.4	41-7.5	106-0.5	* 23-6.3	60-0.2	19-5.0	49-5.3
0	C	49-7.5	126-3.6	* 22-2.5	56-5.2	31-2.5	79-3.8
—	—	—	—	* 16-8.8	42-8.8	41-7.5	106-0.5
—	—	—	—	0	0	49-7.5	126-3.6

* RIB STATIONS



1931 2T-1A ENG. COWLING. 2T-1E WITH CIRRUS HI-DRIVE ENG. WAS INVERTED. AFT EDGE OF COWLING WAS FLEXIBLE.



FOUR MODELS & SOME SPECIAL VERSIONS of the GREAT LAKES SPORT TRAINER WERE PRODUCED from MARCH, 1929, THROUGH 1935. The 2T-1 & 2T-1A (ATC 167 & 228) WERE ALIKE EXCEPT for ENG. HORSEPOWER & INVISIBLE CHANGES in the GEAR & TAIL STRUCTURE. The 1931 2T-1A HAD a ROUNDED COWLING & LARGER FIN & RUDDER AREA. The 2T-1E (ATC 354) HAD an INVERTED CIRRUS HI-DRIVE ENGINE & COWLING. 2T-1 & EARLY 2T-1A ARE SHOWN ON SHEETS 1, 2 & 3.

DIMENSIONS IN FT./IN. & (METRICS)

SCALE ~ 1/10 SIZE

METRIC ~ 10 cm. = 1 m. 0 1m 2m 3m

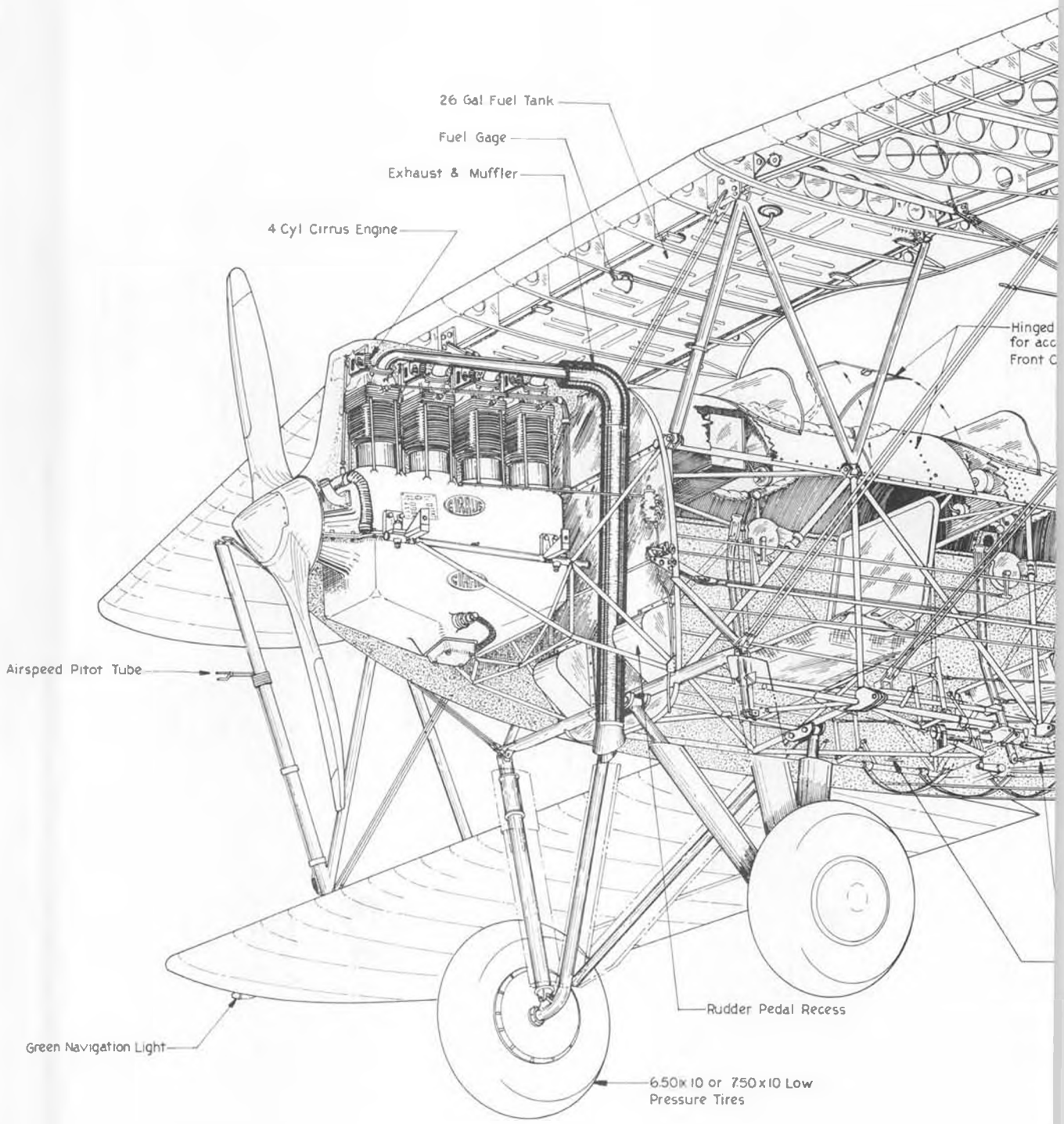
IN./FT. ~ 1.2 in. = 1 ft. 0 1 2 3 4 5 6 7 8 9 10

GREAT LAKES TRAINER

PETER WESTBURG SANTA MONICA, CAL. FEBRUARY, 1977

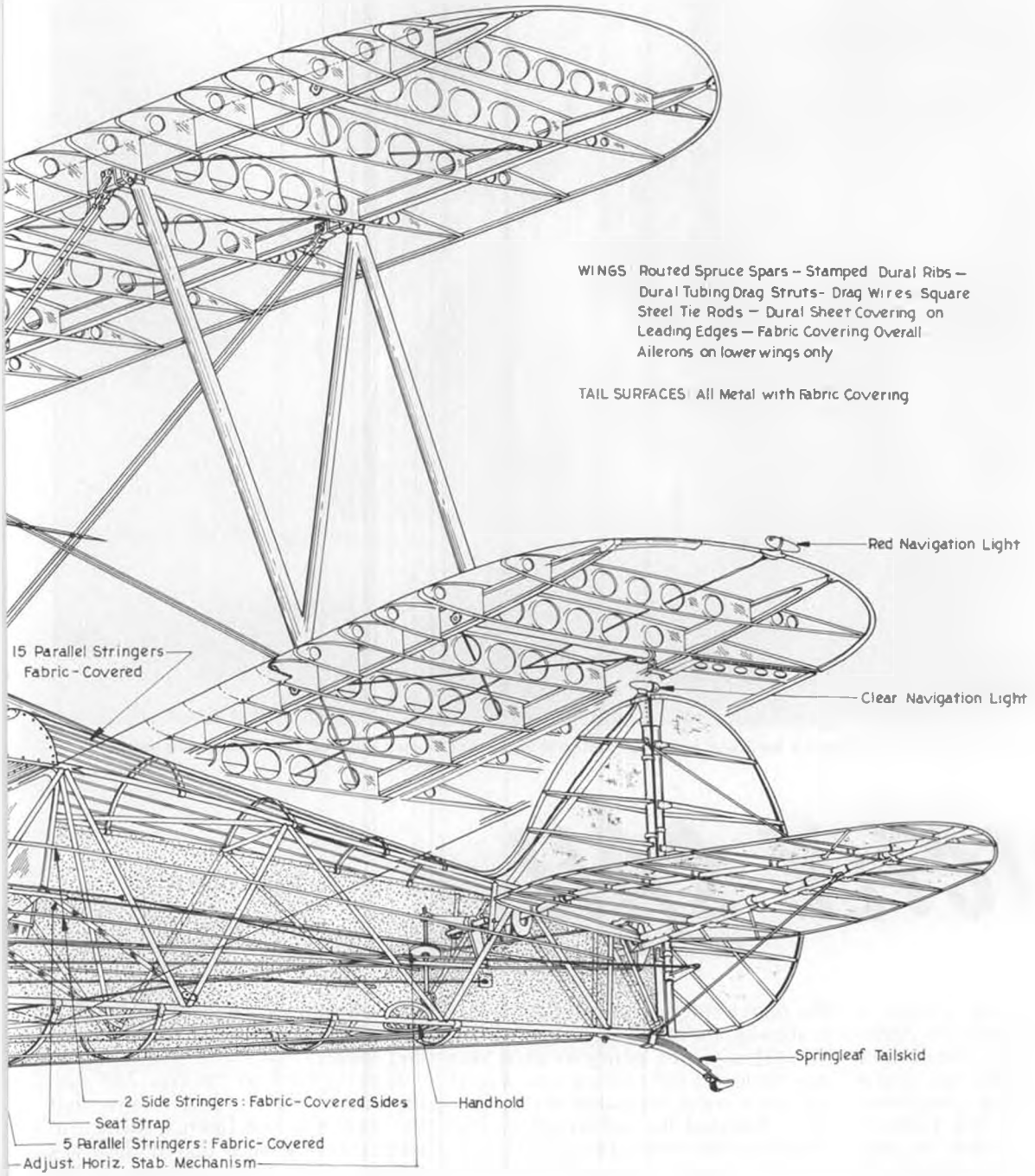
SHEET 4 OF 4

DWG. SIZE ~ 28 X 40 IN.



DATA SOURCES WESTBURG PLANS & Other data from PETE WESTBURG, SANTA MONICA, CAL ; Photos & Information from CEDRIC GALLOWAY, HESPERIA, CAL.

DRAWING SIZE—24 x 34 IN



...e Struct Members cut out in area of
...trols for clarity
...ards also not shown for clarity.

PERSPECTIVE CUTAWAY

GREAT LAKES TRAINER

NICHOLAS KARSTENS	MODEL 2T-1	OCTOBER 1977

A closehauled Santa Barbara. The author discusses this particular boat's sail problems in the text. It may help you in trimming your sails.

STRICTLY SAIL

By ROD CARR

• Our heading picture shows a closehauled Santa Barbara. Its mainsail is worthy of some discussion. First and most important, we notice that the bottom batten is completely missing. Nevertheless, the batten's presence would only make the real problems a little more difficult to find. The big crease which runs up through the numeral 2 is indicative of too much mast bend. The backstay should have been slacker or else the lower shrouds should have been tighter. Next on the list are the small wrinkles leading aft and down from the mast. These are caused, for the most part, by insufficient luff tension. The pouch which is standing just above the gooseneck is a symptom of the same thing. The gooseneck fitting needs to be lowered down the mast a bit, or else the mains'l halyard at the head of the sail should be taken up. The wrinkles along the boom are representative of too little foot tension. Of course, as you get to the right tension, you will have automatically flattened the foot of the sail. This is not going to give you any drive. So right where you would get your most favorable drive, you have flattened the sail to kill it. The bottom third of the sail works to give you the most push with the least heel. It is the most valuable and powerful part of the sail. (That is why jibs are such good pullers, they are never constrained to a boom.) My recommendation is to pull the foot of the sail out of the slot and let it take on a nice camber, giving you back all the horsepower you lost. The big boats do use mains'ls that are locked down to the boom. The reason is that there is so much strain on the sail, that a single clew eye could not take the strain alone. On our models, a clew eye is plenty strong enough, and we do not need to spread the force along a boom. Now if you are making a scale boat, go ahead, or if you sail for sport, by yourself. But if you are going to race the boat, you'll be well advised to get that foot out and loose.

Getting back to the No. 727 sail, the creases in the leech show that the sail has not been getting the tender loving care that it deserves while off the boat. Creases in the leech break down the resin that is in the sail cloth, this speeds up the stretching that the leech undergoes. The end result is that your boat won't point well.

Under the assumption that the boat is actually close hauled, a tightening of the main sheet is called for to remove the twist from the mains'l. You can tell by the way that the leech sags off above the numerals that there is too much twist, preventing the boat from pointing or getting as much power as available from the sails.

If this exercise tells us anything, it is how valuable simple black and white photographs are in diagnosing

our sail set and trim. I shot No. 727 with a 400mm telephoto lens while the boat was a good 250 feet off shore. At this range, the focus of the lens does not have to be changed as the boat wanders a bit from her course. Trying to get meaningful photos of a boat with the typical wide-angle lens found on most cameras is doomed. You'd be surprised at the photos that I often get which have a picture of someone's boat 3/16 of an inch tall in the middle of a wide expanse of water. Just not worth the paper they are printed on. A recommendation would be for an 80-200mm zoom lens as the best single investment. I'll admit my 400mm is a bit unwieldy, even though I've mounted it on a rifle stock.

The other two photos are of former AMYA A-Class Secretary Ed Williams' A-boat. She has a hard chine, and is planked of thin ply on the diagonal. That monstrous lead "shoe" comes off and makes transportation a good deal easier. In the waterborne shot, we see that Ed is persisting in carrying a forestay as part of his rig. In the light air at the time this was no problem. But when the wind blows, the forestay steals some of the tension that should be carried by the jibstay. It is the jibstay tension that keeps the stay straight for the jib to set properly. If the jibstay is allowed to sag, the jib will sag in its middle parts, thereby ruining its pointing ability and probably backwinding the mainsail to boot. The forestay will also prevent the backstay from bending the mast in heavy air. This mast bend will match the curve of the mast with the luff curve of the sail, flattening the mainsail and reducing the heeling moment of the rig. In watching the boat sail at Marsh Creek early in the season, it was obvious that as the wind picked up, her ability to go to weather was reduced. It is not obvious in the photo, but the jib does not sit on the stay that goes from the forward end of the jib club, but on a third stay that goes from just above the club's pivot point. It is no wonder that the jibstay has sagged almost 2-1/2 inches in its mid-portion. As I said, in light air, no problem, and it may well contribute to a nice open slot between the main and jib. But in heavy air, look out.

CURRENT CONSIDERATIONS

Conspicuously absent from the model yaching literature is any mention or discussion of currents. Our courses are usually short, and in protected waters. One would think that currents would have little to do with our sailing. I suppose that one can go forth and find a little pond where there is no significant water movement. But the chances are slight. We can identify three broad classes of currents and discuss each in turn:

a) Tidal Currents
b) River Currents
c) Wind Driven Currents.

TIDAL CURRENTS

Tidal currents are associated with coastal waters, estuaries and the like. The most important feature is a time-related regime of ebb and flow which would sweep across a race course, paying little attention to the local wind and the race committee. What was a foul current during the morning may well turn into a slack or fair current at some point later in the day. A couple of potential spots where these considerations might be required would be in some of the California sites, such as Mission Bay, or at Newport, Rhode Island, where the Mini-America's Cup is sailed. Perhaps we will be lucky enough to elicit some thoughts on those sites by readers who have sailed at them. How about sharing your observations with us, fellows?

RIVER CURRENTS

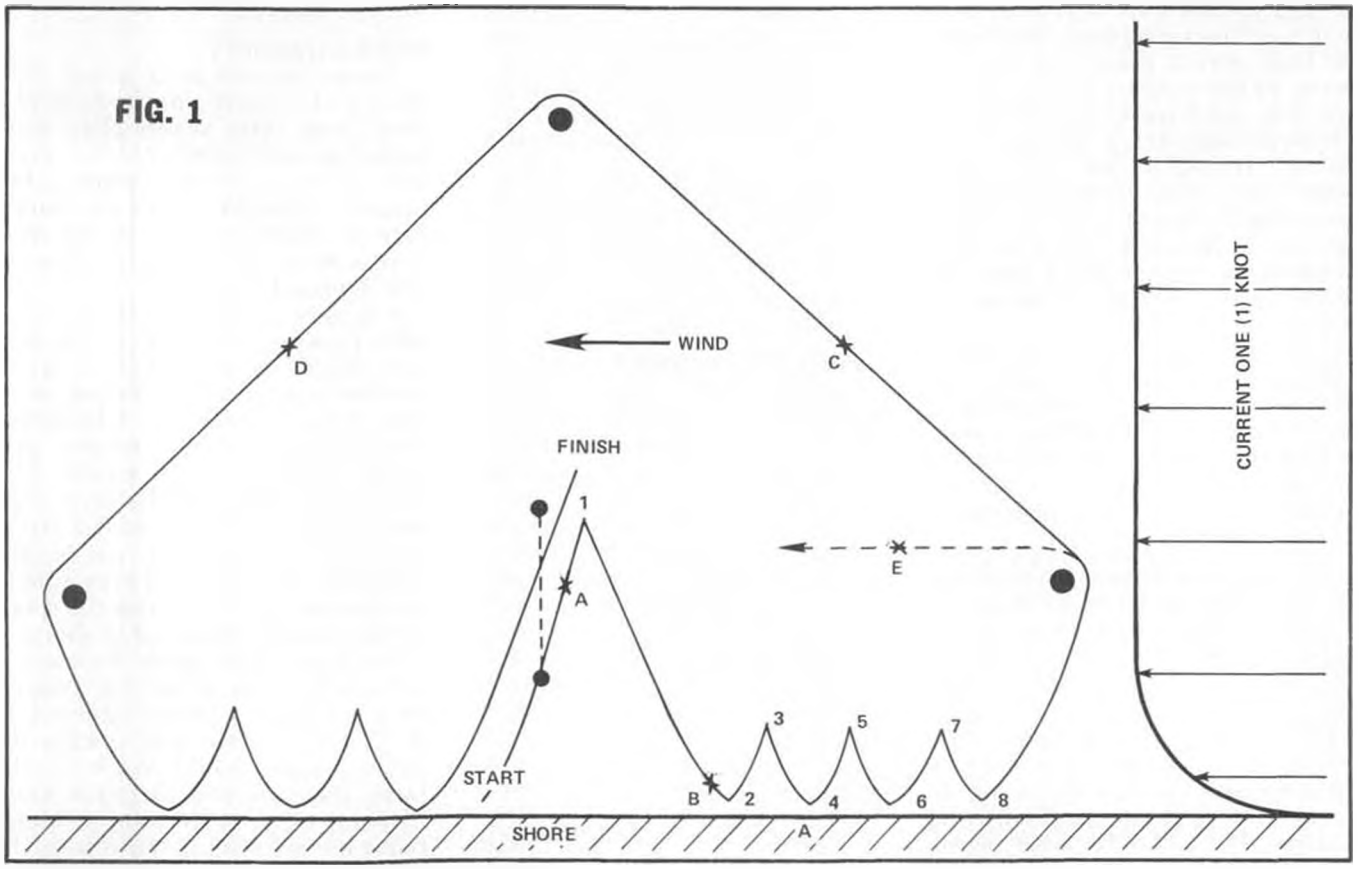
These can exist in an actual river, or might be found along a shore of a very large lake, where they were started by wind pressure. The structure of the current is what is important. I want to discuss the current with no attention paid to the wind except to say that it has a constant direction and speed.

It is very common to lay a course within easy visual reach of the skippers on the nearby shore. So let us confine ourselves to a simple situation shown in Figure 1. A longshore current slows down as one gets further inshore, due to friction with the bottom along the shallower edge (Remember how the wind did that in a vertical sense when we looked at profiles of wind speed over water). In short, we are saying that the speed of the current is less near to shore.

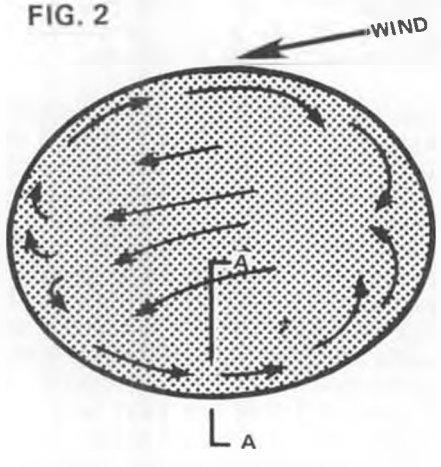
On Figure 1 is shown the track of a boat that has sailed the course. At a number of points (lettered A, B, C, etc. . . .) we will discuss the vector forces which work on the boat. There are two vectors working in each case, with a third vector being the resultant of those two. The current vector, plus the boat speed vector, gives a resultant which is the track of the boat over the bottom. In some cases the boat is helped by the current, in others it is hindered. In all cases it is affected. In all the vector diagrams, the boat speed has been taken as 2 knots. This is not really the case, as we know that boats reach faster than they beat. But by keeping the boat speed constant, our understanding of the effect of current will be easier. Secondly, it is assumed that the boat will sail within 45° of the true wind. So in still water, the angle between the true wind and the boat's heading will be 45°.

Former AMYA A-Class Sec., Ed Williams, built this A-boat. Note hard chine, diagonal planking. Lead shoe removable for transport.

Ed uses a forestay, which is OK in light air, but, according to Carr, steals valuable tension from the jibstay during heavy blows.



At the gun, our skipper is on starboard tack, mainly because he wants to use the starboard side of the course where the current is slower near the shore. I show him carrying on starboard for a little while, since he was apparently able to end up to weather of the whole fleet. By staying on starboard, he is forcing them farther out into the current, realizing that they will have to come back through it to get to the shallows. They can't tack until he does. At A, we refer to the first vector diagram. In still water he would make 45° to the wind, but with the one-knot current pushing him back, we see that he makes only 75° to the wind.



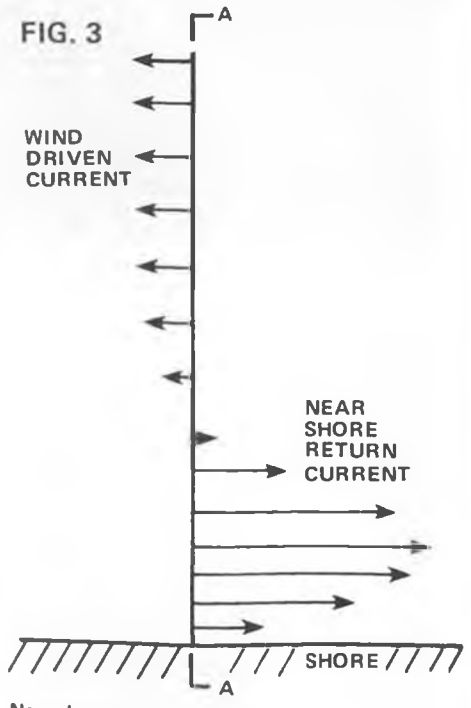
Wind driven currents in a round pond.

Note that having the wind come from the same direction as the current was done to make drawing easier. Also note that a one-knot current is really pretty healthy and not something you'll run into very often.

Our skipper now tacks and makes for shore. We look at him again at B. He is into an area where the current speed has dropped to only 0.75 knots. The change in the direction of the resultant vector allows him to point 12° higher than before, or within 63° of the wind. Believe me, if you can point 12° higher than the competition, nobody is going to catch you.

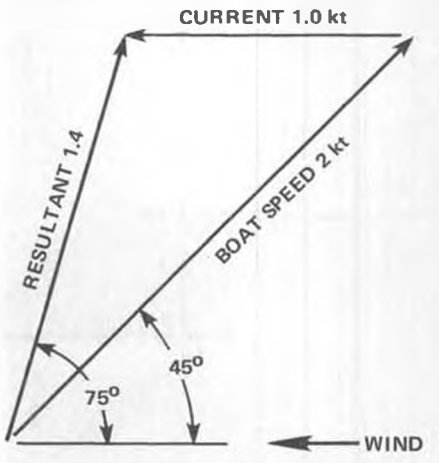
Realizing his advantage, our man tacks back and forth, staying in the low current speed area. It is bounded on the shore side by the depth of the water his boat has to have, and offshore by the place where the current is back up to the full speed of one knot. Notice that when he makes his last tack for the mark (No. 8) he is pointing way above the mark just after his tack. As he gets nearer to the mark, he enters the full current speed area and his boat gets set down to port. If he had started for the mark at tack No. 6, when his boat was pointed at the mark, he would have sailed out past tacking point No. 7 and never laid the mark. So one needs to remember to head into the current, ie., higher than the mark, if the current is going to set you back.

Having rounded the mark, we look at the situation at C. In order to stay on the proper course to the wing mark, our skipper must head high or to starboard of his line of sight. On this leg he is helped by the current, and his 2.0-knot boat speed through the water, goes up to 2.65 knots over

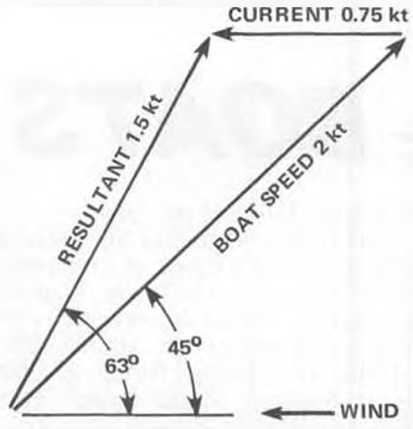


Near shore current structure.

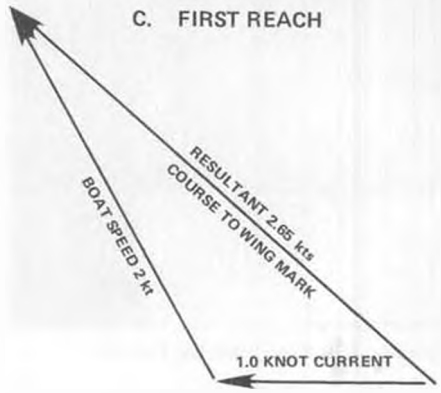
A. FULL CURRENT – BEATING



B. INSHORE – BEATING



C. FIRST REACH



The guy who really started it all . . . R/C model yacht sailing as we know it today, that is . . . Tom Protheroe, creator of the original Santa Barbara One-Design, now produced by Vortex.

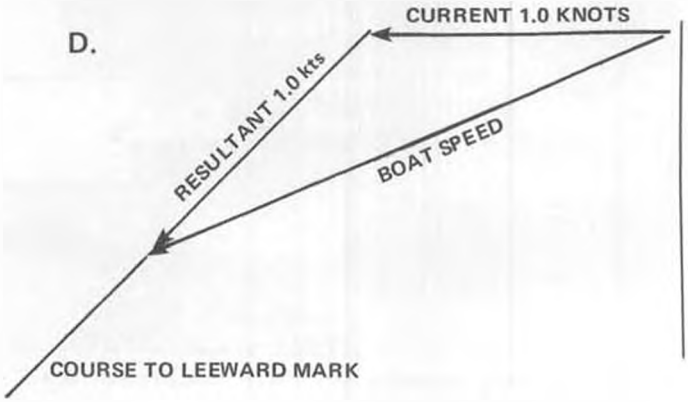
the bottom. Since the buoys are anchored to the bottom, it is speed over the bottom that counts.

He then rounds the wing mark and probably jibes. Now at D he must hold to port, more into the current to keep from being carried below the mark. If one has to sin, it must be in holding too much to port. One can always bear off and run down to the mark with the help of the current, while if you are carried below the mark, it will be a beat back, and in the adversity of the full current. We have already seen how touch that can be.

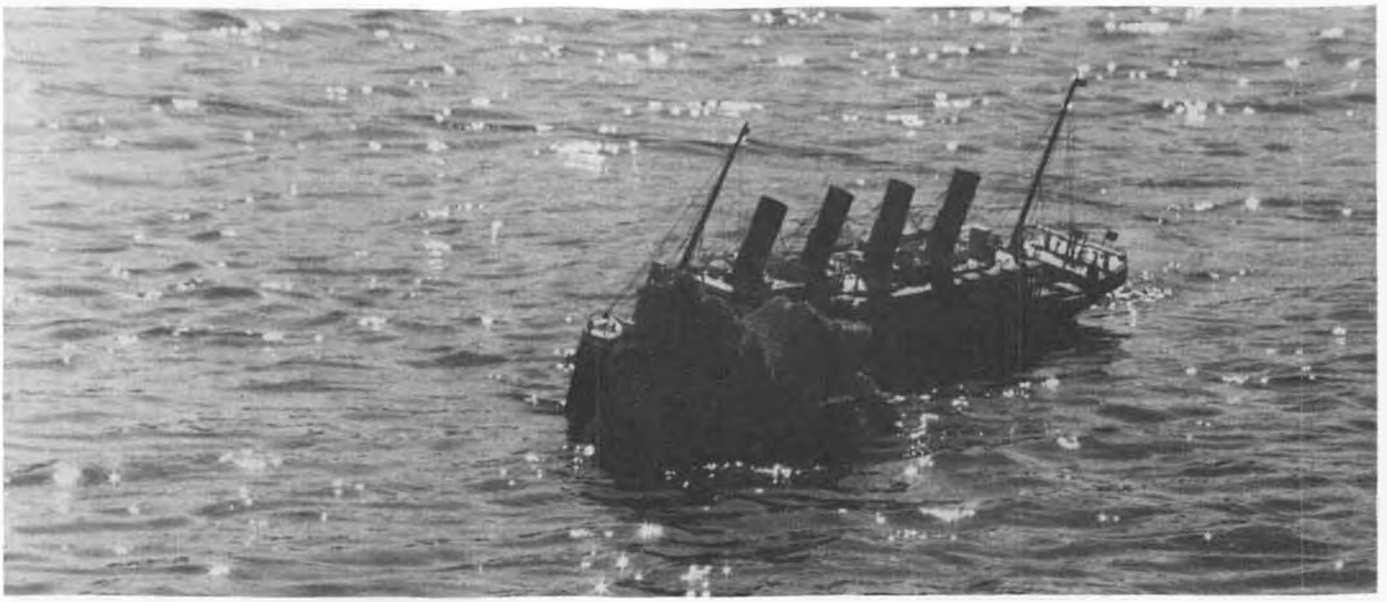
The final beat to the finish line is

Continued on page 105

D.



E. RUN TO FINISH



"You can sing 'Nearer My God to Thee' if you want, but just show me to the nearest lifeboat!" Realistic radio controlled iceberg (!) and Titanic models reenact an historic tragedy at sea. Both models by Bob Cline.

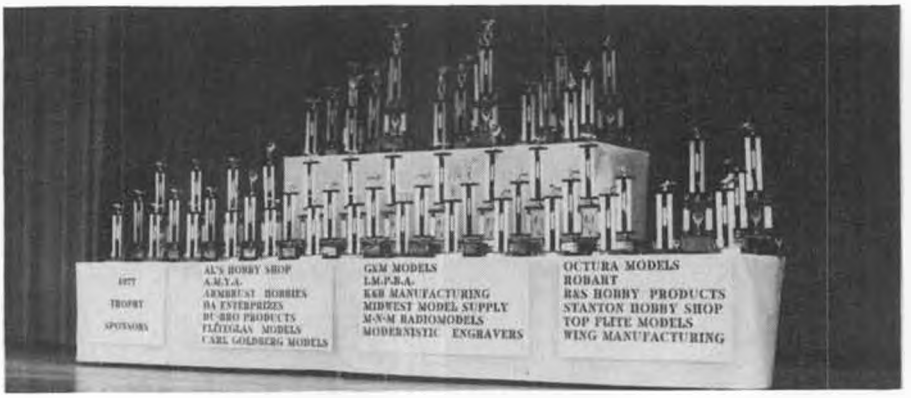
R/C POWER BOATS

By BOB PREUSSE

• On October 29 and 30, the Association of Greater Chicagoland R/C Clubs hosted the 5th Annual Chicago R/C Expo at the DuPage County Fairgrounds in Wheaton, Illinois. The Chicago Expo has become one of the more popular hobby shows in the R/C industry. This year's event was attended by over 6,000 interested modelers and hobby enthusiasts. In fact, the total gate drew a 22% increase over last year. Without a doubt, the Chicago area is a strong market for the R/C manufacturers.

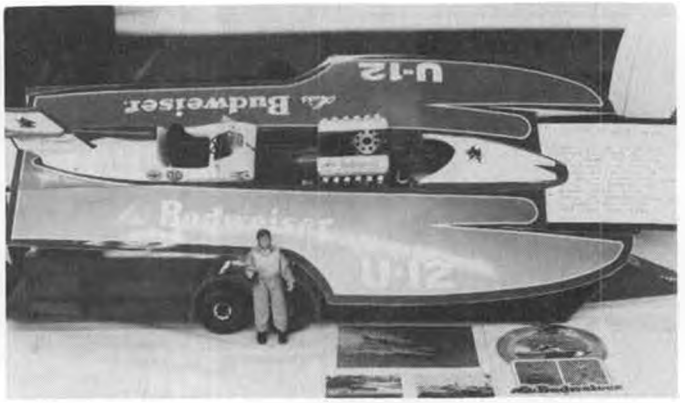
The timing of the Chicago Expo has been instrumental to its success. The peak seasonal activities for the airplane and boat enthusiasts have ended, so all the modelers have a chance to get together and view the new products available, or in the works, for early release next year. It's also a good time for the manufacturers, right before the holidays, a real boost to their sales. A few modelers I talked to prefer to have the show in October because it gives them a chance to review several products at one time and then decide what they wish to build for next season. When the new season begins, they want their new plane or boat finished, rather than just beginning the building process.

Another nice feature of the show is the live demonstrations of airplanes, cars, helicopters, and boats. It gives the public a chance to view some of the latest products in action. Bill Pistello and Doug Riha, of the Minute Breakers Model Power Boat



Beautifully engraved trophies for the 5th Annual Chicago R/C Expo, held last October.

G. Miller scratch-built this African Queen from photographs. Steam engine machined from castings, other parts handmade. Radio control.



"Miss Budweiser", owned by Gary Preusse, complete with trailer. Has exceeded 60 mph, powered by an ST .65.

Atlas Van Lines unlimited, by Dick Major, his first boat. Note complete display, with photos and patch.

First Place in Racing Hydro at Chicago Expo was this 1/8 scale U-95 by Al Wolf, of Oswego, Illinois.

Club, put on a demonstration race between a 3D Models Deep Vee and an A & L Hustler. It was really a grudge race between a "rock boat" (mono) and a "lobster boat" (outrigger). There is a growing rivalry between rocks and lobsters in this area. I think the unlimited races cause the rivalry, with the head to head competition of mixed classes.

One of the best features of Expo is the fact that the show is organized by the modelers in the Chicago area. Through the efforts of many individuals, it hopefully represents the needs and desires of all modelers. If someone feels there is an aspect of the hobby being neglected, then he or she can participate in future shows and submit their opinions. As a boater, I wish to thank Vito DiTraglia, of the Minute Breakers Model Power Boat Club, and Kurt Rothlisberger, of the Wheeling Racing Dolphins, for their continued excellent service as the boating representatives on the Expo Executive Board of Directors. It is not an easy task to organize an event of this size, and each committee deserves a lot of credit.

This year's swap shop had peak activity on Saturday. Boats, engines, hardware, 12-volt batteries, and even ready-to-run outfits were all good sellers. In the swap shop, the Expo committee rents table space per day, and no sales commission is assessed.

In the main building were the manufacturers and static model displays. Ed Hughey, of Hughey Boats, was present with his line of urethane foam and plywood hydro kits. Hughey hydros have proven their superior qualities over and over again in competition. The foam hulls come in four different lengths; 26, 28, 30 and 32 inches. The complete kits include; urethane foam hull, wood parts, flex shaft, twin rudders, flywheel, stainless prop, turn fin, engine nut, screws, plans and instructions. These are great kits for beginners because they are complete. Want to work on props? How about a Hughey Pitch Gauge! For more information, write Hughey Boats, P.O. Box 68328, Indianapolis, Indiana 46268.

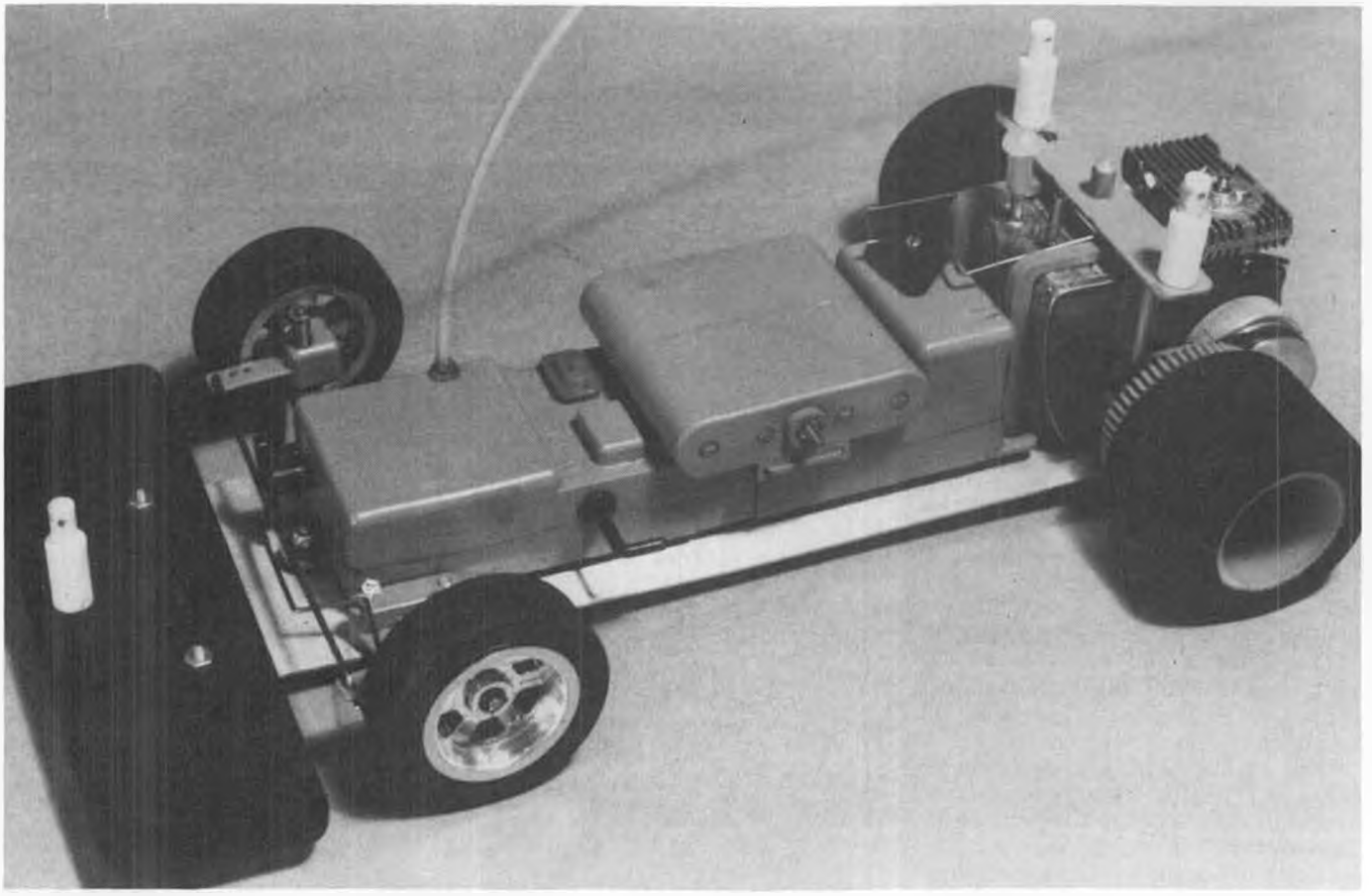
JCM Specialties, Box 194, Addison, Illinois 60101, was on hand with such items as its .60 size tuned pipe and heat resistant pipe coupler. One of its best products is the field box for $23.50, which is designed for boaters or flyers. It is made of select, precision-cut plywood, complete with all hardware. The builder supplies only the glue and paint.

K & S Engineering, 6917 West 59th Street, Chicago, Illinois 60638, the metal specialists, displayed vari-

Continued on page 83

Octura's booth at Chicago, with Tom Perzentka, in checked shirt. Sorry, we don't know if that's his son lending a hand.

Du-Bro's extensive line of accessories take a lot of room to display.



Completed MRP Class A (reed-valve engine) car chassis is ready for body installation. Heat sink, with fins perpendicular instead of parallel to the air flow, was incorrectly mounted when this photo was taken.

BUILDING A 1/12 SCALE R/C CAR

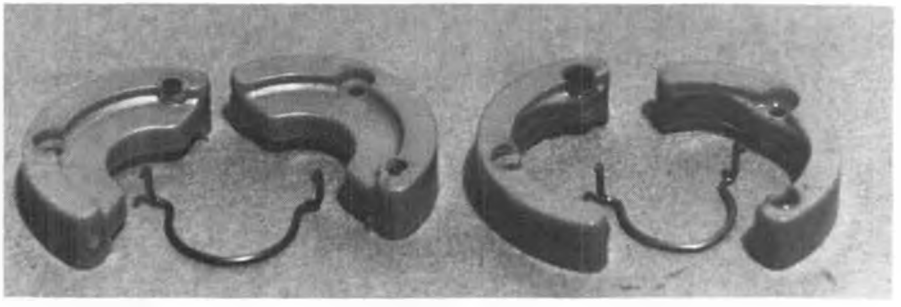
PART TWO
(Conclusion)

• The right side-mount for the reed-valve engine is a stock MRP item. Mounting screws are just about whatever you want to use. The standard 3-48 bolts work fine. I chose to use 4-40 socket head cap screws, as they seem to be easier to work with. The lugs on the tank have to be punched out to accept the 4-40's, but the holes in the mount are okay as is. The forward lower bolt location is difficult to get at, so forget it. I use three bolts in my mount, and it is possible to get away with only two, as long as they are on a diagonal from each other. The forward upper location and the back lower location would be the easiest to work with if you use two bolts. Whatever you use, be sure to install lock washers and nuts with a nylon locking insert.

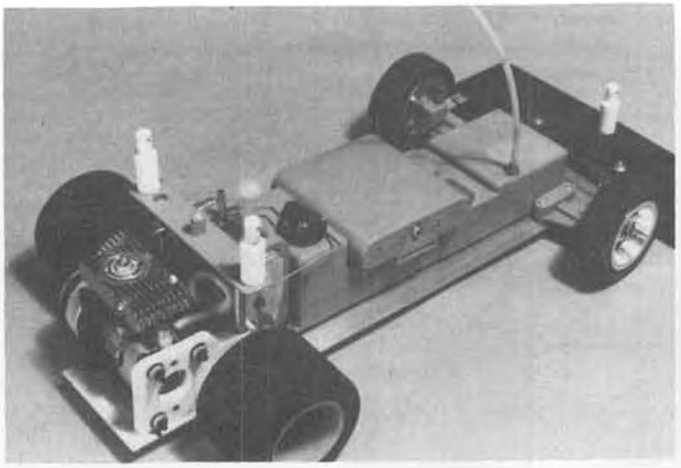
The nose mount shown on my car is the housing/mount number from a Cox recoil starter. Of course, the recoil starter guts have been removed. This mount needs a bit of grinding before it fits right, as it was designed for lay-down engines. No big thing; a couple of passes with a Dremel handles it. The standard No. 4 sheet metal screws used to attach the nose mount to the chassis like to come loose, strip out in the mount, and generally give the wrenches fits. I used No. 6 x 1/2 inch long sheet metal screws, and they are holding up very well to both racing and excessive wrenching.

A better choice for a nose mount is the KRD aluminum unit. Good luck in finding one. Other aluminum mounts are available from French Motor Co. The advantage in using one of these aluminum nose mounts is that they dissipate heat much better than the Cox glass-filled nylon thing. This can be critical, and it is definitely worthwhile trying to locate one of the aluminum mounts.

To make gearing changes easier, the two holes common to the chassis and the nose mount are elongated in the chassis. Also, the hole common to the chassis and rearward-most bolt location in the right hand mount is elongated in the chassis. With the three screws at these locations slightly loosened, the engine can be shifted

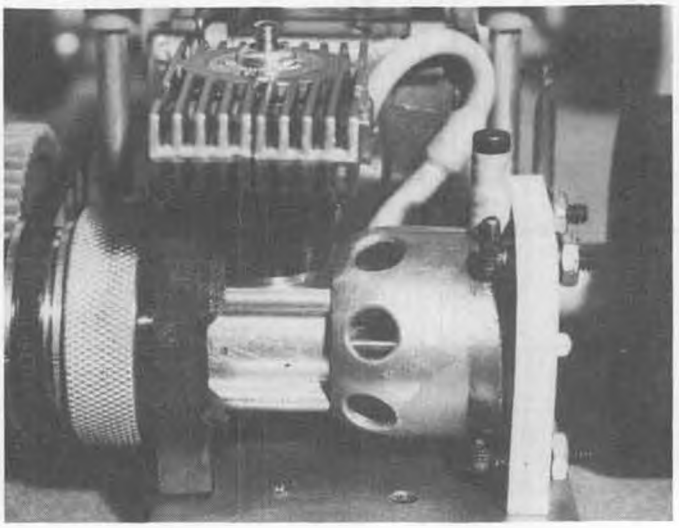


Stock clutch shoes and spring on the left. Shoes on right have center web removed, and spring has been re-shaped to delay clutch action.

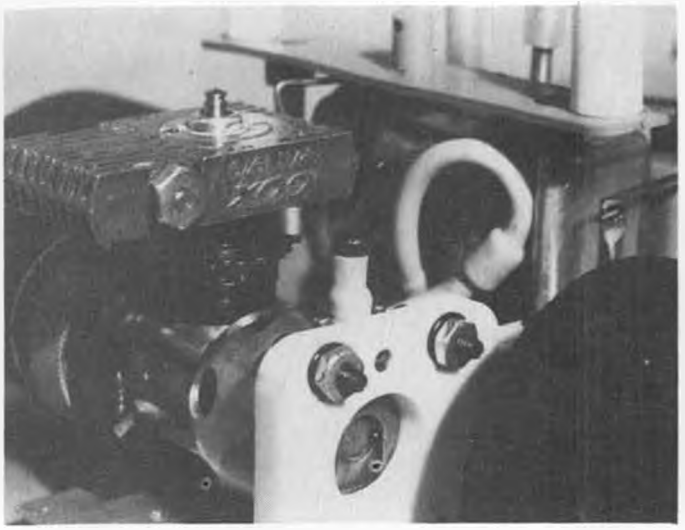


Completed MRP chassis is stock except for double body posts at rear, and jet fuel vent. Heat sink still mounted 90 degrees off.

Wing is formed from .030 Lexan. Can be made adjustable by slotting rear hole on each side.



Nose mount on left houses recoil starter . . . is modified as described in text. Heat sink on straight at last!



Surgical tubing on needle retains setting. Filter forced inside fuel line causes strange lump.

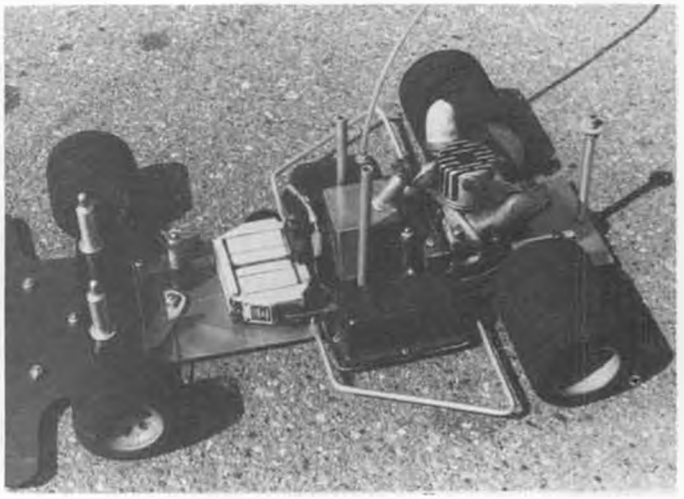
to accommodate different gearing, or simply to adjust gear mesh.

I guess that brings us to actually adjusting gear mesh. This is easy enough. Just push the gears together, ease off a little, and tighten everything down. There should be just a bit of slop in the mesh. Hold one gear stationary and see if the other can be moved. If it can, you have probably got the mesh about right. Do not run the gears too tight. And if you get them too loose, you'll soon know about it. You'll be sitting in the pits installing a new gear.

All rear main gears, as molded by JoMac and used on the MRP and Jerobee cars, as well as the rest of the 1/12th cars sold, have the gear offset very slightly on the hub. They are designed to have the flat-ended hub against the axle bushing, and the rounded end to the wheel. More important, however, is to be sure that the main gear and the pinion gear are lined up properly with the maximum amount of interface possible. Swapping the main gear end-for-end may

Continued on page 74

Matt Vuolo's 1/8 scale R/C version of a 1-1 scale modified (!) stock that he raced. Wing has inverted airfoil.



Matt's Camaro has MRP chassis, Futaba radio, K&B .21 engine, and wide (!) rubber on wheels that he made.

Norm Skuderin built this beautifully detailed Franklin Sport biplane. It was shown at the Junior Air Races, Cleveland, Ohio.

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY AUTHOR UNLESS NOTED

• I haven't done much with this column, as far as new products go, for awhile. I suppose it is about time to do just that.

FROM SIG

Latest thing from Sig is the Skyray, a 1/2A C/L stunt model. Profile fuselage and a flat plate wing. Not too exciting to us contest fliers, of course, but it is a nice design. Plenty of wing area, easy to build and fix, plus it looks more like an airplane than lots of other profile kits.

Everybody seems to have problems in getting good balsa these days, but this particular kit I have here contains good wood throughout. Then again, I doubt if Mac would send me a kit containing junk wood. Anyway, Sig kits generally have wood of good quality in them.

"The Other End", a self-explanatory accessory from Harry Higley.

Included in the Skyray kit is a bunch of extra stuff like hardware, pre-bent pushrods, decals, etc. Glue and paint are about the only extras needed to complete this model. You people looking for a first model, or those after a quickly built sport plane, ought to check this one out, especially if you happen to be one of those poor souls unfortunate enough to have a relative who foised a plastic R-T-C (Ready-To-Crash) on you for Christmas. Even if you have successfully flown your R-T-C (doubtful), you by now are aware of the fact that plastic is difficult to repair and replacement parts quite expensive to buy.

With a model like the Sig Skyray, you have a plane that will fly pretty well, plus being easily fixable right at the field, if (when) you should happen to tent-peg it. Yes, folks, balsa really does fly better.

TESTORS .049, ONE MORE TIME

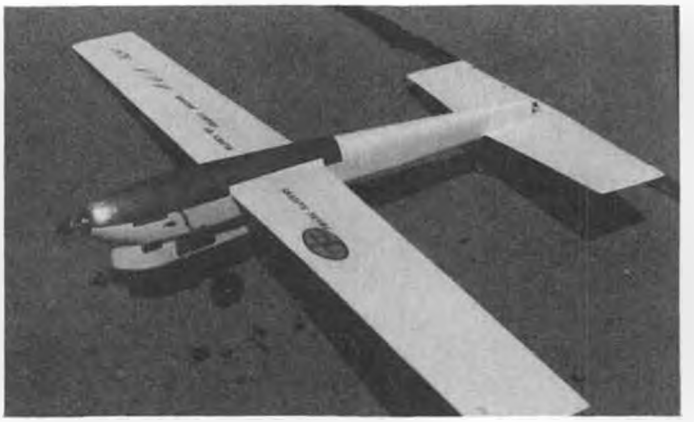
As a rule, those in the market for a kit such as the Skyray, are bucks-down or simply want to give C/L flying a try, not yet knowing if they will like it or even be able to do it. Many of those not able to fly C/L successfully cross over to R/C, of course, but that's another story. . . *(Careful, Dan, you're slipping back into those old bad habits! wcn)*

Back to the Testors .049, referred to as the 8000. It is a logical choice for those just getting into C/L flying, 1/2A style. You may remember that I tested several of these new engines awhile back and found them to be quite good . . . being the fastest out-of-the-box reed-valve .049 presently available. Power generally costs money, but the Testors numbers are retailing for $11.00. Also, spare parts and glow heads are reasonably priced.

Since writing about my first tests of the Testors .049, they have been used by several of the neighborhood urchins for a little flying here in the

The "Biso Balancer", another device from Harry Higley. Hmmm . . also balances props!

Sport Race plane by Frank Czisnia. Fox power. Flown at Junior Air Races, Cleveland, Ohio.



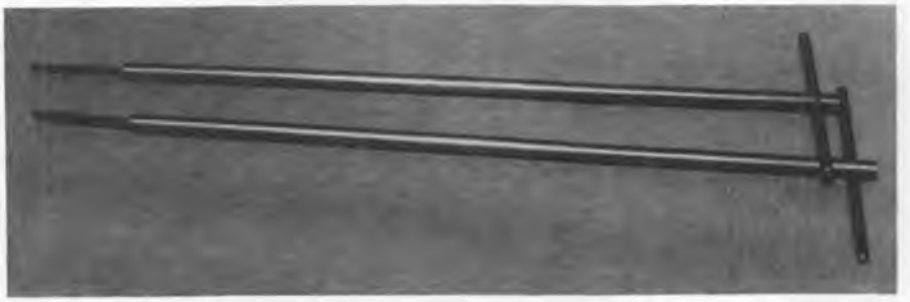
Inverted Rat built by Frank Sanders and flown by Charlie Johnson. Clean design, with inverted engine in half-pan.

cul-de-sac. They have been pounded into the asphalt, run on little props, big props, eaten fuel of questionable origin . . . in short, they have been abused more than used. But all have held up amazingly well, still run good, and always start easily, either hot or cold.

AND FROM HARRY BIGLEY

I know that's not nice, making fun of Harry Higley's name, especially as he and I are the only people doing general-interest C/L columns now, what with Dave Clarkson having laid off a bit. Still, I don't regret it, you know. . .

Harry is offering a few products that you really ought to take a look at. The one I find to be the handiest is the Biso Bender. This is a strange looking little gadget that is claimed to bend 1/8 hard brass tubing. Memories of that long ago discontinued Du-Bro bender come to mind, right? Mine didn't work either, so I didn't expect the Biso Bender to do any better. But it really does the job. Bending tubing for tanks is no longer any problem at all, as this unit will bend the tubing anyway you want it, without crushing the tubing, and do it accurately besides. Making up tanks is hardly my favorite job, and this won't change, but the Biso Bender does make things a bunch easier. Now will somebody tell me what the hell "biso" means?

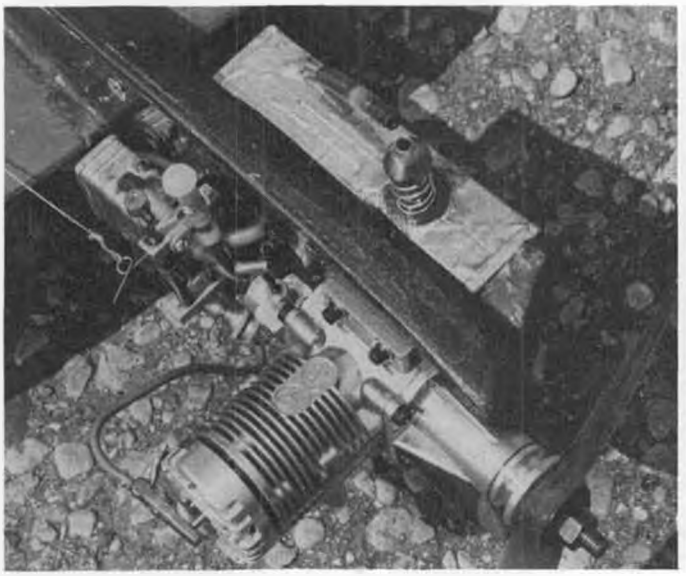


Harry's Handy Hex Keys (not to be said immediately after eating garlic) from Higley, have super-hard keys.

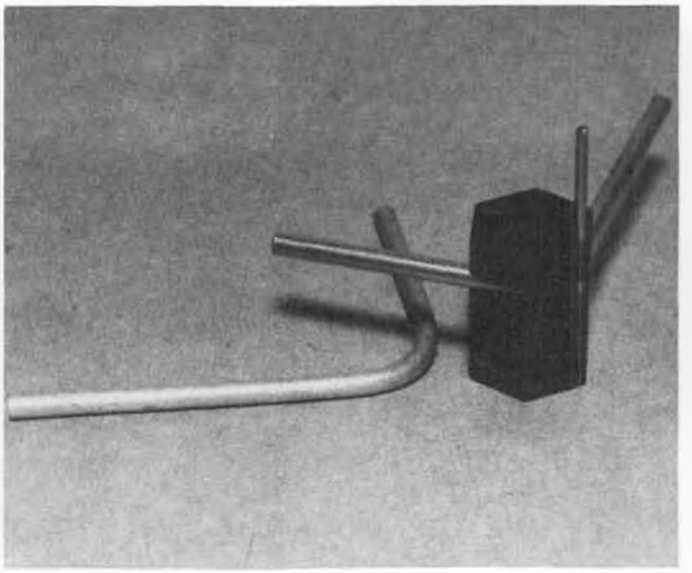
Next item from Higley is the Handy Hex Keys. These are long-handled hex keys (Allen wrenches) with a T-bar handle for ease of overtightening cap screws. You do overtighten them, don't you? One of the real thrills in modeling is digging a busted-off screw out of a motor mount.

Another one of the thrills is in getting a motor (or whatever) mounted in preparation for your next flight at a contest, only to have the damn key (wrench) get rounded off, ruining it. I've had this happen to me several times, so was really interested when noticing the warranty concerning the keys . . . something about fixing any damaged keys for a simple handling fee. I just love warranties and the challenge issued by same. Quick to the shop with a handful of cap screws, both sizes of Harry's Hex Keys, and a destructo attitude. The keys survived, the cap screws all broke. Since then, I've used them quite a bit and they really are tough.

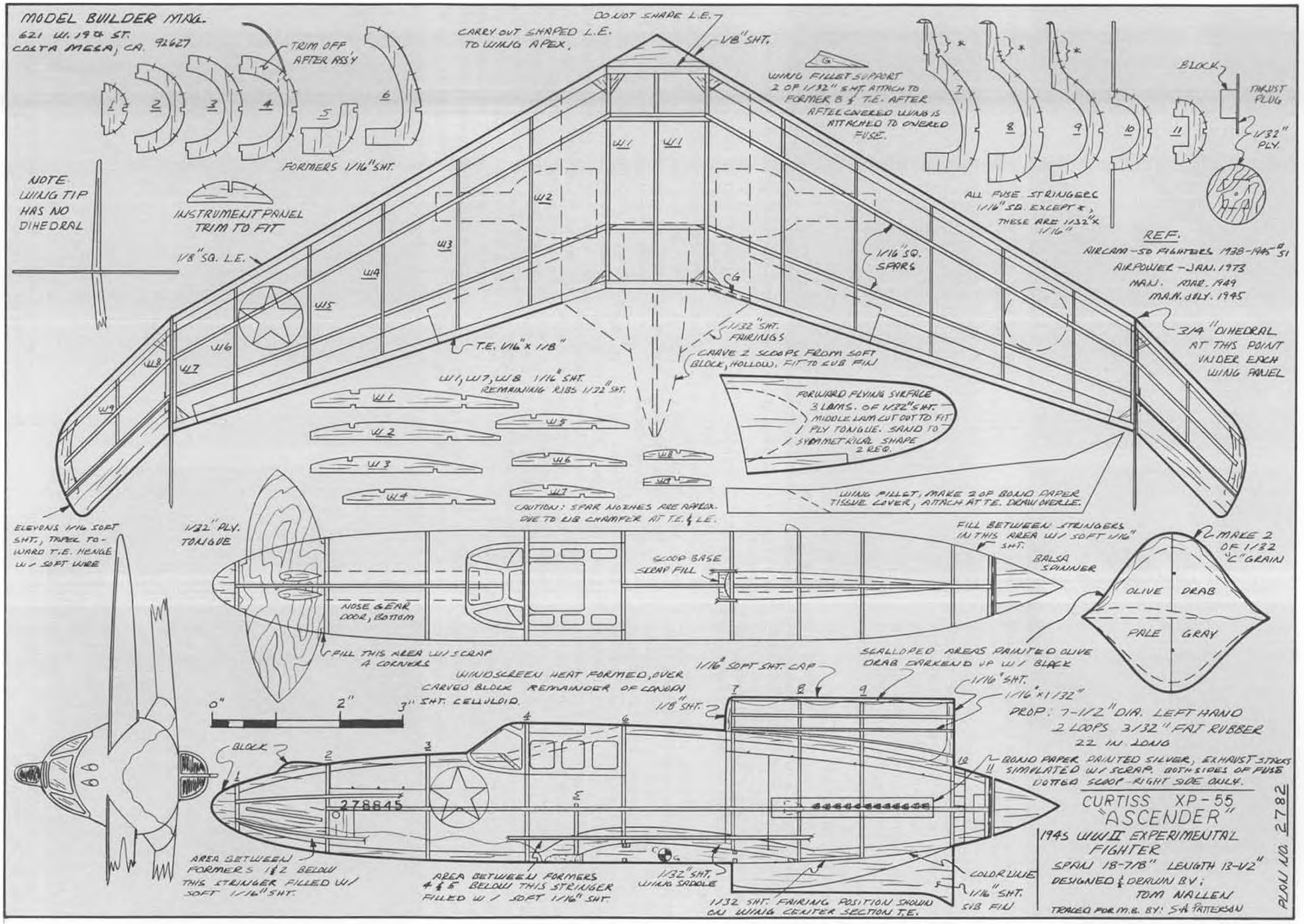
Continued on page 83



Ballard/Fentress AMA Slow Rat. Large inboard tank feeds small tank. HP .40 reworked to .36.



Have you used Harry Higley's Biso Bender? Really work great with hard, thin-wall tubing. No, it won't really bend biso's.



FULL SIZE PLANS AVAILABLE — SEE PAGE 112

THE CURTISS XP-55 'ASCENDER'

By TOM NALLEN . . . The frenzied efforts for wartime air supremacy foster some pretty unorthodox aircraft designs. Some make it big (P-38) and some drop into obscurity (XP-55). Only modelers keep them alive.

• From the time the Wright Brothers started it all by climbing away from the dunes at Kitty Hawk with a stabilizer out front, the canard, or tail-first flying machine, has intrigued aviation fans everywhere. A discussion of canards would be incomplete if it didn't recall the first heavier-than-air flight in France, by the expatriate Brazilian, Santos-Dumont, acknowledged to be the first aeroplane flight in all of Europe. Isn't a tip of the helmet due his box-kite like 14bis, which flew into history in the backward style? Wouldn't it also be an oversight not to mention that in England, heavier-than-air flight began with the colorful Americans, S.F. Cody, who did it first . . . flying tail first . . . at Farnborough?

How fitting, in light of these historic milestones, that one of our own, Paul McCready, should employ the venerable canard configuration in achieving one of aviation's most elusive goals with his man-powered Gossamer Condor.

In the infancy of flight, the canard ruled the roost, but with the epochal flight of Louis Bleriot across the English Channel in 1909, the much cleaner (aerodynamically) tractor monoplane dethroned the dirty old bird, and the backward configuration soon faded into obscurity.

In 1930, Mark Granville, of the Gee Bee clan, built a canard as a lark, at Springfield, Massachusetts. Because the ungainly craft appeared to fly back end to, Granville, tongue-in-cheek, aptly christened his new airplane the "Ascender." Years later, when Curtiss announced its new Ascender, the amused Granville took delight in pointing out that Curtiss' spelling was as deficient as had been his own.

As the clouds of war broke over Europe in 1939, the Luftwaffe, playing the decisive role in the blitzkrieg of Poland, vividly demonstrated the devastating effect of massive airpower. It was a new kind of warfare, awesomely staged before a stunned and unprepared world. A sobered America hastily began to mobilize her near-dormant aircraft industry, and manufacturers hurriedly embarked on research and development programs seeking to gain an edge for their country in the race for supremacy in the air. Off the drawing boards came many farsighted concepts, including a bevy of unorthodox designs. The Curtiss XP-55 Ascender was a product of these efforts. She was destined to excite her imaginative creators with tantalizing hints of brilliant performance, then dash their hopes in sudden, crushing disaster. The imposition of wartime secrecy, and the passage of time have clouded her story, but bits and pieces of information gathered during the search for documentation of the model form an interesting, if somewhat sketchy picture.

To assess the potential of a markedly different, tail-first, swept-wing configuration, the XP-55 was

Some purists maintain that the XP-55 wasn't a true canard, but rather, a flying wing with a forward control surface. Picky, picky, picky . . .

It does fly! In the air, about 80 to 90 feet over Chicopee, Mass. . . . Where?

Clean lines offer minimum drag. Prototype touted as having "excellent spin recovery characteristics" due to outboard rudders. Prop jettisoned for bail-out . . . Thank God!

developed at the St. Louis plant of the Curtiss-Wright Airplane Division. On July 13, 1943, the radical fighter hopeful made her maiden flight, pushed into the air by a liquid-cooled Allison V-12 engine of 1275 hp. Top speed was reportedly equal to comparably powered conventional fighters, placing the remarkable machine in the close-to-400 mph category.

The prototype demonstrated superb high speed handling qualities and first-rate maneuverability, along with a virtue described as, "outstanding longitudinal control". Among the many unique features of the design was a jettisonable propeller, provided to enable the pilot to abandon his aircraft in an emergency without having to contend with a prop whirling behind him, and the exceptional field of vision from the high, forward cockpit was unparalleled in contemporary fighting aircraft.

Unfortunately, with all the good, came some bad. An extraordinarily long takeoff run was required by the new plane, a serious deficiency in a fighter, and engine cooling was a problem at all speeds and altitudes.

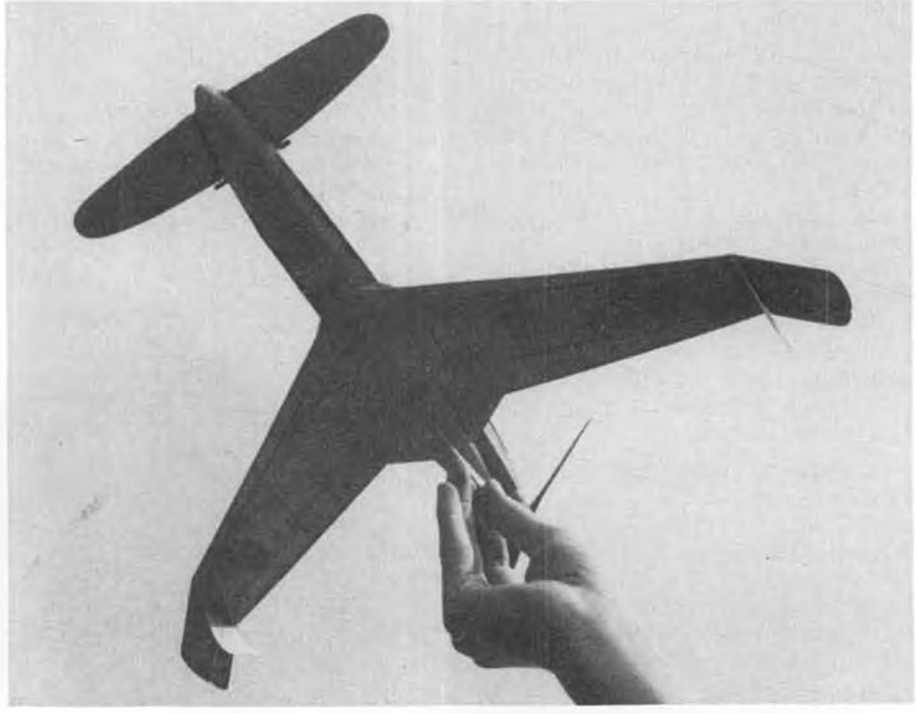
In November of 1943, disaster struck the fledging project, when, ostensibly while undergoing stall tests, the prototype crashed and was destroyed. Undeterred, Curtiss rolled out two more of the type in early 1944. This pair incorporated modifications to the control system and differed but slightly in minor detail. As flight testing resumed, with both new aircraft actively involved, engine overheating continued to plague the project. Nonetheless, it seems that things must have been looking up for the Ascender at this stage of her development, for in April, 1945, her details were released to the public, including the glowing attributes mentioned above. Then swiftly, misfortune struck again. One of the pair of Ascenders, flown by a military pilot, fell victim to what has been termed the 'viscious' stall characteristic of the design. In a file on the XP-55 at the National Air and Space Museum Library, photographs dated May 29, 1945, depict the scattered remains of this, the second ill-fated Ascender, and bear silent testimony to the flaw that presumably ended her development. The unusual and unlucky craft met her fate at the south end of Wright Field, perhaps not far from where many of us took part in the 1976 Nationals.

In spite of her short and tragic tenure in the air, the XP-55 earned her niche in aviation history, and for unique approach to purpose and distinction of line, the Ascender takes a back seat to few. As a flying model she offers an absorbing challenge, and an adventurous change of pace.

The model was built expressly for competition under Flying Aces Club scale rules, where bonus points are awarded to more inherently difficult-to-fly types. Under these rules, the Ascender earns a whopping bonus score of 45 points which are added to flight and scale fidelity scores. Bonus points are earned this way . . . 15 for a low wing, 10 for being a pusher, and 20 for featuring an unorthodox configuration. The rules allow the landing gear to be represented in the retracted position. Flying under these refreshingly innovative rules, the Ascender can never be ruled out of contention, and has won an F.A.C. scale meet against quality competition.

As might be expected, the model XP-55 didn't fly right off the board. First glide tests indicated too little forward flying surface area, so a new, slightly larger stabilizer was built. With the glide satisfactory, it was off to the tall grass for first powered flights. Originally, the stab was built up and was slid through a tapered slot in the forward fuselage to allow for shimming as an aid to optimizing glide trim. The built-up stab quickly proved impractical, as it was damaged to some degree on nearly every landing, good ones included.

Continued on page 94



Underside details reveal landing gear doors, belly scoops. Rubber peg is just aft of the knock-off forward surfaces. An interesting R/C scale project possibility, now that Tom has problems solved.

The "Factory Team" (l to r): Jim's girl friend Renee, father Jack, Jim, mother Janet, and sister Jane. Another sister, Meredith, also builds models.

Nats winner Jim, his glider, and the "loot".

JIM LUEKEN PORTRAIT OF A NATS WINNER

By BILL HANNAN . . . Unfortunately, this article is not only in recognition of Jim's accomplishment at the Nats . . it must also become a memorium to his father, Jack, who just passed away, a victim of leukemia.

• What does it take to win the Nats . . . especially if you've never entered before? Science? Skill? Luck? Ask Senior Hand-Launched Glider winner, Jim Lueken. Like many Californian modelers, he had waited a long time for a chance to fly in the big meet. The last time it was held out this way, he was only seven years old! Of course, his dad had told him all about the Nationals, and he had been reading about the subject for many years. With both his father and mother interested in aircraft, it was natural that Jim should become a modeler. Initially, he seemed mainly interested in control-line, and tried his hand at mouse racing, combat, etc. He received plenty of encouragement from Ben Sasnett and (then) Patty Sak, now Mrs. Sasnett, and managed to place well in a number of local contests.

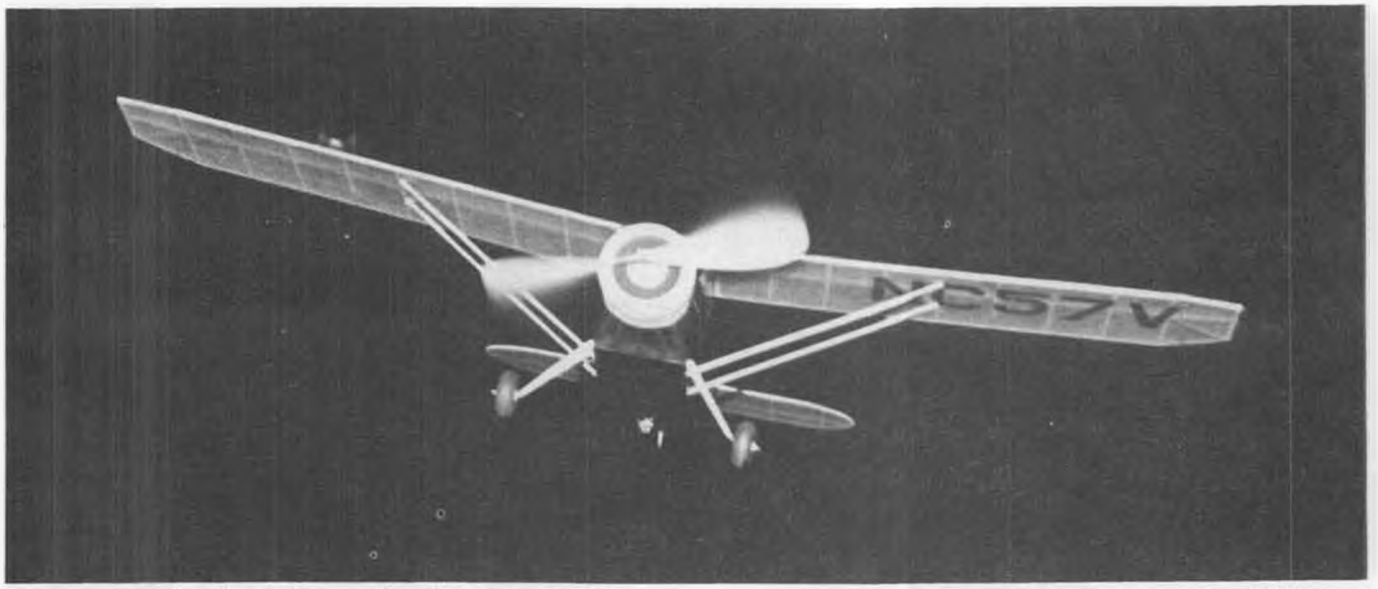
However, Jim also explored other facets, ranging from Peanut Scale through radio control, over the years, and became well versed in them all.

With the approach of the Nationals, no one was quite sure which events Jim would enter, since his interests covered such wide boundaries. As it turned out, he decided upon free flight events, including A-2 towline glider, 1/2A Gas, Flying Scale, plus indoor and outdoor Hand-Launched Glider.

Jim had long been fascinated by gliders of all types, and a couple of discussions with Richard Miller did a lot to heighten his enthusiasm. Miller was not only a hand-launched glider expert, but former Editor of SOARING, an active hang-glider designer, and originator of the VTO column in Model Airplane News. A Richard Miller glider is truly a work of art and the epitome of fine craftsmanship, being fabricated over a light-

Continued on page 82

A proud father congratulates his victorious son. Jack Lueken also managed to bring home some competition "hardware" from the 1977 Riverside Nationals.



Hurst Bowers, Flyline Models, built and flew this Bellanca several years ago at a contest held in one of the hangars at Andrews Air Force Base, Maryland. Photo by John Preston.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• This month I would like to cover several different kinds of hints that I hope you will find useful in building your next scale model. The first one has to do with laminating. For years, I have been laminating tail outlines, wing tips, etc., using basswood. Sometimes this material can be heavy in certain applications. So one modification that I have made is to use balsa trips in conjunction with the basswood. I simply alternate bass and balsa strips. This helps cut down the weight a trifle, and makes just as strong a lamination. I use this method primarily on rubber models. On gas jobs, I still use all basswood.

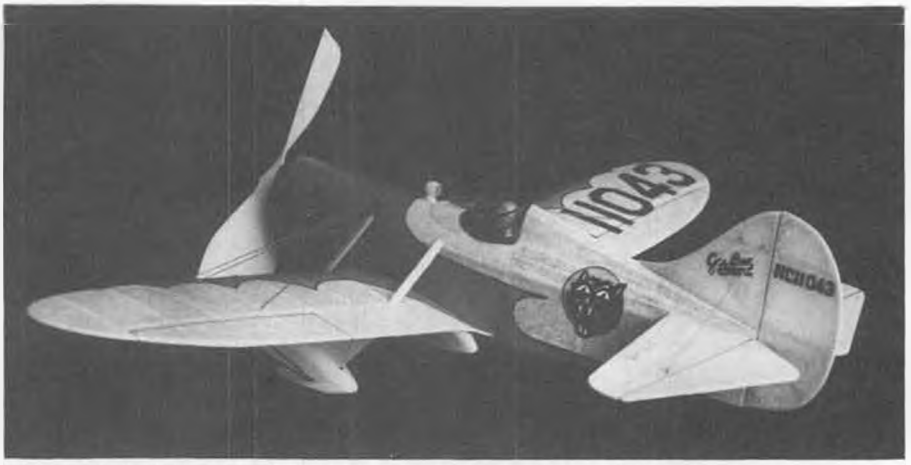
Talking about basswood. It seems to be tough to find *reasonably* priced basswood in a length suitable for laminating flying surfaces for larger models. My source that I mentioned sometime back, Seaport Models, has lost his cutting source. Without this . . . then what? If you have a power saw, cut your own. Use the best and thinnest saw blade you can find. Tom Laurie and I not long ago cut some six foot lengths of 1/32 x 1/4 without any difficulty at all. Naturally, you will have some waste from the saw cuts, but I personally feel that having the basswood at the lengths you require, far outweigh the waste. I bought a hunk of basswood (2" x 10" x 6') a while back for about eight dollars. I'm sure it will be more now, like everything else, but that is a lot of strips. It also makes super propeller blanks.

If you want to give yourself a treat, carve a prop out of basswood. It sure beats balsa. However, you definitely have to have a need for nose weight before you want to hang one of these beauties on your next scale model. This is one easy way to obtain nose weight without hanging hunks of clay under the nose.

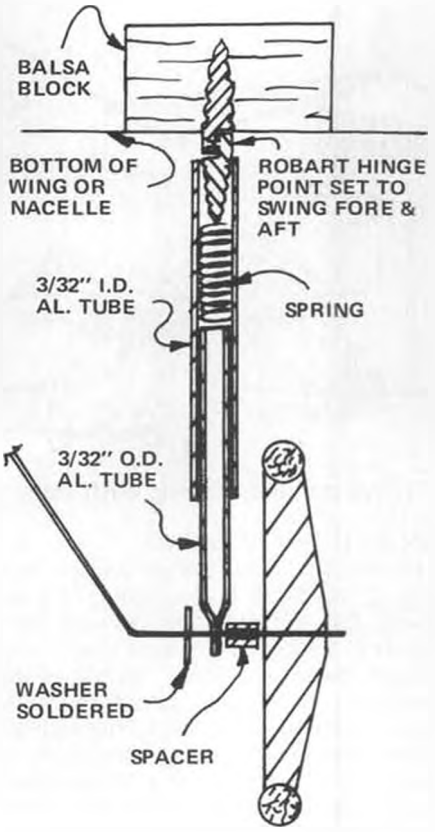
I feel that you cannot do away with clay as your favorite form of ballast, here's an alternative. Take some auto "dum'dum" (this is a type of caulking that is used by fender unbenders) it is soft and pliable. It probably doesn't have the same mass that clay has, but that isn't any problem. Take some real fine buckshot and work it into the "dum-dum". This way, you will have more weight and a smaller piece hanging from your model. Some modelers, depending on the design, like to stuff the clay inside the bottom of the

Tom Laurie's Sikorsky S-39 on the water at Lake Elsinore.

Bill Stroman experiments with power to weight ratio for his "8" Ball speed model.



Gee Bee Model "D" Peanut Scale by Tom Limbrick, built from Walt Mooney plans.



nose. This is OK, and it doesn't distract from the model since it can't be seen, but you certainly have to make sure that it is permanently secured.

If it isn't, a sudden shift of C.G., and your model could become a thing of the past. Using "dum-dum", you will find that it does stick much better than clay. If you plan to use ballast on the inside portion of the cowling, cover the area with several coats of dope. This will insure adhesion. Bare balsa just won't handle it.

Have you ever tried to drill a hole in a thin sheet of balsa, only to have the edges look as though you cut it out with teeth? Even the use of a metal tube sometimes doesn't help. The other day I had an occasion to make such a hole for the opening of the CO_2 filler nozzle at the bottom of the fuselage. I used one of the oldest tricks in the book, that of using heat. I took my soldering iron and burned a neat hole just the size I needed. A little sanding took care of the burned edge. I can remember way back when I was just a little kid, building R.O.G. type models, and having to use a hot needle to burn a hole in the wooden wheels for the axles. Never knew about such neat things as drills in those days!

The use of Letra-Set letters for modeling purposes is becoming more and more prevalent, as modelers find new ways to use them. These dry transfers come in a multitude of shapes and sizes, and many of them can be used to detail your project. The question is, how can this be done, especially on tissue covered models, since they require rubbing with a blunt tool to remove them from their backing. One technique is to apply them onto a piece

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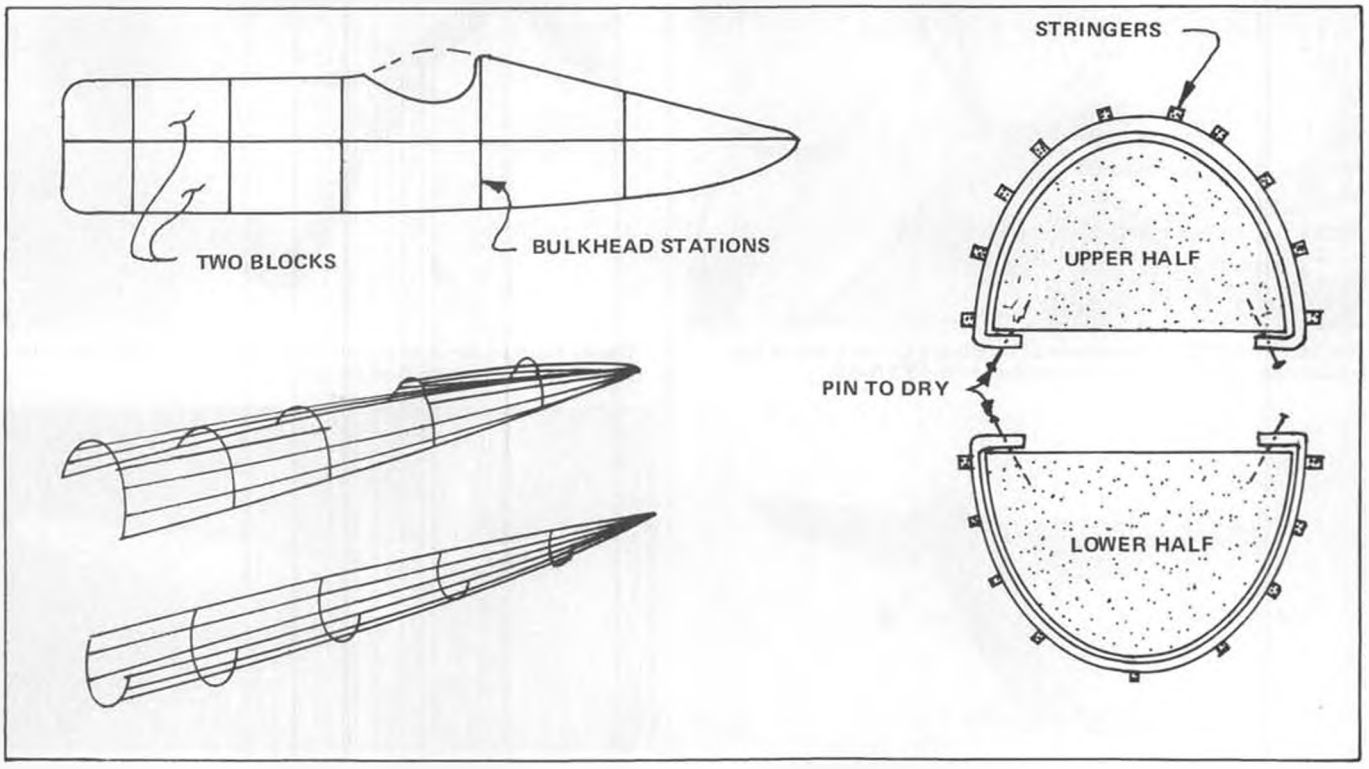
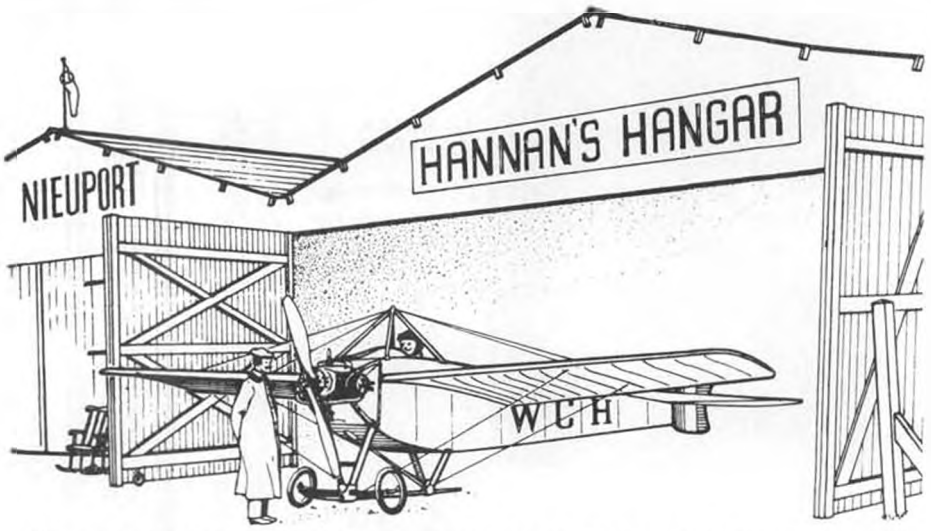




"If we are just playing with toys, how come it is so much hard work?"

MODEL AEROPLANING

Is the name of a book written during 1910 by V.E. Johnson, of England, and reprinted in revised form during 1922. We particularly enjoyed these passages: "What is the peculiar fascination about this pastime, which has weekly throughout even the winter brought hundreds to face the discomfort of a biting wind, a swampy or even half-flooded field, and very often, a long and wearisome journey to and from the flying ground, and to cap all perhaps a smashed machine at the very first attempt?

"It is not its comparative novelty . . . novelties do not last long nowadays . . . popularity in this sense too often being but the prelude to rapid decay and extinction. For any sport or pastime to become popular . . . or to speak more correctly perhaps, to become both popular and lasting . . . we believe the following somewhat paradoxical statement to be true . . . it must be both difficult and easy.

"Whether this be true generally or not, it is eminently true of the subject about which this paragraph is written. Machines of a certain type, popularly known as "rubber-driven flying sticks," being, comparatively speaking, quite easy to both make and fly, whilst others, such as self-launching engine-driven models, ie., models rising from the ground under their own power without any initial push, especially if they are of the tractor or propeller-in-front type, present difficulties of construction, launching, balancing, etc., which tax the skill of the most expert. But probably the factor which has contributed most to its success is the 'wonder of it', even in this age of wonders.

"It is wonderful, if you come to think of it, for you must remember that from the moment when the model is launched or launches itself into the air, it is . . . unlike its full-sized prototype . . . all on its own. Not only has the model to support itself on a medium seven hundred and seventy-three times lighter than water, keeping a sense of direction in both a horizontal and vertical plane at the same time, but it must also keep its balance and fight the varying puffs, side gusts, upward and downward trends, met with during the flight, and it must do this absolutely off its own bat. Finally, having successfully accomplished all this, not only in calm air or in a gentle breeze,

Continued on page 79

CHRIS CLEMENS PHOTO

Bob Haight illustrates his method of handling a CG problem on the rubber-powered speed model he entered at the '77 Nats.

Dennis Norman about to launch his catapult glider B-52. Note the great T-shirt! Photo by Russ Brown.

Beautiful rubber-powered Fokker Air Ambulance, constructed by Dave Stott, from Henry Struck plans. Photo by Dick Benjamin.

Sherman Gillespie constructed and photographed this classic Bleriot, from Ideal plans. Note the "motor stick", popular in early models.

PEANUT SCALE LEMBERGER LD-20b

By WALT MOONEY . . . Dick Baxter, one of the proxy fliers for our Parcel Post Proxy Peanut contest, designed, built, and flight tested this unusual biplane. Excellent model proportions and fine flier.

• The model in the photos is one of the best flying Peanuts I have seen in action. It will consistently fly around a minute indoors, and is stable and easy to trim out well. At the last Flightmasters scale meet, it had one flight of over five minutes. Of course, anything can do a long flight in a thermal, but only if it glides well, and Dick's LD 20b is a consistently good flyer outdoors as well as indoors. Several of the spectators at the contest suggested that it would make a good article, and I was pleased to volunteer to do the job.

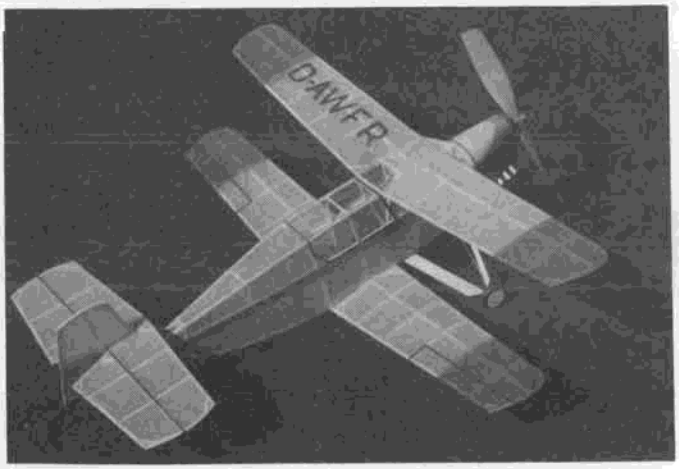
A three-view for this airplane can be found in the 1970 issue of "Janes" All the World's Aircraft, and some photos can be found in the 1973 issue. The LD 20b has equal span (23'-10-1/2") wings, with gap and positive stagger of a chord length. They are cantilevered, and the resultant lack of interplane struts and wires makes for less drag than is found in most biplanes, also, it is a simpler model to build. The LD 20b seats two people in tandem, and is powered with a 62 hp Walter Mikron, four-cylinder in-line engine, which results in a fairly long, (21'-10-1/2") airplane. The length makes for a stable model that is easy to balance and has a long base for the rubber motor.

There is nothing very difficult to construct on the model, so there is no need for a specific, "glue this to that," write up. There are some things worthy of note, however, and they will be discussed.

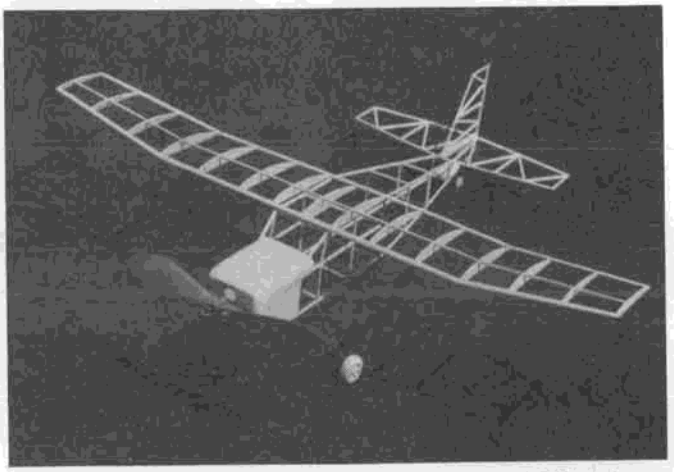
The gusseting method that Dick uses was new to me when I first saw it on his model (I notice that Mark Drela used the same system on his "Rivets" model in the Nov. '77 issue of **MB**). Regardless of the fact that nobody likes a copycat, I too am going to make my gussets this way from now on. Such gussets are easier to fit and lighter in weight than the triangular ones I have used before, and do just as good a job.

Use the lightest wire you can get for the landing gear. The amount of

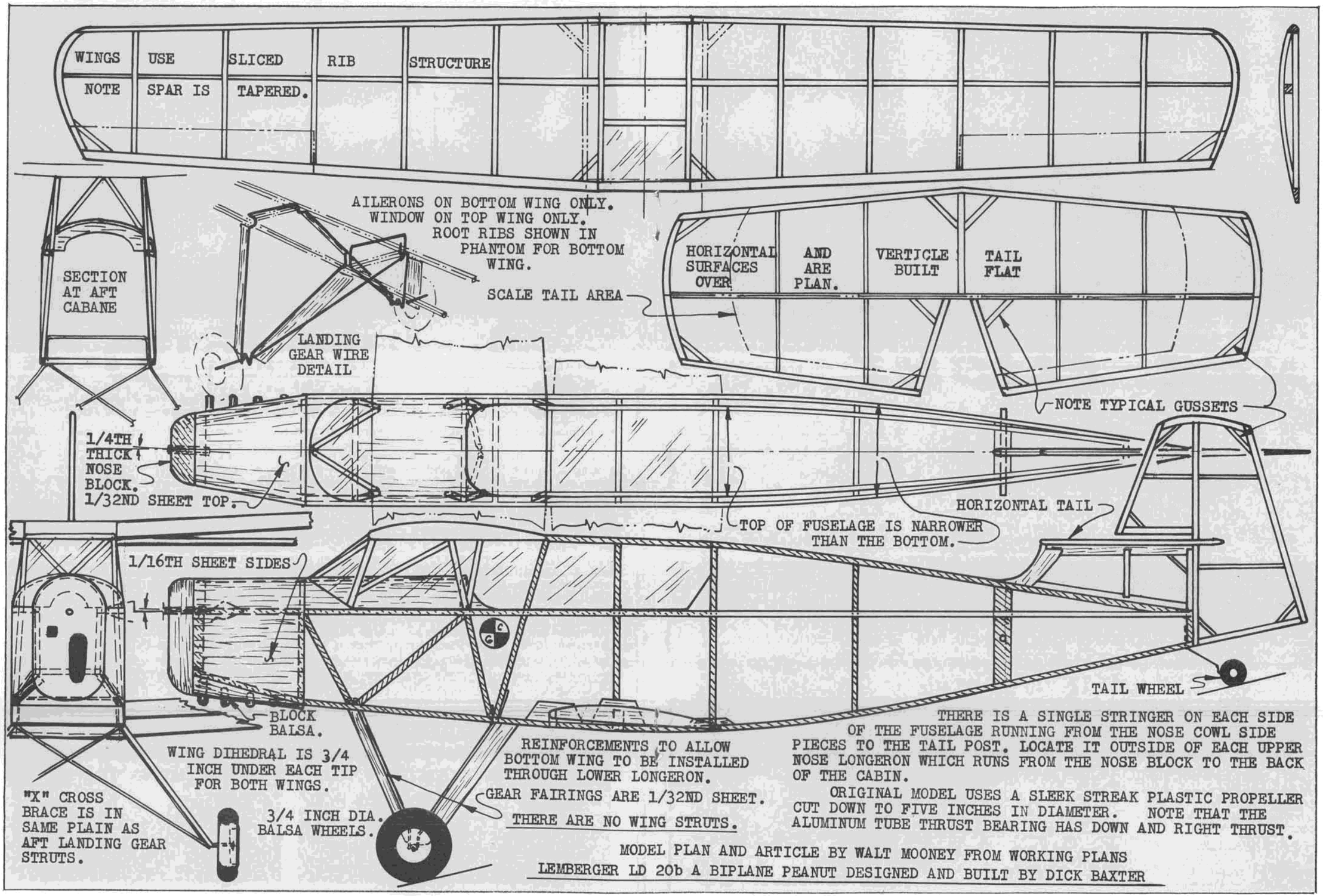
Continued on page 92

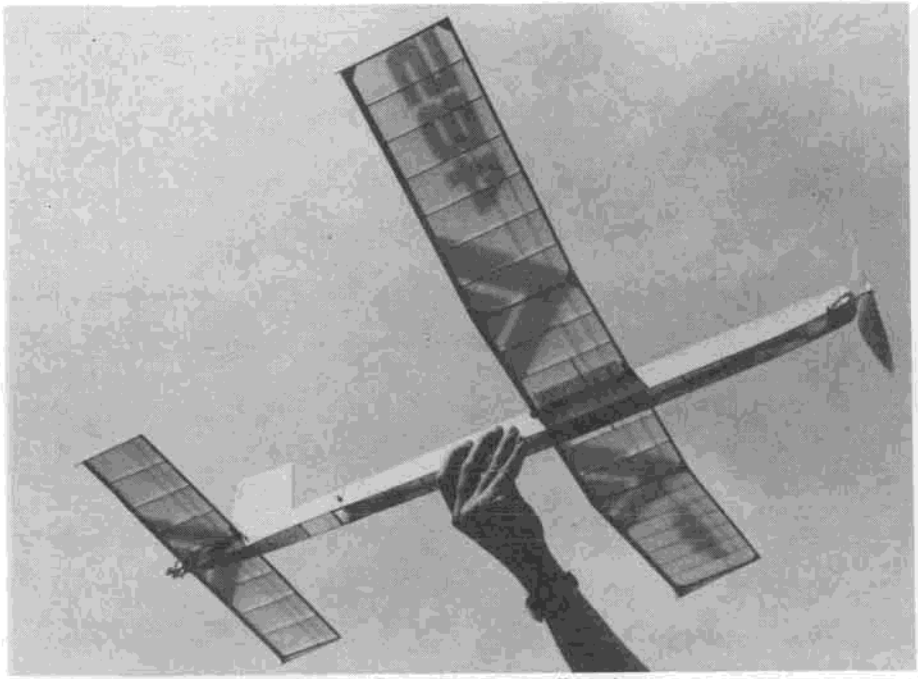


Can you think of another full-scale biplane without cabane or interplane struts? Even though legitimate, it still looks awkward.

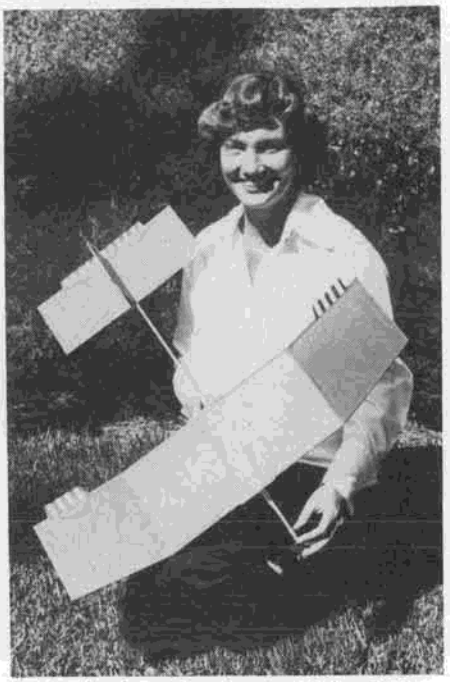


Next Mooney Peanut will be this Found "Centennial 100". It has been averaging 55 to 60 seconds.


WINGS USE SLICED RIB STRUCTURE
NOTE SPAR IS TAPERED.
AILERONS ON BOTTOM WING ONLY.
WINDOW ON TOP WING ONLY.
ROOT RIBS SHOWN IN PHANTOM FOR BOTTOM WING.
SECTION AT AFT CABANE
SCALE TAIL AREA
HORIZONTAL SURFACES OVER AND ARE PLAN. VERTICLE BUILT TAIL FLAT
LANDING GEAR WIRE DETAIL
NOTE TYPICAL GUSSETS
1/4TH THICK NOSE BLOCK.
1/32ND SHEET TOP.
HORIZONTAL TAIL
TOP OF FUSELAGE IS NARROWER THAN THE BOTTOM.
1/16TH SHEET SIDES
TAIL WHEEL
BLOCK BALSA.
WING DIHEDRAL IS 3/4 INCH UNDER EACH TIP FOR BOTH WINGS.
"X" CROSS BRACE IS IN SAME PLAIN AS AFT LANDING GEAR STRUTS.
3/4 INCH DIA. BALSA WHEELS.
REINFORCEMENTS TO ALLOW BOTTOM WING TO BE INSTALLED THROUGH LOWER LONGERON.
GEAR FAIRINGS ARE 1/32ND SHEET.
THERE ARE NO WING STRUTS.
THERE IS A SINGLE STRINGER ON EACH SIDE OF THE FUSELAGE RUNNING FROM THE NOSE COWL SIDE PIECES TO THE TAIL POST. LOCATE IT OUTSIDE OF EACH UPPER NOSE LONGERON WHICH RUNS FROM THE NOSE BLOCK TO THE BACK OF THE CABIN.
ORIGINAL MODEL USES A SLEEK STREAK PLASTIC PROPELLER CUT DOWN TO FIVE INCHES IN DIAMETER. NOTE THAT THE ALUMINUM TUBE THRUST BEARING HAS DOWN AND RIGHT THRUST.
MODEL PLAN AND ARTICLE BY WALT MOONEY FROM WORKING PLANS
LEMBERGER LD 20b A BIPLANE PEANUT DESIGNED AND BUILT BY DICK BAXTER



"Square Eagle" built from P-30 kit by Dave "The Traveler" Lindstrum.



Jim Lueken's mother, Janet, with her P-30 version of the Peck R.O.G. Neat idea.

FREE FLIGHT

By BOB STALICK

• This is the time to ponder the winter with an eye to what to build for the next contest season, and for many of us, it is also the time to ponder for next weekend's indoor meet. I have been reading in the newsletters and magazines about the numbers of contests being held throughout the country, and the problems this cause for the sponsoring clubs, because of declining attendance. It's also a problem for the competitor, since he has to put his priorities in order. Most of us cannot attend a contest every week, so we must choose those we would like to attend. In the Northwest, where there are really only four active free flight clubs, the number of meets is usually reasonable, and the number of meets held any given month is usually such that most of us can get to them. However, in the more active parts of the country, especially So Cal, the competitor must choose from as many as 4 or 5 meets a month. In the end, contests are competing for competitors. That's kind of like double jeopardy, I guess. It sounds as though the organizers are putting their heads together to work out some solutions to the problem. Good luck, I'm interested in finding out how it works this year.

DARNED GOOD AIRFOIL. . .
Niestoj

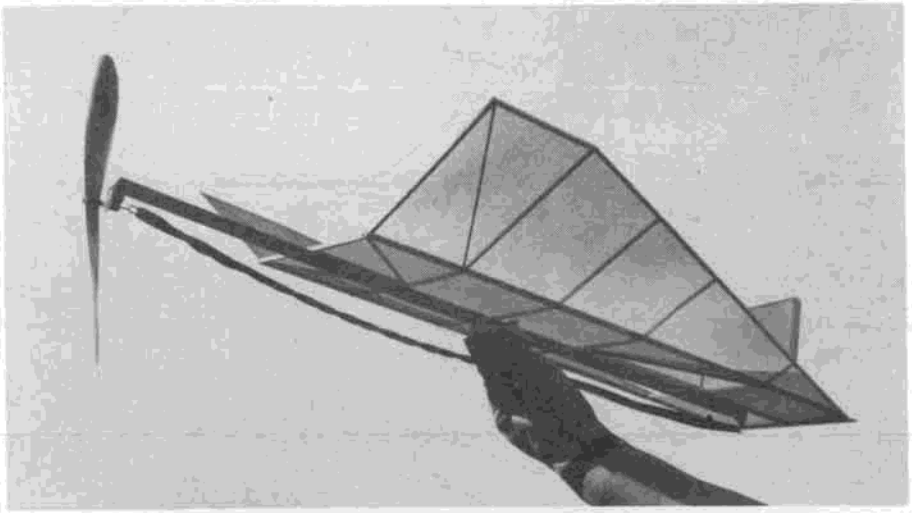
Two months ago, I began this three-part series on Wakefield sections. This is one of the three suggested at the Scandanavian Wakefield Symposium as a good one for the high-performance Wakefield. The very sharp leading edge allegedly contributes to increased lift without the need for artificial turbulation. To me, it looks like a good airfoil.

FEBRUARY MYSTERY MODEL

This is one that I keep running across whenever I go looking through the back issues in my magazine collection. I am taken by it because it is a competition cabin model, designed and flown during a time when such ships were just not seen around the contest circuit. The graceful lines might be a giveaway to the identity of the co-designers, but so be it. Powered by a .19 to a .35, it was built to use the power of the then-popular K&B Greenhead series. A span of 74 inches and 933 sq. in. area kept it in the air. Nice ship! Whatisit? Write your best guess to **MB's** editor.

FEBRUARY 3-VIEW. . .
Hines Sweepette Mk. III

There is no need to spend much time tracing the history of the Sweepette HLG series. The design is a continuing classic. There is seldom a contest held anywhere where Sweepettes do not place high in the final standings. There must be a reason. And there is. It is a very forgiving and competitive design. The Sweepette 16 is no exception. Tom Hutchinson wrote the following about his experiences with this de-



"Stringless Mutant", a 30 inch long P-30 by Linstrum, based on Hannan-designed, Peck-Polymers kitted "Stringless Wonder". The big motorstick models are coming back!

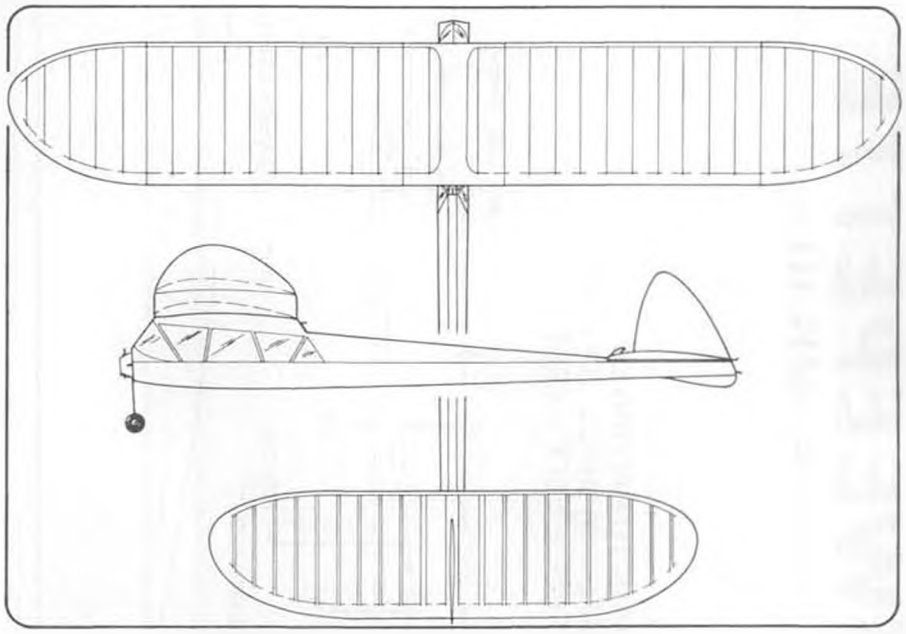
sign, when he was attempting to set a new site record at the South Albany High School site:

"I had a whole lot of fun last winter flying indoor HL at South Albany High School. It was the first chance I'd ever had to fly more than once at the same indoor site, and I was able to improve my times with each flying session. So I thought I'd share my experiences in the hope of creating more interest for the coming season.

"For the first flying session, I made two different size gliders, since I had no idea of the ceiling heights. I made a Sweepette 18 that weighed about 14 grams and a Sweepette 16 that weighed about 10 grams. The larger model was too big and heavy, but the 16 looked promising, even though I kept hitting the ceiling with it. Best flight was an unofficial 29 seconds.

"I showed up at the next session with a new 18 using a 1/16 wing with about a 1/4 inch of undercamber at the root. It didn't fly too well, so I went back to my original 16, which used a 1/8 sheet wing with a flat bottomed airfoil. I still had trouble hitting the ceiling, so I tried a Bill Gieskieng 'kicker'. This was a piece of 1/16 x 1/8 balsa glued edgewise on the bottom of the wing at the T.E. When I tried gliding the modified model, I got a huge stall, but adding more clay to the nose took this out. The kicker worked beyond my wildest expectations! It added enough drag during launch to keep from hitting the ceiling and didn't hurt the glide. This combination broke the site record that day with 31 seconds.

"Before the next session, I wrote to Lee Hines for advice, and he responded with drawings and hints galore. I put some wash-in on the left wing of the 18 model (weight 8 grams) and tried a left/left pattern. I eventually broke the site record again, with a 32.8 second flight, but the model was only getting about 25 feet high. It had a great glide, but I just couldn't throw it high enough.

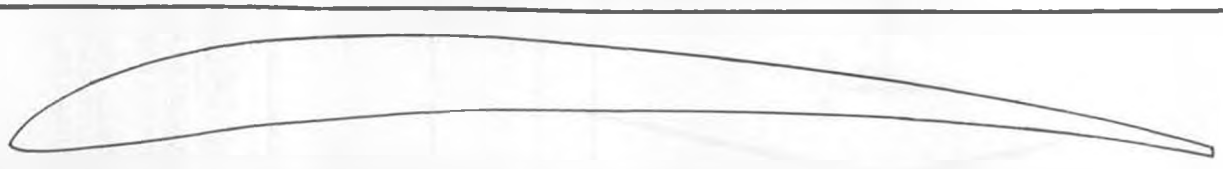


FEBRUARY MYSTERY MODEL

"... AND THEN ON MY THIRD FLIGHT ..."

Jon DeFries set new Class A Cat. I AMA mark of 52:12 with his Rossi .15 powered 450 Satellite with aft rudder. N. Highlands, Calif.

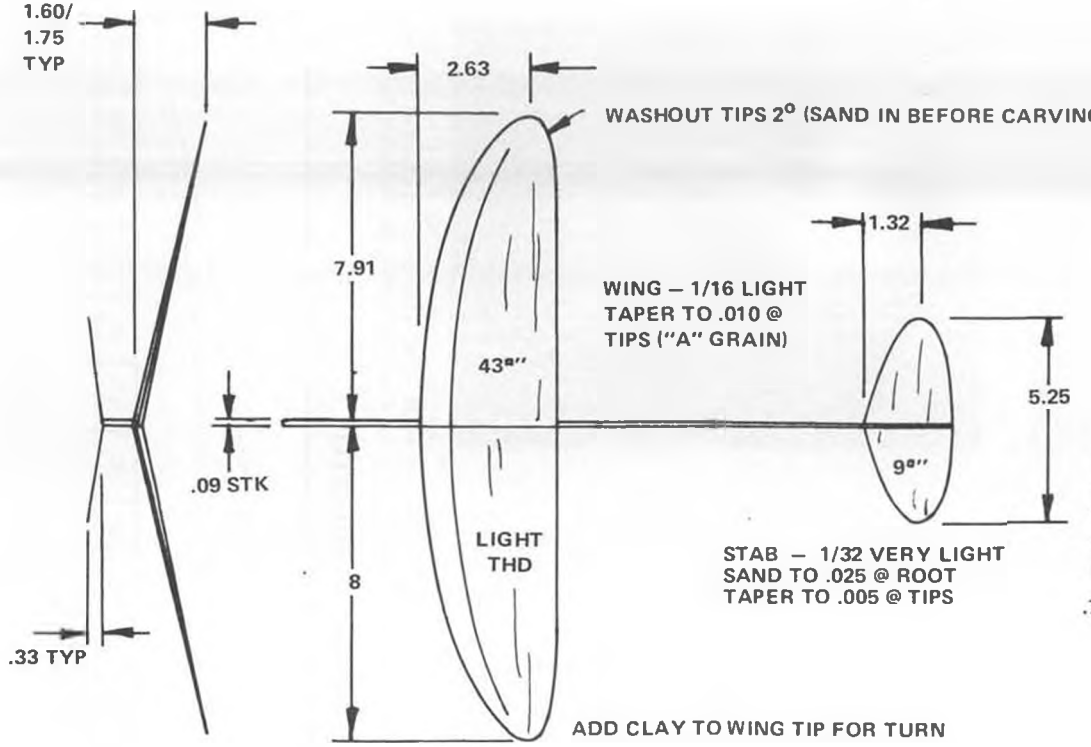
DARNED GOOD AIRFOIL – NIESTOJ

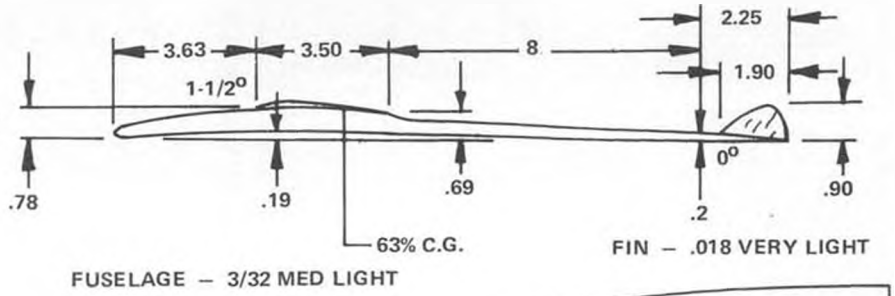


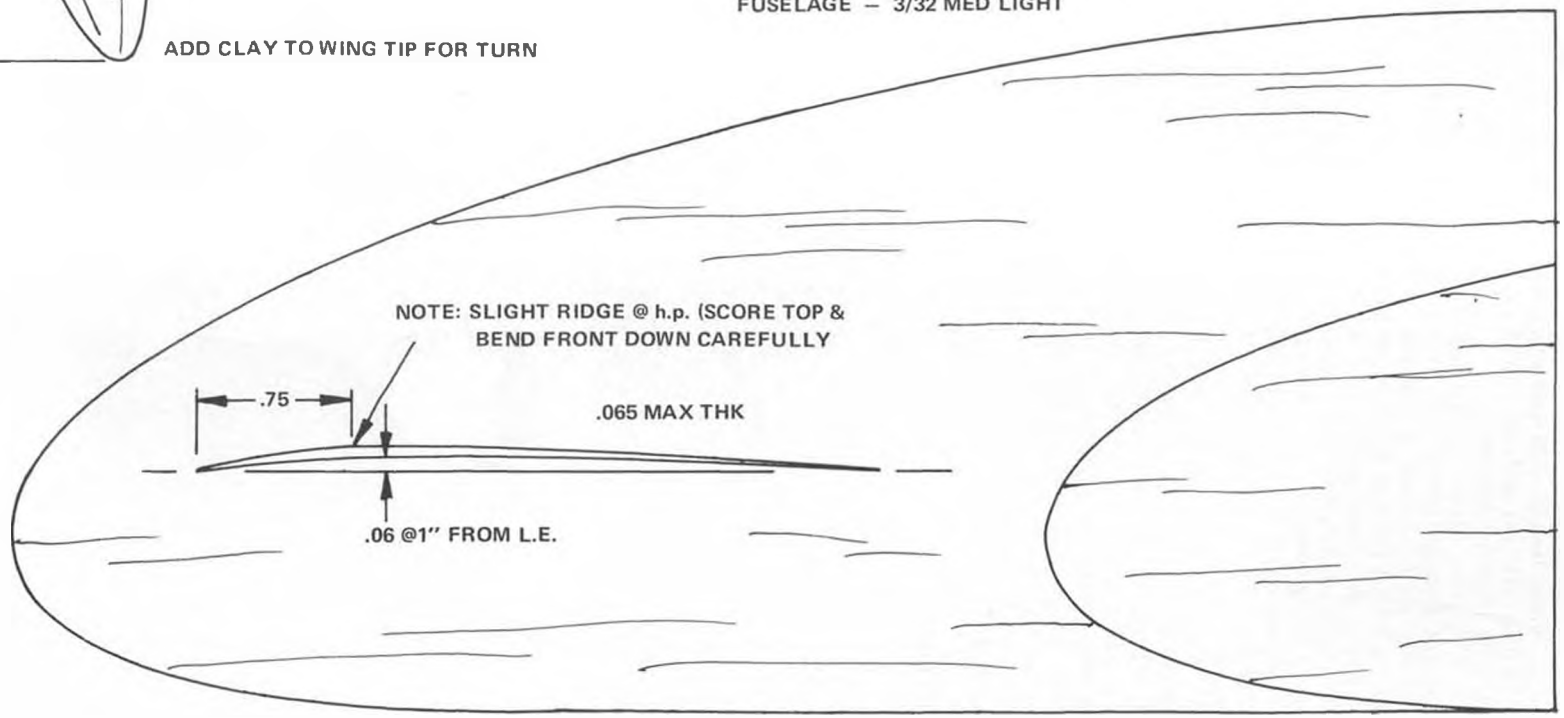
STATION	0	1.25	2.5	5	10	15	20	30	40	50	60	70	80	90	100
UPPER	0.6	2.2	3.2	4.76	6.86	8.18	8.86	9.63	9.38	8.86	7.95	6.6	5.2	3.3	0.7
LOWER	0.6	0.2	0	0.67	0.9	1.47	2	2.83	3.43	3.8	3.8	3.47	2.67	1.5	0

SWEEPETTE
16 MK III

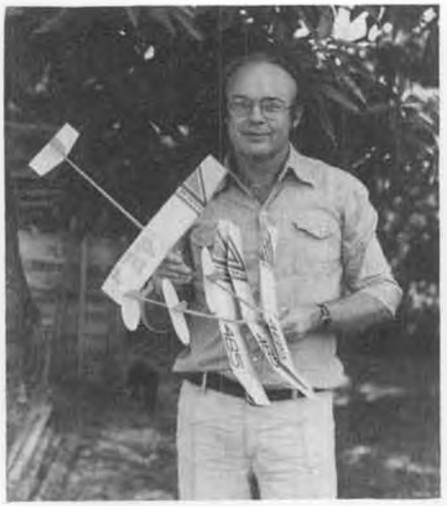
BY LEE R. HINES (16 JAN 62)
INDOOR GLIDER FOR 30 FT
WT: 4 GRAMS
BEST TIME: 38 SEC (12 JAN 62)
FLOWN TO RECORD OF
37 SEC @ WILHALL , 12 JAN 62
PATTERN: LEFT – LEFT



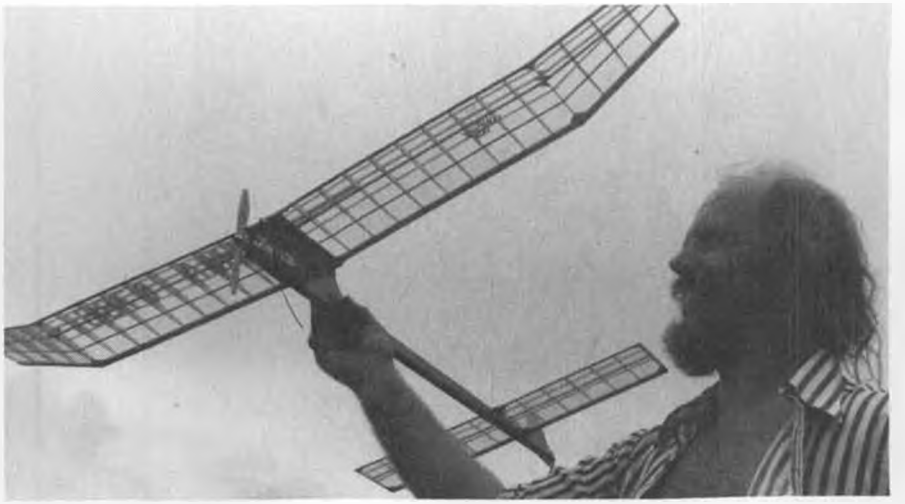




NOTES:
NO FINISH; JUST SAND SMOOTH.
DECREASE UNDERCAMBER NEAR TIPS UNTIL ALMOST FLAT.
NOTE WING OFFSET FOR LEFT TURN.
MODEL WAS BUILD JUST SLIGHTLY HEAVY FOR CLG THEN SANDED IN VARIOUS AREAS AS SEEN FIT.



Dave Whatsistrum and a clutch of OHLG. M&P "Grasshopper", Geraghty "Driftwood".



Al McAdam, Miami, and his "Country Boy" from Jim Clem kit. All Florida photos taken by Dave "VTO" Lindstrum.

It also seemed to have too wide a glide circle for the site. By now, I knew the record could be pushed to at least 35 seconds with the right glider.

"I built two more gliders before the last session of the season. The 16 inch model seemed to turn in tighter circles more easily, so I built one as shown on the 3-view. I wanted to keep weight down to avoid the ceiling, so I used thinner wood, with a little undercamber. I also built an 18 inch version with 1/16 wings, but only 1/8 undercamber.

"The bigger model again proved to have a very good glide, but too large a circle for the site. The next 16 inch model proved to be the best combination, but I had a whole bunch of troubles at first, keeping it out of the seats. It looked like I might never reach 35 seconds . . . one flight hit the bleachers at 33 seconds about 6 ft. above the floor. But I finally managed a pullout at good height for a 35.5 official. (An unofficial flight later made 36 seconds.)

"The problem with flying HLG at South Albany is that you can't take advantage of the 42 ft. ceiling height. The beams at the top are about 4 to 5 feet thick, and spaced narrower than most glider glide circles. So the choice is to pull out close to the bottom of the beams. The glider in the 3-view is still a bit too heavy, since a hard throw will take it into the beams. Changes for this season will include lighter weight (about 4 grams) and perhaps a shorter tail moment to permit tighter circling. But the model, as shown, is a good starting point for anybody who wants to try indoor HLG this season. The reason I flew only HLG last year was that it was the quickest for me to get into the air . . . I didn't have to order rubber, condenser paper, make prop or jigs, buy a torque meter, etc. Try this if you want to build a model the night before the contest. It's fun!"

INDOOR POSTAL METER FOR JUNIORS

For years, Ed Whitten, of New York, was the sole outspoken force behind the postal meet effort for the NFFS. Recently, Ed took on the responsibility for the Junior program in the AMA. It comes as no surprise that Ed is now promoting a postal meet for Juniors (up to age 16) during the months of January and February.

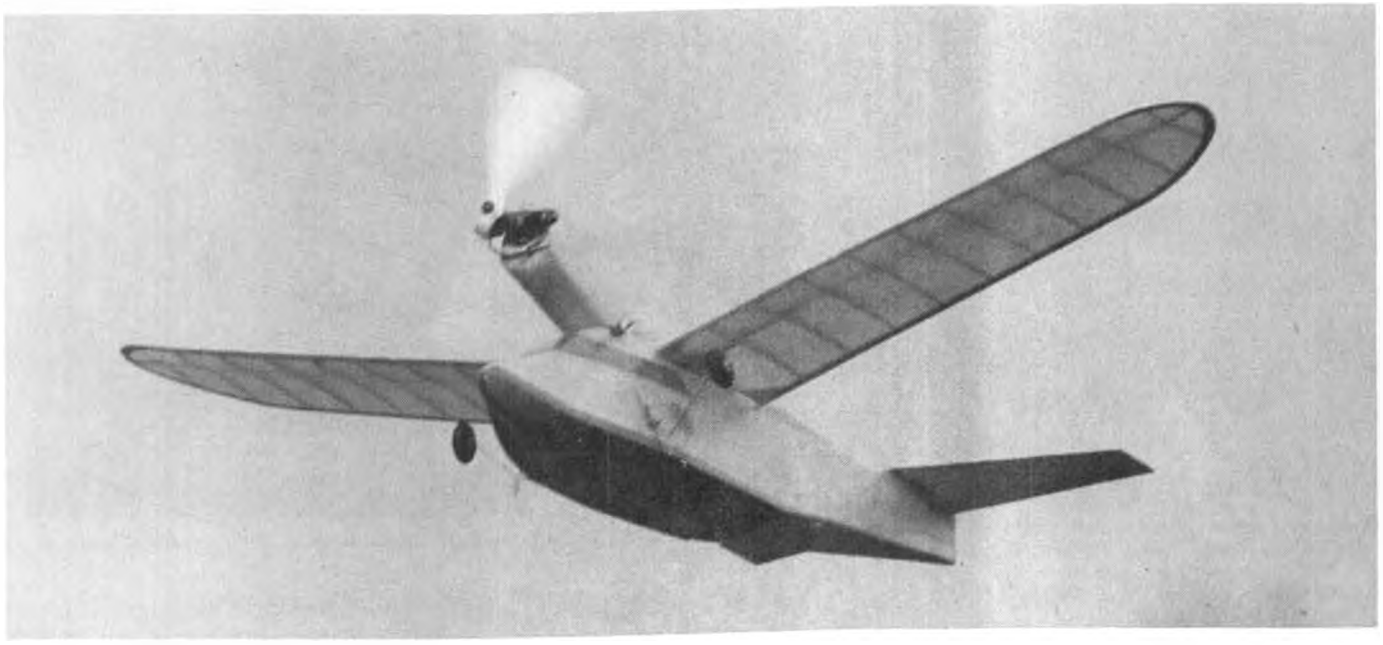
The "Ceiling Hopper" indoor postal meet is open to all youngsters everywhere, as long as they are 16 years of age or younger. AMA membership is not required. No entry fee.

Flying must take place anytime during January or February, 1978, in a site that has a ceiling no higher than 50 feet.

Flights must be supervised by an adult who will time all flights. Signature on the time sheet submitted by

Continued on page 90

"GO BEARS!"



CO_2 DUCKLING

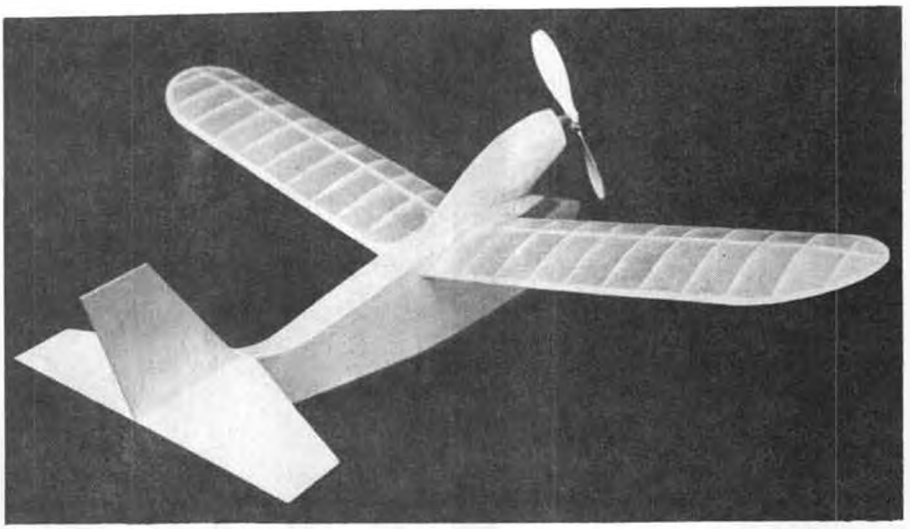
By JOHN WALKER . . . This little amphibian may be flown over water or land, and with CO_2 or rubber power. Some of you old timers may remember a Louis Garami design of similar appearance.

• Our neighbors recently repaired and improved their pond. It would have been a shame to let it go to waste, so the DUCKLING was designed and built. Since there were a number of "tame" geese using the pond, we hedged on our model and made it an amphibian. This means it can operate off of land or water.

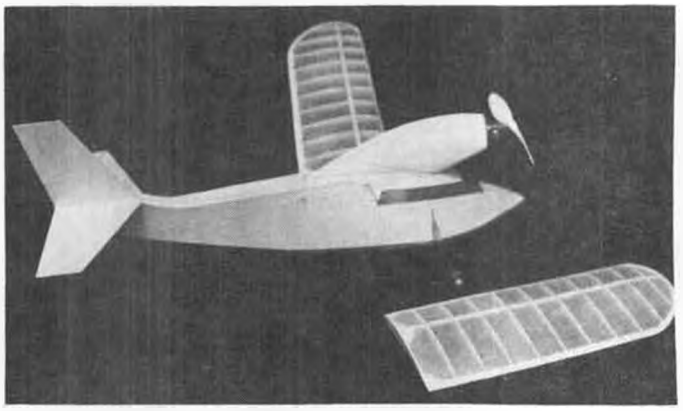
The model is also at home in the air. The Brown Twin CO_2 engine with two fuel storage units provides ample power for slow graceful flight. We had excellent flight results, even though the temperature was in the low 20's. That's cold for CO_2 power.

If the Brown Twin is too rich for you, the plans show how to fit the model with rubber power.

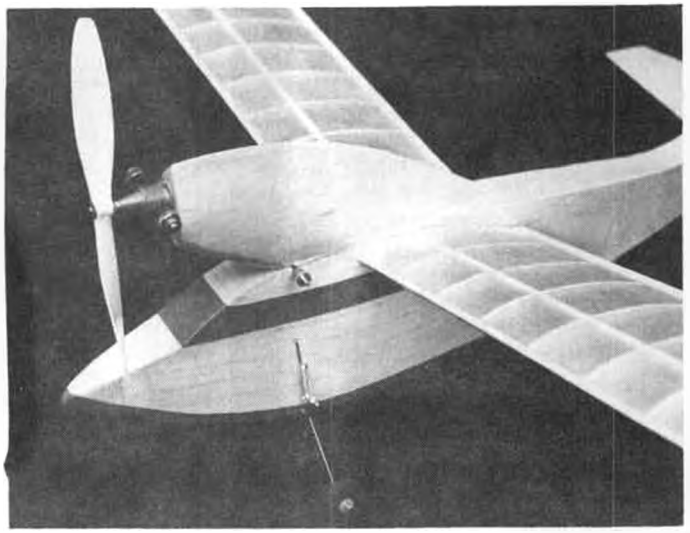
Continued on page 93

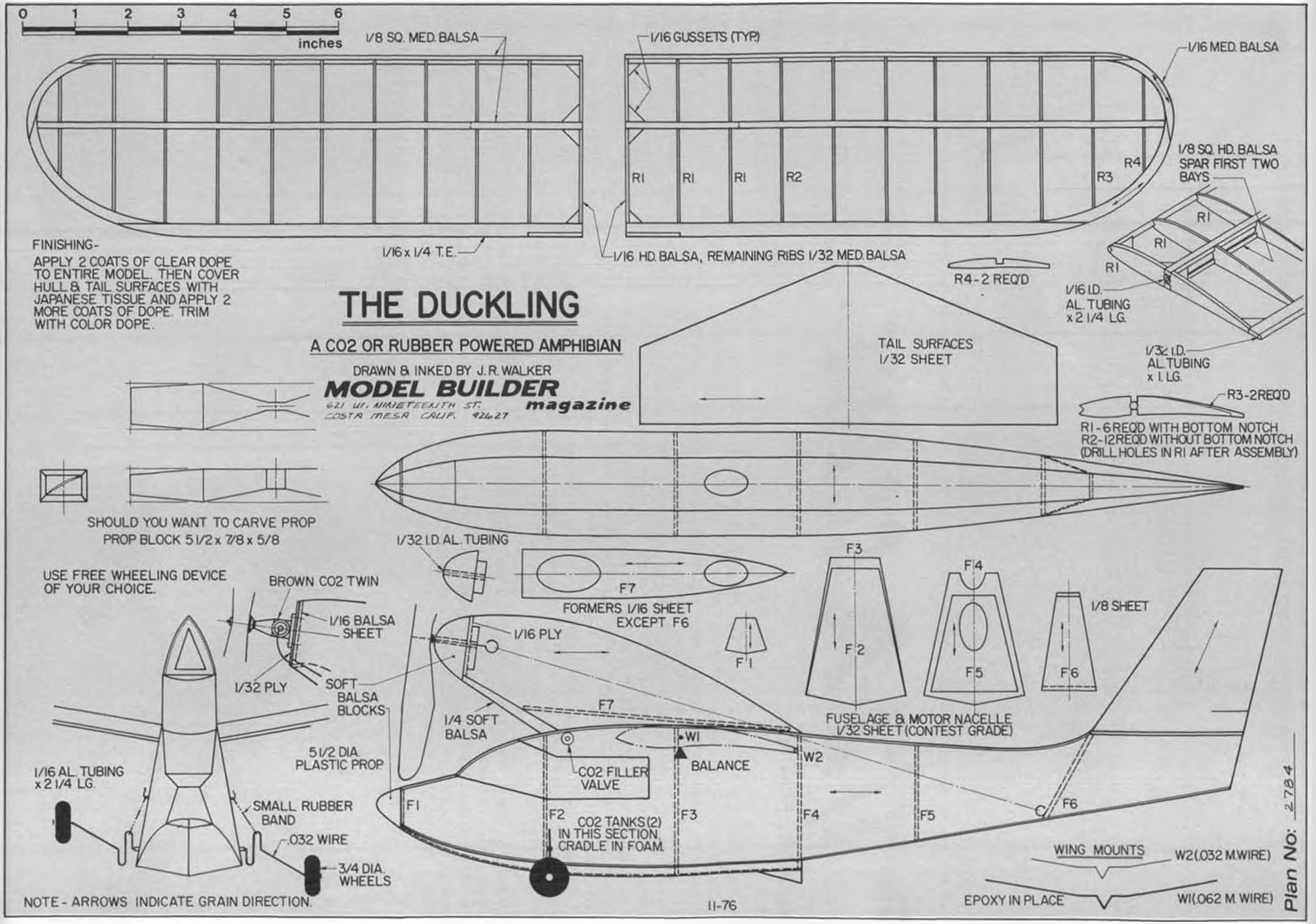


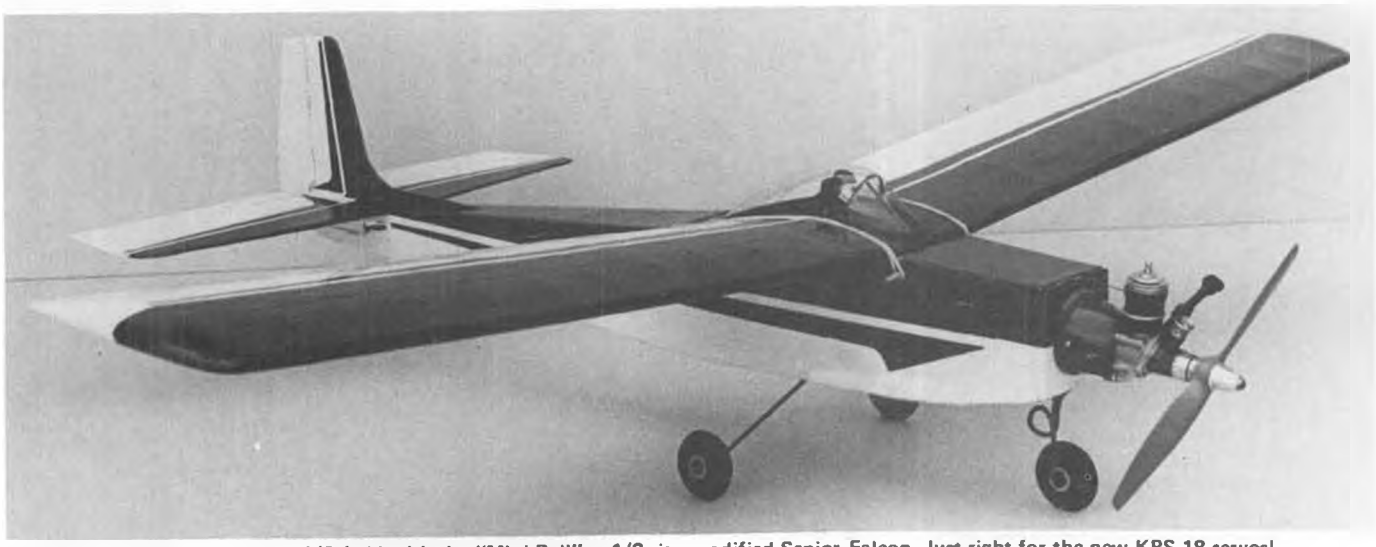
Very reminiscent of a 1930's Garami design, this cute little flying boat can go on rubber or CO_2 power. All photos by the author.



Using the Brown twin-cylinder CO_2 engine and two fuel storage units, the Duckling makes slow, graceful flights. Plans show alternate rubber power set-up. Landing gear may be manually retracted or lowered, for sea or land operation.




0 1 2 3 4 5 6
inches
1/8 SQ. MED. BALSA
1/16 GUSSETS (TYP.)
1/16 MED. BALSA
R1 R1 R1 R2 R3 R4
1/8 SQ. HD. BALSA SPAR FIRST TWO BAYS
R1
R1
R1
1/16 I.D. AL. TUBING x 2 1/4 LG.
1/32 I.D. AL. TUBING x 1 LG.
1/16 x 1/4 T.E.
1/16 HD. BALSA, REMAINING RIBS 1/32 MED. BALSA
R4 - 2 REQ'D
FINISHING-
APPLY 2 COATS OF CLEAR DOPE TO ENTIRE MODEL. THEN COVER HULL & TAIL SURFACES WITH JAPANESE TISSUE AND APPLY 2 MORE COATS OF DOPE. TRIM WITH COLOR DOPE.
THE DUCKLING
A CO2 OR RUBBER POWERED AMPHIBIAN
DRAWN & INKED BY J.R. WALKER
MODEL BUILDER magazine
621 W. NINETEENTH ST.
COSTA MESA CALIF. 92627
TAIL SURFACES 1/32 SHEET
R3 - 2 REQ'D
R1 - 6 REQ'D WITH BOTTOM NOTCH
R2 - 12 REQ'D WITHOUT BOTTOM NOTCH
(DRILL HOLES IN R1 AFTER ASSEMBLY)
SHOULD YOU WANT TO CARVE PROP
PROP BLOCK 5 1/2 x 7/8 x 5/8
1/32 I.D. AL. TUBING
F7
FORMERS 1/16 SHEET EXCEPT F6
F3
F4
F2
F5
F6
F1
1/8 SHEET
USE FREE WHEELING DEVICE OF YOUR CHOICE.
BROWN CO2 TWIN
1/16 BALSA SHEET
1/32 PLY
SOFT BALSA BLOCKS
1/16 PLY
1/4 SOFT BALSA
F7
FUSELAGE & MOTOR NACELLE 1/32 SHEET (CONTEST GRADE)
W1
W2
5 1/2 DIA. PLASTIC PROP
CO2 FILLER VALVE
BALANCE
1/16 AL. TUBING x 2 1/4 LG.
SMALL RUBBER BAND
.032 WIRE
3/4 DIA. WHEELS
F1
F2
CO2 TANKS (2) IN THIS SECTION. CRADLE IN FOAM.
F3
F4
F5
F6
WING MOUNTS
W2 (.032 M. WIRE)
EPOXY IN PLACE
W1 (.062 M. WIRE)
NOTE - ARROWS INDICATE GRAIN DIRECTION.
11-76
Plan No: 2784



Peck-Polymers has invaded the R/C field with the "Mini Bell", a 1/3 size modified Senior Falcon. Just right for the new KPS-18 servos!

The 1/2-A SCENE

By LARRY RENGER

• Help! John Boyd where are you? I've lost your address, and I have some requests from people who want to contact you about your Bipe Stunters. Seems that bipes have a lot of appeal (quite a surprise to our publisher, no doubt). Other 1/2A biplane fliers please send in photos of your creations, too.

I received an enthusiastic letter from Curtis Moss, 6242 Royal Oak Dr., Orlando, FL 32809. He states that there is a peculiar cycle which affects 1/2A flyers. There are few of us, so manufacturers are reluctant to tool up really specialized goodies. The lack of this super-special stuff limits 1/2A's appeal to the general model population. And around it goes! Demand is low so prices are high, which keeps demand low. I dunno, there is some truth in it as far as accessories are concerned, but the kit manufacturers are doing right by us.

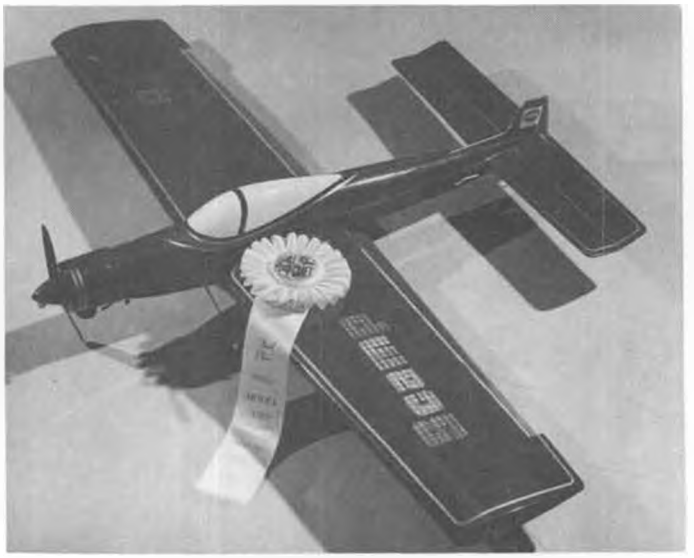
Curtis also suggests that it is hard for 1/2A fliers to find each other, so he is volunteering to compile a list of names and addresses. He says, "I feel that there are many modelers like myself, who are more or less loners, not by choice, but simply because I know of no 1/2A'ers in my area, nor addresses of those in other parts of the country. Anyone interested in contacting or corresponding with other 1/2A modelers of like interests should write to me at my home address. I will compile a list of interested people for a period of 60 days after publication of announcement. The list, with all pertinent information will be printed and mailed to all respondents.

Information on the list should include: Name, address, phone number, and special modeling interest, experience, etc."

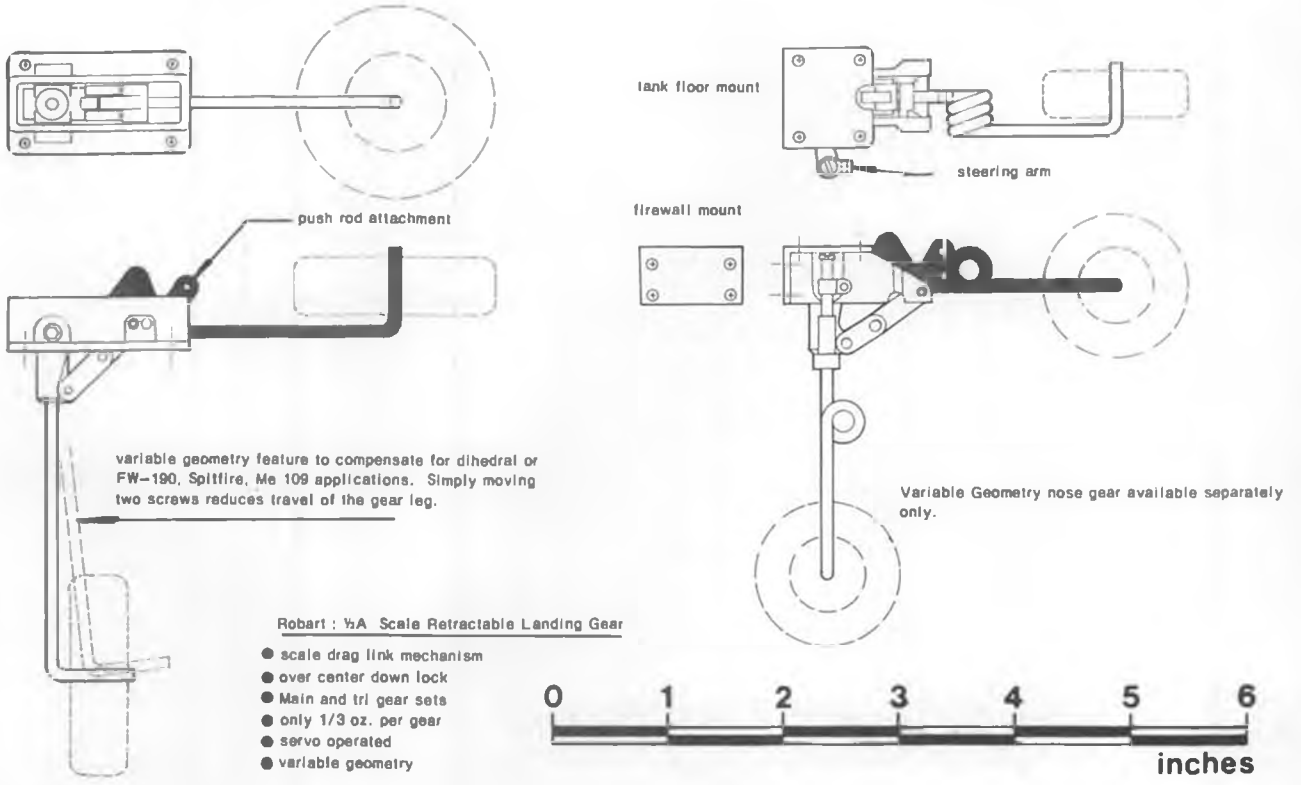
Well, it sounds like a super idea to me, Curtis, so here is the announcement. Those who write Curtis should make it easy on him and include a self-addressed stamped envelope. Might even be the start of a new National special interest group such as NIMAS, PAMPA, NFFS, etc. How about calling it the "Half-A Fliers Association"; that abbreviates to HAFA? Curtis tells me he is 42 years old, with a wife and four daughters, two of whom will imminently turn him into a grandpa!

Another letter this month is from Bob Aberle, R/C editor for Flying Models Magazine. I am including a

Bob Aberle has revised his Li'l Eaglet to use twin rudder set-up. He says this and the original inverted V-tail work about the same.



The author's Half-A stunter, which placed 3rd in that category at the 1977 MAC show. Note flaps, adjustable lead-out positioning.



Now available, this unit from Robart is beautifully made. Just the ticket for that scale or aerobatic ship.

photo of his Lil' Eaglet modification. He deleted the inverted "V" tail because it scared people away from the design. Both versions fly great, and he expects to publish this one too. He mentioned that his Tee Dee .010 is reliable, but suffers from marginal fuel draw when used with a remote tank.

Needle setting gets too sensitive on a bladder pressure system. Bob didn't mention if he had tried the crankshaft pressure tab. That should work okay. Bob is also experimenting with props other than the 3 x 1-1/4 that comes with the .010. Anyone else have some input on using this little gem of an engine?

BEGINNERS WORKSHOP

Wings. . . The heart of an airplane is surprisingly misunderstood by beginners. The most interesting thing about them is that a wing's upper surface is most important in generating lift. About 2/3 of the lift comes from reduced pressure on the top surface and only 1/3 of the lift comes from increased pressure on the lower surface. The reason is that the air tries to follow that smooth curve around the top and then accelerates downward to rejoin the air flowing along the bottom surface.

What this tells us, is that the smoothness of your airfoil is important to make the air follow the surface easily. Also, the top curve is most important, so we can use a symmetrical airfoil successfully when necessary. For example, in control line combat and stunt, you need an airfoil which works the same right-side up and upside-down, the fully symmetrical airfoil fills this kind of need.

The variables you can select in an airfoil are; actual form of curvature, the thickness, and the camber. Camber is a measure of the shape of the line which is halfway between the upper and lower surfaces of the airfoil. This is what makes the difference between a symmetrical, semi-symmetrical, flat-bottomed, or undercambered airfoil.

Symmetrical airfoils have already been mentioned. Semi-symmetrical airfoils lift a bit better than fully symmetrical, but only in one direction, the other way they are worse. Flat-bottom airfoils lift quite well, and are the easiest to build. Undercamber (hollow underside) airfoils give super-high lift, relatively high drag, and a lot of trim change as the speed of the model changes. You have to know what you are doing to use these airfoils, if you do your own model designs.

Russ Sandusky's Open Mouse Racer was 1st at '76 Nats. Customized TD .049, 50% nitro.

Wings lift in direct relation to the wing area, but the weight they can carry is a bit strange to figure out. The problem is that big models are usually flown faster than small ones, and don't need as much wing compared to the smaller model. The formula I use to compare performance of models is:

Weight = (constant) x (wing area) $^{1.5}$

The constant varies with the type of model as follows:

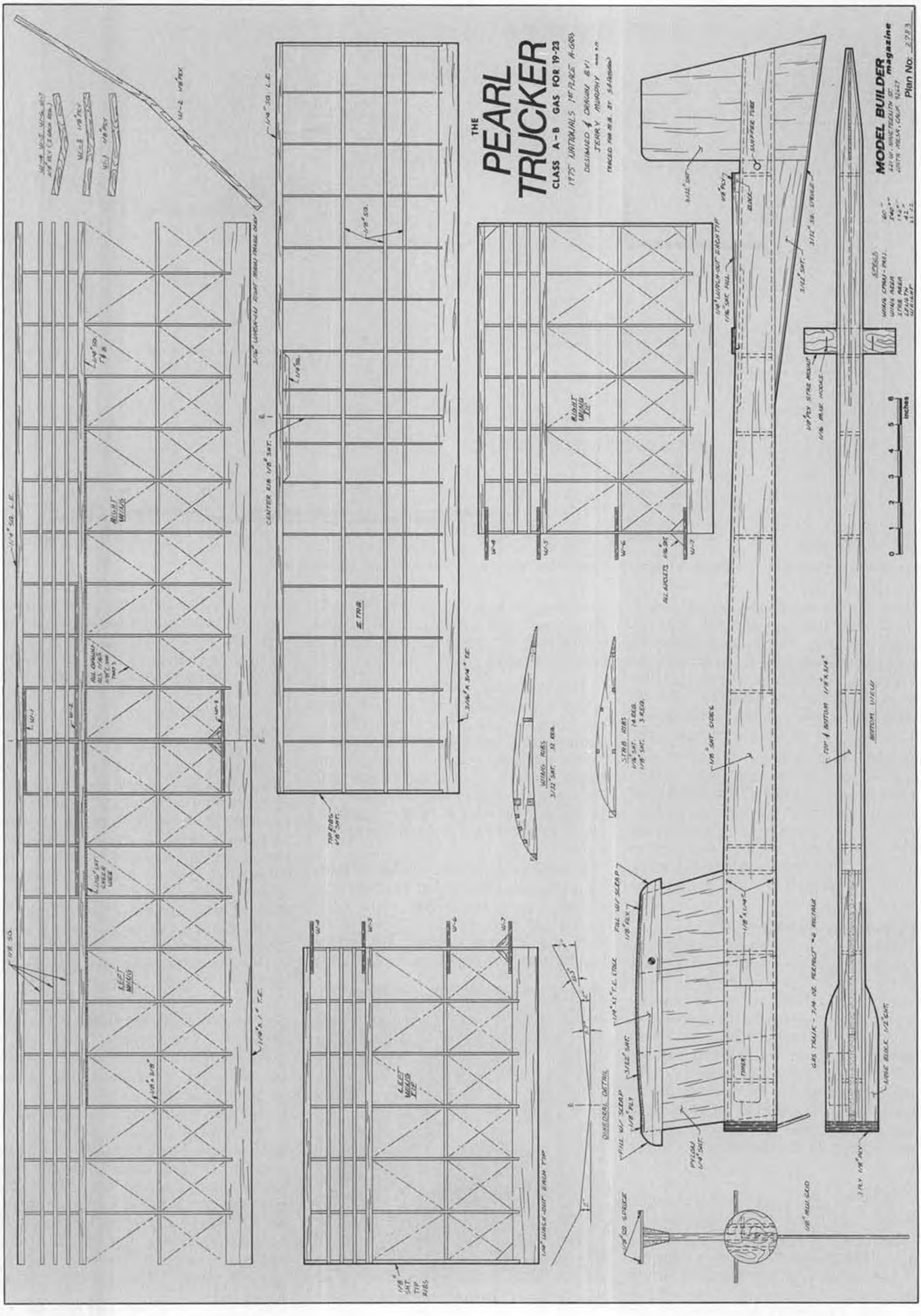
.001 to .002; Soaring and free-flight
.0025, U/C Combat
.0035, U/C Aerobatics
.005 to .007, R/C Aerobatics and sport
.008, R/C Scale

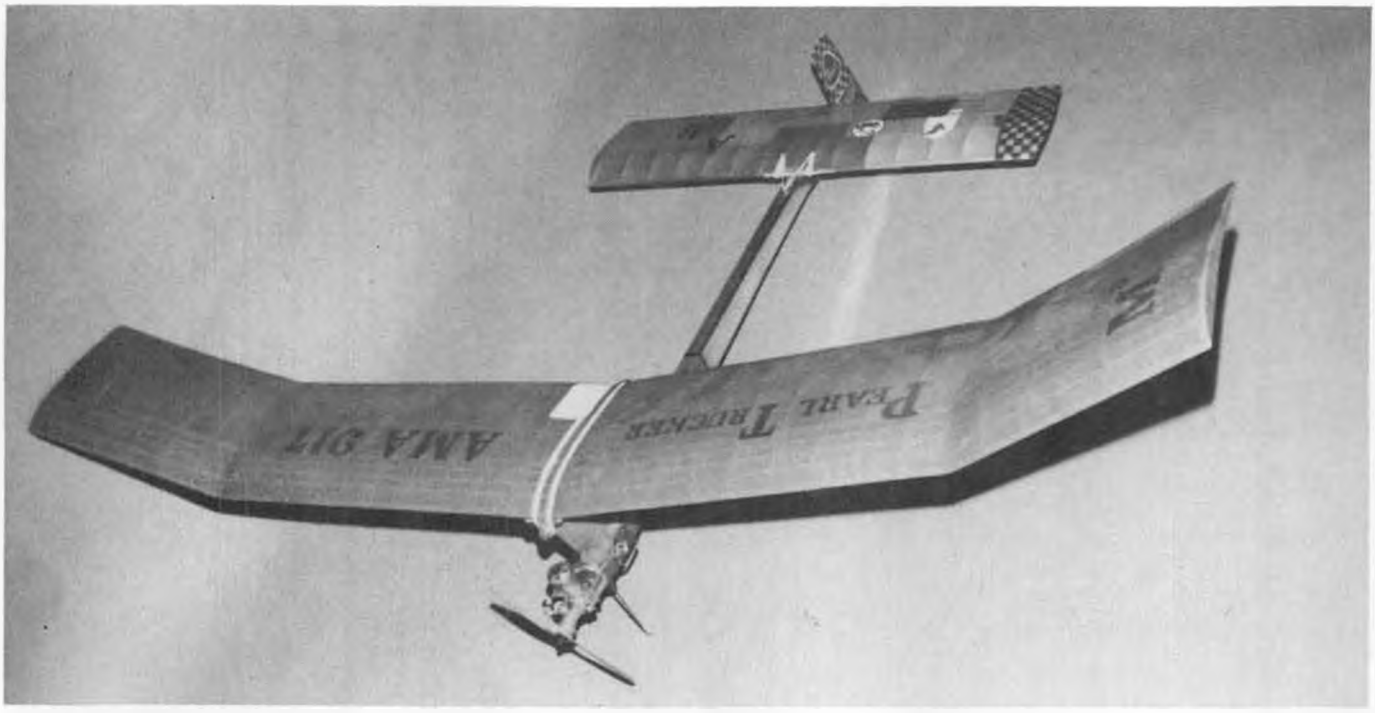
Take any really successful model you like, and you can calculate the precise constant for it:

(constant) = (weight) / (wing area)$^{1.5}$

Theoretical analysis shows that a small and a large model can not be made to fly precisely the same. The formula I use works for level flight and tight turns, but is not accurate for steep climbs. Volumes have been written on the subject, and the only thing you really need to know is that the lighter a model is, generally the better it will fly!

Continued on page 86


THE
PEARL
TRUCKER
CLASS A-B GAS FOR 19-23
175 UNTRIMMED
DESIGNED & DRAWN BY
JERRY MURPHY
MODEL BUILDER magazine
Plan No. 2283



The 'PEARL TRUCKER'

By JERRY MURPHY . . . A high-performance A/B gas model with an unusual design and performance history. Wanna win First Place at a Nats? Let someone else fly it for you! No auto surfaces necessary.

• The Pearl Trucker is a high-formance A/B gas model with a very unusual history.

The model was designed after I moved to Colorado Springs from Dallas, in 1972. I knew that internal combustion engines suffered a considerable power loss with increasing altitude, but mine flew like the prop was on backwards at our 6,000 plus altitude. And the thin mountain air had less drag, which was good, but it also produced less lift, resulting in a glide much like that of a lead brick. You should try HLG here. I could never get one so high back in Dallas, but I still can't beat 40 seconds in dead air. Well, this change in flying field altitude produced a need for a new gas model. In order to obtain the performance I desired, this new model must have a low power loading and low drag in the climb, coupled with a good glide.

In order to obtain the desired glide performance, a light wing loading of 5-1/2 ounces-per-square-foot or less was needed, so for a .19 to .23, that meant an all-up weight of approximately 23 ounces and 540 squares. In order to obtain low drag, an aspect ratio of 6.67 was chosen. To make it stable, a 36% stab worked out nicely. This works out to be a model that looks much like a cross between my good friend Bill Chenault's "Pearl" and Sal Taibi's "Starduster."

The parts of this design that are truly original are the moments and sections. The wing airfoil is an original 7% undercambered section that has a good mixture of high speed performance to help produce the desired climb, and a good glide.

The rather thick (9%) stab airfoil produces enough lift in the power phase to force the undercambered wing into its zero lift angle without the complexity of auto surfaces. Don't attempt to reduce the induced drag of this stab by thinning the section without going to auto surfaces.

How well did this all work, you ask? Well, the early trim flights here went very well, and the model won B Gas at Grand Junction and placed second in A Gas at the Rocky Mountain Championships. Its first attempt at sea level flying in 1974 was at the Lake Charles Nats, where it looked like a gas-powered ornithopter. The wing flutter was so bad that it continued even after the engine cut. So, back home in Colorado, the anti-flutter braces were added and the original silk covering was replaced by double tissue.

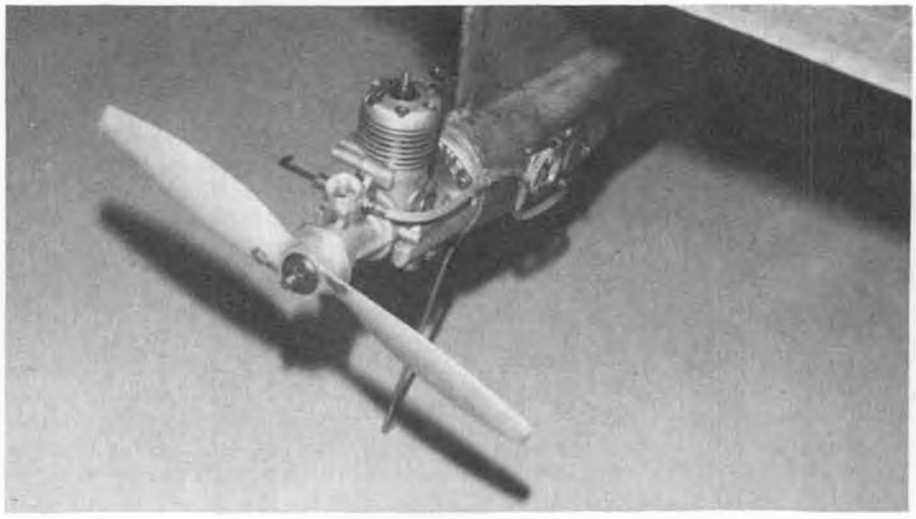
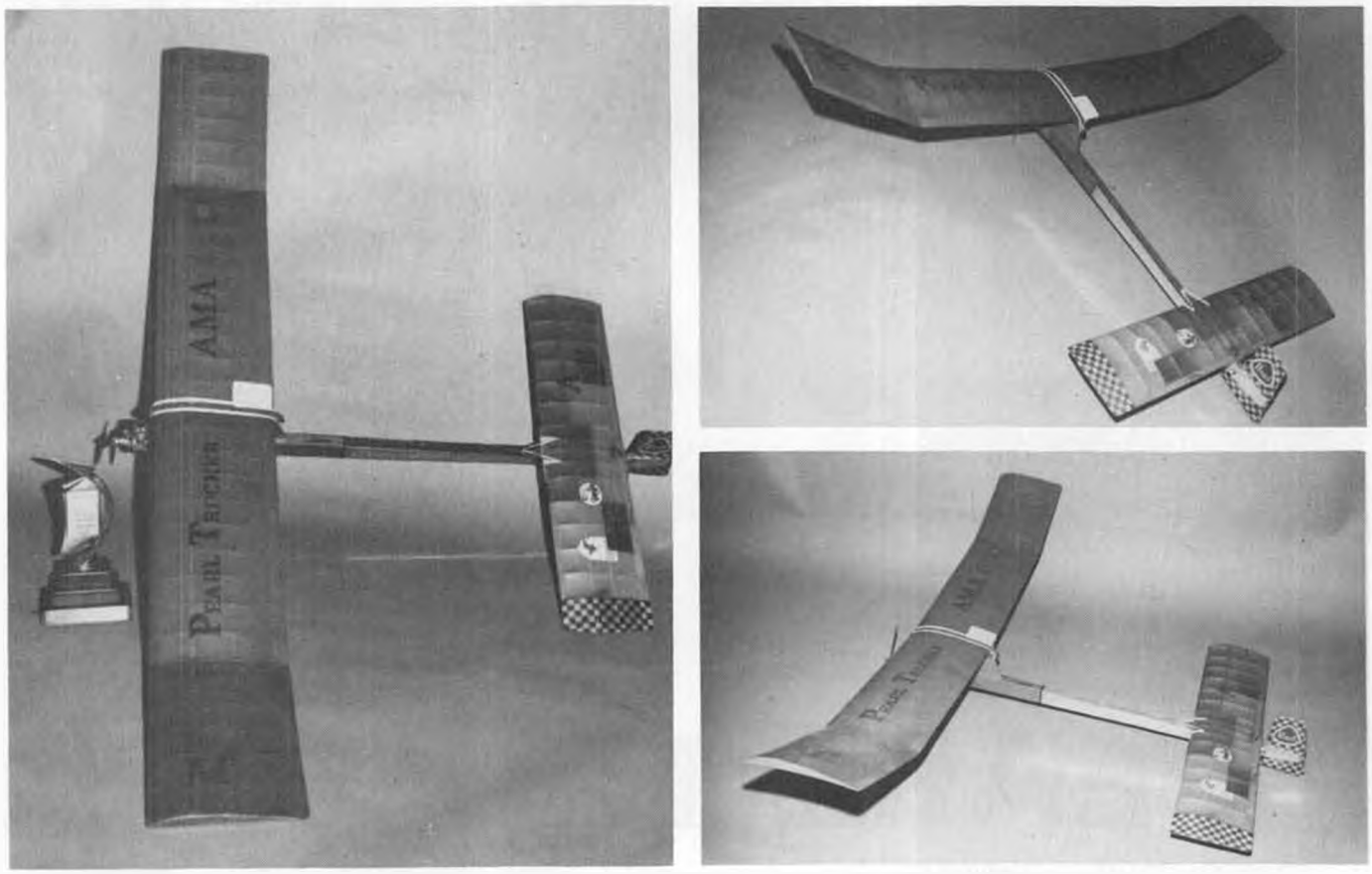


Photo of the "go" department on the PT. The Super Tigre G-21 .19 swings a Cox gray 8 x 4 prop using Casey Hornbeck's 15P Windx fuel. Engine spent 3-1/2 months in tree at '71 Nats.



Three different views of the "Pearl Trucker". It is a cross between Bill Chenault's "Pearl" series and Sal Taibi's "Starduster". Designed for flying at Denver's mile high altitude, it climbs like a rocket at normal levels. Thick stab (9%) eliminates need for auto-surfaces.

In 1975, it was back to Lake Charles, and now everything was fine on the test flights. But when A Gas day came, everything wasn't right with me. I was sick in bed, in the dorm, with the flu. Because our team, the Cliff Cloud Climbers, was in a very close race with the Dixie Whiz Kids, and my A Gas event was one of our declared events, my teammates asked to proxy fly the event. Homer Smith agreed after studying the rule book, and the rest is history. In the capable hands of Mike Fedor, assisted by Mike Ransom, Curt Sanford, and Joe Fedor, the Pearl Trucker won A Gas. All this while I was trying to die back in the dorm. The Dixie Whiz Kids went on to win the team championships.

A Super Tigre G-21 .19, swinging a Cox Gray 8 x 4, was used in Lake Charles. The fuel was Casey Hornbeck's 15P Windx. A K-Mart camera timer was used in a pinch-off mode. In order to get good engine stopping, a check-valve should be used in the pressure line.

The Super Tigre was lost in a fly-away at the 1971 Chicago Nats. In November of that year, I received a letter from a young man who found my model while walking his dog. After 3-1/2 months in the trees, the Super Tigre looked pretty sad, but with the help of WD-40, it cleaned up well enough to win the Nats.

Let's get on with the building of this model. I always like to start with the fuselage. The basic construction is very simple, if you have ever built a "Starduster." First, cut the pylon from 1/4 inch sheet and the fin from 3/32 sheet. The rear part of the fin goes through the fuselage. Draw the side on a good straight sheet of 1/8 sheet and cut it out. Using the bottom view as a guide, cut the notch for the fin in the 1/8 x 3/4 top and bottom parts. Note that the fin aft of the T.E. of the stab (with its grain shown vertical) is one piece. The sub-fin, which is under the stab, is a second part which is glued to the bottom of the fuselage. Now pin the right hand side down to the plans and install the 1/4 x 1/8 stringers under the pylon. After these are dry, install the pylon, fin, and 1/8 x 3/4 stringers.

After all that has had time to dry, add the left hand side. Now remove the fuselage from the plans and add the 1/8 plywood firewall. Be sure to drill the holes for the mounting bolts and install the blind nuts before the firewall is installed.

If you are going to use a metal tank, now is the time to install it in the right hand side of the fuselage. Cut the nose blocks from 1/2 inch thick balsa and tack them in place. Mark them for the firewall and gas tank. Then remove them for carving. Don't forget to leave a flat area for the timer. Add the 1/8 plywood landing skid mount and final 1/8 plywood firewall. Wrap the nose with fiberglass and give it a good coating of fiberglass resin.

I finished my Pearl Trucker with red tissue and NFFS Supply chrome mylar.

The stab is built directly over the plans, and no special instructions should be needed. My original used "Starduster" type tips, but I have switched to the simpler type shown on the plans. The stab is finished with tissue. I don't feel that the iron-on coverings should be used here, due to their weight. The stab on my original weighed in at 1.4 ounces, or 39.4 grams, for you metric types.

The most important part of a free flight model is the wing, so here we go on it. Lay out the L.E. and T.E. on the plans. Jack up the inboard or leading edge side of the T.E. stock with 1/16 sheet balsa scraps. Now install two ribs in each panel, and after they are dry (Hot Stuff makes this go real fast), slide in the bottom main spar and rear spar. Glue these in place and then add shims along their length to prevent any sag. Now add the ribs, spars, and plywood dihedral braces. After everything is dry, mount the tip panels to the main panels. Note the tip washout as called out on the plans. This will help your model fly in rough thermal air. Now add the center section dihedral. Once all of this is dry, add the 1/16 sheet shear webbing and 1/16 x 1/8 anti-flutter braces. One note about the

Continued on page 81

ANNOUNCING!

MODEL BUILDER magazine's

FOURTH ANNUAL INTERNATIONAL

Parcel Post Proxy Peanut RUBBER SCALE CONTEST!

Every peanut model, from near or far, will be proxy flown, indoors, by some of the U.S.A.'s best rubber scale flyers, including Walt Mooney, Bill Hannan, Clarence Mather, Bob Peck, Fernando Ramos, Bill Warner, and many others.

Local modelers will be allowed to enter, but their planes must also be proxy flown, and no verbal or physical help will be allowed from the owner . . . only written instructions to the proxy flier, as allowed for all entries.

SPECIAL ANNOUNCEMENT

Because of the limited time available to MODEL BUILDER's staff for the purpose of properly conducting and staying on top of a world-wide postal competition, we have obtained the capable services of Chuck Conover, a local modeler and Peanut specialist, who will manage the 1978 contest. The result will be prompt processing of entries, score sheets, tabulation, prize awarding, and model return. We apologize for past delays and confusion, and assure you that it will not happen again!

Open to modelers from all parts of the world... any nationality... any age... any sex... come one, come all!

AWARDS to include TROPHIES and MERCHANDISE . . . ALSO, a KRAFT RADIO SYSTEM to the

GRAND PEANUT of 1978!

(HIGHEST OVERALL COMBINED STATIC AND FLIGHT SCORE)

Other prizes include such items as; Peanut Scale kits and materials, Astro Flight and VL Products electric motors, Brown Jr. twin and single cylinder CO_2 engines, Uber Skiver knives and sets . . . over 50 trophy and merchandise awards alltogether!

Contest Director: CARL HATRAK

Competition will be divided into five (5) classes: Pioneer, World War I, Golden Age, World War II, and Modern. There will also be individual awards such as; most distant entry, best shipping container, entry most damaged in shipping (Don't try hard for that one!), best entry built from Walt Mooney plans, best model by a female, best entry by any modeler under 15 years of age, oldest qualifying contestant, youngest qualifying contestant, best biplane (Big John Award!), best entry built from a Peck-Polymers kit, longest flight, most static points, plus a few surprises.

Chief Static Judge: RUSS BARRERA

Scoring will be based on the total of each entry's static scale points (100 maximum) and flight points (100 maximum). Static judging will be according to AMA Indoor Rubber Scale rules. Flight points will be the average of the two best flights out of four official flights (10 seconds minimum, 100 seconds maximum). Ties will be broken by highest single score, or a fly-off. Number of attempts to be limited, subject to size of total entry. DO NOT SEND UNTESTED MODELS! *A three-man jury will preside over all decisions.*

SCHEDULE: Register by mail on or before February 1, 1978.
Models to be on hand on or before April 1, 1978.
Contest to be held approximately April 15 to May 1, 1978.

Send in now for your registration form, which includes an entry blank, a complete set of rules, and other particulars. Write to:

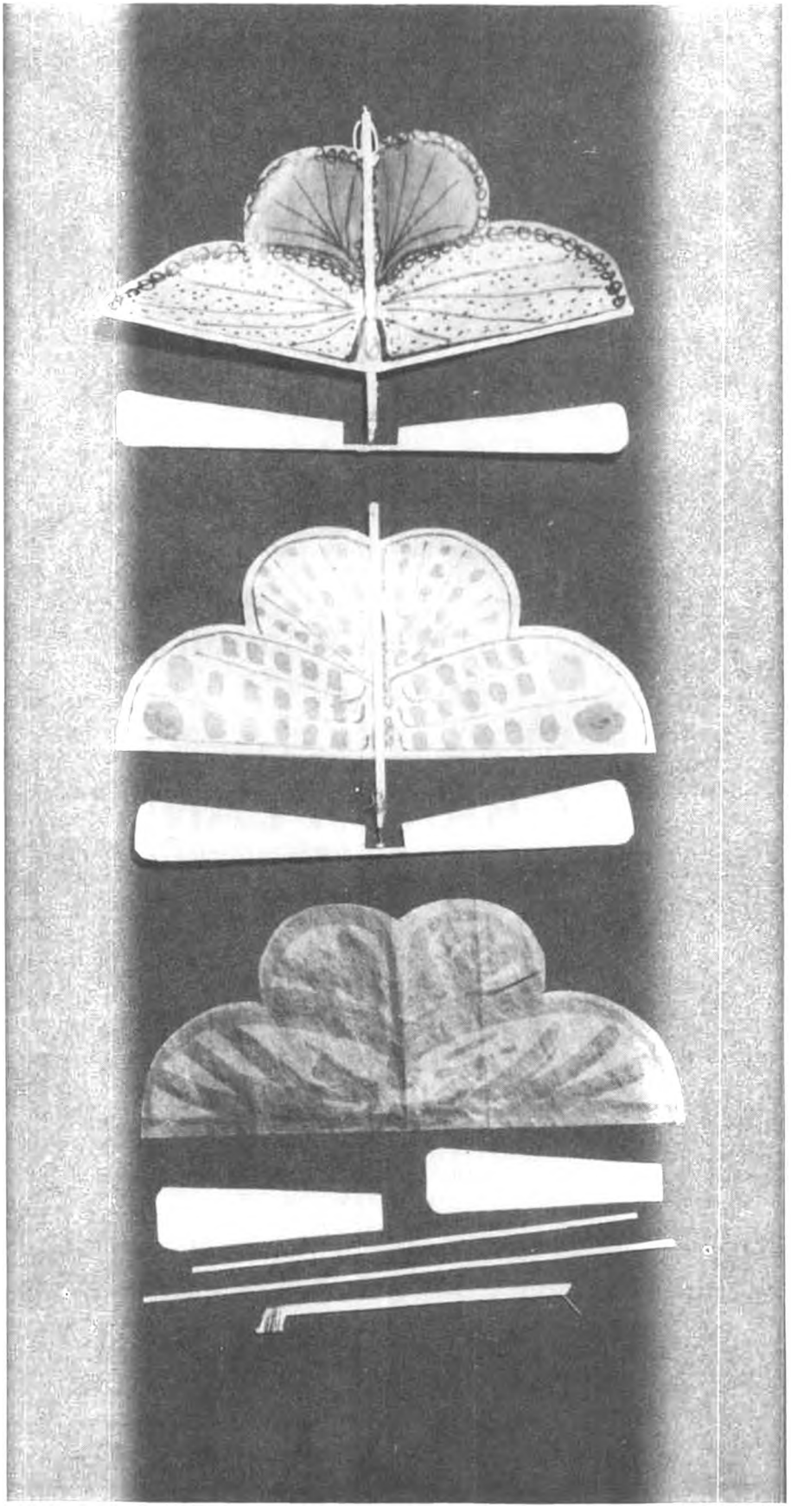
MODEL BUILDER PROXY PEANUT CONTEST
621 West Nineteenth St., Costa Mesa, California 92627 USA

A DANDRIAUX

BUTTERFLY

Want to take a walk in famous footsteps? Build what was possibly the first "model airplane" ever flown by the young Wright Brothers!!

By WALT MOONEY



• Almost everyone knows that the Wright Brothers were inspired to think about flying by a flying toy that their father brought back from Paris for their amusement. Not too many people know what kind of a toy it was. When this article was in its embrionic stages, it was intended to state that the Dandriaux Butterfly was the model that did the trick.

It now seems that in Orville Wright's letters, there is mention of a model by Alphonse Penaud. The Penaud model is more nearly what we would now expect, being something like an early Bleriot in configuration. However the letter was written late in Orville's life, during somewhat of a controversy.

However, in one of Wilbur Wright's letters written much earlier, he mentions little toy bats that he and his brother made and flew when they were young . . . toys that were designed after one was brought home from Paris by their father. He also mentions that when they were made larger, they did not fly so well.

Penaud's model could surely have influenced the Wrights, but it certainly flew like a model airplane (131 feet at 8 mph in 1870). This little toy flys like a bat. It's actually a coaxial counterrotation torque actuated rubber powered helicopter (whew!), capable of long flights vertically, and stable as long as it is under power. After the power runs down, it flutters to the ground like a dying moth (or bat, if you will). Indoors it will flutter around the ceiling like a moth around a light.

I believe it's safe to say the Dandriaux Butterfly was one of the toys that influenced the Wrights, probably the first. Why not have some historical fun building and flying one of your own?

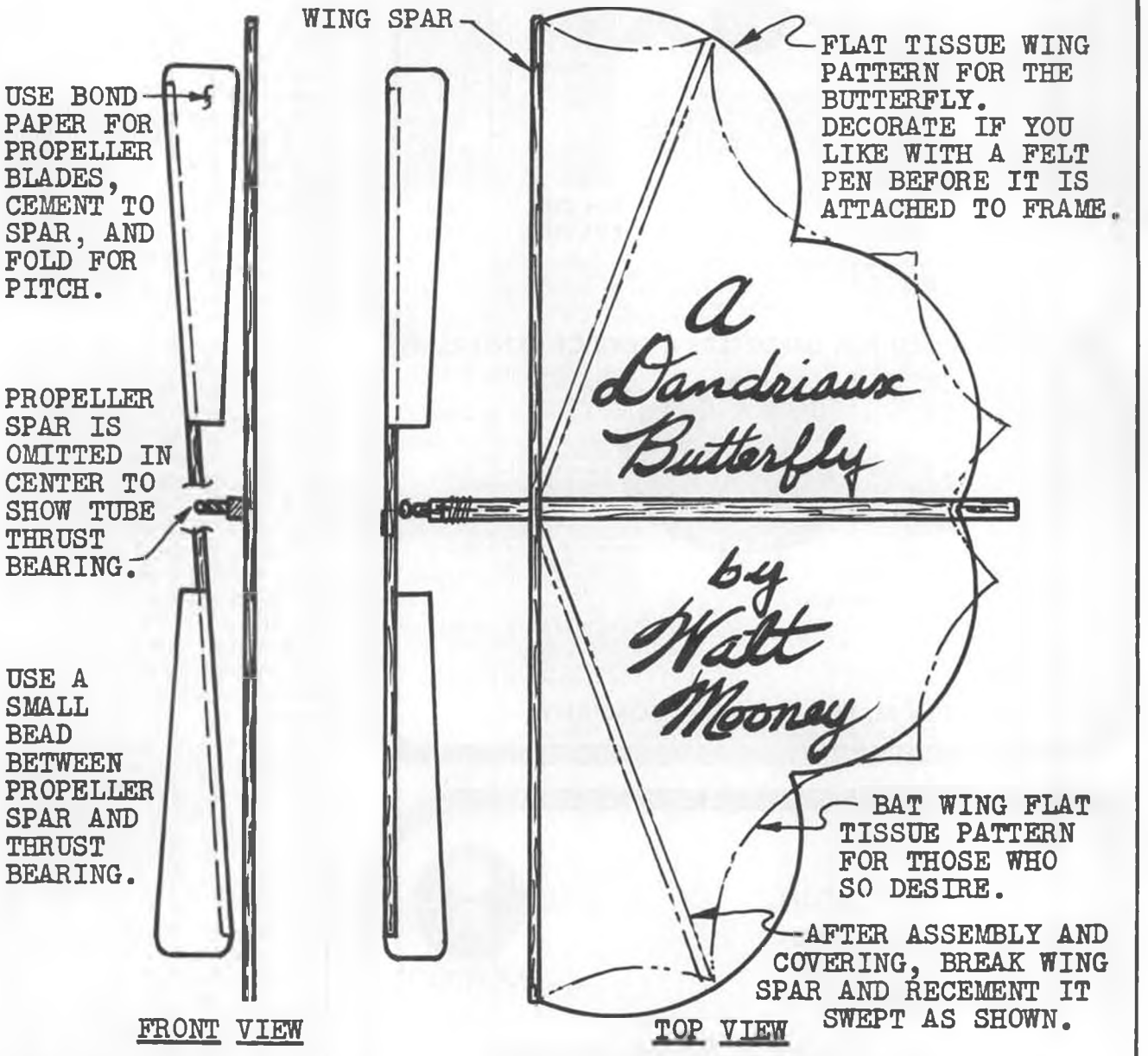
All that is needed is some small sticks, a short piece of aluminum tubing (or a long bead), a small scrap of tissue, a little thin wire, and some cement.

Follow the plan and you can't miss. Just remember to break the spars and fold them towards the tail about an inch at the tips, after covering, so there is some slack in the tissue to form the aft rotor contour.

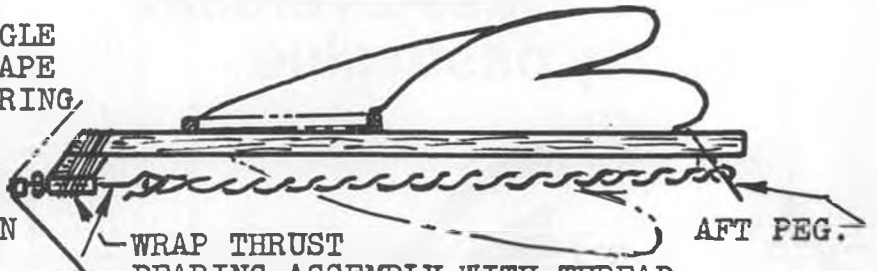
The center of gravity location is not very critical, but if your Butterfly is intent on suicide and dives head first, ballast his tail to move the C.G. aft a bit.

And if you prefer "Bats", use black tissue and a bat-like tissue outline.

Fly your model, reflecting that models, such as this, were being flown 100 years ago. •



THE PROPELLER PITCH ANGLE AND THE APPROXIMATE SHAPE OF THE SLACK WING COVERING ARE INDICATED ON THE SIDE VIEW. NEAR SIDE IS SHOWN WITH A SOLID LINE, FAR SIDE IS SHOWN DOTTED.



SIDE VIEW

MATERIAL LIST:

FUSELAGE ---- 3/32 SQUARE BY 3½"LONG HARD BALSA
WING SPAR --- 1/16 SQUARE BY 6"LONG MEDIUM BALSA
PROP SPAR --- 1/16 SQUARE BY 5¼"LONG HARD BALSA
BEARING SUPPORT -- 1/16 BY 1/8 BY 3/8 HARD BALSA
THRUST BEARING --- 1/16 DIA. BY ¼"LONG ALUMINUM TUBE
PROP HOOK AND AFT PEG --- 1/32 DIA. OR THINNER PIANO WIRE
BOND PAPER, TISSUE, THREAD, CEMENT, AND A THIN RUBBER BAND 3"LONG.

DUBLR ..... *Continued from page 12*

of the sides as a pattern outline. Lay parts out on bench to assemble sides, one right and one left. Check fit of doublers, using scrap piece of 1/8 between D2 and D3.

Start side assembly by gluing D1's to respective sides squarely and accurately. Glue D2 butting against D1; use a piece of 1/8 scrap between D2 and D3 to align D3; glue D4 in place. Glue 1/4 triangle strips to each side as shown on isometric view. While this is drying, cut out formers from 1/8 lite ply and 1/8 balsa.

Remove sides from bench and sand taper into rear of triangle strips as shown on iso view and top view. Place plastic film over top view of fuselage and pin F3 and F4 formers accurately over their positions on the plans. Place each side against three formers and check for fit and alignment. If square, pin each side to bench at the former locations, using Kwik-set epoxy, or (Zap, Hot Stuff, etc.) glue, and pin sides to formers F3 and F4, making sure F4 is butted against back side of D3. Use 90° triangle against sides to keep things square while gluing these formers.

Draw sides together at rear and temporarily hold with a clothespin. Slip stabilizer into slot and check to see if it is level; adjust sides until stab is level with bench and sides meet over centerline on top view, then glue sides together. Lay out centerline and thrust line on F2 firewall. Lay out holes for Golden Bee or beam mount, drill holes, and install blind nuts, using a dab of epoxy to hold in place. Glue firewall F2 in place, squaring over plans and hold in place with rubber bands or tape. The 'hot' glues work good here as a quick 'fix', but be sure to use epoxy for added strength along joints on sides after getting firewall in place.

Remove assembly from plans; glue 1/8 tank floor in place if using a beam mount. Glue 1/8 tripler in place inside D1. Glue triangle strips in place between F2 and F3, and also in engine compartment. Trim right side to clear engine. Bolt mount and engine or Golden Bee in place. Slip F1 over shaft; mount prop and spinner; center F1 behind spinner, and glue in place. Glue 1/8 ply LP in place with epoxy.

Check fit of F5 and F6 formers, trim if necessary, pin each in place against F3 and F4, glue ONLY the inside joint of these formers. The fuselage top will be cut away later. Start sheeting bottom with 1/8 balsa from LP to F4, 3/32 from F4 to rear,

using glue generously on the 1/4 inch strips where sheet goes. Start sheeting top directly over joint at F6 and F4. DO NOT GLUE SHEET TOGETHER AT THIS JOINT. Glue the TH1 and TH2 pieces of 1/8 ply to F2 and F3 as shown on top view, also to one piece of the 1/8 balsa TH pieces. Glue the two TH pieces together. While drying, glue the bottom 1/4 inch sheet in place between F1-F2 and F2-F3.

Place top hatch TH piece in place and drill holes for SM screws. Screw hatch in place, glue 1/4 inch sheet to top of engine compartment, DO NOT GLUE sheet to front edge of TH.

Rotate spinner and scribe a pencil line around circumference of spinner on F1. Remove spinner, prop and engine. Sand fuselage to a smooth, rounded-corner box. Use a Zona saw and carefully saw between F3 and F5, also between F4 and F6, remove fuselage top, and lay aside temporarily.

If only the racing wing is to be used, glue three each WP3 and WP4 into slot provided on D3, using epoxy glue and making sure they are glued well to F3 and F4. If the model is to be flown as a sport or combination model, glue only two each of WP3 and WP4 into slots, the other WP3 and WP4 are glued to the bottom leading and trailing edge of racing wing as the plans show. Mark centerlines on formers F3 and F4, place wing in fuselage saddle centering on marks, and pin to sides. Measure from the tips to the rear of the fuselage to get the wing square. Shift if necessary.

Drill holes down through the wing plates and remove wing, tap holes in the ply plates in fuselage, ream holes in wing plates a little so bolt will slide in hole, and bolt wing to fuselage. If tapped holes are a little 'sloppy', smear some epoxy in holes. When dry, re-tap the holes. Locate screw holes in top sheet of fuselage top that goes over wing, and drill holes for screw access. Place a piece of saran wrap or waxed paper against formers F3 and F4 at leading and trailing edge of wing, glue fuselage top to top of wing, centering it at F3 and F4. Pin until dry. Slide stabilizer into slot, squaring it up with the wing and fuselage, and glue in place. Slip front of fin into slot on F7 and check to see that it is straight and true. Use 90° triangles from stab to fin and glue in place.

Unscrew wing, finish inside of canopy on fuselage top to suit your taste, and glue canopy in place.

Bend landing gear and drill mounting holes, place LG on LP, squaring with the fuselage and leading edge of wing, mark holes on LP, drill and install blind nuts to LP with a dab of epoxy. Install 1/16 MW tail skid to ply sub fin using small wire and solder, overlayed with a coat of epoxy, and glue fin to fuselage. Glue two E1's to 1/8 sq. spruce.

Paint a layer of epoxy in the engine and fuel tank compartments, also the underside of TH. Sand the entire model with fine sandpaper to a smooth finish, and apply your favorite finish. The control surfaces can be attached with Monokote hinges, sewn on, or use mini-mechanical hinges. When bolting on the engine and landing gear, smear a little GE silicone on the screws before putting them in the blind nuts, this keeps oil out of the inside of model. Use the forward CG shown for racing, shifting the CG until it suits your preference for sport and aerobatic flying.

The lil' DUBLR has proven to be the versatile combination model that I had hoped for. I am sure that you will enjoy it as much as I have. ●

Choppers . . . . *Continued on page 19*

in Buena Park, flew his Revolution 2 with modified rotor head and tail control. Now Larry is an accomplished R/C pattern and Q-M flier, but he started building his chopper only 2 months ago! In that very short time, he

has become a real expert chopper pilot. He generally flies in the small parking lot at the shop, lifting vertically above the warehouses, and practices at high altitude before descending straight down to a landing.

When he gets to a large field, such as La Mirada, he goes crazy and flies just as though he's driving an airplane in a pattern contest. High speed turns, zooms, dives, pull-ups, and all that good stuff are just like shooting fish in a barrel to Larry. This guy is going to be real competition in the near future . . . watch out!

As a finals to this visit, Rich Smith showed me how he cut his Revolution starting belt and inserted a short 2-56 stud. That was so he could unfasten it after starting the engine, and so, do away with it altogether in flight, it was a neat trick, worthy of mention. All-in-all, a good time was had by all pilots . . . George Croker said the only bad experience was when an irate golfer started throwing golf balls at his chopper from the putting green next door, after becoming disturbed by the noise.

FINAL APPROACH

I'm sorry we didn't have room for the Jet Ranger control mechanism as promised, however, by waiting until next month, I'll have pictures of the unit I built, instead of drawings only. Also, the next issue should have photos and data on the other group that I visited at the Marine Corp Air Station (Helicopter) in Santa Ana. Hopefully, we'll be able to prove photographically, that the "body english" technique isn't limited to bowlers and pinball machine players . . . we have a chopper pilot in our midst who can put them to shame! Until next trip, then, BCNU. •

R/C Auto . . . . *Continued from page 45*

help with your gear mesh.

When assembling the car, check to be sure that there is a slight bit of end-play in the rear axle and *no* binds. If there is excess end-play, get rid of it by trying different axle spacers, new gears, a different axle, or by shimming the end-play out with washers.

The rear axle bushings get replaced in Bob's car about every four races. It all depends upon how clean or dirty your track is, just don't forget about them, because they rarely give noticeable trouble. They are cheap enough to be replaced before every race, just to be safe.

The only weak point in the 1/12th cars seems to be the clutch and the drive shaft the clutch rides on. With proper set-up and lots of attention, the problems can be minimized.

When installing the drive shaft, be sure to use Loc-tite, or something similar, to insure that it won't come out later on. Do not overtighten the drive shaft, you're bound to strip its threads in the crankshaft of the engine, sooner or later.

Slip the clutch bell on the drive shaft and see if it will ride against the flywheel . . . it will. Eliminate this by slipping thin brass washers on the drive shaft. Reinstall the clutch bell and check again. You want the clutch bell shimmed enough to insure that it won't touch the flywheel when running.

With that taken care of, it is time to screw up a few perfectly good clutch shoes. Take a look at the photo to get an idea of what you want to end up with. The modified shoes in the photo have had all of the webbing ground away, except in the area of the pivot and the spring attach point. Bob also adds tension to his springs by squeezing them shut another 1/8 inch. With the shoes lightened and the spring having extra tension, the clutch slips more at low rpm and finally locks up at a higher rpm. Usually, this will help your lap times go down, but there are no guarantees. Try it on your car at your track and be prepared to experiment a lot with clutch slip. Also try to remember that just because it sounds faster, doesn't mean it is going faster. With the added clutch slip, your motor will be turning higher in the

exits of most turns and this may give the false impression of higher speeds.

Only a stopwatch or racing against a "mule" (a car used as a constant with which to compare yours) will tell you the truth about lap times. Before final assembly of the clutch, slop a bunch of STP in the clutch, on the drive shaft . . . put the stuff everyplace, it can't hurt anything and it does wonders towards eliminating lubrication problems with the drive shaft.

A neat trick shown to me by Jay Dye is to drill a small hole between any two teeth on the pinion gear. Only drill this hole through to the I.D. of the gear. Jay then lubes the assembled clutch with a 50/50 mixture of STP and automatic transmission fluid, by inserting a small piece of tubing into the hole drilled in the gear. On the other end of the tubing is a squeeze bottle filled with the above mix, and by squeezing the bottle, the lube is forced into the bearing area of the clutch bell. When lube comes squirting out at the end of the drive shaft, you know you've got the lube where it will do the most good. A good trick, and worth copying.

Although these clutch-related mods are recommended, and will help out in several ways, never ever take the clutch/flywheel/drive shaft assembly for granted. As soon as you think it is dead-nuts reliable, something will pop . . . that's a promise.

I forgot to mention it, but by shimming the clutch bell out from the flywheel, you are throwing some additional stress on the drive shaft. I personally haven't had much problem here, but it should be noted that Gary Keyes advises installing a new drive shaft before each main event, just to be safe. Then again, other successful racers feel that once a drive shaft is broken in and has shown that it won't give trouble, with proper attention to keeping it lubed, it will last a long time. Again, your choice.

Rear rubber is difficult to discuss with any meaning. It seems as if every track is different, thus requiring varying tire compounds. Both Jerobee and MRP have recently released new tire/wheel sets that are definitely worth trying. These new sets use nylon wheels and are legal for ROAR competition.

Gearing is another item that varies a lot from track to track. Bob suggests five-to-one (11 tooth pinion, 55 tooth main gear) for the TD powered Class B cars, and at least six-to-one gearing for the reed valve Class A cars, with a 9 tooth pinion, 55 tooth main gear being suggested. These are simply starting points; don't be afraid to experiment a lot with gearing.

That should just about wrap-up the chassis, so let's see what goes into a Class A motor. In A, the motor has to be stock . . . almost. Check your ROAR rule book before doing any drilling; it is probably illegal. If you do punch out, say the venturi, and get caught during tech inspection, here is the famous line, "Well, I sure as hell didn't drill it out, it must have come from the factory that way." Not original, but guaranteed to send your fellow racers into fits of laughter.

One area where a reed-valve motor can be worked to give more power is in the crankshaft bearing area. Especially the front bearing. Tap the shaft out of the case and stick a tightly rolled piece of 320 wet-or-dry paper into the front bearing area. Turn the roll of paper in the case and remove just a bit of metal. Clean the case real well and put the shaft back in, along with some lapping compound or plain old toothpaste. Spin the shaft for awhile in your fingers (be careful if you use a drill motor, it is easy to go too far) and clean everything again. Insert shaft into case dry. It should be very free. If it isn't, you probably didn't get things cleaned up very well after lapping. Try again.

I think that cutting the shaft disc is illegal, so I won't tell ya how to do it. Besides, it weakens the shaft.

Something that, even if not legal, is very difficult to detect, is moving the tank farther into the case for additional

packing of the lower end. To do this, lay a piece of 320 wet-or-dry paper on a *smooth, flat* surface. A piece of glass works fine. Place the back of the case on this poor man's milling machine and move it around in either a circular or figure-eight motion. Keep the case square to the flat surface or you're wasting your time . . . and a case. Do this for a while and then insert tank into the case that has the shaft reinstalled. You want to end up with about three or four thousandths clearance between the end of the crankpin and the tank's reed valve housing. Be sure to check this with the shaft pushed as far back as it will to, or you're going to break something when you fire it off.

Before doing the above, be sure to check the ROAR rule book; I'm not sure it is legal and don't have a rule book here to check. It's just an old C/L trick to do this, and as I mentioned, it is difficult to detect and/or prove.

The piston/cylinder can be lapped lightly; just be sure to leave the fit a bit tight in the last 1/16 of piston travel. If you haven't lapped a piston/cylinder set before, it is probably best to just forget doing it on your own, and simply give the motor a proper break-in.

Reed-valve engines have a real weak point, and that is the reed itself. For R/C car use, most people run a double set of reeds. It is doubtful that this gives any more power, but it does give the reeds a much longer, useful life. To install double reeds, simply lay one over the other, being sure that the petals on the reeds line up with each other.

The little "O" ring, fitted between the gas passage in the tank body and venturi in the back plate of the tank, also gives problems, probably due to the heat build-up. As with the reeds, try doubling up on the "O" rings. And *always* install new "O" rings when reassembling the engine.

Getting the fuel tubing to stay on that little nipple on the tank back is always a problem. Bob uses plain old plastic tubing (the kind that gets hard) here, and wires it onto the nipple. I use Pylon's yellow-coated surgical tubing, doubling it at the nipple. To double up the tubing, simply cut a piece about a 1/4 inch long and slip it over the feed line. Push the feed line onto the nipple and then slide the 1/4 inch piece up onto the feed line and nipple. Might take a couple of tries to get it right, but it will stay on forever.

The feed line then goes out the side of the tank to the remote tank. Someplace in there, be sure to stick in a high quality fuel filter. Bob likes to use one with a large capacity. This acts as a fuel reservoir when the car gets upside down and the pickup in the tank is out of fuel, sucking air. The engine can run on the fuel in the filter until the car is again placed right side up.

If you'll take a close look at the photos, you ought to be able to see a lump in the fuel line on my A car. That lump is a Hi Johnson fuel filter that has been turned down some and had the ends cut off. By moistening the filter with some kind of lube (I used spit . . . it was handy) and having some patience, the filter can be worked up the feed line to wherever you want it. The advantage is obvious, no way can the feed line come off of the filter. And it doesn't take up much room. Incidentally, Phil Shew did this filter for me, and I thank him for turning me on to this trick.

With the feed line installed (double check it), it's time to assemble the engine. Nothing to it; just be careful when tightening down the four screws holding the tank to the case. It is easy to warp the backplate if you're not careful.

With the basic engine assembled, install a standard, low compression head for use while breaking in the engine. If using the stock heat sink, it is best to cut the slot in it a bit wider. After awhile, the heat sink will get bent and you won't be able to keep it tight on the head. Run the engine a bit on the rich side during break-in, gradually leaning it out with each successive

run. When it starts to come in, switch to a high-compression head. You may want to run an extra head gasket with the high-comp head. Before running the engine really hard, it is a good idea to strip it down and tighten the ball socket joint in the piston, using the popular Kustom Kraftsmanship reset tool. A loose fit in the ball socket will sooner or later grenade the motor. Tighten it now and save yourself problems later on.

The needle valve spring used by Cox will quickly go away. Just slip a piece of fuel tubing over the needle and spring (surgical tubing works fine) and your needle problems should end.

Before leaving the reed-valve motor, it should be mentioned that as a general rule, those motors that have the exhaust ports facing left and right, when the motor is viewed from the front or back, seem to run the best. When buying a new motor, keep this in mind and choose accordingly. The reverse is true of the TD's, they should have their exhaust ports facing front and rear.

Ooops, one more thing about the reed-valve motors. Toss the steel flywheel, it's a slug. Use the aluminum flywheel for go-fast, stop-quick performance.

In Class B, you can use any .049 you want, and also modify it as much as you like. As the TD's have more power than most can use, not much is done in the way of warming the motor. I know that I have a fairly radical motor done by Joe Klause, of Kustom Kraftsmanship, that is really wicked, but generally just gets me into lots of trouble. The only time I have been able to use its power was at the ROAR Nationals, on a fairly long oval course, but even then it was very difficult to keep the car pointed straight.

It is still a good idea to do little things like free the crankshaft, lightly lap the piston/cylinder, etc. This general loosening of fits is not done to gain more power, but rather to get a cooler-running motor. Heat is a killer in these cars.

Right now, all of my efforts with TD's is going into trying to tame them. Presently, I am using a Medalljon piston/cylinder set, and it seems to run real consistently. A steel clutch bell helps calm things down, as does extra head gaskets and/or a low compression head. A Kustom Kraftsmanship needle valve assembly, while not adding or subtracting power, sure makes needle settings much more positive.

For Bob's use, he simply takes an engine that is box-stock and breaks it in on a 6 x 3 prop, low-nitro fuel, and a low compression head. After break-in, a high compression head is installed and the engine is fitted with a fairly small prop, a Cox 4-1/2 x 4 left-hand number. This is the prop supplied with a Cox R-T-F, and is part No. 4035. This prop is used as a constant against which to judge performance of each engine tested. I believe Bob said they expect to see around 24,000 rpm on this prop.

It would seem more logical to prop-load the motor to something closer to its actual operating range, say 20,000 to 21,000 rpm, and go from there. But according to Bob (and he is no doubt right on this) they get better performance from an engine that will wind high. If it is suffering in mid-range or bottom-end power, clutch slip and lower gearing will compensate. So if you want to go fast, select the motor that revs the highest on your test prop.

Before leaving the subject of engines, I want you to be aware of a very good supplier of 1/2A accessories, Kustom Kraftsmanship, P.O. Box 2699, Laguna Hills, CA 92653. If you prefer to call, try: (714) 830-5162.

KK's catalog is a must, it contains items unobtainable any place else, plus a few things you probably aren't even aware of. For example, they can even supply blank Cox cylinders! You cut in your own exhaust ports and bypasses. Great item for those with a "better idea."

Fuel used by Bob and the rest of the team is Fox's Missile Mist . . . it is used exclusively. The fuel gives plenty of power, yet also keeps the motors supplied with adequate lubrication.

An interesting point concerning the motors used by the Jerobee/MRP Racing Team is that they are built up from used parts . . . really!! They have a couple of huge drawers that are full of engines and parts that have either been returned as defective or used in demonstrations at car shows. To look at the piles of Cox pieces, you'd think it was all junk . . . in fact most of it was considered at one time to be junk, by somebody out there. The message is that swapping parts around from one motor to the other is quite often worth some extra power, and that a well broken-in engine is necessary for top performance and reliability.

With blueprinting of the chassis and engine covered, we can look at the body. Due to weight considerations and the tremendous abuse heaped upon these cars, a Lexan body is the only way to go. Your choice as to body style . . . Welch likes the Abarth body for Can-Am racing and the new Cobra body for GT racing. A wing is optional with either body; take a look at photos of my Cobra body for an easy-to-make and effective wing. This particular wing is bent up from a sheet of .030 Lexan, and does double duty as a handle for carrying the car. This type of wing was first made up by Tony Bellizi, and it definitely works . . . try it some time. Notice that it is easy enough to adapt this style of wing to most Can-Am bodies, as well as other GT bodies.

This article won't go into painting the bodies, it has been done many times before, by this and other magazines. Besides, I find it much easier to just use a body already painted by the folks at JoMac. By doing this, it seems that all of my bodies are of a different color, and that brings up an interesting point. A few successful R/C car racers, Don McKay included, prefer to use the same color paint on all of their cars. When racing, you can't watch just your car, you have to be looking for traffic both in front and in back of your car. If your brain is geared to your car being a certain color, it seems to be easier to spot it when things get hectic, and may just save the day for you sometime. Think about it.

The rumor that my cars are painted white in front and black in the rear, making it easier to see if they are going backward or forward in the turns, is untrue . . . although probably not a bad idea.

It may look nice and neat to use an 1/8 inch hole in the body for the antenna to stick through, but it's a problem causer in the pits. Punch this hole out to at least a 1/4 inch, and 3/8 is even better. Now when you want to get the body back on fast, you don't have to spend time threading the antenna through a small hole.

The body post holes in the body are also enlarged some, but this is done to insure that the fairly stiff body does not interfere with chassis flex, which can affect handling. The body should kind of float around on its mounts, do not mount it solidly. Toward this end, it is also a good idea to use body mounting posts that are 1/8 to a 1/4 inch longer than necessary. With tall body posts, the body pins won't hold the body down tightly to the bumper and/or chassis.

Remember the tripod mounting of the radio, previously discussed? Same thing with the body. The tripod mounting system; two posts in front, one in back, or two in back and one in the front, is the way to go.

For little fingers, the standard body pins are probably okay. I much prefer the larger pins, they are a lot easier to handle when you're in a hurry.

I think everybody knows the trick to trimming bodies, where a line is scribed with a sharp knife and then the excess Lexan is simply torn away by hand, the Lexan separating along the scribed line. The same thing can happen to your body if there are any rough edges left and it gets smacked right there during a race. To keep this from happening, file or sand all edges of the body smooth, eliminating these stress risers.

Due to the fact that the bodies are pulled from a constant thickness sheet of Lexan, and the body is of compound curvature, there are bound to be some areas of the body where the Lexan is thinner than in others. Unfortunately, one of these areas is the front of the body. To keep the front of your body relatively damage-free, put a little silicone glue or hot melt glue inside the body where it is weak. On the Cobra GT body, this would be in the area of the headlights, grill and corners of the

fenders. The side pipes on the Cobra are also a bit weak, so strengthen them also. The Can-Am bodies generally need the reinforcement along the fenders, and don't forget to also do the tops of the front wheel walls. Fins on Can-Am cars are vulnerable, open them up slightly and glop in the silicone. Close the fin, wipe off the excess, and let dry.

After detailing of the body, be sure to put on some *legal* numbers. They have to be black numbers on a white background. I use the mylar numbers and backgrounds sold by JoMac. Even at the '77 ROAR Nationals, it was amazing to see people enter cars featuring bodies with super-zoot paint, hand-lettered tires and lots of detail work . . . topped off with numbers that were not only illegal, but very difficult to read from the lap counter stand. Having legal numbers not only eliminates hassles with the race director, but helps to get all of your laps counted by that bleary-eyed lap counter.

For extra comfort and better control, many drivers, Bob included, fit their transmitters with a pistol grip throttle/handle unit. It's a simple bolt-on modification. The handle comes from Parma, and you make your own linkage. French Motor Co. offers a complete conversion kit that contains the required linkage. Your local dealer supplying the needs of R/C car racers will either have these in stock or be able to get them.

With that, we have covered all the detail work that goes into blueprinting most any 1/12th scale R/C car, the MRP cars in particular. This article ended up being a lot longer than I ever thought it would be, but I decided that if I was going to bother writing it at all, I might just as well cover everything.

We'll close with what has to be the biggest tip for guaranteeing consistent engine runs and finishing each race. *Every time* you run the car, remove the heat sink and check to be sure the glow head is *tight*. This is important, don't forget it.

Good racing with your blueprinted car. I'll see ya at the track. •

Hannan . . . . . *Continued from page 54*

but even in a forty-mile-an-hour gale, it comes to earth, beaten by the elements, certainly not; merely because its power, its source of energy, is run down and it glides to the earth like a tired bird. . . We say then, once more, that all this is very wonderful, for it is literally true."

DASH IT ALL!

For some totally inexplicable reason, the word "BIPLANE"keeps turning up as "BI-PLANE", in model publications and contest programs. Come on fellows, such errors are staggering! *(Confucious say, "If you must travel, go biplane." wcn)*

THE COMMON FLY

According to J.S. Zerbe, author of AEROPLANES (circa 1915), "So many brids have been cited in support of the various flying theories, that the house fly, as an example, has been disregarded. We are prone to overlook the small insect, but it is, nevertheless, a sample which is just as potent to show the efficiency of wing surface as the condor or the vulture. The fly has greater mobility than any other flying creature. By the combined action of its legs and wings, it can spring eighteen inches in the tenth of a second; and when in flight, can change course instantaneously.

"If a sparrow had the same dexterity, proportionately, it could make a flight of 800 feet in the same time. The posterior legs of the fly are the same length as its body, which enable it to spring from its perch with amazing facility.

"The wing surface, proportioned to its body and weight, is no less a matter for wonder and consideration. The weight, compared with sustaining surface, if expressed in understandable terms, would be equal to sixty pounds for every square foot surface.

"The next observation is, that what are called *stream lines* do not exist in the fly. Its head is as large in cross section as its body, with the slightest suggestion only, of a pointed end. Its wings are perfectly flat, forming a true plane, not dished, or provided with a cambre, even . . . that upward curve or bulge on the top of the aeroplane surface, which seems to possess such a fascination for many *bird flight* advocates."

We found this passage of interest for a number of reasons. First, there has been such a marked bifurcation

among model builders regarding the size of their aircraft. On the one hand, we have the heightened interest in the REALLY BIG models, such as the quarter-size R/C types, the Class D free flights, and the Jumbo rubber-driven scale models. In the opposite direction, we find plenty of support for 1/2A R/C, Peanut Scale, Grapenut Scale, and suchlike. Each faction can present plenty of reasons to justify its enthusiasm . . . and they are all probably correct.

The manufacturers are certainly doing their parts to assist model builders on either end of the see-saw. Note the proliferation of larger engines, speed-reduction drives, and large propellers for the "biggies". To the other extreme, we see the introduction of an R/C model kit designed for CO_2 power, and a virtual flood of Peanut (and smaller) kits and plans appearing. Choose your weapons!

THE BIGGEST MODEL OF ALL?

According to Ralph Prey, writing in "THE SATELLITE" San Vallers club newsletter, rumors are circulating that Bill and Bob Hunter are building a man-carrying model airplane, to be flown at Taft, sometime next year!

We are reminded of a threat once advanced by (we think) Bill Watson, of building a full-size SLEEK STREEK, fitted with a saddle. Object? To forever confound the flying scale events! *(We want to be there when he winds it up! wcn)*

AIRCRAFT MODEL PRODUCTS

According to Phil Koopman, proprietor of Vintage Aero, all future retail mail-order sales of its products will be conducted by Aircraft Model Products, P.O. Box 318, Scituate, MA 02066. This will enable Vintage Aero to better concentrate on the manufacturing and wholesale end of the business. Its latest 1977/78 catalog has just been released, and features a tremendous variety of goodies, ranging from building materials and accessories, through kits and CO_2 engines. Copies are available at $1.00, directly from Aircraft Model Products. Tell 'em you heard about it from **Model Builder**!

PHOTO HINT

Leading Florida Peanuter, Dr. John B. Martin, points out that the typical low-priced camera is incapable of taking close-up photos of small models. His suggested remedy is to obtain a *portrait lens*, a low-cost accessory, which may be added in front of the camera's existing lens. While adapters are available for some brands, Martin simply taped the unit on his Kodak 110. By shooting a few test shots of a ruler, lengthwise, you will be able to determine the area of sharpest focus. By placing the model at this optimum distance from the lens, quite good close-ups are possible.

STEP RIGHT UP

Dave Stott shared this little gem with us: Back in pre-Wright days, Sir Hiram Maxim offered a prize of 50,000 pounds to the first inventor of a *successful* aeroplane. When inundated with letters from opportunists, he had this simple reply: "I am glad to hear you have a successful flying machine. Fly 'round with it to my house in the morning, and we will fly together to the bank and get the money." Needless to say, he never had any takers. Pretty clever contest director! *(Pretty sneaky too. Even today, you can't fly to the bank in an aeroplane! wcn)*

CONGRATULATIONS, MODELE MAGAZINE!

We were privileged to receive a copy of the French magazine, MODELE, from Georges Chaulet. What was so special about this particular issue (November), was the fact that it featured a truly outstanding coverage of the U.S. Nationals. Some 16 pages in all, plus the cover, were devoted to the meet, and featured some of the finest photographs we have ever seen, especially of the scale models. Frankly, we think some of the U.S. editors

might benefit from a long, hard look at this publication. Featured in full color were Granger William's Gee Bee (the cover), Don Srull's Dornier 23 (full-color 2-page spread), Bill Warner's Airspeed, Bill Stroman's Valkyrie, Joe Tschirgi's Hansa Brandenburg, Ray Smith's Bf 109, Kent Walter's SBD-3, and others in full color! Additionally, we were pleased to see a photo of our own Walt Mooney, offering real peanuts to the crowd. The caption? "Le plus grand producteur de cacahuetes du monde: Walt Mooney".

We think the magazine might be obtained by mail, but are uncertain as to cost and postage. Doubtless an International Reply Coupon (obtainable at any Post Office) would provide that information. Address: MODELE MAGAZINE, 15-17, quai de l'Oise, 75019 Paris, France.

ONCE UPON A TIME

We thank Tom Nallen, of Chicopee, MA, for this delightful bit of historical conjecture:

"I follow with interest your ongoing, occasional mention of canard, duck, ente, etc. . . . how the tail-first flying machine came to be called a canard, canard being a French word meaning duck; according to one Webster definition, meaning 'to descend suddenly'. Could it have happened this way?

"In October of 1906, in France, Santos-Dumont had climbed aboard his tail-first flying machine. He is warming up the engine, preparing to make what he hopes will be Europe's first heavier-than-air man-carrying flight. A small crowd of curious people have gathered to watch the proceedings, and at the upwind edge of the field, two passersby stop to observe, as they hear the engine's unsteady throb. They are soon joined by a third man, a newsman out searching for a story, and the trio converse animatedly, their conversation punctuated by bursts of laughter. Suddenly, their laughter dies, as the rickety machine, engine popping loudly, begins to roll slowly in their direction. The ungainly craft gathers speed as it bounces across the grass toward the trio of skeptics.

"One of them points, and apprehensively they crouch, as the trembling assembly of wire and cloth staggers into the air. Almost before they realize it, the roaring machine is close upon them and as it suddenly lurches menacingly, almost overhead, one of the men throws himself to the ground, yelling, 'canard!, canard!' (duck!, duck!). And as his friends dives to the ground beside him, the newsman runs from the field to write his story about the wonderful flying machine they call the canard . . . (duck!)". (We are reminded of the boy in school . . . and you deserve it after that one . . . who was asked to write a sentence using the words "Deduct", "Defense", "Defeat", and "Detail". He produced the following: "Defeat of deduct went over defense before detail!" •

Pearl . . . . . *Continued from page 68*

size of the W2 dihedral brace. Up here in Colorado, the models come down very fast after DTing, and after breaking two wings in half, I went to this long part. If you live at a lower altitude, you might make W2 the same length as the other center section braces.

As noted earlier, my original Pearl Trucker was finished with silk, and it didn't have the anti-flutter braces. The National's winning P.T. was double-covered with tissue, and it had anti-flutter braces. I don't know if both of these are needed, but I do know that it doesn't flutter if both are used. I don't feel that the plastic iron-on coverings will provide enough stiffness to prevent flutter, even with the braces.

The double covering is very easy to install. First, cover the wing and water-shrink as usual. After two thin coats of clear dope have had time to dry, apply the second covering by cutting the

tissue slightly oversize and laying it in place. Now, starting at the main spar, use thinner to lay it down. Work first toward the L.E., then T.E. from the main spar. After the tissue is down, apply a very thin coat of clear dope. After the second layer of tissue is installed, finish the wing as if it were single covered.

FLYING

Check that the CG is located as shown on the plans. Check for warps and for the "English" as shown on the plans, ie., wing wash-in. Before you go on to the "tall grass", as called out in every construction article, make sure your fuel system and timer are operational. The only good check for this is a test run at home.

Now if everything is okay in the powerplant department, go out and find that tall grass. Shim the stab until a smooth glide is obtained.

My Pearl Trucker flies a very steep right/right pattern. The trim is right stab tilt, 5 degrees left thrust, and no down thrust. Once you are happy with the hand glides, fire it up for about 5 seconds full power and let her rip. Mine flew off the board, with only a little right rudder required. A good way to add rudder is to glue T.E. stock to the fin. I suggest not using more than a 1/4 inch at a time. A little bit goes a long way on a high speed model like this. ●

Lueken . . . . . *Continued from page 51*

box to permit visual observation of the ultra-thin trailing edges and exacting tolerances in the airfoil shape. Jim was able to borrow some Miller glider wings, and studied them carefully, in order to incorporate some of the features in his own projects.

About six months before the Nats, Jim began practicing seriously with his gliders, in all kinds of weather. His girl friend Renee Shinnick handled the timing chores, and even learned to fly gliders herself. Several of these craft flew out of sight, perhaps an encouraging sign.

As the date of the Nats neared, Jim was working on his many entries almost simultaneously. Most of us felt that he had a good shot at Flying Scale, and his experience with towline gliders augered well for success in that category. The big handicap in hand-launched glider, of course, was the sheer numerical weight of odds . . . one of the most hotly contested of all free flight events (some 76 entrants, all told, with 19 of them in the Senior division). Regardless, Jim prepared four HLG's and shifted his attention to finishing his models for the other classes.

About three weeks before the Nats, the Scale Staffel club from San Diego sponsored a fun contest, which Jim decided to enter. In the course of chasing a model over the rocky terrain, he slipped and fractured his foot, to the extent that he could barely walk, and could not even drive his car . . . a terrible blow to any teenager! The doctor assured him that it would be at least six weeks before he could get back into action. However, Jim continued to practice, hobbling out to local vacant lots and school yards, while Renee took over all the chasing chores.

In spite of the dire medical prognostications, Jim's landing gear was functioning quite well by Nats time, and he headed northward towards March Air Force Base. But Lady Luck had not yet let him off the hook, and his Camaro conked out enroute! Fortunately, a little tinkering and a jumper cable assisted in starting got him underway again, and safely, to the contest site.

The first event on Jim's list was indoor HLG, conducted at Norton air Force Base. However, the best he could manage was a sixth place . . . one spot away from a trophy. The next day, Jim's father garnered a trophy in the Northrop Flying Wing event, which didn't really do much for Jim's morale!

When it came time to process his A-2 glider, it turned out, through some misunderstanding of the rules, to be grossly underweight, and he elected not to fly with the large amount of ballast that would have been required.

While testing his 1/2A Gas entry, the day before the event, the model unexplainably flipped inverted, dove in, and was destroyed.

In keeping with this incredible string of bad luck, Jim's scale model balked, refused to take off, and would not fly properly when hand-launched! By this time, his faith was understandably shaken, and no doubt he seriously considered switching to another, more predictable hobby . . . say, rock collecting?

But the following day was the "biggie", the Hand-Launched Glider event, for which he felt best prepared. Jim selected the model which had turned in the best calm air times of the four he had brought along, and decided to stake his luck on it, even though it was not equipped with a dethermalizer. The desert-like free flight site was extremely hot, and the air conditions were puzzling, even to the most experienced flyers. Thus, many of the entrants played a waiting game, hoping to "piggy-back" one of the "big name" glider

guiders, when a thermal passed through.

Jim Lueken, however, elected to go it alone, early in the morning, while the air was relatively still, and completed all his official flights before 10 a.m. Many other flyers decided to wait for the expected afternoon thermals. But, by 11:30 the wind began to pick up, and most of the thermals were not hanging around! Even the "top dogs" were having difficulties gaining good flight durations, under the prevailing conditions.

Finally, it was all over, and when the results were posted, Jim Lueken had not only won the Senior division, but had beaten the best OPEN entrant by a solid 90 points! In addition to the handsome AMA trophy, Jim received the coveted Tulsa Glue Dobbers perpetual trophy, for the best duration in HLG, regardless of age. And in a true show of good sportsmanship, Jim was warmly congratulated by many of his competitors.

Needless to say, Jim is all fired up to attend next year's Nationals, no matter WHERE it is held, and is already hard at work developing a radical new design hand-launched glider. •

Power Boats . . *Continued from page 43*

ous shapes and sizes of tubing, wire, and brass sheets. For you scale hydro builders, K & S makes an airfoil shaped tubing that can be used for the sponson tie bar on the newer pickle fork hulls.

More and more boaters are getting that reliability edge in the pits with the use of electric starters. The Challenger II by Sonic Tronics Inc., 518 Ryers Avenue, Cheltenham, Pennsylvania 19012, is a super starter for even .60 size engines.

If you need a hot fuel for racing or record trials, why not try a special blend from Space Age Fuels, R.R. 3, Kewanee, Illinois 61443? Space Age has synthetic blends with up to 70% nitro.

G & M Models, Box 342, Broadview, Illinois 60153, carries a complete line of R/C boating supplies. One of G & M's best sellers is its complete waterproof radio box kits. The kits come in 4 sizes and include waterproof radio box seals and pushrod ends.

Tom Perzentka, of Octura Models, 7351 N. Hamlin Avenue, Skokie, Illinois 60076, displayed several kits and various hardware. Tom's twin engine mounts have been a real boost to the hobby. One of his more interesting products is an extruded aluminum building jig with adjustable spacers.

In the linkage department, Du-Bro Products, 480 Bonner Road, Wauconda, Illinois 60084, offers a complete line of nylon and metal Kwik-Links, threaded ball links, and a 20 inch flex-cable motor control ideal for R/C boats. Du-Bro also makes a hand-crank fuel pump which mounts directly to a one gallon fuel can or field box, complete with all hardware.

Both of the national power boating organizations were represented at the show. Al Metelak and his wife answered questions, took membership fees, and passed out free magazines in the NAMBA booth. Al is the current President of NAMBA. Representing the IMPBA was Len Skwiera (Pres.) and Gene Klisnick and his wife. Again, information was provided to interested boaters and the booth was even complete with a film of the 1976 Gold Cup Race.

It was good to see all the entries in racing mono, racing hydro, and scale. The scale hydros took 1st, 2nd, and 3rd in the racing hydro class. Special congratulations to Al Wolk of Oswego, Illinois, for his scratch-built 1/8th scale U-95. All numbers, stripes, vents, decals, etc. are buried under five coats of K & B epoxy clear. Words don't do Al's work justice, so take a look at the photo. All the participants deserve credit, because without their entries, there would not be a show. So let's get your entries polished up for next year's show. •

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

You'll like 'em.

Next I balanced some props with the Biso Balancer and it works just fine, plus being a bit cheaper than several other balancers on the market. Easy to use and accurate, you'll like this item, too.

There are several other items, none of which I've used, but ought to come in handy for many modelers. The Other End looks like a clean way to hook glow leads to a battery or terminal posts on a flight box. The Prime-Or-Tap is a universal type of pressure tap meant to be installed in a muffler, giving muffler pressure the easy way. This piece also doubles as a prime tube. Ever try to prime a muffled engine through the exhaust port? Me, too. With a P-O-T (?) it's simple.

Last item is Harry's Heavy Hub. And heavy it is at 2 oz. Just the thing for a good looking prop nut that does double duty in balancing out the tail-heavy plane you just built.

HAS THE GLOBEE LOST ITS STING?

An issue or so ago I mentioned the new Glo Buttons, designed for use in the Cox 049/051 engines. At that time, I assumed Fusite was tooling up and it wouldn't be long before they would be available.

Now, through the Gazette, I get word that Dale Johnson, prez of Fusite, is not convinced there is a worthwhile market. I think Dale should talk to modelers who are presently paying $1.95 per glow head, only to quickly blast the element out of it. What would they think about a proposed plug that would not only be cheaper and last longer, but give more horsepower besides? Perhaps Dale should listen to Harry Roe, who seems to have things well in hand as far as knowing the needs of the modelers.

Of course there is a market for the proposed 1/2A Glo Buttons. Sheesh!

HOW ABOUT SOMETHING FOR SCALE?

C/L Scale does not get very much attention in this column, primarily because I'm not at all interested in it. I can really get it off on F/F Scale, especially Peanuts, and there are even a few R/C Scale models capable of holding my attention for, oh, about 29 seconds. But C/L Scale? Can't see it at all.

However, there are a lot of C/L Scale folk out there in toy-airplane-land, many who would like to build from a kit. For these people there are many choices, thanks to the popularity of R/C Scale. Two recent kits especially deserve attention. The first is the Howard DGA-15 from G-S Products. This kit has to represent the very best in present-day kit manufacturing. The bits and pieces have been machined to shape, or sawn, and very accurately. All the good hardware is there, as well as a super instruction booklet. If I remember correctly, the plans even show how to make the conversion to C/L. Check this kit out, if for no other reason than to marvel at the contents of the box.

The other kit to check out comes from House of Balsa . . . its 40-sized P-51. House of Balsa also makes kits of high quality, and this one just might make up into a really nice Scale model with a minimum of effort. Do be aware of the fact that this kit is for Stand-Off Scale, so it may be necessary to make a few small changes if you're after something for AMA Scale.

That would seem to be enough concerning a few of the new products now available, except to once again mention that you are missing out on some really neato stuff if you're not paying attention to the many R/C-oriented products introduced each month.

FINISHING

No, I'm not going to go into a bit on finishing, although that isn't a bad idea for a future column. What I want to do is call your attention to an article that you may have passed over, the one written by Eloy (who?) Marez which appeared in the December '77 **MB**. I know that I read it twice, and it is really a super piece. Dig out your back issues and check it out.

Eloy mentioned a couple of things that, for some reason or another, were new to me and that I'd like to go over here. The first is that when going for a light finish, yet done up in more than one color, there is no reason to lay down the primary color on the whole model and then double up on the paint by spraying the secondary color over the primary. Eloy simply gets the model cloaked in primer, ready for color, and then butt-joins the different colors. A little overlap won't hurt, of course, but none of the usual procedure of doing everything one color and then adding trim over the top. Maybe I'm the last person in the world to hear of this weight-saving technique, but I really doubt it. You SSF's (Serious Stunt Fliers) out there are listening, aren't you?

Another trick from Eloy is the use of something called Liquid Masking film. This stuff seems to be worth trying, especially for those high-zoot, ultra-trick paint jobs that can be

difficult with good masking tape and impossible with cheapo masking tape.

Again, go back and read Eloy's article for the full picture of his way of finishing.

SUPER RPM

Quite awhile ago, I got a sample of this stuff, as did everybody else connected with the modeling press. You probably saw it advertised in **Model Builder**. And if you're like me, you laughed out loud at the claims made concerning "free" power, through decreased friction. Just dump this stuff in your fuel and beat the world, right? Only time I've ever added anything to fuel and got more power was when the can said "nitro" on the side of it.

However, feeling quite foolish, I went ahead and added it to some fuel I had around and that I didn't particularly care about. After all, what good is 15% fuel for, other than rinsing out engines?

If this script follows the norm, right here is where I go all giggly and tell you how much better the test motor ran on the fuel, after adding Super RPM . . . Wrong . . . Almost trashed a motor, in fact that piston/cylinder will never be the same again.

As Unca' Bill likes me to follow the rule about not saying anything if all you can say is bad (a rule I quite often ignore anyway), I behaved and didn't write about it.

AND THEN. . .

Just the other day I discovered that the gallon of fuel I added the Super RPM to is bogus. Mixed locally by somebody who was going to get rich selling fuel, it was a sample. Another fuel brewer out of business.

I quick borrowed a bottle of Super RPM from a friend and tried it again. Although I haven't tested it enough to lay out rpm gains and such, I am definitely getting some more power. So I'll do some more testing and let you know how it goes. Of course, you could get some for yourself and try it, you might just like it.

Via Gary James, word is that Bill Lee has seen an additional 700 rpm on his Slow Rat motor after adding 1% of Super RPM to his fuel. If Bill is done ripping Doc Jackson for material, he'll probably have something to say about it in his C/L Racing column.

RULES

As mentioned last month, the new AMA rule book will feature a whole bunch of new rules, plus the elimination of some Speed events. I can't emphasize enough the fact that you are going to have to be aware of these new rules, whether you like the changes or not.

Only problem is that the '78-'79 rule book most likely is not out yet, and I have heard a truemor to the effect that it may not be ready until April. Now that do make things a bit difficult, do it not? About the best I can suggest is that you check back-issues of the AMA News and/or contact your CLCB representative. Also recognize the fact that the summaries of the rules listed in the AMA News are just that, summaries, and may be misleading or even in error, when compared to the actual wording to appear in the rule book.

RULES FOR '80-'81

Coinciding with issuance of a new, two-year rule book is the opportunity to submit rules proposals of your own. Now's the time to seriously be thinking about submitting proposals, assuming you don't like certain rules. And if you like the rules as they now stand, it is also time to get prepared to do battle with those wanting a change.

Even if you are completely satisfied with the rules, there are lots of fun 'n games to be had by joining in with the rest of the rules proposers. The best way to enjoy yourself here it to pick an event in which you *do not* actively participate. With

an event in mind, decide how you can improve it (or screw it up) with a new rule. This new rule need not be logical, in fact, the game is more fun if the rule is *illogical*. The challenge comes in giving logical reasons for your illogical rule to be included in the next rule book.

For maximum pleasure, you may want to set up a point system for yourself. Various results of your new rule should be assigned certain point values. The point values and spreads are up to you (it's your game, after all) but I can suggest a few point-getters, just to get you started in this increasingly popular game. Obsoleting any equipment is good, with engines being the biggie here, the models themselves coming in a close second. Restrictions that don't restrict the pros, just the novices, are good. Got to drive that wedge between pros and novices even deeper, you know. If a manufacturer has developed an engine for a specific event, be sure to get that engine outlawed. Base your points upon how much money the manufacturer loses. Bonus points can be awarded if the manufacturer decides C/L is no longer worth the risk and switches to marketing R/C products exclusively. High-participation events that are reduced to low participation levels, due to your rule, count for a lot in this game. Another guaranteed point-getter is successfully getting a rule passed that is difficult (impossible is better) to enforce. An easy trick, and therefore not worth too many points, is that of getting a rule passed with a certain "intent" in mind. Of course when it appears in the rule book, many modelers will not be aware of this "intent" thing and will build to, or around, the rule to the best of their abilities. Naturally. We are talking about competition, after all. The fun comes when Mr. SeeDy wants to enforce the rule's intent, and not necessarily the black and white wording appearing in the rule book.

The absolute ultimate in acquiring points in this game is to propose rules for R/C and F/F events, assuming you are a C/L flier, of course. Even though it's been done before, removing any possible originality points, it's a good trick.

AND YOU THINK I'M KIDDING

I'm not, you know. We've had people play this game in the past, and we will have to put up with them in the future. It's already difficult enough just dealing with proposals written by well-meaning, but misguided or uninformed modelers, let alone these do-good types looking to top their last points total.

I'm tempted to give names and list examples of this game-playing, but won't, *only* due to the fact that what has already happened can't be changed by holding certain proposers up to ridicule . . . even though they deserve it.

Also, I would ask those who are honestly trying to improve an event, via the rule book we all most follow, to try their best to submit proposals that will have a positive, rather than a negative effect upon the event in question. ●

Half-A . . . . . *Continued from page 65*

Back to the regular column! Peck Polymers is kitting a rather nice R/C ship, the Mini-Bell. This is a scaled-down version of the model flown coast to coast in 1976. Scale-down is to one-third size of the modified Goldberg Senior Falcon. Power is a Cox Pee Wee or Tee Dee .020. Kit includes formed L.G. and canopy. Price is $14.95 at your dealer, or from P.O. Box 2498, La Mesa, CA 92041.

I have warned you guys that if I don't get enough good photos, I'll print my own airplanes. Just to show you it's true, there is a photo of my Scamp 1/2A stunter . . . again!

Finally, I am showing drawings provided by Robart of its new 1/2A

retracting landing gear. These are available in main gear pairs or trike configuration.

Russ Sandusky, editor of the CL-RPM newsletter, sent in a photo of his "Mighty Mouse Too", co-designed with Jerry Kasner. This model won the '76 Nats open class. Russ uses a Kustom Kraftsmanship ported cylinder in his Cox Tee Dee .049. Fuel is Magnum (sic) 50% nitro. Russ expects the model to be kitted by Midwest Models. His address is 1122 Plaza Cir., Joppa, MD 21085.

A couple of months ago I showed a photo of a Shoestring ARF model (all black with glitter tape markings). Anyway, I have since had a chance to fly this model, and I am really excited over its performance. The model was distributed by Hobby Lobby as an exclusive, but it since has been discontinued. Model Merchant's Rickey Rat is effectively identical, and now available. My model was sprayed with Foam Luster paint from Hobby Shack. The radio is a Sanwa 2-channel with a nickel-cadmium 225 mah battery pack in the airborne unit. The engine started out as an exceptionally good Tee Dee .049 and received a drilled venturi, a Kustom Kraftsmanship needle valve assembly, and is fed by a surgical tubing pressure tank. This model will literally stand on its tail and go straight up!

Final item for the month is a handy hint I picked up at my new job. They use cyanoacrylate glues (like Hot Stuff and Zap, etc.), but they completely avoid the clogged tube problem. They use a simple glue dispenser made from a sewing needle jabbed into a stick of wood. The eye of the needle will pick up and hold a small amount of adhesive, then let go of it where you touch it to a surface of joint. I don't know who thought this one up, but he deserves a standing ovation for solving my main frustration with the instant adhesives.

See you next month. •

Mirage . . . . . *Continued from page 23*

appropriate corrections were the solution.

Larry Wolfe owns a hobby shop in Southern California, and can be contacted at Jet Hangar Hobbies, 12554 Centralia Road, Lakewood, California 90715, phone (213) 860-7612. In the interest of furthering the ducted fan activity, Larry is happy to share his experience and knowledge on the subject with anyone needing assistance. He is also making the plans, fiberglass fuselages, and foam wing cores available at a very reasonable price. Several of his Mirage III's are currently under construction. If you would like to be a jet-setter, get in touch with Larry. •

Plug Sparks . . . *Continued from page 29*

(when the bearing started to pound out) and the cap filled to take up the slack. (Real shady mechanic work here!)

Timer casting was aluminum, with a standard auto type point such as found on OK .60, McCoy engines, etc. As noted by one reviewer, the timer arm was located in an easily accessible place to keep hamburger production down.

For those wishing to run a Wasp Twin, probably the best propellers were 14-6, 13-6, or 12-8 sizes, which gave 5700 to 6000 rpm using standard three-to-one fuels. As with most twins, the spark plugs had a tendency to foul, thereby impairing the starting qualities somewhat. Too bad that sales fell off so quickly as to prevent further refinement of this promising twin.

35 YEARS AGO, I WAS. . .

This latest story comes from Ernest Linn of Renton, Washington, as a result of some plan swaps. During the letter exchange, the columnist was able to obtain rare Kansas plans, put out by Orr's Book Store in the late thirties.

According to Ernie, there were three designs put out: Chieftain, Jayhawk, and Pacemaker; the first coming out in 1939. Bob Youngman designed these rubber-powered models, and the production and sales preceded a large contest sponsored by Orr's Book Store. The contest, of course, was limited to these designs.

Ernie notes the Jayhawk and Chieftain designs had no serious flaws and literally flew off the drawing board. The Pacemaker turned out tail heavy when built per plans. The wing mounting area over the cabin was not far enough aft to establish a proper c.g. location.

Linn realized this after watching test models perform, and made changes necessary for better flying. He also made some other small changes which did not prove significant in the big Orr's contest.

Came the day of the contest, and the wing location, as corrected by Ernie, proved to be quite effective. All the rest of the models stalled violently all over the place. However, Ernie outfoxed himself, as his model flew so smoothly it promptly disappeared in a thermal on its second flight, and was not heard of again.

The models that stalled in a thermal eventually came down, were retrieved each time, and naturally, made the three flight total! Ernie ended up in third place behind two of the poorer flying models.

Ernie says that regardless, those were great days, and the models did fly well when a little weight was put on the nose, something that Ernie did not care to do. He is still looking for the Jayhawk plan (as is the writer). Any help from the Kansas boys?

Linn recalls that the Chieftain and Pacemaker contests drew between 35 and 40 contestants. Total sales on each kit was probably between 100 and 150. Prizes were excellent! Linn, himself, received a bronze medal and an OK 49 for third place! Imagine that in a rubber-powered contest today.

The contests were held on the old Yellow Cab property, later occupied by Aviation Industries. This name is the one used by the Morton Brothers, who produced engines (including the famous five-cylinder) and also ran an aircraft school. The property is now owned by Beech Aircraft Company, as part of the factory premises. In line with promoting model aviation in this same area, the Beech Co. has provided part of their private park (about a mile north of the plant) as a model flying site. A fenced-off parking area is provided as a safety measure from the radio control runway and several control line circles. What a great deal for the Wichita boys!

Eventually, Ernie hopes to develop his technique sufficiently to be able to present these old rubber designs in a future issue of **Model Builder**. Let's hope Linn gets real ambitious!

SAM CHAMPS 1978

Maybe the columnist, in his capacity as SAM West Coast Vice-President, set a precedent by getting heavily involved in the staging of a SAM Championships, but it does seem a shame that President Joe Beshar is now saddled with the responsibility of putting on the Eastern SAM Champs. Worst part about the whole situation is that Joe will catch hell no matter which way he goes.

Latest dope resulting from a call to the Contest Manager, "Woody" Woodman, now shows a firmed-up site known as Coyal Air Drop. This is located off Route 72, about 16 miles southwest of Lakehurst NAS. With this large field, a full schedule of free flight O/T events will be run. Jack Florenzie will be the Contest Director for this phase of the SAM Champs.

Unknown yet, is the C.D. for the R/C events. However, Woody assures the columnist all radio controlled events (including ignition) that were held at the Las Vegas Champs, will be staged . . . plus a few more novelty R/C events. The area appears to be sandy, so bring some sort of rug or tarpaulin to work on your models.

Dates are not firmed yet, as Woodman wants to coordinate with the Nationals dates. It will probably occur in late June or early July. In any event, the information should be ready by the time you read this column. For further dope, write the SAM Contest Manager, Everett Woodman, 389 Floral Lane, Saddlebrook, NJ 07662.

ITALIAN O/T

No, it's not a joke. The columnist realizes this month's column is heavily radio control oriented, but the dam of information had to break loose sometime. Latest dope from Angelo Cocoon, of Milan, Italy, indicates that old-time flying is starting to take hold. *(Call it AMOT, for "Attsa My Old Timer". wcn)*

As Angelo put it in his broken English in a recent letter, "Now, I

and my friends have much work. We will launch in Italy a 'Old Timer Pestilence' in this next spring. Us made a contest in my town."

Laugh all you want, but he writes English a helluva lot better than I do Italian. Anyway, ain't that the greatest? Another bunch of converts to old-timer flying.

WEST COAST O/T F/F RADIO CONTROLLED CHAMPS

Well, kinda of a long handle, but that's what we are going to call it. It had been suggested by Otto Bernhardt, of SAM 49, to call this new Memorial Day meet the Pond Commemorative, but that is already tied up with the Santa Maria SAM 26 group for October 14-15 of 1978. Please note that date, as this is one of the best meets in California.

Latest information from Russ James, the Contest Manager, is that he has four fields available. Problem is to select the best one nearest to the best motels. This cornucopia of fields has been brought on by the new California law which limits the big land owners to 160 acres. About the only way a farmer can get around this ruling is to deed off 160-acre parcels of land to his sons and daughters, while keeping nominal managership. With extra 160-acre land areas just begging for a name, Russ has found that the owners are willing to allow the model airplane flyers to use the field(s) in their name. Is that ever the greatest! How would your club like to have a field just for flying models? Hot dog!

Anyway, getting on with the O/T F/F R/C Memorial Day meet, all events, at present, will be restricted to old-timer radio controlled types. This is to avoid any clash with the U.S. Free Flight Champs (also held on the Memorial Day weekend) which has old-timer free flight events as part of its schedule.

Before someone gets real huffy over the selection of the Memorial Day weekend by the R/C contingent, a careful research has shown that very few modelers fly both types of old-timers, ie., free flight and radio control. The sponsoring R/C clubs: SAM 27, 26, 30, and 49 have carefully polled their membership for opinions, and the net result is GO!

The meet will be run by the West Coast SAM V-P, John Pond. Solicitation of one person per day from each of the clubs will comprise the working force each day, as is so necessary to run a truly good contest. Announcements of the meet should be forthcoming early in February. (After all, I'm gonna be gone for a vacation.) At that time, in very similar format to the recent SAM Champs at Las Vegas, each prospective contestant will receive a contest announcement, with entry blank, motel reservations, and banquet tickets.

The meet is really shaping up as a big one, as this O/T R/C continues to boom. Latest information from Otto Bernhardt and Al Hellman, originators of SAM 49, the new Los Angeles Area O/T Club, is that they have acquired 40 members already!!! As this columnist has been preaching; whether it be free flight or radio control, you, as an interested participant in SAM activities, have to get out and sell this old-timer hobby of ours. We can no longer afford to sit back complacently, saying everything is fine, when the original (and sometimes old) SAM members are starting to fade away. The writer feels very keenly about the perpetuation of the old-timer movement.

SPECIAL NOTICE

As this month's column is devoted primarily to Texan activities, we should get in the notice that the MESS Club is going to put on a big old-timer meet at the Texas Christian Junior College South Campus, in Ft. Worth, on the 29th of January.

Incidentally, for those who don't know what the acronym MESS stands for, it is Metro-Electronic Soaring Sailplane Club. They have no officers, no meetings, no dues, and concentrate on only one thing: FUN!

At this meet, events to be featured will be the "15 Minute Add-Em-Up" Events for both Antique and Old Time models; Limited engine run events (20 seconds) for both antique

and old-timer models. Entry fee will be $5.00, to be divided among the first three places in each class.

As an added attraction, if three or more ignition powered models are entered, there will be a separate class for them! Contact C.D. Ernie Harwood, 2711 English Chase Ct., Arlington, Texas, for details.

SHOW AND TELL

That's what I am calling the wrap-up this time, as I will be in Australia just about the same time you are reading this column.

The writer was invited to Australia by his good friend, Brian Potter, of Tamworth, N.S.W., and before you could stutter out the words Jack Robinson, I was committed to being the event director for the Old Timer Events at the Australian Nationals!

Now you know old John; he will do anything, go anywhere, to promote old-timers. This trip is no exception. Best part of it all, you, the reader, will participate, as the columnist expects to feature a full writeup on the Old Timer Events at Australia in the March issue. So . . . Got your subscription renewed? Would hate to hear you missed this tidbit of old-timer activity.

The writer will also take his Jasco Flamingo with him to demonstrate Old Time F/F radio control, particularly the Texaco type flying, which features those most enjoyable leisurely type flights.

So, we're off to see the Wizard . . . err . . . I mean the Aussies. With my trusty 55mm 1.4 lens Topcon, plenty of good photos are going to be taken. You easterners can take pity on me, as I will be roasting in 90 degree plus weather. Haw!! Later on, I'll be down for the Mardi Gras in February, so see you there! •

F/F . . . . . *Continued from page 61*

the adult will be an affidavit that all models and times are accurate. List ages and hometowns of contestants, if available. Ceiling height must be listed.

All models must be constructed by the contestant.

Events:

1. Hand Launched Glider (try the Sweepette 16): Any design, all-balsa glider is acceptable. Contestant must launch own glider. Best two flights constitutes the score.

2. Hand Launched Stick: Any rubber powered stick design, with any covering is acceptable, including: AMA Cub, EZB, PennyPlane, AMA Stick, etc. Best single flight of unlimited number of flights. Contestant must wind and launch own airplane.

If you would like more information, or you are looking for the address to send your winning scores, contact: Ed Whitten, Box 176, Wall St. Sta., New York, NY 10005.

So. . . There are a few things for you indoor modelers out there to be thinking about.

Tom Hutchinson (again?) and I were talking about what to build for the upcoming season just about a week ago, when we were going through his large cardboard box of old glo engines. Fox Stunt .35, Johnson Plain Bearing, OS Max and the like. Most were in good condition, light in weight and unused at the present time.

Discussion drifted, as usual, to a comment made over a decade ago by Al Vela, "First get the power and then design the airplane." It seemed that there was a box full of power setting there in Tom's shop. None of them were really what you would call first-class contemporary engines; that is they didn't feature Schneurle porting, rear rotors, or $50 plus price tags. But they were available.

But, we asked, are the new hot engines really necessary to be competitive? In AMA gas, power-to-weight ratio is still the way to obtain hot performance from any engine/model combination. So, a cheap solution would be to match the design of the plane to the power available at hand. There's no rule that C ships have to be 800 sq. inches. Think about something like 400 sq. inches with a Fox Stunt .35. Aha, we said. The Fox doesn't have the horses of the K&B 40, but it's comparable in H.P. to a good .15 and only weighs 6 oz. With a total weight of say, 16 oz., and a 9 inch prop, you'd have a ship that could easily max on 12 seconds.

Another thing, for those of you who don't have some old lightweight engines setting around in a box, there are sources for such engines used. Your local hobby shop quite often is offered trades from modelers who are cleaning out these used pieces in order to buy the latest snorter. Ask the dealer. Ask some of your friends who have been in the modeling field for awhile. If none of these prove fruitful, try joining MECA, the Model Engine Collector's

Association. The membership fee is a paltry $5.00 per year. These guys (and gals) don't just deal in old ignition engines or rare one-of-a-kind types, more often they deal in common glo engines and the price for these engines will be quite reasonable . . . considering what a new competition engine could set you back.

Some engines which you might look for include; any Fox engine from .15 on up, any O.S. Max plain bearing, the Cox TD .15 or Mk II, Johnson plain bearing engines, Veco 29's and 35's. There are others, too. The main feature of the above engines is that they have a good power-to-engine-weight ratio, and are reasonably available at a moderate to low cost.

Now, lest you think the above is a pitch to not buy the latest Schneurle snorter, I want to set the record straight. You buy and build according to your needs and your pocketbook. The point I'm trying to make is that you don't have to have the newest and most expensive to be competitive in the free flight field. That's what it's all about in the free flight game . . . so get out and do it to the best of your ability, but get out and do it!

NEW PRODUCTS OF NOTE

A.B.S. (Adjustable Balsa Stripper) by Jim Jones. I received in the mail just today a nifty little product being marketed by Jim Jones, 36631 Ledgestone, Mt. Clemens, MI 48043, for $10.80 p.p., that has caused the house and the shop and the yard to be covered with little strips of balsa wood. This stripper is without a doubt the neatest and easiest to use gadget of the type that I've ever had the pleasure of trying out. It will cut strips from literally 0 up to 1/8 from

1/64 (or smaller) to 1/8 thick wood in extremely accurate measurements. I haven't yet tried it as a rubber stripper, but it could work there too, I think. Perfect for the indoor and outdoor modeler, for EZB, Penny-Plane and Peanut Scale, as well as other, larger applications. Fully adjustable up to 1/8 inch, it's a dandy.

Ultimate Dragmaster with F.G. Boom. RM Enterprises has produced the highly successful Dragmaster kit for over a year and a half now, but the kit features all-balsa fuselage construction. Recently a supply of quality fiberglass tailbooms was located and new kits are being offered with this boom. The price of the kit with boom is $27.50 p.p., within the U.S.A. Since there is a limited supply of booms, the time to order shouldn't be delayed.

While on the subject of RM Products, I should make a correction to my column in the December issue. The Zingo partial kit was incorrectly listed at $8.50. The correct cost is $12.00. Order from RM Enterprises, 3255 NW Crocker Lane, Albany, OR 97321.

THE END

That about wraps it and ties it up for another month. As usual, your cards and letters are encouraged. I usually respond to all of them, but it make take awhile. Drop me a line on what's happening in your area, and if you have a free flight newsletter, put me on your mailing list. The address is 1120 Shady Lane, Albany, OR 97321.

Thermals. •

Peanut . . . . . *Continued from page 55*

wire in Dick's gear will make it heavy if you don't. Besides, the landing gear system is amply strong and rigid with wire as thin as .015 diameter.

There are four exhaust stacks for the engine, located on the right-hand side of the bottom cowl block. Use 3/32 diameter aluminum tube or wood dowel to simulate the stacks.

The top of the fuselage is narrower than the bottom. The basic side structure is shown hatched on the plan. The uprights are all straight and thus lean inward. At the very front of the fuselage, the top and bottom are the same width, just behind the nose block. A 1/16 square stringer runs the full length of the fuselage, just behind the cowl and along the upper longeron, as far back as the back of the cabin, and then all

by itself back to the tail post. Taper it for the last two bays of the fuselage so it has very little thickness at the tail post.

Each wing has 3/4 inch dihedral under each tip. Note that the dihedral break is just a little further outboard on the lower wing, to match the fuselage width. Note also that the window goes only in the top wing, and the ailerons were carried only by the bottom wing.

The wing uses built up ribs. The bottom of the ribs are made from 1/16 square balsa and the top is sliced from 1/16 sheet balsa. Use rather hard balsa for the spars and notice that they are tapered. Tail surfaces are built flat over the plan, the wood pieces used are 1/16 thick by the widths indicated on the plan. Tail ribs, for instance, are 1/16 thick by 1/32 wide.

Scale tail area is indicated on the plan for you purists. After seeing Dick's model fly, I think the model would work with a scale tail.

The windshield is located in front of the front cabane struts. Side windows run from the windshield all the way back to the aft end of the cabin.

The bottom wing structure penetrates into the bottom of the fuselage, therefore there are three sets of reinforcements cemented above the bottom longeron, made from 1/16 sheet. They allow the lower longeron to be cut to accommodate the wing leading and trailing edge and spar. Afterwards, the gaps in the longeron are again filled in.

The cabane struts are a little more complicated than usual for a biplane. On each side they form a rough "W" shape. There is a "V" in front of the wing just behind the windshield, and there is an inverted "V" in the plane of the aft cabane as indicated.

The propeller is a Sleek Streek plastic one, but obviously other commercially available plastic propellers of the right diameter (remember you can cut them down to size) would be suitable, as would a self-carved wooden propeller. Noteworthy, is the fact that the propeller on the real airplane turns in the opposite direction to the common American propellers.

Cover the model with tissue, and use contrasting colored tissue for the trim and the registration letters. The model in the photos is mostly yellow, with a red nose, red fuselage stripe, and red wing tips. The tires, cabin outline, control outlines, cowling aft demarcation, registration letters and wing-walk are black. The wing-walk is on the bottom wing just to the left of the fuselage. The letters go on the top of the upper left wing and the bottom of the lower right wing.

The rear motor peg is made from a short length of 1/16 diameter aluminum tube. Birch dowel of the same diameter will also work.

The model should be made to balance at the CG as shown in the side-view of the plan. There are no warps or other adjustments on any of the surfaces, except for about 1/16 inch of left rudder, countered by the right thrust adjustment.

Dick has been flying his model on a single loop of 1/8 rubber 18 inches long. His model weighs about 15 grams, ready to fly.

What more can I say except, "See Dick wind up his motor more than a thousand turns. See Dick launch his model. See the LD 20b Peanut climb high into the blue. See it enter the nice thermal. See Dick run, and run, and run, and run, and run, and. . ."

Wouldn't you like to run too? Build a Lemberger LD 20b. •

Duckling . . . . . *Continued from page 62*

CONSTRUCTION

For best flight results the DUCKLING must be built light. Select your balsa with care. Cyanoacrylate adhesives will provide strong joints with a minimum of weight. They also greatly reduce construction time.

Fabricate the fuselage or hull first.

Cut all formers to shape. Lightening holes can be cut in each former if desired. Then cut the fuselage sides to outline. Lightly mark former locations on each of the sides. Make one right-hand side and one left-hand side.

Carefully cement formers F2, F3, and F4 to one fuselage side. Place this portion of the hull upside down and cement the other side into position. Pull the back of the fuselage together. Check for symmetry and apply adhesive. Cement formers F5 and F6 into place. Don't forget to epoxy the rear hook for the rubber to former F6 if CO_2 power is not used.

Pull the front together and attach former F1.

Epoxy the aluminum tubing for the landing gear wire to former F2 and seal the areas where the tubing exits the hull with epoxy. Epoxy the wing mounting wires into place. Be sure they are located properly.

Cover the top and bottom of the hull with 1/32 balsa. Note grain direction. Do not cover the hull top between formers F2 and F3 if CO_2 power is to be used. This area will be covered after the fuel units are in place.

Add the nose block and cut and sand it into shape.

Bend one-half the landing gear. Slide the wire through the tubing in the hull and bend the second half of the landing gear. Use 3/4 diameter balsa wheels to keep weight down. A hub of 1/32 ID aluminum tubing will keep them running true. Williams Bros. 3/4 diameter streamline wheels may also be used. Make hooks for the retraction rubber bands and cement them into place. The retraction mechanism (?) is foolproof.

Cut the tail surfaces to shape and cover them with Japanese tissue. Cement them to the hull.

Construct the engine nacelle. The nose block for rubber power must be a snug fit. Cut the opening in the top of the fuselage for the rubber power. Attach the nacelle.

If CO_2 power is used, the fuel storage units are wrapped in light foam and inserted into the hull before the nacelle is cemented to the hull.

The nacelle may be made stronger by applying a very thin coat of epoxy to its interior surfaces before attaching it to the hull.

Mount the CO_2 engine.

The entire hull was given two coats of Sig LITE-COAT and lightly sanded. The hull and nacelle is then covered with Japanese tissue. A final coat of dope was then applied.

Conventional stick-and-tissue construction techniques are used to fabricate the wings. After covering, apply two coats of thinned LITE-COAT. Sand lightly to remove any "fuzzies" that will cause drag.

Assemble the wings to the fuselage. Check for alignment and warps. Our model balanced about 1/3 back on the wing chord.

Test glide the model on a calm day and over tall grass. Add modeling clay to the nose or tail until a smooth glide is attained. We were fortunate. Our model balanced without clay having to be added. When glided from shoulder height and in a light breeze, the model would land 20-25 feet away.

Make the first test flight in the calm of the morning or evening.

Do not use a full CO_2 charge for the first power flight. This can be done by holding the model higher than the charging unit. Flight adjustments are made by changing the engine thrust line with shims cut from a 3 x 5 index card.

Use full charges for off-water flights.

Should your model be rubber powered, flight adjustments can be made by shimming the nose block. The amount of rubber power needed depends upon the weight of your model.

Our next step is to enlarge the model slightly and add a Cox .020 engine. An Ace Baby Pulse unit will be added for control. •

XP-55 . . . . . *Continued from page 50*

Even the usually forgiving tall grass was too tough!

An all 1/16 sheet stab was next slid through the slot. This brainstorm not only saw the stab continue to be broken up, but also resulted in damage to the forward fuselage. Frustration built up over a number of testing sessions, and even though the airplane showed promise in flight, the continual need for repair put a

damper on our enthusiasm for the design. A suggestion from one of my sons, that perhaps a tongue arrangement with knock-off surfaces would be the answer, was followed, and turned out to be even more successful than anticipated. In addition to completely eliminating the stabilizer damage problem, the 1/32 plywood tongue made the forward fuselage extremely robust and at the same time provided slight nose ballast. After this modification, the Ascender became the exciting, colorful . . . and durable performer originally envisioned.

Some concern was felt about the vulnerability of the wing-mounted rudders, but they have posed no problem at all over the course of many flights. The rudders are non-adjustable. What amount to elevons are outboard of the rudders, and they are adjustable. They were intended to provide tip wash-out if needed, but have not been necessary for that purpose. Test flying should begin with the elevons in neutral and adjustments worked in gradually as the model is brought into flight trim. The effect of the elevons will be found to be moderate.

Begin construction with the fuselage. Put down the keel pieces and glue on the half-formers. When dry, pick up the keels and add the other former halves. Starting at mid-fuselage, add the side stringers, working first toward the nose, and then toward the tail . . . whoops . . . rear. As stringers are added side-to-side, alternately, keep an eye on fuselage alignment. Note from the plan that the stringers on the upper rear air scoop are 1/32 x 1/16 square. Leave off the two uppermost forward fuselage stringers until the instrument panel former is mounted. When all other stringers are on, glue the sanded plywood tongue into place at the angle shown on the plan.

Fill between the adjacent stringers and the tongue with soft 1/16 sheet balsa. Fill the other fuselage areas indicated at this time too, except that area at the wing's leading edge.

Make the support for the motor peg of fairly hard 1/16 sheet balsa. The upper half of the forward cockpit former is made by wrapping a wet 1/32 x 1/16 basswood strip around a suitable form. Make the ends of this bow a little longer than actually required, and trim to size when cementing into place.

Carefully cut out that portion of former No. 4 indicated and install the instrument panel former, trimming as needed. The dashed portion of the keel running through the canopy area is cut out. Add the two upper forward fuselage stringers at this time. Make two 1/32 sheet balsa wing saddles, from the side view of the plan, and cement them in place. The fuselage should now be sanded and brought to readiness for covering.

The wing is built in five sections. The center section and main panels are constructed together, and after the dihedral is blocked in, are joined, with careful attention being paid to the important center section gussets. The leading edge of the center section is not shaped, but presents a square edge to the facing piece of 1/8 sheet balsa attached there. Construct the tips next, noting that the trailing edge, where the sheet elevons abut, is a piece of 1/16 sheet balsa tapered toward the tip. Add the elevons after covering the tips. Soft copper wire will make satisfactory hinges.

The rudders are simple. Cut them from warp-resistant sheet, with the grain running vertically. The rudders should be sanded but not doped until after they are mounted to the wings.

Trim and sand the wing panels, carrying the leading edge shape to the apex of the center section triangle. Cover the wing with Japanese tissue. White was used on the model shown here.

Attach the rudders to the main panels and when dry, cement the wingtips to the rudders, using care in alignment. Use a sealer on the rudders. Talcum powder in lightly thinned nitrate dope is suitable. Sand the rudders lightly between several coats of sealer.

The forward flying surface, or stab, is made of 3 laminations of medium weight, straight grained 1/32 sheet balsa. The middle lamination should be made first, fitting a blank against the fuselage, under the tongue, and sanding the edge until a flush fit is obtained. Trace around the tongue

onto the blank and cut out. Cement on the upper and lower laminations.

Sand the stab halves to a smooth, symmetrical section. Their plug-on fit should be snug, and may be tightened up by rubbing cement onto the upper and lower surfaces of the tongue. Since the stab isn't covered, it should be sealed and sanded prior to painting.

The covered wing may now be fitted to the uncovered fuselage. Some cutting and trimming will be necessary, particularly where the leading edge of the wing center section must be brought flush with the fuselage bottom. When you're satisfied with the fit, set aside the wing, and sheet that area of the fuselage around the wing's leading edge. Refit the wing, sanding and trimming the newly sheeted portion of the fuselage as necessary. Putting aside the wing, cover the fuselage.

Join the wing and fuselage, carefully checking alignment. Add the 1/16 sheet sub-fin and carve, hollow, and mount the lower scoops. Seal and prepare them for painting, as they are not tissue covered.

Brush a couple of coats of thin nitrate dope onto the entire airplane. Apply the wing fillets, made from the pattern on the plan, attaching first at the rear and drawing over the leading edge/fuselage junction. White glue works well for this purpose.

Color is applied by spraying the model with very thin, clear nitrate dope, tinted with Floquil, a model railroad paint. Apply the color so the dope is almost dry on contact, to minimize weight build-up. Upper surfaces are Olive Drab and below the color line, all surfaces are Pale Gray. Control surface and panel outlines may be black tissue strips applied with Scotch Spra-mount adhesive, or they may be inked.

The windscreen is formed over a balsa block, carved to shape, keeping in mind that the form should be made slightly longer and deeper than actually required so that the windscreen may be trimmed to fit properly.

Make a bond paper pattern for the canopy, cut out the window areas and paint the pattern olive drab. Cement the pattern to a piece of celluloid. The two cockpit components may be mounted to the fuselag with a fast-curing epoxy, using masking tape to hold them in place until the epoxy has set. Windscreen frames are simulated with bond paper and are painted with a small brush. A small brush may also be used to paint the airscoop inlets and the yellow numerals on the forward fuselage sides.

Insignia is done with blue and white tissue and is mounted with spray adhesive. The panel to which the exhaust stacks are attached is a rectangular piece of bond paper painted silver and affixed to the fuselage side where shown on the plan. The exhaust stacks are made of scrap balsa, painted black, and glued to the panel.

Initial glide tests are best performed without prop and rubber, but with the model balanced (with clay) where indicated on the plan. The plane is held by the fuselage just forward of the wing, and should be

"It takes skill to find wood like this."

launched slightly nose down, with reasonably good speed. Experiment with adding small bits of clay fore or aft until you've achieved the best glide possible. All this testing, of course, should take place over tall grass.

When the glide is satisfactory, install the prop and rubber, and wind in 200 or 300 turns. Pin the prop and check the balance point. Add or remove clay until the model balances at the point where the glide was best. Later, the clay may be replaced with bits of lead hidden within the fuselage.

About 3 or 4 degrees of down thrust should be built into the nose (tail) block, and the original flies with a little left thrust, too. That is, the plane of the propeller is offset toward the left when the model is viewed from above and behind.

Now let's try a powered flight. With low winds in, about as specified above, pitch the Ascender straight out, smartly. Increase the number of turns gradually with successive flights, making small incremental thrust line changes as needed. With full winds, my Ascender likes to be launched slightly upwards in a shallow left-hand bank. Properly trimmed, a fairly hard launch, in combination with the initial power burst of the rubber motor, will carry the model to altitude in a spectacular, sweeping climb. The cruise portion of the flight often finds the model circling randomly in either direction, and in best trim, the wide circling glide is gently undulating, paced by rhythmic changes in the speed of the free-wheeling prop as the Ascender swings in to land.

The free-wheeling propeller adds greatly to glide duration, and an adequate device is simply a piece of brass tubing, with a ramp-type notch cut into one end (ala plastic props), epoxied into the spinner. The notch engages the prop shaft when the motor is wound.

Best timed flight so far has been 42 seconds, with several untimed sorties estimated at around 50 seconds. A soarer she's not, but at her ready-to-fly weight of 1.1 oz. the XP-55, under cruise, is capable of riding passing thermals to higher altitudes. Four strands of 3/32 FAI rubber about 22 inches long are used for power, and they turn a carved balsa, 7-1/2 inch diameter left-hand (pusher) propeller.

If you build an Ascender of your own, you'll probably run into the same little kid I did, the one who's sure to ask, "Mister, how come your airplane flies backward?"

References:

50 Fighters 1938-1945, Aircam No. 51. Has 3-views and a color side profile of the prototype. Markings are also depicted.

Factory 3-views and a number of photographs are available from the National Air and Space Museum Library, as are 3-views by Mr. Len Wieczorek, FAC, which originally appeared in M.A.N. for July, 1945.

"Airpower", January 1973. •

Soaring . . . . . *Continued from page 33*

hedral cause the E-374 sectioned wing to exceed the stall angle on one side when yawing, resulting in a tip stall. Good stall characteristics have been achieved despite the high wing loading and aspect ratio by slightly blunting the leading edge on the outboard taper, together with a thicker tip section and 1° of washout.

"While almost free of induced drag, the fuselage does present several significant drag sources to be reckoned with. The form drag of the fuselage has been held down by employing minimal frontal area. Together with a small diameter tail boom, the surface area is kept to a minimum to reduce friction drag. The sharp nose provokes transition to a turbulent boundary layer, which is less prone to separation behind the wing/fuselage intersection. To reduce the drag associated with vortices generated by the corner flow at each intersection the total number of intersections has been reduced to 4 by using a shoulder wing and T-tail configuration. Protruding nose skids have been eliminated by taping a close-fitting fiberglass skid pan to the fuselage underbelly. Ventilation caused by air entering the fuselage in a region of high pressure, such as the tail area, and exiting in a region of low pressure, such as around the canopy, can perturb the boundary layer sufficiently to cause flow separation and excessive form drag. Drag due to leakage in this way has been minimized by sealing the fuselage internally with a foam core extending forward from the fin post to the radio compartment.

"The T-tail utilizes a flying stab to eliminate form drag resulting from separation at an elevator hinge line. The total stab area is minimal, 10% of the wing area, to cut down on skin friction. The airfoil section of the stab is a 10% thickness-to-chord symmetrical section with a conservative leading edge radius to give good pitch resolution about neutral. The T-tail places the stab above the downwash and turbulence coming off the wing, further improving pitch control and minimizing skin friction. In this position, the stab also functions as a tip plate to the vertical stab, thereby increasing the effective vertical surface area and the response of the rudder.

"These are the hand-waving arguments behind the shape, size, proportions, and weight used in the W-21 to achieve high performance slope soaring in storms.

"In contrast to a blissful summer spent frolicking in the warm breezes, you are ready to face one of the most demanding challenges in soaring, a storm. If ever you are to make this confrontation with success and know the overwhelming sense of triumph and accomplishment when it's all over, then both mental and physical preparation are essential

"First, you must know when to meet the storm. Check newspaper and TV weather maps and daily forecasts to learn if any major weather systems are approaching your area. The most favorable systems for bringing wind are generally low pressure and cold fronts. The winds accompanying these systems are systematic and can be predicted accurately, but the speed of advance of the system, and the path which it might take, are often poorly understood. When the daily forecast appears promising, check with the U.S. Weather Service, the U.S. Coast Guard, or a local airport, for hourly updates on forecasted wind and direction. Fast moving frontal systems can be hundreds of miles away when reported on the evening news and be upon you by daybreak.

"Once the storm hits, you must consider two elements before making the decision to fly; namely, rain and wind direction. You certainly don't want to be blinded and soaked in the rain, but a few brief raindrops are at least tolerable, and rain clouds are spectacular to soar under. Ideally, you want the wind direction to be head-on to the face of the slope and deflected no more than 40° to either side. If the wind is any more oblique than this, the lift will be poor, the turbulence will be gruesome, and you will be lucky not to splatter your machine all over the countryside.

"Unfortunately, the Weather Service may be misleading in its evaluation of the probability of rain at your local flying site. Generally, the greatest likelihood of sustained rain showers is during the early hours of the storm. If the sky is totally socked in, wait. If, however, the moisture laiden clouds are scattered or in discrete bands (squawl lines), then you usually can count on a reasonable dry spell for some very intense flying. You can judge your time by how quickly the next incoming squawl line appears to be advancing towards you.

"Many times, the rain squawls will pass to either side or totally burn out before arriving, and you'll never feel a drop. Often a storm only appears threatening, but actually has

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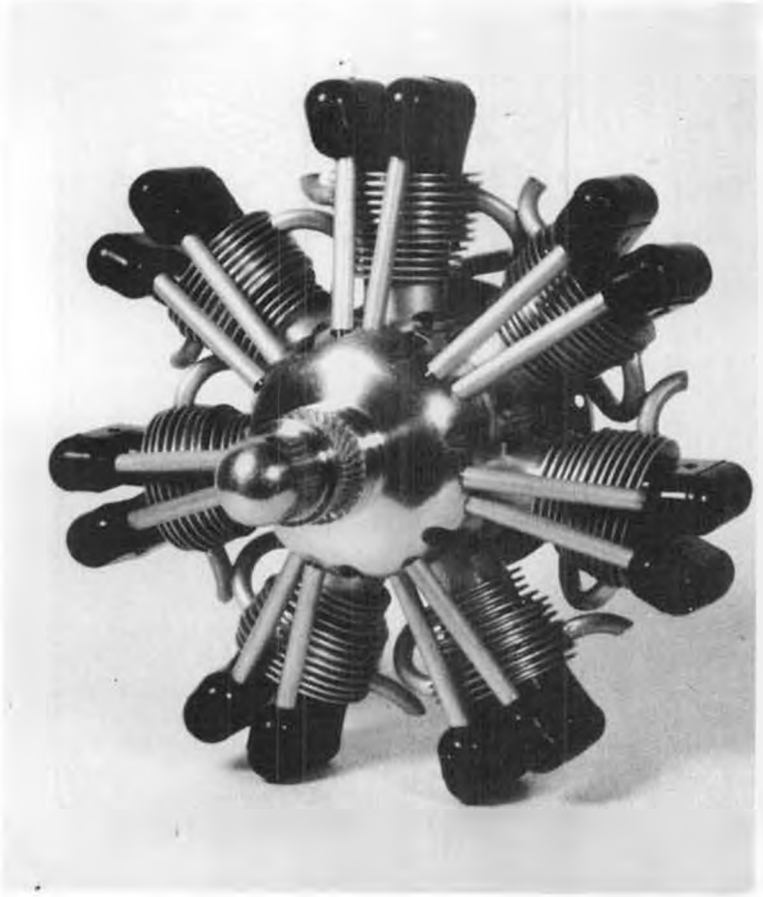

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a low moisture content, as is frequently the case with late winter storms. At other times, it simply pays to wait, because the strong winds and clear skies may be trailing the rain system.

"The wind direction may be quite Shove her off with all your might to penetrate the wall of high velocity air uprushing out in front. Upon leaving your hand, W-21 will bolt skyward in a nearly prone attitude, but may be blown back behind the slope crest if you are not quick in getting the nose down. Even if you get a wing high and she banks out of your hand, W-21 will most likely go up, provided you have thrown her hard enough to get away from the cliff.

"Once safely aloft, take a few minutes to get calmed down and explore the lift. You will find tremendous lift and climb rates around cliff level. However, in very strong wind, you will also find an abrupt, well-defined top to the lift. You will also encounter occasional turbulence bubbles, even at high altitudes, which may cause W-21 to rise, drop, or bank over sharply. This clear air turbulence is common in storm winds, and is due to shear when air at different altitudes moves at different speeds. When flying at cruise speed, most clear air turbulence phenomena present little more than a nuisance. But, if you run over a large bubble or a shear line at high speed, you might take off a wing. Once, an approach dive for a hot pass was interrupted when, incredibly, W-21 skipped sideways in the sky at about 800 ft.! One wing was bent vertically under stress, while the other appeared in it normal position! Even though no wing damage was sustained, the encounter was like glancing off an invisible stone wall. You should also be cautious about doing high speed flying

back behind the slope crest, where rotors and turbulence, shed from the lip and slope face, are carried by the wind.

"The rooftop on the lift will open up on occasions when active cloud formation is present along the ridge line. The ridge deflects the moisture laden winds aloft, where the water vapor condenses as a cloud and gives up its heat of vaporization to the air. This heated air rises, creating suction under the cloud. When cruising up on the rooftop of the ridge lift, you could be vacuumed-up into an active cloud as it passes overhead. I've recently had such an experience during a flight in 35 knot winds. W-21 began climbing at a high rate even though she was already at better than 1500 ft. Suddenly, it vanished into the downwind edge of a cloud that appeared to be thousands of feet above. Despite a desperate search of the heavens, the lean, white W-21 was never again sighted. To soar so high only to lose it all to the storm is the bitter sacrifice which must sometimes be paid to Nature for having the audacity of making such a challenge.

variable at lower wind speeds, especially under rapidly changing cloud cover. However, once the winds have built up above 20 knots, the huge inertia of the wind field makes abrupt changes in direction highly unlikely. Typically, as the storm moves, the wind direction will vary slowly in a manner characteristic of the storm path. You will simply have to learn the prevailing weather in your area to decide if an unfavorable wind direction will improve or worsen as the storm passes through. It's an agonizing decision to make when the direction is marginal, but the wind is turning 40 knots after months of 'drought'. Just keep in mind that there will be always be other soaring days, some almost perfect.

"Be alert while setting up and don't leave wings or tail surfaces loose on the ground where they might be blown away. Crimp the ends of the stab rods just enough for a good friction fit so that the stabs won't vibrate off in the gusts at the cliff edge prior to launch. Seal the wing/fuselage junctions and the canopy with Scotch tape to prevent air leakage for a performance increase of a few extra percent. Above all, have fully charged batteries, particularly in colder weather. Dress warmly, with a wind-tight parka and several sweaters underneath. You will not maintain good flying responses if you are suffering from exposure and numb thumbs. Good stick feel and control resolution is lost when wearing gloves. Instead, a ski hat slipped down the antenna and stretched over the transmitter and hands provides a warm pocket in which you may enjoy the tactile sensation of your control stick for prolonged periods. Wear a pair of goggles or close-fitting sunglasses to protect your eyes from windburn and blowing dirt or raindrops.

"Due to the tremendous velocities up the slope face from the storm winds, the launch is probably the trickiest, most dangerous event of the entire flight. It should only be attempted from the lip of the cliff. To avoid undue punishment from wind gusts, approach the edge with W-21 held low to the ground. Two friends, one at each wing tip, are usually necessary to accomplish this, and the launch itself. Once at the edge, raise W-21 square to the wind with your friends keeping the wings level by holding the trailing edges between thumb and forefinger.

With cloud base at 2500 ft., a glide-slope of 1/40, a cruise speed of 22 mph, and a tail wind of nearly 35 mph, W-21, trimmed straight and true, could conceivably have traveled 50 miles. Yet, late that day, a telephone call brought news of a ruptured scrub oak where W-21 had come to rest, intact! In a week's

time, the healing magic of microballoons and glass had restored her to operational status. The very next storm to visit California was met by W-21.

"The turbulence levels and the lift rooftop may also be altered by phenomena other than cloud condensation of squawls. Often the wind field is stratified, or layered, with heavier, cool, wet air beneath dryer, less dense air. When the stratified wind field is disturbed by a sufficiently high ridge line, a system of stationary waves will develop downwind of the ridge crest and may radiate to great altitudes (see Fig. 4-b). These waves are analogous to the waves appearing in rapids of running streams behind large submerged rocks. The difference is that the density drops sharply across the water/air interface in the case of the running stream, whereas the density decays gradually with altitude in a natural wind field. Consequently, the disturbance is not confined only to the lowest, most dense layer as in water, but may extend vertically great distances from the obstacle in a continuously stratified atmosphere.

"When the ridge line deflects the wind vertically, giving rise to slope lift, it also raises the air in the neighborhood of the ridge above its level of neutral buoyancy (where it usually rests). As this air is carried downstream in the wind field, it does not simply return to its resting level, but rather, oscillates vertically about that level, producing waves in the streamline picture on the lee side of the slope as shown on Figure 4-b. Lift is found on the upwind face of each lee wave, between trough and crest, where streamlines are deflected vertically upwards. This wave lift may become as intense as the slope lift, and be without the limiting rooftop, as shown in Figure 4-a. The lee wave amplitudes and the strength of the wave lift increases with increasing ridge height or stronger stratification, but decreases with increasing wind speed! Thus, wave lift is not apt to be a prominent feature of the wind field during all-out "super blows", when the wind gets up to 60 mph, unless of course, your slope is a mountain!

"However, at more moderate wind speeds, and especially with strong local stratification, lee wave amplitudes may grow to the size of the slope elevation or until the wave oversteepens and doubles back on itself, as in Figure 4-c. Once this happens, a local density inversion is produced, which is unstable, and degenerates into rotors and turbulence. The increased mixing promoted by turbulence reduces the stratification, and subsequently, the lee wave amplitudes. While lee waves offer a physical mechanism for extending intense lift bands and turbulence to extreme altitudes, they exist behind a given slope only with sufficient vertical stratification and for a limited range of wind speeds. But under the right conditions, they may be responsible for many of the strange atmospheric 'mysteries' that haunt your flying site.

"Endurance can be an important aspect of storm soaring. While your senses are adrift in a realm of speed and flight, you may be unaware of fatigue brought on by exposure to the wind and cold. Although long flights are challenging, you must not allow your concentration and reactions to become impaired by excessive fatigue. I've suffered through a 2-1/2 hour flight in a winter storm, but I was bone tired for the landing that followed. Be smart, and save enough of yourself so that you're still sharp for the landing.

"Sometimes it may be necessary to remain aloft and wait out unfavorable weather before attempting a landing. This is frequently the case when squawl lines roll in on you after you become 'airborne'. Unstable air with strong gusts and turbulence usually precedes a squawl, so it is better not to attempt a landing once the squawl line is close in. Find some shelter in a car or on the downwind side of a large parked hang glider, and don't allow anything to get between W-21 and the transmitter antenna. If it starts raining, W-21 will require full up trim once she gets wet. The rain is bad for your transmitter, so keep it dry. The rain will not harm your sailplane, but it will drastically reduce the visibility, so keep W-21 in close and well below the cloud base. The greatest danger is the possibility of the rain becoming hail. Should this happen, land as quickly as you can, because the soft balsa tail group providing all your control will take a horrible beating every second you remain aloft. Once a squawl passes, there is usually a spell of smooth, clean air, providing an ideal time to get the wings dry and attempt a landing.

"In many respects, landing in strong wind is easier than in weak conditions. This results from strong head winds on final approach, substantially reducing the speed of the W-21 over the ground and allowing you to more or less 'park it'. However, turbulence and rotor activity is greatly increased in stronger winds. You must be extremely alert on final approach, ready to counter

with elevator any sudden ballooning or nosing over when flying through a rotor. It helps to know your slope and to know where the least amount of rotor activity will be found for a given wind direction. Remember, your best defense against a rotor will be high flying speed.

"If you remain quick and consistently correct in your judgements, you've earned the right to flight in storm. The grandest of days is realized when you turn your wings toward the awesome might of nature. There is so much of the wind and the sky to be explored!" •

F/F Scale . . . . *Continued from page 53*

of tissue the same color as on the model. This way you can easily align and apply them one by one. Once this has been completed, the tissue is trimmed close to the lettering. This, in turn, is applied in the proper location with clear dope. Too much dope will have an adverse effect on the letters, so be careful.

Another nifty approach, used by Jim McMahon, is to use some of Floquil's paint thinner, called Dio-Sol. (Available in most model shops, particularly those which carry model railroad supplies, or lots of plastic models.) Place a drop or two on the Letra-Set letter you want to use. The Dio-Sol will remove the letter from its backing. Slide the letter or numbers in place much the same way as you would a decal. When you have them all in place, follow up with a spray coat of Testor's Dull Cote or equivalent. This really makes a very neat job.

An idea that I haven't had the time to try, is to line the Letra-Set letters onto a scrap piece of decal paper. (Many decal sheets have plenty of blank space for this.) Carefully rub the letters onto the decal sheet. Spray on a thin coat of Testor's Dull-Cote. When this is dry, apply like a regular decal. I hope to do this on some of the panels on my full size model. The advantage to this latter system is that you can align everything perfectly before putting them in place. In my case, I have to be sitting in the cockpit, and trying to align small letters will be rather difficult. I see no reason why this system shouldn't work.

"Let's put some of that magic of flight into our marriage."

Last month, I mentioned the neat way George James finishes his rubber models. Well, he has come up with a real neat way to make round type of fuselages, particularly on Peanut and Walnut size models. Look at the illustration. Let's take the Peanut Corsair featured in **MB**. The average modeler may shy away from building this type model for several reasons. One is all the wild bulkhead shapes cut out of very thin sheet balsa. Building a model of this type on a half-shell construction basis is a real pain. George's approach to this is really unique. He first takes two balsa blocks and tack glues them together so that he has an upper and lower half of a fuselage, instead of a right and left side. He then carves out the fuselage shape but 1/8 inch underside. The illustration will show why this is necessary. Locate the various bulkhead stations on the fuselage, all the way around. The fuselage halves are then separated. Each half is coated with wax or soap,

or even Saran Wrap. Take two laminations of 1/32 x 1/16, or 1/32 x 3/64 basswood, and wrap them over the upper fuselage half at each station. They are held in place by pinning them on the bottom of the upper half. The same is done on the lower half of the fuselage. When the bows are dry, carefully trim the excess material on the bottom without disturbing the bows. Place the fuselage half on your workboard and pin it down. Take two pieces of 1/16 square and glue one on either side, tangent to each bow and flush to the workboard. The same procedure is followed for the lower fuselage half. Next, glue in place the remainder of the stringers on each half. By now, you can see the advantages of using this system. The structures are now removed from each respective half and are glued together. Maybe you would want to add sheeting between the stringers before removing the structures. Certainly it would be much easier. Also, a thought would be to add sheeting only to the nose area and leaving the stringers only from that point aft.

Once the structures are glued together, a nose bulkhead is needed to tie it all together. One easy way to do this is to place the two fuselage blocks together and trace around the front onto a piece of sheet balsa. Figure how the landing gear goes in and reinforce that area, and don't forget to add balsa around the area of the rear motor peg.

The variations to this sytem are endless. Here are a few ideas that quickly come to mind. When carving a fuselage, use polyurethane type foam or equivalent. This will make the carving task quite easy . . . more on this a bit later. Instead of using 1/16 stringers, 1/20 square or even 1/32 square could be used. Just remember to make the proper adjustments when carving the fuselage.

While at breakfast before a contest recently, George, Tom Laurie and I discussed other possibilities for this system. How about cutting out a foam wing with a hot wire, using root and wing tip templates for a guide. This foam wing would have to be cut undersize for the same reason as the fuselage. The rib stations would then be marked onto the wing core, followed by the wax. The wing ribs would be made in the same manner as the fuselage bows, using two laminations of basswood over each rib station. If the wing did not have a flat bottom airfoil, like an RAF 34 or M6, the bottom ribs would have to be laminated in the same way. These in turn would be glued onto the appropriately sized wing spars. A leading edge and trailing edge would follow. Can you see how easy a tapered wing would be with an RAF 34 airfoil? I can hardly wait to try this system out!

Getting back to carving a fuselage, whether out of wood or foam, the principle is the same. Many of you new-time modelers may have never ventured into this area of modeling. It really isn't difficult at all. First trace the fuselage profile onto the block and cut it out, using a jigsaw or band saw. Next, trace the top view onto the block and cut around these outlines. Look at the illustration. Use the bulkhead cross-sections as shown for templates for your carving. With the foam, you will find that you will be able to remove minute amounts of material, so you can be right on with your carving. Remember that the bulkhead templates have to be undersize by the amount you decide to make your bows and stringers. Once you have tried this, you will probably want to make models you've wanted to tackle but didn't because of the complexity of the fuselage shape. Now you have no excuses!

Another illustration shows the way I hooked up my landing gear on a French bomber I built for the Flightmasters multi-engine contest. It's no big thing, but I thought that I would pass along the idea, since it does

work pretty well. Often a particular model will have the gear strut attach to the bottom of the wing, or as in my case, on the bottom of the engine nacelle. If this strut is made rigid, a hard landing can do away the wing or nacelle. The illustration is self-explanatory, but I'll make a few additional comments that may be of help. I used the smallest Robart "horny hinge points" available. This may depend on the size of your model, but the smallest may work for any size model. The wing or nacelle is reinforced with a small block where the hinge point will be attached. When block has dried, drill the appropriate size hole and insert the hinge point so that it can swing fore and aft. I used 3/32 I.D. aluminum tubing and epoxied the other end of the hinge into the tube. I made a couple of small springs by wrapping fine piano wire around a small drill. These were inserted into the tubing, followed by another piece of aluminum tubing with a 3/32 O.D. that has one end flattened out with a hole in it to fit over the axle. That's all there is to it, and as I said before, no big thing, but it does do the job.

Lastly, I want to comment on the progress of my full-size bipe. This coming weekend, I'm taking the fuselage and tail group out to the airport and leaving it with the designer. This way, when the wings are covered and painted, he will be able to rig for me, and help me with other details. It's really a pretty good deal. So, after all these years, the end is just around the corner. •

Sailing . . . . . *Continued from page 41*

a repeat of the first weather leg.

The other point of sail to be mentioned is shown at E. Often times, the final leg will be a run to the finish. In this case, stay right in the strongest current you can find and ride it right to the line.

Through this whole discussion, we have worked in an absolutely constant wind field. I'm sure your first day on the water convinced you that such a condition doesn't really exist. So, like everything else in sailing, you'll have to continually balance the benefits of wind shifts against current strengths. Where and what the competition is doing will determine your choice of tactics on many occasions. But if you are struggling along in the middle of the course and happen to notice another fellow sneaking quickly up the side, you're probably sailing against another **MODEL BUILDER** reader.

WIND DRIVEN CURRENTS

This situation occurs most often on ponds that we are prone to sail on. The way to assess what's happening is to stroll around the puddle and toss a handful of grass into the water every few steps. The grass lies flat on the water and is indicative of the water movement rather than of the wind movement just above the water, which may be entirely different. These currents are the result of wind stress on the water. The wind pushes the water up to the pond, and a means has to be found for it to flow back. Wind often lifts off the surface of a pond near the edges in response to beaches or bluffs. The immediately adjacent water is not pushed by the wind and can move toward areas where the water has been literally blown away. Consider the case of a circular pond with a uni-directional wind, as shown in Figure 2. Places where the wind actually pushes on the water are shown stippled. All the water gets pushed downwind toward X. When it gets piled up enough (maybe a 1/4 inch or so) it will naturally flow downhill. The nearshore currents result. A typical flow regime is shown for Section A-A in Figure 3. In this case, a nearshore current can be the largest water movement in the pond. Take advantage of it if it will help

you, or try to lead your competitors into it if it will hold them back.

Remember to send in your $5.00 annual dues to the Secretary, AMERICAN MODEL YACHTING ASSOCIATION, 2709 S. Federal Highway, Delray Beach, FL 33444. And I'll continue to field questions, either directly to **MODEL BUILDER** or to me at 7608 Gresham St., Springfield, VA 22151, as long as a self-addressed, stamped envelope is included. ●

Pylon . . . . . *Continued from page 21*

area. A couple of years back, the Northwest was a hot-bed of racing activity, but for some reason, it died out. Well, you guys up that way had better start building, 'cause it's on the upswing again, and now's the time to get into it. Don't know who's spark-plugging (glowplugging?) the activity, but if you contact Vince, I'm sure you'll be given a steer in the right direction. Contact him at 14203 121 St. N.E., Kirkland, Washington 98033. We received the Boeing Hawks newsletter shortly after talking to Vince, and we're printing a small part of it here. Thanks, Vince.

WINTER SEASON OPENS

I'd hoped that we would make this season even better than last year's very successful season, and judging from the October Race, we will! Twenty entries started; 7 of last year's 20 experts remembered where they put their airplanes and radios, and 13 standard class flyers made it. That's not a bad start! Not only did the two-class system get new blood, it made for some really good racing in both classes. The experts had to beat each other, and Bill Warner and Ralph Cooney were best at that. They were so good that they almost beat each other out of first place by mid-airing in the fly off. Cooney was awarded first, however, since Bill had just cut his 2nd pylon of the heat. The longer course really shows in the time. Fast time was a 1:47 . . . last season you had to turn in the 1:20's to take fast time. The long course does help the new fliers in standard class. The extra straightaway time is enough to make it a much calmer scene for nervous thumbs.

Gary Stevens took standard honors, and turned a 2:04 doing it, which is quick enough to earn him a nomination into the expert class. Roger Wilhelm showed a lot of potential in his first race ever, and earned a solid second place. Third ended in a tie between the two guys with the worst average times of the field . . . Joe Harris and Bill McNalley . . . consistency counts!

An innovation worth noting was the way the races were officiated. Other than Dick Kelley (who volunteered to be our starter) and "Leroy from Everett" (who

kept score and manned the starting line headset), all other positions, i.e., lap counters, timers, pylon judges and pit bosses, were filled by flyers from the class which wasn't flying at the time. A total of 40 heats were run, and everyone seemed to enjoy themselves throughout the day.

SEASON WARMUP AT MARYMOOR

It's been a long time since any races have been held at Marymoor Park, but the SAMS decided that Formula 500 was up their alley and sponsored a warmup for the winter season on September 18th. Six expert flyers and 11 standard class flyers flew a total of 28 heats of exciting racing. Chuck Thomas took 1st in standard class, followed by Gene Weaver and John Hurly. Expert was taken by Nelson Eddy, with Bob Hunt and Al Watson following. Maybe the SAMS will do it again? Soon?

PORTLAND WINTER SEASON

Ralph Cooney tells me that the Portland Season will be limited to 1/2A Racing. Races every third Sunday at Delta Park.

SPEAKING OF HALF-A

Al Livesey passed on that the RCFCBC winter season at Boundary Bay will also be 1/2A.

CANADIAN WESTERN PYLON CHAMPIONSHIPS

The RCFCBC is really hot on Pylon Racing, and it shows in the way they ran the championships at their beautiful Boundary Bay field. A first class event in every way. Saturday was taken up with Open and Sport pylon. These two events are equivalent to our Formula 500, except in the engine/prop category. Open means anything goes . . . FI with a F500 airplane. Sport is closer to our rules, except they allow front rotor/side exchaust, Schneurle ported engines and modified props. They fly the Formula One course and most flyers use the same engine/airplane combo in both events. The results are interesting, especially in light of the current 15% Formula One rules proposal being pushed by Terry Prather and Jim Gager.

Fast time for Open was 1:42, while Sport was only six seconds behind at 1:48. Not much difference in speed, but a whole lot less wear and tear on engines and $$ . . . which is what the proponents of the 15% rules have been saying. With all the local talk of resurrecting Formula One with a Northwest Racing Circuit, maybe we should take the 15% fuel seriously, it might bring a few more fliers in.

Quarter Midget and Formula One were flown on Sunday. Don Rice took 2nd in Quarter Midget with his factory Cox engine up front and I took third with my already crummy looking Rickey Rat, looking even worse than normal. We made a family weekend trip out of the races and made the mistake of taking our dog with us. Saturday night we went out for dinner and left the dog and my air-

planes in the motel room . . . the damn dog got mad at being left behind and ate one of the airplanes. Fortunately it got sick before it could eat the whole thing! Rice and I are still arguing over who took fast time. We both turned around 1:34. We should have taken the top spots, but Don's hot Cox can't idle (he lost 2-1/2 points), and I managed to flood my Rossi for a no-start.

Formula One saw 19 entries, including Nelson Eddy, Bob Hunt, and myself from the local area. Nelson was very fast, and should have won, but he double-cut in the fly-off and then lost his airplane and hot X-40 to a radio failure. Nelson was consistently into the higher 1:20's. Bob Hunt was fast enough at around 1:30 to 1:32, but managed to nose over twice at the starting line. My entry couldn't be taken seriously, having been scrounged up in the two weeks before the race. I flew Pfieffer's old Midget Mustang with an FAI HP40RR that I got from Bob Mikko. I test flew it 10 minutes before the first heat . . . managed to pull a whole series of first race boners and still really enjoyed myself! But watch out next time!! Equipment was mostly X-40's and Li'l Toni's, like every place else!

Next up, we have a short notice that John Kilsdonk sent along with some photographs. Herrrrrre's John:

HOW FAST IS IT

In order to determine just how fast we are going, the following summarizes the average speed for each of the four racing events. Notice that I said average Undoubtedly the top speed down the straight always is somewhat higher.

EVENT	COURSE (FT.)	NOMINAL 10-LAP TIME	FT/LAP	TIME/LAP	AVG. LAP SPEED
1/2A	300 x 100	1 Min. 40 Sec.	911	9.52 Sec.	65.16 MPH
QM	478 x 100	1 Min. 40 Sec.	1263	9.52 Sec.	90.34 MPH
Q-500	608 x 100	2 Min. 0 Sec.	1521	11.42 Sec.	90.70 MPH
Form I	608 x 100	1 Min. 20 Sec.	1521	7.61 Sec.	136 MPH

Above assumes: 30 ft. radius turns, clearing all pylons by 10 ft., and first lap takes 50% longer time than others.

While some people will probably not agree with my assumptions, they should be in the ballpark and close enough to warrant a valid comparison.

It is interesting to note that the Q-500 and QM lap speeds are about equal. However, the QM is probably a faster airplane because it's flown on a shorter course as opposed to the Q-500, which has more time to unload down the longer straightaways.

Next in line is a race report sent along by Art Arro.

FORMULA I RACE REPORT

The Toledo Weak Signals R/C Club hosted its Formula I race on September 11, 1977. Nineteen fliers attended the event, which was flown under ideal conditions of wind, sunshine and humidity. The race was professionally run by the Weak Signals who are best known for their annual trade show and conference. Dave Whitaker was the Contest Director. The field was excellent, with a paved runway for takeoff and acres of golf-green for landing.

Five rounds were flown, with three-plane heats due to frequency conflicts. Flyoffs were run down to 8th place. Bill Hager emerged as the winner, with a perfect 15 point score. He also won the $50.00 cash prize for the fastest time of 1:21.0. Dave Keats was hot on his tail, with 2nd Place and the 2nd fastest time of the day. The heat in which they flew together was anticlimactic, in that they both cut on the same lap and back-pedaled for the rest of the race. The only crash occurred when Frank Morosky's "Ballerina" shed a wing at No. 1 pylon.

Cash and certificates were awarded to the top fliers, and every contestant received a merchandise prize.

See you next month. Jim ●

Counter . . . . . *Continued from page 9*

operating instructions. This brand new boating accessory is priced at $59.95, through your dealer. For further information, contact MRC at 2500 Woodbridge Ave., Edison, NJ 08817.

* * *

It doesn't take long for even the newest modeler to discover the advantages of socket head bolts over the screwdriver slot bolt. And it only takes one time around for him to find out that a soft metal L-shaped hardware store Allen wrench is not the most desirable for our use. The 'L' gets in the way, and even a fair amount of torque will round off the end of the wrench.

Du-Bro to the rescue! Its set of two 6-inch screwdriver handle, heat-treated wrenches will handle both of the popular sized bolts, the 4-40's and 6-32's. The 4-3/4 inch long shank reach almost anywhere in your model,

and the ball-end will allow operation at any angle that you are liable to encounter.

The set, designated No. 132, is priced at $3.95, at all Du-Bro dealers. If for some reason they are not available at your local shop, write Du-Bro Products Inc., 480 Bonner Rd., Wauconda, IL 60084.

* * *

The Testor Corporation, long-time manufacturer of many well-known hobby items, has just announced a new line of hobby finishing supplies. Included is Testor Washable Sandpaper; flexible, tough, and reusable, for wet or dry sanding. The 69¢ package contains 5 three by four-inch sheets, in grades from coarse to ultra fine. This polyester backed sandpaper can be wrapped or glued around any shape block for precise sanding.

Precision Gluing Tips in a 47 degree angle are available at 5 for 59¢. They fit on the end of the Testor glue tube (and some others) and allow application with greater control and accuracy. Testor's Hobby Knife is low priced and disposable, though the blade material can be resharpened on a honing stone, thereby stretching the initial 49¢ cost.

And last, but not least, to keep your work surface clean, a 24 by 36-inch Drop Cloth, impervious to all Testor products, and many generally used supplies. It is imprinted with information about modeling tools, materials, and procedures. It is priced at only $1.69.

Look for this attractive display rack at your local store. From Testor Corporation, 620 Buckbee St., Rockford, IL 61101.

* * *

There certainly aren't many R/C airplanes of this type around, a fact which makes it impressive to many of us. It is an Anderson Kingfisher, a four-channel, .60 to .80 powered amphibian for Stand-off Scale.

It sports a 72 inch, 750 sq. in. wing, 6.5 to 7.5 pound flying weight, and is mostly balsa construction, with

ABS preformed tip floats, cowl and nacelle. It features pre-cut and predrilled balsa, plywood, and hardwood parts; hardware, full size plans, and isometric drawings.

It should be on your dealer's shelves by January; ask him to reserve yours. Or check directly with Champion Model Airplane Co., Inc., P.O. Box 45, Keyport, NJ 17735.

* * *

Fourmost Racing Products, 4040 24th Ave., Forest Grove, OR 97116, has just introduced its new hinge assembly tool, the "Gapless Hinge Slotter" designed to make accurate centered slots in control surfaces for installation of the Fourmost "Gapless Hinge". This slotter will work on the four most popular sizes of wood as used for control surfaces; 3/32, 1/8, 3/16, and 1/4 inch. It uses a replaceable and easily available hobby knife blade. Our tests showed that an Uber Skiver No. 15 blade is ideal in shape, will not lose the tip on the first cut, and holds its edge for an extremely long time.

In use, the cutter is adjusted for the proper wood thickness, following the simple instructions. The tool is then run across the edge of the wood until the blade has reached the required depth, after which the hinge is inserted and bonded with cyanoacrylate. We feel this $1.95 slotter will pay for itself the first time it is used in time-savings alone, plus assuring you of the precision and security so important where controls and hinges are concerned.

* * *

If you saw the photo first, couldn't figure out what it was, and have been frantically searching for this paragrph, welcome to the club!

Available only from Kiteworld, Inc., 540 De Haro, San Francisco, CA 94107, the "Superkite" called a "Flexicoil Cyclone", is said to perform like no other kite available. It is a two-stringer that can be controlled into loops, dives, and figure eights.

The more wind, the better, for this flying sleeping bag. Sorry, we did not receive price information from Kiteworld. When you write to ask, mention **MB**.

* * *

As part of its Rocketry Exploration Series, Centuri Engineering Co. has just released its "Power-System Outfit", for beginners in this scientific hobby.

The "Power-System Outfit" is described as NOT a quickie starter set. It offers features not previously

seen in rocket outfits, from 12 engines and 7 vehicle configurations, to a heavy-duty launch system.

We are impressed with the manual that comes with this outfit, entitled "Rocketry Exploration Handbook", but which could truthfully be renamed "All You Ever Wanted to Know About Model Rockets But Were Afraid to Ask". It takes you into rocketry in general, its principles, and its history. You will then read about basics, types, engines, and launchers. You are then ready to proceed to construction, finishing, and flying, and on to specific projects. Then you receive guidance on how and where to advance, and you read about those all-important safety precautions.

It all blends into an ideal combination: an assortment of the proper materials, with complete and thorough instructions. Priced at $25, the Power-System Outfit is claimed to contain more than that amount in individual parts value. Try your nearest rocket dealer, or write Centuri Engineering Co., Inc., Box 1988, Phoenix, AZ 85001.

* * *

There is no way that anybody would ever call me a boat fan. I can not tell port from starboard, or fore from aft; though I can identify an anchor. So therefore, I am usually more impressed with the esthetics and workmanship of model boats than I am with construction procedures and operation. But what immediately caught my eye and impressed me about the material received on the Replica Seacraft scale model boats was their statement that the concept is total individual involvement in the construction. No parts are precut or premolded. The individual builder is challenged to express his craftmanship at each step of construction.

Yes, it means more work, guys, but as with the airplanes which are my first interest, the really impressive ones are the ones that took the work, not the plastic toads or the boxes without canopies that we see at the field.

These model kits closely follow shipyard techniques in constructing ferro-cement and fiberglas boats, from the laying of the keel to the rigging of the sails.

The techniques are all new, and some are even patented, and the kits are recommended for individual building as well as classroom or family projects. Available now are kits for the "Friendship" sloop, Herreshoff's sloop "Prudence", and a Cape Cod Catboat. Each kit is priced at $19.95. For further information, contact Replica Seacraft, High Ridge Park, Stamford, CT 06905. Tell them **MB** sent you.

Remotely . . . . *Continued from page 16*

Top Flite is also producing a reasonably priced 18 x 6 prop.

Ron Shettler has left-hand prop adapters in stock for those who wish to use the Quadra rear shaft for a pusher configuration. He also has Klunk filters that have a helpful feature. As long as any part of the filter touches the fuel, even if the fuel is foaming, the fuel will wick over and be supplied to the engine in a steady stream.

Du-Bro Big Wheels and Prop Drive Units are available, and if sales are any indication, a bunch of people are building Mammoths.

Fox is developing metal hub wheels up to 6 inch diameter in the Cub series (See "Over the Counter").

We are quite elated over the amount of involvement in Mammoth Scale by the model industry. We would like to hear from anyone, modelers or industry, who is building or manufacturing the big stuff. How about dropping us a line and letting us know what you are doing? •

Workbench . . . *Continued from page 6*

at the WRAMS, TOLEDO, IMS, and MAC Trade Shows, as well as from National Scale Association president Bob Underwood, 4109 Concord Oaks Dr., St. Louis, MO 63128. Price is $1.50 each, or 3 for $4.00, postpaid. They should be available by mid-February.

CORRECTION

In last month's Craft-Air ad, the prices of the Field Support Box and Bull Pup kit were switched. Craft-Air's Tom Williams commented that he wouldn't mind selling the ready-to-

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.

DECAL REPRODUCTIONS: N.A.A., O&R, Forster, Drone, Dooling, Super Cyke, Champion and others. 23 varieties on 6 sheets $7.50 p.p. Larry Vance, 5066 Cindy Way, Las Vegas, Nevada 89102.

TISSUE PAPER: 19 colors, 15¢ per sheet, S.A.S.E. brings free sample. Bill Wilson, P.O. Drawer U, Kountze, Texas 77625.

WANTED FOR CASH: Old spark-ignition engines, parts and plane kits. Russell Stokes, Rt. 1, Box 73J, Keller, Texas 76248.

AIRCRAFT MODELERS: Interested in in-depth kit reviews, detailed modeling articles, accurate drawings, and clear sharp photos? Then try "Plastic Aircraft Models (PAM NEWS) magazine from England. Send $1.00 for a sample copy or $9.00 for a six-issue subscription (make checks payable to "J.J. Daileda") to USA/Canada PAM NEWS Agent, 4314 West 238th Street, Torrance, CA 90505.

COMBAT FLYERS . . . Get in the air fast with a CORE HOUSE plane. Almost-Ready-to-Fly Gotcha — $26, Axe — $22. Send S.A.S.E. for complete info and details. The CORE HOUSE, Box 300A, R.D. #2, Palmyra, PA 17078.

FLYING PAPER AIRCRAFT: New books each containing 18 cutout replica paper models that fly. No glue required. $2.73 each postpaid. Specify Volume I, II, or III. L.B.J. Enterprises, Dept. MB, P.O. Box 180, Getzville, New York 14068.

MODEL AIRPLANE PLANS: Peanut, Walnut, Hazelnut, Rubber, Gas, CO_2. S.A.S.E. for list. Modernistic Models, P.O. Box 6974, Albuquerque, New Mexico 87107.

.020 Replica Kits: PLAYBOY SR., STRATOSTREAK, BROOKLYN DODGER, SO-LONG. FREE PRICE LIST, J & R Models, 5021 W. Sheridan St., Phoenix, AZ 85035.

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John Targos, Sec/Treas., 3229 Dianora Dr., Palos Verdes, Calif. 90274

use, roto-cast polyethelene field box for $34.95, but he'd be d _ _ _ _ _ if he'd sell the Bull Pup for $29.95! So don't blame your dealer if his prices are the other way around . . . they're correct!

BEST THING SINCE SLICED BREAD

While proofing Larry Renger's "Half-A Scene" column for this issue, we came across an excellent idea for dispensing small amounts of cyanoacrylate that should forever eliminate the constant clogged-tube problem. Rather than steal his thunder, we suggest that you look it up now, or when you finish this column.

THINGS TO DO

The C.A.R.D.S. (Capital Area Radio Drone Squadron, Inc.) of Lansing, Michigan, are holding their second annual "Great Lakes Model Aviation Expo" on March 25, 1978, at Long's Convention Center, 6810 South Cedar St., Lansing, Michigan. An AMA meeting with AMA's two Johns, Clemens and Worth, in attendance, will be held at 4:30 p.m., with an awards banquet at 7 p.m. For more information and/or pre-registration entry sheet, write to C.L. Hard, 2909 W. Michigan Ave., Lansing, Michigan 48917.

* * *

Southern California F/F Old Timers should keep in mind the "Brown Jr. Only" contest being planned for April or May, during the SCAMPS Texaco meet.

Obviously, planes must be Brown Jr. ignition powered only, and meet SAM rules. Other rules include: 1/8 ounce-per-pound fuel allotment, pre-1939 design, R.O.G., three-flight total, etc. More details later, but you better start building if you don't have a ship now. Some terrific prizes are being gathered.

IN CLOSING

We want to thank all the kind folks who sent Christmas cards to **Model Builder**. It's nice to know that many of our readers regard us as more than just a publishing company. However, we must single out one as being the best, and we hope Doc Mathews doesn't mind our sharing it with all of you. It is simply a large white card, printed in green, with the following inscription:

"GOD DOES NOT DEDUCT THE TIME SPENT BUILDING AND FLYING MODEL AIRCRAFT FROM A MAN'S LIFE SPAN."

ADVERTISERS INDEX

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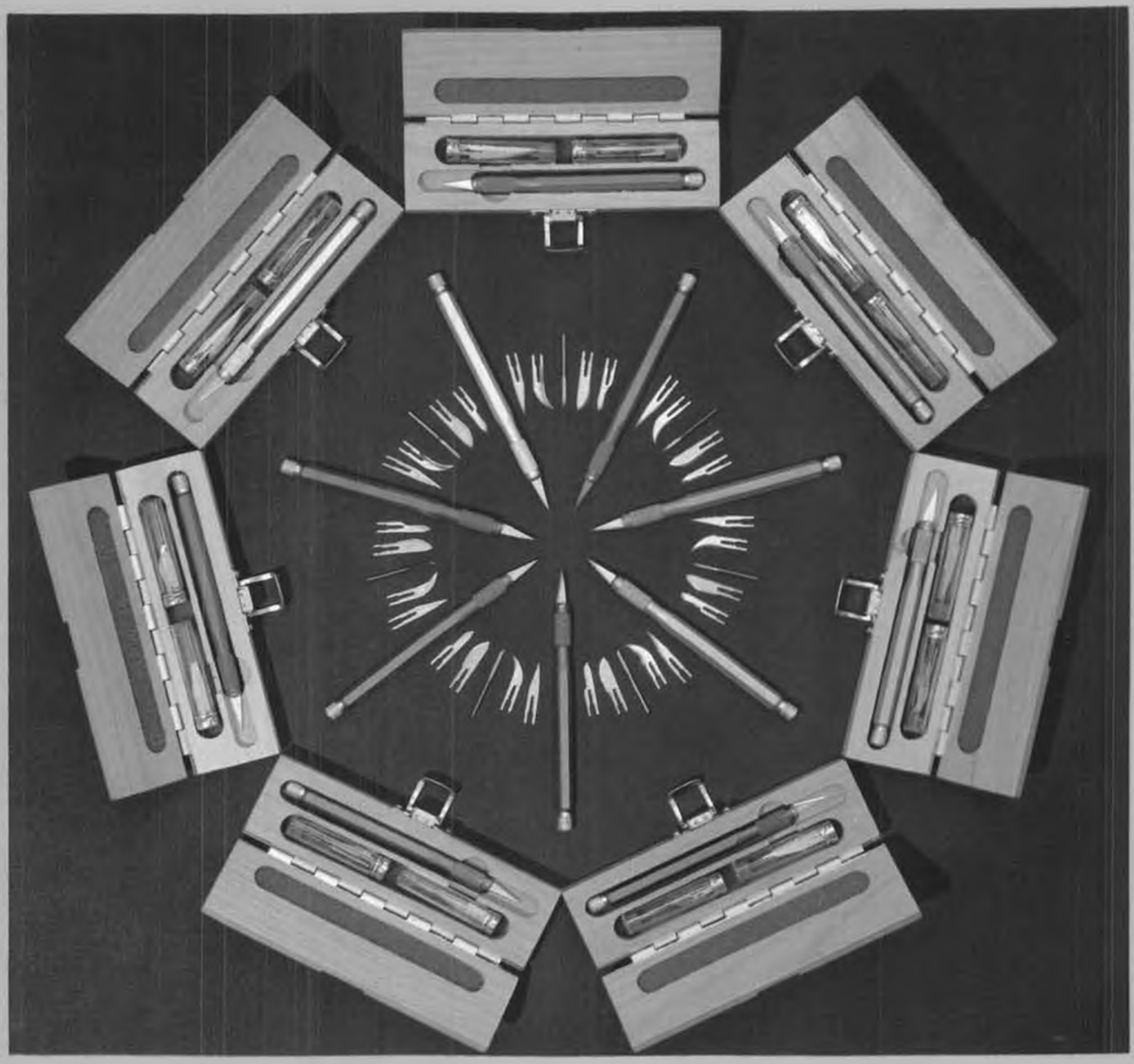

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