MODEL BUILDER

volume 8, number 83 $2.00 DECEMBER 1978

8 PAGE CHRISTMAS SHOPPING GUIDE

Starts on page 52

If you don't know the difference between MRC's 775 and ordinary sets...

there's a lot you don't know

Precision machined all metal open gimbal sticks honed to critical tolerances, outlast and outperform plastic open gimbals.

Sticks are virtually free of play at neutral. No zig-zag. Smooth motion throughout.

Sealed conductive pots supported by bearings minimize friction and play.

Ratchet electronic trim control with 22 detents for precise adjustment.

Hinged TX guard prevents accidental turn-on.

Miniaturized receiver only 2½" x 1¼" x ¾" is metal encased for added protection, better shielding.

C-Mos receiver circuitry for low current drain, increased dependability.

Charging jack on the switch harness mounts neatly into the side or bottom of your model.

Compact, lightweight flight pack ideal for ¼ midgets.

Select from 8 different servos including ball bearing coreless motor and mini type.

System includes reverse servo for easier installation.

And there's one more thing you should know. The difference in price between an ordinary 5 channel and MRC's 775 professional system is less than what you'd probably spend for a couple of gallons of fuel. That's a small price to pay for the best. See the difference at your hobby dealer, today.

Send $1.00 for full color, 44-page, MRC Model Aircraft Product Catalog

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

THE ULTIMATE IN RC FLYING
FOX 20CC OPPOSED TWIN

The Fox Twin is the finest two cylinder model airplane motor ever produced. Every design consideration and manufacturing care has been taken to make the Fox Twin a really practical power plant.

The two cylinder opposed simultaneous firing configuration was selected because equal and opposite piston motions cancel each other out vibration wise and produces a smoother running configuration than the alternate firing in line motor. In addition, the opposed cylinder configuration cools better and fits most scale models better.

The cylinder configuration is of the most modern and advanced schneurle porting, featuring Fox exclusive angle side flow bypasses. The cylinder is glass hard and the pistons are made of the hardest piston alloy available. The crankshaft is of hardened steel, and extremely massive compared to any other motor you have seen. The massive crankshaft construction was necessary because the terrific power of earlier experimental cranks twisted in two for conventionally proportioned shafts. The dual carburetion makes possible adjusting each cylinder for maximum power, a failing of most earlier twins, where a single carburetor would result in one cylinder running rich and the other lean. Although the Fox Twin can turn a 17, 18 or 19 inch propeller faster than most chain saw engines of equal displacement, its true potential is achieved by letting it rev up. The result is the ability to fly your airplane in a realistic manner, using a scale type propeller, but if you are performance minded, then put on a smaller propeller and really move out. We recommend a 15-6 for average models.

Each Fox Twin is factory run at full power, assuring you that when you buy this and put it in your model, you can fly. The carburetor has been adjusted and synchronized for atmospheric conditions at the factory. Unless you are at a rather high altitude, no further adjustments should be necessary.

FOX
MANUFACTURING CO.
5305 TOWSON AVE. FORT SMITH, ARK. 72901
PHONE 501-646-1656

Fox Twin $250.00

SPECIFICATIONS:

Bore	.907
Stroke	.937
H.P. (at 14,000 RPM)	3 plus
Weight	2 lbs., 8 oz.

Standard accessories: Firewall type motor mount, carburetor interlink, and fuel line "Y" fitting.

For More Information - Call: 1-501-646-1656.

INTRODUCING TUTOR

PHOTO OF ACTUAL MODEL
BUILT FROM KIT
Kit N14, Wing span 45"
Wing area 410 sq. in.
Engine size .35
Flying wt. 2-2½ lbs.

Your first step to precision aerobatic U-Control flying

LIST PRICE
$24.95

Patterned after Top Flite's original NOBLER, the winningest U-Control in history, Top Flite's all new TUTOR is the perfect beginning stunt flyer or the ideal practice ship for full stunt competition. TUTOR continues Top Flite's long tradition of outstanding kit design with many important features.

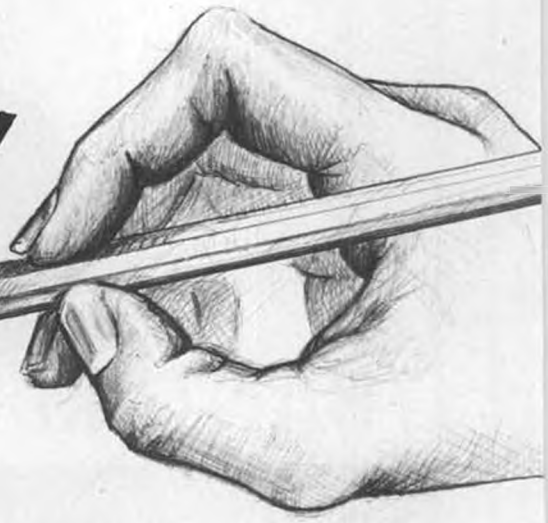
Highlights of the new TUTOR kit include: a special construction feature assuring an easily built, accurate, and warp-free wing; a D-tube leading edge providing a lightweight wing 20% to 25% stronger than conventional design; all balsa structure with maple motor mounts plus preshaped flaps and elevator, and a precision machined one-piece plywood reinforced fuselage with accurate cutouts for wing, motor mounts, and stabilizer.

Other features of this latest in stunt design are full size plans, precision die cutting, hardware, formed wire landing and tail gear, tank mountings, nylon bellcrank, and adjustable lead-out guide. TUTOR . . . one more reason Top Flite continues to be the choice of champions.

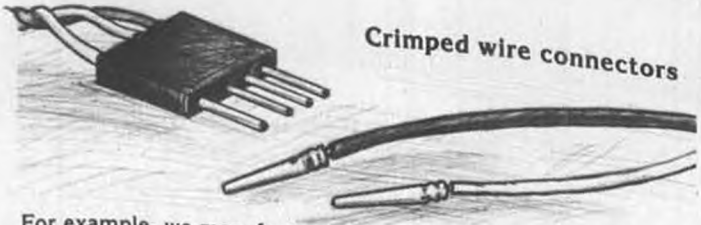
TOP FLITE

Top Flite Models, Inc.
1901 N. Narragansett Avenue
Chicago, Illinois 60639

Fine points that can make a Big difference!

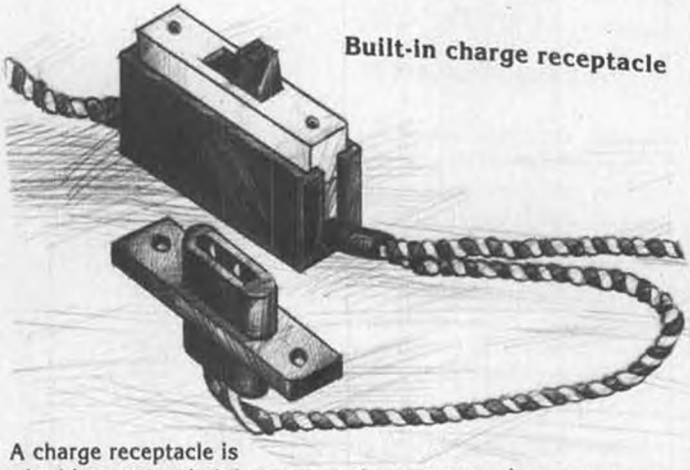


If you are considering the purchase of a Kraft radio control system, you may be impressed with our obvious quality and superior performance. However, you may not be aware of the many little features of our systems that make a big difference in their utility, convenience, and accuracy.



Crimped wire connectors

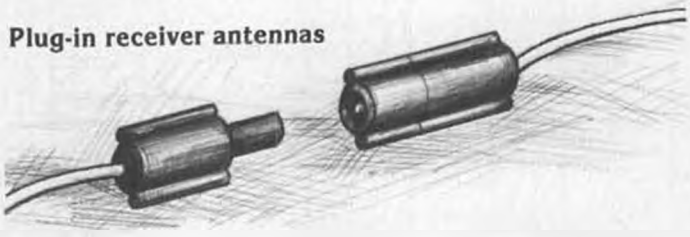
For example, we manufacture our own connectors which feature gold-plated beryllium copper pins and sockets for long life and corrosion and vibration resistance. Wires are crimp connected rather than soldered to.minimize wire lead breakage.



Built-in charge receptacle

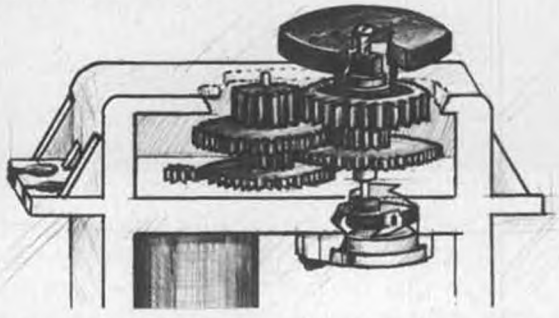
A charge receptacle is wired into our switch harness so that you may charge your model without the inconvenience of disassembly. Other systems require that the battery pack must be disconnected from the receiver and be connected directly to the charger.

Plug-in receiver antennas



A plug-in receiver antenna is standard with all receivers. This means that you may mount the antenna permanently in your model. Extra antennas are available in standard and special RF loaded short lengths. The short antennas are especially convenient for small aircraft, cars, and boats.

Direct drive servo mechanics



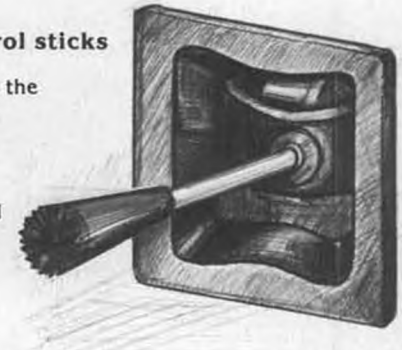
Our servos are molded of long wearing rugged nylon rather than the cheaper short life materials used in competitive servos. For accuracy, our servos have their reference potentiometers actuated directly from the output drive rather than indirectly through a gear which, because of gear teeth backlash, adds to centering error.

Clockwise and counterclockwise servo rotation

Servos are supplied with four or more channel sets, two rotating clockwise and two counterclockwise. This feature greatly simplifies the radio control installation.

Open gimbal control sticks

Our control sticks are the open gimbal type for better feel and accuracy. Their design eliminates any possiblity of centering error and is self compensating for wear.



These are but a few of the fine points which when added together make our radio control equipment the world's finest. Write for our free catalog and get the complete story.

KRAFT SYSTEMS, INC.®

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

LIGHT WEIGHT

POWER

SPEED

BANTAM MIDGET

BY NOVAK ELECTRONICS

Finally, you can purchase a servo that is light enough to fly a 1/2A airplane, and strong enough to fly a big .60. NOVAK ELECTRONICS proudly announces the introduction of the BANTAM MIDGET SERVO. By working closely with Dick Rehling, of D&R Products, we have been able to produce a servo that has the power, strength, speed, and durability to perform in any type of airplane. These new servos use the highly advanced Signetics 544 IC, offering internally regulated power supply, dynamic braking, linear ramp timing, and an exclusive temperature-compensated dead-band circuit. Servo reliability is further enhanced by the use of the Clarostat conductive plastic potentiometer and external silicon drive transistors.

NOVAK ELECTRONICS IS INTRODUCING A NEW CONCEPT IN AIRBORNES.

Choose one of our colors to mix or match with your existing equipment. Tell us your radio manufacturer, and we will supply servos, battery packs, and switch harnesses with the proper plugs and specifications to match your system.

Actual Size

DEALER INQUIRIES PROMPTLY ANSWERED

SPECIFICATIONS FOR BANTAM MIDGET

TORQUE: . . . . . 21 oz. in.
TRANSIT TIME: . . 0.3 seconds/100 degrees
SIZE (inches): . . . . . 1.125H x 0.6W x 1.43L
WEIGHT: . . . . . 24 grams, or .846 ounces
OUTPUTS: Rotary wheel, arm, adjustable arm. Compatible with ALL 3-wire digital radio systems, except Pro Line.

BANTAM MIDGET, Assembled	$29.95
Battery, 100 MAH, Square (35 gms, 1.2 oz.) . .	$15.95
Battery, 250 MAH, Square (60 gms, 2.1 oz.) . .	15.95
Battery, 450 MAH, Square, (100 gms, 3.5 oz.) .	15.95
Battery, 450 MAH, Flat, (100 gms, 3.5 oz.) . . .	15.95
Miniature Switch Harness	$7.95
Switch Mount, Bulkhead type	1.00
Tray, Bantam Midget, Vertical	1.00
Tray, Bantam Midget, Side Mount	1.00

WHEN ORDERING, PLEASE SPECIFY YOUR BRAND OF R/C SYSTEM AND COLOR PREFERRED (WHITE, BLACK, RED, BLUE, YELLOW, ORANGE, IVORY). NOW! Also available in KRAFT GOLD.

COD, Shipping, Handling, and Insurance	$2.50
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Three weeks delay on personal checks.
Foreign orders add 15%

California Residents, add 6% Sales Tax

NOVAK ELECTRONICS, 1915A, South Evergreen St., Santa Ana, CA 92707 Ph. (714) 549-3741

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RESISTOR CAR WITHOUT RADIO - 6 CELL

Choose from Alfa, Vette or Porsche Body Style

Comes with painted lexan body, durable lexan chassis, speed control, high speed electric motor, roar legal.

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OUTPUTS ROTARY WHEEL ARM ADJUSTABLE ARM COMPATIBLE WITH ALL DIGITAL RADIO SYSTEMS EXCEPT PRO LINE SPECIFY RADIO **$29.95**

TORQUE 21 OZ IN TRANSIT TIME 0.3 SECONDS/100 DEG SIZE (INCHES) 1.125 H X 0.6W X 1.43L WEIGHT 24 GRAMS OR .846 OUNCES

NEW ASSOCIATED

ELECTRIC "ELECTRIC"

ASSOCIATED

1/12 SCALE ELECTRIC R/C RACE CAR BY ASSOCIATED

List $135.

OCH Reg. Low Price $119.95

SPECIAL LIMITED OFFER

$98.88

Ready to Run - Less Radio

6 CELL - 1/12th Scale RACING CAR

WANT TO BE A FAMOUS RACEDRIVER?...JOIN THE ORANGE COAST HOBBIES RACING TEAM.

ASSOCIATED RCI Complete Car

$113.95

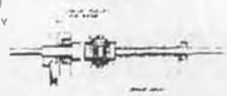
RC100...**$99.98**

RC200...**$149.95**

THORPE...**$195.00** WITH CHOICE OF ANY BODY

TITAN CHASSIS... **$149.95**

THORPE DIFFERENTIAL



THORPE AUTOMATIC TRANSMISSION

TECHNI MODELS

049/051 GLOW PLUG CONVERSION

$1.99

011 BLADES /5 Pk

List 65c

39c

(Fit X-Acto, PO, Dixun, small handles)

R/C GLIDER KIT SPECIALS

WANDERER 72"	$14.95
WANDERER 99"	$22.88
BRIDI SOAR BIRDI	$14.88
PIERCE PARAGON	$39.88
CASS STEIN SKYBOLT (glass)	$79.88

LION FUEL

GALLONS

#1-10% NITRO	$10.80
#2-20% NITRO	$12.15
#3-30% NITRO	$13.50
#4-40% NITRO	$14.85

Formulated expressly for R/C car use. Consistant formulation and cool running are the reasons the car racing champions use this fuel!

WISCO

12V 5A WET CELL BATTERY and CHARGER

$13.65

HB ENGINES

HB 12 R/C-muffler	$29.88
HB 15 R/C-muffler	34.88
HB 20 R/C-muffler	39.88
HB 25 R/C-muffler	39.88
HB 40 PDP	59.88
HB 61 PDP	79.88

ONE OF THE FINEST LINES OF ENGINES

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LARGE KITS, HEAVY BOXES ADD ADDITIONAL $1.00

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Opaques & Transparents	$4.99
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2 CU. IN. FOR THOSE BIG BIRDS — Retail $149.95

$99.88

LEARN TO FLY RC THE SIG WAY

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!

STEP 1 BASIC: Start With Rudder Control

BALSA RIB WING

KADET

Designed by CLAUDE McCULLOUGH

LENGTH: 42 In.
WING SPAN: 57 In.
WEIGHT: 4 Lbs.
ENGINES: .19 - .35 Cu. In.
FOR 3 CHANNEL RC EQUIPMENT

$34.95

SIG KIT RC-31

KIT NOW INCLUDES BEGINNER'S CHECK LIST AND FLYING HINTS.

STEP 2
INTERMEDIATE: Progress To Ailerons

BALSA RIB CONSTRUCTION WING FEATURING BUILT-IN WASHOUT

WING SPAN: 55-1/2"
ENGINES: .29-.40

KAVALIER $39.95

Designed by CLAUDE McCULLOUGH

When the student pilot feels secure flying the Kadet and can handle it capably, he is ready to take the next step. The Kavalier has a special wing design, calculated to make this transition easier. The precise amount of incidence change required to help eliminate tip stall is automatically incorporated as the wing is built in the usual way on a flat surface. In addition to this aid to stability, differential movement aileron horns are furnished in the kit, providing less down and more up travel on the ailerons. Adverse yaw in turns is reduced by this simple method and controllability of the model is greatly improved. Find out what smooth flying really is with the Kavalier.

or

LARGER SIZED MODEL - FOAM CORE WING WITH BUILT-IN WASHOUT

SIG KIT RC-32

WING SPAN: 62 In.
LENGTH: 44 In.
WEIGHT: 5-1/2 Lbs.
ENGINES: .40 - .50 Cu. In.

$39.95 KOMANDER

Designed by CLAUDE McCULLOUGH

Specially designed for novice RCers who want to move up from simpler models or prefer to start with an aileron controlled airplane. The built-in stability, coupled with good maneuvering and aerobatic ability, allows rank amateurs and low-time fliers to do a creditable job. Piloting boners that would clobber other airplanes are readily forgiven by the Komander. It will fly right down to the full stalling point without snap rolling or falling off on a wing. This enables slowed down, nose-high landings to be made. Coupled with the shock absorbing qualities of the wing mounted gear, the [illegible] or ground handling characteristics make this a fine performer from rough or grass

STEP 3
ADVANCED: Move Up To Aerobatics

FOAM CORE WING WITH WASHOUT

SIG KIT RC-35

$44.95

KOUGAR

ENGINES: .40 to .50
WING SPAN: 51 In.
WING AREA: 550 Sq. In.
LENGTH: 45-1/2 In.
WEIGHT: 5-1/4 Lbs.

Designed by CLAUDE McCULLOUGH

After some flying time on the Kadet and the Komander, the student will be ready for this sleek stunter. The Kougar is a carefully tailored design that will do every stunt in the book-even the lomcevak - and yet is not difficult for low-time pilots to handle. The wash-out incorporated into the foam wing allows the model to be slowed down to a walk for the landing approach and flared onto the runway in a main-gear first touchdown without undue stalling or snap rolling tendencies. The large amount of wing area for the 51" span keeps the wing loading low and aids handling characteristics. The Kougar is highly recommended as an introduction to low wing flying and AMA pattern competition.

STEP 4
EXPERT: For The Grad[illegible]

or

SIG KIT RC-29

FOAM CO

Plywood Skin $51.65
Balsa Skin $47.25

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

KOMET

Designed by MAXEY HESTER

In the Komet, Maxey Hester has created a pattern ship that meets the requirements of the most demanding competition flying, yet is equally at home at a Sunday afternoon sport flying session. As in the Kougar, construction is speeded and appearance improved by a formed plastic top made from ABS plastic that is easy to glue and easy to paint. It carries no load and serves only as a streamlined fairing on top of the rugged balsa box fuselage. Featuring a foam core wing, this big kit takes only a short time longer to build than one of the so-called ARF (almost ready-to-fly) types and results in a durable aircraft with lower wing loading and higher flight performance, at a lower cost.

See your dealer first! To order direct, add $1 postage under $10, postage free over $10. No C.O.D.

PLACE YOUR ORDER NOW FOR SIG'S LATEST COMPLETE CATALOG - NO. 39 - $2.00 POSTPAID

SIG MANUFACTURING CO. . . . . Montezuma, Iowa 50171

MODEL BUILDER

DECEMBER

1978

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

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

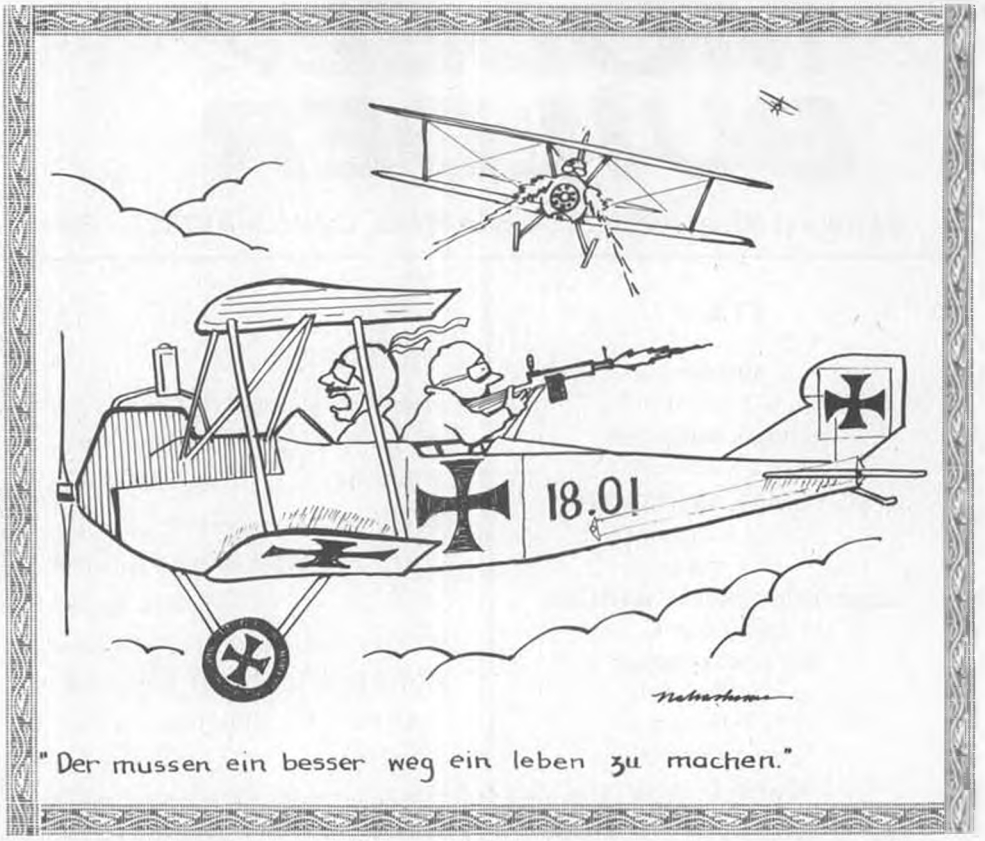
CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: Floyd Fitzgerald, Pontiac, Illinois, designed and built this 2-1/2 inch scale Grumman Ag-Cat. The radio controlled model spans 7-1/2 feet, weighs 18 pounds, and is powered by an O & R engine turning an 18 x 6 Top Flite prop. The Kraft radio works without interference from the ignition engine. Construction article begins on page 15. The 35 mm Kodachrome transparency was taken by Grant Boldt.



from Bill Northrop's workbench

• • •

YOU*BLEW* IT, JIMMY!

As an official who has been involved in World Championship competition under the aeromodeling branch of the FAI, we have always been proud to be a citizen of a country which has held its participation in international sporting competition above the petty political poopery and emotional distrust that has occasionally disrupted otherwise friendly activities.

We were proud, that is, until we read the excellently written editorial in the September NAA Newsletter, by NAA Executive Director, Vic Powell. Part of that editorial follows.

"NAA was especially disappointed and disheartened recently when the Carter administration injected politics into the United States team attending the III World Helicopter Championships, in Vitebsk, USSR, July 31 to August 4, 1978. The action was in direct conflict with the first goal of the Federation Aeronautique Internationale, the world body for sport aviation, which NAA serves as exclusive U.S. representative. FAI's first aim is (to make) . . . *evident the essentially international spirit of aeronautics as a powerful instrument for bringing all people closer, regardless of any political or racial consideration. (FAI STATUTES).*

"It is a goal to which the Carter administration ought to find agreement.

"Three members of the 11-person U.S. helicopter team were military pilots. The three had proven themselves in training, on their own time, to be leading pilots. Their experience, ability and expertise were a decided asset, and we looked forward to providing stiff competition to the country we regarded as a tough competitor, the Soviet Union.

"The administration reportedly desired to send a message to the Soviet Union regarding administration displeasure with a variety of USSR developments. It chose as a vehicle for that message the three military members of the U.S. helicopter team by preventing them from attending the championships. The three learned of the administration's decision while undergoing last minute training in West Germany prior to the flight into Russia.

"NAA does not dispute the government's right to control its employees. But we regard the Carter administration's action as heavy handed against a nonprofit organization attempting to meet the lawful purposes to which it subscribes, and from which the nation benefits. They chose to insert politics in an activity that is working to keep political interference out.

"Politics and international championship aviation do not mix.

"It was true when representatives of the United States joined with other nations to form the FAI in 1905, it is just as true today. The Carter administration's action against the U.S. helicopter team is an international embarrasement of this nation."

GOODBYE, WILLY

Probably the most famous and most misspelled name to come out of World War II aviation was Messerschmitt. His first name was Willy, and he died on Friday, September 15, 1978, at the age of 80, after a major surgical operation.

Best known as designer of the ME-109 Fighter, he also designed the world's first production jet fighter, the ME-262, which might have appeared in WW-II European skies if it weren't for strategy disputes among the Nazi high command which held up production until too late, when allied bombers wiped out the Messerschmitt production lines.

Willy had built and flown his own glider at the age of 15, and by the age of 25, after graduating from the Munich Technical University, set up his own aircraft company, in 1923. In 1927 Messerschmitt merged with the Bavarian Motor Plane Works, becoming manager and chief designer.

By coincidence, his death came on the day that Great Britain marks as the anniversary of the Battle of Britain, 1940. The RAF claims to have shot down 185 German planes on that day.

GIT YER HOT STUFF!

On a lighter note (BEEEEP . . .!), through an agreement with Bob and Bill Hunter, of Satellite City, a free sample 7-gram bottle of "Hot Stuff" will be included with each shipment of Uber Skiver knives or **Model Builder** binders amounting to $10.00 or more in value. The 7-gram bottle has a retail value of $1.95.

Incidentally, by sending a stamped addressed envelope to Satellite City, Box 836, Simi, CA 93065, you'll get a free 4-page summary of tips and illustrations for uses of Hot Stuff. Our hint . . . put the bottle upright on your bench and squeeze out that last drop when you're finished for a while. Then the tube won't clog! •

OVER THE COUNTER

• Many so-called "package" deals remind me of the car salesman telling me that the cigarette lighter is free. Not so, in the case of Midwest Products' "Performer", two-channel powered glider/trainer, and the companion "Radio Control Flying for the Non-Modeler" book, published by Boynton and Associates.

Both are designed and written for the person whose first exposure to R/C took place last Sunday after he/she took a wrong turn and wound up at the local flying field. The "Performer" is a 72-inch, 490-square-inch, .049 model; the kit features a solid pre-shaped balsa wing, box construction fuselage, and includes all hardware and control rods. It is fully described in the book, which includes plans for its construction if one does not desire to purchase the kit.

They are now on the way to all dealers, and can be purchased together or separately.

Midwest Products Co. can be addressed at 400 S. Indiana St., Hobart, IN 46342, while Boynton & Associates is at Clifton House, Clifton, VA 22024.

* * *

Builders of 3/8-inch to the foot scale air-cooled radial engine models will especially be happy to see these new Universal Dummy Engine Cylinders from Williams Bros. No more having to stick washers together, or to wrap thread around a dowel to simulate engine cylinders . . . these will do the job neater, faster, and lighter.

And no longer will you have to avoid those engine-in-the-breeze models, as duplicating the powerplant will be a snap.

Available in packages of 5, the cylinders are priced at $1.30 for the 1 inchers, $1.10 for the 3/4, 98¢ for the 1/2, and 65¢ for the 3/8 scale.

All down at the local model emporium, and all from Williams Bros., Inc., 181 Pawnee St., San Marcos, CA 92069.

* * *

Two new K&B's have made the scene! Both are 7.5 cc displacement, which every one of you will quickly and mentally convert to .45 cu. in.

Our accompanying photo shows the 7.5 cc Ducted Fan version, specially equipped with a Perry Pump and Pump Carburetor. Max power and reliable throttling should be obtained right out of the box.

The marine version of the 7.5 is a rear-intake model, equipped with an exhaust butterfly throttle and water-cooled head. Both versions are ABC, and both use a 7075-T6 aluminum connecting rod, which is machined from solid bar stock and bushed at both ends. Two ball bearings, beefed-up crankshafts, and K&B's quintuple porting are other fea-

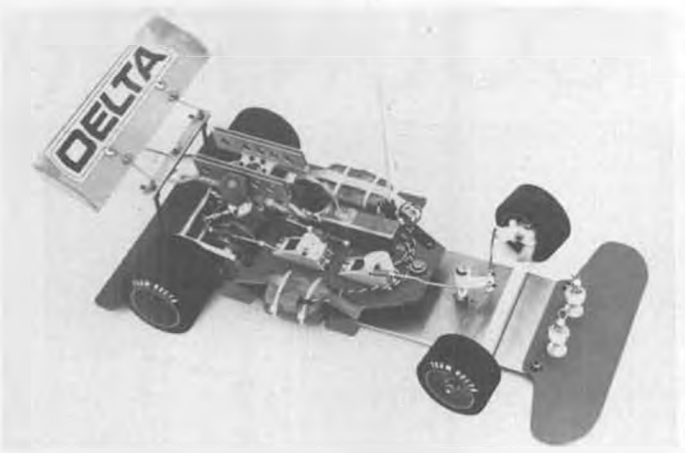
Receiver-operated ON-OFF electric motor switch, from Astro Flight.

Universal dummy engine cylinders, in 3/8" scale, by Williams Bros.

New K&B 7.5cc ducted fan engine.

Midwest Products' "Performer", half-A powered glider.

"Multi Charger", from L.R. Taylor & Co. (Isn't there supposed to be an "i" in "transmtters"?)



"Super J", 1/8-scale R/C race car, from Delta Manufacturing.

Cessna Agwagon, built from plans available from Repla-Tech.

tures of these new powerplants.

Models already equipped with 6.5 cc engines can be immediately converted to these new more powerful versions, as they fit the same mounting set-up.

Look for these brand new state-of-the-art engines at your favorite hobby store. They are products of K&B Manufacturing Co., 12152 Woodruff Ave., Downey, CA 90241.

* * *

Having trouble controlling your electrons? If so, we'd like you to meet a new miniature electric motor control which is now available from Astro Flight, Inc.

This device provides ON-OFF operation of your airplane, car, or boat motor, and is controlled directly from the servo output plug of your R/C receiver. An additional bulky and expensive servo is therefore not required.

A deluxe version is also available, which contains a voltage regulator to power the radio receiver from the motor battery, thereby eliminating the need to carry another battery. Special circuitry is included that turns the motor off when the drive battery gets low, but still retains enough current for operation of the radio.

Both versions are available now, and are priced at $29.95 for the Standard, and $39.95 for the Deluxe versions. From your local shop, or from Astro Flight, Inc., 13377 Beach Ave., Venice, CA 90291.

Fuel line clamp, from Octura Models.

* * *

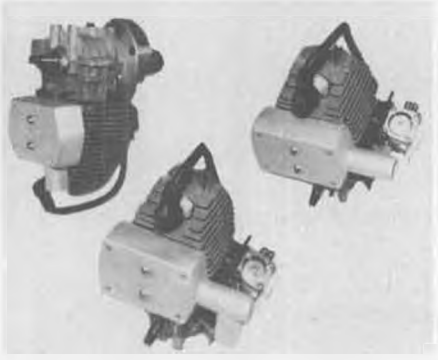
Owners of the popular Quadra engine will be glad to learn about these two goodies.

First, a beautiful cast aluminum mount, drilled and machined to fit the engine exactly. It provides the solid support so necessary for proper operation, and allows easy side-thrust adjustments to be made. Catalog No. Q-3, $16.95.

As a companion to this mount, there is a special neoprene backplate, cut from 3/16-inch rubber, and designed to fit between the mount and the firewall. It will eliminate a large percentage of the engine vibration. Catalog No. Q-3NEQ.

And if noise is a problem with your Quadra, you have your choice of mufflers from a series designed for upright or inverted engine installation. These mufflers are made of aluminum and require only two screws for attachment. A length of heat and fuel-resistant neoprene tubing is supplied to extend the exhaust out of the cowling, if desired. No. QM-IST, for inverted engine, side exhaust, is $19.95; QM-IBT inverted

Continued on page 119



New mufflers for Quadra engines, by Quarter Headquarters.

Cast-aluminum Quadra mount, by Quarter Headquarters.

Fiberglass hulls from Futuraglass Design are, from left to right: the "Magnum" tunnel hull; .40-.60 Scale Hydro; and .20, .40, and .60-size Deep-Vees.

R/C WORLD

Big radio controlled Unlimiteds thunder into the countdown start of a heat during the R/C POWER BOAT WORLD CHAMPIONSHIPS, on Lake Washington, Seattle, Washington, in early August, 1978. Photo by Jerry Dunlap. Complete story on page 32.

Brad Allen's 12-foot span Aeronca "Master" was one of the many "monster" models seen at the recent Las Vegas meet hosted by the QSAA. Also, like many, it was not 1/4-scale! Ship weighs 32 pounds. Lots more info and photos of the meet next month.

R/C WORLD

By BILL NORTHROP

• When we wrote about our own four R/C proposals in last month's column, we had not yet received, nor were we aware of, the total onslaught of R/C proposals that had come into AMA Headquarters ahead of the September 1 deadline. We're sure the new R/C Contest Board Chairman, Joe Friend, suspects that we had a hint of what was coming, when we bowed out of the chairmanship after 10 years. No less than 82 official proposals have been circulated to the R/C Contest Board members for the 1980-1981 rules period (second only to C/L, which nosed us out with 87!). Of these, 24 are on pattern, 17 on soaring, 15 on 1/2A Pylon, 17 on Quarter Midget, and 3 have to do with new types of events. For the second rules period in a row, Formula I Pylon had no proposed changes. . .

Incidentally, there really aren't 82 rules change possibilities. Many of the Soaring and Pylon proposals were unknowingly duplicated by other proposers. In some cases, the same rule proposal was made by three different individuals. At least the three modelers and their co-signers agree on the proposal!

Unfortunately, the deadline for the preliminary ballot by the contest board is December 1, so time is short. Meanwhile, you should be studying the proposals that affect your main interest and give your opinions to your district contest board member. Detailed changes of proposals aren't important now, the main thing is to get rid of bad ones, and keep the others . . . even if they need reworking. The intermediate ballot, which will come along in early 1979, will include all the cross-proposals . . . suggested changes to otherwise acceptable rules proposals.

So . . . don't complain after all the work is done. Now is the time to review all the proposals, as published in *Model Aviation*, and contact your R/C CB member. He needs your input!

ON THE OTHER HAND. . .

Many radio control modelers, in fact the wide majority, couldn't care less about disciplined competition. Most modelers enjoy it as a hobby, not a competitive sport, and prefer to build and fly for their own amazement and their own type of relaxation. We say *their own type of relaxation*, for as tension-ridden as disciplined competition may seem to the sport flier, it *is* relaxation to the competitive flier, who gets his or her kicks from the "thrill of victory and the agony of defeat."

Sport flying actually has two categories. One is for the totally solo flier, who wishes only to fly when and where the time and place is most appropriate for that person's schedule. The other is

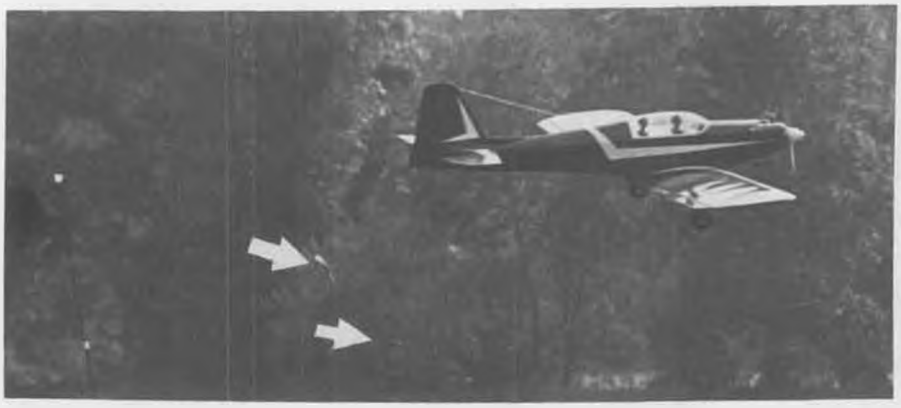
Which Quadra is a dummy? No, it's not a Quadra twin. Cylinder on Aeronca's right is bolted on for appearance . . . also helped balance.

Mark Morgan, Dallas, Texas, sexed up his MB "Dragonfly". Has .15 engine, open cockpits, spoilers, and glider and bomb release.

PHOTO BY RANDY RANDOLPH

Robbie Wallace applies body English, to no avail, as Bob Wallace misses balloon with K&B 40 powered Sig Kadet. Bud Gay photo.

Robbie Wallace gets a little closer than his dad. He was second in the event at a club Fun Fly. Read more about it in text.



Keith Palmer, Bristol, Conn., makes a direct hit on the balloon (arrows point to pieces) to win the event. Andrews Trainermaster, K&B 40, Futaba radio. All fun fly photos by Bud Gay.

Fred Essel makes a ribbon cut, using Keith Palmer's Trainermaster.

for the flier who enjoys informal, undisciplined competition . . . maybe against others, or maybe against the clock or the tape measure, usually at local club functions.

Take for instance the Central Connecticut R/C Club. On August 13, the club held a Fun Fly in which the competition consisted of a Taxi Race, Ribbon Cut, Estimated Time Flight, and Balloon Burst. Some of this month's photos, by Bud Gay, depict the action.

In Estimated Time Flight, the contestant must give up all watches or other time pieces, is then timed from take-off during flight, and until wheels stop rolling on the landing. The one coming nearest to 90 seconds is the winner (no help from the audience, please!).

For Balloon Burst, the flier is timed from take-off alongside the 7-foot pole that supports the balloon, a complete circle, and until he hits the balloon. Time is official only if the balloon is busted.

In Taxi Race, the contestant taxies out to three balloons staked to the ground fifty feet away, busts the middle one, and taxies back. Shortest time wins.

As for Ribbon Cut, the ribbon is suspended about 4 to 5 feet above the ground. Pilot takes off from the ribbon, flies a full circle, and then has at the ribbon. Shortest time wins.

To give you something to shoot for, the Estimated Time Flight was hit on the nose by Dick Bellanger, Jack Anderson was 2/10ths of a second long, Fred Essel was 7/10ths short and Sue Degennaro was 8/10ths short.

In Balloon Burst, Keith Palmer took only 14.9 seconds, Robbie Wallace took 17, and then the time jumped to 1:08 by Fred Essel.

The Taxi Race times were interesting, with Glen Sicotte getting out and back, plus busting the middle balloon in 15 seconds! In fact, the longest time was only 23.6 seconds.

Now get this for Sport Flying . . . Bob Beaudette took off by the ribbon, made a full circle, and cut the ribbon in 7 seconds! And to prove the watch was working, Bob Wallace did it in 7.5 seconds, and Tom Munsell took 8.1 seconds. By contrast, the longest time consumed for the job was 2 minutes, 51 seconds.

C/L PLUS 32 EQUALS R/C

In addition to the above info on fun flys, Bud Gay,, proprietor of Bristol Hobby Center, Bristol, Connecticut, sent us the following story.

"The year is 1947, place is Page Park, Bristol, Conn. State controline championships in progress. Scale event is next.

"Checking the entries, it's no contest. A beautiful seven foot Stinson Reliant SR 10 dwarfs all other models on the line. Kitted by Cleveland Models and magnificently built by Michael Adajian, of New Britain, Conn. it looked first place and took first place.

"At every meet entered, State, Regional and Mirror, it always finished in the top three places over a period of eight years. Power was furnished by an Atwood .60 engine with dual ignition providing low and high speed. Seventy feet of insulated lines provided by Matty Sullivan, connected to a remote A.J. U-reely with attached 67-1/2 volt battery, actuated a relay in the model to switch from low to high speed.

"The Stinson was finally retired when Mike turned to flying RC. It survived the following years stashed in the attic, not to mention several moving van experiences. This year, and many RC ships later, resurrection to radio control!!

"No changes were made except for an engine change to an Enya .60 RC and a Kraft radio installed. Using three channels; elevator, rudder and engine, the Stinson flew very well. One unhappy landing caused the No. 1 rib to disintegrate. This rib contained proper alignment. To rebuild, this meant plotting the rib exactly.

"So Mike dug into the big balsa scrap box for a sheet of 1/8 balsa to start rebuilding . . . would you believe . . . from the myriad of scraps saved for years, up comes a partial sheet stamped *Cleveland Models Stinson SR 10 Rib Sheet*. On the sheet is printed No. 1 rib, complete and in perfect condition.

"Thirty two years in the scrap box!! That rib waited a long time to become airborne, but it did make it. How patient can a rib be?

"Stinson is back in the air and making up for the lost years in attic space."

FAN HAS ARRIVED

After several years of experimentation and refinement, the Skyhawk fan jet model by Bob Violett is no longer just a specialty item and one which is only seen at special affairs, flown only by Bob himself.

Barbara Hayes, Burlington, Conn., offers a pleasing background for Mike Adajian's 32 year old Cleveland Stinson SR 10. Interesting Stinson history will be found in text.

Eight years as a C/L, many years retired, and now flying again in R/C, Adajian's Stinson.

The Skyhawk II is now a proven fan jet model, and is available with accessory packages. The semi kit includes epoxy fiberglass fuselage, molded tailpipe, and wheel pods. Also included is a high efficiency internal ducting system, clear plastic canopy, detailed plans, photo instruction book (60 technical photos), and adhesive backed mylar rib and former templates. Provisions for retracts and flaps complete all requirements for a total ducted fan propulsion model.

Price of the semi kit is $129.95. The Skyhawk fan unit is $75.00. Also available is the Avionics Dorsal Pack ($12.00), a Drop Tank ($15.00), and Blue Angel Decals ($15.00). Plans, templates and instructions, if purchased separately, are $20.00.

Bob placed second in Sport Scale at the 1978 NATS with his Skyhawk II A-4N model. His address is 26516 Aiken Drive, Clarksburg, MD 20734. •

Latest version of Bob Violett's Skyhawk is this A-4N, with avionics dorsal pack and long-range fuel tank. Kit is fully described in text. Ship placed 2nd in Nats Sport Scale.

Maryann Parenti, Bristol, Conn., holds husband Phil's Big H Ray. K&B 40. MRC radio, Monokote with 3M striping. Andrews kit.

Debbie Kelly, Dallas, Texas, with husband Joe's "Paskey" (June '78 MB) designed by Randy Randolph. Randy also took photo.

R/C FORUM

with

Hal deBolt

P.O. Box 147
Buffalo, N.Y. 14225

Mail in your questions or concerns.

• This is being written right in the middle of the busy flying season. My work is pressing . . . everyone wants overnight service, as they do not want to miss a single flying day unnecessarily . . . and our Circuit races seem to come up too quick for proper preparation. There never seems to be enough time to get ready with that "new" idea. Would the old phrase "Time Flies" fit? Seems so to me. However, the point to be made is that this is a *great* hobby and sport, simply because we never run out of new things to try and do!

During the flying season, we see more rank beginners than at any other time. Someone accidentally stops by the flying field or contest and is immediately impressed. When someone tells him that he can do it too, the newcomer is off to find the bits and pieces required to get into the air. Advice, of course, comes from all directions, and the most important decision winds up being the R/C equipment. With zilch for knowledge, he is confronted with how many sticks, number of channels, frequencies, and of course, what brands. Even after he comes to some conslusion on these questions, he finds that the brand he has chosen can cost up to 3 times that of the lowest priced system. Even if the prospect is the Cadillac buyer type, he often wonders if he should buy the highest priced, simply because he does not know whether he will stay with the hobby or not. We see these people and their problems nearly every day, and it is important to give them the proper guidance. We would like to present some time-worn advice which has proven successful with these people over and over again; following this can, in most cases, create another sustaining member for your club. These are the answers to the questions we hear from the rank beginner:

1) Buying new or used equipment: If it will not stretch the pocketbook too badly, do buy new equipment; it is the best assurance of reliability to start with. If money is important and a savings would help, there is nothing wrong with used equipment that is not too old and has not been abused. However, in buying used, it is good advice to look for "reconditioned" equipment, or else have a stipulation in the agreement that the seller will have it checked out at a reputable service center for you.

2) What brands: Decide on a brand which you can easily get serviced quickly and reliably; in other words, a reliable service center within one day's shipping time (500 miles) of your home. There will be annual "check ups", and when you finally do need service, it usually is at the same time you wish to fly, so time is important. As to a particular brand, this used to be important, as some brands had outstanding advantages. Thankfully, today, if you watch the performance of any of the top brands, you will have a hard time seeing any difference. R/C equipment has stabilized, so that it is hard to see any real difference between them all.

3) Stick configuration: There is probably more kibitzing-type advice handed out about this factor than any other. However, the fact is that both single and two-stick types are most successful, so for the beginner, there is little advantage to either one. The sensible advice is to *choose the configuration most popular in your area;* in this way you, will find it easier to obtain instruction from an experienced flier who is accustomed to your style of transmitter.

4) Servo type: Here you will have to project yourself a bit and have some idea of what direction you will be taking in R/C. If you feel that the majority of your flying will be with small models (schoolyard types), the miniature radios should be your choice. Although small, these still will handle typical "trainers" reliably. Should you have visions of "Mammoth Scale", go for the larger radios; most trainers will still have room for these. There is, of course, an "average size" radio, and if you just cannot make up your mind as to what direction you will be heading, do not hesitate to choose them. Like anything else "average", there are few places where they will not be usable.

5) What price range: For a good many years, the manufacturers produced only one line of equipment. All you could ask for was the brand; the choice was only between brands. Because the technology was still new, manufacturers were spending development time improving and trying new ideas. In short, they were looking for "the" way to produce R/C equipment.

A few years ago, "the" way was finalized, and today, no matter what the color of the box is, you will find that the same methods of operation and production are used by all of the familiar brands. Of course, there are specific differences, but the basics are all the same. With this status quo, manufacturers found development time available to use in producing systems for specific purposes. At this time they are offering about 3 classes of systems, which generally could be called "Sport", "Expert", and "Competition". The "Sport" systems are simply basic systems that provide all that is needed to successfully and continuously fly R/C models. Much like a "standard" car, the running gear is sound and the body will provide the transportation. Like the "deluxe" car, the "Expert" series simply adds some frills, perhaps a little more precise control and perhaps a bit more comfortable transmitter. These things naturally add to the cost. The "Competition" series is another story; this type was created by the serious competition fliers looking for easier ways to get perfection in their maneuvers. An all-out effort was made to fill this demand, with the result being the use of fundamental "computers" as transmitters. These transmitters can be programmed to do most anything a flier wishes . . . they have been developed that far. As a result, they can only be a "toy of the experts", for in order to use one, you not only need to be a pilot but also a computer programmer and operator!

The "Sport" types have obviously done R/C, as a whole, the most good, as far as drawing new people into it is concerned. The competition in this line has been fierce between the various brands and even the imports. Sales competition being good for the consumer, we now find that we can have a most reliable and usable R/C system at a very attractive price. The offerings are complete enough so that by spending a minimum amount, the newcomer will have a system which can fill his every need through the first few years of his R/C enjoyment.

Finally, most newcomers feel that they are making a large financial investment when entering R/C initially. To many it may well be, but we would suggest that they compare it with entering most any other sport before complaining too loudly. However, it should be remembered that, in modeling, any investment has one financial feature. Modeling equipment, and especially R/C gear, has built-in equity. It maintains much of its value over a substantial number of years.

We would like to cover a few points brought up in a few most welcome recent letters. Theodore Off, of Ventura, California, takes us to task for a couple of points in recent columns, which only proves once more that neither **Model Builder**, nor I, is God. Unlike the Savior, we can be wrong!

We mentioned "walking beams" as a useful method of transferring servo power to the control surfaces. Apparently, there was something wrong with the diagram shown, which was only for descriptive purposes. Ted advises that all pivot points should be equally spaced for such a system to work properly; apparently our sketch did not show equal spacing.

We were also talking about the aerodynamic balancing of control surfaces. In other words, methods of pivoting them which would tend to equalize the pressure on each side of the pivot point or line. We suggested that a pivot point at 50% of the chord of the control surface would create an almost perfect pressure balance. Ted suggests that the theoretical pivot point would be 25 to 30% back from the leading edge of the control

surface.

My understanding would qualify both statements a bit. We are looking, ideally, to equalize the pressure on both sides of the pivot. To do this, both sides of the pivot must be exposed to the same pressure potential. All control surfaces are attached to a fixed surface. Because of this, there is always some disturbance created by the fixed surface which will reduce the pressure on the leading edge portion of a control surface, as compared to the pressure present on the aft portion. Of course, the thicker the fixed surface at the leading edge of the control surface, the more the disturbance *and* the further the leading edge of the control surface will have to move before encountering the "clean" air the control surface's aft portion is already enjoying. What all this amounts to is that Ted has said that if the *total* pressure affecting a surface is 15 lbs., as an example, 5 lbs. applied forward of the pivot will equal 10 lbs. applied aft of the pivot. What is important to remember is that you must have the correct differential in pressure to achieve success. Obviously, pivoting the surface at the 50% station will *not* provide equal pressure because of the disturbance from the surface it is attached to. It will be less on the forward surface, in direct proportion to the amount of disturbance.

To expound a bit further: theory is great, but what is practical? In this case, it is obvious that the pivot location, to achieve aerodynamic balance of a control surface, will vary according to the surface it is attached to. Generally speaking, you might say that an aileron or flap attached to a rather thick airfoiled wing will require the pivot to be further back than would a sheet-type elevator or rudder attached to a sheet-type stabilizer or fin. It should also be understood that *complete* aerodynamic balancing is not advisable either; in fact, it is seldom used. One of the major problems with control surfaces of all kinds is that they tend to flutter. Controlling flutter can be a nasty problem. One of the best flutter controls is to be sure that there is a pressure differential about the pivot. When the pressure is greater behind the pivot, the control surface will tend to "weathervane" in the airflow. Of course, when you add a counterweight ahead of the pivot, you have in effect created a weathervane in its most fundamental form. The final point would be that, like all of aerodynamics, the balancing of control surfaces is a compromise; you must find the proper combination of all the factors involved to obtain success.

We also had a nice letter from Paul Spreiegen, of Washington, D.C., with some questions which may be of some help. His first questions relate to Ni-Cds, which is a subject that I hope to devote a future column to, when time for research is more free than now. Paul has a battery cycler which is set up to test 500 MAH batteries. He wishes to also use it for checking a 225 MAH battery, and wants to know how it can be done. A small addition to the cycler will make it possible, but if his knowledge of the problem is such that he does not know how, he would do well to have a qualified techincian do it for him. The procedure is simple. Place a low ohmage potentiometer in one lead from the cycler so that it is in series with the 225 battery. Place a milliameter in series with the battery in the other lead. Adjust the potentiometer until the milliameter reads a current flow of 22.5 MA. Remove the potentiometer without changing its adjustment and take an ohmage reading from it to find the resistance that was in use. A jumper wire can then be made which suits the cycler lead. A resistor matching the resistance reading is placed in series in the jumper lead. Then, any time the 225 MAH battery is to be checked, the jumper is added to the cycler lead.

Paul's next Ni-Cd question is simple, yet can be complex. He asks how a "faulty" cell can be detected in a pack. His use of the word "faulty" adds the complexity. Ni-Cds can be faulty by being dead, weak, or bothered by vibration . . . and being the rascals that they are, probably from other mysterious reasons!

Finding a dead cell is the simpliest, of course. Taking a voltage reading of each individual cell will find one with no voltage; it will be dead as a door nail! Paul asks if it is OK to replace just the one cell. Remember, they said to never do that with dry batteries? Replacing one cell in a Ni-Cd pack is perfectly alright, *providing all of the other cells are in good condition.* So, the procedure in this case would be to run a load test on the remaining cells; if they pass, replace the one cell. If they appear marginal in any way, do yourself a favor and replace the entire pack! Weak cells are not all that hard to find. Charge the pack fully and then put it on a load test. Watch the voltage, and the minute it drops below the rated value, remove the load. Quickly check the voltage of the individual cells. Place the load test back onto the pack. The instant the voltage once again drops, start measuring single-cell voltages. The weak cells will read a lower voltage than the others. Minute differences are of little concern, but a difference of a 1/4 volt or more would be cause for concern.

Paul has another question very seldom answered in equipment instructions. His transmitter, like most, has a meter. He does not understand it. Transmitter meters fall into three types. One type will either read battery voltage or condition, the second will read both battery condition and the radio frequency (RF) output of the circuit. Generally speaking, "RF" is an indication of the power the transmitter is actually transmitting. If the transmitter had either of these two of meters, the instructions would explain the operation, as they both are uncommon with R/C transmitters.

The third type of meter, the type usually provided, measures RF output only, the reason being that the only *real importance* is how much power the transmitter if putting out. If the output is not normal, then it is of little value, at the moment, to know that the battery voltage is down. Most important is that the meter will show a decline when there is a problem of any sort in the unit. The amount that the meter reads is of little importance also, when compared to that of some other transmitter. The amount that the meter reads is optional with the manufacturer; he can adjust the circuit to give any reading on the scale that suits him! What is important is to know what your particular transmitter meter reads when *your* transmitter is in perfect operating order, not what someone else's similar meter reads. This would be the maximum output for *your* unit. It should read this every time you use it. The meter will read zero with the switch off. Anytime the hand on the meter retreats from its normal maximum towards this zero point when the switch is on, you can be assured that there is a problem of some sort.

Obviously, the condition of the transmitter batteries controls the output of the unit. With most transmitters, as the voltage drops, so does the output. With many types, the condition of the batteries can be related to the RF output. When the voltage drops, the RF output reading will also show a decline, providing a warning that the batteries are below normal. However, unless you have experience with the unit, do not take this as gospel. There are some transmitters which will maintain a stable RF output over a sizable voltage drop, thus no meter change will occur, even if the batteries are low. In conclusion, remember that Ni-Cd batteries hold their voltage until practically the end of their capacity. Thus, once the voltage and meter reading starts to drop, there is very little left in the battery. This is one time when that "just one more flight" can (will!) be a fatal one!

Paul also had a glider in which the elevator was operated by a Nyrod which was not supported between the servo and the elevator horn. In flight, there was elevator flutter. Supporting the Nyrod cured the flutter. Apparently it was the Nyrod fluttering in the fuselage, more than the elevator itself. Question is, would the fluttering Nyrod affect the servo, similar to a fluttering elevator? The answer would seem to be that it makes no difference what is fluttering; if it is attached to the servo in any way, the vibration will be transmitted to the servo and there can be damage.

Final question is: If there is a load on the elevator great enough to cause flutter, will this load affect the servo. The answer here is that, in general, a load will *not* affect a servo, providing the load is no greater than the output of the servo. It is vibration which causes the damage in normal cases.

To clarify a bit more; a control surface in flight *always* has a load on it. It can be assumed that when the surface is in

Continued on page 112

PHOTOS BY GRANT BOLDT

GRUMMAN • AG-CAT •

By FLOYD FITZGERALD . . . A Mammoth Scale model (2-1/2" = 1') for 2 cubic inch engines or belt-drive 60's, the Ag-Cat spans 7-1/2 feet, weighs 18 pounds, and is a totally realistic flier. Already a trophy winner.

• Everyone has that certain time, place, person, or thing indelibly etched into his memory. Mine, as a lad of 9 years, was of being literally thrown out of bed early one summer morning by an old Stearman Duster, flying right by my window. With more speed than I ever could muster getting ready for school, I was dressed, down the stairs, and outside watching the Stearman doing its thing. From that time on, spray planes (biplanes in particular) have held a special fascination for me. My first impression of the Ag-Cat was predictable. It was even better looking than the Stearman! A strictly utility-type airplane, it has struts, wires, scoops, etc., sticking out all over. Beautiful!

Not being a designer or scratch builder of any note, I kept waiting for an article on the Ag-Cat to appear in one of the magazines, but it never happened. If I was going to have one, I would have to build it myself! After receiving a set of three-views from Grumman, I took the easy way out by sticking the whole works in an old Navy opaque projector and blowing it up to the scale I wanted. Not very kosher, I suppose, but it worked. After a lot of eyeball engineering on the construction, I ended up with a damn fine flying airplane.

HISTORY

The Grumman Ag-Cat was designed in the late fifties to take the place of the fast disappearing Stearmans, N3N's, and other types that were wearing out beyond use in the hard-flying, chemical-eroding field of crop dusting. The design parameters included ease of flying (stable), maintenance simplicity, and pilot safety. This last point is well demonstrated by the N numbers on my model. The full-size plane that bore those numbers no longer exists, but the pilot does! (He lost it in a stall turn while spraying.) Whatever the design reasons, she looks typically Grumman, harkening back to the days when the Wildcat and the Hellcat were engaged in the more serious business of trying to blow the other guy out of the sky.

Similar to the photo angle on the front cover, this pose creates a very realistic appearance for the model Ag-Cat. If you have any doubts, compare this with the photo below.

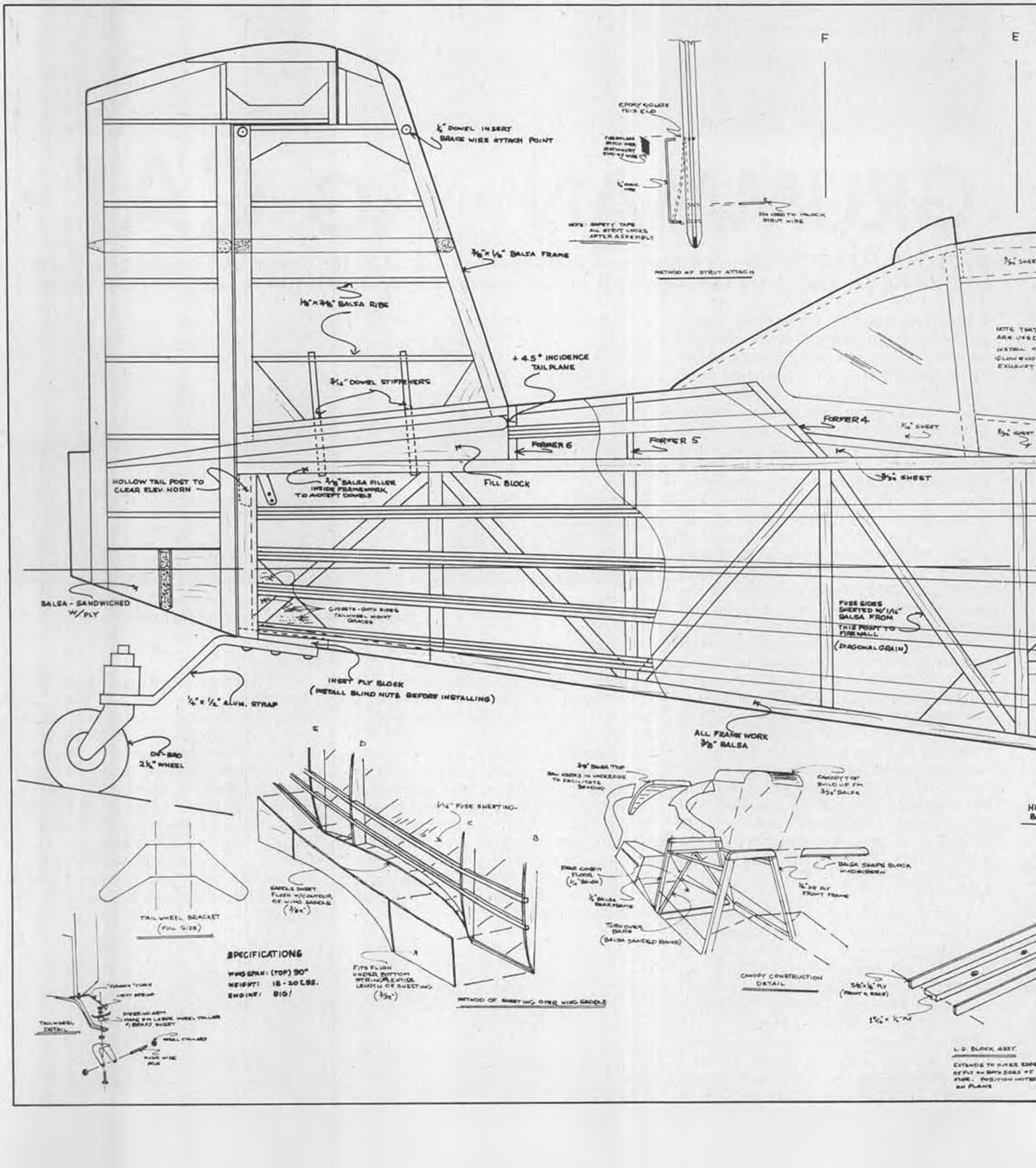
CONSTRUCTION

Before beginning construction, you must decide whether you will build to Sport or Precision scale. The plans will do fine for Sport, but you should visit your friendly local Ag-Cat (they seem to be everywhere!), with camera and tape measure in hand, for the exact scale version. I have yet to see one that looks exactly like the next one, so you should stick to one particular example. Not being a beginner's project, we will assume that you will be able to decipher the plans, so we will cover only the more complex items.

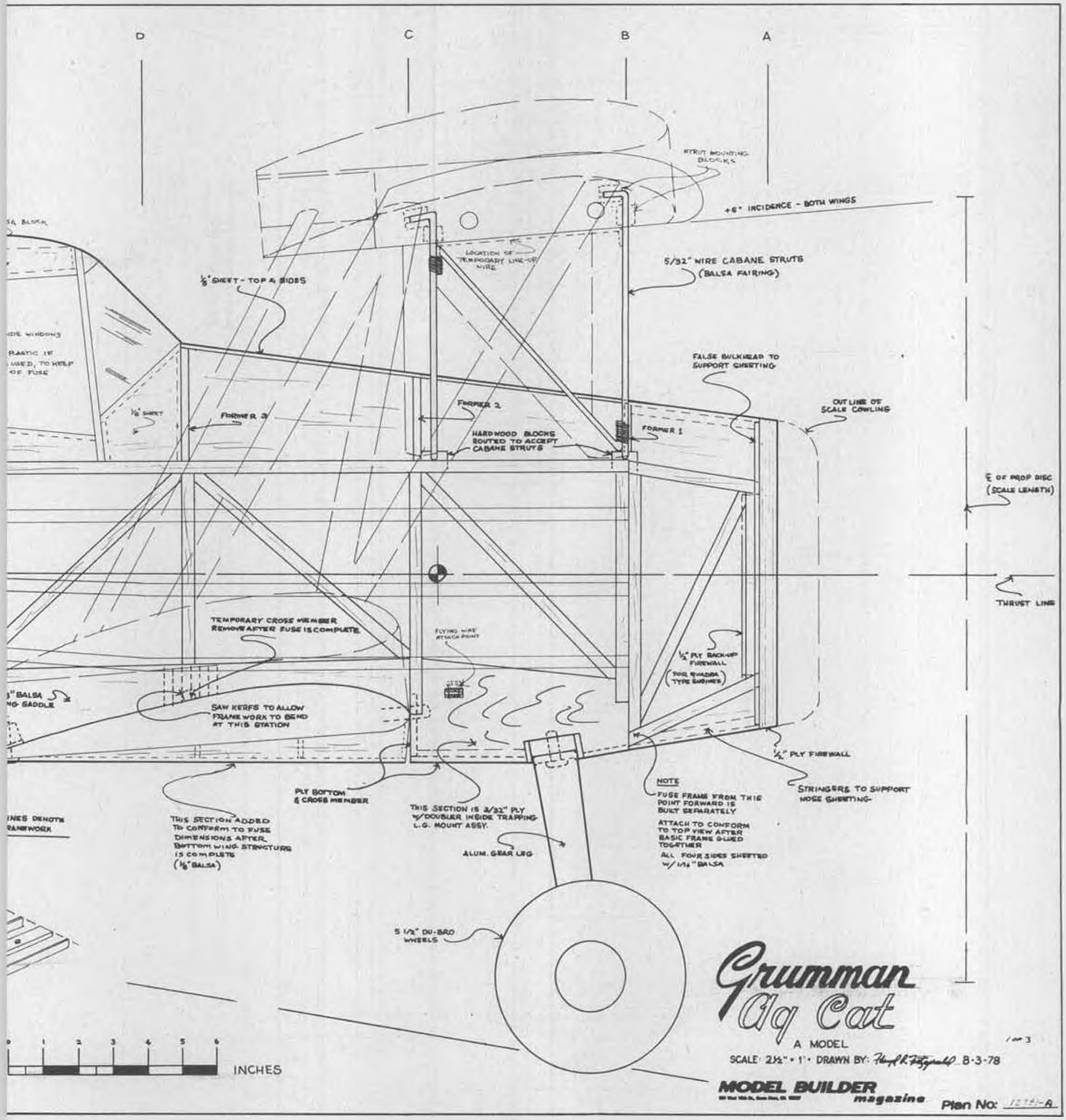
FUSELAGE

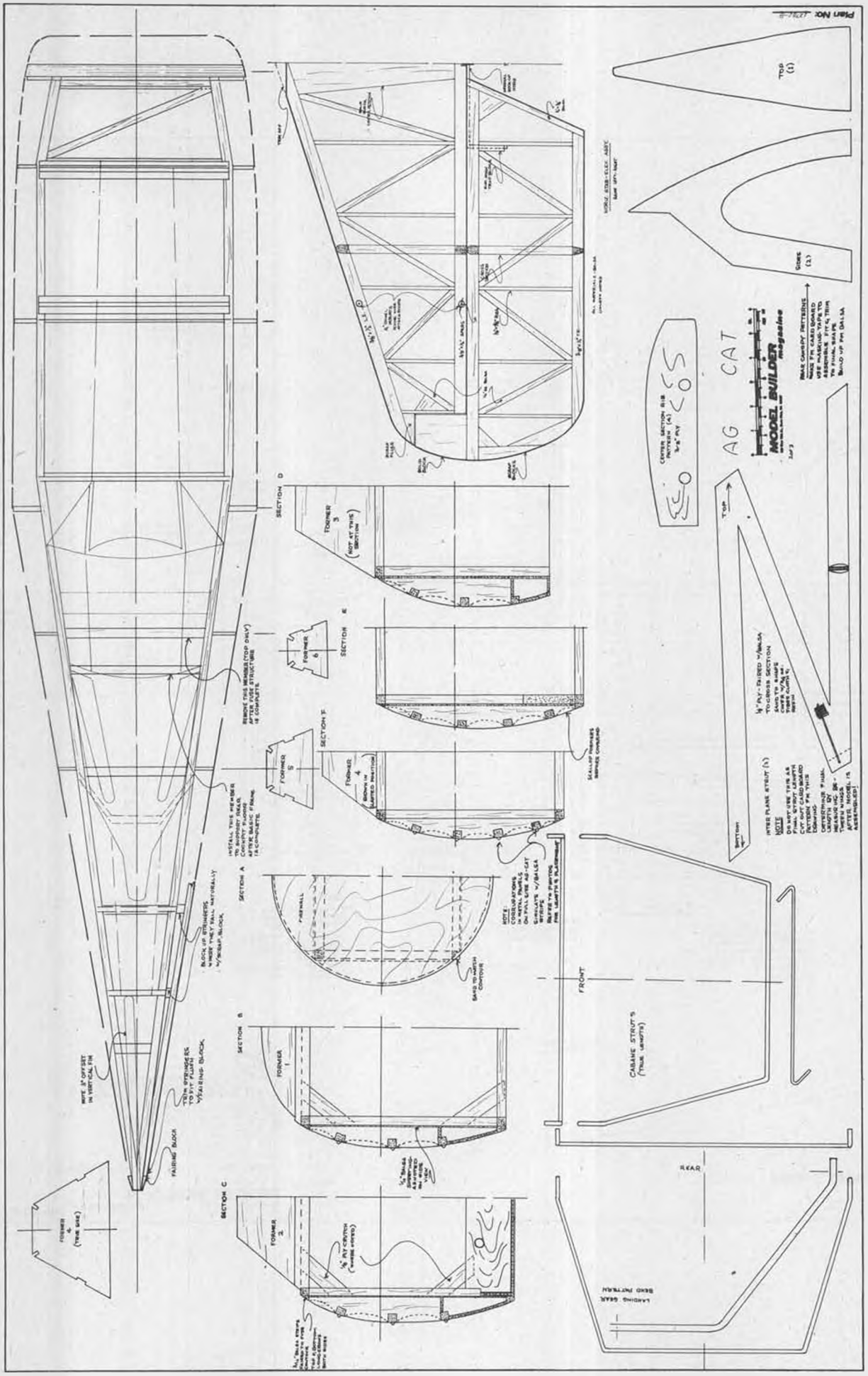
Construction is begun with the basic framework. Two sides are built, and when dry, the cross members, cabane strut, and landing gear blocks are glued in. Keep everything in line! Note that the fuselage assembly from section B forward to the firewall is built separately, and then attached to the main fuselage structure. Add the firewall, following the plans as to correct location. Next, sheet the fuselage sides with 1/16 balsa at noted areas. The section from B forward is sheeted on all four sides for strength.

From the same angle as the photo above, it is obvious that the builders of the real one did a good job of duplicating Floyd's excellent model! This one has optional auxiliary wing gas tanks.



F
E
1/4" DOWEL INSERT
BRACE WIRE ATTACH POINT
EPOXY & GLASS THIS END
NOTE: SAFETY TAPE ALL STRUT LOCKS AFTER ASSEMBLY
PIN USED TO UNLOCK STRUT WIRE
METHOD OF STRUT ATTACH
3/8" x 1/2" BALSA FRAME
1/8" x 3/8" BALSA RIBS
+4.5° INCIDENCE TAILPLANE
3/16" DOWEL STIFFENERS
FORMER 4
FORMER 5
FORMER 6
1/16" SHEET
3/32" SHEET
HOLLOW TAIL POST TO CLEAR ELEV. HORN
3/8" BALSA FILLER INSIDE FRAMEWORK TO ACCEPT DOWELS
FILL BLOCK
BALSA - SANDWICHED W/PLY
GUSSETS - BOTH SIDES TAILWHEEL MOUNT GRACES
FUSE SIDES SHEETED W/1/16" BALSA FROM THIS POINT TO FIREWALL
(DIAGONAL GRAIN)
INSET PLY BLOCK
(INSTALL BLIND NUTS BEFORE INSTALLING)
1/4" x 1/2" ALUM. STRAP
DU-BRO 2 1/2" WHEEL
ALL FRAME WORK 3/8" BALSA
1/16" FUSE SHEETING
3/8" BALSA TOP
CANOPY TOP BUILD UP FM 3/32" BALSA
BALSA SHAPE BLOCK
1/8" 3/8 PLY FRONT FRAME
1/4" BALSA REAR FRAME
TURN OVER BASE
(BALSA SANDED ROUND)
CANOPY CONSTRUCTION DETAIL
TAIL WHEEL BRACKET
(FULL SIZE)
SPECIFICATIONS
WING SPAN: (TOP) 90"
WEIGHT: 18-20 LBS.
ENGINE: 810!
METHOD OF SHEETING OVER WING SADDLE
TAILWHEEL DETAIL
L.G. BLOCK ASSY

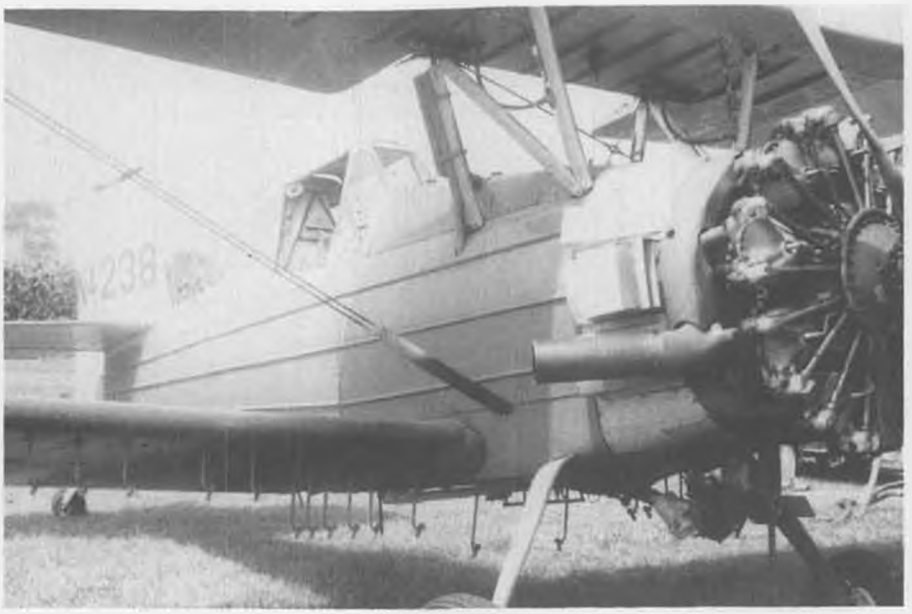

D
C
B
A
STRUT MOUNTING BLOCKS
+6° INCIDENCE - BOTH WINGS
LOCATION OF TEMPORARY LINE-UP WIRE
5/32" WIRE CABANE STRUTS (BALSA FAIRING)
1/8" SHEET - TOP & SIDES
FALSE BULKHEAD TO SUPPORT SHEETING
OUT LINE OF SCALE COWLING
FORMER 3
FORMER 2
FORMER 1
HARDWOOD BLOCKS ROUTED TO ACCEPT CABANE STRUTS
℄ OF PROP DISC (SCALE LENGTH)
THRUST LINE
TEMPORARY CROSS MEMBER REMOVE AFTER FUSE IS COMPLETE
FLYING WIRE ATTACH POINT
1/2" PLY BACK-UP FIREWALL (FOR RHADRA TYPE SHOCKS)
SAW KERFS TO ALLOW FRAMEWORK TO BEND AT THIS STATION
1/2" PLY FIREWALL
PLY BOTTOM & CROSS MEMBER
STRINGERS TO SUPPORT NOSE SHEETING
NOTE
FUSE FRAME FROM THIS POINT FORWARD IS BUILT SEPARATELY
ATTACH TO CONFORM TO TOP VIEW AFTER BASIC FRAME GLUED TOGETHER
ALL FOUR SIDES SHEETED W/ 1/16" BALSA
THIS SECTION ADDED TO CONFORM TO FUSE DIMENSIONS AFTER BOTTOM WING STRUCTURE IS COMPLETE (1/8" BALSA)
THIS SECTION IS 3/32" PLY W/DOUBLER INSIDE TRAPPING L.G. MOUNT ASSY.
ALUM. GEAR LEG
5 1/2" DU-BRO WHEELS
0 1 2 3 4 5 6
INCHES
Grumman Ag Cat
A MODEL
SCALE: 2½" = 1' DRAWN BY: Floyd R. Fitzgerald 8-3-78
MODEL BUILDER magazine
Plan No: 1274-A


AG CAT
MODEL BUILDER magazine
FRONT
REAR
CABANE STRUTS (TRUE LENGTH)
SECTION A
SECTION B
SECTION C
SECTION D
SECTION E
SECTION F
FORMER 1
FORMER 2
FORMER 3
FORMER 4
FORMER 5
FORMER 6
TOP (1)
SIDE (2)
CENTER SECTION RIB PATTERN (4) 1/4" PLY
INTER PLANE STRUT (1)
LANDING GEAR SEND PATTERN

Pinning top wing in place. Tank is a Superpoxy thinner can. Gravity feed, like real!

Same pliers, same hand, different job. Attaching strut. Note rigging wire attach point.

Radio hatch, spray tank and shut-off valve. Tube connects to spray booms.



Nice detail shot of 1 to 1 ship, for scale nuts. Note size of exhaust pipe, exhaust blast protector sleeve over flying wires, and fairing under bottom wing.

Close-up of steerable tail wheel assembly. Usual wire rig won't handle this job.

Install cabane struts, keeping them vertical to the top longerons. All formers, stringers, and wing saddle areas are now completed. Sheet the top of the fuselage from cockpit forward to section B. Watch it here, if you intend to go Precision Scale. The top of the fuselage from the windscreen to the rear cabane strut is actually the top of the spray bulk tank in some examples, and may differ in cross section from the plans. Stringers, all around forward fuselage section from B to firewall are added, and sheeting glued on. Install plywood on the bottom of the fuselage ahead of wing saddle.

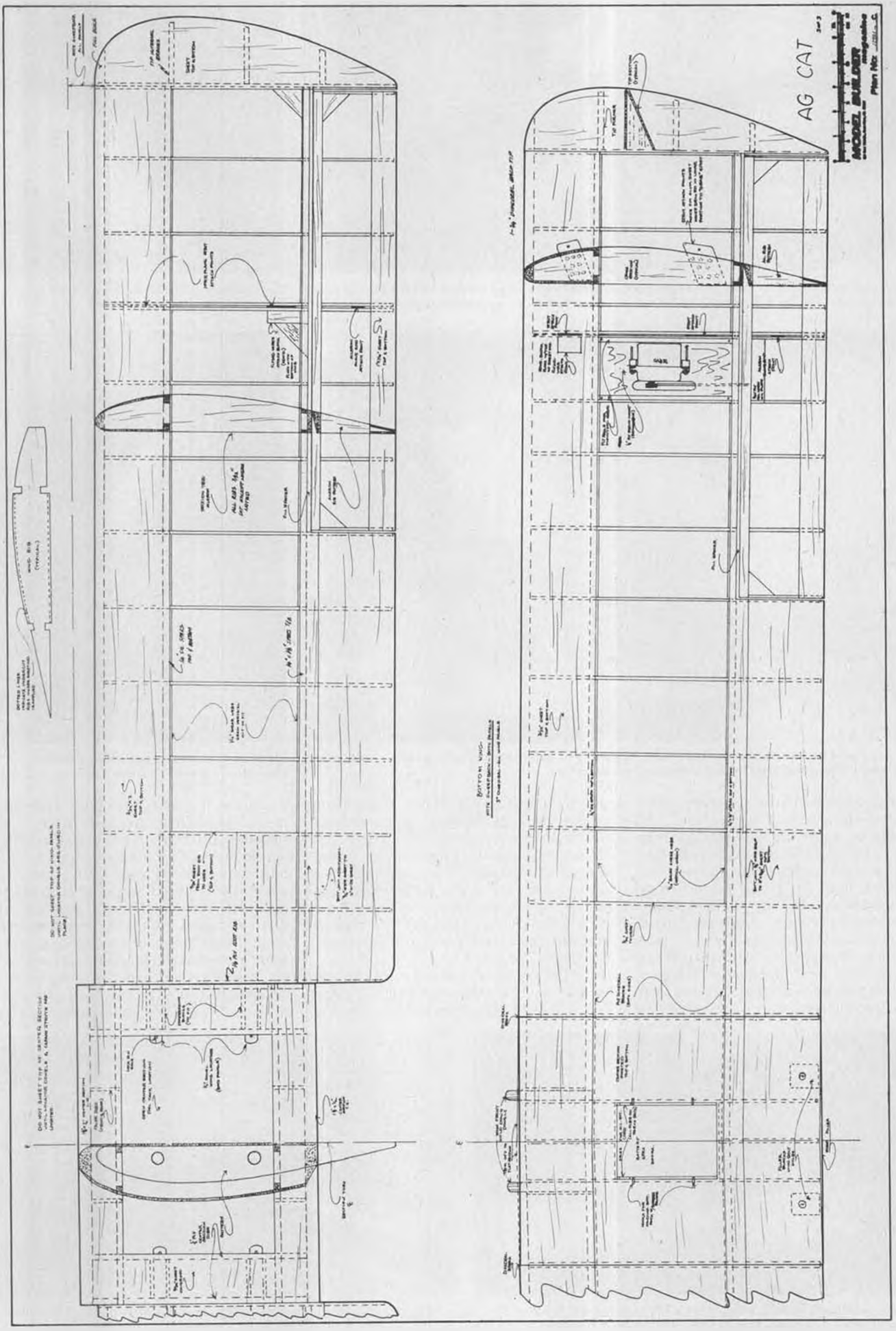
The canopy is built up as per the drawings; refer to plans as to correct location of all parts. This step could be done away with if you have access to a vacuum-form machine, and can carve a mold. The canopy itself adds nothing to the structural strength of the fuselage.

LANDING GEAR

This proved to be a sticky area for me to handle. The gear on the full-size Ag-Cat is of the Cessna spring type. I tried to duplicate this with 3/16 wire, but after much swearing, broken wire, and smashed and burned fingers, I threw the whole mess away, and made for the local hardware store. I eventually came up with a 1/4x1-inch strap of aluminum, used for molding around large plate glass windows. While it is not exactly scale-like in cross section, it has proven quite serviceable. Maybe you scroungers in the crowd can come up with a better substitute. In case you are wondering about the method of attaching

Strange method of fueling, at least for a model airplane! It's poured through funnel into tank. Center section stays with fuselage.

Designer Floyd Fitzgerald applies manual starter to O&R ignition engine. Radio is unaffected by ignition interference.

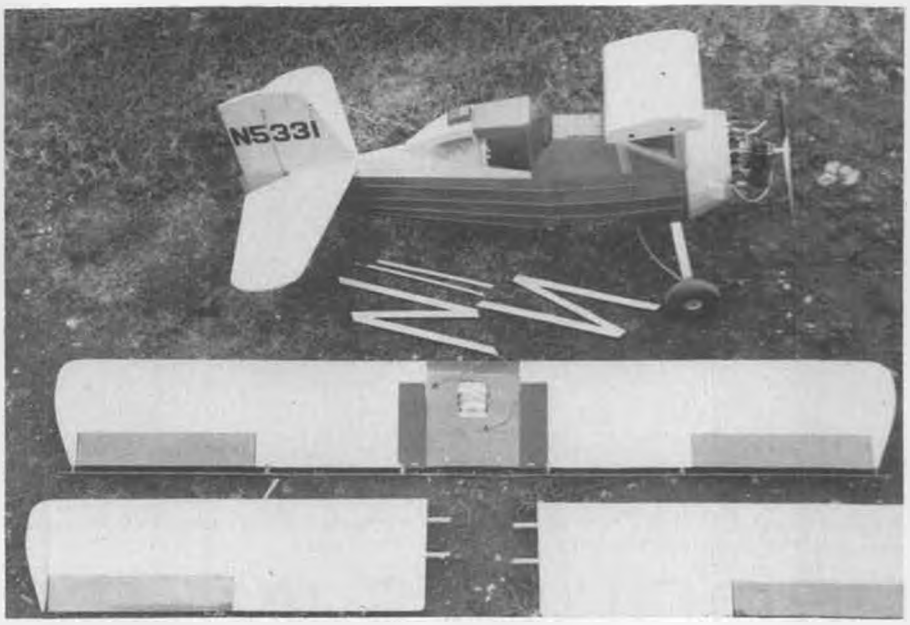

AG CAT
MODEL BUILDER

the main gear to the fuselage, don't worry; it has been crash tested by Yours Truly! On one of the later test flights, the engine quit (traveling needle) too far out over the bean field next to the flying site to make it back. Everyone knows the sink rate of a biplane with no power. Trying to make the best of a bad situation, I set her down as easily as possible, but the soft ground was just too much. She hit with a mighty "whoomph!" heard clear to the other side of our field. Naturally, there was an audience, and everyone started out to help pick up the pieces. The three nylon bolts had sheared, and the only damage was a bunch of dirt in the cylinder fins! Didn't bust the prop, even! (At six bucks a throw, that helps.) I have never had it fail under normal takeoffs and landings.

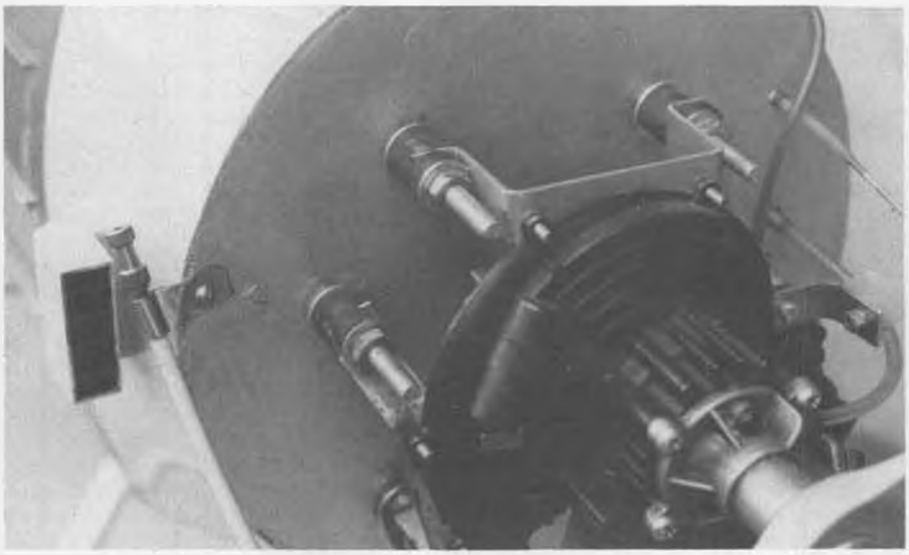
WINGS

Nothing too far-out here, but do build the top wing center section first. Do not sheet the top of this section, or the tops of the wing panels, until the locator dowels are in place. Build the wings flat on the plans by laying down the bottom sheeting first, and working from there. Remember your dihedral angle at the root ribs. After the panels are done (except for the top sheeting), place the center section (less its top sheeting) over the plans, along with one wing panel. Block the panel up to the correct dihedral (3°). Cut locator dowels to length, slide them through the center section ribs, and against the first wing rib. By rotating the dowels while applying pressure against the rib, you will make a mark for the hole. Cut out the hole, and repeat this process until the dowels are in the proper location and all assemblies are lined up, then glue in place. Do the other wing panel in the same manner. Make sure nothing slips out of line. The top sheeting can now be added to the wing panels, but do not sheet the top of the center section yet.

The bottom wing is built up in the same manner as the top, in three sections. Do not sheet the top of any of the assemblies until they are joined together with the ply dihedral braces. Make sure the holes in the ribs covered by the sheeting are large enough to allow the servo extension leads to be pulled through, or better yet, install the servo leads before sheeting the top of the wing.



The ideal ARF model! The Ag-Cat knocked down for transporting. Note spray boom along trailing edge of bottom wing. Receiver switch is inside canopy.



Close-up of engine mount. Needle valve extension on left is bike brake cable with Enya needle knob silver soldered to end. Nice way to adjust thrust alignment.

TAIL GROUP

All simple construction here. Note the dowel inserts for attaching the brace wires, and the stiffening dowels through the vertical fin.

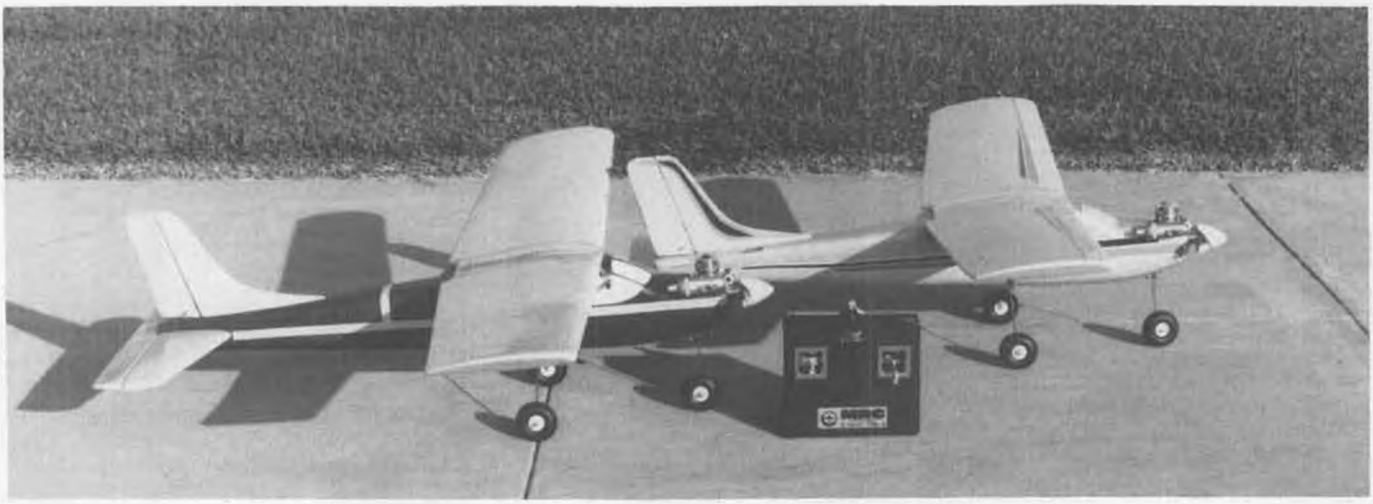
ASSEMBLY AND COVERING

At this point, you should decide how you are going to cover the various components. I used Hobby Lobby Supercote throughout, simply because it was inexpensive and came in brown and yellow, approximating the colors of the real thing. The full-size plane uses

Continued on page 107

Hardwood inserts provide strong base for brace wire fittings. Operating turnbuckles provide realism and fine adjustment.

Close-up of spray tank fill hatch. Floyd is still experimenting with spray system to improve results.



A pair of Hawks, with MRC 775 transmitter. Model on the right is stock; one on the left is customized as per the text. Customized version looks more individualized and also makes the model last a little longer.

PRODUCT$ IN U$E

MRC's "TRAINER HAWK", by ELOY MAREZ

PHOTOS BY AUTHOR

• On any given weekend, at any active R/C flying field, you will probably run into some of every class of model flier. By class, we don't mean short, medium, tall, or whatever standard you use to judge people, we mean the designer/builder/flier; the plan-builder/flier; the kit-builder/flier, etc. And finally, way down at the bottom of this airborne pecking order, the buyer/flier with his airplanes that someone else built, or that are sold as Almost-Ready-To-Fly, Ready-To-Fly, or variations in between.

Even without realizing it, many of us look down our noses at these guys with their Plastic Toads, Rubber Ducks, or Dixie Cups, as the all-foam molded airplanes have come to be known. Maybe some of this is justified, as to those of us who are builders, a large part of the satisfaction of the hobby is the thrill of seeing something we created roll down the runway and do just exactly what it was intended to do. But when it comes to getting flying time, which is the primary objective for many of those guys at the field, it'll probably help us understand them and their ARF's if we remember that oft offered advice: "Candy is dandy, but liquor is quicker!" *(Don't forget the experienced builder/flier who suddenly . . . by crash . . . needs an airplane, ready to fly, by the coming weekend. wcn)*

And the liquor in the R/C hobby has got to be ready-to-flys. So let us take a more objective look at them in general, and at one, the MRC all-foam, almost-ready-to-fly "Trainer Hawk" three-channel airplane in particular.

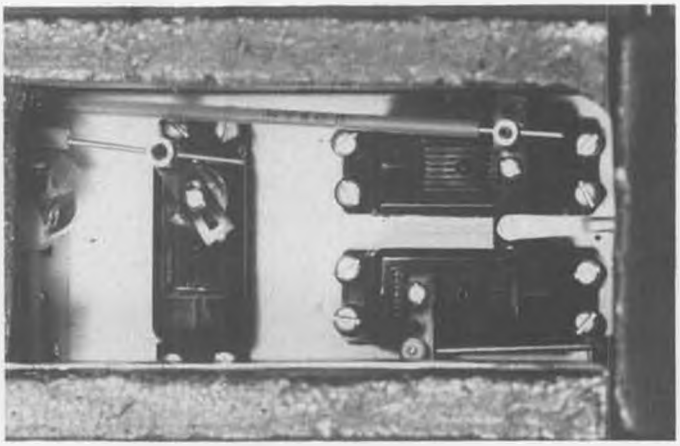
Let us assume that some nice young man . . . uhh, person, comes to you and expresses an interest in R/C flying. The person has the money, time, and ambition, which is probably all it takes. Being a builder/flier yourself, you naturally recommend he hurry down to Pop's Hobby Shop, purchase a Falcon 56 and a container of glue, and clear off the dining room table. Now, during the months that it'll take this airplane to be completed, you can do one of three things. You can teach him to fly on YOUR airplane (Who, me?); you can wait for him to finish his, during which time the flying season will probably pass; OR, you can help him select an RTF trainer in which you can install the radio in one evening and have him out at the field the next Sunday for his first session of "hold your nose up!" Because when all the talking and hangar flying is over, out at the field is where it's at.

Or, suppose you have an engine to break in, or a new radio to test. And how about that repaired radio that just came back from the service center after having gone into the ground doing a hundred plusity-plus miles per hour? Wouldn't you feel better about testing or flying any of these things in a fairly inexpensive airplane? Inexpensive in dollars, and maybe even more important, inexpensive in that precious commodity, building time.

There are also the guys who just don't have time to build, being too involved in the other mundane things of which life is made, such as making a living. The few hours that can be spared for relaxation or a hobby have to be spent carefully, and would you rather see these persons flying an RTF, or watching the one-eyed monster?

True, RTF's are an excuse to some . . . the "I don't know how to build" guys, which is a reason I can't accept, as none of us were born knowing how to build model airplanes. It is a skill and knowledge that we acquired, just like we acquired whatever else we know or are

Everything in this photo is furnished . . . Enya .15, muffler, glow plug, spinner, and Top Flite 8 x 6 prop.



Installation of Novak Electronics' Bantam Midget servos on a piece of 1/8 Lite Ply.

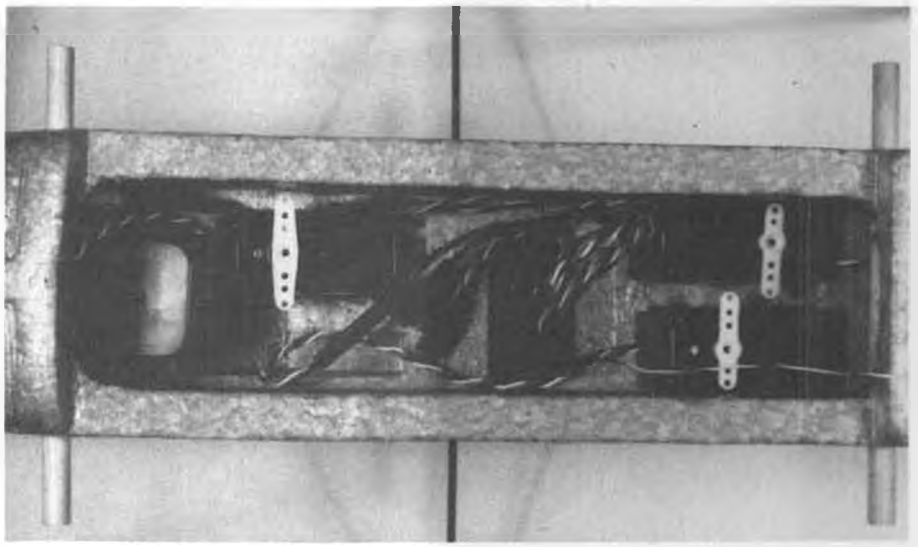
capable of doing. There is no excuse for these guys, but there may be a real good one for the rest of the RTF fliers, so give them a chance.

Model Rectifier Corporation's entry into this field is its 48-inch wingspan, Enya .15-powered "Trainer Hawk", designed primarily for training purposes, but equally useful as a test bed and for sport flying.

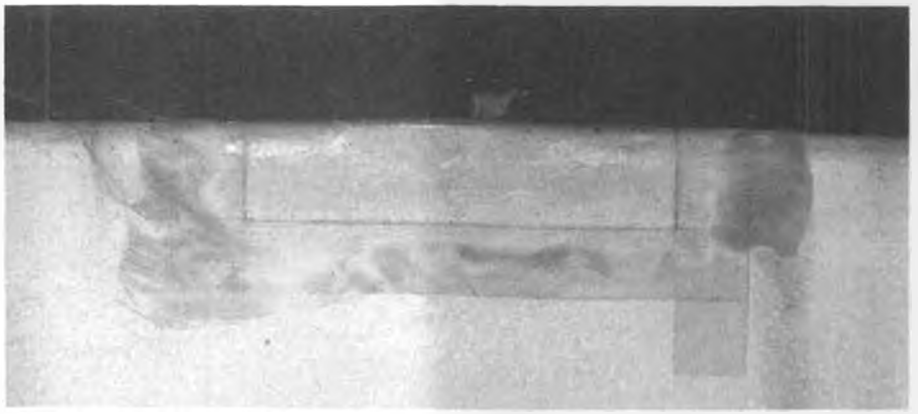
It uses a two or three-channel radio, on rudder/nose wheel, elevator, and/or throttle, if desired. It has molded cavities into which all the MRC R/C components fit perfectly, though of course, any other system can be installed with only slight modifications to the foam. The pre-bent pushrods are also of the right length to fit the MRC servos; either the MR-10, -30, -40, -70, or the ball-bearing coreless motor -80's can be used.

The Cessna-looking Trainer Hawk is precision molded from high-density foam, in light blue for the fuselage and empennage, and contrasting light yellow for the one-piece wing. It is furnished with engine installed, pushrods in place, fuel tank and lines installed, and all controls hinged. Other than radio installation, the only things that need be done are gluing in the horizontal stab, gluing in the main landing gear, and gluing in the rear wing hold-down dowel. Now, what could be easier than that?

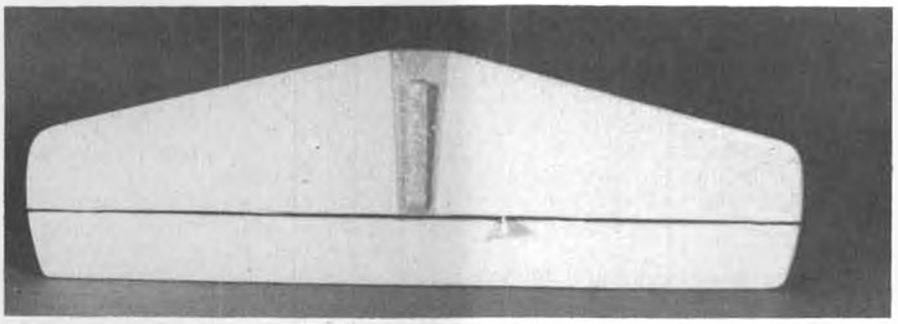
On one of the two Hawks we tested, the person doing the control hinging got a little overzealous with the epoxy, and the excess built up between the surfaces enough to restrict movement. The excess is easily removed with a sharp blade, being careful not to scratch the hinge itself. They are of the one-piece flexible type which will probably outlast the airplane, but which often part if marked with a sharp pointed object.



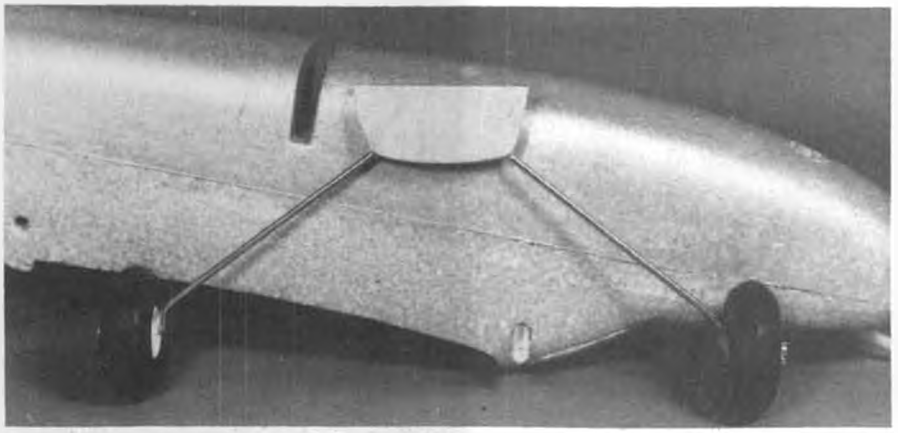
Installation of MRC 775 airborne system. Everything fits into specially molded cavities . . . makes installation a cinch. Only slight modifications required to get other radios to fit.



Fiberglass cloth and 5-minute epoxy reinforcement on wing center section keeps rubber bands from digging into the wing. Procedure is fully described in text.



Econokote-covered horizontal stab for customized model. Stab is covered only up to the fuselage line, to provide a foam-to-foam contact when the stab is glued to the fuselage.



Landing gear comes pre-bent and already laminated between plywood formers; all the builder has to do is epoxy the landing gear assembly to the fuselage. What would be easier?

All necessary clevises, wheels, collars, etc. are included. The following list of tools and supplies are recommended by MRC for completion of the project:

Needlenose pliers
Phillips head screwdriver
Regular screwdriver
Modeler's knife
Prop and plug wrench
Prop reamer
Servo tape
Fuel (Approximately 10% nitro)
Fuel pump or bulb
"Chicken Stick" or electric starter
Glow plug battery and clip
Extra rubber bands (No. 64)
A pencil
Safety glasses

To that list, add a 10-mm metric wrench, which is needed for the Enya prop nut. The otherwise handy-dandy Fox four-way wrench, being made for U.S. nuts, will not fit. And if you use pilers, you are fired, as MY student!

A most comprehensive instruction booklet is included, written specifically for the beginner who is still learning the language. It includes an illustrated

Continued on page 120

Mick Reeves won the R/C Scale World Championships with this outstanding Fournier RF-4 motorglider. Large model is powered by an HP.61 and is rock-steady in flight.

1 TO 1 SCALE

By BOB UNDERWOOD PHOTOS BY AUTHOR

LOOK RIGHT-THINK LEFT

• Liverpool and the gathering of the international scale community seemed such a long time away at Riverside in 1977, but time has a way of creeping on cat's paws, only to spring from the bush to catch you unaware.

Such an occurance happened in my case this year, and frantic weeks of work dominated the days following school in June and July. Painting and building, redoing and pondering.

The trim flight on July 3rd, with no canopy or windows or cockpit details, convinced me that the Hiperbipe would fly. Then came more 16-hour days doing the little details . . . instruments, handles . . . a myriad of items finally fused into a hopefully competitive model.

A monster of a box was made, scale presentation developed, and packing commenced. For the uninitiated, this is a time-consuming, complicated job, due to the fragile nature of the beast. A ding in a pattern plane does not result in lost points, but "hangar rash" in a scale model is often looked upon with a scratch of the chin and a "Hmmm!"

The boxed eagle was taken by trailer to Chicago's O'Hare Airport, where it joined Bob Wischer's model and a frustrated British Airways staff. The Hiperbipe's "hangar" was a sturdy box measuring 63 x 55 x 18 inches, and weighed 100 lbs. Bob and I watched as it was angled about several different ways before being stuffed into the tail cargo area of our 747.

The trip to London's Heathrow Airport was uneventful, but at that point the well known "all you-know-what" broke loose. The Underwoods had a two-hour layover before a connecting flight to Manchester could be arranged. It took 1-1/2 hours to get through a passport line, due to a jam-up caused by the French air controllers' slow-down.

After quickly collecting the lugguge and the model, we caused a minor sensation by literally running almost a mile in underground subways to reach terminal 1 from 3, pushing a cart with the huge red, white, and blue box perched precariously thereon.

A wonderful porter helped me wrestle it into an elevator and up to the baggage check-in. There the girl said, "Run, the flight is almost loaded!" She instructed me to leave the box and they would send it on. I realized it probably would never make the flight we were on, but many flights go into Manchester from London, so it posed no problem.

So much for theory. We found out in Manchester that the box would not fit in the baggage area of a Trident, used by British Airways.

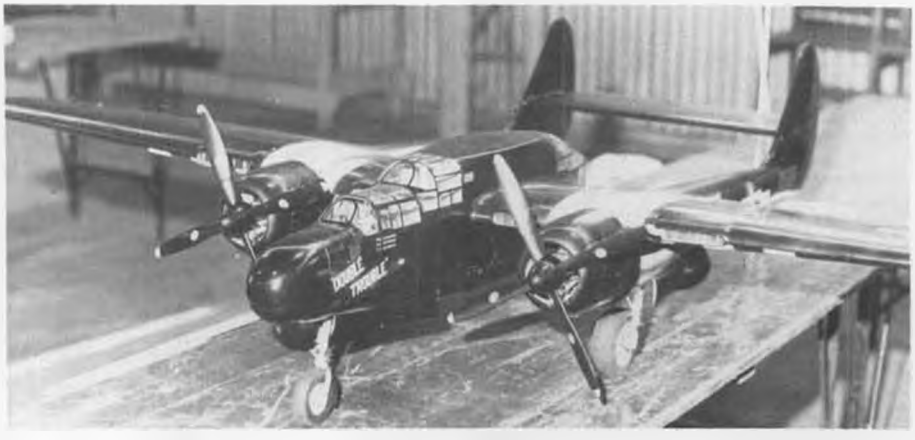
"No problem," the baggage man said, "they will send it up tonight by truck and you can pick it up in the morning." Another theory!

As we waited around the terminal the next morning for baggage to get a line to Heathrow to find out where it was, we retired to the lounge to await the arrival of Steve Sauger, our teammate.

Munching a pastry and watching the airport activity was interrupted by my oldest daughter, Anne's cry, "Look!" There, reposing majestically on its own little airport cart and pulled regally across the apron by a tractor, was the Hiperbipe box. Very shortly after, it was tied to the roof rack of our rental Audi and on its way to Liverpool. Steve, incidentally, was not on the flight. He came in several flights later.

Our lodgings at the university were most satisfactory, with each person having a separate room in small suites of two. The staff at the university was most friendly and helpful.

The first morning we were treated to an English breakfast: juice or cereal, fried eggs, bacon or ham, sausage, tomato section, toast, orange marmalade, coffee or tea. After about three mornings of this, the girls of the Underwood clan wondered when it would



G. Britain's Brian Taylor entered this P-61 Black Widow, powered by two .29's. Model consistently put in the highest flight scores, but a low static score bumped it down to 8th place.

Bob and Dolly Wischer fire up Bob's Piel Beryl CP 750 under the watchful eye of a contest official. Placed 7th.

Englishman Terry Melleney's D.H. Moth Minor has been around for quite a few years, placed 5th at WC. Strange wheels!

change. It never did. For 23 days, neither rain nor shine, hotel or bed or breakfast, could affect a change in that English standard. If the chickens of Britian ever go on strike, the Empire will fall!

Having arrived on Tuesday with the Wischers, and Steve Sauger arriving on Wednesday, made the R/C team complete. The control-line team of Dan Osdoba, Roland Baltes, and Ray Smith was on hand as well, and with George Buso and his wife, Olive, the U.S. Scale team was complete. The days before the competition was to officially begin were filled with unpacking the models and getting used to the surroundings.

The team held a meeting one evening that proved to be most valuable. We went over everyone's scale presentation in detail and found points which could be improved in some. Panic set in when it was discovered that one team member, whose initials are RLU, had completely messed up the scale ratio. I had listed the ratio of the model to the three-view, instead of the model to the full-size! Gadzooks, what a mistake. The next day, on a borrowed typewriter, Olive Buso retyped the information page while the Wischers helped improve a couple of other presentations.

The models, in a caravan of cars, left for Woodvale. Others, who had made the almost-20-mile trip, had given us driving times of from 30 minutes to "you can't get there from here."

Sparmann P1 (foreground) by E. Stromquist, and SAAB BA (background) by J. Stromquist, both of Sweden. Latter model was 7-1/2 oz. overweight, had severe flight problems.

Our intrepid leader, Manager Buso, led the procession of cars. We got lost! However, through sheer determination, the airbase was located and the models removed from the boxes and set up on tables provided in the hangar.

None of the models had sustained damage, and clean-up was the order of the moment, with many interested spectators huddled about.

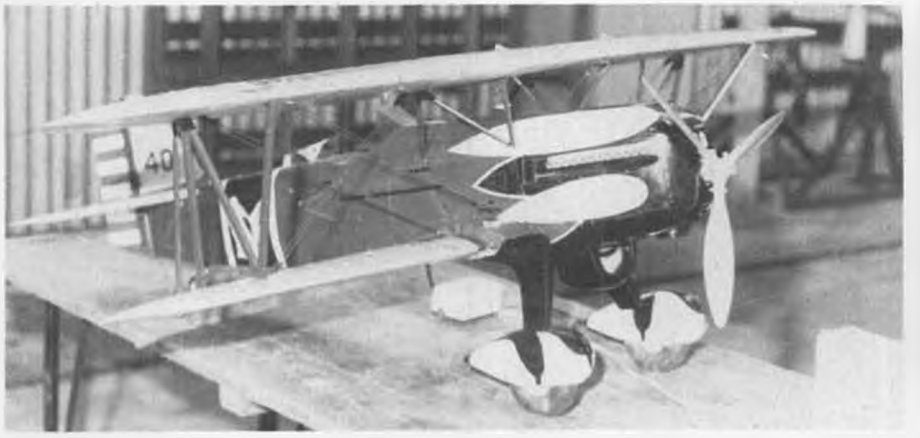
The Canadian team had already collected and others began to trickle in, bringing about the renewing of old friendships and the making of new ones.

On the day before the event officially began, we were witness to flight attempts of a 24-foot R/C "stand-way-off" scale Lancaster bomber and a 747 with a span of about 15 ft. I must honestly state that the 747 flew very realistically and made a thrilling sight in the air. The Lancaster seemed underpowered.

Both of these models were flown using two men and two transmitters. The system certainly appeared to work well, but I still harbor the fear that 24 feet of model would do a whale of a lot of damage to a crowd. Later in the week, when I was told that the SMAE, the British aeromodeling group, no longer carries insurance for its members, as does our AMA, I asked one of the

Bob Underwood readies his 2nd place Hiperbipe while Jay Gerber (left) shoots film for upcoming AMA movie.

Very colorful Fairchild PT-19 by W. Reger, of West Germany. Model placed 12th overall.



P. Muller's well-detailed curtiss P-6E Hawk is powered by an O.S. .60, placed 13th overall. Muller hails from Switzerland.

Here's Bob Underwood himself, with the Loening M8 he proxy-flew for Tom Stark. Unfortunately, he was unable to make the required 30-second flight needed to qualify, and had to settle for 9th place.

organizers what would happen if something went into the crowd. His answer was, "It would be a pity." An interesting approach.

On Saturday the judging began, and competition in other areas began in earnest. Unlike other earlier international events, much more was going on in the area. There were scores of tents and booths selling every imaginable type of thing. A huge football field-sized tent contained scores of model industry sales booths. You should have seen the pile of Profile Publications at one dealer's space!

There were carnival rides, an antique car show, and thousands of spectators in spite of rather inclement weather both Saturday and Sunday.

A considerable amount of time was spent on demonstration flights and an invitational pattern competition on both days. Some of the Sport Scale competitors were concerned that this left them only time for two flights, and this was further complicated on Sunday by heavy rain.

One part of the demo included the flying of sleek, delta-winged, jet-engined R/C models from the Netherlands. Their flight was spectacular and noisy, with vertical rolls out of sight into the clouds.

While the multitudes persued the carnival and flying areas, the five scale judges moved through the models one-by-one. It was interesting to watch them work. Heavy rains on Saturday night had flooded the area of the hangar they had been using. Then, French television film crews flooded their new area with light and directions as they shot a documentary. Add to this a visit by the Lord Mayor and Mayoress of Sefton (Liverpool). One must marvel at the high level of concentration the judges were able to maintain.

Sunday evening came and the static scores were history. Mick Reeves paced the field, with Steve Sauger second, Bob Wischer third, and my Hiperbipe in fifth. It appeared that the U.S. was in an excellent position to bring home the team trophy, at least.

Competition on all levels began in earnest on Monday morning. Each country had a position and one member flew in each third of the round.

Steve Sauger was the first to go for the U.S., followed by Bob Wischer, with the Hiperbipe's daddy wearing the No. 24 vest. That tended to be somewhat disconcerting at first, when one considers that there were only 23 contestants. I can't imagine how Nos. 25 and 26 felt.

The flying was spotty the first day, with some very nice flights and some "interesting" ones. It became evident from the first that a twin, a Black Widow, entered by Britain's Brain Taylor, would have to be watched in spite of a low static score. The new system of flight scoring which awarded percentage bonuses for various aircraft made itself known. Since the Widow was a twin and has retracts, it garnered a 20% flight bonus.

At the end of round one, Mick Reeves held the number one spot, Taylor,

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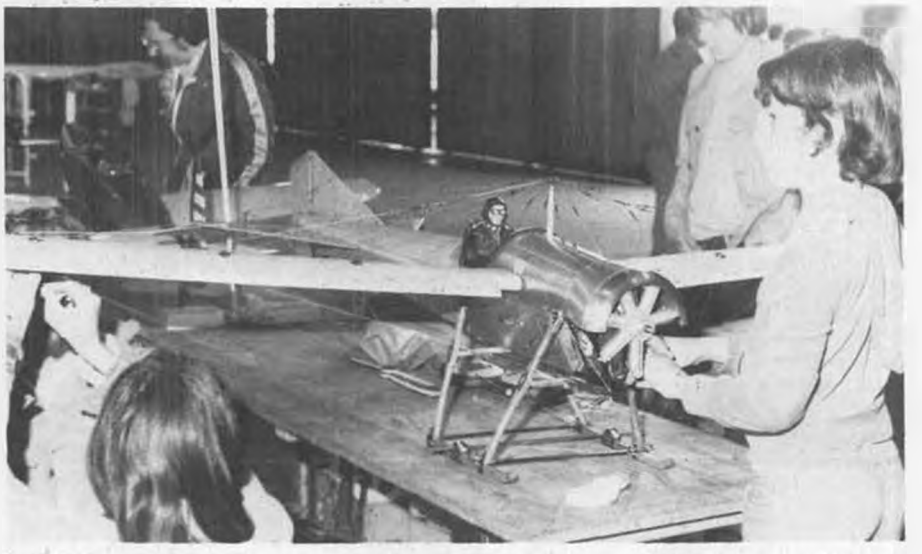

A. Steinberger's crew assembles his beautifully-built 1912 Blackburn. He must have a fortune invested in turnbuckles! Steinberger was the highest-placing member of the W. German team.

French film crew about to capture Canadian Bob Nelitz (foreground) and his Chipmunk on a film they are producing. Bob placed 4th overall.

INSTRUCTOR

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

• Can you believe it? I actually received three whole letters this month. At this rate, Fearless Leader will be able to print this column in the classified section in a few months. A couple months ago, a friend from Mexico asked me when I found time to answer all the inquiries. He was sure surprised when I told him that I had not only answered all the letters, but that every one had been used in the column and that over half the questions were made up by this writer! I'm beginning to think that our readers fit into one of only three categories: they know all the answers, they can't write, or they don't care. If you don't fit into one of these catagories, then drop me a line.

The first subject this month will be the anhedraled or drooped stab.

I keep kidding Don Lowe that when he designed the Phoenix, he bent it at the wrong end. The pros and cons of the anhedral stab are still being argued among the experts, but one thing all agree on is that the anhedral alters more than just the looks of the airplane. The main reason for the addition of anhedral is to correct the tendency of most airplanes to pitch the nose down when rudder is applied. It seems that when the rudder is deflected right behind the stab, it acts as an air dam and effectively blanks out a portion of the stab. This decreases the negative lift of the stab, causing the nose of the airplane to pitch down. (Yes, the stab is creating negative lift in most cases; see Dave Thornburg's "Center of Pressure" article in October '78 **Model Builder**). If you look at the enclosed sketch, you will see why the anhedral tends to hold the nose up. Bear in mind that when you yaw the airplane, there is some airflow across the fuselage.

In Fig. 1, "A" represents the airflow across the fuselage due to yaw. "B" represents the lift vector caused by the anhedral, and "C" represents the lift vector caused by the blanking of the stab with rudder application. As you can see, if the anhedral is adjusted so that "B" equals "C", then the airplane will remain neutral in pitch when rudder is applied. Now, everything is cool, right? Wrong. This has now created an adverse roll when rudder is applied, due to the lift vectors on opposite sides of the stab. This must be compensated for by a slight increase in wing dihedral! If we ever get all this adjusted properly (and few people ever do), then we should have a perfect airplane, but now, what happens in a crosswind? It will not be any more problem than with a "normal" straight stab, but if it is a gusty crosswind, the anhedral will cause the airplane to bounce around, not only in yaw as it would normally do, but in pitch as well! This is caused by vector "A" in the previous drawing becoming variable, due to gusts creating a variable vector "B" without the balancing vector "C". Ya can't win!! Whether this cure for the downward pitch is worth the problems it creates is a matter of discussion, but I feel it improves the flying characteristics under most conditions, and is therefore beneficial, but I haven't yet given up on other ways to eliminate the downward pitch. One involves a simple adaptation of the Du-Bro V-tail mixer to apply a little up elevator when rudder is applied, as in Fig. 2.

Another possible solution to this may be to either move the rudder way back so it won't interfere with the airflow over the stab, or to split the rudder into a top and bottom half, leaving the section behind the stab fixed. I don't know for sure that either will work, but I think they should, and neither would exhibit the crosswind problems of the anhedral tail. Let me know if you try either method and how it works out. Now I'll have to answer those three letters and sign off for this month.

Dear Dave;

How about some tips on landing? It seems most guys have more trouble with that than anything else. Perhaps a series of some kind dealing with landing different types of planes. My own main difficulty at this time is not landing in general (haven't smashed one lately), but hitting the runway consistently. Sometimes I do, sometimes I don't. Is there a secret to it?

I noticed that your column deals mainly (so far) with pattern flying and pattern ships, but there are lots of other types (scale, gliders, etc.) which require different techniques. How about some columns on specific types of planes and the right ways to set up and fly them? Anyway, I think your column is a good idea. I know I have learned a few things! So keep up the good work, and may your thumbs be never dumb. Aerially Yours, Jan G. Eugenides, Coral Springs, FL.

Dear Jan:

If you will look up the column in the May issue, it covers landings in some detail, but I'll repeat most of the important points. First, the airspeed and attitude of the airplane is controlled by the elevator, and the placement of the landing is controlled primarily by the use of throttle. The secret is to aim short and drag the airplane to the spot with the throttle. This will solve the problem of landing properly lengthwise, but to hit the runway crosswise will require

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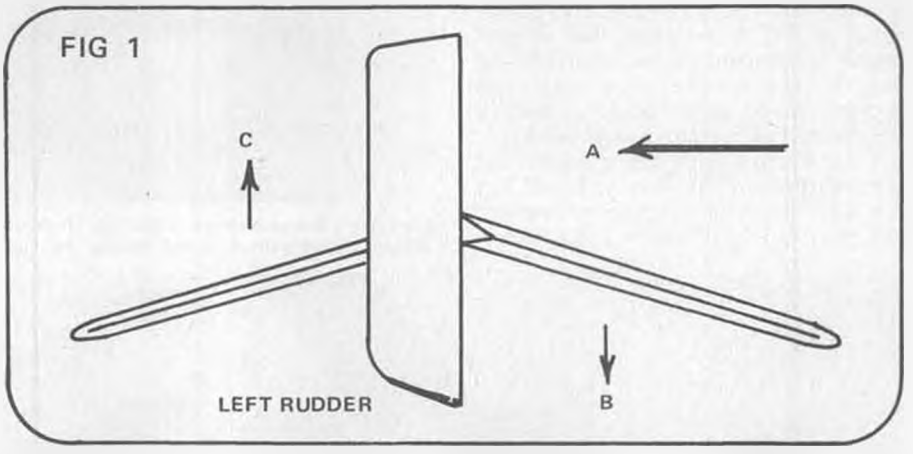

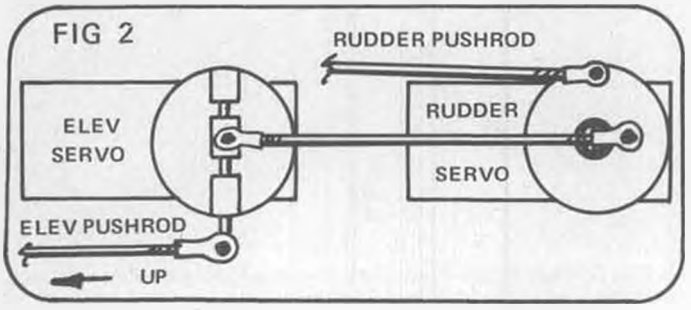

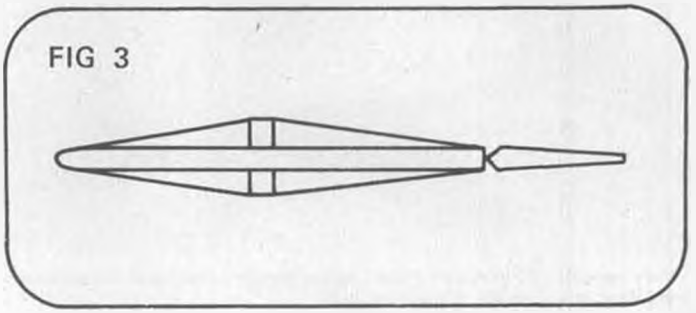

PHOTOS BY AUTHOR

Just part of the lineup of 1/4-scale biggies on the flight line at Hill Country. Casual fun-fly brought out 20 flyable models, plus a couple of unfinished ones that were put on display. At right is the Hill Country Air Museum hangar. Flying Lady restaurant is to the right of the hangar.

1/4 SCALE AT MORGAN HILL

By MONTY GROVES . . . A quarter-scale fly-in for quarter-scale (plus or minus) models at Morgan Hill generated a lot of participant interest. After the amazement is over, some friendly tasks may be needed.

• The big guys came to Hill Country. In Pintos and vans they came. And would you believe that nearly a quarter ton of R/C models were unloaded and assembled at the Northern California flying site? Would you believe that just 20 models could accumulate that much lard?

For the Hill Country Flyers, the Quarter Scale Association event was scheduled to determine if the flying site and the mammoth scale planes are compatible. For one thing, Hill Country is a privately-owned, multi-purpose recreational facility in Morgan Hill. A golf course is adjacent to the model flying site, so the quarter-size airplanes couldn't range as far afield as they're capable of, nor perhaps would like to . . . can't have 'em scaring the bejeebers out of the duffers on the links, ya know. But the QSA'ers honored this recreation, and the Arnold Palmers were barely

Jim Love's Aeronca Sedan is his first 1/4-scaler. Short prop arc leads us to suspect he's using a .60-size engine with no speed reducer. Hey, Jim, where's the driver?

Very realistic .60-powered Piper Cub by Howard Osegueda is now in retirement; too much to carry around!

This Concept Models Fleet was one of three giants brought by Ken Runestrand (he must drive a Greyhound bus!).

Bert Baker's scratch-built Piper Cherokee 235 uses a plywood frame with balsa covering. Model is very easy to fly.

Ray Baker's 35-pound Cessna 310 comes in with nosewheel twisted and starboard engine out. Landed OK.

aware of the behemoths at the far end of the fairway.

Typical of the QSA approach to modeling and flying, it was a non-contest. No pressure. No sweat. Just a gathering of like-minded individuals wanting to fly a little and talk a lot. Members from Sacramento, Los Angeles, and points in between came to swap technical approaches, building techniques, discuss powerplants, and compare notes.

The QSA's stand on safety is not only gratifying, it's downright rewarding. Airworthiness and safety inspections are mandatory, and it pays off. After 200 flights over the weekend, no one went home with a pile of miscellaneous lumber. A couple of busted props, a few dings in the Monokote, and a scratched cowl or two was about the extent of any damage.

As with any R/C scale gathering, the models varied in construction quality and fidelity to scale. Of the 20 at the fly-in, only three could be considered near Precision Scale quality. Only four were

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Bill Eich's 9-ft. Taylorcraft on landing approach. Model was built from a Vic's Custom Kit. Bill's expert nose-high side slips made for very realistic landings.

Most scale-like model at the meet was this 28-lb. PT-19, designed and built by Jim Follini and flown by Lee Taylor.

Bob Seigelkoff put on an excellent aerobatic demonstration with his 1/4-scale Little Toni, now being kitted by Bridi.

Very realistic Nosen Champ, by Paul Sims, making a touch-and-go. Pilot in the cockpit really makes the model look good.

Calvin Pope's Gere Sport flew all weekend without mishap. Looks like the "pilot" is signalling for a left turn.

The birthplace of the Quadra engine is this Trail Manufacturing Ltd. plant, located in Canada. This month's column is a step-by-step care and maintenance manual for the Quadra engine, including tips on how to get the most out of it.

MAMMOTH SCALE

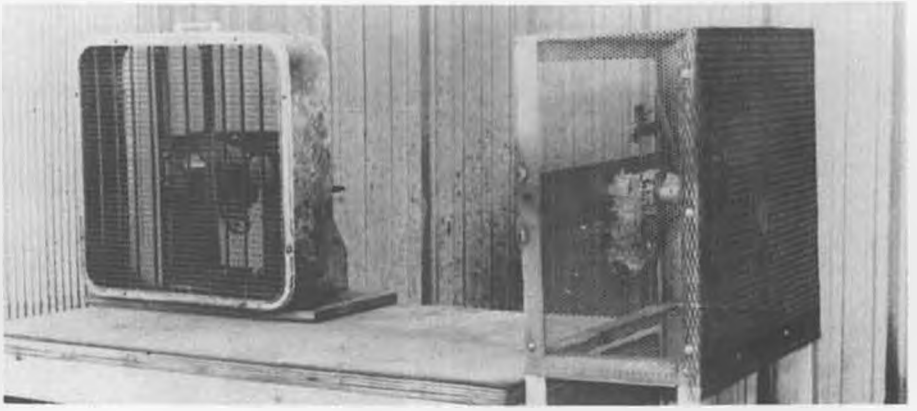
By RON SHETTLER

• This month, we will delve into the care and feeding of the Quadra engine. With over 3500 Quadras in the USA alone, and many more throughout the world, some with considerable hours on them, others in the hands of curious tinkerers, some crashed, etc., it was decided to use **Model Builder** as the most logical means of consolidating possible questions and answers before they get asked and I get snowed under with correspondence. While I can't speak for manufacturers of other products, the reader will be able to spot similarities in maintenance, service, and operation, and apply the information here if he chooses. It also will provide some food for thought before converting brand X into an airplane engine, both from the economic and practical standpoints, but more importantly, the safety aspect and your responsibility to yourself and others when attempting it.

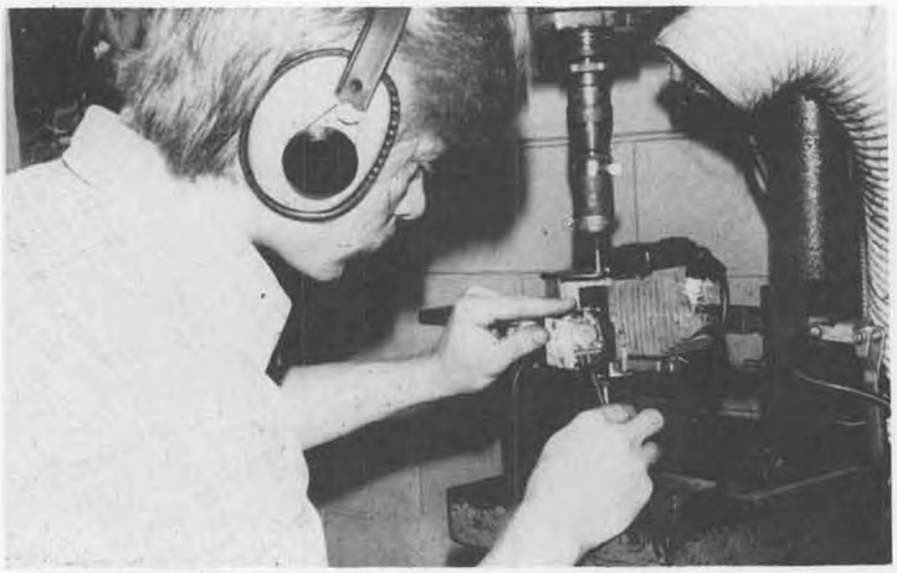
The Quadra engine is an industrial engine. Its construction and design allow a great variety of uses (including ours). A pure chainsaw engine often has parts which make it difficult to tell where the engine stops and the chain starts. A requirement for full power loads for hours on end is not a factor. Chainsaws in a normal environment run only minutes at full power. It's unlikely you will find a small saw engine that will do the job of an industrial engine in our use. The Quadra engine has powered over 280,000 chainsaws in 41 countries for customers who demand quality rather than low price. The result is a product which is appreciated by its owners worldwide.

One of the most-asked questions is, "I've found an old chainsaw with an engine that looks like a Quadra. Can you sell me the parts to convert it?" Let me answer that in this way. The original engine had no provision for an adequate engine mount. The castings were changed to include mounting lugs, and these are not machined on later models which have this provision and are used in a saw, etc. The crankshaft and bearing retainers were also changed, as well as the bearing specs. The flywheel is modified and had to be retested by the factory for our use. The Quadra engine (for propeller applications) is built in a separate production run, from the ground up, as an aircraft or marine engine. An industrial engine is not taken off the line and remachined, with parts added to turn it into an aircraft or marine water-cooled engine. Add the cost of repairing that "old" engine to the forementioned, and I think you have your answer.

The reason for this preamble is to help someone who intends to convert an engine for model use to avoid wasting a lot of time and money on an engine not really suited to the job. Many thousands of research and engineering dollars were spent to give you the product you have now, and many more are being spent to improve it further. The Quadra engine as you know it is a factory produced item, the production of which can quickly be adjusted to suit any demand without affecting the ability to produce its sister products simultaneously. Sure, I produced the first prototype for our application, and these are still running today; however, all units sold were engineered and built by one of the most respected names in the



Testing station at the TML plant. Quadra engines are almost continuously being run on one test program or another.



Initial running and test station. All Quadra engines are run at the factory. Here, a worker adjusts the high and low-speed needles.

A busy station on the Quadra assembly line.

industry. It isn't a converted anything.

The flywheel modifications, for example, were professionally engineered. *Do not under any circumstances modify any flywheel on anything.* The flywheel mods on the Quadra have been burst-tested to far greater speeds than possible with wide open throttle and no load. Conversely, if you feel the flywheel sustained damage in a crack-up, *replace it* with a factory part.

One other item to keep in mind before you tear down any engine *that has been run: don't do so unless it is absolutely necessary.* All engines will develop normal wear patterns and will not run their best until they have done so. If you take the engine apart unnecessarily, you disturb these, and new ones will have to be established while the old running marks remain, thus reducing the performance and life of the engine. All Quadra engines have been test run at the factory to ensure that you receive a clean, usable product.

Many model engines, such as Fox, are also test run, so I'm quite disturbed when I see someone advocate taking an engine apart before they run it (without finding out if it has already been run). In many cases, irreparable damage is done by someone with good intentions, but with sufficient knowledge of the product to ensure it's done properly.

Let's start with normal maintenance procedures that don't involve "wear pattern" disturbance. Check mounting plate for cracks and security. If the lower mounting crankcase bolts are loose, tighten all 4 diagonally and snugly. If the rear screws are loose, remove them and put a drop of Loctite on, then tighten securely. The mounting plate on a Quadra was purposely designed to be frangible, so that in the event of an accident, the plate will bend rather than possibly destroy the crankcase, shaft, or other expensive part of the engine. If you do replace or remove this plate, *be careful you don't bump the crankshaft* when you remove the two rear lower crankcase bolts. The engine's crankshaft endplay adjustment is held by the position of the main roller bearings, and these are held in place by the "pre-load" applied when the crankcase is tightened to the block. Check the coil retaining clip and mounting screws for security. They have been fastened in place with Loctite, and if removed, should have Loctite (suggest No. 242) or equivalent reapplied.

If you feel a total disassembly is necessary, these are the minimum tools and materials necessary to do the job at home:

1) A pin or screwdriver which will fit into one of the tooling holes on the back of the flywheel, and which is long enough to enable the flywheel to be locked against rotation by trapping it between the lower crankcase bolts.

2) A 1-inch box-end wrench or socket for prop spool removal.

3) A 5/16-inch or 8mm hex socket or box-end wrench.

4) A good grade of common screwdriver.

5) A feeler gauge with 25, 15, and 10 thousandths feelers.

6) A 3/4-inch deep socket for spark plug removal.

7) Needlenose pliers for wrist pin circlip removal.

8) A plastic-headed hammer for flywheel removal.

9) Petroleum jelly (Vaseline), Loctite (perferably No. 242 or equivalent), Dow Corning silicon seal (crankcase seal material), and a good grade of 2-cycle oil for pre-run lubrication.

Depending on how long your engine was in use and how well it was looked after, you may also need these items: crankcase seals, carb mounting gaskets, and exhaust manifold and crankcase gaskets, if used.

I must again stress that the only reason you should have to disassemble an engine is that it has inhaled some of your flying field at an angle not normally associated with taxiing, or an uncompleted flying maneuver, or you suspect that something has fallen inside, or the engine is either damaged or worn to the point that it has to be repaired, or you're going to do an overhaul.

For those who read the instructions only when all else fails, on a Quadra you must first remove the mount and the ignition points *before* you can remove the crankcase from the block. Also, when you have discovered that the rod has loose roller bearings, you have to find all 11 of them before you put it back together again.

For the people who need further help, use the following sequence:

1) Remove carb, muffler, mounting plate, coil assembly, and spark plug.

2) Insert pin in back of flywheel to lock against rotation and partially remove prop spool (right-hand thread). Strike flywheel sharply on the side opposite the magnets; this should

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Packing a batch of Quadras.

PHOTOS BY AUTHOR

POWER BOAT WORLD CHAMPIONSHIPS

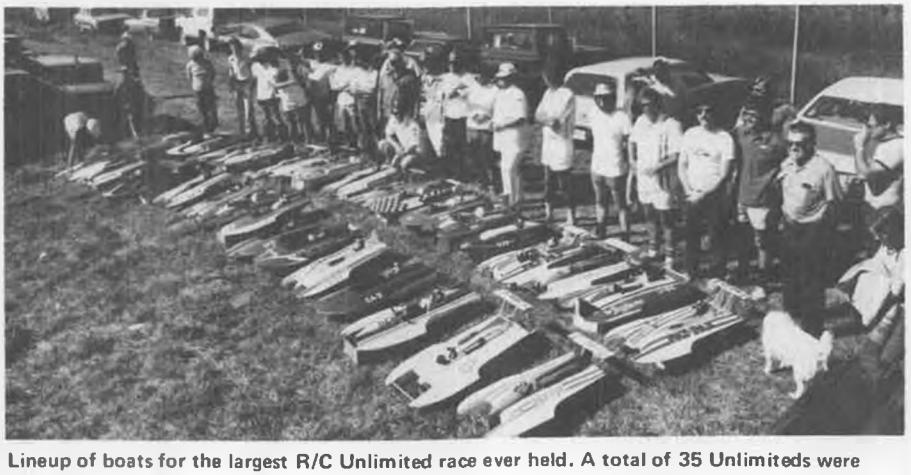
By JERRY DUNLAP . . . Sponsored by John Perry, of carburetor fame, this race was to be the best race in the world for R/C model boats that look like real boats, especially the Unlimiteds . . . and it *certainly was!*

• Many modelers might wonder how a group up in the northwest portion of this nation can host a model boat race for only three classes (R/C Unlimiteds, Deep Vee, and Outboard Tunnel) and call it a "World Championship". The truth be known, we didn't have people from all over the world racing. *(Not to worry. Look at baseball's "World Series". wcn)* But we did have a couple from Thonotosassa, Florida (Herb and Ricki Stewart) and Richard Hazlewood came up from a place called Needles, California, and both those places are somewhere in the world. Actually, the idea for this race can trace its roots back to the 1977 NAMBA Nats at Reno, Nevada, when John Perry, of Perry Aeromotive, Inc., expressed an interest in sponsoring a race for just the R/C Unlimiteds and possibly a couple of other classes. So it was that a five-man steering committee, comprised of Jerry Dunlap, Ron Erickson, Gary Jensen, Roger Newton, and Les Ruggles, decided to take advantage of John Perry's offer and put together what they felt would be the best race in the world for a select group of model boats.

The overall idea was to hold a race for boats that look like real boats. From the beginning, the R/C Unlimited class was to be the featured event of the contest. Next was added the .21 Outboard Tunnel class, since it had close ties with full-size tunnel boats racing in the Outboard Performance Class (OPC). The Deep-Vee class was then added because the deep-vees are most certainly a recognizable class in full-scale racing. As it later turned out, two of the classes, R/C Unlimited and .21 Outboard Tunnel, drew the largest number of boats ever entered in these classes anywhere in the world. So, maybe the title "World R/C Boating Championships" wasn't such a misnomer after all.

Each event was allotted a full day of racing activities. Prior to the actual start of racing activities on Thursday, August 3, a day was set aside for tuning and running for fast times. Wednesday's tune-up period provided the contestants with an opportunity to get in some fast laps around the record NAMBA 5-lap oval course. The day's top times were

Ron Erickson's Spirit, on the inside, prepares to pass Mark Chamberlain's Miss Technicolor in the final heat of R/C Unlimited.



Lineup of boats for the largest R/C Unlimited race ever held. A total of 35 Unlimiteds were entered.

Jay Selby won Best of Scale in .21 Outboard with his Wild Won.

Bill Hornell prepares to launch his Thriftway Too, winner of the R/C Unlimited final. Two K&B 6.5 cc's.

Ed Fisher won the Outboard Tunnel class with his original design. Boat looks to be of very simple construction.

Ricki and Herb Stewart won Best of Scale in Deep Vee with their Michelob Light.

Herb Stewart, of Thonotosassa, Florida, had engine problems with the K&B .40 in his Michelob Light, was 4th fastest qualifier in Deep Vee.

turned in by a couple of model boaters known for their quick boats. Ed Fisher, holder of more NAMBA records than any other NAMBA member, showed that his new tunnel would be the boat to beat, as he turned in a two-lap time of 42.8 seconds to gain the award for fastest qualifier in the .21 Outboard Tunnel class. Ed also showed the Deep-Vee class the quickest way around the buoys by posting a 35.6-seconds clocking for two laps with his Wardcraft Formula V and K&B 6.5. In the R/C Unlimited division, Ron Erickson used a new OPS .65 in his Spirit of Dayton Walther to turn a 33.3 timing.

The Deep-Vee class led off the schedule of racing events on Thursday with 19 boats (four .21's, eleven .40's, and four .60's) competing together as one class. The Deep-Vees ran four 5-lap heat races and three 10-minute enduros to arrive at the eventual winners. Showing that his quick time during the practice session wasn't any fluke, Ed Fisher won all four of his heat races to take top points in this event. Points towards the Overall Championship were awarded in inverse order of finish. By winning the heat racing section, Ed picked up 19 points. John Perry, after getting off to a shaky start by jumping the starting clock, placed second in the heat racing, besting Merrily Hornell on the basis of a faster heat timing. Merrily piloted her Dumas CF 40 to third and was followed by Frank Ward, designer and builder of the Wardcraft Formula V, using an OPS .60 for power. Ron Erickson guided his OPS .40-powered Formula V to fifth position. John Perry was using his new Perry Vee and a Rossi .61 front rotor with Perry Pump and Carb.

With the completion of the heat racing, 17 boats were able to begin the 10-minute enduro phase of the Championships. The wind picked up slightly as the enduros began, and this added a new dimension, since the boats couldn't race at full throttle without experiencing handling problems. It would seem hard to believe that after 30 minutes of enduro racing, there should be a tie for the top position. But there it was, with both Ed and Ron showing 73-1/2 laps. Based on running a 1/4 lap more in his best enduro, Ed was awarded first posi-

John Perry (left) prepares to start the engine in Bill Bennett's Deep Vee. Bill placed 6th in Deep Vee finals.

Coming in after winning the first Unlimited consolation race is Gary Jensen's Pride of Pay 'n Pak outrigger. OPS .60 engine.

tion, bumping Ron to second. John Perry followed with 59-1/2 for third. Placing fourth was Bill Bennett, owner of the Circus Circus Hotel in Las Vegas and sponsor of the Las Vegas Tournament of Championships for R/C aircraft. Bill was running a Perry Vee with a Rossi .61 set up like John Perry's. Merrily Hornell kept the feminist movement alive with her fifth place finish. Based on winning both events, Ed Fisher was the winner of the Deep-Vee Championships with 36 points. John Perry's second and third place finishes garnered him second overall with 33 points. A close third with 31 points was Ron Erickson, closely followed by Merrily in fourth overall with 30. Frank Ward and Bill Bennett rounded out the top six positions.

The .21 Outboard Tunnel class took to the water on Friday, with 37 entries ready for three 5-lap heat races and three 5-minute enduros. Water conditions remained ideal for the tunnels throughout the entire day's racing program. With little or no wind, blow-overs, the nemesis of tunnel boats were a welcome absence. The tunnel racing action was very close in both the heat racing and enduros. There was a three-way tie for first place in the heat racing portion of the tunnel schedule. Based on having the fastest heat time, Ed Fisher, racing his original tunnel design, took first place points. John Moss, a first-year model boater, placed second with his modified Midwest Klampon-Kai. Third place was awarded to Vic Drew, manufacturer of the Excaliber II tunnel outboard. Curt Weston, using another Excaliber II, was able to place fourth. John Havens, Jr., racing a wooden version of the Excaliber II, was the fifth place finisher in the heat racing.

One of the most exciting races of the day found Jay Selby, a pioneer in model outboard tunnel racing, barely holding off Ed Fisher after Ed jumped the starting clock and came within inches of lapping the rest of the field. With Ed now having two firsts and a second, Curt Weston found himself with two firsts and the chance to win it all in the heat racing. Unfortunately for Curt, he also jumped the start of his final heat and dropped from first to fourth.

Although the final results of the enduro racing weren't quite as close as the heat racing, only 2-1/2 laps separated the first and fifth place boats after 15 minutes of enduro racing action. Ed Fisher chose to play it safe and was able to parlay excellent speed and reliability for another first place finish with 33-1/2 laps. Vic Drew, who turned the most laps in a single enduro with 11-3/4 laps, came in second with a 32-1/2 lap count. Buzz Passarino, racing an original tunnel design, ran 32 laps for a third place finish. Both Dennis Caines, using a wooden Excaliber II, and Jack Garcia, driving a Spickler Rascal tunnel, had identical counts of 31 laps. However, Dennis was awarded fourth, based on a

Three unidentified tunnels racing together through the right turn. Absence of wind, main bugaboo of tunnel hulls, made for dead calm water.

Hey! Get that tub outta there! Deep Vee action during the 10-minute enduros shows Herb Stewart retrieving a boat while two other Vees zip past.

Ed Fisher's original design tunnel passes Kathy Moss' Midwest Klampon Kai in one of the Outboard Tunnel heats.

Looking more like the full-size boat than a model, Jesse Gray's Northwest Tank Service thunders by. Boat had rudder problems.

Merrily Hornell drove her Dumas CF 40 to 4th place in Deep Vee, using a K&B 6.5cc and Kraft radio.

Fastest qualifier and winner of Deep Vee was Ed Fisher, driving this Wardcraft Deep Vee with K&B 6.5cc engine.

Morrie Lemke's Valu Mart gets loose down the front straightaway while Bill Hornell's Thriftway Too runs on the inside.

Jack Garcia drove his Spickler Rascal to 5th place in Outboard Tunnel, using Futaba radio and K&B outboard.

Talk about realism! Roger Newton's Miss Budweiser was 5th in the R/C Unlimited finals. Uses OPS .60 and Futaba radio.

Frank Melewski piloted his checkerboard Bardahl to third place in the first R/C Unlimited consolation race.

higher lap count for one 5-minute enduro. That placed Jack in fifth position.

Since Ed Fisher had once again won two firsts, he easily took the Overall Championship. Vic Drew's second and third place finishes totaled up for a second place in the final standings. Buzz Passarino and Curt Weston ended up in a tie for third place. After some discussion, it was decided to race the two modelers off for the third place slot. This was done prior to the racing of the R/C Unlimiteds on Saturday, and Buzz bested Curt in a 5-lap heat race for third place. Following Curt's fourth place finish in the overall standings, were Jack Garcia in fifth and John Moss in sixth. Pat Pottol experienced a few exciting moments during one of the outboard races when a bee lighted on her right hand and decided to try out its stinger. It took a few moments for husband Charlie to understand why Pat was hopping up and down and yelling, "Bee, bee!" The Pottols are definitely considering obtaining different colored racing shirts, since they have had similar troubles with the bees buzzing around their yellow shirts.

The 35 R/C Unlimited models entered in Saturday's races marked the largest gathering ever held for these beautiful mini-thunderboats. A good frequency

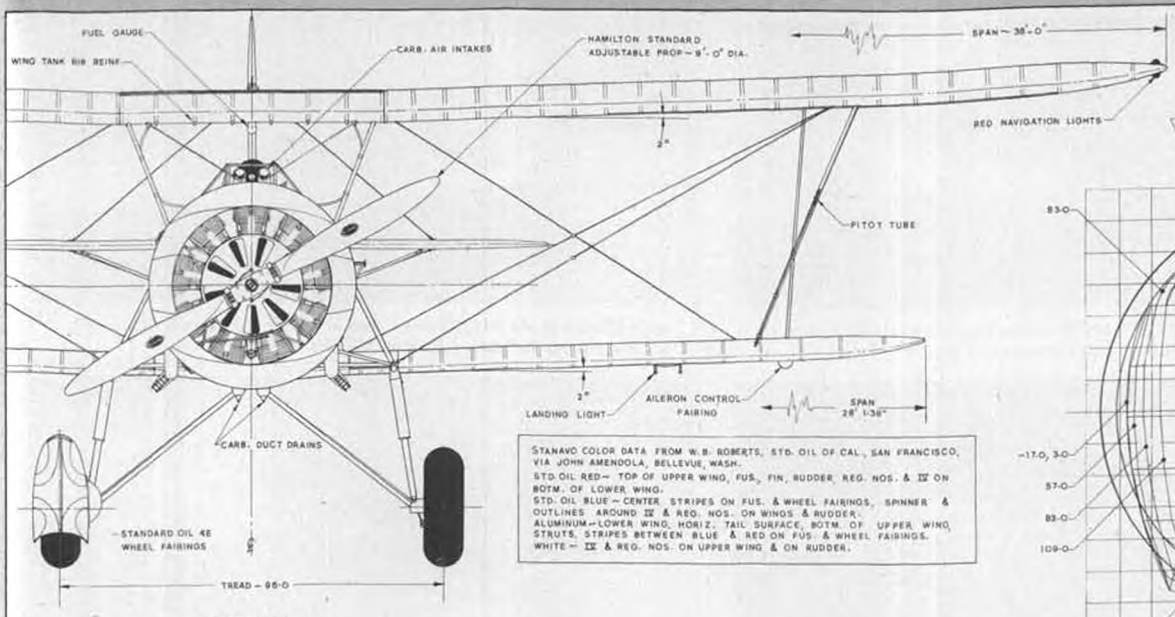
Continued on page 118

R/C Unlimited winners (l to r): R. Newton, 5th; M. Chamberlain, 6th; L. Ruggles, 4th; W. Osborne, 3rd; R. Erickson, 2nd; W. Hornell, 1st.

Race Sponsor, John Perry (left), and .21 Outboard Tunnel sponsor, John Brodbeck, were presented with special T-shirts at the Awards Banquet.

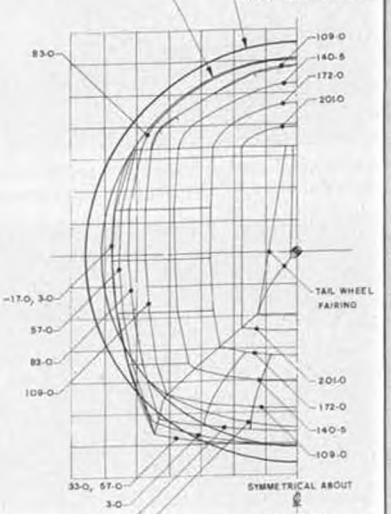
Deep Vee winners (l to r): E. Fisher, 1st; R. Erickson, 3rd; W. Bennett, 6th; J. Perry, 2nd; M. Hornell, 4th; F. Ward, 6th; T. Feist, Top .21 Vee.

Outboard Tunnel winners (l to r): E. Fisher, 1st; V. Drew, 2nd; D. Caines accepting 4th for C. Weston; J. Garcia, 5th; B. Passarion, 3rd; J. Moss, 6th.



FRONT VIEW

STANAVO COLOR DATA FROM W.B. ROBERTS, STD. OIL OF CAL., SAN FRANCISCO, VIA JOHN AMENDOLA, BELLEVUE, WASH.
STD. OIL RED - TOP OF UPPER WING, FUS., FIN, RUDDER, REG. NOS. & III ON BOTM. OF LOWER WING.
STD. OIL BLUE - CENTER STRIPES ON FUS. & WHEEL FAIRINGS, SPINNER & OUTLINES AROUND III & REG. NOS. ON WINGS & RUDDER.
ALUMINUM - LOWER WING, HORIZ. TAIL SURFACE, BOTM. OF UPPER WING STRUTS, STRIPES BETWEEN BLUE & RED ON FUS. & WHEEL FAIRINGS.
WHITE - III & REG. NOS. ON UPPER WING & ON RUDDER.



FUSELAGE HALF-SECTIONS
1/6 TH SIZE (4" SQS.)

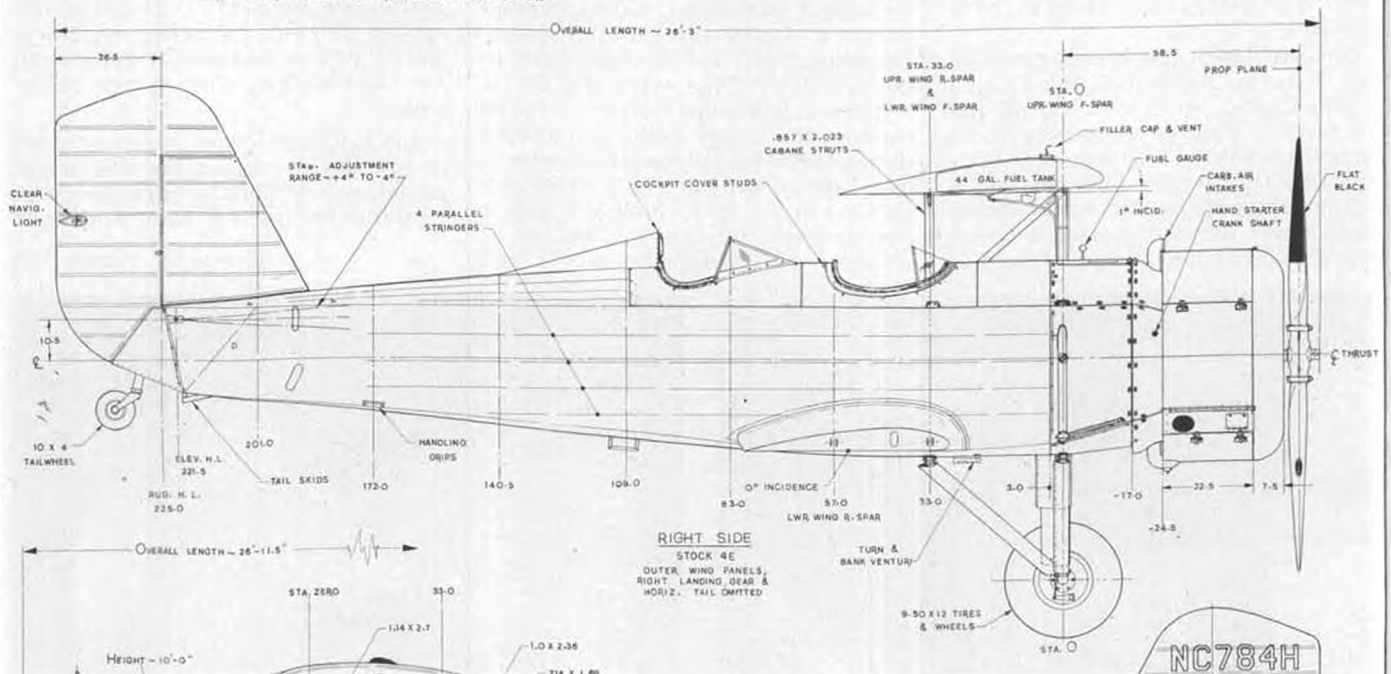
*PERFORMANCE:-	
HIGH SPEED	158 MPH
CRUISING SPEED, AT 1700RPM	128 MPH
CRUISING RADIUS	850 MILES
LANDING SPEED	53 MPH
RATE OF CLIMB, FULL LOAD, S.L.	1400 FPM
SERVICE CEILING	18,000 FEET

*WEIGHT DATA:-	
EMPTY WEIGHT	2434 LBS.
PAYLOAD	667 LBS.
USEFUL LOAD	1502 LBS.
GROSS WEIGHT	3936 LBS.
FUEL	100 GALS.
OIL	10 GALS.

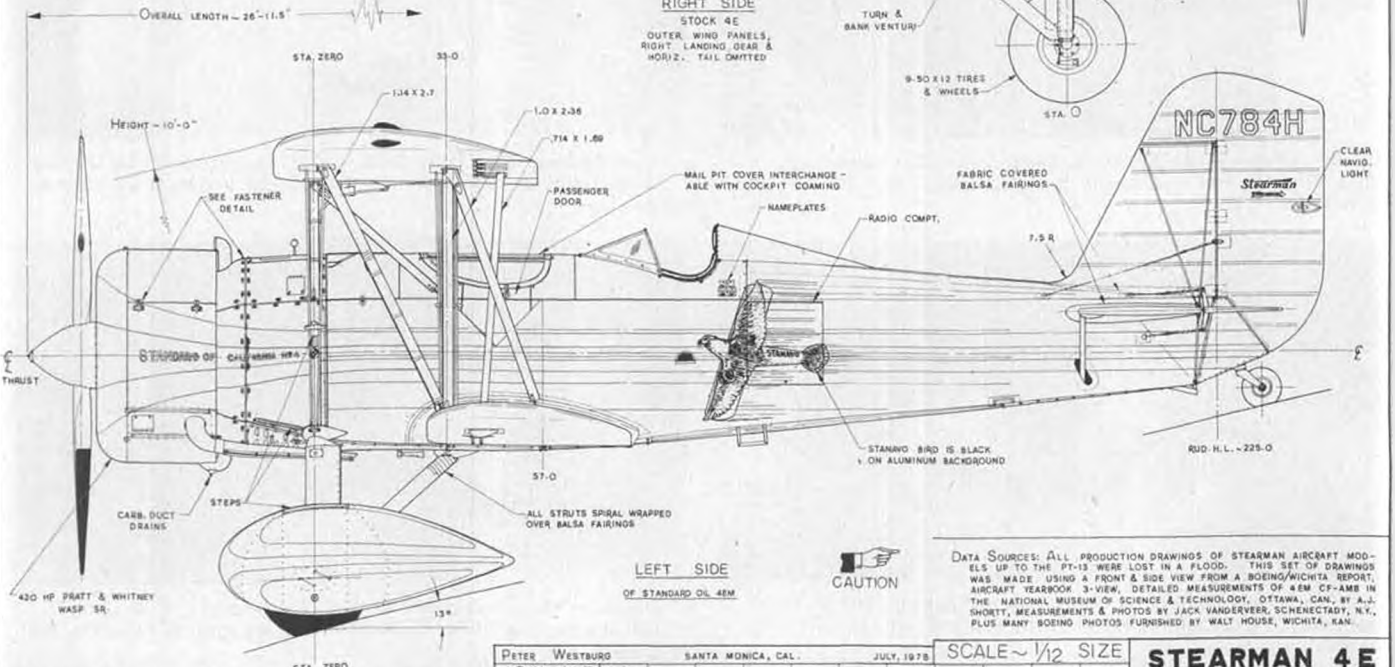
*DIMENSIONS:-	
WING SPAN	38' 0"
WING AREA	307 SQ. FT.
OVERALL LENGTH	26' 4"
HEIGHT	8' 10"
CARGO SPACE, MAIL PLANE	43 CU. FT.
CARGO SPACE, PASS. PLANE	10 CU. FT.

GAP AT CENTER SECT.	64"
STAGGER	38"
INCIDENCE, UPR. WING	1°
INCIDENCE, LWR. WING	0°
DIHEDRAL, EACH WING	2°
FIN AREA	6-84 SQ. FT.
RUDDER AREA	12-47 SQ. FT.
HOR. STAB. AREA	27-85 SQ. FT.
ELEV. AREA	15-02 SQ. FT.

* FROM "STEARMAN AIR AD" @ 1929, LOANED BY HURST BOWERS.



RIGHT SIDE
STOCK 4E
OUTER WING PANELS, RIGHT LANDING GEAR & HORIZ. TAIL OMITTED



LEFT SIDE
OF STANDARD OIL 4EM

CAUTION

DATA SOURCES: ALL PRODUCTION DRAWINGS OF STEARMAN AIRCRAFT MODELS UP TO THE PT-13 WERE LOST IN A FLOOD. THIS SET OF DRAWINGS WAS MADE USING A FRONT & SIDE VIEW FROM A BOEING/WICHITA REPORT, AIRCRAFT YEARBOOK 3-VIEW, DETAILED MEASUREMENTS OF 4EM CF-AMB IN THE NATIONAL MUSEUM OF SCIENCE & TECHNOLOGY, OTTAWA, CAN., BY A.J. SHORTT, MEASUREMENTS & PHOTOS BY JACK VANDERVEER, SCHENECTADY, N.Y., PLUS MANY BOEING PHOTOS FURNISHED BY WALT HOUSE, WICHITA, KAN.

PETER WESTBURG SANTA MONICA, CAL. JULY, 1978
1.0 IN. = 1 FT.
SCALE - 1/12 SIZE

STEARMAN 4E

DRAWING SIZE - 29 X 41

FULL SIZE PRINTS MAY BE PURCHASED FROM PETER WESTBURG, 834 7TH ST., NO 6, FOR $5-50. MAILED FOLDED, FIRST CLASS.

PHOTOS FROM BOEING/WICHITA

This Stearman 4CM was the first of 12 sold to American Airways, forerunner of American Airlines. The planes were used to shuttle mail on American's routes. Note that the exhaust collector ring forms the leading edge of the NACA cowl, a distinguishing feature of 4C models.

STEARMAN 4E

PART ONE

by PETER WESTBURG

These are probably the only accurate drawings ever published of this beautiful biplane. The original factory drawings were destroyed in a flood! These are from first-hand measurements, photos, and technical reports.

• The prolific genius of Lloyd Stearman was never more apparent than in the design of his Model 4, an airplane he lovingly called "the finest airplane I ever built". It is a tribute to the quality of his designs that long after the Boeing Airplane Co. took over the Stearman Aircraft Co., his aircraft were (and are still) called "Stearmans". Stearman became a part of United Aircraft and Transport in 1929; part of that company became United Airlines, the rest being absorbed by the Boeing Co. in 1931. Stearman became the Stearman Airplane Division and later, the Wichita, Kansas, division of Boeing.

The Model 4 Stearman came in three slightly different versions, all alike except for their powerplants. Actually, six different Approved Type Certificates were issued for the series, but three were for the mailplane configuration. The 4C had a 300-hp Wright J-6, 9-cylinder radial, as did the 4CM mailplane. The 4D and 4DM were pulled along by 300-hp P&W Wasp Jrs., and the 4E and 4EM were powered by the big P&W Wasp Sr. of 420 to 450 hp.

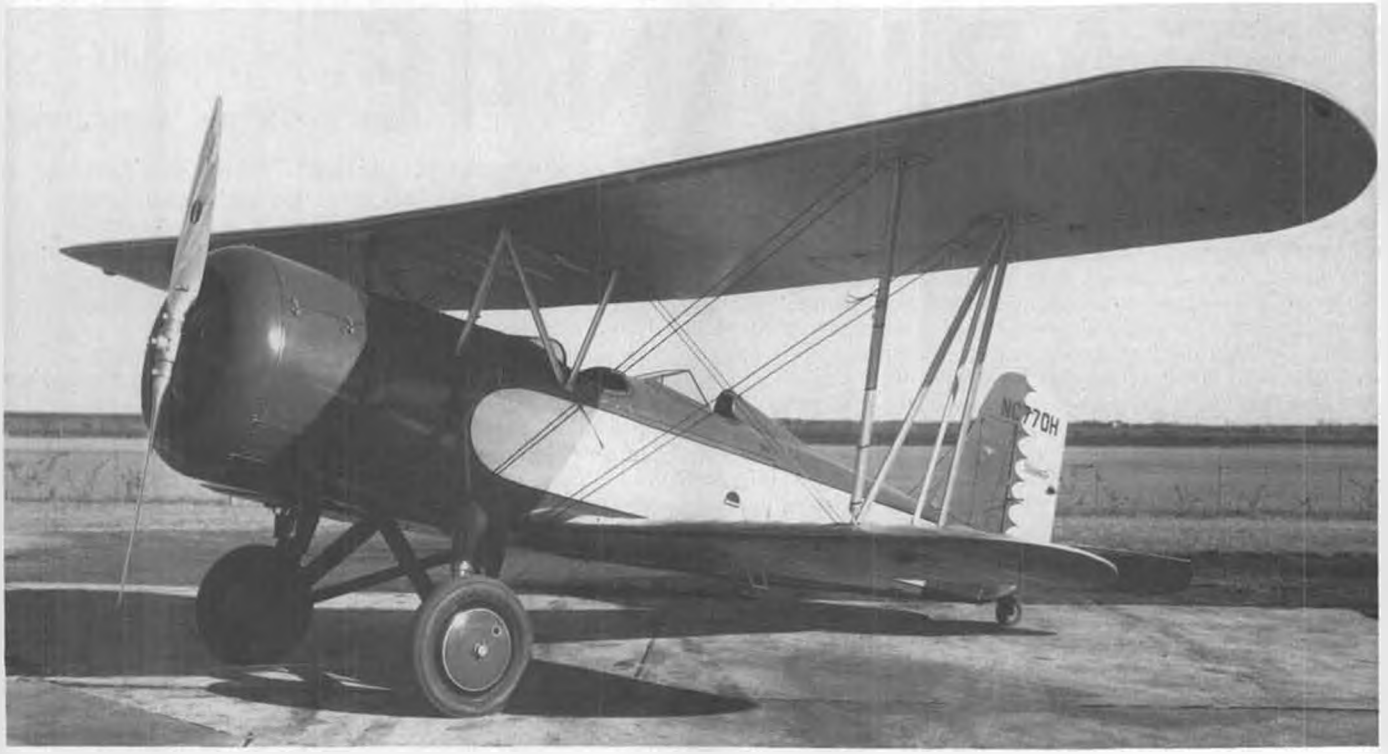
Some confusion exists about Junior and Senior Speedmails, as the various airplanes were called. The first Junior Speedmail 4C was the successor to the Stearman M-2, a much larger mail carrier; the 4D and 4E were also called Juniors. The front cockpit furnishings and coaming with windshield attached could be replaced with a hinged cover, making a mail compartment out of the roomy front cockpit. Thus converted, the airplane became a "Senior Speedmail". This was the only difference between the two models. Occasionally, one will find a photo of a Bull Stearman with "Junior Speedmail" on the rudder, but with a mail compartment. Nevertheless, the airplane is a true Senior Speedmail.

•

Stearman s/n 4011, shown above, was originally a 4D powered by a 300 hp P&W Wasp Jr., as shown here. The aircraft was later converted to a 4DM by covering the front cockpit; it was used to haul express and mail. Stearman plant is in the background.

Handbook photo of Stanavo 4E shows excellent detail of suitcase cowl fasteners and numerous twist fasteners.

Excellent detail is visible in this close-up of the nose of the Stearman 4DM, powered by 300 hp P&W Wasp Jr.



The caption on this Boeing photo states that the airplane is a 4E, but the engine is a P&W Wasp Jr., making it a 4D. The airplane was originally a Stearman test article before being sold to Canadian Airways, where it was converted to a 4EM.

The third of three 4E's delivered to Standard Oil of California has had the forward cockpit converted to a mail pit, making it a 4EM. The words "Junior Speedmail" are painted on the rudder; however, when converted to a mail plane, the planes were called "Senior Speedmails".

Unlimited Open winner and NSS National Champion, Jim Fitch, has his landing measured by Lou Faerman prior to last round.

Leon Kincaid flew his Free Spirit to 1st place in Standard Open. Site is the LARKS field at Carlyss, LA.

PHOTOS BY AUTHOR

SOARING AT THE NATS

By KEN CASHION . . . The author, a contestant at the Glider Nats, describes what has to be one of the most relaxed, well-organized, and fun-filled competitions to take place at the Lake Charles 1978 AMA Nationals.

• What a rare contest . . . a contest in which the entrants included the World Champion, three different Mexican Champions, and the elite of the soaring community. The contest director and his support team easily matched the competence of the 76 fliers. This team of workers received as much praise as the fliers. To listen to fliers talk, one would assume that at most contests, the apparent ability of the contest management decreases as competition intensity increases: not so in this one.

The contest director, Bert Striegler, of Houston, had 24 non-flying helpers from his Houston Radio Control Club (HRCC) and three from the Manned Spacecraft Center Club in Houston. Consider . . . a timer always ready for the flier at the winch . . . not looking for a frequency clip . . . an on-the-field computer giving printouts of scores and standings . . . a well-equipped hobby shop on the field . . . good food cooked on the field . . . covered work areas with tables . . . immediate access to cars . . . contest site 10 minutes from motel . . . on-the-field charging of winch batteries from powerlines, not gasoline engines . . . an HRCC-provided MD and RN (Dr. Chip Friday and wife) on the field with full medical supplies . . . a scorer, Donna Scheider, who was friendly, all day, every day, . . . and as it came to pass, perfect weather.

Bill Haga's Legionaire making one of its usual high-point landings. Bill placed 3rd in Unlimited Open, received the Texas/Florida Challenge Plaque for being the highest scoring Texan.

The sailplane competition took place at the Lake Area Radio Kontrol Society (LARKS) field at Carlyss, Louisiana. This was seven miles south of Sulphur, where the sailplane headquarters were located.

The mornings did have very high humidity, and one flier had to resort to "drying out" his sailplane under the hood of his little car each morning

Dave Cook, about to launch his Aquila XL for an official in Unlimited Open. Dave placed 8th out of 35 fliers.

Some of the many sailplanes at the Nats. Note the shaded tables and air-conditioned LARKS field house . . . really high-class!

No, this is not how one flier brought his model to the field each morning . . . see text to find out what's goin' on.

before some of the wood parts would operate properly. But there were no problems with mosquitoes, alligators, or snakes. The LARKS did not allow them on their field.

The soaring activity actually started Tuesday evening in a long line in an ultra-hot gym at Chennault Field, where transmitter and sailplane processing took place. The first time through the line, a flier needed his FCC license, AMA entry form, and transmitters. The next time through was with sailplanes. Imagine 76 fliers, often carrying two sailplanes . . . some assembled, some not . . . and all of this in a slow-moving line.

There was more chance of damaging a plane in the line than on the field. At least, going through the line twice permitted one to visit with different groups of fliers.

This processing business should have been arranged differently, but sailplaners made the best of it and used the time to renew old acquaintances and make new ones. Owen Morris and wife and Co-CD Bob Scheider and wife good-naturedly performed the necessary processing tasks.

The Florida/Texas rivalry was rekindled when fliers from these states found themselves intermixed in the processing line. This wholesome and fun competition from the past has resulted in a special, non-AMA plaque which is awarded to the winning state.

On Wednesday morning at 8:15, with cheers and applause, the first launch of the contest was made. The first round was over well before noon. Two more rounds were flown that day with the flight order reversed for each. Each day, each flier used a different winch and landing circle (three winches . . . three circles). The task was 7-minute duration on 300-meter line from 6-volt, 4-inch reels. Maximum landing bonus was 100 points, with a loss of four points per foot from center.

At the end of the first day's competition, Texas' Tom Williams had 1498 points; Jim Fitch, 1490; Dave Cook, 1448; Clark Fitch, 1444; Stan Pfost, 1410; Bill Haga, 1396; John Rimmer, 1394; and Phil Harris, 1388. The first place flier had 95.5% of a perfect score, but was only 8 points ahead of second place! Such was the fine flying throughout the contest.

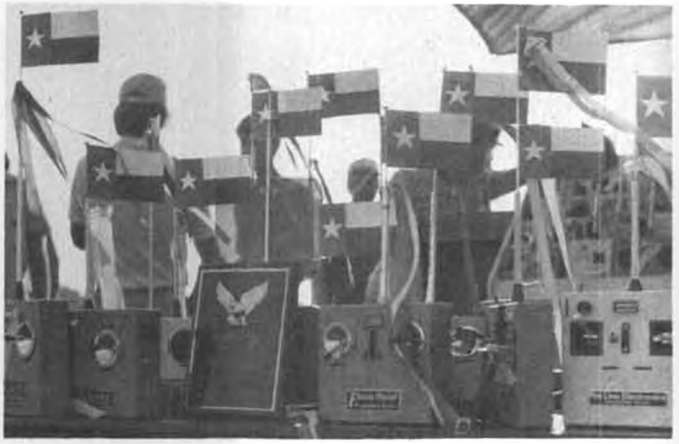
The Northwest Soaring Society

Cecil Haga accepts Challenge award from Stan Pfost. Bert Striegler gives his approval.

Bill Haga, of the 20-man Texas team, concentrates hard while flying his Legionaire.

Youngest flier was Jorge Guzman, 9, Mexico City, here being coached by father, Roberto.

Ron Feiler, with the aid of his very pretty helper, does a little modifying to his JASCO Floater 110.



On the last day of the meet, all the Texas fliers showed up with Texas flags on their antennas. What class!

John Rimmer, designer of the Calisto, placed third in Modified Standard Open.

(NWSS), in the form of Frank Girolani, provided a computer for the processing of scoring data. Each score was punched into the computer with the flier's name for storage and compilation. The immediate hard copy printout listed, in order of overall position, the flier's name, ID number, score, and percent of perfect score. Another listing showed the class-by-class placing with names, scores, and score percentages. This program was developed by Mike Freeman with assistance from Girolani, and is available to other clubs.

Besides the 14 states, including Alaska, represented, there were eight fliers from Mexico. Raul Lopez and Alejandro Huerta, both from Puebla, are National co-Champions of Mexico. The youngest flier in the contest was Jorge Guzman from Mexico City, who at nine, has been known to beat his father/coach, Roberto. The visitors from south of the border made a good showing for themselves.

After the heated competition of the

Jim Fitch receives the NSS trophy from NSS President Stan Pfost.

first day, there was cooling off and guitar playing around the motel pool, while the winners plotted strategy and the losers made up excuses.

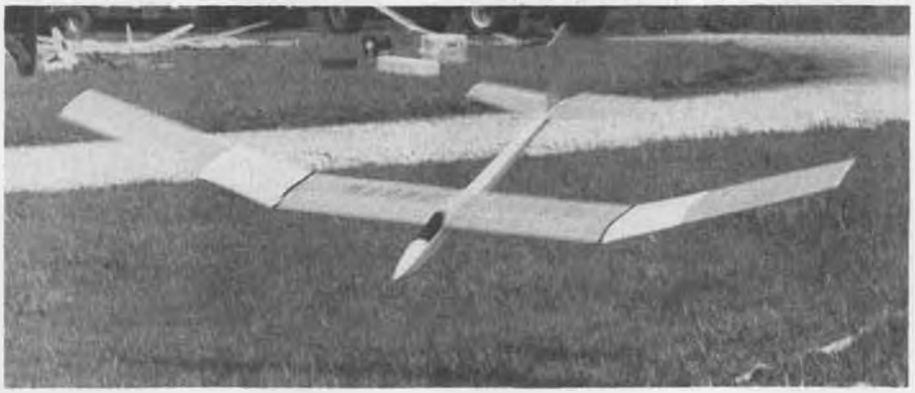
On Thursday, there were three more rounds with no individual dominating the competition; one could anticipate the general list of the top five, though not the order. The pea patch downwind of the landing circles arrested the landings of a few more sailplanes, but, like the day before, only very minor damage was suffered by any aircraft.

The contest structure, while appearing overly organized on paper, worked out very well. The flier would receive his

Clark Lydick flew an Aquila to 3rd place in Standard Open.

transmitter from the impound area, bring his sailplane to his assigned winch, and wait his turn to fly. At the winch he would receive the frequency clip from his timer and the timer would remove the tape from his transmitter switch. After the flight, the timer would confirm that the transmitter was off, replace the tape, and remove the frequency clip. The pilot would then turn in his transmitter. There were no yells of "GLITCH!"

Continued on page 105



Scott Simmons' Mirage about to bore a hole in the sod. Model was originally designed by Blaine Rawdon.

Frank Girolani operated scoring computer throughout the meet. Printer at right provides hard copies.

Contest Director Bert Striegler and Scorer Donna Scheider during one of their few breaks. Both did a great job.

PHOTOS BY THE AUTHOR

First Place winner Steve Work, with his "Bird of Time". Steve flew 97% of perfect to win . . . without spoilers!

Steve's Bird of Time was designed by Dave Thornburg, who flew it to 4th in 1976 FAI finals. Model is now kitted by Dave.

R/C SOARING TEAM FINALS

By DAVE THORNBURG . . . The 1979 FAI R/C Soaring Team for the U.S. has to answer to no one! The *lowest* man was only 91.96% from perfect, in this toughest of all separator finals. A first-hand report.

• Ladies and Gentlemen, I give you the United States Soaring Team for 1979:

1. Steve Work (New Mexico) "Bird of Time" 11,683.7 points.
2. Terry Koplan (California) "Viking" 11,309.3 points.
3. Skip Miller (Colorado) "Aquila Grande" 11,184.96 points. First alternate is Jack Hiner of Illinois, with 11,035.6 points.

This year's Team Selection Finals took place in Pensacola, Florida, over Labor Day weekend. The contest ran a full six rounds, filling three long, lovely Florida days. Temperatures floated in the 80's and 90's, with very little wind. The site was a square mile of rolling green grass . . . a Navy practice field deep in the piney woods of the western panhandle. Contest organization, under the control of CD Rae Fritz of Pensacola, was just like the site . . . fantastic!

So what did it take to win, under these near-ideal conditions?

For starters, let's look at the scores. At the 1976 FAI Finals in Denver, LeMon Payne of Dallas took first overall with 9714.3 out of a possible 12,000 points . . . approximately 81% of perfect. At Pensacola, 81% would put you solidly in twentieth place; first place winner Steve Work flew 97.36% of perfect, with no throw-away round!

It look like de competition gettin' tougher, Maude.

Scores were so close that, for the first time in my FAI experience, you couldn't afford to "specialize", or focus on just one or two of the three tasks; you had to be prepared to fly all three to the hilt. Planes and/or pilots who were very good at distance and duration, but a little slow on the speed run, simply didn't stand a chance. I found it encouraging that the three winners were all flying airplanes that had been developed specifically for the FAI multi-task events . . . airplanes that floated well in minimum-sink conditions, yet could hang together for 13-second speed runs.

Second member of the 1979 team is Californian, Terry Koplan, who flew a Craft-Air Viking.

"Texas" Tom Williams flew this original design to 14th place. More original designs showed up this year than in years past.

Current World Champion, Skip Miller, flew an Aquila Grande to third spot on team.

Chris Smith models her father Herb's Invader. Herb flew the model to 7th place.

I continue to maintain that minimum sink and maximum go are the only viable parameters of sailplane design; if you have a winner in these two categories, then all you're measuring when you fly the distance event is the quality of the air on the course. I could name you at least three first-rate pilots who fell from grace on the Pensacola distance course, not because their planes were inefficient (one of them recorded the fastest speed time of the contest) but simply because the air between imaginary planes A and B was sick, sick, sick for the entire eight minutes of their working time.

But the scoreboard never tells the whole story about what it takes to win; and that, Dear Hearts, is why magazine editors need us lowly correspondents. I went down to Florida as an assistant to Steve Work and former team member Dale Nutter, so I got to watch the contest from the inside without having to suffer the pressures of competing in it. And I'm bloody glad I *didn't* compete in it, too. . . it was the toughest sailplane contest I've ever attended. Most contests I've gone to in the past, whether they were fifty-man or 250-man contests, had only about six or seven competitors; this one had at least a dozen, maybe more. By *competitor* I mean a pilot who, at that particular point in time, has the skill, the pyschic energy, the airplane, and the help necessary to come out on top of the heap. It's a rare combination.

1977 team member, Dale Nutter, waiting his turn to launch his Grand Espirit. Note the incredible expanse of grass . . . a perfect soaring site!

Bob Gerbin, of L.A., mutters over his Paragon. Two of Koplan's Vikings in background.

So I went down to Florida, and I kept my eyes open, and I learned a couple of things about competition flying. If you can sit still for another ten minutes, I'll share 'em with you.

One of them has to do with the common belief that you need to fly a plane for a long time in order to become thoroughly familiar with it, in order to fly it well. Turns out that this simply isn't so.

Steve Work completed his first Bird of Time in May, and flew it in only one or two contests before entering the FAI program. Number Two Bird came off the board just days before he left for Florida.

On the first practice day in Pensacola, he pushed Number Two too hard in a speed run and blew it up. He then rebuilt the fuselage, mated it to the Number One wing, practiced with it for one day, and won the contest with it.

Terry Koplan, who came in second overall, flew his first Viking for only a short time, entered the first L.A. quarter-finals and blew it up on the speed run, qualified for Florida with his faithful Sailaire, and finished his second Viking just in time for the Finals.

Skip Miller, current World Champion and the third team member, blew up his first Aquila Grande on a speed run this summer, and finished his second ship just in time for two days of practice with it before the Finals.

John Gunsallus placed 9th with his original design "Whispering Hope". Model uses 10' Hobie Hawk wings, skinny fuselage.

"TUES" (Truitt's Ultimate Evolution for Soaring), by Jim Truitt, features a low aspect ratio, all-flying V-tail, and tiny spoilers.

Jack Hamilton flew his Legionaire to 8th place. Meesh Miller checks out the competition for Skip.

Dr. Walt Good looks over "Texas" Tom Williams original design. Walt was just passing through, stopped by to chat.

Stories sound familiar? Maybe there's a moral in there somewhere: *introduce a first-rate pilot to a first-rate aircraft and it doesn't take them long to get acquainted. (Or to exceed the Redline — wcn)*

A second thing I learned about competition flying at the Pensacola Finals has to do with teamwork. FAI rules allow a pilot three helpers on the field when he flies. *He needs all three.* Two of them are merely grunts, guys willing and able to run their legs off to see that the pilot has a primary launch system and one or two backup systems ready and waiting for him when his working time begins.

The third helper is the spotter. A pilot needs a spotter he can trust standing next to him during the flight . . . someone with a quick eye and a calm voice to feed him information about other ships flying in his group, about changing wind conditions on the field, and sometimes even about his own performance ("How many more circles you planning to make in that sinkhole, Bufo?"). A good spotter

Continued on page 97

Skip Miller with his Aquila Grande. Skip flew 93% of perfect for 3rd place.

Craig Foxgord of L.A. flew his venerable Albatross to 10th. Overall competition was tougher this year, partly because the air was a lot more stable than in Denver two years ago.

Terry Koplan digs for spare change to give to cameraman Dave Thornburg. Terry finished his Viking just prior to the finals.

Ray Hayes of Indiana with his original Osprey. Turned 13.6 seconds in speed to tie Don Edberg for fast time.

At the very top, familiar faces (l to r): Dave Brown 1st, Steve Helms 2nd, Mark Radcliff 3rd, Tony Bonetti 5th. Dean Koger 4th, missing.

Top NSRCA Novice, Lamar Gilbert, gets trophy from Joe Bridi. Non-NSRCA member (at the time), Steve Cowee, was No. 1 Novice.

PHOTOS BY AUTHOR

Pattern AT THE NATS

By SALLY BROWN . . . A first-hand report of the 1978 Pattern Nationals, by someone who knows it well . . . Wife of the winner, Sec./Treas. of NSRCA, top reporter for the "K FACTOR", and a USPJA judge.

• Just a few hours before Dave and I left for the Nationals, amid the hurrying, scurrying, packing, and "gosh darns", the phone rang and our hard-working editor, Bill, explained that he couldn't make it to the Nats this year (for the first time in many years), and did I think I could handle the report? Did you ever know me to turn down a captive audience? Anyway, I obviously said yes. I could handle the report, and if I begged, pleaded, and/or threatened to go on strike in the middle of a flight, I could get Dave to take the pictures (with help from Ron VanPutte and Dick Penrod).

We started for Lake Charles in our trusty motorhome (which turned out to be not so trusty . . . read on) and the further south we went, the hotter and more humid it became, and this Yankee began to have doubts about her sanity.

We arrived at AMA headquarters on Saturday, July 29, and were very pleasantly surprised at our surroundings. My last visit to Lake Charles was in 1974 and I remember the base as being very desolate and run down . . . gave me the feeling we were the last flying "nuts" on earth . . . but what a change in four years. There are housing areas, a restaurant, golf course, school bus parking lot, etc., already built on what was the air base, plus much active construction on other projects going on every day. The place was alive and growing . . . the same impression was gained everywhere we went in Lake Charles. AMA headquarters was actually two buildings . . . one the old gym where press headquarters, scale cage, transmitter processing, etc. were, and the other was an office-type building where all AMA officials could be found.

Both Mark Radcliff and his Phoenix are "flairing" for a landing!

Sunday was transmitter processing for pattern, and the troops really poured in, with 63 Novice, 40 Advanced, 16 Expert, and 40 Master flyers, for a grand total of 159 pattern fliers. There was some flying done and much meeting and greeting of friends, old and new, and much drinking of anything cold that was available. No nerves today . . . but the fun begins

Three judges await their next "victim" at the flight line (l to r): Al Tuttle, Joanne Meyers, and Mike Montgomery.

Long-time pattern campaigner Ron Chidgey (6th) calls for Steve Helms (2nd).

Novice Champion, Steve Cowee, receives AMA trophy from NSRCA President, Joe Bridi.

Don Weitz (8th Masters) preps his modified "Deception" as Joe Bridi (left) stands by to assist.

Marty Whittenberg won Expert plus best NSRCA Jr./Sr. Look out, Masters!

Repeated winner, Dave Brown, duplicated last year's Masters victory.

tomorrow! Sunday was also the night our camper decided to blow some of its cool; all the lights went out, except in the bathroom (now, if you had a choice, which light would you prefer stayed on? Me too!).

Monday dawned sunny, hot and humid, as it was destined to be all week. We played with our camper lights for a while and found no reasonable explanation, so off we went to fly (who needs lights anyway!).

The pattern event was set up with lots of flying time; four days of qualifying (Monday through Thursday) and two days of finals (Friday and Saturday). The finals would involve the top ten fliers from each class, and the top three scores from the qualifing rounds would count toward this. We flew four flight lines on a huge runway (approximately 1200 ft. by 200 ft.) with lots and lots of space around. There were two flying sites (A and B) with two flight lines on each site. The frequencies were arranged such that each line had either 39 or 40 fliers, which made the rounds very even . . . very little waiting for judge changing, etc.

Monday's flying was delayed approximately 1-1/2 hours for a quick shower (monsoon?) but it began before anyone had gotten their airplanes out (we were on the site early for the pilots meeting, so it was really just an inconvenience, rather than a catastrophe). The shower over, the site was then set up while the pilots meeting was concluded and flying began. It was evidenced early that the youngsters were here for blood; according to AMA figures, we had 2 juniors and 24 seniors flying, to say nothing of many young open members.

Flying was generally impressive in all classes, but it seems that Lady Luck also was having fun . . . Dave's engine decided to quit while I was running it out for his takeoff run, and after restarting, was blubbering rich all during the flight (seems there was some question about it being rich or lean from our "peanut gallery", until I walked back to the pits covered with fuel spray from shoulder to thigh!); Ron Chidgey had a spin that didn't spin for some unexplained reason, and Mark Radcliff and Tony Bonetti both had retract failures . . . granted,

Dave Platt's twin-engined "Duellist", like most twins, had a most attractive sound.

Dave Brown must have made a good deal on 55 gallon drums of bronze and white dope! Not a modified Phoenix, it's his Curare.

Workhorseperson of the R/C Pattern Nats, Betty Stream, receives congratulations from Joe Bridi. Bev Wisniewski looks on.

Young Michael Johncock, a seasoned campaigner (8th Expert), and his Phoenix.

nothing disastrous, but not very pleasing, either.

At the end of the day the die was pretty well cast, as five of the Novice, seven Advanced, eight Expert, and five Master fliers who were in the top ten after Monday's flying were still there at the end of the qualifying flights. . .which is not to say the fight was over.

Monday night, with the help of a friend and the advice of the whole camping area, we finally traced our light problem to a shorted wire behind the refrigerator (after every cupboard, nook, and cranny was emptied and investigated). I have to admit that, if nothing else, we entertained everyone who happened to be in the AMA camp area that night!

Tuesday was again hot and humid, but there was a slight breeze which helped greatly (especially since our camper now decided to lose its cool completely, in the form of a generator malfuction, which of course means no air conditioning!). The flying goddess was better to most everyone today, except Mark Radcliff, who was still fighting his retract problems.

The best part of Tuesday was observing the running of our pattern event. It was a joy to start on time and have the site completely ready to go, and to have equipment and people at their proper places without waiting. The judges were ready and consistent, and tabulation (practically non-existent in previous years) was as fast, if not faster, than a normal well-run contest, and the management . . . Betty Stream (event director), Dick Sonheim (category director) and Julie Woods (chief judge) . . . were always on the lines, available and ready to help in any way. No Nats is without its questions, hassles, and protests, but these three hard-working people handled them quietly and efficiently. Some difference from years past, when even finding a management type was very difficult!

Tuesday saw one-and-a-half rounds completed, with another one-and-a-half flown on Wednesday. The weather

Continued on page 94

Cliff Hiatt, Advanced Class winner, receives NSRCA trophy from Joe Bridi as Betty checks the list.

George Radcliff, Gus Christman (4th Novice), Mark Radcliff (3rd Masters), and Jim Keiger check the scoreboard.

Mark Radcliff preps for a flight, as Jim Keiger, his caller, lends a hand. Ship is a Phoenix 7.

Perennial Mexican competitor, Luis Castenada starts his Dirty Birdi, as caller Carlos Benitez holds on. Luis is from Puebla, Mexico.

How about *this* for a soaring site! Al Tuttle's "Saracen" flying wing over Kahului Bay, on the island of Maui.

Al Tuttle launching his prototype Aquila into the incredible lift coming up the cliff at the Poli Poli soaring site.

R/C SOARING

by Dr. LARRY FOGEL.

PHOTOS BY AUTHOR

• In a recent phone conversation with Al Tuttle, a fellow member of the National Soaring Society, I clearly heard him claim that he flies at the world's *best* soaring site. I just couldn't let such a remark go untested, so I packed three sailplanes and grabbed the next flight for Hawaii. Al met me at the Kahului airport on the island of Maui, then took me to his favorite soaring sites . . . good thing, too, since they're both on private property.

A Cheetah just misses the target at the "beer can bowling" event at Torrey Pines.

Maui is a beautiful island comprised of two mountains and a valley between them. It's lush and green. The trade winds from the northeast provide steady lift along the north shore. The only problem is to find suitable launching and landing sites.

About five miles northwest of Kahului, Route 34 takes you up the cliff. So you're presented with a spectacular view of the whitecap-speckled bay, with the town and sugar cane fields in the distance. You park the car, scamper up a sharp incline, and over a low barbed-wire fence. After a few hundred feet of more gentle climbing, you've reached a super slope site.

You're now ready to launch. Al prepared his Saracen . . . a fully aerobatic flying wing that really performs. You heave the plane. It moves out, gradually descending until it passes over the edge of the cliff. From then on, all is *UP*. Now you can perform any maneuver you can imagine and even chase the clouds as they form overhead (an expected result of the updraft). There seems to be no end to the lift.

This is grazing land. The local cows show little interest in our activity, but their presence makes every high-speed landing very exciting. I asked Al, "How long does this great soaring condition prevail?" His answer was brief: "Always."

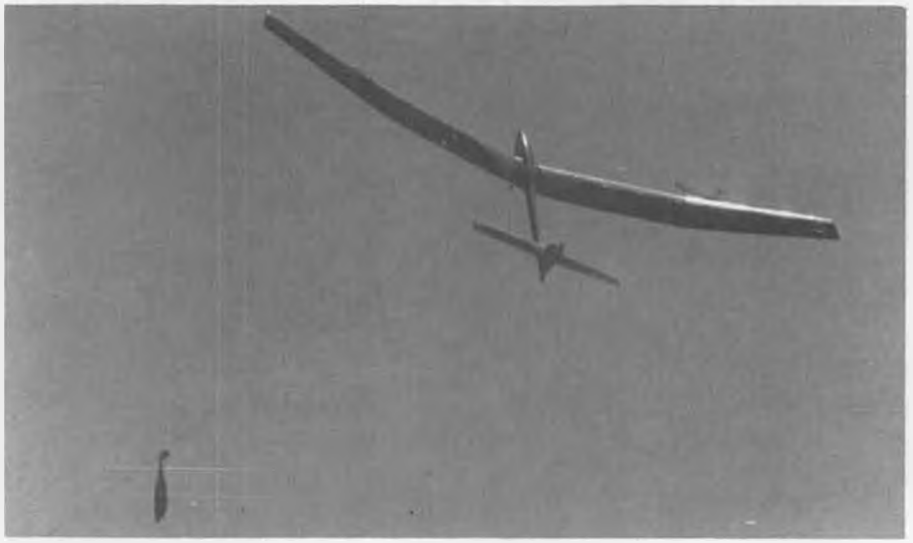
We then moved to another site, this one on the slope of Mt. Haleakala, a 10,500-foot extinct volcano rising from sugar cane fields, through high grass and natural blossoms to the higher elevations. Here there is little vegetation. The peak is covered with brittle volcanic ash . . . hardly a suitable landing site, especially when you consider the air density at that altitude. Incidentally, Al is supervisor of the observatory and satellite

Larry Fogel launching his Olympic 650, designed for two-meter soaring events.

Another near-miss, this time by Phil Merrick and his Windfree. As you can see, this event is very popular with the spectators.

How much lower can you get? A Cheetah passes under the line with room to spare at recent Torrey Pines limbo contest.

Now *that's* the way a sailplane ought to be flown! Cecil Haga was the only competitor at the 1978 Nats to pull up a chair for his 7-minute duration flights. He's Legionair Sailplane mfgr.



Chet Tuttle's original design "Dreamer" on winch tow at the Nats. Thirteen-foot model has tip spoilers for turn control, reported to be very effective.

tracking station situated on that peak. He's now lived on Maui for four years, and calls this place home.

But the best soaring site is Poli Poli, off Waipoli Road at about 5,600 feet. You chug along a narrow winding road, zig-zagging up steeply inclined meadows. Imagine standing in knee-high grass dotted with yellow flowers, looking down over unlimited Elysian fields bounded on the north and south by the blue Pacific and on the far west by the other mountain (which is usually capped by gray clouds). It's really inspiring. You truly feel that you're part of nature.

I started to set up a hi-start, but Al and his friends said that was unnecessary. They tossed their thermal ships into the gentle slope lift and traced large constant-altitude circles over the valley. Soon your ship happens upon a thermal. In the local parlance, you've found an "Otis". At first I thought this was a Hawaiian word, but it's simply their name for thermals that take you up like an elevator.

At times, you find lift which carries you up between the clouds, which generally form at about 6,000 feet. If you're lucky, you remain in such a "puka", the Hawaiian word for "hole in the sky" . . . enough blue sky to allow you to watch your bird as it maneuvers between the constantly changing clouds. If you get trapped in a cloud, the procedure is to spin down until you reach clear air. All eyes are on the lookout for your craft. Very exciting!!!

Al is still flying a prototype of the Aquila. Jim Martin flies a *very modified* Square Soar. He drives the V-tail with a mixer of his own design and construction. It's neat! Say, have you ever had your sailplane attacked while it's in flight? Jim watched as a frigate bird took on his Square Soar. The result was considerable damage to the wings, but still less than total destruction. Victor Amor demonstrated his Das Slupen Thing, while Pete Wolford prepared his Olympic II for similar action. By the way, if you're on Maui without access to the private property soaring sites, there's always the athletic field of Maui Community College. I tried that too; it works fine.

While in Hawaii, I couldn't resist visiting the island of Kauai. This "garden island" is less industrial, and yet the soaring sites are harder to find . . . but they're there, and worthy of your effort.

For those who like excitement, there are schoolyards near Kapaa which permit you to launch into the trade wind as it glances off the beach and frontage road. Excitement is provided by the turbulence and the school children who surround you with interest and ride their bicycles across the yard while you're trying to find a vacant spot to land on. I found myself giving flight instruction to a number of youngsters in return for their keeping the landing site free and clear.

You ought to visit Princeville, near Hanalei, on the northernmost edge of the island. Here there are large grassy fields for thermal soaring when the wind isn't too strong. If you get high enough, there's ridge lift from the trade winds. You can't visit Kauai without following Route 50 to the western-most (leeward)

Continued on page 102

The original prototype Pierce Paragon, flown at the Nats by Col. Bob Thacker.

NSS President, Stan Pfost, flew an extended-wing Paragon at the Nats, placed 4th in Unlimited Open.

Byron Sansom and his Bingo, kitted by Dumas. Boat won 1st at 1975 ACCR.

Andy Littlejohn and his Boomer. Look at the length of that keel!

STRICTLY SAIL

By ROD CARR

• Liberally sprinkled through this column are the remaining pictures from the 50/800 Western Divisional Championship. As of this writing, I've heard reports from the class Nationals, which was won by a WIND II. You may remember that we published the lines for the WIND I here in **Model Builder** a few months ago. Who says that we weren't the fustest with the mostest???

With the continuing help of Chuck Black, we present the matrix on the 50/800 boats featured in the photos. I think an immediate conclusion from the table is that the boats are all tending toward a similar displacement and ballast ratio. The maximum beams are tending to center around the 9 to 10-inch range, with max beam turning out between 26 and 33 inches aft of the bow. The sail plans center on a 42% jib, 58% mains'l ratio, with no jib smaller than 40% nor larger than 45.3%. Mains'l luff ranges between 66 and 73 inches, with none of the ultra-tall rigs in evidence.

It looks to me as if we have seen the birth of the American R/C 50/800. Not so heavy as the older vane boats, but averaging 16± 0.5 pounds with about a 9-pound keel bulb. A keel fin area between 55 and 60 square inches is used, with about 20 square inches of rudder. Draft is 16 inches or so, with all boats taking the maximum allowable LWL. The aspect ratio of the sails has resulted in the need for good reaching performance and has compromised the 85-inch rigs which appear only rarely.

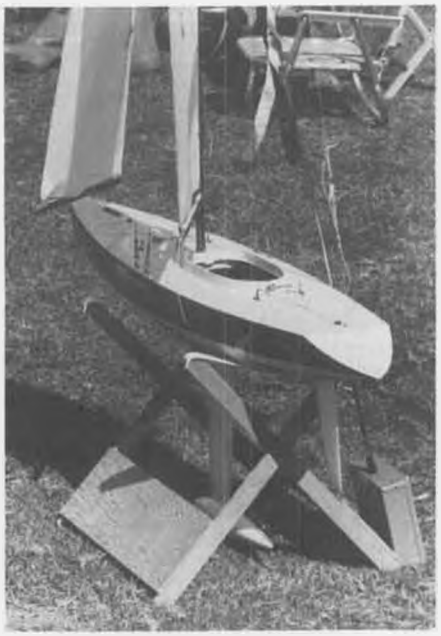
Well, there you have it. Put these dimensions down on a piece of paper, fill in the blanks between, and you'll have a world beater.

I was pleased to hear that the skippers of the EC/12 class were proud of the original name and voted to retain East Coast 12-Meter. I've never swallowed the argument that the name was preventing the class from spreading. What prevents the sport from spreading is the lack of fellows and gals who will donate a little of their time to showing it off to the folks who have never seen R/C yachting, and then do a little organizing so that the participants can maximize the fun that sailing "little boats" is.

We have seen, in 1978, a stabilizing of the numbers of skippers competing in the National Championship level competitions. The EC/12 Class mustered 18 or so, while smaller classes like the STAR 45 drew the hard core that have supported the class since its early days in 1974. This was the first year that SPOT didn't wet her hull at the event. She was sold to a New York skipper who would rather admire her closeup, than see her in front of the fleet. John Krick, of Glenolden, PA, hitched up his boots and swept the competition, winning all the heats but one, and with a boat that I speared and sank last year. He said he sailed with the tape over the hole, just for good luck, and it must have worked. Meanwhile, up in Rhode Island, Buddy Black dusted off a vintage 1970 EC/12 hull (remember when they didn't look

BOATS IN 1978 50/800 WESTERN DIVISIONAL

DESIGN	DISPLACEMENT	KEEL BULB	KEEL FIN AREA	RUDDER AREA	DRAFT	JIB/MAIN	MAINS'L LUFF	DECK BEAM MAX.	LOCATION OF MAX. BEAM
	(lbs.)	(lbs.)	(sq. in.)	(sq. in.)	(in.)	(% of total)	(in.)	(in.)	(in. aft of bow)
Magic Dragon	15.25	9.5	57.5	20.25	16.5	45.3/54.7	70	10.87	29
Orion	15-16	9.5	56.25	19.5	16	44.3/55.7	66	9.8	26.5
Tempest	14.8-15.8	9.25	57.5	18	16	44.3/55.7	66	9.75	27.5
Epic	17	9.25	56.25	18	15.5	43.75/56.25	72	9.75	30"
Bingo	15-16	9.5	58	19.5	15.5	43/57	73	9.75	24.75
Black Magic	14.7	9.0	60	18	18.25	44/56	70	10	33
Wind II	15.5	9.25	55	28	15	40/60	72	10.375	27



Chuck Black's new design is called the "Tempest". Another long, skinny keel!

like Woody Woodpecker with a thyroid condition?) and proved once and for all that the differences between skippers is so much of a gulf that a meaningful measurement of hull difference is yet to be proposed.

I'm sorry not to have more regatta results, but the folks who run them just don't bother to put me on their mailing list. The following are more AMYA sanctioned clubs:

3. R/C MARINERS
   Ray Kieding
   290 N. Fairview Ave.
   Goleta, CA 93017
5. Metro Marine Modelers
   Dennis Eason
   1182 Warden Ave.
   Scarborough, Ont.
   Canada M1R 2R1
6. Puget Sound MBC
   Gerald R. Julian
   4417 Alar-Mar Lane
   Olympia, WA 98501
7. Chicago R/C MYC
   Bob Cornell
   6478 Dauphine Ct.
   Elk Grove Village, IL 60807
8. San Diego Argonauts
   Chuck Black
   4761 Niagara Ave.
   San Diego, CA 92107
9. Denver Area MYA
   Joe J. Vella
   7913 Rarita St.
   Denver, CO 80221
12. Northern CA S/B Fleet 2
    George Montague
    305 McCormick Ave.
    Capitola, CA 95010
15. Golden Triangle MYA
    Bill Hays
    213412 Sorrento Dr.
    Largo, FL 33540
18. Buffalo Model Boat Club
    Leonard E. Salika
    110 Bidwell Pkwy.
    Buffalo, NY 14222
21. Stormbird MYC
    Juduth E. Gabay
    5900 Saranac Ave.
    Columbus, OH 43227
23. Helmsmen MYC
    Bill Baughman
    12762 Spring St.
    Garden Grove, CA 92645
24. Delaware Valley MYC
    John Krick
    214 Rively Ave.
    Glenholden, PA 19036

Another new design is the "Black Magic", by Paul Black.

Modified Wind II by Lionel Goodman. This design won the 1978 ACCR.

25. Minute Man MYC
    Park & Recreation Comm.
    Town Hall, Room 25
    Needham, MA 02192
26. Sandusky MSC
    Shannon McGreevy
    828 Salem Dr.
    Huron, OH 44839
27. Conn. Valley MYC
    George Bielak
    78 Northbrick Lane
    Wethersfield, CT 06109
28. EL DORADO YACHT CLUB
    Claudia Lindsey
    515 N. Lyall Ave.
    West Covina, CA 91790
29. Copper State MBC
    Charles A. Vosburgh
    8137 E. Amelia Ave.
    Scottsdale, AZ 85251

AMYA dues are now $10/year and should be sent to the new Secretary: Bob Espenshade, 7221 Casa Adobe, Citrus Heights, CA 95610.

I'll answer questions accompanied with a stamped, self-addressed envelope: Rod Carr, 7608 Gresham St., Springfield, VA 22151. •

Fresh out of the water, Don Prough's double-ended "Epic" shows the trend toward deep bulbs.

The builder of this boat was not identified; all we know is that it is a modified Orion.

CHRISTMAS SHOPPING GUIDE

FOR THE "MODEL BUILDER'S" FAMILY AND FRIENDS

• It's that time of year again! Your Christmas list is complete. You have checked it twice, and decided the model builder in your life has not been naughty, but nice, and deserves something he really wants. Comes the big problem: Just what to get for Harry? Or Fritz? Or Joaquin?

It is a common problem, and we understand how confusing it can be. The 1978 edition of the "Radio Control Buyer's Guide" claims to list over 2300 items, to which you have to add everything common only to free flight, control line, and rubber-powered models. The selection is staggering!

Well, cheer up, we are going to help you. JUST for you, we have gathered basic information, including photos and prices, of the most popular model products we have used or observed being used successfully by our friends at the local flying fields, boat ponds, and car tracks. There are a few exceptions, such as the "Damo" engine shown, which is too new and too expensive to be seen in great numbers, but it is something that most modelers would gladly trade for their season tickets at the opera. Popularity changes from one area of the country to another, and there may be similar items more in use in your area. In general, everything pictured and described is of modern design, and we consider it of good quality, and fairly priced.

Now you need only to determine your modeler's favorite type of modeling activity, and look for items under that heading. With few exceptions, these are all things that active hobby dealers have in stock or can get for you. The exceptions are noted, and ordering information is furnished.

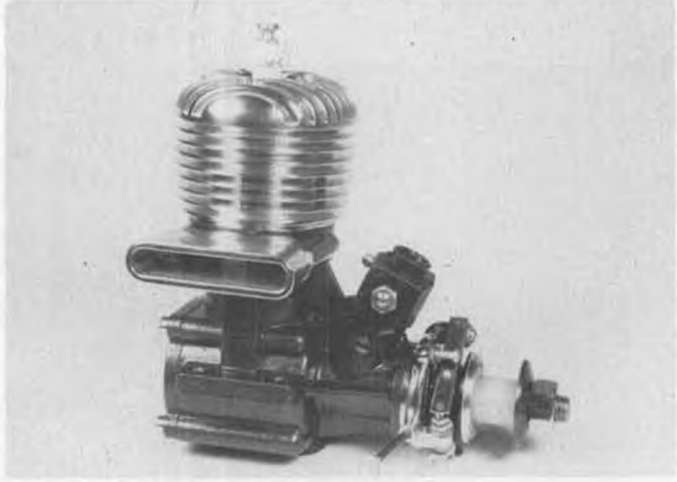
Speaking of dealers, depend on him for final information. He can and will verify that your choice of airplane and engine, for example, are compatible. And if you also need some stocking stuffers, such as glue and props, he will know the proper ones to get.

Have a Merry Christmas in the company of your modeler. If you have any money left, send ME a card! •

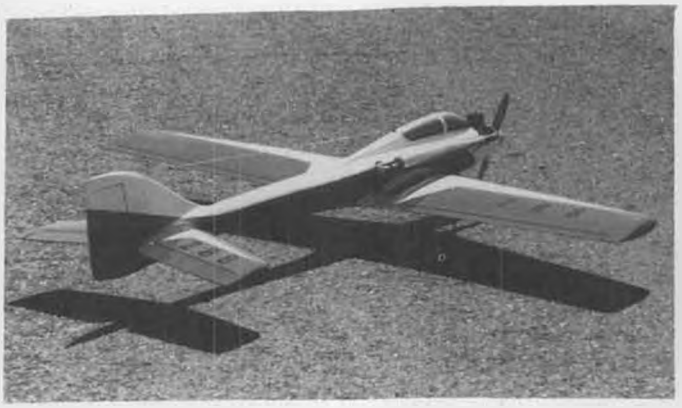
FREE FLIGHT, AIRPLANES: A-B-C Scrambler, Sig Mfg. Co. Designed by Jim Clem. For all engines from .15 to .35, $14.95. Kit includes die-cut Sig balsa, covering materials, full-size plans.

FREE-FLIGHT, ENGINES: Cox .15, suitable for A-B-C Scrambler, also available in versions for U-Control and Radio Control. For both competition and sport flying. About $60.

OLD TIMERS, AIRPLANES: Buzzard Bombshell, by Model Engineering of Norwalk (M.E.N.). Classic free-flight favorite, redesigned for current radio control Old Timer class. $49.95.



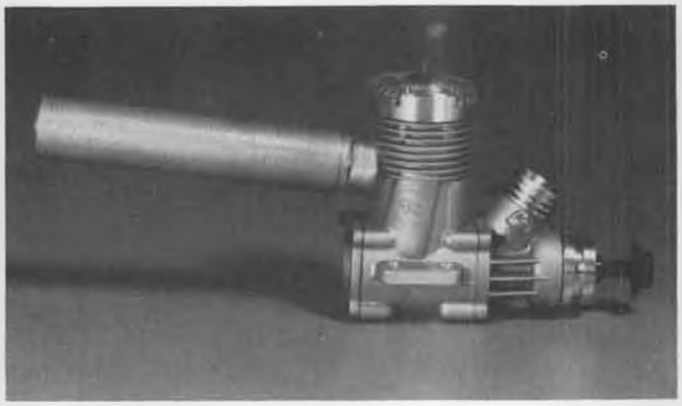
OLD TIMER, ENGINES: 77 Special, by 77 Products, 17119 S. Harvard Blvd., Gardena, CA 90247. Custom produced ignition engine; of a type no longer in general production. Direct only, $160.



RADIO CONTROL PATTERN, AIRPLANES: UFO, by Bridi Hobby Enterprises. Modern aerobatic competition model, used successfully by many well-known fliers. $129.95.

RADIO CONTROL PATTERN, ENGINES: Rossi .60, one of the engines most used in this class of competition, with airplanes such as the Bridi UFO. Tuned pipe available for added power. $166.90.

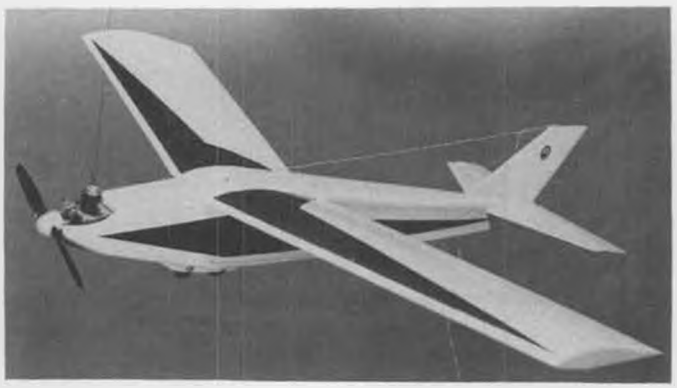
FORMULA ONE RACING, AIRPLANES: "Little Toni", Prather Products. Most consistent winner ever available as kit, holder of many national records. Fiberglass fuselage, foam wing. $99.95.



FORMULA ONE RACING, ENGINES: K&B 6.5cc, from K&B Mfg., one of the oldest U.S. engine manufacturers. Shown here in front rotor version, also made as rear rotor model. About $90.

QUARTER MIDGET RACING, AIRPLANES: "Li'l Cobra", by R/C Etc., Box 127, Costa Mesa, CA 92627. QMRC high-point winner in 1976,1977. Direct only, $50.00, includes postage.

QUARTER MIDGET RACING, ENGINES: Rossi .15, long-time favorite of Q-M fliers, also available in free flight and U-control versions. Made in Italy. From Bill's Miniature Engines. $60.00.



HALF-A RACING, AIRPLANES: "GLH II", stands for "Goes Like Heck", very competitive in this class. From Ace R/C, foam wing version $16.95, built-up wing version $18.95. Complete kit.

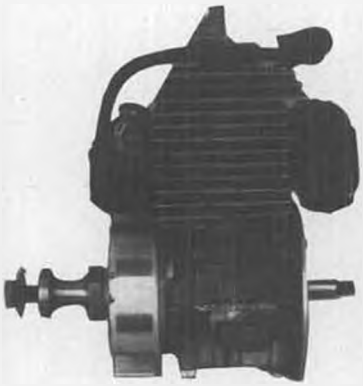
HALF-A RACING, ENGINES: Cox T.D. .051, by Cox Hobbies. This engine dominates most Half-A events, can be used for U-control and free-flight as well, competition and sport. $20.

R/C SCALE, AIRPLANES: P-47D Thunderbolt, from Top Flite Models. All-balsa kit of one of WW-II's favorite fighter planes, featuring many pre-shaped and molded pieces. Uses .60 engine. $79.95.

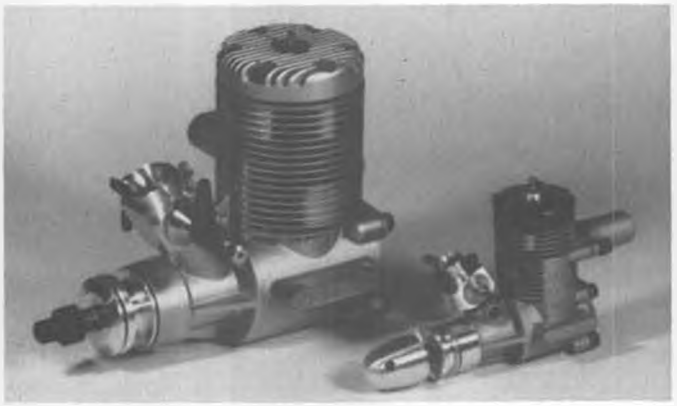
R/C SCALE, AIRPLANES: Mirage, from Jet Hangar Hobbies, 12554 Centralia Rd., Lakewood, CA 90715. Modern ducted fan design, utilizing all the newest materials and techniques. Direct, $129.95.

MAMMOTH SCALE (also referred to as Quarter Scale), AIRPLANES: Cosmic Wind, from Bridi Hobby Enterprises. Fiberglass and foam kit of famous racing airplane. Stable, realistic flier. $139.95.

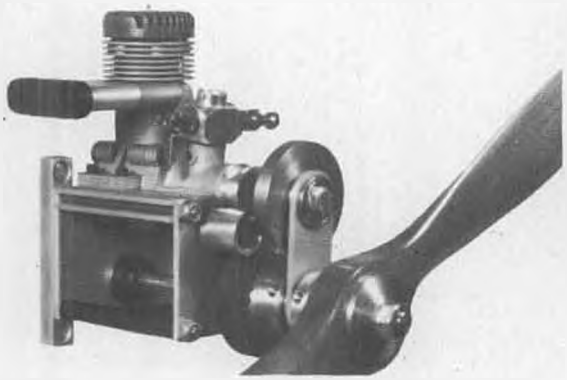
MAMMOTH SCALE, AIRPLANES: Fleet biplane, by Concept Models. Large 86-inch wingspan model of a 1930 favorite, in balsa and hardwood. Realistic construction and in-flight performance. $180.



MAMMOTH SCALE, ENGINES: Quadra, from Shettler Hobby Enterprises. Big two-cubic-inch displacement engine for the larger airplanes, swings large propellers, runs on oil and gas mixture. $137.



MAMMOTH SCALE, ENGINES: Webra .91, from Model Rectifier Corp., the favorite glow engine of the 1978 Las Vegas Tournament of Champions scale fliers. $230. Tuned pipe muffler, $61.55.

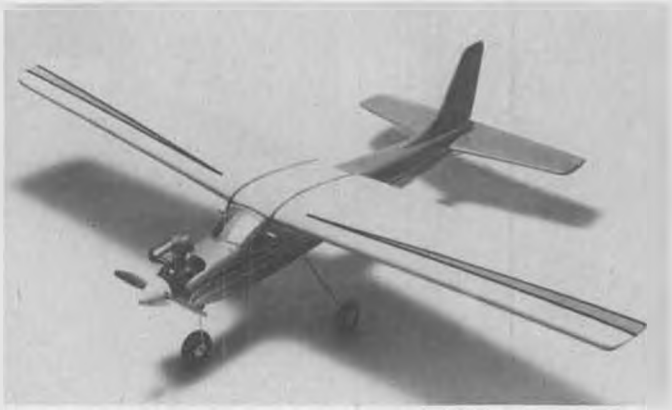


MAMMOTH SCALE, PROP DRIVE: Du-Bro. A device used for powering large models with existing .60-size engine and large propeller. Good way to use an already available engine. $100.00.

R/C SPORT/TRAINER, AIRPLANES: "Kavalier", by Sig Mfg. Co. All-balsa model, designed for sport flying and training. Uses four-channel radio and .20-.40 engines. $39.95.

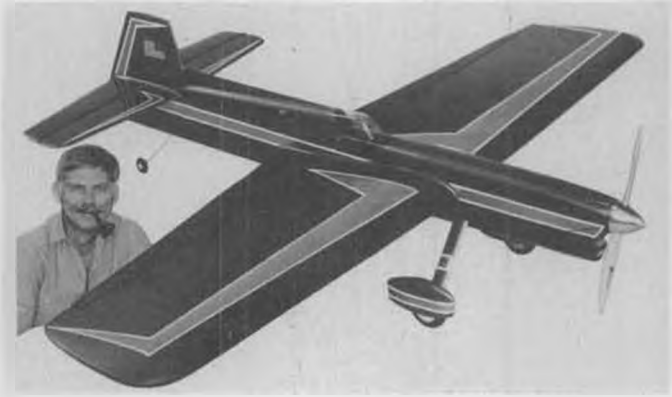
R/C SPORT/TRAINER, AIRPLANES: Falcon 56, from Carl Goldberg Models. An updated version of one of the most famous and most flown trainer and sport designs. All-balsa construction. $34.95.

R/C SPORT/TRAINER, AIRPLANES: Sunny, from Mark's Models. An attractive biplane design suitable for advanced training and sport flying. Fast building, all-balsa, complete kit. $32.95.



R/C SPORT/TRAINER, AIRPLANES: "Trainer Hawk", from MRC. All-foam, completely ready-to-fly (ARF) model for beginner of flier without time to build. Complete with engine, $90.00.

R/C SPORT TRAINER, AIRPLANES: Alpha, from Ace R/C. Economical small airplane for the smaller engines, such as the Cox T.D.'s and the smaller, lighter radios. Wood fuselage, foam wing, $19.95.



U-CONTROL, AIRPLANES: Gieseke Nobler, from Top Flite Models. Updated kit for one of the perpetually successful controlline stunt designs. A sure-fire contest winner; all-balsa. $38.50.

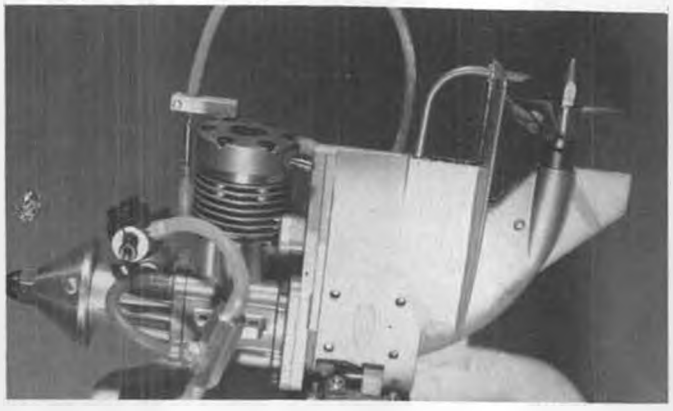
U-CONTROL, ENGINES: Fox .35, from Fox Mfg. Co. Another modern version of a product that has earned a well-deserved reputation for quality and dependability through the years. $25.95.

R/C SPORT/SCALE, BOATS: Puddle Jumper, from Sterling Models. A prop-driven air boat that can utilize any .15 to .35 engine already on hand, and a 2-channel (or more) radio system. $39.95.

R/C SPORT/SCALE, BOATS: Dauntless, from Dumas Products. A 50-inch scale model of a commuter class boat, can be powered by gas or electric motors. High speed hull design. $59.95.

R/C RACING, BOATS: Lil' Lightning, from Steve Muck's R/C Boats. Very successful fiberglass model for the new and increasingly popular outboard class. Complete with radio box. $92.50.

R/C RACING, BOATS: Wing Ding, from Octura Models. For all-out competition hydro racing, available for .40 or .60 engines, and can be raced in the Unlimited class with twin engines. About $75.

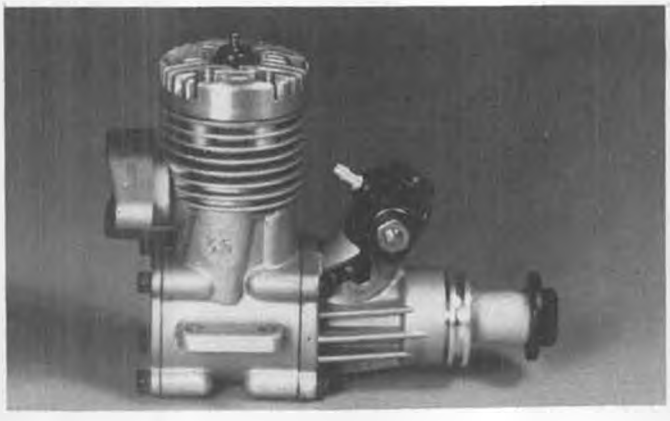


R/C BOAT, ENGINES: 3.5cc Outboard, from K&B Mfg. Co. A new type of engine that started a whole new class of competition and sport boating. As used with the "Lil' Lightning". $99.50.

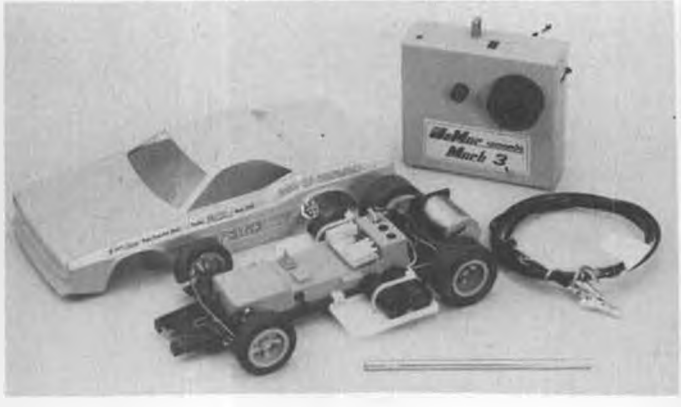
R/C BOAT, ENGINES: HB .61 Marine, from Bavarian Precision Products. Especially designed marine engine for the larger class of competition and sport boats, such as the "Wing Ding". $100.

R/C SYSTEM "FP-2F", BOATS: from Futaba Industries. One of the most seen radios at all boating events; also popular with R/C car enthusiasts. All frequencies, less batteries, $139.95.

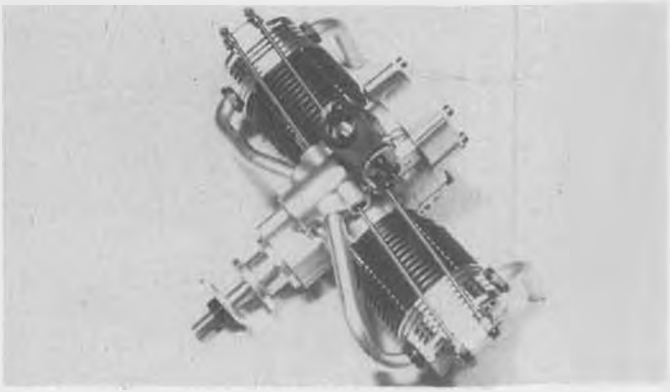
R/C RACING, CARS: "HRE 1000", from HRE Inc. Competitive R/C racer designed by one of the pioneers in this phase of the hobby. Consistent winner, complete chassis kit. $144.95



R/C CAR RACING, ENGINES: 3.5cc, by K&B Mfg. Co., an engine manufactured especially for high speed competition racing. Seen in large quantities at all car racing events. With carb, $67.50.



R/C ELECTRIC, CARS: Commander car and "Mach 3" radio, from JoMac Products. One of many electric cars for legal ROAR competition and sport driving from this company. Complete w/radio, $200.



ENGINES, GLOW PLUG TWIN: "Damo", an excitingly different Swedish import from Midwest Model Supply. If model engines were used in autos, you'd see this one in Lincolns & Cadillacs. About $500.

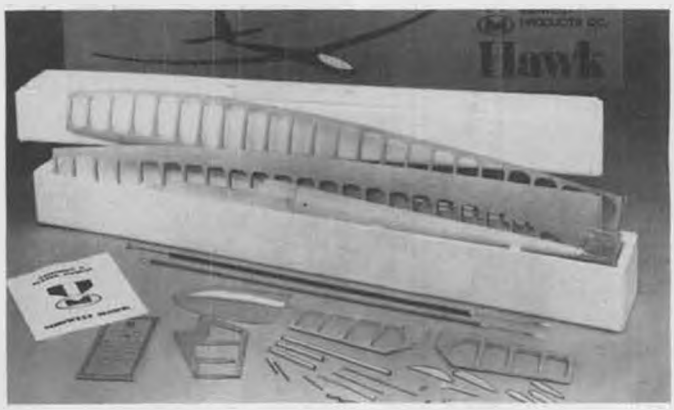
MOTORS, ELECTRIC: A complete class of electric motors for all types of modeling applications, from Astro Flight. Prop reducers (shown), batteries, chargers, etc. also available. $20 to $175.

R/C HELICOPTERS: Heli-Boy, from Schluter Products, the inventor of the R/C helicopter. Latest design, extremely successful both in competition and sport flying. Complete kit, $339.95.

R/C HELICOPTERS: "Rev-olution 40", by American R/C Helicopters. Flown by 1977 National Helicopter Champ John Simone, Jr. Uses .40 engine, 4-channel radio. Easily assembled. $239.00.

R/C SAILPLANES: Paragon, by Pierce Aero Co. Large 118-inch soarer designed for competition flying. All-balsa, precision cut parts. Includes all hardware. For any 2 or more channel radio. $60.

R/C SAILPLANES: Wanderer 99, from Mark's Models. Latest design by the three-time National Glider Champion, and holder of a 13-hour endurance record. All-balsa kit, with hardware. $30.



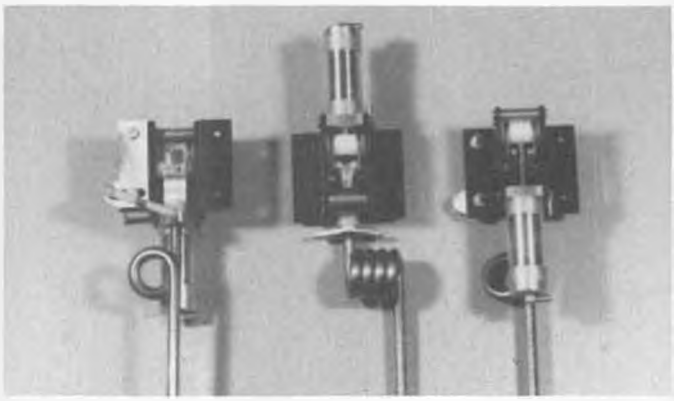
R/C SAILPLANES: Hawk, by Midwest Products Co. A pre-fab glider kit, requiring only covering of the wing and tail, and painting of the fuselage, if desired. A proven graceful flier. $130.

R/C SAILBOATS: Soling M, from Vortex Model Engineering, 210 East Ortega St., Santa Barbara, CA 93101. A 60-inch mast, 50-inch hull R/C sailboat, for sport and competition. Direct, about $400.

RADIO CONTROL SYSTEMS: "Signature Series", by Kraft Systems, Vista, California. Most sophisticated system now available, Custom made to order. Contact Dave Shadel at Kraft.

RADIO CONTROL SYSTEMS: Super-Mini, from Cannon Electronics. The smallest, lightest system currently available, popular with all builders of 1/2A and smaller airplanes. From $185.

RADIO CONTROL SERVOS: "Bantam Midget", from Novak Electronics. The muscle of all radio control systems. These are small, light, strong, designed to work with most radio brands. $30.00.



MISCELLANEOUS: Rom-Air Retract Gear, from Rhom Mfg. Co. Very popular air-operated retractable landing gear system usable with many scale, sport, and pattern designs. Two or three-wheel, from $80.

MISCELLANEOUS: Digi-Pace, from Ace R/C. The latest in radio system battery testers. Tells the exact amount of current, thus the exact amount of flying time possible. Detects bad cells. $95.

FIELD EQUIPMENT: Pylon Brand Starter, from Sullivan Products. A great time and temper saver, will start all sizes of engines. Two models available, Standard at $36.95, Deluxe at $39.95.

FIELD EQUIPMENT: Mini Starter, from Astro Flight, Designed for use with Half-A and smaller engines. Has smaller drive cone, runs at high rate required for consistent starts. $17.

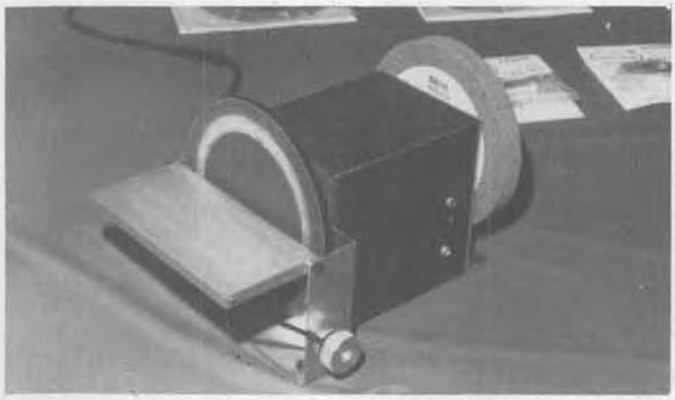
FIELD EQUIPMENT: Charge'N Test, from MRC. A combination R/C system battery tester that measures exactly how much battery life is left in your system, and field-charges it when needed. $59.95.

FIELD EQUIPMENT: "ProTach", by Royal Electronics. Important instrument with which you can read engine speed, and thus determine the most efficient adjustment. For all power models. $27.00.

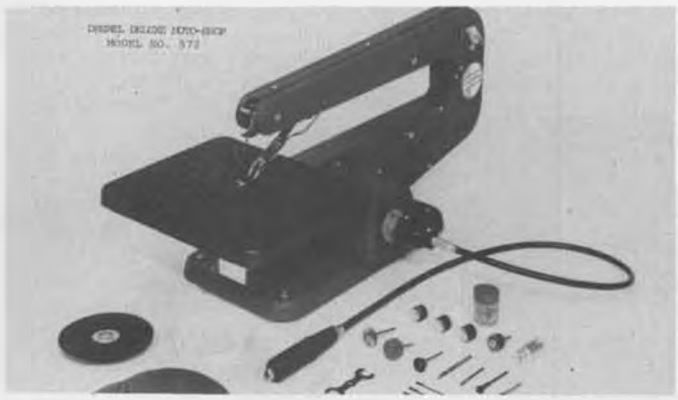
FIELD EQUIPMENT: "GloBee Fireplug", by Fusite Corp. Modern, fully adjustable power source for glow plugs as used in most model engines. Takes place of expendable dry cells. Rechargeable. $27.00.

FIELD EQUIPMENT: Field Box, by Craft-Air. Something to carry it all in . . . a last-forever molded plastic equipment carrier that holds everything, from his radio to the can of fuel and spare props. $29.95.

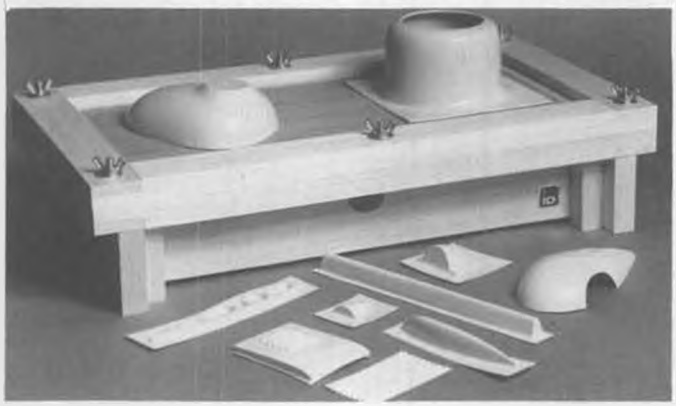
TOOLS: Uber Skiver, from Model Builder Products, this address. A good knife with changeable blades is a necessity. This is the best one around, with non-slip blade holder. In different colors, $15.



TOOLS: Powr-Mite Sander, from Strick's Enterprises. Combination sander and grinder that has a thousand and one uses in the model shop. Saves time, increases quality. Different models, $30 to $40.



TOOLS: Moto-Shop, from Dremel Mfg. Co. A combination saw and multi-accessory electric tool, very popular and having many uses for the active builder. A great time saver. Complete as shown, $90.



TOOLS: Formicator, a vacuum forming device from Idea Development Co. Used by the advanced and novice modeler to mold various model parts and accessories. Complete with supply of plastic, $39.

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

OTTO BERNHARDT
17119 S. Harvard
Gardena, CA 90247

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

KLAUSE

• This month, we'll make good on a previous promise to discuss combustion chamber/nitro combinations. Before getting to specific examples, let's briefly review some basics on engines and physics.

Our model engines operate on what is generally referred to as a fuel/air mixture. Since fuel was previously discussed in the October '78 issue of **Model Builder**, it's time to add something about that other essential ingredient; air . . . that good stuff we also breathe to keep our human engines running. Air is composed of a mixture of nitrogen, oxygen, small percentages of several other gases, varying amounts of water vapor, and of course, smog. As far as our engines are concerned, oxygen is really the important ingredient . . . specifically, oxygen molecules.

Our air is also referred to as being under pressure. The pressure will vary with the weather, and pressure will affect the number of oxygen molecules available to our engines. Remember the meaning of some principles of physics? First, relatively low barometric pressure will mean fewer oxygen molecules per given volume and temperature. Second, higher temperature will mean fewer oxygen molecules per given volume and pressure. Further, high humidity will mean a relatively high number of water molecules which displace usable oxygen molecules per given volume, temperature, and pressure. Tying it all together, on a hot, humid day with low barometric pressure, there'll be quite a few less molecules of oxygen, per given volume, available to mix with our fuel. Result: horsepower will be down.

Fortunately, we can compensate for this by using a supercharger to cram more molecules of fuel/air mixture into the combustion chamber . . . an increase in effective pressure and power. Unfortunately, superchargers, as we typically think of them, are not currently available for our engines. However, all is not lost, because we can "supercharge" our engines by other means, such as resonant exhaust systems. If you don't want to get that complex, we can just simply increase the effective pressure in the combustion chamber by decreasing chamber volume . . . a higher compression head. In addition to that, we could add a bunch more nitro, and really honk that engine. Right? Well, yes, but there are very serious limitations. Simply stated, too much compression and nitro will generate, in order, too much heat, detonation, and disaster . . . in the form of ruined engines.

As a practical matter, in handling 1/2A-size engines, most modelers are somewhat limited to using commercially available glow heads such as Cox, Glow Bee, etc. Using these in their stock configuration, compression can be varied by simply increasing or decreasing the number of copper head-gaskets. One little, .005-inch thick copper gasket may not seem like much, but it will change combustion chamber volume to a significant degree. As an example, if you are using a No. 1702 Cox glow head with one gasket, and then insert a second gasket, you will have increased the volume of the combustion chamber approximately 9%! Now we can see that it makes a lot of sense to use three gaskets during engine break-in. The effective pressure will be lower, and there'll be a lot less heat and associated friction while the engine parts are mating together.

If you have access to a lathe, you can modify stock glow heads to increase performance. To help save you some time and the expense of trial and error, our experiments have shown that the following modification of the Cox 1702 head will produce a nice increase in power. First, machine .015 inch off the face of the head. This will decrease chamber volume, and it will also provide a squish band on the head which will help prevent detonation. Second, machine .015 inch off the shoulder of the head, just past the threads. This will ensure that the squish band will fully seat against the copper head gaskets. A standard Cox 1702 head and a modified one are shown in one of the accompanying photographs. As you can see, a significant squish band has been created by machining off a mere .015 inch.

At this point, it would be nice to be able to categorically tell you the ideal head spacing for each head, fuel, and atmospheric condition. Unfortunately, the list would contain literally thousands of figures, if for no other reason than the so varied weather. Instead, we'll do the next best thing. Remembering that it's

Top, l to r: Cox 302-I Sport head, Cox 1702 high-compression head, and modified 1702 head. Note the squish band on the modified head. Middle, l to r: Glo Bee hold-down ring, GB-5P Sport head insert, and GB-5R Racing head insert. Bottom, l to r: Techni-Models head for .049-.051 engines. Uses short-reach standard glow plugs.

	15%	40%	65%
Suction Fuel System (One Head Gasket)			
Techni-Models	14,300	14,500	
Cox 302-1	16,700	17,100	
Cox 1702	20,500	21,500	
Glow Bee Sport	22,000	22,500	
Pressure Fuel System (Two Head Gaskets)			
Cox 1702	20,200	21,500	22,800
Glo Bee Racing	20,900	22,500	23,300
Cox 1702 modified	21,300	22,500	23,500
Pressure Fuel System (One Head Gasket)			
Cox 1702	20,600	22,200	23,300
Glo Bee Racing	21,500	22,900	23,500
Cox 1702 modified	21,500	22,900	24,100

all relative, here are some general guidelines and hints for good performance:

1) With dry, high air temperatures, try a little more compression and/or nitro.

2) With high barometric pressure, try lower compression and/or nitro.

3) With high humidity, average temperature and barometer, some increase in compression and/or nitro may be beneficial. It will be relative to where you started out with the compression and nitro.

Obviously, there are many possible combinations of the above. Experience naturally will help, but for starters, we suggest that you: first, decide upon a fuel for your 1/2A event . . . again, see October '78 **Model Builder**; second, if the atmospheric conditions are not extreme, simply add or subtract gaskets for optimum performance; third, if conditions are extreme, and if you're having trouble needling your engine, or if it's running too hot, then don't hesitate to back off both the compression and nitro until things smooth out. Above all, remember that sacrificing a couple hundred rpm could well mean a consistent engine run and a completed flight.

To give you some idea about what to expect in the way of performance, we ran a series of tests using a well-broken-in Tee Dee .049. During these tests, the average temperature was 80° F, humidity 53%, sea level barometer 29.39 inches, and the test elevation was 1200 feet. The fuels used were:

Nitro	Propylene Oxide	Klotz KL-100
15%	None	20%
40%	None	20%
65%	15%	20%

All remaining percentages are methanol. The test prop was a balanced, fiberglass 4-3/4x3 with square, blunt tips, .550 inch wide and .075 inch thick at each tip. This is our standard test/reference prop. It is approximately equal in performance to a balanced Cox gray competition 5x3 prop. It is also approximately equal to the in-air performance of a Cox gray competition 6x3 prop.

The following heads were used during the tests:

Cox 302-1 (low compression, sport head)

Cox 1702 (high compression)

Cox 1702 (modified as previously described)

Techni-Models Custom Cylinder Head (used with a K&B short plug)

Glo Bee GB-5P (Sport)

Glo Bee GB-5R (Racing)

A few additional comments seem appropriate concerning the Glo Bee Sport head. To begin, it has higher compression than the Glo Bee Racing head, and the element is designed for fuels containing 5 to 50% nitro. The Glo Bee Racing head is designed for use with 50 to 70% nitro, and it has a colder, heavy duty element designed to withstand many high nitro runs. We also tested the Glo Bee Sport head on the 65% mixture. It was very difficult to needle, and the engine ran noticeably hotter. This agrees with the comments concerning combustion chamber pressures and nitro. We might also add that the atmospheric conditions during the tests were less than ideal. For example, 20,000 rpm under these conditions, with correction factors applied, is equal to approximately 20,750 rpm at standard temperature and pressure and zero percent humidity.

One closing comment. IT IS ABSOLUTELY ESSENTIAL that you thoroughly break-in your engine before using high compression heads and high nitro, otherwise you're inviting the disaster of a ruined engine. Perhaps we'll discuss comprehensive 1/2A break-in procedures next time around. Until then, if you have any questions, just drop me a note together with a stamped, self-addressed envelope: P.O. Box 2699, Laguna Hills, CA 92653. •

ALDRICH

Dear George,

You have been talking about pipes, etc. in your articles, and I think more information would really help some of us.

The information that I and fellow club members need is the practical application *of the pipe for pattern and sport pylon flying. We don't expect a "This is it!!", but at what point do we start?*

1) How long from glow plug to center or high point of pipe? .40? .60?

2) How much variation of above length for different rpm's? 14,000? 15,000? 16,000? 18,000? 20,000?

3) You've mentioned nitro previously, but what should I expect with an OPS .40? K&B 6.5? S.T. X-60?

4) What is a practical rpm range to tune for in a .60 pattern engine? How much rpm increase should I look for, within practical reason?

5) Is there some way to extend plug life, or should I expect to blow one each flight? (Just got an OPS rear exhaust, .60-size F.R. Perry to really cooking on pipe . . . sport pylon . . . last 5 flights cleaned plug completely. On last flight, engine literally exploded. Fuel was 40% nitro, but engine had flown 50-60 flights last year . . . well broken in.)

6) George, pipes are here to stay, even for Sunday sport fliers. How about leading the pack with good practical application information? (P.S. I'm a sport flier only and so are most of my fellow pipe-rs.) Thanks.

Sincerely,
Horace D. Cain

Dear Horace,

I suspect you are my old friend, Horace Cain, who was flying C/L stunt back in the 1960's when I was CD'ing U.S.A.F. meets.

Unfortunately, there is no absolute answer for how long the pipe should be. There are a number of variables that will affect pipe length and rpm. Nitro content of the fuel, prop, exhaust timing, and bypass timing are among these factors which affect an engine's range of performance when utilizing a tuned exhaust system.

1) Resonance of a tuned exhaust system has one variable that is not as easily nailed down as the timing, for instance. This variable is the speed of the gases in the pipe. There have been many figures published for the wave speed of gases in a pipe, varying from 1500 to 1700 ft./sec. Most of these numbers come from motorcycle people and are based on gasoline. Enter methanol and nitromethane. Methanol flashes at 52 F., where nitromethane's flash point is 96 F.! Surprise! That's right, nitro is harder

Continued on page 116

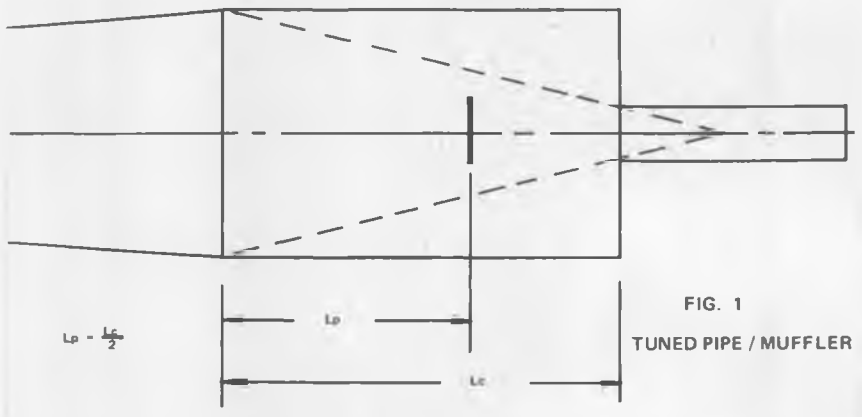

FIG. 1
TUNED PIPE / MUFFLER

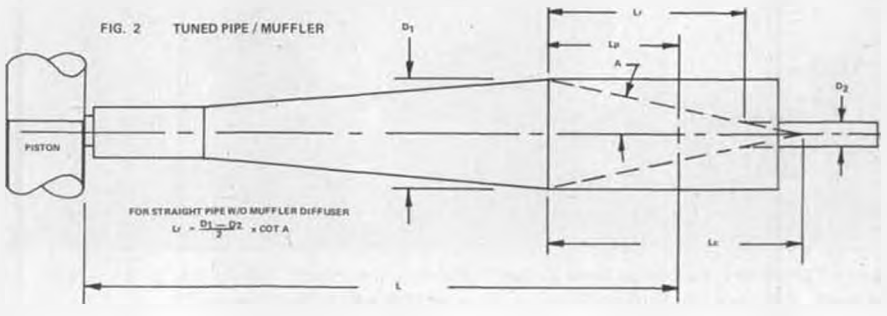

FIG. 2 TUNED PIPE / MUFFLER

Scale models at San Diego meet (front to rear): Cessna 180, Rearwin Speedster, CW-1 Junior, three P-68's, and Gee Bee Sportster.

Bob Boucher's Partenavia P-68 won 2nd in Scale at San Diego. Model is a good choice for an electric twin.

ELECTRIC POWER

By MITCH POLING

• Last month, I made some estimates on what a competitive indoor electric R/C plane would be, given the rules for the International Modeler Show record trials at Pasadena, CA, on January 6 and 7, 1979. The airship category emphasizes distance instead of endurance; the longest flight of a lighter-than-air model around the indoor figure-eight course wins $250, a sizable prize. One complete lap is about 800 feet long. The only lifting gas that is at all practical is helium, which can lift one ounce per cubic foot. An Astro 020 ship might weigh one lb., an Astro 05 ship would be about two lbs., and an Astro 15 ship would be about four lbs. If the airship is cylindrical in shape, then the 020 ship would be 2 feet in diameter by 6 feet long, the 05 ship would be 2-1/2 feet in diameter by 6 feet long, and the 15 ship would be 3 feet in diameter by 8 feet long.

I checked around the local sources for helium, and it costs about 10¢ per cubic foot. This was a lot less than I had expected; even the Astro 15 ship would only cost $6.50 to fill, and the 020 ship would only be $1.60 for a fill! This makes the LTA a lot more attractive than I had first thought. Anyone for LTA's? Let me know if you do it, and send photos, any type will do. The details of the Record Trials are given in the September issue of **Model Builder**, in the R/C World column. For more up-to-date information, write to **Model Builder**, 621 West 19th, Costa Mesa, CA 92627.

Bob Boucher sent photos and a complete report on the first all-electric contest in San Diego, at Miramar NAS, on July 16. Bob says that Bob and Sandy Peck are the local electric livewires in San Diego and that they have been actively promoting electric flight for the past two years. They organized and ran the meet, and their company, Peck-Polymers, together with Astro Flight, donated the trophies. The Pecks deserve some praise for supporting electric flight. Their company sells an excellent line of peanut scale kits, plus electric flight supplies.

MB's Phil Bernhardt was 1st in Scale at San Diego all-electric meet. Model uses an Astro 075, Ace micro airborne unit. Curtiss-Wright Jr. designed from Paul Matt 3-views.

The weather was hot and there was just a bit of breeze (great for scale flying), but the thermals were weak and hard to find. The sailplane event started promptly at 9 a.m., and Dale Black went up first with his beautiful Buteo. He got about a thousand feet of altitude, then Bob Boucher went up. Both soon hit sink, and times stayed low most of the day. The pattern seemed to be fast climbs followed by fast sink! Bob Torres and Steve Neu got maxes by going downwind about a half mile and getting lift off a hill, but the scores were all low compared to the January **Model Builder** contest where the top ten places all got maxes. Bob Torres took first with his Buteo, Dale Black was second with a Buteo, Steve Neu was third with a Super Monterey (Astro Flight kit), and Richard Greibe was fourth with a Super Monterey. All these were powered by the Astro 05.

The Buteo is really a super design. Dale Black beat me out of first place last January with his, flying against my Olympic II, both with Astro 05's. Both planes are designed by Lee Renaud (Cox Hobbies), and the Buteo can outclimb any other Astro 05 sailplane that I know of, plus the fact that it has a good glide ratio. Unfortunately, Lee hasn't published plans or kitted it, so write him at Cox Hobbies if you are interested!

The scale entries were quite interesting, with two new designs by Phil Bernhardt and Bob Sliff. Phil took top honors with his Curtiss-Wright Jr., powered by an Astro 075. Phil finished it

in red and silver, the same colors as the full-size Jr. that one of his flying buddies used to own. The model did not have very many flights on it before the contest, but despite this, Phil did a fine job of flying. The plane looks very realistic in the air. Phil did a breathtaking seven or eight-turn spin and pulled out at five foot altitude in front of the judges' noses. Phil claims he planned it that way, but then why were his hands shaking?

Second place went to John Sczary's Partenavia P-68 (Astro Flight kit) with flaps, ailerons, rudder, elevator, and a three-speed motor control. John's plane was nicely detailed, and his scale presentation was exceptionally well done, with color plates of the full-scale plane. Bob Boucher got third place with his three-year-old P-68. It has a few wrinkles, but is still going strong. It is four-channel, with on-off motor control, and weighs four pounds. Bob believes in keeping things light and simple, and got the second best flight points of the meet. Bob quotes an old French proverb on this; "You can make the best soup in an old pot". I agree, as my Brigadier and Olympic II are close to the two-year mark, and they get better and better with each flight! The P-68 is a potent scale model because it flies so well, and is fully aerobatic with the twin Astro 05 unit.

Fourth place went to Bob Sliff with his nifty Rearwin Speedster, powered by a geared Astro 15 turning a 13x8 Y&O prop. It is 1/6 scale, with a span of 64 inches, a three-channel Cirrus radio and an Astro Flight electronic speed control. It weighs four pounds, which is really light for this size of plane. It was not quite finished and lacked wheel pants and wing struts. It made its first two flights at the contest, and it flew so well that Bob even looped it on the second flight. When it is all finished it will be a sure winner, as it is very realistic both on the ground and in the air.

Thanks, Bob, for your coverage, excellent report, and photos.

Merry Christmas to all, and if it's too cold to fly outdoors, try electric flight indoors, or race with the sharp little electric cars on the market. Keep warm with electric power! •

ELECTRIC POWER

Astro Flight's Super Monterey makes an excellent powered sailplane with an Astro 05 system. The one above, held by its builder, Steve Neu, placed 3rd at San Diego meet.

Bob Sliff's brand-new Rearwin Speedster made its first flights at San Diego contest. Model flew great, but lack of struts and wheel pants cost Bob quite a few static points, placed 4th.

Bruce McAvinew flew this Long Cabin Old Timer in Electric Sailplane, won 7th. Model uses one of the two prototype speed reducer units now produced by Astro Flight.

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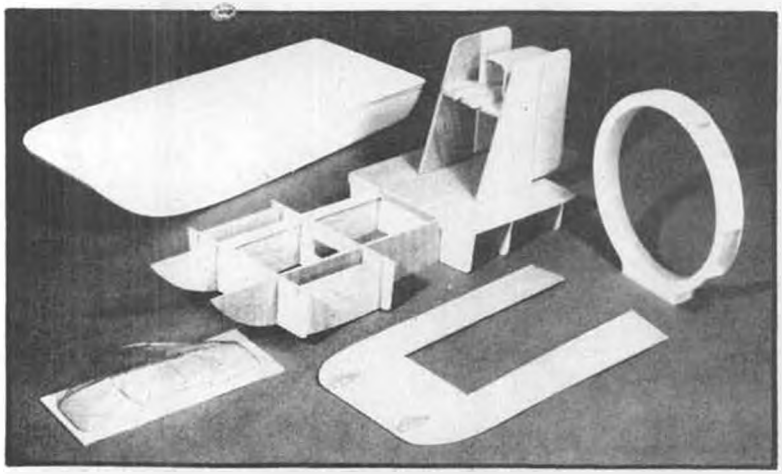

Frame Photo Reveals Simple-Rugged Construction

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Wing Area . . . . . 555 sq. in.
Power . . . . . .15 to .19 cu. in.
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O.T. R/C seaplane flying has really caught on in the San Jose area. Here Jim Kyncy is about to launch Homer Stevenson's Buccaneer.

Rats! The engine quit! Jim Kyncy wades out to get his Lanzo Record Breaker at Thermalita After-Bay fun-fly.

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• Back in July 1976, we wrote a lead column on Old Timer seaplane activity. Although it was regarded by some as "tongue-in-cheek", such was not the case, as activity is finally starting to develop in a big way.

As pointed out before, seaplane flying has always been popular in San Jose at Calero Dam, and at Lake Elsinore in Southern California. Activity has generally been confined to select groups. A "once-a-year" type contest does not attract modelers to build a special airplane, to be flown at one meet and then put away for another year.

It all started when SAM 21 scheduled an O/T hydro contest when making up the 1978 calendar of O/T R/C flying on the West Coast. This bold step, proposed by Bob Von Konsky, was the kick-off hydro meet. Scheduled for August, this gave the boys plenty of time to get their models ready. This, plus the long drought of 1976 and 1977, left quite a backlog of hydro models on hand. As a matter of fact, the writer's Gladiator on floats had to wait over a year to be flown on water!

The events for the SAM 21 Hydro Meet were not firmed up until two months before the date of the meet. To keep things on a strictly fun basis, the membership decided to hold a special water taxi event, a cross-country run, and, of all things, a pylon race for O/T hydro models! As it turned out, one model could be used for all events, which added hugely to the enjoyment.

Weatherwise, the day started out great, with quite a few successful trial flights. By the time the water markers had been put out for the Precision Taxi event, the wind was starting to whip up. Those models that had polyhedral wings suffered the most because of their weathervaning characteristics. Once a wing got down, there was no way in the world of righting the model. As it turned out, young Lawrence Bekins was the only one able to negotiate the complete course with a small Air Trails Sportster with V-dihedral wings.

About this time, it was decided to abandon the Cross-Country event and concentrate on the Pylon event. This turned out to be more fun, as only two at a time raced. Of course, the lowest elapsed time of all the races would be judged the winner.

View of north end of Calero Dam lake. Bob Von Konsky's retrieval boat (background) proved to be invaluable for picking up stranded models. This is an excellent site for R.O.W. flying.

Daddy Warbucks built this Gladiator especially to fly off water. It hung from his ceiling for over a year before being flown!

Big Gee Bee floats look tiny on Speed Hughes' Boehle Giant. Wing is supposed to have V-dihedral; wonder why he changed it?

Adjusting the floats on Warren Pickering's Lanzo. Simple rubber band installation.

Don Bekins retrieves his Cal Aero Models' Air Trails Sportster at Thermalita After-Bay fun-fly sponsored by SAM 30. Model powered by a Cox Conquest .15.

A real David and Goliath contest developed with Lawrence Bekins' Air Trails Sportster and Von Konsky's Powerhouse. The former had a screaming glow engine, while the Powerhouse featured a very deep-throated Anderson Spitfire. In spite of the very close course flown by Bob, the hot little job was faster, and finally finished ahead despite some very wide turns.

The winning model, a Long Cabin model by Paul Forrette was probably the grooviest model of the bunch. However, the heralded race between the two fastest models, Pond's Gladiator and Bekins' Playboy, failed to materialize, as a crosswind launch did in the Gladiator and Bekins promptly ran out of gas after two laps and had to ditch the model.

In any contest, credit should go to those who organize and run it; in this case, Bob Von Konsky for the retrieval boat (invaluable!) and Bill Squire for getting the meet rolling. Based on the fun, another hydro meet will be scheduled in the late Fall.

SAM 30 FUN-FLY

Not to be outdone by SAM 21, the very up and coming SAM 30 Club decided to hold a Texaco-type hydro meet in connection with their standard O/T Fun Fly. As a "throw-in", this turned out to be so darn popular that another get together was promptly scheduled for three weeks later.

Hal Cullens, SAM 30 Secretary, reports the meet held on August 13 at the Thermalita After-Bay, near Oroville, was a real success, based on 19 entries for just a fun fly. (Most guys come just to fly, not compete.) Based on all the favorable comments Hal received from the majority of the contestants, he scheduled another meet for September 24.

The most surprising thing about this contest was the comparison of times between the Texaco and the ROW events. If one considers they were using similar types of models for both events, then the results do not seem out of line. Look at the comparative times:

TEXACO

1. Karl Tulp (Dallaire) 27:17
2. Speed Hughes (Boehle) 15:21
3. Karl Tulp (Lanzo) 15:07
4. Don Bekins (Lanzo) 12:53

ROW

1. Hal Cullens (Dallaire) 29:23
2. Jim Kyncy (Lanzo) 27:14
3. Rod Gunderson (Buccaneer) 26:09
4. Speed Hughes (Boehle) 25:39

One would get the idea there were terrific thermals at Thermalita After-Bay, but in real life, it turns out the floats do not add that much drag to the slow-gliding mammoths.

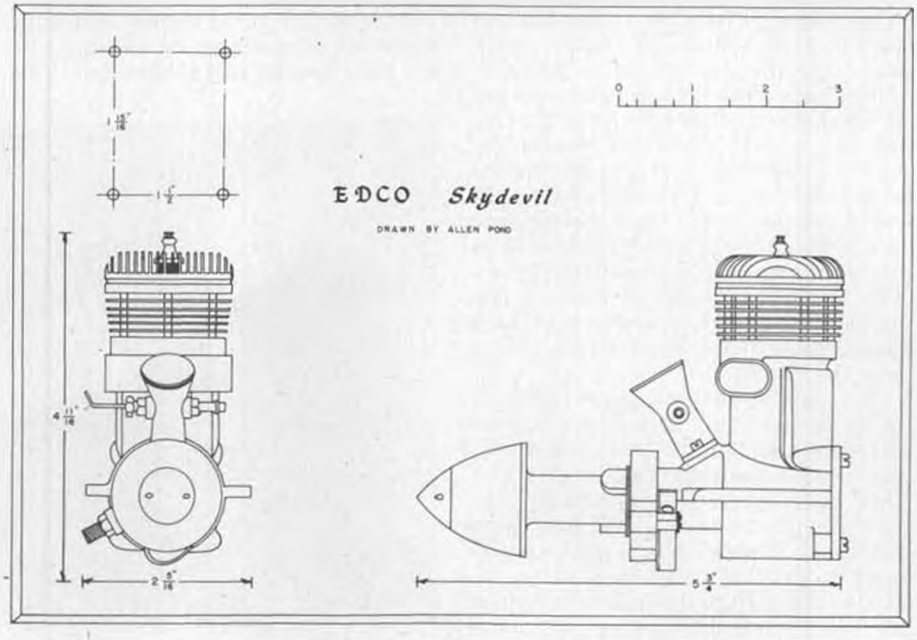
The best part of these hydro events is the interest that has been generated and the new members SAM 30 has been able to come up with. All Old Timer flying, whether it be free flight or radio control, has a tendency to stagnate from competition in the same old events with the same winners all the time. Something new gives everyone a chance to have fun and even win!

ENGINE OF THE MONTH

Not many modern day modelers are aware of the Edco Sky Devil, as produced by the Engineering Development Company (Frank Howarth, Pres.) and designed by Ira Hassad.

This engine, a mass produced version

Bill Baker's method of making cam riders from commercial control horns (see text).



Paul Forrette's Long Cabin won the pylon racing event at the SAM 21 fun-fly. Looks like Sure Flite floats.

Bob Von Konsky's Anderson Spitfire-powered Powerhouse used a simplified version of the Berkeley Gondolier 40 floats.

of the Hassad Custom, came out directly after World War II. Interestingly enough, the name, Sky Devil, had been employed before, as quite a few Hassad Customs were sold under this name. The name, incidentally, was derived from the airplane club associated with Tom Herbert's Westchester Hobbies in White Plains, which first sold the engine. With the "Sky Devils" promoting the engine in contests, it was a natural to name the motor.

To back up a little, Ira Hassad, who is still actively running a machine shop in San Diego, was one of the early pioneers of model engines. He and Irwin Ohlsson attended Polytechnic High in Los Angeles, where they singly and collectively attempted to build minature gas engines. After graduation in 1934, Hassad first worked for McFarland motors, along with Irwin Ohlsson.

When the company folded, their paths separated and Hassad caught on with Grand Central Air Terminal at Glendale, the center for Curtiss-Wright. About this time, Major C.C. Moseley decided to produce a model gas engine based on Bill Atwood's design, and Hassad and Mel Anderson were hired along with Atwood. But, that is another story we will run in the future.

Edco advertisements (primarily in Model Craftsman for the auto racing trade) showed two versions of the Sky Devil, a 1500 SD for airplanes and a 1500 SDR for race cars. The airplane version featured a bore of .940 inches and a stroke of .935. However, the race car version, to comply with the .61 cu. in. engine limitation, had a stroke of .935 inches, with a reduced bore of .910.

When interviewed by Bill Thompson, an ardent engine collector residing in San Diego, Ira readily admitted that the Sky Devil production version never did meet the performance standards of the Custom. According to Bill, the thing that was missing in mass production was the care that Ira Hassad took when assembling each engine. However, many owners were aware of Hassad's rework service, and for $15.00 could have Ira turn their engine into a first-rate winner.

With the year of 1947 starting and the demand for engines finally satisfied, it didn't take long for sales to start falling off, especially in view of the demise of

Continued on page 124

OLD TIMER Model of the Month

Designed by: Frank Ehling

Drawn by: Bernard Shulman

Traced by: Al Patterson

Text by: Phil Bernhardt

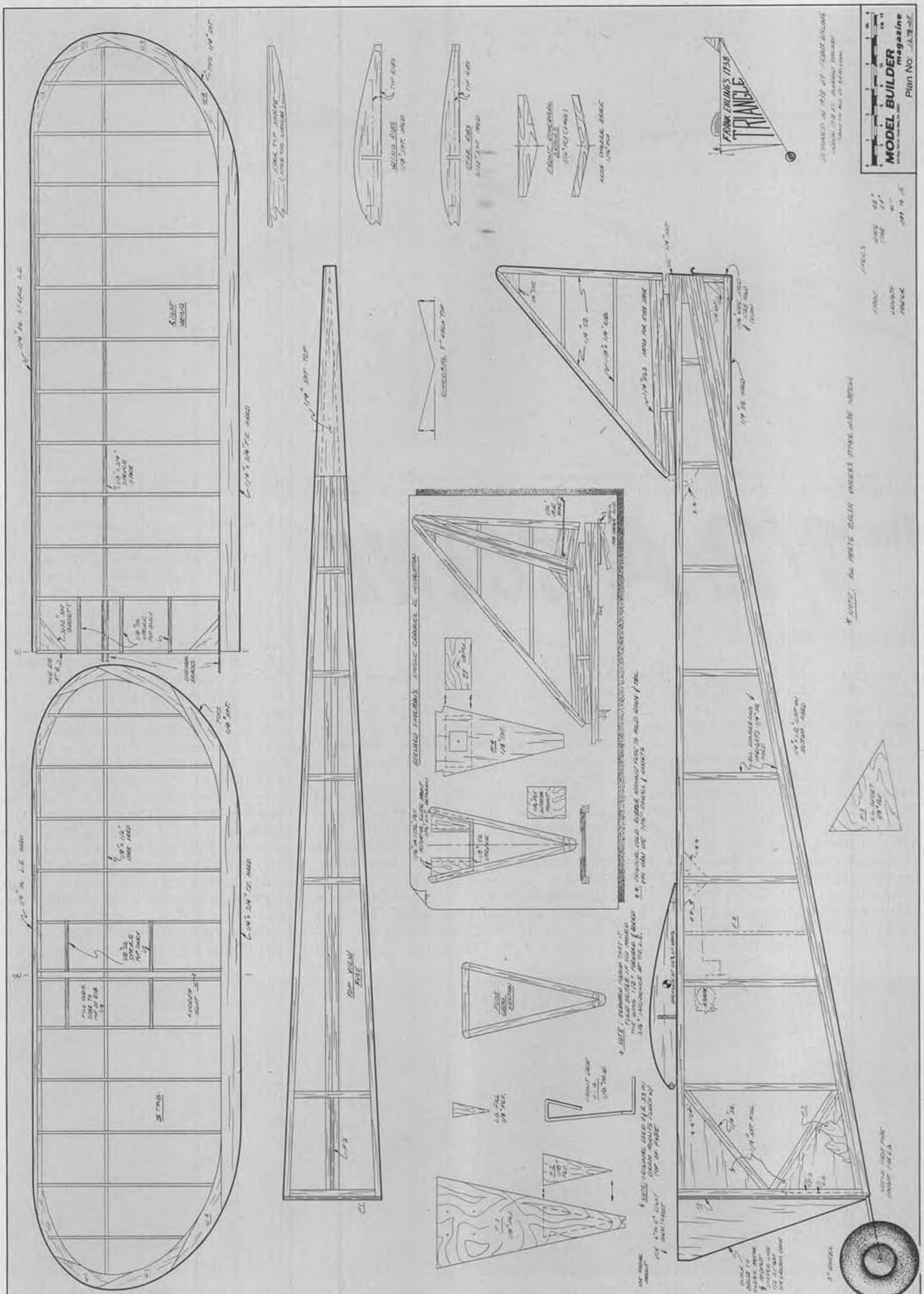
EHLING'S 'TRIANGLE'

• Here's an Old Timer that probably even John Pond doesn't know about. It's Frank Ehling's "Triangle", designed and built in 1938. Actually, the first Triangle was twice the size of the model presented here. When Ehling's club decided to hold a marathon contest at Cherry Hill, N.J., he built a half-size version (the model presented here) and powered it with an Ohlsson .23. The idea was to put in as many one-minute flights as possible in one hour. All flights were R.O.G., and if you broke a prop, you were out (that's why the wheel is out in front of the prop). The model turned out to be a good, stable flier so much so that Ehling won the contest!

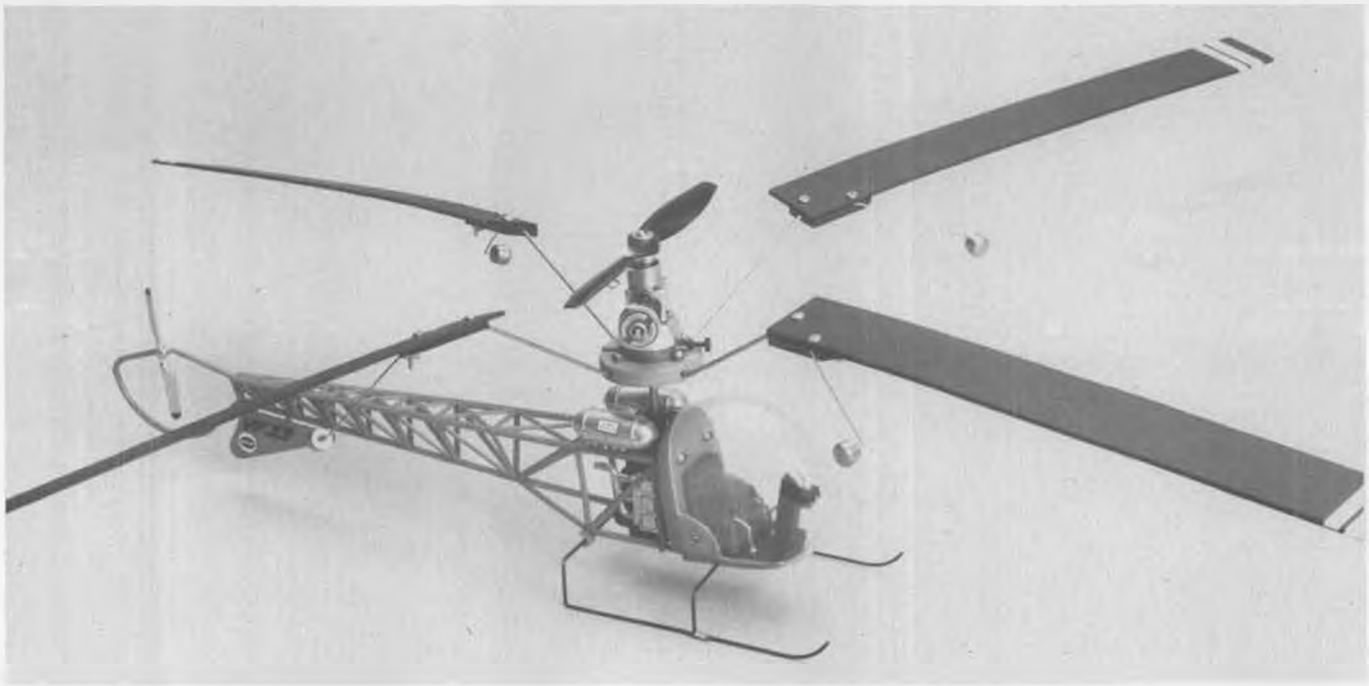
The plans for the Triangle were sent to us by Bernard Shulman, who got them directly from Frank Ehling himself. Bernard has been flying a Triangle with a Cox Tee Dee .049 and Ace single-channel pulse radio, and has been having a ball with it. For those who may want to do the same thing, we've included a sketch of the modified rudder on the drawing. Bernard says the model flies better with the wing moved a 1/2 inch forward of the position shown, and with 3/16 inch of incidence under the l.e. of the wing. He also used spruce for the wing l.e. and spar (the original used balsa).

Bernard says the Triangle is so odd-looking, his wife thinks it's cute. Well, it's odd-looking, all right . . . nobody will disagree with that . . . but *cute*? •

PHOTO BY BERNARD SHULMAN



FULL SIZE PLANS AVAILABLE — SEE PAGE 128



Cox's Skycopter can be modified into a very good performer . . . see text. A slightly modified Skycopter won 3rd place in F/F Helicopter at the 1974 Nats. Even in stock condition, these things are a lot of fun. One thing's for sure: there's not much chance of losing it in a thermal!

The 1/2-A SCENE

By LARRY RENGER

• World's fastest 1/2A! Until further notice, Bob Novak will hold the unofficial world's speed record for 1/2A-powered models. His shrunk-down, slicked-up, GLH-derived 1/2A R/C pylon racer beat a Quarter Midget in a fair race. Not just any Q-M, either; this was a fly-off race between the winner of Q-M and 1/2A unlimited at the June RC Bees' race at Mile Square, California. Bob Novak vs. Bob Root and his Cox Conquest .15-powered Airacobra. The time was in the low 1:20's on the short Q-M course.

Bob has flown as fast as a 1:09 at the Valley Flyers' May 20th race. This time was on the standard AMA 1/2A course, and may be the first time under 1:10 in any form of pylon racing. Bob intends to run this little bomb through the traps next time there is an R/C speed trials in this area. He figures he'll need to work with props a bit to get the best straight-line speed.

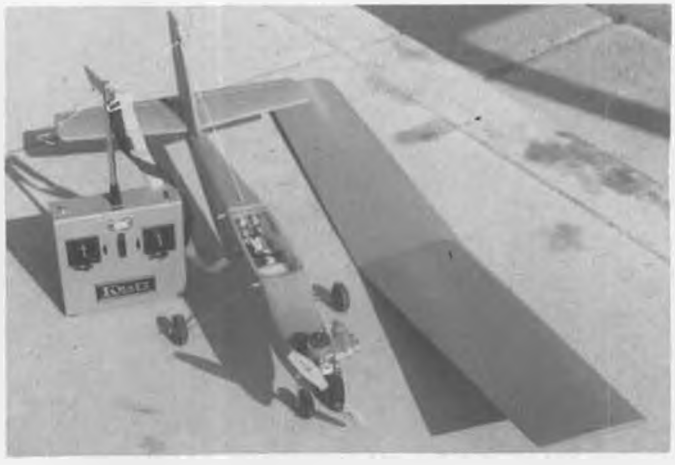
Specs on the plane are about what you'd expect of a carefully thought-out unlimited: 28-in. span, 100 sq. in., 5-in. root chord tapering to 2-1/4 in. at the tip, .4-in. root airfoil thickness tapering to .3 in. at the tip, 9-in. stab span, fuselage is 20-3/4 in. long, 2.2 in. high, and 1-3/4 in. wide. The radio is RS (what else?) with Bob's own new Bantam Midget servos. The engine is a Tee Dee .051 modified by Larry Laulom, swinging a 5X3 Cox competition prop.

All I can say is that the airplane looks even sleeker in person than it does in the photo.

As long as we are into the photographs, let's continue. Next up is a very nice choice for beginning R/C'ers. Bill Hill (23541 Belmar Dr., Laguna Niguel, CA 92577) built the Ranger 42 as a 3-channel model. He used an Enya .09 TV and a Kraft Sport 6 with the optional KPS-18 servos. The plane was a very docile combination when I saw it fly. The Ranger is one of the very first models to use all-foam construction. Carl Goldberg still makes it, and it is still an excellent choice. One thing I would do, however, is add a couple of lengths of strapping tape (the stuff with nylon or glass fibers in it) to the underside of the wing. Covering with Econokote or Flitekote would be a reasonable alternative.

Next is a photo of the bones of a Pilot QB-10L that I am building. The engine is

Ace's Upstart II is a hopped-up version of the model that helped start 1/2A racing on its way.



One of the first all-foam models, Carl Goldberg's Ranger 42 is still a good choice for a beginner. Performs well on 3 channels, .09-.10.

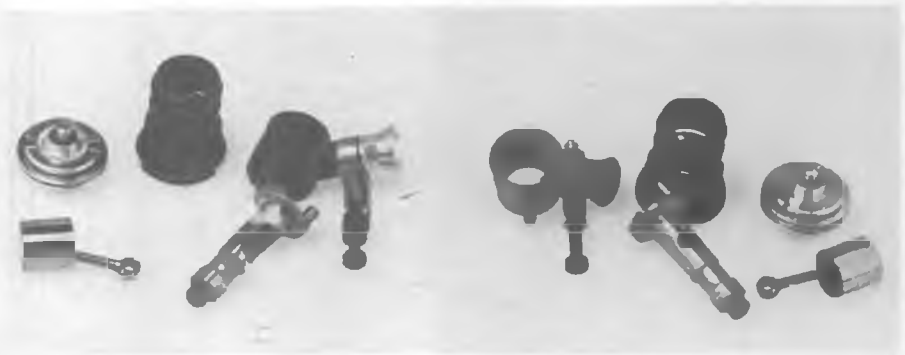
mounted on a replaceable firewall so that I may switch from engine to engine for testing. I ran Nyrod down both sides of the inside of the nose so I can handle throttle linkages on either side. The only other modifications are the shortened ailerons, rounded tail surface contours, a swept-back landing gear to improve gound handling, and a steerable tailwheel. One of these days I'll even finish it!

Next photo is all them there itty bitty engine parts. The point of the picture is to illustrate the differences between the Medallion and Tee Dee series of engines. Starting from the top and working our way down, there is the glowhead. The Tee Dees use a high compression ratio reverse-curve "trumpet" combustion chamber shape. The element takes more of a pounding, but the shape and high compression are good for about 1000 rpm.

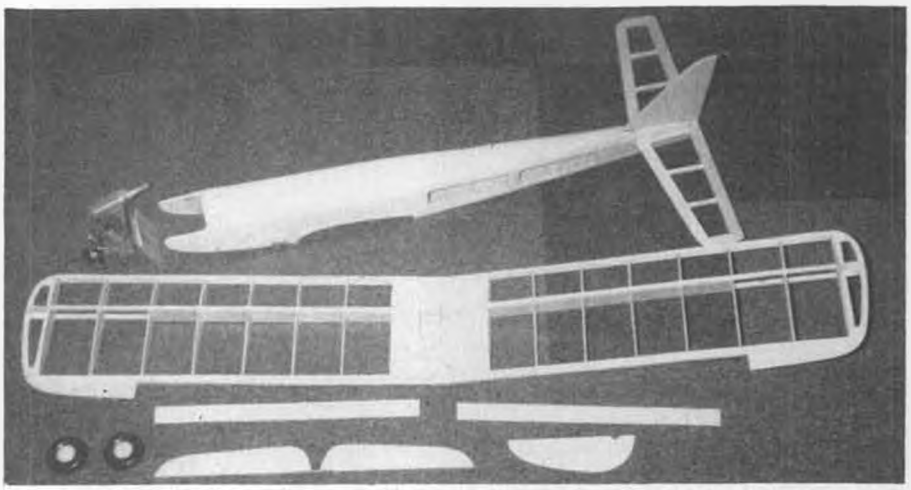
Working downward, we get the cylinder next. The Tee Dee has bypass ports on each side, and on the .049, the bypasses have a special large area contour. The Medallion has only a single, simple bypass. Exhaust ports are the same on both engines.

Pistons are next. The difference here is very subtle, with the structures and materials absolutely identical. When I worked at Cox, the Medallion piston was .0001 in. narrower at the top than bottom, but the Tee Dee had a second taper on about the top .06 inch of another .0001. I don't know the current contours, and you can bet they are secret, because there is a whole potful of rpm hidden in piston and cylinder tapers.

Crankshafts have a very obvious difference, in that the Tee Dee had that humongous hole, while the Medallion doesn't. The difference counts in timing settings and air passage efficiency.



Everything you always wanted to know about the differences between Cox Medallions and Tee Dees . . . see text.



Larry Renger is progressing slowly but surely on his Pilot QB-10L. This photo shows its current state. Model will be used to test different engines.

Bob Novak's incredibly fast Unlimited 1/2A racer has only 100 sq. in. area, beat a top-notch Quarter Midget in a fair fight. Now that's *fast!*

Speaking of crankshafts, this is the part that breaks on the engine when it's mistreated. Most bent or broken conrods seem to be the result of bent crank pins. When doing a Davis Diesel conversion on these engines, use at least a one-inch oversize prop to keep the rpm *down*. The service department at Cox can tell if you have been using the conversion, and since they won't warranty the engine for that use, you will be courteously informed that you will be charged parts and labor for repairs. The conversions work and are fun to use, but it's at your own discretion and risk not to overload the engine beyond its structural limits.

The final difference is the carburetor system. The one on the Tee Dee is sophisticated, well-made, complex, and I never have been able to tell any performance difference between it and the much simpler sprung-needle-in-a-spraybar system on the Medallions. You do have to open up the air passage, of course.

The racy little airplane with 88 on the wing is Ace's "Upstart II". This model, in its original form, was probably the genesis of 1/2A R/C racing. After the event had developed for a couple of years, the design was throughly outmoded. Paul and Tom Runge decided not to be left behind at the first pylon, so they slimmed it, lightened it, removed the dihedral, and added ailerons instead of rudder control. The overall result is a

Continued on page 96

East side of Rattey's Raceway, site of the 1978 ROAR Nats. In background is the building that houses a 1/12-scale indoor track.

Activity along west side of track. Bumpy track surface is evident in this photo.

R/C AUTO NEWS

By CHUCK HALLUM

PHOTOS BY AUTHOR

• Once again, it's ROAR Nats report time. The 1/8-scale Nats events were held July 26 to August 2, 1978, at Rattey's Raceway in North Attleboro, MA. The weather ranged from hot and humid to cold and damp (rain). The big winners in the Expert class races were: Arturo Carbonell in Road, Bill Jianas in GT Superstock, and Bob Welch in Oval. I'll give some interesting details later. Amateur winners were: Mike Kimrey, Road; Bill Watson, GT; B.J. Hunt, Oval. Novice winners were: Jim Nelson, Road; George Anderson, GT; Sandro Tamburi, Oval.

Before I get into the gory details, I'm going to talk about the ROAR annual meeting. These meetings string out quite a while, but the topics have to be talked about. Most of the subjects discussed related to rules and procedures and are very important to all racers. Since you ROAR members must vote on the proposed rules changes, I'm putting these proposed changes right up front. Presently, all rules changes are supposed to be voted upon by all ROAR members. Last year, numerous rules changes were made without membership approval because "there wasn't enough time". Many members complained, so all the rules discussed at the meeting are to be proposed to the general membership as: 1) leave the old rule in, or 2) approve the new proposed rule (as decided by a majority vote at the annual meeting).

My interpretation of the rules proposals are (each member is to vote for choice "a" or choice "b"):

1) Mufflers: sound level, maximum.
   a. 85 db at 50 ft. (existing rule).
   b) 80 db at 10 meters (European standard).
2) Minimum tire diameters.
   a) 3-inch dia. rear, 2-5/8-inch dia. front (existing rule).
   b) 70-mm dia. rear, 65-mm dia. front (International standard); equivalent to 2.76 inches rear and 2.56 inches front.
3) Superstock engine type.
   a) Cross-flow ported only; e.g., Veco 19 (existing).
   b) Any engine type, 3.5 cc limit.
4) Superstock fuel.
   a) 10% nitro limit (existing).
   b) Any nitro content.
5) Superstock minimum weight.
   a) 5-1/2 lb. minimum weight (existing).
   b) 5 lb. minimum weight.

Other topics discussed at the annual meeting were driver classifications at the Nationals and whether to switch to an A, B, C, etc. main system. I'm not too sure how this will be worded or if it will even be put up for a vote. We also talked about having a formula road race, counter-clockwise, instead of oval racing. This may not even be proposed, since I can't recall any official alternatives discussed at the annual meeting.

And now, here is how *I* intend to vote, and some of the reasons why.

1) Mufflers: For 80 db @ 10 meters. Here in Southern California there are many potential track sites, but one club has lost a couple of good locations because of noise problems. Another club site has had noise complaints made against it. Quieter mufflers will definitely help . . . probably back east too, where good sites may be more difficult to find. Also, international events are becoming more common. If U.S. drivers compete in Europe, the quieter mufflers must be used. And I don't think we should neglect the damage that even the current sound limits are exposing the racing enthusiast to. After a long day at races, my ears know it, and it takes some time for them to recover. (I think this should still be a non-negotiable ROAR rule).

2) Tire Diameters: For 70-mm rear and 65-mm front minimum tire diameters, because most racers seem to favor the decrease, and because it will be a minimum diameter used for international racing. Personally, I don't think it will make the present cars perform better if they are presently set up properly. Also, tire wear will be worse in the usable range of tire diameters

Art Carbonell working on his car. Art qualified 2nd in Sports Road and was T.Q. in Oval. Used OPS engine.

Beautifully detailed 1/8-scale concours-winning Porsche, by Bill Miller.

Bill Jianas, Expert GT Superstock winner.

Arturo Carbonell, Expert Sports Road winner.

Bob Welch, Expert Oval winner.

because there is actually less rubber on the tire to wear. Another con argument is that GT and GN cars, as well as some sports cars, will look funny and out of proportion with the smaller tires. Despite these con agruments, I still have to go for smaller minimum diameter tires.

3) SS: For any 3.5 cc (max) engine. A stock or very slightly modified out-of-the-box K&B 3.5 cc engine (probably others too) would be very competitive (only a little . . . 30 minutes or so . . . crank and piston work required). Cost, compared to the present engine with conversion parts and 19 carb (additional), would be less. Most present racers have, and new racers get, 3.5 cc engines.

4) SS: For 10% nitro limit; against any ROAR-legal fuel with no nitro limit. Even though providing and/or monitoring fuel is a problem, I feel it is a necessity to keep the Superstock class more uniform competitively and keep costs down. I'm sure 50% and 60% nitro would become standard and required if you wanted to win. Fuel costs would be much higher and probably more beefed-up parts (non-OEM parts) would be required, since blown engines would be more commonplace. Keep the dollar and engine prep time down and competition closer with a little effort on race day.

5) SS: For present 5-1/2 lb. minimum weight. All major manufacturer's kit cars, when built per instruction, weigh in near 5-1/2 lbs., one possibly as low as 5-1/4 lbs. To get down to 5 lbs., titanium bolts and other modifications, some major, are required, and car strength suffers. Most racers find that under most circumstances, weight helps controllability of even the open class cars with Schneurle-ported engines, and run car weights of 5-1/4 to 5-1/2 lbs. A 5-lb. minimum would mean that, to be competitive with the reduced power, you would *have* to get down to the minimum weight. Besides, if quiet mufflers are required, some more weight is being added, and the 5-lb. limit would really weaken the car and be nearly impossible to reach in any reasonable fashion with current cars.

If the A, B, C, etc. main (based on qualifying time only) vs. the current Expert, Amateur, Novice and Beginner driver classes comes up for vote, I'll probably go for the ABC system, mostly because of the difficulty of national driver classification . . . and I also think that there should be no Nationals Beginner class. I personally think that the Nationals is no place for true beginners; they can get sufficient and better track experience at local races. A point was brought up at the meeting about factory and sponsored drivers being placed in a special class. Any rules along this line would be tough to enforce, but we should think about it.

Some rules probably should be made by ROAR (Executive Committee, Rules Committee, or Nationals Committee) without a general membership vote. In this category, I place mufflers, specific races at the Nats, and number of races (mains) at the Nats. In many areas, quieter mufflers are a necessity. International racers must use quieter mufflers. Besides, we will be protecting the ears of the race participants. And I do feel it is a necessary step for the sport of R/C car racing to continue with its steady growth. Also, there should be common (big race) rules throughout the country.

I think everybody who saw cars with quiet mufflers (European, pipes, or otherwise) run, thought performance was hardly degraded. In fact, most of the racers using pipe mufflers were using them because they thought the pipe gave the engines more power. Certainly the quiet mufflers are competitive with the current ones and little performance is lost. With a little more trial-and-error or seat-of-the-pants testing and modification, engine horsepower for the quiet mufflers may even exceed that of the 85-db mufflers.

In order to run after 7:30 pm, racers did funny things to get quiet mufflers. One racer added about a foot or so of high temperature hose to the muffler tailpipe. Another stuffed the muffler with a shredded scrub pad (kitchen variety) which was like coarse steel wool. The amazing thing was that these approaches seemed to work with little power loss.

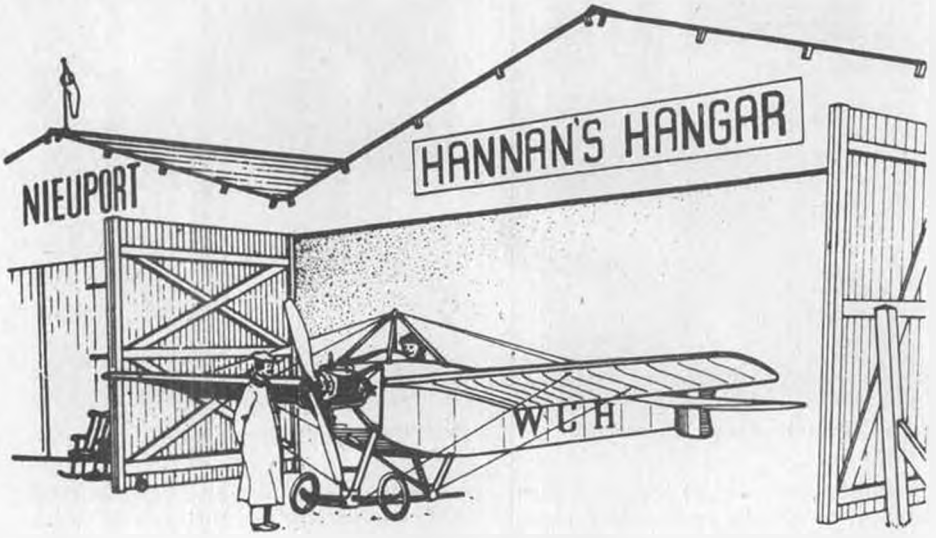
Old Superstock engines and cars don't get obsolete. My Superstock engine and car was among the (if not the) fastest and best handling at the 1978 Nats. The car was built in 1975, and the engine parts are from 1974. The bottom-of-the-line chassis was run in 1976, a disc brake added in 1977, and an 8-mm Ti axle and new radio tray added for 1978. A new carb and piston/sleeve assembly were put in the engine for 1978. The

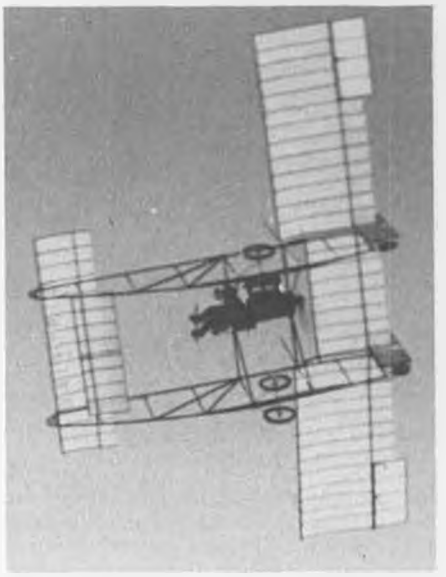
Continued on page 111

Bill Watson, Amateur GT Superstock winner.

Mike Kimrey, Amateur Sports Road winner.

B. J. Hunt, Amateur Oval winner.





Bill Stroman's Valkyrie uses an Astro .020 electric motor. Very realistic and stable.

"Everything you set out to build costs more than first estimated!"

• Or so sez Jack McCracken, scale modeler extraordinary. As Jimmy Durante used to say: "Them are the conditions what prevail." But we'll keep on with our projects anyhow.

HOW'S THAT AGAIN?

Walt Mooney called after a recent Scale Staffel contest to report: "I've lost my Found!" Sure enough, his Found Peanut, featured a while back in **MB**, had gone O.O.S. after an 174-second official flight.

FREE FLIGHT SCALE AT WOODVALE

According to preliminary reports, the first international free flight scale contest, held in England, was quite successful. Evidently, the weather was unfavorable during most of the week, but providentially, a few hours of dry, flat calm occurred one evening for the free flighters, surely a favorable sign! A hoped-for additional round, scheduled for the following day, failed to materialize, as the climate again turned foul. In spite of conditions, Woodvale was crowded with spectators, and organizer-in-chief Arthur Searl was heard to exclaim: "Where has everybody come from?"

Of the 18 or so expected free flight entries, 14 actually reached the flight line, a creditable showing for a competition of this stature, never previously attempted. The variety of models was remarkable but typical of scale meets where individuality is such an important factor. Also varied were the contestants' choices of motive power, which included diesel, glow, CO_2, and rubber.

Static scale judging was conducted with special thoroughness by *Aeromodeller* columnist Alan Callaghan and Canadian Team Manager Ted Sharp, who devoted some ten hours to the task! The "unusual" documentation accompanying Bill Warner's entry reportedly had the judges in stitches. Results were as follows: *(see box)*

Two other entries, Milan Kacha's Zlin (Czechoslovakia) and Fernando Ramos' Monocoupe (U.S.A.), arrived too late to participate. The U.K. modelers clearly out-pointed the U.S. entries in both static scale and flying, suggesting that we need to devote more attention to our homework! Note that four of the U.S. entrants were former Nationals winners.

Walt Mooney's Peanut created quite a hit in England, and in fact appeared on a BBC Television program broadcast nationwide. A tremendous amount of effort went into the Woodvale affair and we would like to acknowledge those of whom we are aware, and hope the others involved will share the appreciation: First off, Bob and Dolly Wischer, who relayed the dismal reaction to the idea by FAI HQ. Doubtless this was the real spark that got things moving. In the United Kingdom, John Blagg responded enthusiastically and rallied many of his countrymen to the cause, in spite of some initial resistance.

Thanks to Mick Duce, who pulled the concept together, and along with his Liverpool club members, made it a reality. To Arthur Searl, who was so instrumental in obtaining SMAE sanction for the event. To the dedicated volunteer proxy-fliers, who performed their difficult tasks most efficiently, and the patient static scale and flight judges.

Continued on page 109

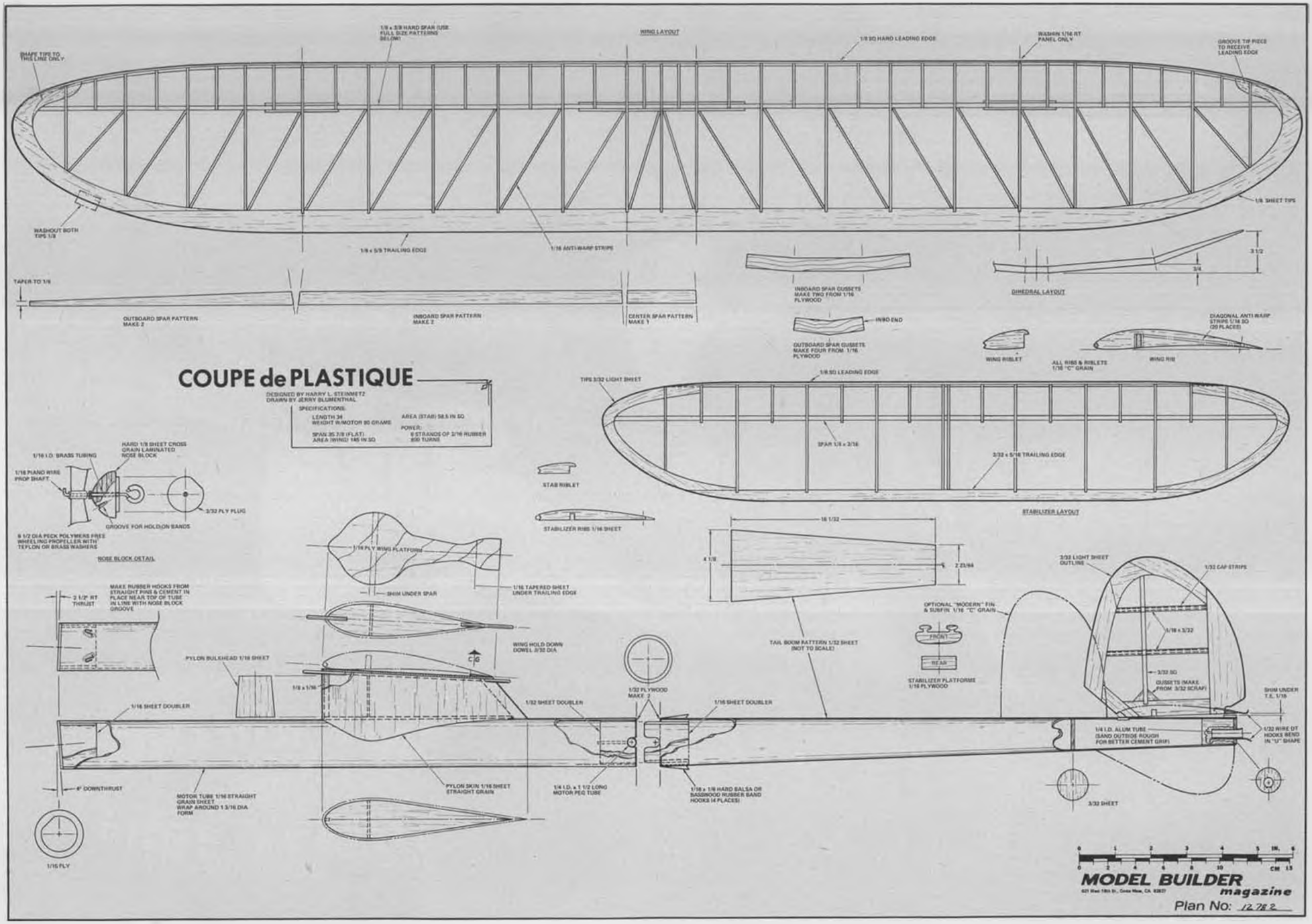
F/F SCALE AT THE WORLD CHAMPS

1. Eric Coates	D.H. 9A	power	U.K.
2. Bill Dennis	H.P. 0/400	power	U.K.
(Both of the above machines dropped bombs in flight)			
3. T. Manley	Blackburn Swift	power	U.K.
4. W. Hannan	Farman Moustique	CO_2	U.S.A.
5. Bill Warner	MacDonald S-21	rubber	U.S.A.
6. D. Hunt	Comper Swift	CO_2	U.K.
7. P. Sutherland	Heath Baby Bullet	CO_2	U.K.
8. John Blagg	Isaacs Fury Mk. I	rubber	U.K.
9. Tom Stark	Loening M8	power	U.S.A.
10. Walt Mooney	Baby Ace (Peanut!)	rubber	U.S.A.
11. R. Falconer	P 38	rubber	U.K.
12. B. Hotham	Bu. Jungmann	rubber	U.K.
13. Bill Stroman	Stinson Model S	rubber	U.S.A.
14. B. Sinclair	Nieuport 17	CO_2	U.K.

Finished at last! "Daring" Goehring tries on his graceful man-powered machine at Palomar Airport. Looks to be a bit on the heavy side. Photo by Warren Shipp.

FREE FLIGHT AND CONTROL LINE

Tiny 13/8 inch-to-the-foot) scale static display Gee Bee R-1, by Mike Fulmer, Portland, Oregon, features operating door latch, polished metal prop, and hand-rubbed lacquer finish.


COUPE de PLASTIQUE
DESIGNED BY HARRY L. STEINMETZ
DRAWN BY JERRY BLUMENTHAL
SPECIFICATIONS:
LENGTH 34
WEIGHT W/MOTOR 80 GRAME
AREA (STAB) 58.5 IN SQ.
SPAN 35 7/8 (FLAT)
AREA (WING) 185 IN SQ
POWER:
6 STRANDS OF 3/16 RUBBER
850 TURNS
WING LAYOUT
SHAPE TIPS TO THIS LINE ONLY
1/8 x 3/8 HARD SPAR (USE FULL SIZE PATTERNS BELOW)
1/8 SQ HARD LEADING EDGE
WASHIN 1/16 RT PANEL ONLY
GROOVE TIP PIECE TO RECEIVE LEADING EDGE
WASHOUT BOTH TIPS 1/8
1/8 x 5/8 TRAILING EDGE
1/16 ANTI-WARP STRIPS
1/8 SHEET TIPS
TAPER TO 1/8
OUTBOARD SPAR PATTERN MAKE 2
INBOARD SPAR PATTERN MAKE 2
CENTER SPAR PATTERN MAKE 1
INBOARD SPAR GUSSETS MAKE TWO FROM 1/16 PLYWOOD
DIHEDRAL LAYOUT
3 1/2
3/4
INBD END
OUTBOARD SPAR GUSSETS MAKE FOUR FROM 1/16 PLYWOOD
WING RIBLET
ALL RIBS & RIBLETS 1/16 "C" GRAIN
DIAGONAL ANTI-WARP STRIPS 1/16 SQ (20 PLACES)
WING RIB
TIPS 3/32 LIGHT SHEET
1/8 SQ LEADING EDGE
SPAR 1/8 x 3/16
3/32 x 5/16 TRAILING EDGE
STABILIZER LAYOUT
STAB RIBLET
STABILIZER RIBS 1/16 SHEET
1/16 I.D. BRASS TUBING
HARD 1/8 SHEET CROSS GRAIN LAMINATED NOSE BLOCK
1/16 PIANO WIRE PROP SHAFT
3/32 PLY PLUG
GROOVE FOR HOLDON BANDS
6 1/2 DIA PECK POLYMERS FREE WHEELING PROPELLER WITH TEFLON OR BRASS WASHERS
NOSE BLOCK DETAIL
1/16 PLY WING PLATFORM
SHIM UNDER SPAR
1/16 TAPERED SHEET UNDER TRAILING EDGE
16 1/32
4 1/8
2 23/64
TAIL BOOM PATTERN 1/32 SHEET (NOT TO SCALE)
OPTIONAL "MODERN" FIN & SURFIN 1/16 "C" GRAIN
FRONT
REAR
STABILIZER PLATFORMS 1/16 PLYWOOD
3/32 LIGHT SHEET OUTLINE
1/32 CAP STRIPS
3/16 x 3/32
3/32 SQ
GUSSETS (MAKE FROM 3/32 SCRAP)
SHIM UNDER T.E. 1/16
2 1/2° RT THRUST
MAKE RUBBER HOOKS FROM STRAIGHT PINS & CEMENT IN PLACE NEAR TOP OF TUBE IN LINE WITH NOSE BLOCK GROOVE
PYLON BULKHEAD 1/16 SHEET
1/8 x 1/16
WING HOLD DOWN DOWEL 3/32 DIA
C/G
1/16 SHEET DOUBLER
1/32 SHEET DOUBLER
1/32 PLYWOOD MAKE 2
1/16 SHEET DOUBLER
1/4 I.D. ALUM TUBE (SAND OUTSIDE ROUGH FOR BETTER CEMENT GRIP)
1/32 WIRE DT HOOKS BEND IN "U" SHAPE
4° DOWNTHRUST
MOTOR TUBE 1/16 STRAIGHT GRAIN SHEET WRAP AROUND 1 3/16 DIA FORM
PYLON SKIN 1/16 SHEET STRAIGHT GRAIN
1/4 I.D. x 1 1/2 LONG MOTOR PEG TUBE
1/16 x 1/8 HARD BALSA OR BASSWOOD RUBBER BAND HOOKS (4 PLACES)
3/32 SHEET
1/16 PLY
MODEL BUILDER magazine
Plan No: 12782

Photographer John Oldenkamp caught Harry in the process of launching for his first max at Taft FAI contest in honor of French flier Pierre Chaussebourg. Harry's wife, Susan, at right.

Yes, plastic props *can* win, as shown by this photo taken by Cynthia Sabransky.

COUPE de PLASTIQUE

By HARRY STEINMETZ . . . Putting an end to the theory that "Plastic is toy and wood is supreme", our author also agrees that picking air is nearly everything about winning . . . and then goes on to tell you how.

• In July 1976, a good friend called and asked if I would like to take part in an invitational FAI meet in honor of the well-known French flier, Pierre Chaussebourg. It seems Pierre, who was touring the U.S. with his charming wife Josette, had heard so much about Taft that he wanted a chance to fly there. His hosts, the Maxmen, put together an FAI meet for the middle of July, and sent out invitations to a number of Southern California fliers. When my friend called, he added, almost nonchalantly,that the meet was in three days. My A/2 was in many pieces, my Wakefield just begun, my FAI power ship entirely in my head: what could I fly? The fourth event was Coupe d'Hiver. I scrounged through the garage and decided that some twenty-two-year-old flying surfaces from an old cabin rubber ship could be grafted to my new Wakefield fuselage, if radical surgery were performed on its nose. A pylon was fabricated to meet cross-section rules and the nose block was fitted with a Peck-Polymers 9-1/2 inch plastic prop! In recognition of the French contribution to the American Revolution, the tail surfaces were recovered in blue, white, and red. There was no time to recover the wing. Test flying took place the evening before the meet. It seemed to have promise.

The next day it finished second, one place ahead of Pierre, who had had a busy day flying both Wakefield and A/2 as well. As the champagne was consumed at the end of a grand weekend, I took some gentle ribbing about the "toy" airplane flying in a real FAI meet. After all, real rubber ships use carved or laminated propellers, don't they? Was it a fluke? Did I just find particularly good air? Or did the ship *really* have promise? To give you some idea, in the following year, it placed in nine out of the ten meets it entered. At Fresno it maxed out, winning the event with 13 minutes and 45 seconds.

In accepting this article, the editor of **Model Builder**, Bill Northrop stated, "I feel that picking good air is 90% of the trick. The constant search for the ultimate design is a farce!" I don't agree with his ratio, but there's no denying that the modeler who can't pick air doesn't win, no matter what he's flying. The irony of all of this is that I've always been a theory designer, rather than a competitor. The record of this little Coupe is by far the best of any plane I've ever built. I enjoy the pursuit of good design and improved building techniques. I have file drawers full of plans and airfoils by the score. But success cannot be denied, so let's talk a little bit about picking air.

If you don't take time to learn some of the techniques of picking good air, then any success you will have will be blind luck. A Coupe that has less than 145 square inches of wing area, weighs 80 grams, and struggles into the air on a third of an ounce of rubber with a generally less-than-efficient plastic prop which is "too small", needs all the help it can get to fly two minutes. There are, in current use, a number of exotic gadgets and some rather wild theories, all intended to help the contest flier pick rising air. NONE OF THEM ARE INFALLIBLE. At Taft, it is claimed by some, if you wear polarized sunglasses, you can actually see the thermals coming. I keep losing sunglasses, so this method I do not find reliable. Of course, we can all piggyback, and some meets consist of hours waiting for some brave soul to throw his plane into the air while others wait and watch. As the contest day wears on, or time limits for launching are imposed, the waiting to be certain sometimes proves disastrous as your hopes are dashed when your plane misses the broomstick thermal and sinks in down air.

So what methods can be used with some consistency to give you at least a notion of when to launch? One of the simplest and most readily available is the use of cattails, or "fluffies", as they are called. A well-ripened cattail can be wrapped in newspaper (so you don't fill your car with fuzz) and a friend or your wife stands upwind, fluffing little pieces of fuzz into the breeze which drifts them toward you. They are so light that any up air is easily detected. If there are power fliers on the same field, they may curse you; it seems that fluffies play hob with model engines when inhaled.

The second method, also requiring a helper, is to go to "Toys-R-Us" or other large toy store and purchase a Bubble Factory. This device has a reservoir for bubble fluid, multiple circles which automatically dip when a crank is turned, and a small fan which blows the bubbles away. They act very much like the fluffies and are good indicators of rising air.

This shows what can happen if you don't watch where you launch . . . the Coupe de Plastique tried to chew up the mylar ribbon thermal detector! Photo shows vast expanse of Taft site.

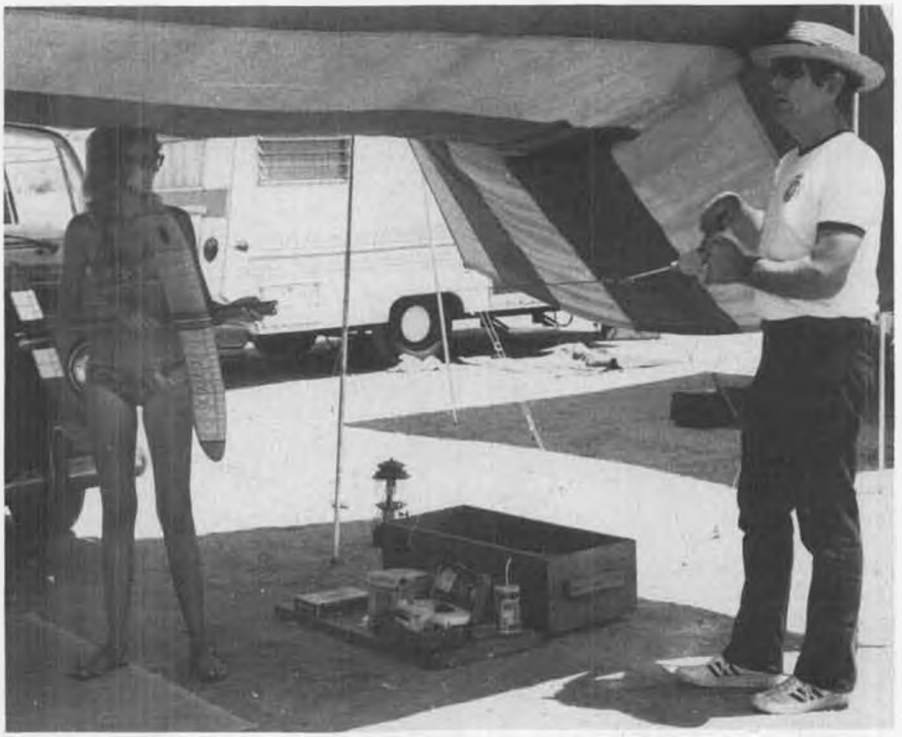
Several of these devices have been fitted with larger reservoirs, so time need not be taken for refilling during a contest.

The third method, which I like very much, is to use a long pole (the longest I know of is some fifty feet high) from which flies a forty or fifty-foot mylar streamer. With practice, you can learn to read the undulations of the streamer about 90% of the time. Of course, you must be immediately downwind! Now, all three of these methods have drawbacks. The first two tire your friend or your wife if you ask her to continually loft fluffies or bubbles into the breeze, and the streamer pole is not always immediately upwind, since the wind has a way of changing.

In normal flying conditions, there is some breeze, sometimes gentle, sometimes almost a wind. With practice, you will find that often there is a moment of calm just before the warm air arrives. Fluffies or bubbles which were wafting along just hang or settle to the ground. The streamer droops. After the calm, there is often a directional wind change which can be confusing. It is caused by the circular pattern of the thermal. Thermals look a lot like the vortex in your sink or tub when it is fairly full and you pull the plug. Incidentally, thermals and water vortexes move counter-clockwise in the northern hemisphere, and clockwise in the southern. It has to do with the earth's rotation. Now that you have detected a lull in the breeze, don't be fooled. Some calms are not followed by rising air. As the breeze freshens, ask your helper to loft fluffies or bubbles; watch them. If your streamer begins to swing in several directions and then balloons gently up, get ready. If there are several streamers on the field, they will all point toward the patch of rising air.

All of these methods involve helpers or paraphernalia. Is there any way to improve air picking if you are alone on the field with just your model? Yes, there is!

Years ago, I was impressed by an article in a British magazine which reported the techniques of three Finnish fliers, all of whom had made the flyoffs in the World A/2 Championships. As I recall, they wore no shirts, only short pants, and had their hair freshly cut. They stood with their backs to the wind while waiting to launch their planes. In short, they got in touch with their environment. You can learn to do something of the same sort if you work on the secret ingredient of successful model flying: patience. Rising air, or thermal air, is several degrees warmer than static air. Down air is often several degrees cooler than static air. There are battery-operated temperature sensing devices available on the market, but you can learn to be your own. I can testify that the haircut, especially a close trim on the back of your neck, does tend to sensitize you to a remarkable degree. Scrubbing your arms and face clean just before going out to fly has much the same effect.



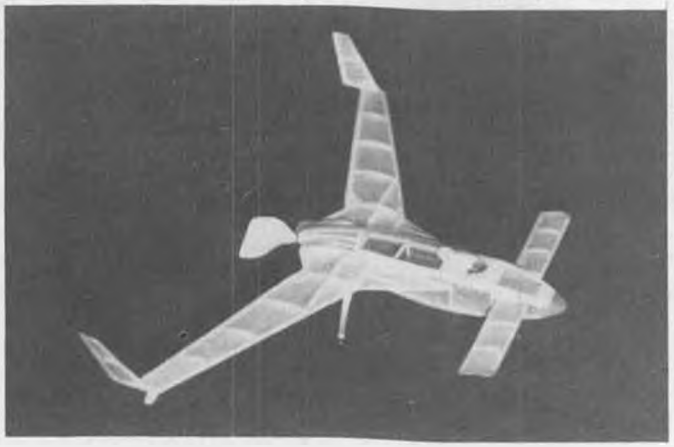
Harry's helper (and wife . . . sorry, guys!), Susan, holds while Harry cranks in the winds. Model has an impressive list of wins, in spite of "toy" plastic prop. Photo by Pierre Chaussebourg.

Max-bound at Lake Elsinore. Plastic prop really puts out the thrust. Oldenkamp photo.

If you fly regularly at one site, you should get to know the wind patterns and temperature variations throughout the day. A little time spent in such study will go a long way toward improving your competitive record. Remember that I said that the secret ingredient was patience . . . patience to pick the best time during the day or round, and patience to wait for good air, even within that part of the day. Don't be in a hurry; try to stay mentally alert. We've all seen more third-round mistakes destroy the chances of good fliers than can be blamed on bad luck alone. Finally, know your model, its flight characteristics, and test fly, test fly, test fly.

Now, a word or two about that plastic prop. The San Diego Orbiteers have been developing the P-30 class of rubber model as a small field, category II,

Continued on page 113



PHOTOS BY AUTHOR

PEANUT SCALE

VARIEZE

PEANUT SCALE

By HANK NIXON . . . After flying this or any canard, you'll wonder why the "tractor" has become the convention. The short fuselage handicaps rubber duration, but the stability doesn't know when to quit!

• The Rutan VariEze is the most exciting homebuilt since the BD-5. It offers very high performance, economy, and ease of building . . . a homebuilder's dream. Originally Volkswagen powered, it now uses the same 100-hp engine as the Cessna 150, and has a primary structure of urethane foam and fiberglass-reinforced epoxy. This revolutionary airplane has sparked the homebuilt world, and dozens are now under construction.

Choosing the VariEze as a subject for a Peanut Scale model was not done with dreams of the ultimate competition model. It was built to find out if this very interesting machine could be made to fly well. My prototype has proven to be the most stable Peanut I've flown. Pitch stability is excellent, due to the fact that if the nose gets too high, the canard always stalls first, due to it being at a higher angle of attack than the main wing. This then drops the nose, causing immediate recovery.

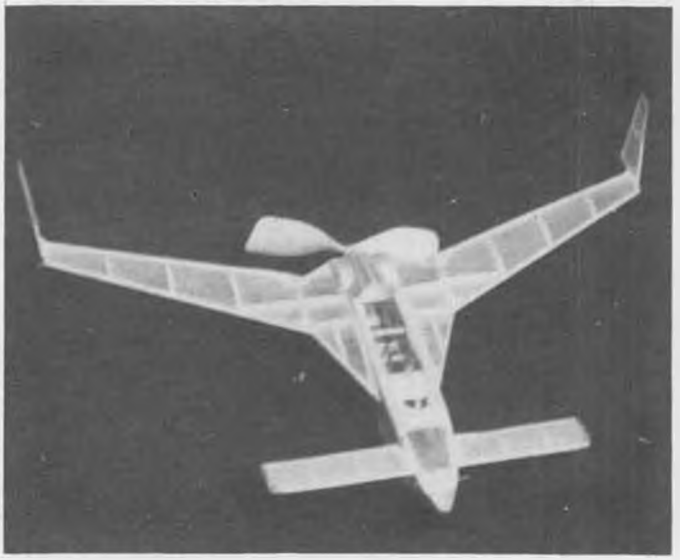
The high amount of sweep, combined with the winglet design, gives a high degree of roll stability, even when near or at the stall point. In hundreds of flights, my VairEze has never failed to land on the gear except when it hit something. The duration performance is a little less exciting. Mine gets about 10-12 seconds hand wound, and has gotten 17-20 seconds when using a winder and well-lubed fresh rubber. The main reason for this performance is a fairly heavy wing loading, even though mine weighs in at 8 grams including rubber. Some liberty was taken in increasing the area of the wing and canard to reduce the loading. Scale outlines are shown with dotted lines.

Construction should begin with the fuselage, since it is most of the work. Begin by making two sides over the cross-hatched lines. The longerons look big, but some material is removed during shaping, and they should be made of fairly light wood to allow enough flexibility for the sharp bends. The sides are next brought together with cross pieces at stations A, B, E, and the former at G. Wetting the sides will help in bending.

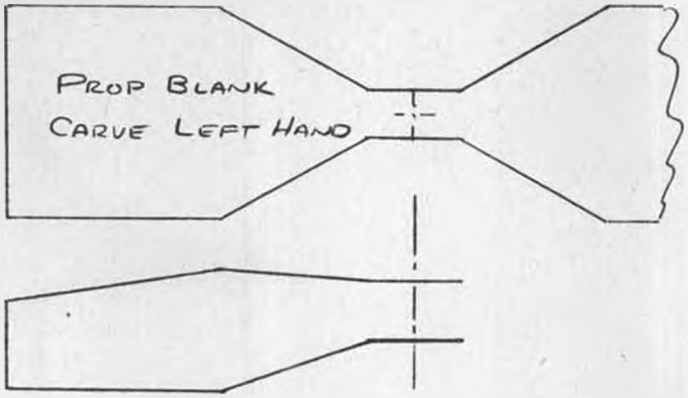
After this has dried, add the remaining formers and nose pieces. I use a small razor saw to notch the formers after they are in place; I break fewer pieces that way. Next, add the light 1/16 sheet top piece from former B to the rear of the canopy and add stringers to the bottom. Stringers for the turtledeck are sliced to shape from 1/20 sheet. Some careful sanding will now bring the fuselage to shape.

Form the nose gear from .012 wire and glue to the inside of the nose bottom sheeting. The main gear shape is unusual and is best made from a piece of .008-.010 aluminum, sanded to reduce weight. Wire axles are then glued and bound to the gear. Install the main gear by gluing it directly to the lower longerons, and add the 1/32 sheet filler below. Note that this is probably one of the first times a fiberglass gear has been copied on a

Continued on page 100



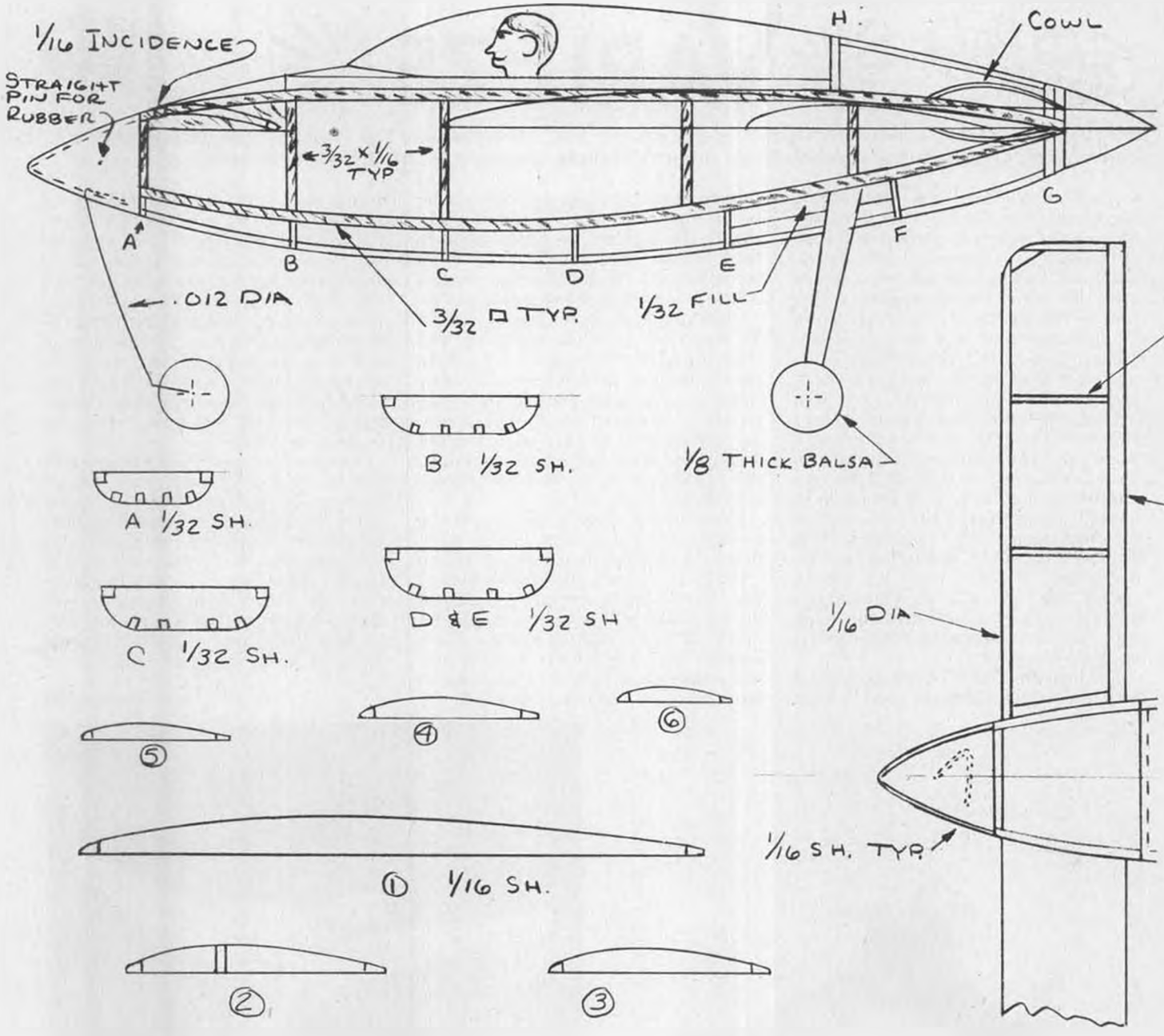
In contrast to most Peanuts, which feature gobs of wing area, the VariEze has a rather minimal amount, which increases the wing loading and results in a faster flying model. Simple construction is evident in these photos.



POWER: 1 LOOP .030 X .050
PIRELLI
8 INCHES LONG

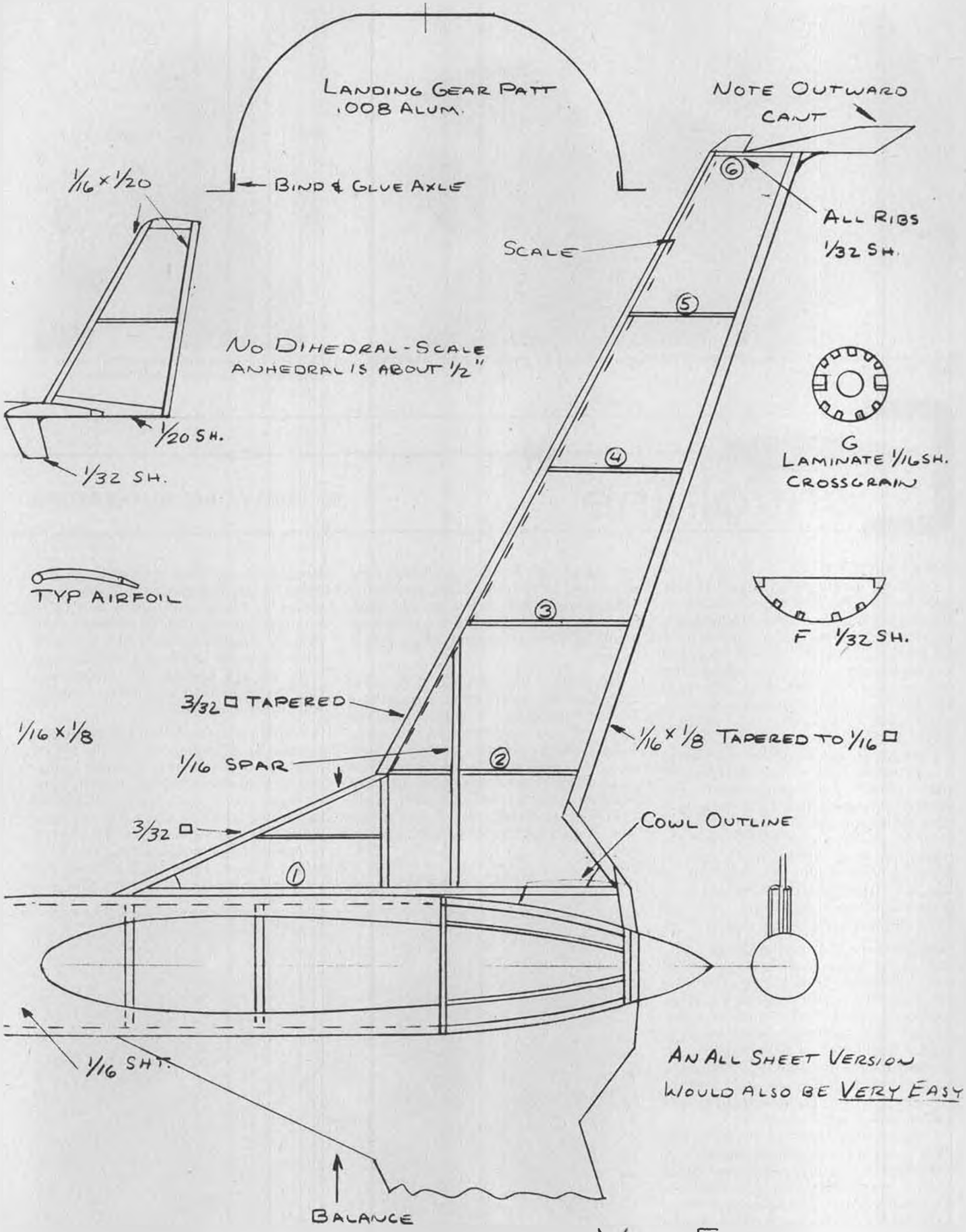
H 1/16 SHT

STRINGERS OMITTED FOR CLARITY



REF: SPORT AVIATION 4/77
AIR PROGRESS 9/75
CANARD PUSHER

COLOR: WHITE W/ RED TRIM



VARI EZE BY HANK NIXON
HMN 9/20/77

Duke Fox must have a built-in smile; as the above photo shows, he smiles even while holding Dirty Kid Josh Rutherford!

Doc Jackson is laughing because he knows how silly he must look in that helmet.

Control line

By "DIRTY DAN" RUTHERFORD

SORRY ABOUT THAT

I missed making the deadline last month, due to a slight miscalculation in alotting my time and a mix-up between WCN and myself on just how late I could get my text to him. By the time he called to check on me, I was just starting the column, and it needed to be in the mail by then. You probably didn't miss much anyway. . .

RULES FOR '80-'81

Here we go again, another rules cycle is well under way, with distribution of about 60 C/L rules proposals having been completed. I've got my stack right here beside me, and although the pile is smaller than before and seemingly contains fewer of the really wacko proposals that have provided lots of laughs in years past, there are plenty of proposals that will significantly alter (or even eliminate) many C/L events.

For instance, we see the British influence in a proposal to allow single-wheel gear in Badyear (Scale Racing). For Slow Rat, there is a fellow proposing that we require 2-ounce tanks, and to make mileage an even bigger factor, to go to 100-lap qualifiers and 200-lap mains. An old Speed class may bite it . . . there is a proposal to drop B Proto. And another to drop A Speed, going instead to FAI Speed for a .15-size event.

The proposals I have at this time only show one concerning Stunt, possibly an indication of the Stunt rules being OK as is, and/or that the Stunt guys have got their stuff together and now concentrate on flying the event instead of changing it every other year.

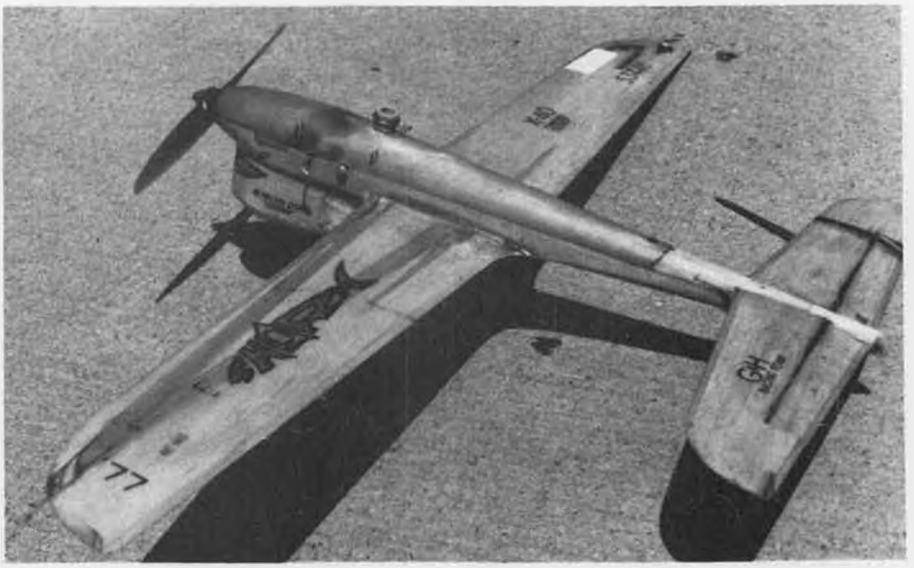
In contrast, we have a number of proposals pertaining to Combat, several of which significantly alter certain Combat events as flown in '78 and the coming year of '79. There has been some talk about proposing (once again) that 1/2A Combat be added to the AMA rulebook, but no proposal has shown up yet. And I most certainly hope that it doesn't.

No matter what the CLCB (Control Line Contest Board) does about these 60-odd proposals, somebody will be upset. If you would prefer not to be upset, check out the proposals pertaining to your favorite events and then pass along your comments to your representative on the CLCB. With so few bothering to do so, the reaction of just one individual tends to carry a lot of weight.

LABELS

While some of us do not like to be labeled as one type of modeler or the other, there are lots of people who seem to prefer being referred to as a "C/L modeler", or as an "R/C modeler". I am one of those who don't like labels. If anything, refer to me as a modeler and leave off any prefixes. Or, better yet, refer to me as a model builder . . . WCN will surely love that.

Even though I write this C/L column, I cannot be classified as strictly a C/L modeler (how about C/L model builder?), as I am interested in and participate in many modeling activities that have little to do with C/L. The F/F scene here in the N.W. is very healthy, and flying F/F remains a very enjoyable thing to me . . . in fact, I like to think of F/F as being the ultimate flying model activity. Once in



Tim Gillott calls his original design rat racer the "Shark". A very fast Rat, it loses only if Tim has equipment problems.

awhile I fly some R/C, and while I can get the planes around the sky just fine, I have yet to see the attraction of it all. This winter I plan on flying in some Quickie 500 races; maybe some R/C competition will be different and more attractive to me than just putt-putting around the sky.

This last summer, the whole family has gotten involved in R/C car racing, and that is a very enjoyable activity that I plan on being involved with for quite some time.

So why do I stay with C/L? Because I have yet to do any modeling activity that provides the fast-speed excitement that C/L Combat does. The feeling of participating in a hard-fought match is incredible, so much so that quite often, even the loser of a real battle is so high after the match that he doesn't even care that he lost. C/L Racing, even though down in participation in this area, also gives a certain thrill that can't be matched in other modeling events. It's something that is very hard to describe; you have to feel it to know what I'm talking about. Possibly the only others to know this feeling are the R/C Pylon fliers.

And there I go with another label, which started off this whole section. I don't like labels pinned on me, but have been guilty of pinning them on others. I can't say it has been unintentional, but can say that it has been my form of backlash to all of the bozos making the very silly statement, "And then I moved up to R/C". Having been involved in many events damanding a high degree of sophistication, but are not R/C, and then having some Sunday flier tell me that what he is doing with his store-bought toy is sophistication . . . Aggravation.

Anyway, Betty Stream not only wrote a letter to me, but this time she got it in the mail. Here's what she has to say:

"Dear D.D.,

I have been reading your column since it started . . . alternately cussing and laughing, but always enjoying!

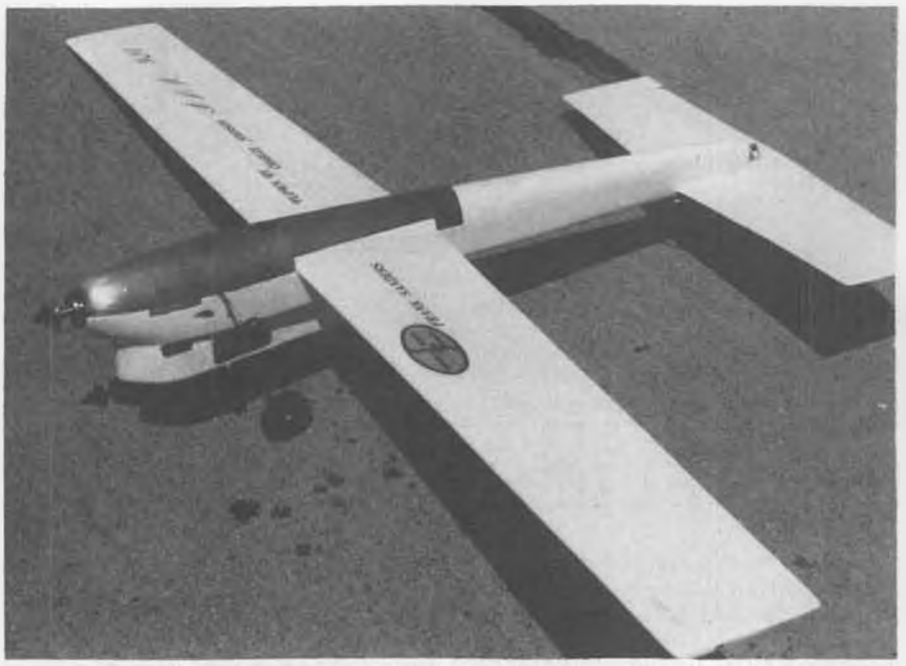
"I am categorized as 'R/C', although in the 29 years (next month) that I have married, I've been through it all . . . so I do resent your putting people in boxes labeled 'R/C', 'C/L', or 'F/F'. Come on, man, they're all modelers!

"I have also been trying to meet you for several years, but even when we are in the same place at the same time (as at Riverside last year . . . and you should have been the four-page letter I wrote you about that!!), our paths never seem to cross.

"Oh, well, I might be disillusioned if we met, so I'll just keep reading and writing those nasty letters that never get sent. . . .

Sincerely,
Betty Stream"

Betty, you are right, we are all modelers. I'll try to keep that in mind more often from now on. And you're right, you may be very disillusioned should we ever meet! On second thought, maybe we did meet at Riverside, but I claimed to be Rich Lopez . . . I've pulled that just a few times, you know.



Another Rat, this time a very clean inverted-engine machine built by Frank Sanders and flown by Charlie (California Flash) Johnson.

Betty's mention of four-page letter she wrote after the Riverside Nats evidently is reference to a letter commenting on my report about the Nats. Sure wish she had mailed it.

Just shortly after getting Betty's letter, the "Headwind", a newsletter put out by Super Stunt Guy, Arlie Preszler, arrived in the mail. What Arlie has to say is important enough to reprint here.

"EDITORIAL: I don't suppose the dumb rivalry between R/C types and C/L and F/F will ever end, but I sure wish it would. While we in Lodi seem to have good mutual understanding, I frequently read about R/C being the most complex and sophisticated event.

"I have often been asked, 'How come you prefer control line to R/C?' My answer is that I don't. What I personally prefer in the world of model aeronautics is competitive C/L Precision Aerobatics. If my choice was between C/L Combat and R/C Scale, I would choose R/C Scale. If it was between R/C helicopters and FAI F/F, I would choose the F/F event.

Glenn Lee, all-around excellent modeler, but a specialist in C/L Speed.

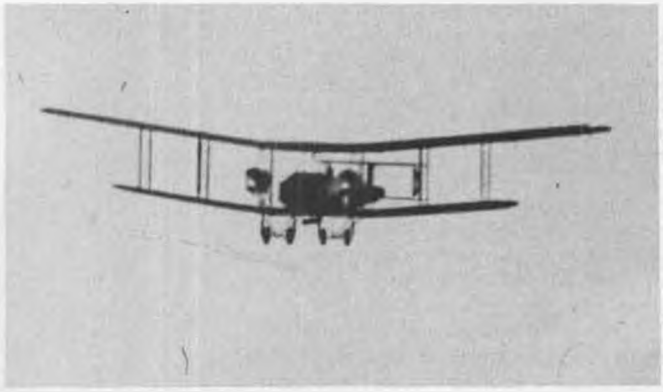
Tim Gillott snags his team racer during warm-up practice runs prior to a heat.

"But these are personal choices and I am not knocking anyone whose selection would be different. If your selection is Sport R/C, then do it and enjoy it, but honest guys, it is no harder to install an R/C servo than it is a C/L bellcrank or a F/F timer. If you got involved in C/L Combat, you'd soon be overwhelmed at the degree of sophistication in those simple machines.

"One of these years I'd like to be able to stop defending everyone to everybody else . . . it is the public to whom we should be directing our efforts."

Arlie makes a good point, and I'd just like to elaborate on his point about the Combat planes being sophisticated. They do indeed appear to be simple models, and have to be, due to their expendable nature, but the fact that

Continued on page 100



Ron Moulton, editor of Aeromodeller magazine, took these photos of W. Dennis' beautifully built H.P. 0/400, which had the highest static score and which placed 2nd overall in the F/F Scale event held at the World Scale Championships, at Woodvale, England. Model is a very stable flier.

FREE FLIGHT SCALE

By FERNANDO RAMOS

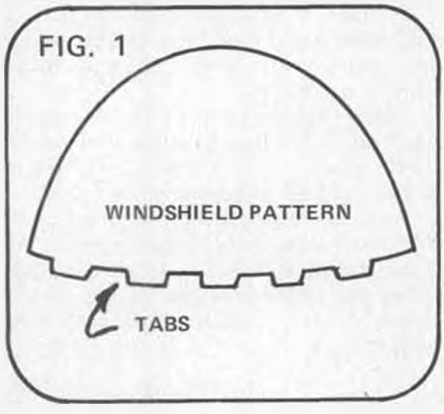
PHOTOS BY RON MOULTON

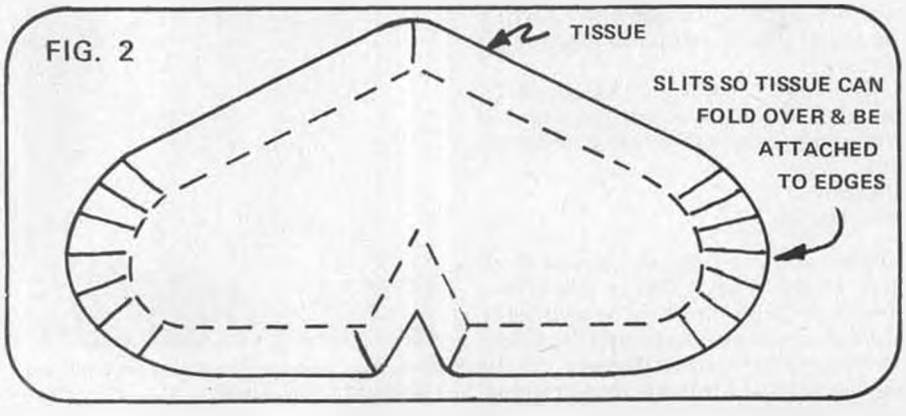
• I want to start this month off by saying thanks to all of you who have taken time to write me, and to compliment this column. I also want to apologize to those of you who are still waiting for me to answer your questions. It seems that the time just flies by so fast that I'm unable to get the chance to sit long enough to answer them. However, I will make every effort to do so. Those of you who do not get a direct answer will find the information that you seek in this column. The following is one such request.

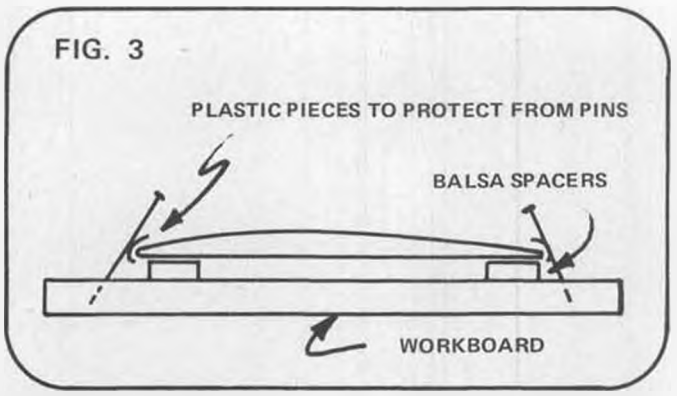
Windshields. Seems as though this is a real problem when building cabin-type models. I know that in particular, the front windshield is quite difficult to cope with, both in cutting it out and securing it into place. Maybe that is one reason that I prefer bipes over cabin types. At any rate, here are a few suggestions that may be of some help. First, take some typing paper or equivalent, and trim it so that it will nearly fit as the windshield. While you hold the paper in place, mark areas where additional trimming is required. Once you are satisfied that the paper template fits about as well as possible, take the acetate you will be using for the windshield and moisten it with water. Place the template on the acetate. The water holds it in place while you cut it out with either a pair of scissors, a sharp X-Acto knife, or better yet, an Uber Skiver. Hold the acetate windshield in place and check to see if further trimming is necessary. A fine-tip felt marker is ideal to use on the acetate for this purpose.

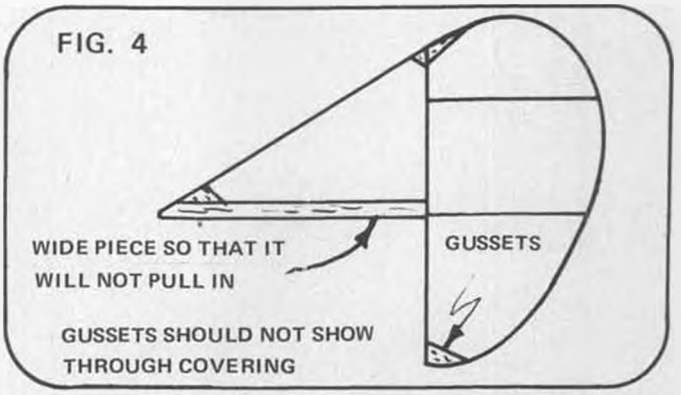
The windshield is now ready for final installation. This is the part that many modelers cringe when doing. Nothing looks worse than smeared glue on the windshield. There are two ways to avoid smearing glue. The first method is one that I use most often with rubber-powered models. I first brush the area where the windshield attaches to the fuselage with several coats of clear dope. (I use only nitrate dope, but I'm sure that butyrate will work equally as well.) Once the dope has dried sufficiently, I hold the windshield in place with the aid of

A real scale challenge is this rubber-powered P-38 by R. Falconer, of England. Model features well-detailed cockpit and counter-rotating props. Must require special launching technique!









drafting tape. For those of you who may not be familiar with drafting tape, it looks just like regular masking tape, except that it does not have nearly the amount of adhesion. You can place it on tissue without it ripping the tissue when you remove it. It can be purchased in art stores or where drafting supplies are sold.

For adhesion, I use Kodak's film splicing cement. The bottle comes with a brush on the cap, but don't use it. Once you see it, you'll know why! Instead, use a fine pointed brush and apply the cement to the edge of the windshield. The cement will travel along the edge of the windshield by capillary action. Carefully remove the tape and apply cement to these areas as well. You will find that the windshield will stay in place quite nicely, and with *no* smudges.

The second method is essentially the same, except that instead of using film splicing cement, I use Wilhold's glue made especially for attaching canopies and windshields. I prefer this adhesive for gas models, where the acetate will be thicker in size than that used for rubber models. Care must be used, however, since this glue is quite viscous. If you get too much on the edges and then push the windshield in place, the glue will ooze, causing unwanted smearing. It is best to apply the glue with a fine brush, working carefully but quickly.

Biplane windshields are easier, and here are a few hints that may help you make them look even better. Look at Fig.

Bill Hannan's Farman Moustique was proxy-flown at the World Champs, placed 4th.

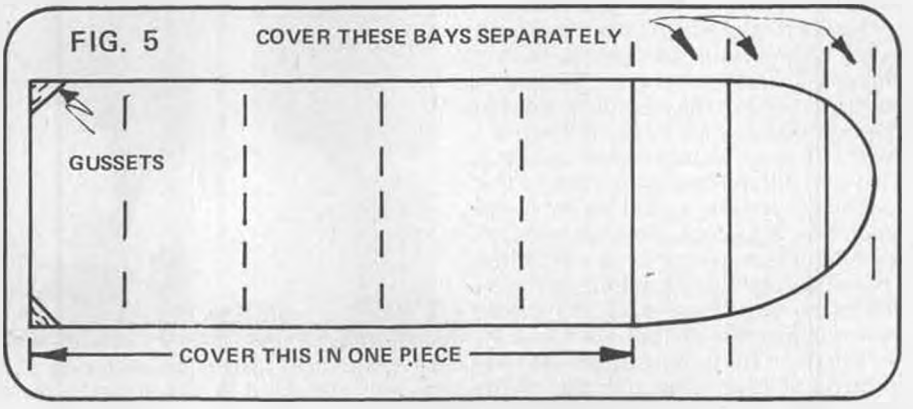
P. Sutherland, of G. Britain, placed 7th at World Champs with this CO_2 Baby Bullet.

Neat rubber-powered Bucker Jungmann by B. Hotham placed 12th at World Champs.

1. Cutting out a windshield that has the tabs on it will help when it comes time to secure it to the fuselage. All that is required is to make a very small slit where the tab comes in contact with the fuselage. Don't make the tabs too long or they will show up inside the cockpit. Some film splicing cement around the edge will complete the job.

Now, if you really want to be fancy and do it the way it should be done, do it in the following manner. Most early biplanes, and I'm talking about bipes of the thirties, had some type of windshield frame. Some had frames around the entire edge of the windshield. Others, which had only the wrap-around type, still had to have a frame at the base of the windshield, otherwise attachment to the fuselage would be impossible. Very seldom to you see these frames reproduced. Sometimes you will see chart tape used for this, but this looks kind of hokey, in my opinion. Some of you may not want to take the time to make the frames correctly, but the end result will certainly be worth the effort. You must first carve a mold which represents the top of the fuselage where the windshield will set. You don't need much more than the actual area of the windshield. The next step is to carve the shape of the windshield and glue it onto the fuselage-shaped block. Make certain that the windshield is at the same slant angle as on the real machine. Fillet the joint where the windshield block comes in contact with the fuselage block with vinyl spackle. When this dries, coat the forms with several coats of clear dope.

Continued on page 98



Marc Nagasawa of Seattle heaves his Bob White rubber ship into the blue. Photo taken at Harts Lake Prairie, Washington.

Gary Stevens, one of Dirty Dan's U/C Combat flying buddies, launches his Sig ABC Scrambler. A real mover with a Fox.

FREE FLIGHT

By BOB STALICK

• The first time a columnist sits down to write his first column, it seems as though the possibilities are endless. The thoughts flow and the ideas are fresh and creative. Writing the first column is a process of sorting out which things to say first. So it is with the last column. Five years, 60 issues and approximately 84,000 words have passed since that first column. Three FAI teams have been overseas and we have just chosen the next group. **Model Builder** has doubled in size since then. It has been a good five years. I'll save the rest of the ruminations until the end of this column, so that if you want to skip that part, you can feel free to do so. For now, let's get on with the regular features.

DARNED GOOD AIRFOIL
B-6358B

This section was designed by Georges Benedek especially for A-1 and A-2 wings. It is a highly flexed airfoil for good gust and thermal stability. Suggestion: try a turbulator spar or string at around 50% chord. Use a B-6356B in the stabilizer for best results. A somewhat dated section, but worth consideration for those who fly in less than ideal conditions. This is the 62nd Darned Good Airfoil featured in this column during the past 5 years. If you are looking for a special airfoil, there is no doubt that it has been featured at one time or another. Check over the back issues.

MYSTERY MODEL FOR DECEMBER

This is a model which I have looked at many a time with an eye to its very pleasing shape and curves. Without a doubt, it is one of the most attractive FAI Power models which has ever flown at a World Champs. I have held off using it as a Mystery Model because I thought that too many people would know it immediately. However, after last month's mystery design, you deserve a breather. I passed by several suggestions that I use one of my own obscure designs for this feature, since they all look alike anyhow (so I've been told). Instead, you get this foreign FAI Power ship. If you know the name, send it in to Bill Northrop for your free subscription to America's greatest model airplane magazine. Gotta be first, though.

DECEMBER 3-VIEW(S)

Pete Stewart's 1/2A Power Model and Triolo's Manhattan. I guess it was only a matter of time before the 3-fin craze hit the 1/2A models. Recently, there have been several examples both here and overseas with this feature. This example comes from the pages of Free Flight News (England). It features the usual FAI gadgetry worked off of a camera timer. VIT, AR, Flood-off and the like. At 250 square inches, it should be a mover. Key the stab carefully and launch steeply for short motor runs during trimming.

Triolo's Skyscraper Too is a new version of the model which won last year in the fledgling Manhattan Cabin event. This one, however, has broken the 10-minute barrier with a time of 10:25, set at Lakehurst on July 15, 1978 (see results later in this issue). Manhattan is an event whose time has finally arrived. If you are contemplating flying some indoor this winter, try the Skyscraper.

NFFS SYMPOSIUM

As mentioned in the last issue, Symposium copies are available. This latest issue is a dandy. For any serious free flighter or serious modeler of any persuasion, this issue (as well as the previous ten) is invaluable. Get your copy for $7.50 (NFFS members) or $8.50 for non-members from Jack Brown, 20267 Northbrook Sq., Cupertino, CA 95014. Enclose an extra buck for postage and handling here in the U.S.A.

While you are at it, contributions for articles, as well as nominations for the Model of the Year, are now being accepted for the 1979 Sympo. If you have some burning information to share with the rest of us, send it to Bob Dodds, Box 436, Rancho Santa Fe, CA 92067. Bob will be taking on the editorship for the third year in a row. You can help him by contacting him early. If you have a nomination which you believe to be worthy of a Model of the Year award, drop a line with that nomination to Tony Italiano, 1655 Revere Dr., Brookfield, WI 53005.

CROCKET STRIKES AGAIN!

Jim Crocket, of Fresno, CA, seems to come up with the needed little gadgets that make flying fun. He has towhooks, copy cutters (wood stripper), engine stands, and winding hooks. I have used all of them, and the quality is excellent. Jim has now come out with a cast aluminum T-bar style rubber hook, which features an anti-fall-off sleeve to keep the rubber motor nice and tidy on

Ed Whitten (left) about to present the top 2 cups to Walt Van Gorder and John Triolo (the winner) at Lakehurst Manhattan contest. Photo by Mrs. H.K. Whitten.

the hook. A picture of this new development will be featured in an upcoming issue of **Model Builder** Free Flight. The quality, as with all of his other products, is outstanding.

FROM THE INDOOR TEAM

Ray Harlan, manager of this year's FAI Indoor team, announces the sale of the 1978 U.S. Indoor Team decal. They are made on self-stick mylar, and are a means to help support the team travel fund to Cardingdon, England. You can get your very own sticker for $1.25 each or a buck apiece if you order 3 or more. Available postage paid from Ray Harlan, 15 Happy Hollow Rd., Wayland, MA 01778.

BIG MANHATTAN FLYOFF AT LAKEHURST

Using the 155-ft. ceiling to good advantage, the two combatants, Walt Van Gorder and John Triolo, waited until the end of the contest at 7 p.m. on August 20 to set their times. Walt's time of 9:57 was second best to John Triolo's new record of 10:25. This event, originated and sponsored by Ed Whitten, had 8 contestants. High humidity caused problems, and more than one model had to have balsa wing braces to keep the tips from flexing. The New York Official Rules allow this addition. These rules also allow the very popular innovation of an unlimited number of official flights. Manhattan continues to grow in popularity, as it is so much more sensible and realistic than the standard AMA Cabin event. Let's hope that Manhattan does not succumb to the rules makers' pens, as that seems to be a sure way of destroying a budding event. Congratulations, John, on an impressive win.

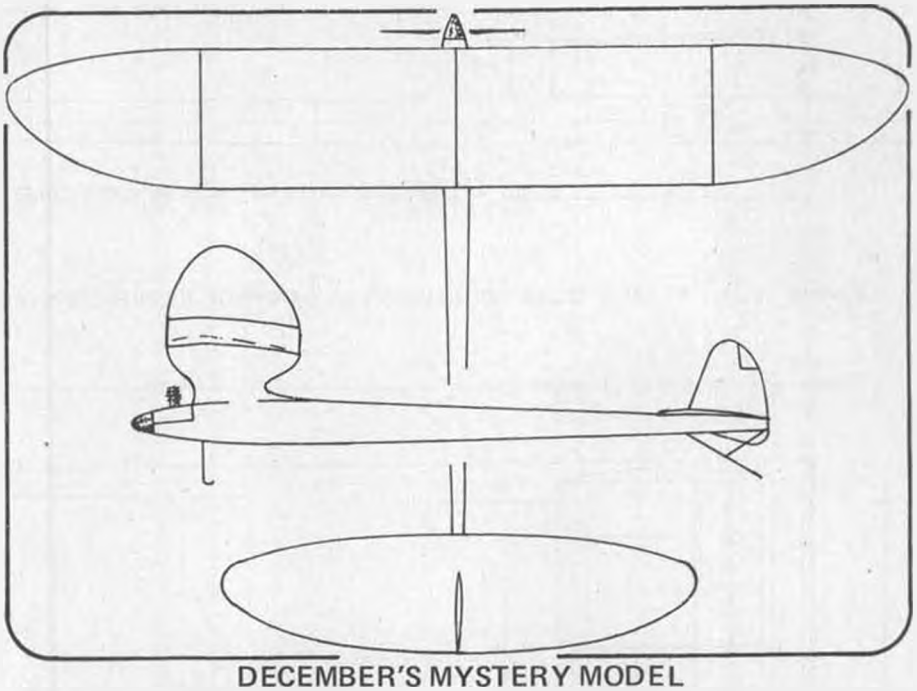
FAI TEAM SELECTION FINALS

I just got back from flying in the FAI Team finals at Taft. Tom Hutchinson will cover the details in next month's column, but for now, here are the results:

	TIME IN SECONDS
WAKEFIELD	
Walt Ghio	3420
Bob White	3329
Bob Piscerchio	3272
POWER	
Carl Bogart	3420
Roger Simpson	3401
Doug Galbreath	3374
NORDIC	
Bob Isaacson	3210
Jim Wilson	3209
Lee Hines	3195

AND SO IT COMES TO AN END

The last five years have been very



DECEMBER'S MYSTERY MODEL

good to me. All of you free flighters out there cannot know the friendships that writing this column have created. I get a large number of free flight newsletters from many of the more active clubs, and much of what appears in this column is gleaned directly or indirectly from their pages. The newsletters which have provided the most information for this column are excellent publications. To name a few that you should subscribe to: The CIA Informer, The Bat Sheet, The Boeing Hawks Newsletter, Free Flight News, and Scatter. There are others which provide topical and informational bits and pieces which have been used. Newsletters are the lifeblood of the free flight hobby and of magazine columnists. I thank all of you who have seen fit to put me on your mailing lists. I also would like to thank all of you who have taken your time to correspond with me on topics far and wide, as well as those of you who have taken time to offer constructive criticism and praise. I have been saving such a letter for the last couple of months. It comes from Bill Park, of North Carolina. I trust Bill doesn't mind if I quote him:

"I have been meaning to thank you for some time for the great work you did while Chairman of the FAI F/F Committee. In the past, there have been some very fine people handling the Program, but you especially managed to involve everyone by continuing to inform and poll even those of us who didn't get past the qualifying stage. This continued contact was of great psychological value to me, as I live in an area where the nearest known free flighter is 100 miles away, and flying space is hard to come by.

"Your column in **Model Builder** is also excellent, containing a great deal of useful material. I always turn to it first.

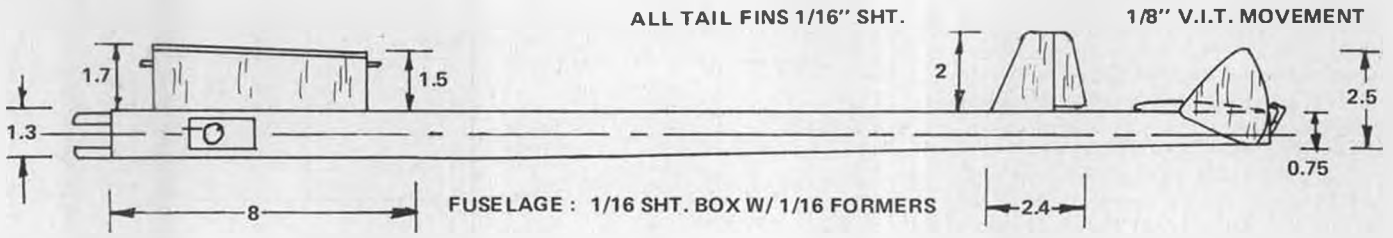
"I look forward to meeting you some day, perhaps at the Nats or some other place where modelers meet to enjoy other's company."

So it goes. Writing a column is a frustrating experience. Some months, there is just too much to say. Others, just the opposite. The deadline is there just the same. You want to pitch the column so that it has broad appeal, but if you get too technical, most of the readers will skip over what you report. If it is too broad and general, the free flight competitor will not read it. Somewhere in between is where you want to be.

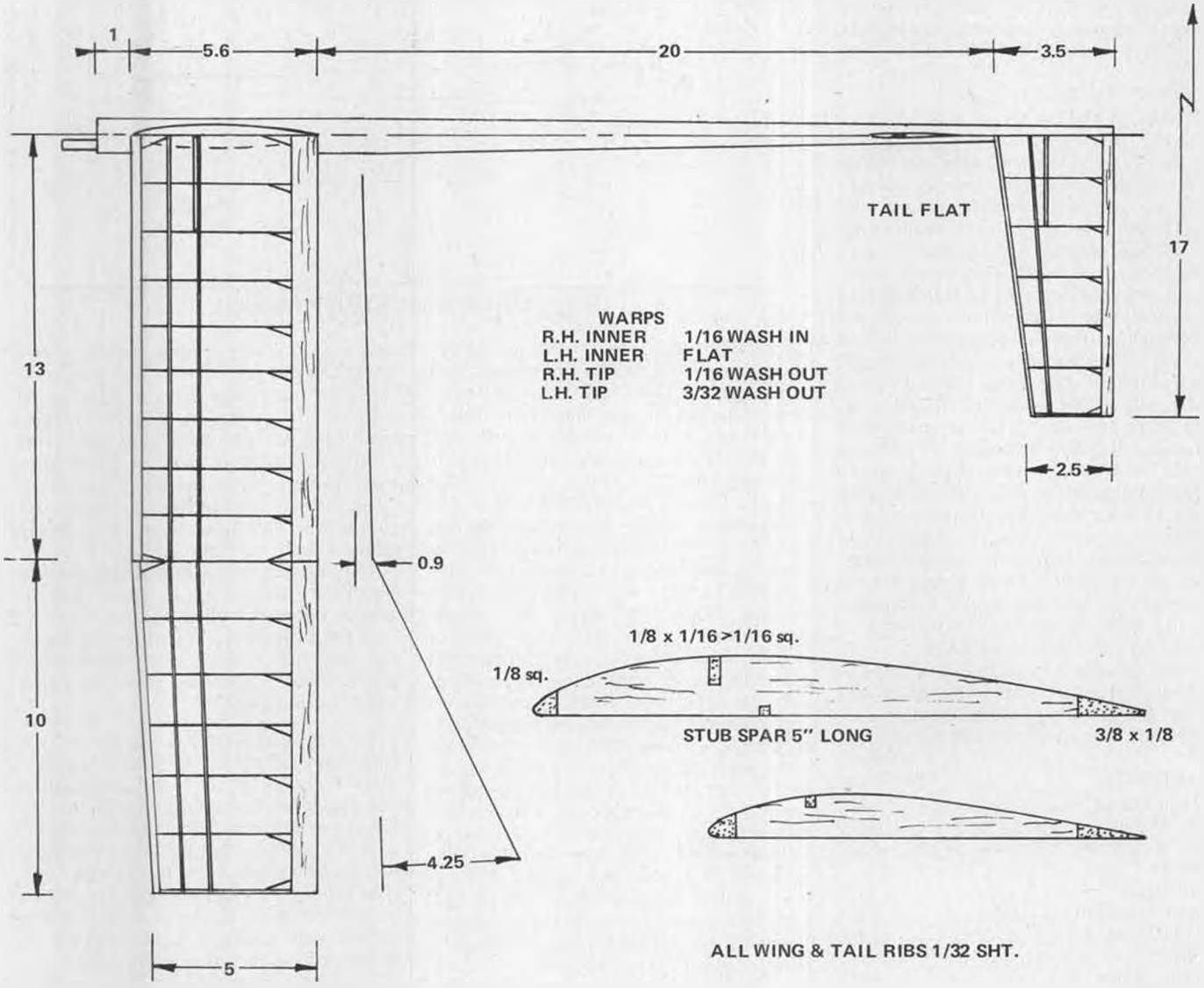
The Mystery Model idea had been fun and a challenge to both the writer and the reader. It provided more correspondence from the woodwork than any other single topic. Giving Dirty Dan a

DARNED GOOD AIRFOIL — B-6358B

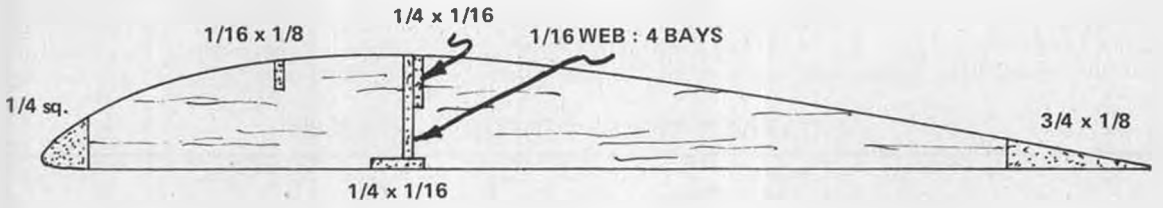
STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
UPPER	0.7	2.3	3.4	5.2	6.5	7.6	9.3	10.2	10.8	11.1	10.9	9.9	8.5	6.7	4.7	2.5	0.3
LOWER	0.7	0.1	0.3	0.8	1.4	2.1	3.2	4.1	4.8	5.2	5.5	5.3	4.7	3.8	2.8	1.4	0



POWER : COX T.D. .049 – .051 W/ TOP FLITE 5-1/4 x 3-1/4 PROP, CAMERA TIMER, PRESSURE TANK & FLOOD OFF.



ALL WING & TAIL RIBS 1/32 SHT.



1/2A POWER MODEL

BY: PETE STEWART

Bill Giffen, of British Columbia, tosses up his Maverick (a Tom Hutchinson design).

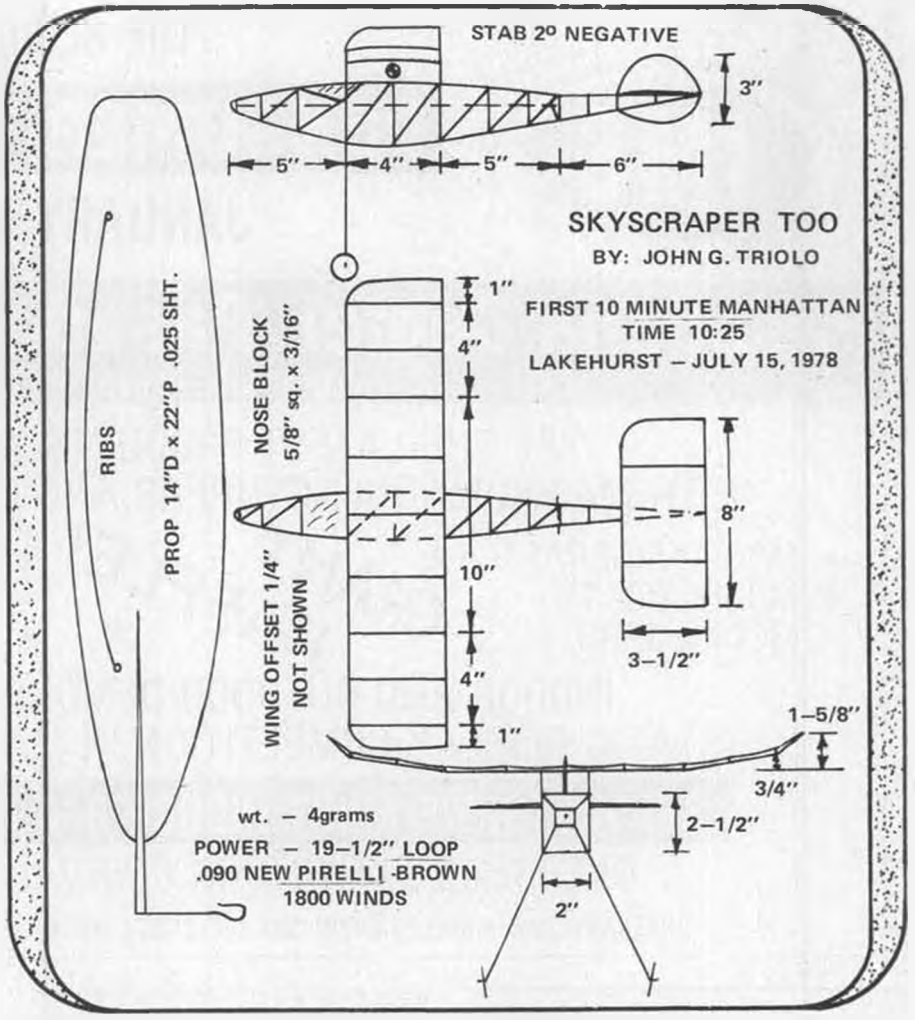
bad time now and then kept things going up here in the Northwest. I'll miss that, but knowing Dan, so will he.

Now, I finally got a Round Tuit. I can spend a bit more time building and flying. Tom Hutchinson will lose a little of his as he takes over this column. He would appreciate the same kind of help that all of you provided for me. Let him have it when he needs it. Come to think of it, I'll let him have it when he needs it, too. Try 3255 W. Crocker Lane, Albany, OR 97321.

I'll be in the magazines now and then. I've still got to finish up writing that "25 years of 1/2A Free Flight" article, and I will. There are some other ideas up the sleeve. So, I guess that this is my goodbye column, but it really isn't goodbye, it's just so long for now.

We wish to put in our note of thanks to Bob for a job well done. He has recognized the requirements and has fulfilled them like a pro.

Bob, may the Free Flight Bird of Paradise cut your engine one-tenth of a second under the limit . . . stop your winder one turn less than the break point . . . get you off the hook with a vertical towline . . . and may your DT's always work in time, in the air, and in site of the timer! wcn •



"Look at your model, son! Why, the ribs are uneven. The panels don't match. The paper's wrinkled. Why, it's beautiful, son!"

1 to 1 . . . . . . *Continued from page 26*

number two, and the Hiperbipe third. Bob Wischer was fourth, and Steve Sauger seventh.

Bob Nelitz, after running out of time and having a "landing in the air", was in the middle of the pack.

Tuesday's flying presented some interesting problems. Shifting winds had caused the flight line to be moved on Monday, bringing the R/C models directly over the C/L aerobatic areas. This was most unfortunate, for it not only was distracting for the C/L fliers, but made it necessary to keep the R/C pattern rather restricted on the one leg. On Tuesday, the line was shifted a number of times. It resulted in causing the flight path to pass directly over the spectators for a portion of the flight. The landing approach was made from that direction.

The P.A. announcer was right on the ball, since he let everyone know when the landing would be made and they could get a great shot of the model overhead (about 30 ft. overhead!).

I recognize that attempts were being made to keep the flight line wind-oriented so all the models could enjoy true upwind takeoffs and landings, but I must confess to a rather large degree of concern at flying in that manner. This was especially heightened since we were flying on non-typical frequencies which, while they had been approved, were in spectrums generally alloted to other activities. At any rate, all's well that ends well, and day two ended that way.

Fouquereau of France put in a barn burner, and the standings were now Reeves, Fouquereau, Underwood, Taylor, Rousseau, Wischer, Sauger.

One interesting sidelight of competition had occurred up to this point. Several models were found to be overweight at the initial weigh-in. In one case, a Swedish model was something like 7-1/2 oz. overweight. I'm certain you can imagine that removing that much is a difficult task. You can further guess where the weight came from in respect to the CG. By the second run, there had been some interesting flight attempts.

My personal feeling is that you should show up with a model at least 6 to 8 oz. under the maximum weight, to be assured that any weighing scale difference will not do you in.

Wednesday brought the best flying day of the three, and certainly the best flights. The standings, with the exception of Mick Reeves in number one, jumped about like grasshoppers.

Steve Sauger pulled the Fairchild off too early and it banged into the runway, breaking the stab and some other parts. He returned to the tent with glue and a will to get it fixed so he could make a second attempt.

Bob Wischer put in his best flight, and if Steve could get his plane fixed, and if he could get in a good flight, and if I put in my best flight, we could take home that team trophy. In addition, of course, I needed to have a really good flight to return to the earlier placing level. Things like that really tend to steady a guy's nerves!

Several earlier mistakes I needed to overcome involved flying characteristics of the Hiperbipe that I was not accustomed to. One maneuver in the pattern was an inverted pass. It seems to be human nature that when you roll a plane inverted, it is necessary to push a little down elevator to maintain level flight. But the Hiperbipe is neutral upright or inverted, and I had to resist the temptation to feed in down elevator lest I start an outside loop!

Indeed, on the second leg of the Cuban Eight, it flattened out quite a bit because of this "problem". It really is a spooky feeling to have to apply up elevator to get it down closer to the ground.

The second problem involves the effectiveness of the flaperons. When fully deflected some 25 degrees, the model virtually stops in the air. In addition, when they are deflected, the ailerons lose most of their effectiveness. On flight two, I got carried away on the crosswind leg and put the flaperons down their full amount, and as a result "turned" (wallowed!) onto final with all the grace of a pregnant water buffalo.

I used care to make certain that did

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not occur on the final flight, and the result was a 2470-point flight which moved me into second place, ahead of some six or eight fliers who had spirinted around me earlier in the day.

The team trophy hung in the balance as Steve brought the Fairchild to the line for his final attempt. As this was also the final flight of the contest, much attention was directed toward it. Steve put in a good, steady flight that, while not dazzling, reflected a desire to win. The U.S. and the U.K. team waited with trepidation as the score was checked carefully and the totals were posted. Steve's 2144-point flight brought the U.S. total to 14,939, just 309 points behind the Great Britain team with 15,248.

While that might seem like a very large amount, remember that with K factors involved and five judges adding to the total, 300 points is a very small amount. For instance, the small landing circle is worth a 9K factor, while the larger circle is a 4K factor. Suppose you got a 7 on the landing. 7x9x5=315 while 7x4x5=140. In that case, you have a 175-point difference for on contestant on one maneuver.

Thus it ended with some surprises and some disappointments. As you look over the results, you'll note some models with lower static scores but which finished quite well, reflecting some very fine flying. Certainly, Rousseau and Fouquereau of France are to be commended for flying extremely well. While it can be said that their models, C.A.P. 20's, are pattern-type aircraft, it was obvious they knew them well and had flown them often. Their takeoffs, landings, and touch-and-goes were very nicely done.

Wednesday evening brought the awards banquet at an old established hotel in downtown Liverpool, the Adelphi. The sheer number of people again caused the organizers problems. Buses were to be provided to get the huge number from the university to the hotel. Unfortunately, three buses could not handle the multitude. Neither could the hotel, as rooms all over the hotel were pressed into service, with chambermaids and porters acting as waitresses and waiters.

The award ceremony was held in the main ballroom, with closed circuit TV to carry it to the other rooms. Most of the people, however, crowded into the ballroom. The word "crowded" is appropriate.

The evening was capped off with the awarding of the FAI medals. Unfortunately, they were mixed up, due to the French language used on them. In an effort to clear it up, we were requested to bring them to the microphone so we could exchange them. Somehow it didn't work! I managed to get the second place control line aerobatic medal to Al Rabe, but since he didn't have mine, it is still in limbo.

So the event was over. Scale would now look forward to Ottawa, Canada, in 1980.

There are some general thoughts to be communicated at this point. First, a very large and sincere apology to the U.S. control line team. Ray Smith, Roland Baltes, and Dan Osdoba were there ready to compete even if it was to be just a two or three-country contest. Unfortunately, nobody else showed up to compete! We were at a loss to understand why others didn't appear. A conversation with one British control-liner who had come simply to be a spectator related that he had been told the competition was off, since two countries had boycotted the championships for political reasons. The assumption had been that even if a world championship event could not be held some competition would be arranged. It wasn't, and our three members were most discouraged. Their models were on display for most of the event and evoked much interest from modelers and the general public.

I regret that one of the rolls of film I processed did not come out, and the shots of their models were on that roll. Thus, I inadvertantly add to them being left out. My sincerest apologies.

A success story that must be told, however, revolves around the free flight scale competition. Organized on an informal basis, it was very successful, with 14 entries. A number of these were flown proxy by British modelers (and one inept R/C'er from the United States, who shall remain nameless).

The event was run by Mick Duce, who was most helpful to everyone. In parti-

cular, I must say "thank you" for the advice and help he gave to me as I participated, flying Tom Stark's Loening M8. The model was slightly damaged in transit by the antenna post on the Hiperbipe, but by judging time, with the help of Mick, it was repaired.

The static judging pressed into service Ted Sharp, the Canadian Team Manager, and while the judging was not completed by Saturday evening, we sallied forth to do battle with the elements. Actually, Saturday evening was quite nice, and we found a good area in one corner of the airport.

Looking at the photos and the list of models, you'll note that the rules accommodate a very wide range of types. There were rubber, CO^2, and gas powered models ranging in size from Peanut Scale to multi-engined bombers.

Now that's a set of rules which really allows innovation and fun competition. Perhaps the only detriment would be that an official flight needed to be at least 30 seconds, and some rubber power models might be at a disadvantage.

The Stark-Underwood effort resulted in a first flight, complete with ROG, that come up two seconds short of official. A second attempt ended at 23 seconds when the runway got in the way of the model's nose after a rather pronounced stall. A couple of broken struts and a broken landing gear were repaired for the next round on Sunday. Unfortunately, Sunday's weather was conducive only to ducks with built-in wind anchors, so the results of Saturday became the official ones.

It was really a most enjoyable, relaxed experience, and hopefully Canada will be able to include it once again as at least an unofficial event. In the interum, perhaps other countries can be stirred to consider it as an official event.

Free flight, to me, has to be one of the highest forms of modeling, for it requires a modeler well versed in many areas to be successful. Those trim levers on my transmitters allow me some margin of error in my expertise as a builder, and perhaps a second chance.

A true free flighter tosses his efforts to the unpredictable winds and must be well versed in the arts of trimming and flight characteristics. To see R. Falconer launch his rubber-powered P-38 made me appreciate the desire and interest necessary to compete in free flight scale. Certainly the same can be said of Eric Coats, who won with a DH-9a bomber, or W. Dennis who garnered second with a multi-engined model.

It was great fun, and I'm interested in knowing where Mick Duce wears the patch I gave him from my home R/C club!

Each contestant received a very nice engraved memento of the event and a merchandise prize. I brought home a very nice knife set, one of several donated by **Model Builder**, for Tom. I also brought home a slightly bent model as well!

A big "thank you" to Ron Moulton of *Aero Modeler* magazine for sharing some of his fine photos of the activity.

I trust that you have not taken too many of my comments about the event as being negative. There were problems. These, however, were almost completely the result of the sheer magnitude of people involved. It is truly amazing that so much did get done when one considers the rather small number of workers that were actually involved. The local Liverpool area provided the basic staff, and I dread to think about having to come up with that many volunteers. Perhaps what can be said is that the piece bitten off was more than they could easily masticate.

Certainly the English people, both those involved in the contest and those of the general public, were very friendly and possessed of that dry wit that makes teasing one another great fun.

The scale judges worked hard under often trying conditions, both for the static and flying portions of the contest. Of the five, two new members were included, with Tony Aarts of the Netherlands and Alfred Fisch of W. Germany joining Dennis Thumpston of Great Britian, John Carroll of Ireland, and LeRoy Weber of the U.S.

In later articles I will include some items of concern that occurred during a scale meeting at the competition.

The Underwood clan went on to travel about England, Scotland, and Wales for several weeks following the

event. We capped off our stay with four days in London at the Glendower Hotel, run by Caeser Melani and his wife. Caeser is a scale modeler who was intimately involved in the organization of the international events. It was interesting to share stories and experiences with him.

We also had an opportunity to spend some time at the Shuttleworth collection and see the full-size DH-88 Comet.

I personally would like to thank the many individuals and groups that helped make this venture such a memorable experience for me. Certainly this would have to include my family, who cleared the decks, making it possible to get the model completed. In addition, much helpful advice and direction was provided by various people, including Sorrell Aviation.

Monty and Pat Groves did a lion's share by providing contacts with Ray Stevens and photo work so necessary for a scale project. Without that source, all would have been lost.

Of course, thanks must be given to the AMA and modelers in general for their support and confidence.

Lastly, a "thank you" to NASA, for it is obvious that my ability to devote more time to the association was compromised. For this I am truly sorry. The need to get out a monthly newsletter, along with the sale of patches, resulted in several projects not being realized.

Oh yes . . . the title "Look Right, Think Left". If that seems oblique to some of you, you've never visited England and started to step off the curb to cross the street or slid behind the wheel of an automobile to drive from point A to point B, by way of two roundabouts and a flyover.

Confused? Welcome to the club. My daughters found an English-American translation with an Oscar Wilde quotation that "England and the United States have everything in common . . . except the language." •

Nats Pattern . . *Continued from page 47*

in Texas was very, very soggy that week, and we kept expecting it to come get us, but it never did. We had four flights in by Thursday, just in case.

Friday again gave us clear weather, so now we have a problem, as everyone had seen each set of judges once, so the decision was to scramble the judging team and fly one additional flight. I heard no squawking about this, either before or after the flight. The flying was very good this round. I was impressed by Tony Frackiowiak, a new Master flier who was flying on our site, and also by Marty Wittenberg (Expert), who is going to cause havoc next year in Masters. And talk about flying under pressure, how about Steve Stricker (Advanced), whose father was stabbed and seriously hurt defending their van and equipment from robbers during qualifying. And then there is Tony Bonetti, who really tried to break his neck on my son's skateboard, but succeeded in riding it so well we decided he should do that instead of fly. Wonder if they have R/C skateboards! Anyway, the ten finalists in each class were:

NOVICE	ADVANCED
Anderson	Avila
Christman	Clifton
Cowee	Hiatt
Fritzinger	Hoppes
Galle	Krafft
Gilbert	Leonard
James	Strong
Milla	Toolan
Pannell	Utasi
Sheridan	Wilson

EXPERT	MASTER
Barnes	Bonetti
Hartley	Brown
Ingerson	Chidgey
Johncock	Danley
Mahady	Frackiowiak
McKenzie	Helms
Ramsey	Koger
Redmon	Radcliff
Stricker	Underwood
Wittenberg	Weitz

By the way, our camper generator still wasn't generating, and after entertaining the troops at the campground each of the last three evenings, while we tried valiantly to fix it ourselves, we finally decided to take the #*"$&# thing out and have it fixed before they x-rated the show at the campgrounds.

Friday, the first of two finals days, was again clear . . . perhaps a bit hotter. Again, we had four flight lines, two at site A and two at Site B, with ten pilots on each line. the judging teams (three judges each) were again scrambled. Two flights were flown on Friday, with two more to follow on Saturday, with the best three counted for a final tally. Lady Luck again played her game this time with Dean Koger. Dean was up to call his first flight . . . in fact, he was ready for takeoff when a judge yelled, "Where are the scoresheets?" Dean suddenly realized he didn't have them. Of course,

the new Masters finals are very individualized, and just any scoresheets wouldn't do, so because his time had started, he lost a flight. He later realized he had laid his scoresheets down when he got a drink of water at the tabulation tent and later found them laying just where he had put them. Gad, what a way to lose! But as Dean said, it isn't something he'd likely do again! He handled it like the champion he is. Mark Radcliff finally seemed to have conquered his problems, and according to his father, George, was flying super. Tony Bonetti was still fighting his gear and it cost him another landing on Friday.

In case you think nerves get better the longer you fly, you might like to talk to Rod Barnes, who called a Double Immelman from his Expert pattern, and then proceeded to do a Top Hat. He said he realized what he'd done about halfway through, but decided he might as well finish what he'd started. Now that is Brain Lock!!

After Friday's flying, it sure was close scorewise. Dave Brown and Steve Helms were only two points apart, with Mark Radcliff closing fast. There were numerous ties and very close scores in the other classes. It was going to be a dogfight on the final day.

Saturday again was clear (praise the weather god), and our two final finals flights were flown. Things pretty well went down to the final round as scores were close . . . in fact, the Expert Champ won in the final round. But when all was said and done, the results, down to 20th place, were:

NOVICE

1)	Steve Cowee	968
2)	Lamar Gilbert	926
3)	Tommy Fritzinger	884
4)	Gus Christman	874
5)	Steve James	871
6)	Dan Sheridan	869
7)	Gary Galle	860
8)	Bob Pannell	852
9)	Danny Milla	850
10)	Richard Anderson	838
11)	Jesse Powers	
12)	John Wolflick	
13)	Peter Lepir	
14)	Don Roberson	
15)	Lee Lamury	
16)	Sidney Austin	
17)	Jerry Cruse	
18)	George Asteris	
19)	Dan Crosswhite	
20)	Ronald Hesslebrock	

ADVANCED

1)	Cliff Hiatt	914
2)	David Wilson	901
3)	Jerry Clifton	901
4)	David Hoppes	900
5)	Michael Toolan	887
6)	Robert Krafft	876
7)	Eugene Leonard	849
8)	Joe Utasi	841
9)	George Avila	725
10)	Jamie Strong	691
11)	Mel Douglas	
12)	Tom Kirk	
13)	Tommy Moore	
14)	Robert Lesmerises	
15)	James Keiger	
16)	Tiny Westberg	
17)	Thomas Blakeney	
18)	Paul Clements	
19)	William Hurley	
20)	Donald Krafft	

EXPERT

1)	Marty Whittenberg	12,965
2)	Ed Hartley	12,705
3)	Robert Redmon	12,360
4)	Danny Ramsey	12,345
5)	Steve Stricker	12,320
6)	Rod Barnes	12,225
7)	Marvin Ingerson	12,155
8)	Mike Johncock	12,020
9)	Terrace Mahady	11,650
10)	David McKenzie	9,997
11)	Randall Lyman	
12)	Bob Stewart	
13)	Dan McCan	
14)	William Adams	
15)	Bill Payne	
16)	Carl Garrett	
17)	David Noll	
18)	Dave Platt	

(only 18 entered)

MASTERS

1)	Dave Brown	3541
2)	Steve Helms	3475
3)	Mark Radcliff	3434
4)	Dean Koger	3426
5)	Tony Bonetti	3411
6)	Ron Chidgey	3344
7)	Tony Frackiowiak	3284
8)	Donald Weitz	3248
9)	Charles Danley	3225
10)	Bruce Underwood	3163
11)	William Thomas	

12) James Kimbro
13) Andre Bouchard
14) Bud Weber
15) Wayne Abernathy
16) Allan Johncock
17) Joe Bridi
18) Ed Izzo
19) Edward Keck
20) Joseph Gross

Airplanes and equipment used was as widely varied as I've ever seen; Curares, Phoenixes, Bootleggers, Intrepeds, EU-1's, and Tigertails were all in the top ten, and really the only "different" plane was Dave Platt's "Duelist", a twin-engine job which sounded really nice and woke up the crowd, but needed work in the air.

Yes, Dave was flying a Curare . . . I know it was bronze and white checks, but it was *not* a Phoenix 8, as many asked us, but definitely a Curare (at least that's what the box said!). Crashes were, thankfully, not very many, with, to my knowledge, only two, and one of those was someone who hit a pylon cage on a landing approach.

I was somewhat surprised and disappointed by the people not present: Phil Kraft was a spectator for the finals, as his work load prevented a whole week's participation; Don Lowe had work commitments; Rhett Miller was missing, as well as Mike Mueller, Jim Whitley, and Fred Kugel. Their places were taken by a talented new crew . . . as you'll notice, places 7-10 in the Masters class are all newcomers whom I expect we'll see again soon, as well as many of the lower class guys as they move up. Being a top Masters flier is far from a secure position! Just so you "oldsters" won't be completely disheartened, meet Gus Christman (4th in Novice), who assures me he has been "interested in airplanes longer than I have 'been' ", and Ed Hartlet (2nd in Expert) who calls himself "Old Ugly Ed". Take heart, you guys over 35, there IS hope.

Problems were few and far between . . . there was some grumbling about not having the fliers change sites every other flight, as some felt the trees at site B were a hinderance, but site A had an airport nearby with a takeoff pattern which, although not dangerous, was distracting to say the least. And some felt the judging was off. Personally, I think the judging was the best I've seen at a Nationals by far. Yes, there were high and low judges, particularly in the finals, where we had two high sets and two low sets, but because everyone had the same exposure to all sets, and the sets stayed either high or low, it was OK. Consistency is the name of that game.

Very interesting to me was the number of women involved this year. We had a lady event director and her assistant (Betty and Suzi Stream), a lady chief judge, three lady judges, a lady pilot, and me (caller par excellent and writer slightly less excellent!). It was in 1973 that you'll find a picture in **Model Builder's** Nats coverage of Bill, Don Lowe, and myself proclaiming me the first Nationals pattern event lady judge . . . now, a frantic Womens' Libber I'm not, but it sure seems good to see more of "us" involved, instead of home fussing 'cause "he's" gone.

May I congratulate all who helped run our event . . . a very professional job! May we, please, keep pattern people running pattern? The NSRCA has done a grand job in this department.

Saturday evening the NSRCA hosted a "buy your own drinks"-type awards party, which I thought was a nice ending to a glorious week. Trophies for all classes were awarded by Betty Stream and Joe Bridi, and each winner was given a special NSRCA trophy. In this way each flier was given special recognition for his achievements without having the added expense and long wait of a banquet. Congratulations to all forty finalists, and especially to Steve, Cliff, Marty, and Dave . . . CHAMPIONS ALL.

So the Nats is over for 1978. I sincerely hope next year's is as good. I keep hearing that the Nats is "dead" and we should separate into categories and events and do our own things, and my head tells me this is a very sensible solution to the problems that plague a Nats, but my heart hopes it never happens . . . where else can one find all one's friend and enjoy such a variety of activities. It is such fun!
(P.S. Yes, we did finally get our generator in our camper working . . . the day we left. But we had a flat tire on the way home, just for good measure!) •

Halt-A . . . . . *Continued from page 71*

much faster model. You could gain even more speed by sharpening the leading edge contour, as is done on the GLH kits (also by Ace), and I think I'd substitute slimmer wheels such as the 1/2A racing wheels Joe Klause sells, too. Also, it wouldn't hurt to file some roundess into the aluminum landing gear.

The last photograph is of an early prototype of the ready-to-fly Cox Skycopter. Although the basic model is not of terrific interest, I am presenting it here because this model has formed the basis for some very good performing competition models. Bruce Paton took 3rd in helicopter at the 1974 Nats with a slightly lightened production copter,

with a Tee Dee .020 substituted for the Pee Wee .020 we were using at that time. For current competition, I would again make the engine switch, and lighten the model's fuselage as much as possible. The major change would be to enlarge the rotor blades by using only the inner and outer ends, and substituting larger balsa rotors. Use hard balsa, as the blades must be rigid, and more rotational inertia means greater stability. If you have stability problems, try increasing the weight at the end of the counterbalance arms. You can also add weight to the tips of the blades themselves for even smoother flight characteristics.

Be sure to time your engine run carefully; these babies can go clean out of sight straight up. Plug both tank outlets for flight, and use a pin hole in the tank near the top for an in-flight air vent.

BEGINNER'S WORKBENCH

Last month I talked about several inexpensive but invaluable hand tools. This month, I'll cover some slightly expensive but also very handy tools. Specifically, the ones that seem most useful are the Dremel or other hand-held motor tool, Dremel's Moto Shop, Powr-Mite sander, and any of several brands of tabletop drill presses.

The motor tool, especially the ones with variable speed, provide the capability for shaping and sanding inside tight spots, and the cutters are good for metal cutting, hollowing balsa, opening up motor mounts, and shaping plastic parts (at lower speeds). The tools are great for small diameter drill bits, as the high speed seems to reduce the probability of breakage.

The "Moto Shop" is basically a very long-throat jigsaw with a power take-off on one side. I use mine both as a saw and as a motor tool. The remote power cable is actually less tiring to use than the moto-tools, but lacks the variable speed feature. The Moto Shop also has buffing wheels, sanding discs, and used to have a grinder available.

Next tool is the Powr-Mite sander, by Strick Enterprises. This is a miniature disc sander with an adjustable table to assure that your work is held at the angle you want. Just the ticket for making stacks of ribs identical . . . squaring up firewalls becomes a breeze, too. Used freehand, the sander is good for shaping cowls and nose blocks.

Last but not least, there are a variety of small tabletop drill presses available. Sears and Wards have them, and so do hardware stores, discount stores, etc. The best ones have smooth drives, true-running chucks up to 3/8-inch diameter, and variable speed. Cost varies from 40 to 70 bucks. As an expensive but very useful accessory, get a drill angle vise. This little gem will hold your work firmly at any angle you choose.

As I said last month, a good workman can get along with simple tools, but the best ones get the best tools they can afford, then learn how to use and maintain them. •

Glider Team . . *Continued from page 44*

is invaluable, in FAI as well as AMA competition . . . how many times have you seen a contest won by the group effort of three or four guys clustered around a pilot during his last-round flight? Loners and solo artists, like myself, find there's plenty of room in soaring for the Rugged Individualist . . . but the room's all at the bottom of the scoreboard.

The third thing I learned in Florida has to do with luck. Everyone in soaring has their opinion of the luck factor, from the rank beginner who sees it as *all* luck, to people like Herb Semmelmeyer (LSF 098) who says, "If you think there's a 10% luck factor, then I have a 10% advantage on you every time we compete, because there isn't *any* luck in soaring, there isn't *any* aspect of it that's not ultimately controllable."

At the 1976 Denver Finals, LeMon Payne went around asking all the pilots

for percentage-of-importance figures between pilot, plane, and luck. The consensus came out something like this:

pilot	65-70%
plane	25-30%
luck	5-10%

A lot of folk seemed surprised at those figures, because we can all think of specific instances which were exceptional (Denver itself, with its mile-square patches of Killer Sink, was one of those exceptions.) But over the long haul, I feel, the figures are basically sound. Certainly the Pensacola contest, with its mild lift, mild sink, and benign, humid, seacoast conditions was a perfect example.

A fourth lesson that came out of this year's Finals has to do with flexibility. None of the four fliers I followed the most closely went to Florida expecting to do much highstarting; hand-tow and winch were their primary launch methods. But the 200-meter stretch limit had been removed from the highstart, and the few folk who arrived prepared to exploit this loophole soon had the rest of us scurrying about, looking for surgical tubing. The low wind velocities were more than compensated for by the lift on the field, and almost every high-start launch I witnessed came off the top with at least some stretch left in the

rubber. When Koplan and Miller went up side-by-side, Miller on a hand tow and Koplan on a highstart, the results were dramatic; even the diehard hand-tow fans could see Terry's hundred-foot advantage. Everybody who could, began to rally around highstarts. And the field was perfect for them: three different pilots used Nutter's 100-foot Cox Hobbies Heavy Duty rubber for three long days, stretching it a minimum of five hundred feet on every launch, without a single failure. If this loophole isn't plugged before the 1979 World Champs, there's sure to be some weeping and wailing and teeth-gnashing from the Europeans, who simply don't have easy access to the kind of surgical tubing that we can buy so inexpensively here in the States.

So that, in a nutshell, is how it went in Pensacola. I feel we picked a really first-rate team, and picked them in conditions that came very near to those they'll face next year in Belgium. The lift was a bit stronger and the wind somewhat lighter than what I remember of the Continent, but these are secondary conditions, nothing the team can't practice and prepare for. All three members are sound, experienced competitors.

Steve Work, from Albuquerque, finished his Level Five LSF requirements just 48 hours behind John Baxter, to become the second Level Five in the world. He's been out of competition for the last couple of years while he wandered around over the hemisphere on an aircraft carrier as a member of the U.S. Navy. He's currently stationed in San Diego, where he attends Torrey Pine Gulls' meetings and whoops it up occasionally with the Macadam Madmen at Hourglass Field.

Terry Koplan has been in the top five in just about every contest I've ever flown down in Los Angeles the Damned, and dragged his share of loot home from Chicago, back in the old S.O.A.R. Nationals days. He flies just about anything Tom Williams at Craft-Air designs (he ain't picky), and he flies it extremely well.

Everyone was glad to see Skip Miller win his way back onto the team. The current World Champion, Skip is one of the coolest and most thoroughly rational competitors I've ever been up against. Definitely a right-brain flier, Skip takes very few chances, calculates everything well in advance, and never, *never* stops thinking once the flight begins. As a flier, spotter and tactitian, he'll be invaluable in Belgium next summer.

For people enamoured of statistics, here's a list of the top fifteen fliers (you gotta stop somewhere — there were 40 entrants) and their toys, plus the points they amassed out of a possible 12,000:

(Author's note: Please don't bother Bill at **Model Builder** *for info on the Bird of Time. Drop me a note at 3635 Mt. Vernon, Sebastopol, CA 95472. The phone here is 707-823-7046.)* ●

Steve Work	New Mexico	Bird of Time	11,683.7
Terry Koplan	California	Viking	11,309.3
Skip Miller	Colorado	Aquila Grande	11,184.9
Jack Hiner	Illinois	Aquila Grande	11,035.6
Bill Haga	Texas	Legionaire	10,932.9
Bob Gill	Illinois	Viking	10,857.2
Herb Smith	Colorado	Original	10,723.6
Jack Hamilton	Texas	Legionaire	10,700.5
John Gunsallus	Florida	Original	10,632.7
Craig Foxgord	California	Albatross	10,481.4
Ray Hayes	Indiana	Original	10,364.4
Blaine Miller	Florida	Original	10,313.7
Bob Domer	Colorado	Legionaire	10,271.7
Tom Williams	Texas	Original	10,236.9
Don Edberg	California	Aquila Grande	10,187.1

F/F Scale . . . . *Continued from page 85*

Vacuum form by whatever method you are accustomed to using. (I use the old Mattel unit, which is perfect for this type of work.)

Carefully trim the vacuum-formed part so that you now have a complete windshield frame. In fact, this mold can be used to vacuum form the windshield from clear acetate. Glue the clear acetate to the frame and mount onto the fuselage. You will see how super the windshield will look. If you really want to get fancy, you can use very small drops of white glue (use a pin to apply the tiny drops) on the windshield frame part of the mold, spaced evenly apart, to represent screw heads. Or, you can do this after vacuum forming, placing the drops on the windshield frame. When they dry, paint the frame and the results will be very gratifying.

With few exceptions, most side windows are glued to the outside framework of the fuselage. (I'm talking about rubber and gas-powered F/F scale models, not R/C. Since R/C models are usually larger, it is easier to simulate the real aircraft.) Certainly, it is much easier to attach side windows in this fashion. However, the realism is lacking. If this is the only way you can do it or want to do it, then trim the acetate so that it barely covers the window. Use the film splicing cement for attachment. If you are building a gas model, then by all means inset the side windows just like on the real aircraft. If your model is large enough, this can be done by having a small backing frame built around the inside edges of the window opening. The acetate would then be bonded to this frame. On the other hand, if your model is not large, then carefully trim the

acetate so that it fits perfectly in the frame opening. Coat the frame with several applications of clear dope. Place the acetate in the opening and coat the edges with film splicing cement. This gives a really neat job.

I can remember the old days when the kits had pre-cut windshields which included the side windows in the same piece. I would say that this might be easier to apply to a model, but it is the least appealing, as far as appearance and realism is concerned. So, I would avoid this alternative if I were you. Peck-Polymers has clear acetate available at reasonable cost.

Another question often asked by new modelers is how to cover light-structured models without the usual warps, etc. Well, I don't know if there is a pat answer, since you can talk to several experienced modelers and each will give you a different way to do it. I found this to be true when it came time to cover and finish my full-size biplane. You almost have to filter through all that is said and go from there. At any rate, I'll give you a method for doing this rather pleasant task.

This method works well regardless of the size or structure of the model. Obviously, light models have to be handled more carefully, and that's about it. Once you have completed the construction of the wing and tail, while still pinned to the workboard, spray the structure with a fine mist of water. What for, you say? Well, the idea is to relieve any stresses that might have been built in. This will help eliminate warps later on. (Some free flighters do the same thing by leaving the structures pinned down for weeks . . . curing, so to speak, but the fine mist of water, I feel, will just about do the same thing.)

Sand all of the structures smooth, but do not clear dope them. The next step is what makes covering so easy, and will make the job pleasureable. Instead of using dope to adhere the tissue to the framework, use thinned-out white glue. I usually thin it out just a bit over 50-50 with water. Start with the bottom side and brush the glue around the outer edges of the structures only. Place the tissue over the structure and pull in every direction carefully until you have the surface smooth, free from wrinkles. In a couple of minutes, take a piece of fine sandpaper such as No. 400, or even 320 wet-or-dry, and sand the excess tissue off. This works much better than trimming the tissue with a razor blade.

Repeat the same for the top side. However, if you are *not* planning to paint or use dyes to color the tissue, then the following addition should be observed on the upper surfaces. Once the tissue has been applied to the upper surface, instead of trimming flush with the edge, fold it over and glue it to the bare edges of the structure. On curved tips, you will find it necessary to make several slits to that the tissue will fold over the edge smoothly (see Fig. 2). The object of all this is to have all of the edges of the flying surfaces covered so that the job looks complete and neat.

Water shrinking seems to be more of an art than people think. There are several different ways to do it. I'll give you the ones that I personally feel do the job with the least amount of warping. If at all possible, use an air brush to spray an even, light mist of water onto the tissue. This seems to be one of the best ways to do it. A regular atomizer will not do as well, but if that is all you have, then by all means use it. Stand back far enough though so that only the finest mist will hit the surface. The other way is to use alcohol in lieu of water. Alcohol evaporates more quickly, therefore minimizing the chance for warps. Leave the structures pinned down with spacers (see illustration), so that the air can circulate around the botton, until thoroughly dry. Use small plastic strips, or equivalent, wherever a pin is used, to hold down the structure (see Fig. 3). This prevents the pins from denting the surfaces.

Clear doping is next. Use only plasticized dope. Sig puts out a dope called Litecoat, which works quite well, if you don't mind using butyrate dope. I personally do not like butyrate, so I never use it. If you can't get ahold of non-tautening nitrate dope at the local airport, here is a source where I get mine. It is called Aircraft Spruce and Specialty Co., 201 Truslow Ave., Fullerton, CA 92632. The cost of one *thick* gallon is $6.10, plus postage. It is well worth it, and the solvent for it is nothing more than lacquer thinner. If you prefer to plasticize your own, use TCP (Tricresyl Phosphate). This can be purchased from Sargent Welch and Co., catalog number SC 15514. The address is 1617 East Ball Rd., Anaheim, CA 92803. The cost used to be $3.25 a pint, but that price has changed several times. Also, if you want to order some, you must use your company's letterhead; otherwise, they will not sell you any. Some hobby shops sell plasticizers, but I'm not sure whether they can be used with nitrate dope.

Some of you new to modeling may not even know what is meant by plasticized dope. Plasticizing of dope is necessary to prevent excess shrinking. If straight dope is used, your structure will end up looking like a banana. After you have decided which way to go with the plasticized dope, thin the dope about 40% with thinner. Some modelers prefer a 50-50 ratio. I always start on the bottom side first. Brush an even coat bottom and top. Once this is done, pin down structure again and let it dry throughly. Do the same with all of the other flying surfaces. The number of coats is strictly up to the modeler. In some cases, for a very light model, one coat is enough.

Sometimes wrinkles appear after you have water shrunk the surfaces. This may occur even though the tissue was quite smooth when first applied. Why does this happen? Usually, the structure gives way with the force of the shrinking, leaving unwanted wrinkles. To prevent this from happening, put small gussets in

those areas usually affected (see Fig. 4).

One last addendum. Covering the upper surface of a wing can be a real pain. Well, it need not be. Whenever there is a compound curve involved, you have to cover in several individual pieces, since tissue is unable to go over these curves without excess wrinkles. First, cover with one piece of tissue the portion of the wing which has the constant chord. The rest of the wing to the top may have to be done bay by bay (see Fig. 5). Make certain that this individual piece of tissue still has the grain running spanwise. If not, these areas will sag so badly that you will have to do them over. They sag even worse after water shrinking and doping.

I lay the tissue over the bay to be covered and mark it lightly with pencil so that I can trim it properly. This piece is then white glued into place, and the procedure repeated until the tip has been covered. The rest is done in the conventional manner.

There you have it. Once you have done this a few times, you will find that you can cover as well as some of the best modelers. Some experts get wrinkles also, but they're sneaky . . . they cut the wrinkle out and patch it so that nobody ever finds out! •

Peanut . . . . . *Continued from page 79*

model in aluminum!

The wings are straightforward. Do everything possible to keep the tips light, as they are far behind the Center of Gravity. The same goes for the winglets.

Canard construction is unusual, in that for a change, you can build a heavy "tail". If you don't use the dowel for the leading edge, use very hard balsa, because the canard takes a lot of abuse when the VariEze flies into things. The sliced ribs with undercamber are important, so don't cheat here. A possible substitute would be solid sheet with the camber warped in.

Covering is a little tricky on the fuselage. Use small pieces and work slowly. Cover the top of the wing strake separately from the rest of the top, to reduce wrinkles. Make sure the tissue on the bottom of the canard is well attached to the ribs.

Assembly has no real tricks. The only unusual thing here is no dihedral. Note the outward-canted winglets. The cowl parts are formed from 1/32 sheet bent to shape before assembly.

Form the canopy over a balsa or basswood (preferred) mold. If you get a small wrinkle or two, an electric iron as a heat source and a cotton glove come in handy for rubbing these out. Don't forget the pilot!

My wheels are balsa with small .005 aluminum washers for bearings. These are colored with a black felt pen. The small amount of trim is red. My prototype has one coat of dope thinned 50-50 on the flying surfaces and 2 coats on the fuselage, which gets handled most.

The prop shown is the third one I made, each with more blade area. It is far superior to the small plastic ones that were tried on this model. Keep it very thin, as it adds weight behind the Center of Gravity.

Balance the model at the point shown on the plan. If the canard incidence is as shown and there are no warps, it will fly right off the board. Turn can be trimmed with the winglets. Use thrustline adjustments for power path to get maximum climb. Canard adjustments should only be used if the bird is really out of trim.

I'm sure you'll find the VariEze to be a lot of fun to fly. Good Luck. •

C/L . . . . . *Continued from page 83*

they are sophisticated models has to be recognized. Just watch a top-notch Combat plane fly sometime. The level of performance is incredible from these finely-tuned weapons. Just a small misalignment on these planes spells a quick end to them. A tiny warp that takes one click of trim adjustment on an R/C plane to cancel will find you eating (literally) almost any of today's top-level Combat planes. The same applies to the high-performance F/F machines, and yes, even a hand launch glider is a high-performance F/F; one mistake and you'll eat it, let alone being competitive at the contests.

Maybe someday, model builders will be a more united group, claiming to be model builders, nothing more, nothing less, and simply participating in their choice of events without a label being

put on them, and without getting a down-the-nose look from others who have simply chosen to participate in other forms of modeling.

WHITELY NATS STUNT CHAMP

Got a call from Bob Whitely the other night and we talked about everything from C/L to R/C to motorcycles. Mixed in there was some stuff about Bob's winning plane. Power was from the usual S.T. .46, but not one of his own as he, like everybody else, has been having trouble beating rings and rods out of his motors. Just before the Nats, Bob borrowed an ancient two-ring .46 from Tom Lay, the person responsible for many excellent Stunt engines. Bob dropped the motor in his plane and it ran perfect right from the start, and certainly did the job at the Nats.

Quite often, the winner in Nats Stunt is flying a plane that has been around for a few months, but Bob built a completely new plane for '78. And he did it in only 28 days, from the time the first piece of wood was cut until it was ready to fly.

If you know the amount of building and finishing that goes into a modern Stunt plane, you can appreciate the 28-day building time. If not, then remember that this plane had a paper-and-dope finish that was good enough to tie with Ron Harding and Bill Werwage for top appearance points at the Nats. Only perfect models do this, as anybody who has seen appearance judging at the Nats can verify.

In talking about the engine problems in Stunt, Bob mentioned that he saw five models at this year's Nats that were using the new O.S. .45, which is a motor designed primarily for R/C helicopters, and so features bunches of torque. Bob said all of the motors ran bitchen and they all ran the same, so he'll probably be trying one out.

Many of you probably wonder why the Stunt guys have trouble with engines. For one thing, they are absolute perfectionists and demand smooth, consistent power from their engines. And they don't run them very fast, which explains the problems with pounding rings and rods out of the S.T. .46's. For example, Bob wants his motors to run at 8600 to 8800 rpm, pulling a large-diameter prop, and to do this without overheating or changing rpm through the flight. As the .46 was not designed to do this, it is difficult to get them to be super reliable.

For you guys not wanting to bother with building your own Stunt engine, Bob and I would like to suggest that you contact Tom Lay at T&L Model Specialties, P.O. Box 6052, Torrance, CA 90504. Tom does very good work while not charging outrageous prices, and his reputation for delivering engines on time and then having them perform as claimed is extremely good. I've heard lots of scare stories about certain "engine builders", but never a bad word about Tom Lay, and I did some checking before writing this. Incidentally, Tom works on several other engines besides the standby S.T. .46; the O.S. .35 and certain models of K&B came to mind, but I know there are others. Write to him for a list and quotes on the different rework he performs.

As long as we are talking about Whitely's winning equipment, his foam wing was cut by J&K Custom Foam Wings, 10261 Janice Lynn, Cypress, CA 90630. Bob and I never got around to talking about their work, but if it is good enough for him, I would imagine it is top-notch. It's wintertime now, and you're supposed to be building something new, so contact J&K if you're interested in a foam wing for that new model.

STRANGE MAIL

I suppose that when you punch out the kind of material that I do, you have to expect the correspondence generated to be just slightly strange. And so it was the other day. In came a large postcard, the front being solid, bright blue with equally bright yellow letters spelling "hahaha! hehehe! hohoho!". The piece was from Woodvale, England, site of the C/L World Champs, and it said:

"Greetings, Dirty Dan!

From No. 1 fan of *British* FAI Combat Fliers, who reads your column every month with a chuckle in his heart, and who will enjoy it all the more now!

Cordially,

Basil de Wazzle"

Not knowing the results of FAI Combat yet, I figured this to be an excellent

clue that we got stomped and that the British had won. A call to the California Flash verified this, although he wouldn't say we got stomped, just that we lost, having equipment easily the equal of anything else there and also having flying talent. But we did get beat pretty badly, in my opinion.

AND THEN. . .

Yet another postcard, just like the first, from my new friend in England.

"Dear Dan,

Just read your bit in August **MB** about the Trash Can Event. This has to be the lowest low in your subterranean writing. You should have invented this idea before sending your team to Woodvale, and put the fliers in the can too, with you on top.

"I bet Duke Fox would be first in line to put the lid on permanently.

Yours Sincerely,
Basil de Wazzle
UK FAI Combat Fan"

I have the feeling we will be hearing more from this chap. I'll let you know.

And I don't think Duke would put the lid on me; I rather like Fox, and he claims to be a faithful reader of this column (although the Trash Can Event probably shocked even Duke Fox, who is a great practical joker himself, a side of him that not too many seem to know about).

A STOOGE TO WRAP IT UP

Charles Kirkland saw the article about the C/L stooge device and wrote in to let us know that he still has plans available for one he designed years ago. He sent along a set of the plans and they look good, being full-size and very clear about exactly how to make the stooge. The plans only cost $1.00, and that includes postage. Write to: Chuck Kirkland, Kirkland's Hobbyland, 5340 Parker Avenue, Chicago, IL 60639. •

Soaring . . . . . *Continued from page 49*

side of the island. There you'll find a superb beach just below Nohili Point. This can be a great soaring site, provided the wind is right. I wished for an eastward blow, but no such luck. The hot sands provide sufficient thermal activity for lengthy soaring over the waves and bluegreen water beyond.

By the way, I recommend that you consider staying at the new building of Hotel Coral Reef, 1516 Kuhio Highway, Kapaa, Kauai, Hawaii 96746 (Phone 808-822-4481). These beach-front rooms are well-furnished. You look between palm trees out over grass and sand to see the waves rolling toward shore. All this at *very* moderate cost. Who needs air conditioning and TV?

I wish I had time to explore the rest of Hawaii, but that leaves something for next time. Returning to *my* favorite soaring site, Torrey Pines, I found a new breed of cat gaining popularity . . . the Cheetah. This bird, designed by Bill Watson, is strictly for slope soaring . . . both aerobatics and combat. The foam wing, 48 inches in span, covers 432 square inches. It flies at about 33 ozs., and comes ARF. The fuselage is preformed of polyethelene. It's strong and really suitable for this sport that's captured the imagination of both fliers and spectators at Torrey Pines.

Ordinarily, one or more planes drag a paper streamer. Your task is to touch that streamer, or better still, tear off a piece. As if that's not exciting enough, the coming "Gulls Gamut" will be a "combat to the death". The winner is the pilot of the last plane remaining aloft. Only a low-cost, crash-worthy craft can justify such sport.

And the Cheetah is all of that. It's easy to put together, rolls at up to 400 degrees per second, flies in light lift, and is tough to beat. You can obtain the semi-kit for this bird from Mark Loveland, 3319 Par Drive, La Mesa, CA 92041 (phone 714-463-0841) for only $25. It includes the foam wings, stab and rudder, Kromcote covering, a completed fuselage, and a pushrod (only one needed). You have to provide the aileron linkage, leading and trailing edges, and, of course, the radio.

Mike Redman conducted the annual Redman Rules Contest, comprised of three tasks: beer can bowling, limbo, and carrier landing. The Cheetah fits right into this scheme of things. All went well, but for the sake of "refinement", our next year's bowling contest will use plastic bowling pins rather than beer cans. This kind of contest is a real crowd-pleaser. You should hear the cheers for each successful pass. If the contest had taken place 25 miles south of Torrey Pines, the shouts would have been, "Ole!"

While attending the 1978 Nats at Lake Charles, LA, I came upon some interesting items. For example, Rae Fritz (1005 Revere Drive, Pensacola, FL 32505) and his friends are flying the "Glass Kite", built around a sleek fiberglass fuselage available from Rae at $25 per copy. The polyhedral wing is 132 inches in span with a 9-1/2-inch chord. The section is NACA 6410. The 36-inch inboard panels have six degrees of dihedral at the root, while the outboard 30-inch panels have 10 degrees at the break point. The spoilers, measuring 1x12 inches, are effective, but 1x15-inch spoilers would really fill the bill. The all-up weight is 66 ozs., and you can bolt ballast to the tow hook skid support if you like. Incidentally, Rae was Contest Director for the finals which selected the U.S. sailplane team which will represent us at the next FAI international championship (to be held in Belgium).

I thought I came a long way to reach the Nats (1,800 miles), but Leonard Oakley traveled 5,000 miles . . . all the way from Chugiak, Alaska (25 miles north of Anchorage). He brought with him his own design, the "Caracara" (named after the Mexican eagle). The wing is 126 inches, area is 960 square inches, and it has a 10 percent thick airfoil. The short tail moment aids tight turning. The spoilers are 1-1/2x12 inches.

Leonard operates this bird at 42 ozs., that is, about 7 ozs. per square foot. He tells me that in Alaska, R/C soaring is popular

from April to October each year. They use a hi-start and rarely encounter high winds. On special occasions they slope soar. Once a year, their club, the Anchorage League of Silent Flight, travels to within 25 miles of the arctic circle. There they hold a midnight contest. You can guess the date of this annual event.

Chet Tuttle, of Tullahoma, Tennessee, is now flying the ninth version of his "Dreamer". Originally, this was a hybrid derived from the Mesquite and Yankee Soar sailplanes. The wing is standard Clark Y, of high aspect ratio (13-foot span). It operates at 12 ozs. per square foot and is controlled through tip spoilers which operate independently. Chet describes how they take you into tight circles by controlling the drag on the wingtips, rather than adjusting the lift through ailerons. He also operates a 16-foot version of the "Dreamer" with long flaperons. Here is a real beauty . . . an experimental plane that testifies to Chet's ingenuity and construction talent.

As expected, Col. Bob Thacker was at the Nats, but this time he entered the original prototype Paragon (loaned by Ed Slobod, its designer). The plane operates well without additional ballast on the CG, but it can carry three to four additional pounds for coping with high winds. We got into the usual discussion of whether the Paragon's stepped-forward upper surface provides more efficiency than would a smoothly-sheeted leading edge. Some say that such "turbulation" is an old wive's tale. Others say it's the only way to go. Phil Harris, who took first place in unlimited class in last year's LSF contest, commented that a fully-sheeted center section yields greater speed and improved performance. I sure would like some concrete evidence on this subject. The best way to answer the question would be to fly with one wing sheeted while the other has turbulator spars, and noting which way the plane wants to turn (thus indicating which wing provides extra lift and/or less drag). Please let me know if you've run this experiment. In the meantime, rest assured that although the temperature was near 94° and the humidity near 100%, Col. Thacker was always well-dressed, wearing a tie throughout this three-day event. By the way, Stan Pfost, President of the National Soaring Society, flew an extended-wing Paragon. Yours truly flew an Olympic 650 in the 2-meter class.

Some manufacturers were well represented. Bob Elliott "spoke for" E.K. Logictrol, and Jim Simpson of Name, Inc. flew an Aquila XL. Cecil Haga, designer and manufacturer of the Legionair, takes flying seriously, but was the only contestant to remain seated throughout most of his 7-minute duration flights.

While at the Nats, I attended the executive board meeting of the National Soaring Society. We discussed how the Society can most benefit the membership and the R/C soaring community at large. NSS already provides a fine monthly journal of information of particular interest to those in R/C soaring. We really need your support of this organization . . . items you want to share with others of like mind, and your personal participation in the activities sponsored by the Society. Now's the time to become a member of the National Soaring Society. Write to Jim Barr, Box 2009, Denver CO 80201, for details.

For those who enjoy the beauty of full-scale flight and appreciate how much we can learn by modeling full-scale sailplanes, may I recommend a new book entitled *Soarers*, by Ferdinando Gale (LSF 1745). This book describes "aeromodeling" in relationship to full-scale, then presents detailed dimensions, drawings, photos, and a comparison of 24 current full-scale sailplanes. This book is top quality and well worth adding to your library. You can obtain a copy (via registered airmail) by sending $15 in a check drawn on any U.S. bank to Dr. Gale. His address is: Via Trieste 6, 20081 Abbiategrasso, Italy (telephone 02-942724). •

1/4 Scale . . . . . *Continued from page 29*

scratch built, meaning that 16 of the 20 were kitted versions. ("Highly modified" were the words most often heard over the weekend.)

Pilotage was generally good. As a spectator event, though, it was boring. Spectators just can't relate to hour after hour of takeoffs, flights around the pattern, and landings. This tedium was relieved only by the more adventuresome QSA'ers. Bill Eich's slipping of his big T-Craft to a landing was as beautiful a demonstration as you're likely to see anywhere. The aerobatic performances of Bob Seigelkoff and Lee Taylor were a joy to watch. Those who didn't possess the aerobatic finesse of an Art Scholl were applauded for their courage to try, and good sportsmanship.

But lacking any challenge . . . not even a spot landing contest . . . frankly makes one wonder why they'd travel so far to do what they can do at their own home fields. The only proof they have that they've been to a meet is a Hill Country Flyers transmitter plaque.

Although limitations on maximum weights and wing loadings will undoubtedly be imposed, it appears certain that a planned event for quarter-scale aircraft can be hosted at Hill Country next August. And, given the scope of a contest . . . some skill events, some tasks to perform . . . should make it more rewarding not only for the spectators, but for the modelers themselves.

The attractive feature of the big airplanes is their potential for scale construction and detailing, as well as an uncanny flight realism. In that, lies the challenge. •

Mammoth . . . . *Continued from page 31*

loosen flywheel off tapered shaft. Remove spool and flywheel.

3) Remove flywheel key and store it on flywheel magnet to prevent loss (remembering that you put it there!!).

4) Remove point cover *very carefully* to avoid breakage by prying under flanges provided.

5) Remove points (two screws) being careful not to lose washers.

6) Remove the four crankcase bolts, tap crankcase with plastic hammer to break seal, and remove.

7) Lift out crankshaft, rod, and piston assembly. Note: hold conrod against crankshaft web side to avoid losing rollers on crank pin bearing.

8) Observe position of seals, retaining rings, bearings, and thrust washers on shaft. Remove carefully.

9) Note: to prevent rod bearing roller loss, tape rod to crank web before removing piston assembly. To remove piston, use needlenose pliers to remove

one wrist pin clip (being careful not to distort). Push out wrist pin, which is a slide fit. Carefully remove piston ring.

10) Clean (decarb) piston crown, combustion chamber, exhaust port, and ring groove if necessary. Meticulously clean all parts with a good approved engine cleaner. Ensure that all silicon residue is removed from engine block and crankcase. As the ring is an inexpensive item, should you suspect any damage or if the engine has run any appreciable length of time, it is a good policy to replace it at this time.

11) Should the connecting rod have to be removed, slip rod off flywheel end noting that the tapered outer edge faces flywheel. After thorough cleaning, dry all parts. Liberally coat crank pin with petroleum jelly and stick on the 11 rollers (yes, all 11, check your count!). Carefully reinstall rod and previously assembled piston assembly.

12) Lubricate shaft, piston, and piston ring with two-cycle oil. Replace thrust washers, ensuring that the chamfered inside edge is facing in (allows for radius on crank). Install main roller bearings (markings out) to present smooth face for thrust washers. Install retaining rings. Check seals for wear or deterioration. Lubricate seal lip, ensuring that metal side is out. If for any reason seals are suspect, replace them.

13) Apply a light coating of silicon seal to the cylinder block/crankcase joint, ensuring that you have a nice, smooth, even coating.

14) *A very important step.* To adjust for minimum end-play, pull crankshaft assembly forward (toward flywheel) and press rear bearing tightly against rear thrust washer. While maintaining pull on crankshaft, carefully install crankcase, ensuring that retaining rings enter grooves provided.

15) Continue forward pull on crankshaft, install and diagonally tighten all 4 crankcase bolts snugly, ensuring that both seals are installed flush with crankcase.

16) Carefully remove 2 rear crankcase bolts and *carefully* install motor mount plate, replace rear crankcase bolts and retighten all 4.

17) Apply Loctite on mounting plate screws and tighten firmly.

18) Replace previously cleaned exhaust system and spark plug (plug gap is .025 inch).

19) Check all carb assembly screws for security and replace carb assembly (replacing gaskets). Temporarily plug inlet with clean cloth.

20) Replace ignition point assembly, ensuring that points are not pitted and are scrupulously clean. Replace if necessary. Before fully tightening screws, rotate crankshaft so that rub block is just over cam (high point). Adjust points to .015 inch for used points and .017 for new ones (extra two thousandths allows for rapid initial wear of rub block). Tighten screws firmly and recheck settings. Get it right!

21) Ensure that point lead exits through notch provided in cylinder block. Apply a small amount of silicon to seal lead at this point and carefully snap on point cover.

22) Thoroughly dry flywheel taper on crankshaft of all oil residue. Replace flywheel key (you left it on the magnet!) ensuring that key is fully seated in keyway. Line up flywheel and install. Replace prop spool, lock flywheel and tighten, but *don't overdo it.*

23) Apply Loctite on coil screws and install coil assembly, having routed point wire behind and to the left on the upper coil mount boss, and attach to terminal spade provided. Before installing upper mount screw, place ground wire from coil between coil assembly and screw boss. Do not tighten screws. Coil assembly should be able to move. Rotate magnet segment of flywheel away from coil core lamination. Slip in .010-inch feeler gauge while holding coil up as far as it will go. Rotate flywheel so that magnets are directly below coil core. Allow magnets to pull coil assembly down to flywheel, ensuring that feeler gauge is between coil and magnet. Tighten screws securely.

The following tips are from Gary Isberg, the manufacturer's chief engineer.

Oils: use the best two-cycle air-cooled motor oils available in your area, with mix ratings of 40:1 or better. This will ensure lower carbon build-up. We recommend this be used as a 20:1 ratio.

Exhaust system outlets: we suggest that exhaust outlets be not less than 1/2 inch in duals and 3/4 inch in singles for maximum power. If quieter operation is required, add a second chamber or increase the size of the present exhaust system.

Proper carb adjustments: use a tach, if possible, to set up your engine. The engine will not go "over the hill" as a glow engine will and stop, seize, or overheat. A lean mixture in a Quadra will result in a loss of power and rpm only, *provided a good grade of oil is used at the recommended mix.* We have deliberately tried to "fry" test Quadras, and it just can't be done on a lean mixture. This is a result of over-design in the engine. Maximum temperature will result at the best fuel/air mixture at full load which the engine is designed to take. The cooling area provided by the engine itself is more than adequate. Just allow sufficient air to enter *and leave* any cowling you provide. In fact, a speed governing device was tested, and it bled additional air to the engine, thus reducing power and speed at the governing point. So, again, use your tach to set the carb and not your "modeler's ear" for maximum power. The pump and fuel regulator will take care of fuel level height differences, and you shouldn't have to allow for this.

Performance tips: for those who are inclined to experiment, a method which could result in a power boost and added fuel economy is achieved by adding a length of tubing to the carb mouth with an inside diameter as large as the carb

inlet. Start by adding a 14-inch length of hose or tubing, keeping any necessary bends as gentle as possible. Adjust length for maximum performance increase. This could be routed inside the fuselage and would help keep some of the dirt out of the engine as well. You must, however, *ensure that the fuselage itself is clean* and there is no possibility of any debris being sucked into the engine, and also that there is sufficient air entering the airframe to feed the engine. The tube will act as a pulse charger which can provide additional fuel/air mix to the engine and utilize the spitback fuel now thrown out. If working properly, you will have to readjust the engine to compensate.

Note: you will be amazed how much unburned fuel is tossed out of a model engine. The higher performance engine you have, the higher this amount is, especially if you load the engine down on larger props. If you try the above on other engines, you are on your own; however, the tuned length would be much shorter than on the Quadra.

New items under test, built and designed by the manufacturer, are a new prop adapter, shock mount, quieter exhaust system, combination choke and air cleaner, standard mounting plate, and a capacitor-discharge ignition system. All of these items will retrofit on past and present production engines, and should involve little added cost. It should be emphasized that these and other articles are under test, and when they will be available is not firmed up. Tests made so far on the CD ignition for our use have been less than perfect. The systems we have tested have been lacking in the ability to produce a hot starting voltage when hand cranked, something the present system does very well. Jim Sunday's column "Overheard" in the August issue of *R/C Sportsman* advised that a new CD system will be available for the Quadra, the information coming from a reliable source. We aren't the source, and a phone call to Jim indicated he couldn't give out the source, as the person requested it be held confidential until he was ready to market the device. So, unfortunately, we can't advise anyone about the product.

We received the quarter-scale pilots we ordered from Williams Bros., and I feel they will add more per dollar to the appearance of your aircraft than anything else you could spend your hard-earned dollars on. I've seen modelers who could carve an exact replica of a World War I machine gun, but when it came to recreating the human face, their efforts looked like an escapee from a freak show. Previously, we could get away without a pilot because he couldn't usually be noticed in flight, and on the ground the aircraft could be presented as uninhabited. Some modelers didn't like to be associated with playing with dolls. On our mammoth-sized models, pilots and passengers are really visable in flight, and an aircraft without a pilot looks like runaway aircraft or one that had a defective seat belt. The Williams Bros. pilots are large enough to allow the addition of sufficient detail and changes so that all models are not flown by the same pilot. A lot of money went into producing these, not because the Williams brothers thought they were going to produce the hottest item on the modeling scene, but because they are modelers and appreciate our problems. I hope the sales justify their expenditure to the point where they feel it viable to produce other much-needed detail items. I know they have sold me, and I can now spend more time on structure.

Again, we would like to express our many thanks to the modelers who have written and phoned favorable comments and sent pictures. Keep the pictures coming. Please keep this article even if you don't presently have a Quadra or similar product. Someone else might be glad you did. The information contained is usable by the average person. A service book which instructs you to use tool number such-and-such and jig so-and-so is of little use to the person repairing the engine without these professional aids, and would cost many times what you paid for this magazine. And just think of all the really fine articles you get as an extra bonus . . . another service to the modeler from **Model Builder.** •

Nats Soaring . . *Continued from page 41*

during this contest. Each flier assumed the responsibility of being at the right winch at the right time. No more than three people were called on the public address system to come to the flight line. This was generally after a flight order change, and the delay was minor, unintentional, and obviously due to confusion.

After flying that Thursday, the National Soaring Society (NSS) had a general meeting with the main topic being how to increase the representation of sailplane fliers in the AMA. The NSS was responsible for coordinating the soaring portion of the Nats for the AMA, and it was the NSS which contacted Striegler to CD the event. This was the most critical decision made in the entire Nats chain of decisions, and one that could not have worked out better.

Friday morning arrived, and so did the first moments obviously affected by tensions. The flight order had been posted, and during the ensuing discussion, prior to the first flight, the winds demonstrated a definite preference for a northerly direction, so the winch layout was reversed. This delay was significant. The first fliers were not

launching as early as some of their competition had on previous mornings, and instead of an early morning, slightly downwind launch, they had a healthy headwind. These are the quirks of nature and the breaks of a contest which affect scores, but no one knows by how much. Such things are beyond the control of contest management, and they are what make sailplane flying so unpredictable and challenging.

The morning tension was somewhat alleviated by the Texas crew, when they appeared, en masse, at the transmitter impound table with 20 beautiful 3x5 red, white, and blue Lone Star state flags proudly attached to each Texas transmitter antenna. The Florida license plate taped to a transmitter just did not have the same class. During the last round, a Texas flier put a double whammy on the flying of Stan Pfost, the leader of the Florida delegation. Unknown to Stan at the time, he made his entire flight with a Texas flag stuck on his back. Earlier in the day (from somewhere) Pfost had acquired the jawbone of a cow (well, they said it was a cow), taped a Texas flag to it, and presented it to Cecil Haga, the Texas crew chief.

Jim Fitch continued to fly superbly. On his next-to-last flight, he got a max and made a high bonus landing for about 97 landing points. This was *the* flight. No one could pull ahead of him on that round, and on the last round, as one of the last to fly, Jim caught lift over the turn-around and from then on it was smooth sailing. This young man's enthusiasm for good flying and landings makes you happy for him, and he lets you share in his excitement and pleasure. More winners should be of his nature.

Guests at the awards banquet enjoyed a recap of events, with humorous personal observations from Striegler and Johnny Clemens. Striegler, assisted by the NSS President, Stan Pfost, presented the trophies. Each flier proudly named his home state and enjoyed the customary round of applause.

The Texas team was victorious over Florida, and Bill Haga, as highest scoring Texan, received the much sought-after Texas/Florida Challenge Plaque.

The NSS National Championship went to Jim Fitch, of Tullahoma, Tennessee, who finished with 96.2% of a perfect score.

A review of the scores shows only three of the 22 modified standard sailplanes in the top 21 overall, yet in 8th place was one of the five 2-meter sailplanes; the next 2-meter ship was in 71st position. Texas had 20 fliers; Florida, 11; California, 9; Mexico, 8; and Colorado, 6. So that the Texans do not get too impressed with their performances, please note: two of the three fliers from Tullahoma, Tennessee, were in the top seven, that is District V (the one with Florida) and not District VIII (the one with Texas).

The 1978 Nats soaring contest was a success enjoyed by all. The Houston Radio Control Club and the National Soaring Society are due many thanks. This writer routinely flies in the HRCC sailplane contests, and always considers the 16-hour round trip drive worth it. The AMA has identified the NSS as the cognizant organization to represent sailplane fliers, and each flier is encouraged to join and receive the monthly SAILPLANE journal.

The trophy winners were:

UNLIMITED, OPEN 35 entered
1. Fitch, J 4001
2. Harris 3843
3. Haga, B. 3840
4. Pfost 3735
5. Fitch, C 3680
6. Williams 3622
7. Haga, C. 3613
8. Cook 3558

UNLIMITED, SENIOR 5 entered
1. Copeland 3558
2. Gunning, D. 3397
3. Enkerlin 3206

MODIFIED STANDARD, OPEN 18 entered
1. Raichle 3772
2. Berton 3592
3. Rimmer 3324
4. Hinojosa 3315
5. Perez 3283

MODIFIED STANDARD, SENIOR 2 entered
1. Miller, S. 3729
2. Simons 2770

MODIFIED STANDARD, JUNIOR 2 entered
1. Langley, W. 2591
2. Guzman, J. 2465

STANDARD, OPEN 7 entered
1. Kincaid 3318
2. Pitts 3229
3. Lydick 3146
STANDARD, SENIOR 1 entered
1. Richardson 2641
STANDARD, JUNIOR 1 entered
1. Agnew, B.
TWO-METER, OPEN 4 entered
1. Rutledge 3663
2. Kennedy 2132
3. Womack 1718
TWO-METER, SENIOR 1 entered
1. Mattingly 1406

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Ag-Cat ..... *Continued from page 21*

removable corrugated aluminum panels for the fuselage covering. Perhaps this can be duplicated with sheeting. If you do this, watch the weight build-up. A few more side formers may have to be added to prevent sagging.

I would advise the purchase of a Robart incidence meter, especially if you are like me, and can't get everything lined up by measuring alone. Bolt the landing gear to the fuselage, and bolt on the bottom wing. Block up the fuselage until you get a 0° reading on the incidence meter at the firewall. The wing should be at 6° positive incidence. Shim or trim the saddle area as required. Slip the elevator horn/pushrod assembly through the rear stab platform opening. By checking incidence (4.5°), trammeling, measuring, and swearing a lot, line up the horizontal stab in relation to the bottom wing. When you are satisfied with the figures, mark the location, and glue in place. Maintain a constant check on alignment until glue is dry. Using a drafting triangle or similar tool, line up the vertical fin in relation to the horizontal stab, and glue in place. Make sure you have 3° fin offset to the left of centerline.

Begin top wing center section attachment by temporarily fastening two "line-up" wires between the cabane struts (for and aft), at the location shown on the plans. I did this using light fishline and Hot Stuff. They will hold the cabane struts in position and provide a base for the center section to sit on while you check alignment. Shim or move the line-up wires until the center section is square and a 6° positive incidence is achieved. Check everything again, then fasten the struts to the inside of the outer center section ribs with the grooved hardwood blocks and epoxy. Remove the line-up wires. Sheeting, hatch cover, and center section brace wires can now be added. Note that the center section wires go through the sheeting on top of fuselage (refer to pictures). They are tied off at the lower locations on the struts, and Proctor turnbuckles are used at the top locations. You can pull this assembly out of line, so be careful! The struts are faired with balsa, and glassed.

INTERPLANE STRUTS

With all wing panels in place, make a cardboard pattern of the strut. Use a sheet of balsa (fairly stiff), longer than the distance between the top and bottom wings, as a gauge (pin it to the top and bottom ribs near the strut attach points). This will hold the wings apart, so you can take measurements and arrive at a final strut length. Aileron slave rods are fabricated from K&S 1/2-inch streamlined aluminum tube, threaded rod, and metal clevises. Solder a clevis at the bottom location, leaving the top clevis free for adjustment.

TAIL WHEEL

It's important to make up this item as shown in the pictures. If you try the more common method used on regular size R/C models (bent from music wire), you will have the same experience I had. It collapsed on about the third flight! After all, this thing weighs about 20 lbs., and the single wire arm will just not take the weight and side loads.

FINAL TOUCHES

Complete the rest of the covering and attach the brace wires to the tail surfaces. Flying wires can be installed as per the pictures, or if you have a better way of doing it, go to it. A note of caution; you might be able to do away with the flying wires, but do not leave off the tail brace or center section wires . . . that is, unless you like to pick up pieces, and send your radio in for repairs!

ENGINE-GAS TANK

This area will be left up to the builder. If you are going to use one of the Quadra-type engines, be sure you add the extra 1/2-inch ply back-up firewall!

I ended up with an O&R industrial engine on mine, with the gas tank (made from a Superpoxy thinner can) installed in the top wing center section. No fuel draw problems were encountered, as the engine has a very effective hand primer, and a regulated carburetor.

RADIO INSTALLATION

After 5 years of trying to stuff radios into Quarter Midgets, this was like dying, and going to heaven! Gad, there's a lot of room! After much head scratching and studying the factory drawings, which indicated where the CG should be, the receiver and the servos ended up behind the pilot's seat area. The battery pack is in the center of the lower wing. This had several benefits, in that the tail surface control rods could be made much shorter than normal (lots of load on those things), the cockpit area was open for later detailing, and the nose was free for the spray tank installation. The aileron servos were installed in the bottom wing as per the plans, using an extension lead made for me by Kraft. This system has worked to perfection. I can't claim responsibility for this idea, as I saw it somewhere in a magazine. I had no problems at all with ignition noise, but check your set-up before flying.

SPRAY SYSTEM

It seems a shame to build this airplane and not make some provisions for dust, or spray. So far, the rig I have been experimenting with is working, but the spray mist is still not too visible. I made the liquid tank out of a bottle normally used to keep water cold in the refrigerator. The shut-off valve is an old Enya carb, well greased to lessen leakage, operated from a fifth servo. Combined engine pressure and gravity feed the spray booms. I've got a feeling that a pump of some sort will have to be used to get real scale effect. Whether you install a spray tank or not, be sure you pack the nose snugly with foam. This will dampen engine-airframe vibration, and really must be used with the chainsaw type engines.

FLYING

The first test flight was anxiously awaited by all the club members, and as the time grew near, somebody was dropping by my sign shop every day, to make sure I didn't sneak out and try it without an audience! The First Annual Great Plane Fly-In was to be held the 25th of June, in Champaign, Illinois. I intended to show up with this plane, so the test flight day could no longer be postponed. I took the topper off my Datsun pickup, so as to haul it to the field in one piece, and as I arrived, I was greeted by the largest crowd ever assembled there in some time. Even my wife, who merely tolerates this airplane business, showed up! A thorough range check was performed with the engine running at different throttle settings. Everything checked out here, so next, the ground handling and taxi tests. The engine was then shut down, and the whole airframe checked over to make sure that nothing was loose. We topped off the tank, cranked 'er up, and taxied out to the takeoff position.

Suddenly, everyone seemed to have important business behind their cars, or other places where cover was quickly available. That is, everyone except LeRoy Webb, who was running the camera (He used to jump out of perfectly good airplanes though, so maybe that says something . . .). I advanced the throttle, and after a short run, the tail came up. I let her run on the mains until I thought it was time (I was running out of runway), eased in some up, and she was OFF and FLYING! AMAZING!

I had never flown a big airplane like this, and I soon learned first-hand about adverse yaw and flying on the wings, not the prop! After a few turns around the field, I checked the transmitter trims, and found that only some down elevator had been put in; everything else was dead center. The first landing also pointed out another thing to watch for.

Large airplanes throw off your depth perception until you get used to them, and I flared perfectly into some high weeds at the edge of the field. But she handled it in true Ag-Cat style, and just plowed right through them for an otherwise perfect landing. Anyway, everybody gave me a good round of applause, and I went over the the pits and had a BIG ORANGE!

I made it to the Great Plane Fly-In, and came home with the Best Scale Achievement trophy. One of the nicer things I received was the praise of a full-size Ag-Cat pilot in the crowd, who told me that

it looked exactly like the real thing to him, both on the ground and in flight. This was one of the first meets strictly for the 1/4-scalers, and Eric Meyers, of Great Planes Distrs., in Champaign, deserves a big hand for organizing and CD'ing what I'm sure is going to become an annual event.

An interesting side note to the meet: a pull test device was used to measure the static thrust of the various engines used. My O&R pulled 7-1/2 to 8 lbs., while the Quadras where pulling up to 12 on the same prop (18/6). *(A later note from the author indicates that the engine picked up 500 rpm after more running time. wcn)*

I'm sure that I could stand more engine. I don't think it would fly any faster, but pull-ups from straight and level could be made with more authority on more power.

Well, there it is. Hope you will give it a try, and remember, at this scale, lots of detail can be added without seriously affecting performance. AG-CATS FOREVER! •

Hannan . . . . . *Continued from page 74*

To Eric Coates, who not only composed a new F/F Scale rules proposal to present to the FAI, but took time out from his Radio Control Contest Director duties to WIN the free flight event! To all the competitors, who, after all, are the heart of any contest, and the following enthusiasts who contributed support in various forms: Fernando Ramos, Bob Underwood, Ron Moulton, Bill Dennis, Rex Oldridge, Cedric de la Nougerede, J.D. Gillies, Bob Meuser, David Deadman, Ken McDonough, Phil Owens, Joe Barnes, M. Cowley, Hurst Bowers, Russ Brown, Dennis Norman, Dave Linstrum, Dr. John Martin, Russ Barrera, LeRoy Weber, and Ichiro Yamada. Helpful organizations included The English F/F Scale club, Model & Allied Publications, SMAE, AMA, **Model Builder**, Model Airplane News, Model Aviation, Flyline Models, Modellers Den, Sterling Models Inc., Los Angeles Flightmasters, Scale Staffel, M.I.A.M.A., the Cleveland Free Flight Society, and probably others of whom we are unaware. And, special personal thanks to long-time pen-pal Pete Redhead, who proxied my entry so ably.

All in all, a magnificent experiment, made possible by the cooperation of many. The next international championships are slated for Canada. How 'bout it, shouldn't Free Flight Scale be on the agenda?

MYSTERY MAN IDENTIFIED

Ed Lidgard seems to have been the first to send us the identity of Clarence Mather, our September column "young model builder". Ed sez: "Clarence and I were stationed at Chanute Field in 1941. Later we weren't far apart in Michigan. He's a great guy, even if he gets his prop at the back end once in a while." (No doubt a reference to Mather's canard experiments.) Ed also mentions that he has some Pirelli rubber of good quality for any interested indoor fliers. You might drop him a stamped, addressed return envelope for details: Lidgard, 700 Pine Ridge Drive, Perry, GA 31069.

Perry Peterson also guessed our mystery man correctly, and hopes that Clarence will author an article on rubber motors, comparing the characteristics of the currently available brands. Anyone second the motion?

ASK A SILLY QUESTION

Russ Brown had asked if the plural of FARMAN should be FARMEN. Warren Shipp and Bob Meuser supplied similar answers, but Bob elaborated as follows: "I really think that, in deferance to women's lib, we should use the words FARPERSON and FARPERSONS. I work for part of a state institution that is under contract to the federal government. A recent memo requires us to use such phrases as 'draftsperson' rather than draftsman, and also to use 'he/she' as the subject of a sentence dealing with people in general. It is interesting to note that 'he' comes before 'she', which is fittin' and proper. I wouldn't be surprised, though, if they change the policy and make us give equal time to 'she/he'."

BALLOONISTS TRIUMPH

Three Americans completed a historic crossing of the Atlantic recently, fulfilling a challenge more than a century old. Ben Abruzzo, Maxie Anderson, and Larry Newman landed their "Double Eagle II" most appropriately in France,

home of the Montgolfier Brothers, who started the whole thing during 1782.

The balloonists were welcomed joyously, and the souvenir hunters had a field-day ripping away portions of the gas bag. (Some actually tore sections off with their teeth!) The gondola survived, and is expected to be enshrined along with the other important aviation artifacts in the Smithsonian Institution.

In direct contrast to the leisurely pace of the trio drifting across the ocean, was their return voyage via supersonic Concorde.

Now that the concept has been proven workable, Dr. Dzus suggests that hot-air balloons be issued to congressmen for their future junkets. Since they generate an almost limitless supply of fuel, the savings to the taxpayers should be considerable.

GOSSAMER ALBATROSS

. . .is the name of the man-powered English Channel crosser being prepared by Paul McCready and crew, of Gossamer Condor fame. The pilot is again slated to be Bryan Allen, and the attempt is expected to take place next May.

FLYING ACES NATIONALS

This most successful flying scale model meet of all time offers a very clear message: Fun and good fellowship should be the *prime* objective of model builders!

"Some modelers miss a great deal of positive feedback which may be in the air. Generally speaking, positive vibrations regarding one's work can mean a lot, and cannot be as easily measured as a first, second, or third place."

Entrant Frank Scott had these observations: "I've never seen so many rubber jobs in one place before. We went to the glorious FAC Nats . . . the contest opened on the nicest day that we could have bought. It was a memorable experience meeting, talking to, and just plain listening in to all of the greats, friends, pen-pals, and new acquaintances."

Robert Thompson, of FAC Headquarters, writing in the Flying Aces News, had this view: "We have something very precious here, something that other clubs and organizations have lost, and those who came from other 'downtown' outfits see our meets and wonder where it went. We can't tell you. We can't tell them. All we know is our slogan from our first meets of thirteen years ago: 'Just like in the old days'."

If you think these assessments of the contest are exaggerated, consider these statistics: 81 contestants entered 252 models, and achieved 743 official flights!

We were fortunate enough to see Bill Noonan's movies of the affair, and never have we seen a happier bunch of model builders. Isn't this our real objective?

TO FLY OR NOT TO FLY

We have been receiving widely diverse comments regarding the film "To Fly", which recently opened in San Diego, after a lengthy run in the National Air and Space Museum in Washington. Virtually everyone who saw it in the East approved, while some who saw it on the West Coast openly disliked it. Among the yea-sayers was Eloy Marez of this magazine, while Janet Lueken staunchly supported the thumbs-down contingent. Obviously, a personal investigation was in order, to break the tie, and we donned our film-critic hat for the occasion. Conclusion? Both factions may have a strong case. How is this possible? Here is our guess, unsupported by any really scientific evidence: The movie itself is truly spectacular, featuring breathtaking sequences of ballooning, hang gliding, aerobatics, and a space shot. We were particularly enthralled by an all-too-brief glimpse of the Navy Blue Angles, taken from *above* the aircraft.

However, the problem area seems not to be one of esthetics, but rather one of optics, with possibly a bit of physiology thrown in. According to the box-office literature, the film was originally intended for the Smithsonian museum screen, which measures 75 feet wide x 50 feet high. Locally, we have quite a different situation. Here, the image is being projected inside a 76-foot diameter hemispherical surface. Thus, it appears that optical compatibility has not been achieved. Additionally, the position of the seat occupied may radically affect one's impressions. Then too, certain people by nature are more subject to vertigo than others. Some visitors, including a number of pilots, have reported a feeling of dizziness which persisted quite some time after leaving the theater. However, a warning sign suggesting such possibilities is posted in the lobby.

Inevitably, "To Fly" will be compared with the original CINERAMA, which featured wonderful aerial photography by the late Paul Mantz and his crew. Another yardstick might be the 360-degree CIRCARAMA at Disneyland. We would have to rate them closely in terms of visual effectiveness, and feel all three represented interesting experiences.

Unless you are a bit queasy, we think you will enjoy "To Fly", especially with the added bonus attractions featured in the same Rueben H. Fleet theater. Just down the hall is a splendid laser beam show, and on display in the scientific experiment gallery is an immaculate Fleet 7

biplane, soon to be installed in the new San Diego Aerospace Museum.

SIGN-OFF

Blame Randy Wrisley for this one: An airplane and a helicopter decided to go fishing one morning, at a nearby lake. The airplane asked the helicopter for some bait, but the reply was, "I thought you brought it." The airplane looked at the 'copter and said, "Silly, don't you know the whirley bird catches the worm?" •

R/C Auto . . . . *Continued from page 73*

piston was relieved (bottom edge raised about 1/8 in.) at the transfer port region and took about 10 minutes. The crank was done by a friend of mine in 1973, and a 5.27:1 gear ratio seemed about right for the 20% fuel we had to run (the K&B 100 did not arrive in time). In the Expert main, Bill Jianas was quicker on the infield, but my car was faster on the sweepers and straights. After following me for about 5 or 6 laps, Bill had to push me in the infield to try to pass, spinning both of us out . . . and I still came out ahead. My problem in the main was three blown plugs, ones I had never used in the SS engine with 20% fuel, which cost me lots of positions. So, an old car and an old engine can be competitive with minimal changes in the (old) Superstock class.

During Road qualifying, I talked for a while with Art Carbonell. I had just watched Art turn in a super qualifying time. We got talking about tires and how we both had only a few of the right kinds of tire compounds. For the next qualifying heat, Art had to use slightly harder tires on the rear (conserve the good ones), and he said to watch how the car went through the sweepers. Normally, harder rear tires would reduce traction and give a little more oversteer . . . but that's not what happened. The car now understeered badly, and Art had to really back off the throttle to make the sweeper going onto the back straight. The track was bumpy enough that the harder tires reduced the bounce and improved overall rear traction, giving understeer. This is item 762 to put in your book.

Noticing who and what made the Oval main events was quite interesting. Most of the Expert Oval main cars had good-sized tail fins. I believe tail fins help high speed stability a lot and give much better cornering speeds. The next tech article will get into this. Also, some reduction of max power made driving much easier. If you watched the cars on the back straight, you saw that some cars got completely out of shape when going over the bumps at full throttle. No way could they make it down the chute without backing off the throttle and losing lots of time getting straightened out again. My car had a 40 carb and was running as quick as the fastest cars, and was getting 56 laps per tank of fuel besides. Carbonell's converted Road car and my car seemed to be the smoothest-running cars on the track. Art's car just hummed along as he switched to about a 6:1 gear ratio and seemed to have reduced power.

Only one (Carbonell) of the Monaco World Cup drivers made the Open Wheel main. Thorp's car was running well but had problems and didn't quite make the program. And several of the World Cup drivers didn't even put a car on the track, which shows their interest in Open Wheel car racing.

When the rain came, I thought I really had it made for the Oval main. At a driver's meeting to decide if the mains would be run, the vote was to run. After a question and a re-count, the Amateur main was not to be run and the Expert main would be. Ten minutes to race time was immediately announced. Several racers, including myself, still had all their stuff in their auto trunks . . . and one driver was still on his way to the track. Anyway, I only got about one or two laps in before the race started. It took me about ten laps of the race to get the wet corner down right, and got in a few tangles there in the meantime. Finally I was running with the leaders, but a couple of laps down. I ran out of fuel about fifteen laps after my first pit stop. One of the early crashes had knocked my fuel tank loose and a hole was worn in the bottom. At the end, Bob Welch won, with Carbonell on the same lap coming on strong. But the really interesting thing is that Welch had switched to his Superstock engine the night before, because of the wet weather. Bob made two pit stops versus three for Art, and that was about the winning margin.

One of the most interesting races of the Nats program was the Amateur GT Superstock race. The 100-lap mains, especially in Road events, are really long at Rattey's, and usually, as problems occur, the lead driver usually gets a lap or two on the field. Not so in the amateur GT race. Several cars were on the same lap for about 60 laps. Bill Watson was the leader by a good margin at that time, but Bill Klingbeil was coming on strong. From about 80 laps on, there was only about a quarter lap separating Klingbeil from Watson. Klingbeil would gain on Watson, only to

have a problem passing a slower car, or a pit stop would be required and Watson's pit stops were faster. With one lap to go, it looked like Klingbeil would be able to catch Watson, but again he had trouble passing a slower car and Watson romped home a winner by about half a lap.

The Expert Road main looked like it was going to be quite a race. Jeff Rold was running great and was top qualifier, less than 1 sec. ahead of Carbonell. At the start of the main, Jeff immediately jumped out to a substantial lead. But after 25 laps or so and three blown gears, Jeff dropped out. The bumpy track took its toll, because Jeff doesn't have gear problems at home. After that, Carbonell seemed to have the race his way and finished first ahead of Rick Davis and Chuck Phelps.

Again, I'm trying to forget what happened to me at the 1/8 Nats. Actually, I did quite well, qualifying for all the Expert class mains. But what happened in the main events shouldn't happen to a first-time Nationals driver.

The race committee and organizers had their problems, too. With the first few days running late and rain on the last day, the Amateur and Expert mains were postponed to the next day. The Expert program was really tough physically and mentally because of the delays. On the first day of GT, we had one early practice session, then waited hours to find time running out, so we couldn't run our first round of qualifying. That meant we had to be the first at the track the next day for our first qualifying round, then have the second round and be the last main event, if you were lucky enough. So, besides having both days extremely long, there was no time to really make some changes that the car required. Then the same darn thing happened in the Expert Road class. By the time the Oval event started, I was really bushed and had lost some of my enthusiasm, which is really why I didn't do well in Oval. I didn't do anything to my car the night before the main.

Now it's time to back off on the race schedule and recuperate for next year. The 2nd World Championship and U.S. Nationals should really do it.

EXPERT GT CLASS
1 Bill Jianas (TQ)
2 Rick Davis
3 Jeff Rold
4 Eric Hahn
5 Bob Titterington

EXPERT CAN AM CLASS
1 Arturo Carbonell
2 Rick Davis
3 Chuck Phelps
4 Ken Campbell
5 Gene Husting

EXPERT OVAL CLASS
1 Bob Welch
2 Art Carbonell (TQ)
3 Rick Davis
4 Gary Kyes
5 Georgia Campbell

AMATEUR GT CLASS
1 Bill Watson
2 Bill Klingbeil
3 Sim Picheloup
4 Jerry Thompson
5 Louis Przybyla

AMATEUR CAN AM CLASS
1 Mike Kimrey (TQ)
2 Oswaldo de la Rosa
3 Jerry Thompson
4 Dana Smeltzer
5 Don Shreve

AMATEUR OVAL CLASS*
1 B.J. Hunt
2 Dana Smeltzer
3 Mike Kimrey
4 Rick Perry
5 Dennis Thomas
* (Qualifying Order)

NOVICE GT CLASS
1 George Anderson
2 Mike Reedy (TQ)
3 Phil Goodwine
4 Jack Benas
5 Virgilio Gonzalvez

NOVICE CAN AM CLASS
1 Jim Nelson (TQ)
2 Virgilio Gonzalvez
3 Steve Delvito
4 George Anderson
5 Donn Bryans

NOVICE OVAL CLASS
1 Sandro Tamburi
2 Diane Moody
3 Phil Goodwine (TQ)
4 Mark Parus
5 George Anderson

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R/C Forum . . . *Continued from page 14*

neutral position, the load will be equal on both sides, so, the servo sees no part of it. However, in creating lift to fly or for stability, most surfaces operate most of the time with a greater load on one side than the other, otherwise they would be doing no work and would be useless. So, it can be said that a servo sees a small load with the surface in neutral, and that the load increases anytime a control movement is called for. Important here

is to be sure that the greatest load encountered is well within the rated capacity of the servo. Any load within this capacity will create no harm.

"Time has flown", and this has to be it for another month. It is good to hear from you, write when you can! The address is 49 Colden Court, Buffalo, NY 14225. •

Coupe ..... *Continued from page 78*

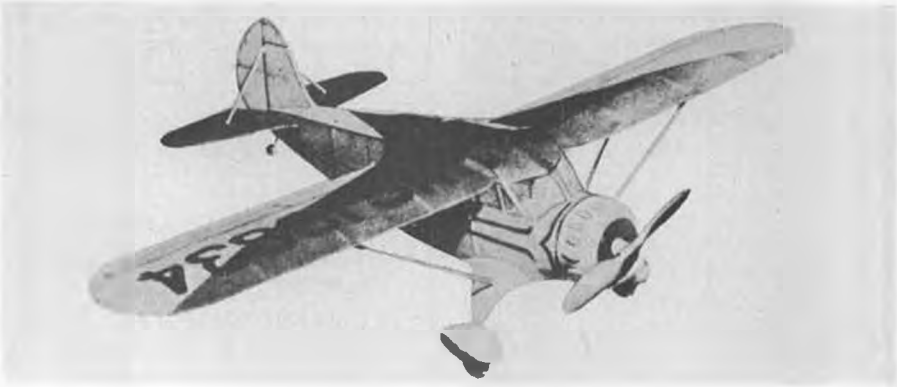
rubber event for nearly two years now. The idea is to provide a competitive model without the giant hurdle of carving and hinging a wooden propeller. Both Kaysen and Peck-Polymers offer good 9-1/2 inch free-wheeling plastic propellers. They work very well, if not overwhelmed by too much torque. In other words, match your motor to your prop. For Coupe flying, we have found that six strands of 3/16-inch is just about optimum. This gives about a twenty-inch motor on ten grams. (Remember that a free-wheeler requires that the motor go slack.) We have used both six and eight strands of 1/8, four and six strands of 3/16, and four strands of 1/4. All seem to work well, with the four strands of 3/16 taking nearly 300 turns and giving nearly a 50-second motor run, but not enough torque for Coupe flying. Now to the model itself.

Clarence Mather, John Oldenkamp, Bob White, and I have spent some time discussing why this model seems to fly so well. We've concluded that, aside from picking good air, matching the motor to the prop, and a lot of luck, there is something to the design. (Sorry about that, Bill!) The polywog airfoil and the incidence set-up seem to be a perfect match for the free-wheeling propeller. The large stabilizer gives it a rather tail-high-kicking glide with remarkable recovery in case of an upset. I should point out that the plane has been flown successfully in rain and wind in Albany, Oregon, in 100-degree breeze in Fresno, in gray overcast conditions in Los Angeles, and in ideal and not-so-ideal conditions at Elsinore, Taft, and the Mexican border. It has performed well everywhere. What determined its moment arm, its nose moment, the height of the pylon, the ratio of areas, and the location of the center of gravity? I must confess it was not intense theoretical study. You might say it was intuition derived from thirty years of poring over plans and listening and watching. All I know is, that in three days time, a disparate collection of parts became a rather attractive and successful Coupe d'Hiver. Try one. I'm sure you will be pleasantly surprised.

In building any free flight model, it is best to construct the flying surfaces so they have time to age a bit. This seems to reduce the likelihood of warps. First, cut out the ribs and the four wing tip pieces. Sand them true and cut the six tip ribs to length. Do this by cutting off the trailing edge, and then use the rib template to reduce the height, slicing off the top of the rib so the trailing edge is no more than 1/8-inch high. Next, cut and notch the trailing edge. Pin this in place with 1/16-inch packing under the front edge so the t.e. angle matches the under-camber. Cut the five pieces of the spar and pin them to the plan with 1/16-inch packing underneath also. Now glue all the ribs in place except the six tip and four dihedral ones; these go in later.

Fit and glue the wing tip pieces in place. You will need to pack them up with scrap, and be sure to include the 1/8-inch washout in each tip. Don't forget to groove the front piece to receive the leading edge. To help hold things in place, glue in the tip ribs. Now attach the leading edge. The center three pieces should be quite hard, but the two tip pieces should be soft enough to bend easily. Set the wing aside and build the stabilizer. Since this is flat-bottomed, no packing is needed. Cut out the ribs. The two tip ribs are reduced in size the same way as for the wing. Cut out the t.e. and notch it, then pin it in place. Pin the spar in place and glue in the ribs. Cut and fit the tip pieces. Be sure to groove the front piece for the l.e. Glue in the l.e. and cut out and glue in the riblets on the stab only.

Back to the wing. Cut out the six 1/16 ply spar gussets. Now cut the five panels apart and very carefully sand in the proper bevel on each end of each panel. Glue the two tips to the long



STINSON RELIANT This 23" blue, yellow and black old time flyer contains hand printed contest grade balsa, balsa wheels, alum. tubing, wire, rubber and prop. $5.25 p.p. U.S.A. First Class, Canada and Mexico $5.75. Catalog of kits and plans ¢50. GOLDEN AGE Reps. Box 13, Braintree, Mass. 02184

center panels. With the center panels flat, the tips should rise 2-1/2 inches.

With everything in place and the angle correct, glue in the spar gussets. I use clothespin clamps for this. Build the rudder while these are drying. The entire rudder is built flat. After it is dry, add the 1/32 cap strips to both sides, extending them on to the leading and trailing edges. This entire unit is then sanded to a symmetrical section and set aside. If you prefer not to have your rudder mounted on your stab, the plans show an alternate rudder and sub-rudder of 1/16 sheet construction. Either one is fine, but I prefer the built-up one myself.

Back to the wing again. Pin the short center section to your board. Pin and glue the main panels so that each tip has 3-1/2 inches of dihedral. Now add the center spar gussets. While this is drying, cut out the wing riblets. Glue in the dihedral ribs and all of the riblets. Set the wing aside and build the fuselage. The balsa used for the three main parts should be straight-grained and should roll easily. Either soak them in hot water or, if you are brave and have a well-ventilated workshop, soak them in ammonia mixed with an equal amount of water. The motor tube blank should be 4-1/2 inches longer than the finished tube, to allow for the doublers. It can be wrapped around any straight form . . . dowel, tubing, or fluorescent light tube.

The tail boom was wrapped on a straight pool cue. I hold the sheets in place with 2-inch wide gauze bandage strips, but rubber strips or old shoe laces would do. When these are dry, carefully glue the seams together. Add the doublers in the motor tube and one in the tailboom. Do not add the long doubler key to the tailboom at this time. Add the two circular formers and the snuffer tube brace to the tailboom. The snuffer tube and lower DT wire go in easily at this stage. Cut out the two 1/32 ply rings and carefully line up the motor tube and the tailboom. The top of the fuselage is straight. Sand the joint until it is perfect.

Now glue on the ply rings and the doubler key. Notch the parts for the motor tube. Now that you have determined the top of the motor tube, sand in the down and side thrust and glue on the 1/16 ply nose ring.

Cut out the two symmetrical formers, the bulkhead, and the short 1/8 x 1/16 stick for the pylon. Assemble these, as per the plans, into an open frame for the pylon skin. Glue together several pieces of 1/16 flexible balsa so you have a piece 2 inches by 12 inches long, with the grain going in the short direction. Draw a line perpendicular to one edge of this piece, in the middle of it. Glue the edge of the 1/8 x 1/16 stick to this line. Be sure that the smaller former is at the edge of the skin. Now, gradually roll the frame down onto the sheet skin, gluing as you go. Hot Stuff is ideal for this operation. When one side is attached, trim and bevel the end; then roll down and glue the other side, overlapping the skin at the rear. Trim the top so the pollywog ply platform can glue directly to the former. Its shape was determined by a scrap I had on hand; if you reshape it, do not make it any narrower.

Now wrap a piece of medium sandpaper around the form you used for the motor tube, with the rough side out. Being careful to keep the pylon straight on the form, rub it along sandpaper until the bottom fits the motor tube perfectly. A word of caution: Coupe has a minimum cross-section required, so don't sand past the bottom former. Epoxy in the wing hold down dowels and add the two shim pieces to the platform. Sand all your various parts and pieces, and pick your covering scheme. Cover the tail surfaces and the tailboom with the lightest grade tissue you can find. The motor tube should be wrapped with a spiral covering of silk, lightweight fiberglass cloth, or at least, heavy duty silkspan. Then cover it with tissue. Glue on the pylon, lining it up carefully. Cover the wing, being sure to attach the tissue to the undercamber of each rib.

Assemble the nose block from five pieces of 1/8 hard balsa plus 3/32 ply plug. Drill a straight 3/32 hole through the middle. I shaped the nose block on a drill, using a file. Cut out the stab platforms and epoxy them in place. Bend the top dethermalizer wire and glue it in place on the stab. Cut the four rubber band hooks for the fuselage from hard balsa or basswood. Scratch the surface of the fuselage and epoxy them in place. Drill the nose block and install the propeller. That short sentence is what makes the Coupe de Plastique unique! There are a number of thrust bearings on the market, but I find that the brass tube and a brass and teflon washer work fine. If need be, balance the prop with a little clay on the back of the light tip.

You may now think that you are ready to go flying, but you are not. Key your surfaces!! Assemble your model, and by measuring from wing tip to tail, be sure that the wing is square. When it is, glue short pieces of split dowel to the underside of the wing next to the platform; two at the spar and two at the trailing edge. Now do the same thing with the

stab. With the rudder on the stab, you do not want any shifting to take place. Now, let's go fly.

A few hand glides are fine if you have some of that scarce long grass, but free-wheeling props can bend shafts on hard, rough surfaces. If your center of gravity is as marked on the plan and your incidence is correct, you are ready to put in 50 to 60 winder turns. I use a Sterling winder, which has a 5:1 ratio. Now release the model gently in level flight. Watch it! You want it to fly right/right. Bend the rudder trailing edge for right turn and/or tilt the stab (shim up the right side). If you tilt the stab, be sure that the key is still holding your stab in alignment. Now add 10 winder turns and try it again. Keep working a little bit at a time. The speed of the glide should be controlled by the incidence of the stab. The angle of the climb is regulated by down thrust. As you approach 140-150 turns, the plane should jump out of your hands. It is very important not to throw it or to launch it crosswind or downwind. If there is a bit of a wind, launch your plane just to the left of it. If you practice enough, you should learn to pick good air. You have an excellent plane, so now go find the experts and beat them with your plastic "toy"! •

Instructor . . . . *Continued from page 27*

that you aim it at the runway and fly it in. Typically, if your problem is hitting the runway lengthwise you are probably landing too fast, but if you are missing left or right, it is too slow, causing the airplane to wander.

I like your ideas on devoting columns to flying specific airplane types, and I'll consider it in the future. Thanks for the compliments.

Dear Dave:

I have a Pulsar biplane that wanders and hunts as it flies straight, but rolls and loops just fine. The CG seems OK. I have tried different CG's, motor alignments -3° to +3°, and different right thrust. Also have tried changing the top wing from -3° to +3° in small stages. All of these changes have not fixed the hunting when it is going straight.

The thing that stumps me is that it changes with speed in one way and changes with power in another. (Power off from full speed will dive or climb, depending on how the engine is set.) But it will not stay stable with high power setting. Not bad at low setting, unless the plane is going fast (as in a dive). Thanks for your help, Tim Mattern, Grafton, ND.

P.S. The plane is set up very well, with dual pushrods to the elevator and ailerons. Also saw many Pulsars at Omaha Nationals doing the same thing.

Dear Tim:

I applaud your efforts to cure this problem, and I must admit I've seen this in many Pulsars (sorry, Norm). I believe this problem is caused by having a flat stab and fin on an airplane with a lot of drag up front (two wings). I think the problem would be cured by putting a thick stab on the Pulsar. It would be easiest done by putting a piece of 1/4 square balsa top and bottom on the stab and Monokote over this (see sketch). This will increase the thickness substantially and create a diamond section. I hope this works, and if you try it, let me know the results.

(We'll back up Dave's suggestion, and add some documentation. Some years ago, when Phil Kraft's Quick-Fli design dominated the contest scene, there were occasional reports of mild "fish-tailing" noticed during otherwise perfectly straight flight. We particularly remember watching this phenomenon during low inverted passes in calm evening air, by experienced pattern flier, Gus Geissinger. We forget who came up with the analysis, but the conclusion was that the thin, flat tail surfaces were going through a series of highspeed stalls.

At the time, we were developing the second Big John design, "O.M.T." [One More Time], which was to follow the prototype B.J. and 7/8 B.J. [which was called the "Duster" and published in M.A.N., September 1964]. Recalling that the prototype and 7/8-versions had similar wandering characteristics [mostly blamed on pilot inability], we put a thick symmetrical section in the tail surfaces. Voila! The big ole bipe grooved like a modern FAI aerobatic ship.

We plan to re-issue the "Duster" sometime in the future, and will change the tail feathers to a diamond section, for this reason. wcn)

Dear Dave:

Are pattern contests going to become as rare as the snail darter fish? What prompts such a question is the steady decline in the number of contestants showing up at contests. At least, that is evident here in Texas.

I certainly wish to take issue with the present set-up. Novice class pattern is a farce! An OPS with tuned pipe attached to a Bootlegger with Rhom retracts and guided by a custom contest multi-buttoned radio is not my idea of a Novice pattern plane. When some poor soul drives a hundred miles with a Veco-powered Kaos in the trunk gets to a contest, he quietly leaves his bird put.

Why in the hell can't we leave Novice

events for novices?

I admire Expert and Master-type fliers, but don't like them in Novice. Three wins and they move up . . . baloney! Here in Texas we have ten-year novices.

Looks like the manufacturers, if no one else, would like a broad-based Novice event. Oh well, at least you will get this one letter this month. Happy Flying, Ben Garrett, Brownwood, TX.

Dear Ben:

I don't think they will become that rare, because in some parts of the country, pattern contests are on the rise. I do agree that perhaps the equipment used in the Novice event is becoming too sophisticated, but the other side of the coin is that if the equipment is restricted, it will be obsolete when the competitor moves up to the next class. Proposals are being made now to the AMA which should help this situation, but I'd like to recommend that you submit a proposal to the R/C contest board, detailing your ideas which may be incorporated into a final proposal or rule. The advancement system is the primary problem, as it advances people out of Novice too slowly and into Masters too quickly. •

Fuel Lines . . . . *Continued from page 61*

to "light off" than alchy. My notes from 1968 have a notation "use 1650 ft./sec.". Since I was totally involved in speed in those days, and "go fast" was *the* word (I once ran 88% nitro, 10% lube, and 2% propylene oxide), let's assume this figure related to at least 70% nitro content fuel.

O.K., the most important point to remember is that the length of the pipe is measured from the face of the piston to a "mean" point of reflection from the rear or baffle cone. This mean point is approximately one-half of the complete rear cone; that is, if it was measured from its major diameter out to a sharp point (see Fig. 1).

All of these dimensions can be determined by drawing the complete system out on paper, or they can be calculated by the formulas given later on. Our main object here is to give you an easy way to determine the correct length for your commercially-produced engine and pipe, not to get into pipe design. By taking the length specified by the engine manufacturer, you can work backwards to find the correct wave speed for your fuel.

The formula for finding the length of the system is:

$$L = \frac{E\,V}{N}$$

Where L = Tuned length (see Fig. 2).
E = Total exhaust timing in degrees.
V = Velocity of gases in ft./sec.
N = rpm.

From the above, you can arrive at a reasonably accurate figure for various fuels and/or props, and/or nitro content. Just remember that you cannot have more than one variable at a time to get consistent results. If your engine's manufacturer specifies a tuned length for a given rpm, consider the nitro content of the fuel for that length. For example, if it is an OPS or Rossi, the chances are 99.9% that their figures relate to FAI or no-nitro fuel.

3) All of the engines you mention are fine pieces of equipment. The Super Tigre X-60 is relatively new, and we still have not received the pipe for this engine from Italy via World Engines.

Our only observation with the X-60 so far is that it takes a lot of running to come up to its full potential. It's hard to say what you can expect from these engines, except that you mention blowing up an OPS .60 on 40% nitro. With this much nitro and the pipe, I'm afraid you obtained the results to be expected! Consider that in C/L speed, the engine rarely runs for more than 15 seconds at full power. At 200 mph, it takes less than 9 seconds to make 6 laps on 70-ft. lines. Consider also that it is not unusual to rebuild a racing .60 or .65 several times to get one flight with a full pipe and high nitro! Now, think about what you are asking your R/C engine to do. If you fly for only 3 minutes with a full pipe on 40% nitro, you're asking a lot of an engine, much less the glow plug. Unless you are willing to invest about $50 in special phenolic retainer bearings, if available, and another $50 to $100 in a titanium connecting rod that utilizes caged needle bearings, don't expect any engine presently available to stand up to the rigors of high nitro fuels *and* several minutes of flying time on the pipe. The only engine I know of that can possibly stand "the gaff" is the special TWA's, as built by Glenn Dye of Performance Model Engineering. I understand that K&B is due to release a new rear-exhaust, piped .61 soon. As it is also designed by Bill Wisniewski (as was the original TWA), perhaps it will be capable of much more, but my guess is that, in order to be commercially marketable, 15% nitro fuel will be about the upper limit. And even then, be prepared to replace parts. The K&B 6.5 is probably one of, if not *the* most powerful engine for its size ever produced. But be prepared to rebuild it if you run lots of nitro,

even for short periods. For $400 to $500, most any good manufacturer could give you something that will GO for long periods . . . but obviously, they would not sell many.

4) Considering the engines available today, and there are some darn good ones, my guess is that you should tune them for about 13,500 rpm max on the ground, which will give about 15,000 to 15,500 unloaded in the air.

5) As we've said before, if you aren't getting at least 10 flights per glow plug, you're either overcompressed, running too much nitro , or both. (See my previous column with more data on this and a special head design.) My advice is run no more than 5% nitro! The pipe is already giving you a bunch more rpm. Unless you're willing to rebuild your engines regularly, back off on the head compression and/or nitro.

6) The key to this one is, "I'm a sport flier." Like the man said, "Back off, Charlie . . . or Horace!" Your OPS .60 is one of the finest engines available, but don't expect more than it is capable of giving for the price you pay. Pylon racers found out in a hurry what we've known in C/L speed for years; "If you want to go fast, how much money can you spend?"

Maybe I'm mellowing in my approach, but why not get everything working smoothly on no more than 5% nitro fuel. Make all necessary adjustments, such as head shims for longer plug life, prop blades balanced, thinned, etc., until you can fly at will with absolutely no problems. With a full pipe/muffler system you'll still be going stronger than BTP (before the pipe). If all else fails, set up your engine on the bench and adjust the pipe in or out, holding it with a heavy glove or rag, to get the optimum length. The point is, get consistency first, before going to higher nitro. And if you do, only make one change at a time; i.e., if you add nitro, don't change the prop or raise the head at the same time. Make a test run first, and if it wipes out the plug, then add a head shim and test again. More than one variable will not give conclusive results.●

BERNHARDT

● Ignition Troubleshooting . . . cont.

There are some brave individuals who will check for spark by placing their finger on top of the spark plug while cranking the engine. "Yup, I got a spark," they say. Big deal! It only proves they have a lot of insulation at the end of their finger tip. I jump like hell when I try it! Actually, this is a poor test and proves very little. A good coil operating with a defective condenser will give every indication of a good spark when tested with the finger method, but your engine will still refuse to run. The reason is that the coil produces the spark, but the condenser is a good deal responsible for the length of the spark. If the spark is not strong enough, it will not jump the distance between the spark plug electrodes, especially under compression. For reliable performance, you must be able to throw a spark at least 3/16 of an inch in length. This will be impossible if your condenser is faulty, so if in doubt, change it and try again.

So far, we have discussed the engine that refuses to run. But what about the engine that does run, but is obviously not performing as it should? This could be defined as engine missing or erratic firing. Sometimes, an engine will refuse to go into a two-cycle mode when the needle valve is leaned out. And there are engines that will run smoothly at slow speed, but miss like crazy when asked to operate at high speed. This can be a frustrating experience, but in reality, the solutions are usually quite simple. Let's examine them separately.

1) Engine will start but misses at all speeds.

Possible causes:

A) Contact points are dirty.

B) Contact points are loose. Check the condition of the riveted tungsten point on both contacts. Sometimes they get loose and have to be reriveted. This is a difficult trouble point to observe, but it is a real source of trouble, especially in original old timer engines.

C) Spark plug is dirty.

Conclusions: At least 90% of engine missing can be traced back to a faulty electrical component.

2) Engine runs fine at low speed but misses at high speed.

Possible causes:

A) Contact points are slightly loose.

B) Condenser is faulty.

C) Movable point is floating at high speed.

D) Spark plug is dirty.

E) Batteries are weak.

Conclusions: At low speeds, an engine is operating at low compression cylinder pressure through which a weak spark can operate across the spark plug electrodes. However, at high speed, the pressure within the cylinder increases and requires more electrical force to generate a spark at the plug. A miss occurs when the fuel/air mixture is not ignited by the spark plug. Inspect for one or more of the above causes. An additional cause of engine miss only at

high speed is a weak spring that operates the moving point. This may prevent proper mating of the points at high speed. The correction for this mechanical weakness would be to install a helper spring or replace the original spring with a stronger one. Engine miss can occur if the outside surface of the spark plug is exceptionally dirty. This will cause the spark to travel on the outside surface of the spark plug instead of across the electrodes. Sometimes this may be clearly seen on a dark night.

The following sums up the essentials of a good ignition system:

1) Sound wiring of the shortest length.

2) Fresh batteries, properly connected.

3) Clean contact points.

4) Clean spark plug.

5) Proper contact point and spark plug gap.

6) Reliable coil and condenser.

Earlier I stated that at least 90% of engine missing can be traced to something faulty in the electrical system. This leaves 10% falling into the mechanical category, however, the symptoms will usually show up as a balky engine that refuses to start. I once worked over an hour with a friend trying to get his pesky engine to keep running. It would run fine on a prime, but refused to keep going, no matter how much we opened the needle valve. It was only by accident that we discovered a minute hole in the fuel line, which prevented the engine from drawing fuel.

Another mechanical point to check periodically is the sealing quality of all gaskets. You would be amazed at the power loss derived from a leaking head gasket. This holds true for the spark plug gasket, too.

One last mechanical thing you might check is the direction of the fuel jet in the needle valve body. If the body has a single fuel jet, it must be positioned to face in the direction of the air flow. This means that as you are looking at the needle valve body through the intake tube, the jet hole would be on the side opposite. If the needle valve body has two fuel jet holes, it should be positioned so that the jet holes are facing the sides of the intake tube. •

Power Boats . . *Continued from page 35*

mix allowed for 6-boat heats during the three qualifying heats, leading up to a winner-take-all final heat for the top six boats and two consolation races for the next dozen unlimiteds. With a field of 35, gaining access to the six-boat final took both good driving and some good luck. Observing the different models working their way through the qualifying heats, this writer was especially impressed with four of the boats and their drivers. Ron Erickson, fastest qualifier during Wednesday's activities, was having no problems winning his three qualifying races. Les Ruggles, driving his Miss Super Test, also won all three of his races quite handily. Another boat, Bill Hornell's Thriftway Too, also gained the finals with three heat victories. However, Bill really had to work for one of his heat wins when he jumped the start and then proceeded to lap the entire field to take the win. The fourth boat that looked impressive reaching the final was the Slo-Mo-Shun V driven by Bill Osborne. The Mo V is now in its fifth year of competition, and still remains a constant performer. Filling out the top six boats for the final were the Miss Budweiser, driven by Roger "Czar" Newton, and the Miss Technicolor, driven by Mark Chamberlain, a junior engineering student at the University of Washington.

Prior to the running of the final, two consolation races were conducted. In the second consolation race, Steve Maggard brought home the Miss Shanandoah in front of Rocky Fridell's Squire. They were the only finishers in this six-boat field. The first consolation race was an excellent contest between the Hamm's Beer, driven by Dennis Caines, and the outrigger Pay 'n Pak, driven by Gary Jensen. Both boats battled side-by-side for 4-1/2 laps before Jensen ducked inside a stalled boat in the last corner and took the first place honors. Dennis followed in second, and Butch Melewski, piloting the checkerboard Bardahl, took third place.

With the conclusion of the consolation races, the stage was now set for the final of the World R/C Boating Championships, R/C Unlimited division. With all six of the top qualifiers running 30 seconds prior to the race start, Gary Jensen pulled the alternate Pay 'n Pak off the course as the finalists jockeyed for starting positions. Striving to gain the advantage of being first boat into the first corner, Ruggles, Newton, and Chamberlain jumped the start. This left Erickson as the first legal starter, followed by Hornell and Osborne. Ron was forced to swing wide in the first turn to avoid the boats that were early, and Bill Hornell hung his twin K&B 6.5-powered Thriftway Too right on the buoys to take a slim lead down the back straightaway. Although Ron made some strong challenges during the next 4-1/2 laps, he wasn't able to overtake the Thriftway Too and had to settle for second place behind Bill's fine running twin-powered machine. In third position, Bill Osborne drove a very steady race to prove that the old Slo-Mo-Shun V is still a competitive piece of equipment. Les Ruggles finished up in fourth place, followed by Roger Newton and Mark Chamberlain. All six boats finished and returned to the pit area under power. That in itself is quite an accomplishment. The exciting, well-raced final heat was a fitting climax to the 1978 World R/C Boating Championships.

The Planning Committee wishes to

express its sincere thanks to our primary race sponsor, John Perry, and a special thanks to our event sponsors; Dumas Boats, International Products, Octura Models, and K&B Manufacturing, for their contributions. •

Counter . . . . . *Continued from page 8*

engine bottom exhaust is also $19.95; and QM-UBT, upright engine, bottom exhaust is $21.50.

Who? Where? Try your local shop first; if not in yet, contact Quarter Headquarters, P.O. Box 12321, San Francisco, CA 94112.

* * *

Airplane modelers should not overlook this one just because it says "Octura Models" on the package . . . this is a handy item for all drivers of engine-powered models. It is an inexpensive fuel line clamp that will keep that liquid gold from dripping out on the ground or into the carburetor and making you lose a heat because of a flooded engine.

The clamp is precision molded out of what appears to be reinforced nylon, in ivory color. The serrated ends will not slip off any oily fuel line, and they will not pinch through, as some of the metal hemostats often used for this purpose will do. The locking clips on the handle end are spaced so as to permit clamping different thicknesses of fuel lines.

Only 75¢, from all dealers, or from Octura Models, P.O. Box 536, Park Ridge, IL 60068.

* * *

A fresh, stimulating, and exciting new service is now available to the scale scratch builder from Repla-Tech International. It is offering R/C Flying Scale plans, but doesn't stop there. You may also obtain a Repla-Build Booklet, containing photos and instructions for building the model. You may also purchase a Repla-Sketch Booklet of scale data, including a history, three-views, sketches, and photos . . . all suitable for scale presentation.

You may purchase a PhotoPacket, which includes photos of the completed model, as well as 5 x 7 color and black & white photos of the actual airplane. And last but not least, vacuum-formed plastic parts are available for hard-to-duplicate items such as canopies.

The first of the series is for the 1978 Cessna Agwagon crop duster; soon to be available will be similar material for the Zlin Z-50L aerobatic airplane. Others will be announced as soon as completed.

We have seen samples of all of the above, and are impressed with it all. Knowing the amount of research and time that goes into a project of this sort, we think the pricing is fair in all respects.

For example, the Agwagon plans, for a 48-inch model, drawn with a .19, are only $6.50. Repla-Build and Repla-Sketch Booklets are $2.35 and $1.50 respectively. Various packages are also available, including everything for the Agwagon at $21.00.

A catalog of plans, with complete details, is available for 25¢. All from Repla-Tech International, Inc., 48500 McKenzie Hwy., Vida, OR 97488.

* * *

The fleet's in! The Futuraglass Design fleet, that is, which consists of competition fiberglass designs of various types and for various events. The first one we'd like to present to you is the 40-60 Scale Hydro, which is a 36-1/8-inch hull suitable for many scale hydros. It features installed stringers and forward bulkheads, fiberglass cowl, and white gel-coat finish on the hull and cowl. It is priced at $79.95; a hardware kit is available for $47.00.

If your interest lies in Deep-Vee's, there are three available, in 20, 40, and 60 sizes. They also feature gel-coat finishes and joined deck and hull. They may be ordered with metalflake decks and a matching solid color panel on the side. Deep-Vee's are priced at $74.95, $89.95, and $99.95 in progressive sizes, and hardware kits are $44 and $49.

A tunnel hull is also available . . . a lightweight design intended for the K&B 3.5 cc outboard. The "Magnum", as it is called, also features brilliant gel-coat and comes joined and ready to run. Length of the "Magnum" is 29-3/8 inches, beam is 14-5/8, and tunnel width is 8-1/2. The choice of colors includes orange, red, blue, and British racing green. This one is priced at $89.95.

These fine looking competition boats, as well as further information, are available from Futuraglass Design, One Cannon Drive, Nashua, NH 03060.

* * *

It's calendar time again . . . it seems to roll around at least once a year! And for '79, a calendar designed especially with the R/C modeler in mind is now available. It can be obtained from Photography by Fred House, and each month features an 8 x 10 full-color photo of an R/C model airplane.

All types of models are included: racing, pattern, bipes, scale, and even female persons posing with some of

them.

The calendar is 10 inches wide by 18 inches long, in a vertical format, with plenty of space for notating dates to remember. The full-color prints of the models are on enamel-coated semi-luster paper, suitable for framing once the month or year has passed.

Cost is $4.95, plus 75¢ for shipping and handling, direct from Photography by Fred House, 9032 90th Northwest, Oak Harbor, WA 98277. Washington residents don't forget to cough up that extra 5%.

* * *

Second only to the quality of the batteries in your radio system is the charger that you are reviving them with. L.R. Taylor & Co. has introduced its "Multi Charger", designed for convenient and safe simultaneous charging of two transmitter and four airborne batteries.

This multiple charger features transformer isolation for user safety, and independent circuits for the protection of the individual packs. With the addition of the proper plugs for your system, it can be used with nearly all radio systems on the market.

The charging rate for the receiver packs is 50 MA. Transmitter packs will be charged at 55 MA if they are of the 6-volt, 5-cell (Kraft Sport Series) type; 50 MA for the 9.6-volt, 8-cell (most used) types; and at 45 MA for the Cox Sanwa kind which uses 10.8 volts, 9 cells. The "Multi Charger" will work off 117 VAC 60 Hz, and can be ordered for 220 VAC 50 Hz operation. Price of either is $24.95.

Contact your dealer, or order direct from L.R. Taylor & Co., 20831½ Roscoe Blvd., Canoga Park, CA 91306.

* * *

Topless, Topless, Topless!!

Now that we have your attention, we can tell you about Delta Manufacturing's "Super J" 1/8-scale R/C race car, shown here in topless form so that you can see all the goodies.

The Super J and its companion, the Panther, are just part of what is described in great detail in Delta's 1978 illustrated catalog, available for $1.00. In addition to exploded views of these two cars, the catalog lists chassis, bodies, disc brakes, clutches, engines, decals, tires . . . in fact, just about everything needed by the beginner and expert in this popular part of the R/C hobby.

Delta equipment was used by a large percentage of the successful racing drivers in 1977, and continues to build an enviable record in 1978. You can obtain your catalog direct from Delta Manufacturing, 27 Race Car Court, Lorimer, IA 50149.

* * *

Custom Model Products, 27 Fulton St., Brockton, MA 02401, which offers a wide variety of modeling products, has one new one to tell us about, and an old one to remind us about.

The first is 15-minute Quick Cure Epoxy, in economical 4-ounce (mixed) containers. This adhesive dries clear, sands easily, and is fuel-proof and flexible. It comes in easy-to-use squeeze bottles that let you meter out exact amounts as required.

The older product which you should take a look at is the "Z" Pliers, as used to shape the ends of 1/16-inch music wire pushrods for easy and reliable insertion into servo arms and control horns. This is an economical way of making that needed connection right where you need it.

Both are available through most shops and distributors. ●

MRC Hawk . . *Continued from page 23*

glossary of airplane and radio parts, and extremely clear drawings of pushrod installations and clevises, horns, etc. This type of basic information, which so many of us take for granted, is extremely important to the novice, and can make a difference in how long the learning process is going to be.

Step-by-step instructions are given, including the all-important proper positioning of the elevator and wing relative to each other and to the fuselage. Control movements, both direction and degree, are discussed and explained, and recommendations for flying are clear and concise, including: "Before attempting to fly your model, it should be carefully checked by a com-

petent, experienced model pilot and its initial flight made by that pilot."

A separate "Safety Instructions" booklet is enclosed, which explains R/C in general, frequency sharing, the AMA Official Safety Code, and many do's and don'ts to assure the safety of your investment, yourself, and others at the flying field.

There is another sheet of safety instructions for the engine, which lists all the precautions that new modelers should be told of, and some that us more experienced should be reminded of from time to time. In fact, safety in all aspects of the R/C hobby is often mentioned throughout all the instructions that come with the Trainer Hawk.

We feel this is a step in the right direction, since there is already some concern on the part of the industry and the serious hobbyist since the arrival of the department store ready-to-operate R/C models. We are rightfully concerned that inexperienced purchasers will shoot us down from the schoolyard adjacent to the flying field, or that they might hurt themselves or nearby property, giving us all an undeserved black eye. The MRC instructions do their best to warn and control newcomers without scaring them away from the hobby.

The engine furnished with the Hawk is the popular Enya 15-III, a sport class engine which, if you are familiar with Enya engines, you would recognize immediately by its lines and by its exceptional external finish. It is not all external though; Enyas have established a good reputation as being long-lasting and reliable.

This one uses a bronze bearing, lapped piston/cylinder, and is received with an Enya muffler. The carburetor appears rather small in throat area, especially if you are used to looking at racing .15's as I am, but it is ample, and easy to adjust. Idle is controlled with a mechanical screw stop that sets the opening, and a screw-adjusted air bleed on the front that requires a one-time setting. The weight of the engine is 5.2 ounces, and it is rated at 2,000 to 13,000 rpm.

The Enyas in my Trainer Hawks have been trouble free. They start easily, requiring only one flip of the prop with a finger over the intake, and a quick blip of the starter. With the Enya muffler supplied, and still rich enough to leave a trace of smoke, they swing the Top Flite 8x6 supplied at just over 12,000. This is enough to get the airplane off in 50-60 feet and climb out quite sharply. The airplane will climb vertically for a short period, and will loop out of level flight without any strain. It is definitely enough power, with a bit to spare for those times when a situation calls for it.

The spinner is of good general quality, but will be a problem for those who like to use an electric starter. It is a two-piece spinner; the front part screws on after installation of the back half, prop, and prop nut. Since it has a right-hand thread, the starter can spin it off, especially if you flood the engine. The front half does have a hold through which a length of wire can be inserted for extra tightening which has worked so far for me . . . I use a starter and have yet to spin the front off. And of course, it will not create a problem for you chicken stick operators. It works, though if it ever needs replacement, I would consider one of Carl Goldberg's inexpensive "Snap-On" spinners.

Feeling as I do that this type of airplane can also be of value to other than a rank beginner, as already explained, I opted to attempt a slight customizing job on one. No attempt was made to change the basic design or flight characteristics, merely to make it look a little different from the stock Hawk, and possibly prolong its life somewhat.

The first step was to apply some of Top Flite Models' new Econokote to the wing and tail assembly. This was my first experience with this material on foam, and it went as well as the Econokote instructions say it should. Using slightly less heat than is required for Monokote, which is good because high heat will blister the foam, Econokote goes on easily and adheres well. Complete instructions about applying this type of covering is not the intent here; suffice it to say that you must first sand the foam with 400, and then 600 grade paper, and then vacuum it thoroughly. This is

important, as any dust left on the surface or in the pores will result in imperfect adherance of the covering. I have read a tack rag is recommended for a final wipe down . . . I threw mine away the first time I had a paint job ruined because of residue from a commercial tack rag. If you feel one is necessary, use a lint-free cloth slightly dampened with alcohol.

The horizontal stab is temporarily placed in position, and a line drawn around the fuselage section. Cover only to this line, so that the epoxy later used to secure it will be holding foam to foam, not foam to covering. The rudder is covered down to the fuselage line; the Econokote goes around the compound curves quite easily if it is done slowly and gently pulled as heat is applied with an iron. DO NOT USE A HEAT GUN at any time during the covering operation, as it will cause blistering of the foam.

The wing is covered like any other wing, after the mentioned sanding and vacuuming. To reinforce the center section upon which the hold-down rubber bands will press, I used a layer of 3/4-ounce fiberglass cloth applied with 5-minute epoxy. Do not use resin, as it will dissolve the foam. The photo shows how the cloth can be applied neatly. Apply a border of masking tape around the area to be reinforced. Cover it with epoxy, and lay on an oversized piece of cloth. Add more epoxy from the outside, being careful that the cloth is saturated but that no thick build-ups occur. Do this right up to the masking tape, and slightly over it. Soon after the epoxy has set, but is not yet completely hardened, the cloth can be trimmed around the edge of the tape. A new No. 11 blade on your Uber Skiver will do this perfectly. Press down the edge, remove the tape, and give it a few more minutes, after which it can be sanded and covered.

The instructions recommend that a piece of aluminum foil be glued on the wing on the places that the bands will press, for the same purpose. Something else that will work is ordinary clear acetate plastic, such as is used for windshields and windows. It can be secured with any of the foam-safe contact cements. Some protection of this sort is definitely recommended.

The fuselage was sprayed with a coat of paint . . . any of the finishes recommended for foam can be used. If you insist on using something from the corner hardware store, be sure and test it first on a piece of scrap foam cut from inside the fuselage. It may contain solvents or propellants that will attack foam.

But the painted one looks original. Though I didn't use it, there is a new material available from Midwest Products Co., called "Styromate Sealer", which can be used as a paint base on foam. Proper application and sanding, then painting with epoxy or polyuethane, is supposed to result in finishes resembling those seen on wood surfaces.

I added some trim and windows, also cut out from Econokote, and compared the weight . . . a difference of 1-1/4 ounces between the covered and painted Hawk, and the completely stock one. Flying weight of the latter is 2 pounds, 8.5 ounces. The Enya .15 didn't seem to notice the extra weight, nor was there any noticeable difference in the flying characteristics of the Hawks.

Not for reasons of looks, but I also changed the engine mounting slightly. It uses a plywood beam mount, epoxied to a plywood firewall, both of adequate thickness to securely hold the engine and firewall-mounted nose gear. I had some doubts about the sheet metal screws used to hold the engine to the mount, and replaced them with blind nuts and 4-40 Allen head screws. I realize that using the sheet metal screws is done successfully and is even recommended by some of the manufacturers of molded plastic mounts, but now and then they will come loose, or the hole will get too big for the screw. I decided long ago that I wasn't going to have things drop off in flight if I can possibly help it, or make a trip to the field and not fly just because I tried to save two minutes and 19¢, so I always use the ALMOST 100% sure methods.

FLYING

The Trainer Hawk instructions call for a Center of Gravity at 1-3/4 inches to the rear of the leading edge of the wing, and we used that as a starting position. As it turned out, they were right. With the CG there, the Hawk trimmed out nicely both for flight and for landing. With a control movement of 3/4 inch each side on the rudder and 7/16 inch up and down on the elevator, control is adequate but not

sensitive.

I would say that it is almost impossible for a student to stall this model. To do so, you have to keep power on, establish at least a 45-degree climb, and chop power, after which the airplane will slow down, drop the nose, and glide ahead. Nothing violent, and no sign of a wing dropping or a spiral unless rudder is also applied. If a stall is attempted out of level flight, by chopping power first and then attempting to lift the nose, you will simply lose speed until it is starting to mush, then slowly drop the nose and go through the cycle again.

The Hawk will roll quite readily. Out of a slightly nose-high attitude at which you would approach a roll with an aileron equipped plane, full rudder in either direction will result in a large barrel roll, losing 50 to 75 feet of altitude and finishing up in a dive at about 15 degrees.

More realistic roll can be made by starting with the nose higher, at about 45 degrees, upon which full rudder will result in what closely resembles a fast aileron roll. There will be no loss of altitude, and it will end up in straight and level flight.

With the degree of control mentioned, the Hawk will do a fast spiral but I was not able to get it to spin.

Landing is normal; it requires the usual flying to get it on final, after which it is just a matter of letting it come in and flaring out at the proper time. The airplane does not have any characteristiics that will affect its ability to do what it isprimarily intended for: training. It does possess enough flying ability to require controlling . . . it will not fly itself 100%, so it can also be fun for the flier who has mastered the basics.

The instructors list the throttle installation as optional, but I strongly recommend it, as it is a definite help in getting your student those important landings and approaches. And as the airplane does not really need full throttle to maintain altitude, it is also nice if you can throttle back to a slower speed while he is making his first flights.

The one control I am not fully in agreement with is the use of the nose wheel coupled to the rudder, in this or similar three-channel installations when the rudder (turn) control is controlled by what is normally the aileron stick in four-channel installations. It works, but the longer the newcomer flies this airplane, the more he will get used to nosewheel steering in this manner, which he will later have to unlearn when he graduates to an aileron-equipped model with the nose wheel coupled to rudder on a different stick.

Then too, in common with all high wing trike gear equipped models, the Trainer Hawk does not like to taxi in the wind. It tips over in a crosswind, unless you go very slowly. In fact, if it wasn't that the beginner really needs that prop-saving long landing gear, it could be shorter for improved ground handling. Even though non-steerable nose wheels do have other disadvantages, I would vote for that for a rank beginner . . . but then there is that old saying about opinions being like noses; everyone has one, some are just bigger than others.

Another of my opinions is that at $98, this minimum-building, maximum-flying Trainer Hawk is an excellent buy. Bear in mind that this includes a $40.98 engine and $6.98 muffler that can be used for years, and that except for the radio and general purpose items listed, you won't have to purchase anything else directly connected with the airplane.

Important too, is that spare parts can be obtained if your student zigs when he should have zagged. The wing is priced at only $10.95, as is the stab and rudder combination. The fully assembled fuselage, less engine, is $49.95. Engine parts, down to the last nut and bolt, are also available, should they ever be required.

The complete Trainer Hawk is a product of Model Rectifier Corp., 5200 Woodbridge Ave., Edison NJ 08817, and is available from its many dealers and distributors. Parts for the airplane and engine will probably not be as widely stocked, and may be obtained directly from MRC, which has promised complete stocks and speedy shipments.

Have a nice training session! •

Plug Sparks . . *Continued from page 68*

big time model race car competition. With the advent of the glow plug and the introduction of the powerful small motors, the company quickly fell into financial trouble and discontinued production. All in all, about 1,000 to 1,500 Edco Sky Devil engines were produced.

The columnist would be remiss in not acknowledging the tremendous amount of research work done by Bill Thompson, who published a very complete history of all Hassad engines in the Model Engine Collectors Journal back in 1973. Many thanks are due to Bill for most of the foregoing information.

THIRTY YEARS AGO, I WAS. . .

Bob Gable of the Reading, PA group writes to say that the design that started in their area was called the "Old Box". The design was started the year the Brown Jr. was born (not sure whether 1931 or 1932). Like all modelers, the Reading gang really went bananas over gas models.

Mel Haines worked in the Hobby Dept. of Croll & Keck at that time. It didn't take Mel very long to talk the manager, Sol Asen, into giving him the first motor and kit in Reading, PA. At this time, there was only one kit available, the "Loutrel Speedster", a parasol monoplane of six-foot wingspan.

Well, in less time than it takes to tell about it, the model was built, covered with bamboo paper, and doped black and silver with big letters "Croll & Keck" on the model. Surprisingly, the model flew quite well. So, to get some publicity for the company, Croll and Keck sponsored Mel Haines and Bob Long to the Nationals at Akron that year.

It was at Akron that Bob Long decided the model needed more circle to improve its performance (they were tweaking rudders that early!). That ended the Loutrel Speedster, as it spun in and thoroughly demolished itself.

Back home, chastened but not discouraged, Mel Haines made a trip to the butcher shop and promoted some 18-inch wide butcher paper and as long as needed. (Oh! those were the days! Everyone must have used either butcher paper or brown wrapping paper.)

After a short conference (bull session to you), the boys decided the original Speedster design was good but that the parasol idea was bad. The same force set-up was used, but a cabin replaced the struts. Wingspan was increased to seven feet. Well, wouldn't you know it, the model was one of those that literally flew off the drawing board.

This design started winning contests at once. At the Eastern States Champs, against Joe Kovel and a flock of other experts, it placed high, and not too far behind Kovel's record setting flight!

The "Old Box" was built in many forms. One favorite was a wider fuselage with round bottom that dressed it up. Actually, the "improvements" did not help the performance of the model, but it did look better.

Everyone in the Reading gang who could afford a motor built one or two of this good-flying design. Actually, our club members ended up covering the model with light cotton cloth, as bamboo paper did split easily. Surprisingly, the models still only weighed between 4-1/2 to 5 pounds . . . a small price to pay for added strength and long-lived covering.

When the limited engine run events first came out, Bob Gable won the first meet and the Polk Trophy to boot. The last one built in their area was later called the Long Cabin (as described in Air Trails).

Most everyone built the "Old Box" so it was no surprise when Steve Kowalik had a model called the Miss Delaware (June '78 **MB**) that was almost a carbon copy. About this time, Steve won the Consistency Event with his model, and was approached by Ideal to kit the design.

To make sure he wasn't stepping on my toes, Steve got together with Bob Long, Mel Haines, and Bob Gable to obtain permission to use the design. Inasmuch as the Limited Engine Run Event was now becoming the vogue and the early Zipper-type pylon models were making themselves felt, the gang said go ahead.

(Columnist's note: As it turned out, the Ideal Co. did not want such a large model, realizing the market change for the new rules. Kowalik then scaled his model to five feet, which the Ideal Co. bought and called the "Air Chief".)

The main point I wanted to make is that Mel Haines of Reading should be given due credit for the early designs. Mel no longer builds now. He has run the Haines Hobby Shop in Reading for over 30 years. He was one builder in a thousand. Everything perfect! His models were always a work of art.

This yarn was submitted by Bob Gable, one of the surviving members of the Reading, PA gang. A word about Gable is in order.

Bob has been building models for over 50 years and still hasn't lost his zest for them. (Kinda like this columnist.) Gable has won his share of contests, but no longer competes actively.

Bob sez he must have built close to several thousand models over this period of time, most of them his own designs. In regards to the "Old Box", he built two within the last five years (for radio control, of course!). The first one was an .020 version with pulse control; i.e., single channel. Unfortunately it got downwind too far and was lost! To really rub things in, it was on the first flight!

The second "Old Box" was a six-foot model equipped with rudder, elevator, and motor control. This model has had many good flights and has proven itself to be a good trainer, as it was sold to a beginner. Bob concludes by saying the "Old Box" was a good airplane, but it

had a bad habit of flying away all the time.

OK 60 TIMER REPAIRS

Bill Baker, of Norman, Oklahoma, submitted a photo of a real neat idea to replace the cam rider on an OK 60 motor. We thought it was so great that we are running a photo of same and letting Bill tell his story.

"My OK Super 60, a good runner, came to a sudden stop quite unexpectedly. Inspection of the motor revealed the trouble to be the cam rider on the moving point assembly. The rider was shattered. Further investigation disclosed it was made of some sort of hard plastic (probably bakelite). Age had made it brittle.

"Looking the piece over, I was struck by the similarity of shape to a nylon R/C control horn. So I cut a horn to the shape of the cam rider. First, I drilled out the rivets on the timer arm and replaced them with 2-56 machine screws and nuts. When re-assembled, the timer assembly works like a charm!"

Bill concludes by saying the operation is quite simple, requiring only a Zona saw (to cut the nylon horn) and a hand drill. He hasn't looked into the possibility of adapting this idea to other engines, but it will work with engines having a similar point assembly.

1979 VAMPS ANNUAL

Now, that's the way this columnist likes to receive an advance contest notice . . . early! Scheduled for February 24, 1979, the Vegas Antique Model Plane Society will hold their Spring Annual at El Dorado Dry Lake, Las Vegas, Nevada.

Seven events are scheduled to be flown on both days: A-B Cabin, A-B Pylon, C Cabin, C Pylon, 30 Second Antique, .020 Replica, and Old Timer Scale. There will be one special event, known as the Don Weitz 96-inch-plus event, which is for models of 96-inch wingspan or greater.

In many respects, the latter is suspiciously like a Texaco event, with the limitations very similar to the Brown Jr. contest as recently put on by Bud McNorgan of the SCAMPS. Motors will be limited to original ignition engines of not more than 1.00 cubic inch displacement. The rules are otherwise pretty much as outlined in the SAM Rulebook, with a particular emphasis on fidelity to the original design.

For further information, write to Bob Haight, 5724 Balzar Avenue, Las Vegas, NV 89108, or failing that, call at (702) 648-2287.

CALIFORNIA CAPERS

With the tremendous amount of Old Timer model flying in California (no less than eight SAM Chapters), this columnist could probably write a column every month devoted just to California activities. When one considers other clubs like the Orbiteers, San Valeers, Peninsula Channel Masters, and the U.S. Free Flight Champs at Taft, there is no dearth of material.

This is one of the main reasons the columnist, in his many travels, is always exhorting the local membership to submit photos, writeups, anecdotes, or what have you, for possible inclusion in this column. It has been the policy of this writer to avoid a provincial look in reporting O/T activities around the nation. Remember fellows, I can't put your photo in if you keep it at home!

Anyway, if the reporter just wrote on the Northern California activities, he could fill a half column on what SAM 21, 27, and 30 have been doing in R/C O/T flying. As an example, SAM 27 has finally been successful in promoting a field, and is subsequently having an upsurge in activity.

Fields are always difficult to obtain, but in this case, Karl Tulp used a different idea by approaching the Coast Guard to use the area scheduled to be turned over to the county because of lack of use. The government officials were delighted to see the park facilities used again (with fun flys, picnics, and general get-togethers), as it meant there was a justification for retention of the property. Other clubs would do well to look into unused government areas. In many cases, they are simply up for grabs.

The last SAM 27 contest was dominated by Ted Kafer, the SAM 21 newsletter editor, who showed the boys how with his ignition-powered Jasco Flamingo by taking first in the Texaco and Antique events. (Understand he ran out of time to compete in the Limited Engine Run event.)

This meet, held at the Two Rock U.S. Coast Guard Training Center near Petaluma, provided ample area for flying. The only drawback was the high grass, which got neatly mowed by all props. Editor Kafer modestly attributes his victories to a newly discovered technique, to wit:

Crash your airplane on a downwind landing when your motor quits with fifty feet of altitude. You will then spend considerable time repairing the model until the lift improves (after most have already flown). Shades of Larry Boyer!

Also reported was the SAM 27 club's generous prizes: large quantities of balsa wood! It is ironic; those who win, don't need the balsa. The losers need it more to repair their models! Maybe an awarding of merchandise prizes for reverse finish might spark up some real interest. Of course, this would have to be announced just before the contest ended to prevent sandbagging. Sounds wild! You would never know if you were a winner until the end!

NORTH-SOUTH MEET

Here is a meet that has all the potential for developing a rivalry similar to baseball's LA Dodgers and SF Giants, but somehow or another it never seems to materialize.

As pointed out by Jim Dean, editor of the SCAMPS newsletter, "Hot Leads", the beautiful flyers produced by the SCIFS failed to get distributed up in Northern California. The net result was that the North-South meet was com-

prised of nothing but Southern California contestants! In short, it was no-contest.

Big winners were Larry Boyer with Sweepstakes (those Comet Clipper and Megow Ranger models never seem to wear out or get lost!), with Bruce Chandler, Jim Adams, Andy Faykun, and Brad Levine in close pursuit.

In summary, it was interesting to note that out of 24 entrants, 22 were winners. How about that for distribution!

OHLSSON 23 CONTEST

As originally proposed by Bill Daniels, noted MECA engine collector out of Long Beach, CA, and put into action by the SCAMPS, this year's Ohlsson 23 Contest should have been called the Gene Wallock Benefit. In one of his rather infrequent appearances, due to his work load, Gene is always a good bet to win. This meet was no different, with Gene copping first in the Ohlsson 23 event, first in Class A Pylon, and first in Class C Cabin. Tough man to beat!

For the benefit of those unfamiliar with this novel event, the rules call for the exclusive use of Ohlsson 23 motors in any cabin design you like. Pylon designs are prohibited. After that, it is just another three-flight, five-minute (or three minutes, depending on weather) contest, with the highest total winning. The 20-second engine run and rise-off-ground takeoffs are strictly enforced.

Probably the most surprising thing about this contest is the amount of participation. For a once-a-year type meet, entries were heavier than most standard free flight O/T events. Great stuff!

GREAT TWIN PUSHER CAPER

Jim Adams of the SCAMPS cooked up this meet for Mile Square, with a Twin Pusher event being the main attraction. Along with the two twin pusher events (Endurance and Distance), three other events were offered: Commercial Rubber, O/T Rubber Scale, and O/T .020 Replica.

This was the contest the columnist wanted to attend with his twin pusher, as he is fully aware of the performance characteristics of these old crates. Much to everyone's surprise, the twin pusher racked up the highest time of the day. You guys didn't know that twin pushers could soar, huh?

Actually, Hal Cover won the Twin Pusher event along with high time of the day, closely followed by Jim Adams. The Distance event was won by Jim Adams, but unfortunately no one actually measured the distance traversed. Maybe next time.

And there *will* be a next time, as this twin pusher meet proved to be so popular that another is scheduled for October 24. Don't miss this one!

"MUTT & JEFF" CONTEST

This unusual name was developed by SAM 49 for a recent O/T R/C contest that featured a Texaco event and an .020 event. (Big and little, get it?) Unfortunately, this meet fell between several large meets, and attendance from Northern California chapters was dismal.

Three events were offered, with the most challenging being the balloon bust event. As the writer has attended quite a few of these type R/C meets, it was no great surprise to find that no one had broken a balloon. The columnist is still waiting for someone to break one. Those balloons are tricky little things to hit. And the wind doesn't help one bit!

According to Bob Sliff, editor of the "Arcing Point", the SAM 49'ers' newsletter, the biggest story of the day was Ross Thomas flying proxy for Nick Nickolau. Ross found that the warp in the wing (which was difficult to fly) was a natural for a turning climb and circle in a strong thermal. Needless to say, Ross found the right thermal to fit the warped wing of the Dallaire, and promptly took first place in Texaco.

For those who are wondering what Ross Thomas was doing flying someone else's model, a fire in the Thomas home wiped out all his models and radio equipment. He has not had the time for models, as rebuilding the home comes first.

Al Hellman finally put it all together and won .020 Replica with a fine flying Strato Streak, using an Ace pulse system. With Sliff taking second in .020 with a Sailplane, also equipped with Ace, the only user of Kraft's new lightweight system was Jack Albrecht (he's Kraft Production Manager, so what else could he use?).

The fine day was embellished by the great "weenie roast" the girls put on, led primarily by Marge Bernhardt. This is what makes O/T flying real enjoyment. Everyone is in the action.

For prizes, Bob Oslan brought balsa obtained from Superior Aircraft Materials (Mike Taibi), and everyone got a goodly stack of wood for future projects.

MISS AMERICA KIT

P&W has done it again! This time Gene Wallock announces the production of still another excellent partial kit, the Miss America. The parts come with excellent instructions on how to set up the wing construction properly.

CLASSIFIED ADS

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PLANS: Gee Bee "Z" 2"=1', plans used by Granger Williams, $10.00; Gee Bee R-1 2"=1', plans used by Granger, $15.00; Monocoupe 110 Clip-Wing 2"=1', $9.00; 1940 Culver Cadet 1"=1', $6.00; Hall Racer 1/2"=1'=13" span, $2.50. All construction parts plotted on these plans of established scale accuracy & detail. Add your own control system for RC, CL, or FF. Postpaid. Vern Clements, P.O. Box 608, Caldwell, ID 83605.

FF/UC SCALE PLANS. Peanuts, Walnuts, Hazelnuts, Rubber, CO_2, Gas. Modernistic Models P.O. Box 6974, Albuquerque, NM 87197.

PROPELLERS: Quarter scalers, carve your own for maximum performance. Simplified method proven easy. $3.00. Mende, Box 180, Quitman, AR 72131.

PHENOLIC MICRO-BALLOONS: One full pound (about one gallon by volume) of quality Micro-Balloons for $5.00 inclusive. No postage, handling or packaging charge. Send check or money order prepaid to: Rae W. Fritz, 1005 Revere Drive, Pensacola, FL 32505.

Super Cyclone, dual ignition, new, with coil, condenser, $100; Dooling 61, $75; Ohlsson 60, $60; Forster Dual Point Timer, new, $20; Wasp twin timer, new, $10. Joe Locasto, 447 State St., San Mateo, CA 94401.

SCALE SAILPLANES: Kits, plans, and over 250 3-views of vintage and modern sailplanes. Also Dr. Gale's NASAF Book of 3-views. SASE. Jim Ealy, Box 120, Pottstown, PA 19464.

R/C systems and engines, old-timers, scale, gliders. R/C Country, 610 E. Alosta, Glendora, CA 91740. (213) 963-7310.

NEW PEANUTS: Piper Super Cruiser, Bristol M.1C, Fokker Triplane, Davis DA-2, SBD Dauntless, OV-10 Bronco, $1 ea. Stamp for new Peanut/Grapenut catalog. Aero Era, 11333 N. Lake Shore Dr., Mequon, WI 53092

OLD-TIMER REPLICAS: Bombshell, Clipper, Ranger, Buccaneer, New Ruler, Playboy, Mercury, others. Catalog 25¢. Micro Models, Box 1273B, Covina, CA 91722

F1A, F1B, F1C, Coupe, Unlimited, Old-Timers, Indoors, Peanuts, best FAI rubber accessories. Send 25¢ or S.A.S.E. for catalog. Che Hobbies F/F Specialists, 10900 Eastwood Ave., Inglewood, CA 90304

WANTED: Old-Time spark-ignition model airplane motors, magazines and gas powered race cars of the 1930's and 1940's. Russell Stokes, Rt. 1, Box 73J, Keller, TX 76248.

VINTAGE Ignition and Glow Engines. Back-issue magazines; MAN, AT, FA, etc. 25¢ and SASE for list. F.V. Hansen, 3118 Fairway Drive, Las Cruces, NM 88001.

PRO SHOP For The Sport Flyer, also quarter scale models. Charge cards accepted. King R.C., P.O. Box 897, King, NC 27021; 919-983-5660.

AERO HOBBIES: Rubber and CO_2 specialists. Kits, rubber, accessories from Peck, Vintage Aero, R/N, Classic, Moorehouse, Micro-X, SIG, Lee's, Keil Kraft, Flyline and others. Catalog 50¢. Send to: Aero Hobbies, Box 115, East Glastonbury, CT 06025.

.020 REPLICA KITS: PLAYBOY SR., STRATO—STREAK, BROOKLYN DODGER, SO-LONG. FREE PRICE LIST. J & R MODELS, 5021 W. Sheridan St., Phoenix, AZ 85035

Bob Hunter is so enthused over this latest release, he has just about completed one (for R/C, of all things!). Bob has evidently recovered from the unfortunate experience of getting shot down by a careless radio modeler.

For those interested in obtaining one of Gene Wallock's excellent kits, write to P&W Model Service, 1114B East Edna Place, Covina, CA 91724, or better yet, call him at (213) 967-5533. As you can see from his new address, he has finally moved out from his garage set-up and is now going full time at the business. We wish Gene the best of luck. He's going to need it!

NEWG SUMMER O/T OUTING

Thanks to Sears McCorrison, of Stroughton, MA, we have a report on the New England Wakefield Group Summer Old Timer Contest (held in good weather, for a change). Sears points out that the last few NEWG contests have been noted for strong winds that held model flying to a minimum. This meet was a dandy, with very few flyaways.

The free flight boys had the use of the South Shore R/C Club's field, and very little interference was encountered between the R/C and F/F flying. Only one model, an out-of-control Quadra-powered Mr. Mulligan, augered in at the free flight area. Outside of the model being R/C, not too much attention was paid to the crash, as this is an everyday happening in the free flight area.

Among the winners, Chet Bukowski grabbed off the O/T and O/T Scale events. R/C boy, Tom Accavati, flying free flight, pulled in a couple of places. Of particular interest was Tom's three boys flying in the Junior event, with Eric, Tom, and Gregg placing 3rd, 4th, and 5th. Just like the old man. They're gonna be in the winner's circle more than once!

KING ORANGE INTERNATIONALS

Just received a letter from Terry Rimert announcing that the King Orange Internationals will be held on the last

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MODEL BUILDER

three days of 1978 at Jacksonville. This is a great meet that is gradually getting back to its former days of glory. For further information, write to Terry Rimert, North East Florida Flying Model Council, P.O. Box 6176, Jacksonville, FL 32205.

COLORADO CALLING

In a recent telephone conversation with Doug Wilkey, efforts are being made by Doug to organize some activity in Old Timer Rubber Scale. Doug hopes to organize a club somewhat on the order of the Flying Aces Club, with similar rules and competitions. Those interested in O/T Flying Scale should contact Doug Wilkey, 2119 Eighth Avenue, Greeley, CO 80631. Better yet, call Doug at (303) 353-2311, Extension 328, and get the straight dope.

MORE DENNYPLANE DEALS

We wrote in the September issue that consideration was being given to a Dennyplane contest, especially in view of the possible impending kit.

It is now official! Ed Kelley (of 4 K's Models), will be coming out with a Dennyplane kit that will feature all parts, as in the original kit! Not content with that, Ed has managed to dig up the original box label, and all kits will feature this! How about that?

Unfortunately, the writer's hope that the original motor (Skycharger) would be available with the kit, will not be produced at this time. Rats! Wouldn't that have been a terrific combination! In follow-up talks, it appears that when Irwin Ohlsson took over the production of Dennymite Motors, he destroyed the dies when there was no more demand for the motor.

Anyway, to get the new Dennyplane kit at $75.00 a copy, write to Ed Kelley, 4202 W. 172nd St., Torrance CA 90504.

THE WRAP-UP

Like a good cup of coffee at the end of a fine dinner, a good ending to this column is always hard to find. Anecdotes are fine, but you can't always leave them laughing (show parlance). Serious thought-provoking endings are good once in awhile, but if Ken Sykora will accept our apology, we would like to excerpt part of his eulogy to the passing of Bill Atwood. This columnist thinks he hit the nail on the head when he said in closing:

"Modeling was his business, but we like to think it was also Atwood's passion. It would be hard to come by a modeler more diversely skilled. The scope of his capabilities had to be seen to be appreciated. We recall watching Atwood at a Nationals, masterfully handling a huge microfilm model of incredible fragility. Then later, fine tuning a very snarling brute of a control-line speed engine . . . and then, applying his incomparable trimming technique to a free flight gassie that seemed to magically transform the performance from good to superb.

"In these days of highly specialized events and even more specialized modelers, such a universal skill, such a zest for a broad reach into all avenues that our hobby offers, is all too rare.

"There are a few active modelers today who we could place in this rank, but it would only take a few fingers to count them. More's the pity that there are others with this demonstrated level who do not apply their full potential.

"It's worthwhile to reflect on such great active talents of our pastime. Experienced and beginner modelers can learn from such examples of maximum application of inherent and learned skills. Then, the associated satisfaction and personal pleasure that grows out of it.

"After all, isn't that what it is all about?" •

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We began with the receiver, which boasts a dual conversion IF stage in addition to our standard double-tuned, RF amplified front end. And we've also used our exclusive, extra strength 3-pin connectors for the ultimate in positive contact.

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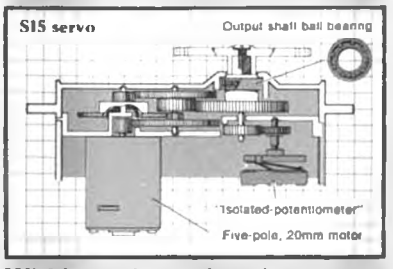

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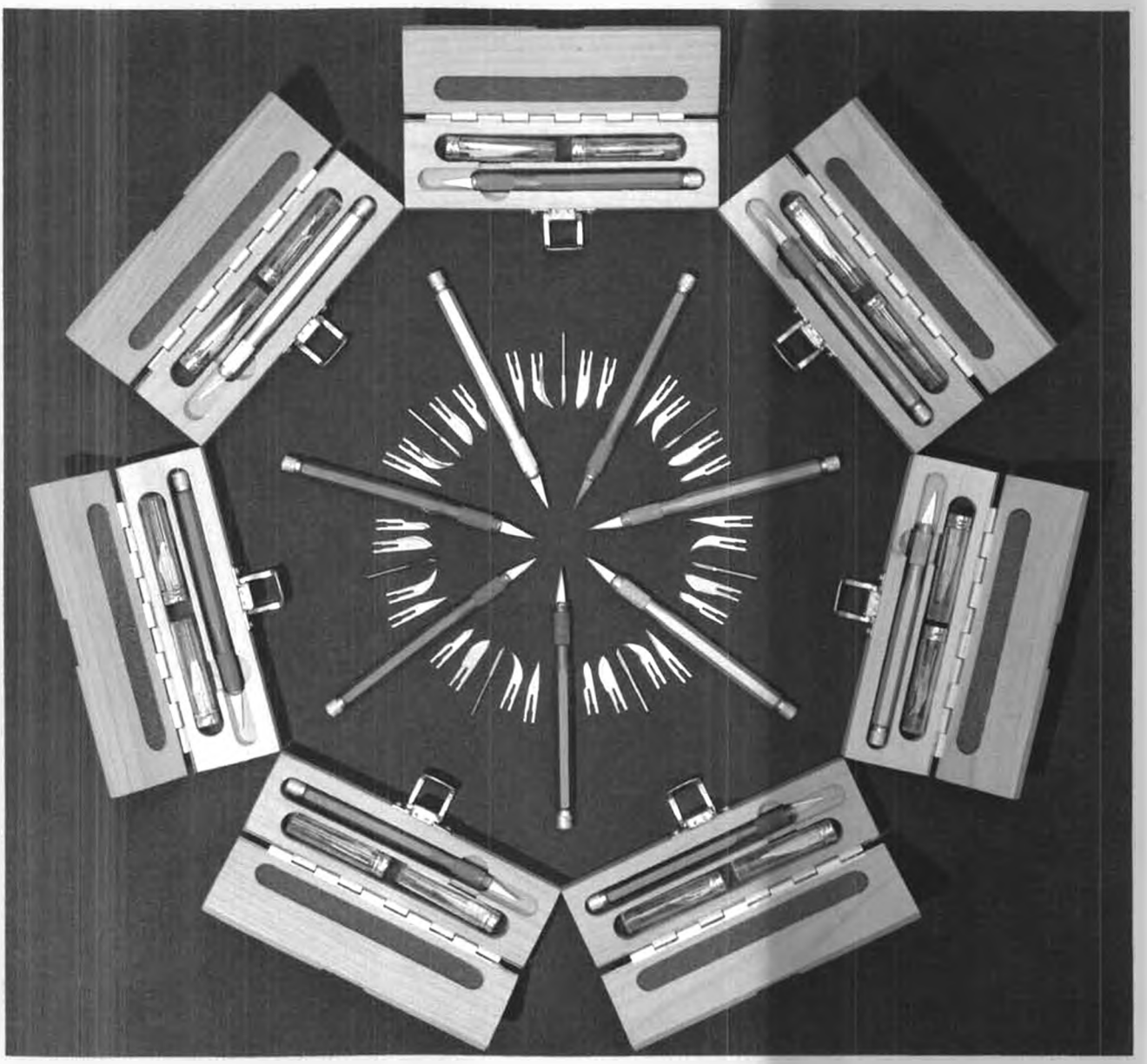

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(No. 12 or 20) $3.30

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The breakthrough plane in ready-to-run R/C is our Cessna Centurion. Perfect for beginners, the easy flying Cessna sports a factory installed QRC .049 engine and 36-inch wingspan.
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Whichever Cox ready-built you choose, be sure to include the 8020 radio. Then, expanding a collection of fine Cox models doesn't require the purchase of another R/C system. And that's like getting a present anytime of the year.
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1505 East Warner Avenue, Santa Ana, CA 92702

MRC'S new ready-to-fly breaks the price barrier...

with quality, performance and power at under $100

Until now if you wanted to buy a ready-to-fly airplane that wasn't an .049 powered toy you had to spend big bucks, or settle for kid stuff control, low end power and minimum performance features. MRC's Trainer Hawk puts an end to that. Now for under $100 take home, a big brightly colored rugged foam aircraft with full 48" wingspan, 32" fuselage, complete with an MRC-Enya 15IV TV already installed. You'll fly loops, figure 8's, Cuban 8's . . . trim it properly and you'll even fly hands off. You've complete throttle control at your fingertips. The Trainer Hawk is indeed a new plateau in beginner ready-to-fly.

We've designed it with high dihedral, anti-stall wing tips for maximum stability and excellent wind penetration. There's even a steerable nose wheel that lets you taxi with complete control. Best of all you can go from buy-to-fly in about an hour because so many of the time consuming installations have already been completed at the factory.

Included in the package are muffler, propeller, glow plug, spinner, dowels, decals, wheels. See the spirited ready-to-fly, full size Trainer Hawk at your dealer. It's ready to go. (Also available, Electra-Fli ready-to-fly electric trainer complete with MRC-Mabuchi electric power system installed.)

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