
MODEL BUILDER
MARCH 1983
$2.50
volume 13, number 134
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Recognized for Quality
THE WORLD OVER


Staggerwing Beech
1/5 scale


P-51 Mustang
1/5 scale


Christen Eagle II
1/3 scale


A-36 Beech
1/6 scale


V-35 B Bonanza
1/6 scale

F-86 Sabre Jet
Avail. in D & H
models (ducted fan)
1/8 scale


A-4 Skyhawk (ducted fan)
1/7 scale


T-34B Mentor
1/6 scale

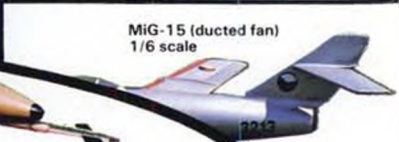
General information about these new product releases found in catalog.

NEW for '83

F-16 (ducted fan)
1/8 scale


Kfir
1/7 scale


MiG-15 (ducted fan)
1/6 scale


MiG-15 (ducted fan)
1/6 scale

BYRON ORIGINALS
T.M.

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


F-33A Beechcraft
1/6 scale


Byro-Jet ducted fan
(for .60 engines)


Pitts Special
1/3 scale

Beech Baron 58
1/6 scale

T-34C Mentor
1/6 scale


Mirage (ducted fan)
1/7 scale

CAP 21
1/4 scale

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With an unbeatable combination of power, speed and performance, gas R/C car racing has grown to be a truly international sport.

Associated cars have played a major role in the history of 1:8 scale competition. Our legendary RC1, a simple, flat pan-chassied car won both the Road and Oval US National Championships immediately following its introduction in 1971. After several years of testing and development we next introduced the amazing RC100, which won it all in R/C car racing's first World Championships.

Always a dominant force in the world of R/C racing, Team Associated's RC300 continued our winning tradition, setting records all the way in Florida's classic 24 hour Enduro.

Our secret to success is simple. We do our talking on the track, offering model car racing enthusiasts competition tested and proven cars and components.

We build race cars to stand up to world class competition, and win.

INDEPENDENT SUSPENSION. A NEW ERA.

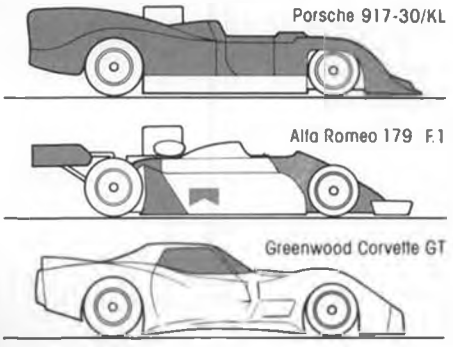
Our new RC500 is the most unique and revolutionary race car we have ever built, because it is designed around a chassis using 4 wheel independent suspension.

In the development, testing and prototype stages for over 2 years, the RC500 is the final result of Team Associated's joint British/American effort.

The RC500 is a true racing car, with authentic race car suspension geometry and fully adjustable springs, shocks and sway bars.

You set the ride height. You select the stabilizer bars to suit your track. You even fine-tune the coil-over shocks.

Every option is there for you to dial-in your RC500 the same way racing mechanics set-up a modern, full-scale Formula car... perfectly balanced for optimum performance.



The refined rear suspension geometry of the RC500 rides on adjustable competition coil-over shocks and features simple sway bar tuning.

And to make sure you get your RC500 set-up right we've included a comprehensive assembly and suspension tuning manual. Together with our simple, step-by-step assembly photos even the novice can build the RC500 and become an expert on subjects like understeer/oversteer, roll rates, spring rates, caster and camber. Special sections also cover advanced engine tuning, radio installation and driving techniques.

Exclusive cross-over front shock layout provides optimum suspension travel and rebound.

THE RC500. ANOTHER WINNER.

For all the pride and satisfaction there is in building and driving the sophisticated RC500, there is still nothing quite like the thrill of victory.

Like all Associated race cars your RC500 is above all designed and engineered to win. Each component must meet our strict, competition tolerances and are manufactured of the highest quality materials.

Already prototypes of the RC500 have won several prestigious British and American national titles, proving the versatility of the basic chassis in several different body classes.

Your RC500 meets all specifications for competition in the Americas (R.O.A.R.), Europe (EFRA) and Asia (JMRCA) using internationally recognized standards for fuel capacity and dimensions.

Take up the ultimate challenge with your driving skills and RC500. Join the thousands of RC car racing enthusiasts of ROAR (Radio Operated Auto Racers) and get into the high-powered excitement of gas car competition.

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MODEL BUILDER

MARCH

1983

volume 13, number 134

621 West Nineteenth St., Box 10335, Costa Mesa, CA 92627-0132 Phone: (714) 645-8830

CONTENTS

FEATURES

CONSTRUCTION

Cover: Here is Charlotte Jolly, in formal attire, holding husband Larry's "Electricus." This two-meter sailplane is powered by an 05 direct-drive electric motor, is highly competitive, fully aerobatic, and quite easy to build. Construction article begins on page 16. Photo on Kodacolor print film by Larry Jolly.

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Always the value leader in RC, Futaba's 2 channel 2L ($114.95) and all-NiCad 4L ($209.95) systems also feature our new S28 precision servos.

A HOT NEW ROAD PACK MAKES THIS 2F SYSTEM TOUGH TO BEAT.

A pair of rapid-transit S32 servos (0.16 sec./33.4 oz/in.) and our micro R4H receiver make this 2F system ($139.95) perfect for the RC car driver in a hurry.

Designed for serious racers, this high-speed, lightweight Futaba combo can give your car the winning edge.

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$44.95

KIT CL-21

MUSTANG STUNTER

SPEEDY CONSTRUCTION! WITH MOLDED PARTS AND FOAM WING CORE

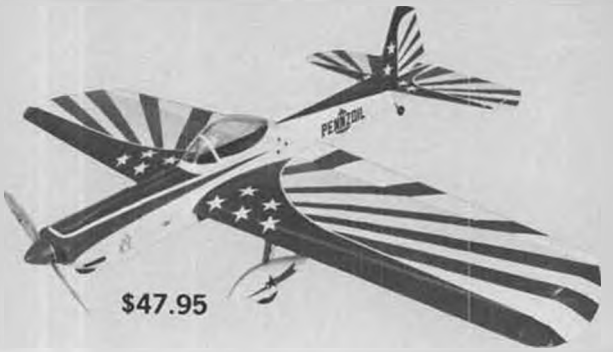
The classic lines of the P-51, top fighter design of World War II, have been blended with the ideal control line stunter layout to produce this aerobatic show-stopper. Low work-shop time because of the precut foam wing, ready-made molded plastic fuselage top, molded lower scoop and molded plastic cowling. It's easy to duplicate the realistic appearance of the prototype model. Responsive flight performance makes the Mustang a tough competitor.

ENGINES: .29 - .40
WING SPAN: 50 In.
Designed by MIKE GRETZ
WING AREA: 480 Sq. In.
WEIGHT: 41 Oz.

SUPER CHIPMUNK

We've been selling this model for many years and it has become a classic in the CL Aerobatic field. Dave Fitzgerald took 1st place at the nationals for five straight years (1976-1980). Others have won with the design regularly at contests. That doesn't mean you have to be a top competitor to fly the Super Chip for it is not difficult to handle. Plastic cowl, plastic wheel pants and a colorful decal sheet dress up the aircraft without a lot of extra workshop time. Heavy duty nylon bellcrank is supplied.

KIT CL-19
ENGINES: .29 - .40
Designed by MIKE STOTT
WING SPAN: 53-1/2 In.
WING AREA: 575 Sq. In.



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THE BIGGEST LITTLE STUNTER AVAILABLE

AKROMASTER

If your need is tor an economical start in CL aerobatic flying, you can't do better than this little gem. Patterned after larger CL stunt models and incorporating the lines of a famous full-scale aerobatic aircraft, it is one beginner's design that doesn't look as if it was made from part of an orange crate. All of the features found on other Sig CL stunters, including coupled flaps. Supplied are: Shaped fuselage, die-cut parts, shock absorbing landing gear, formed clear plastic canopy, nylon bellcrank, nylon elevator horn, hardware, etc.

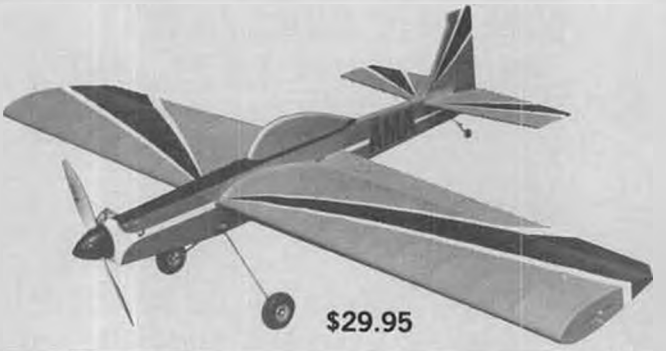
KIT CL-20
ENGINES: .15 - .19
Designed by MIKE GRETZ
WING SPAN: 34 In.
WING AREA: 250 Sq. In.

TWISTER

AN EASY-TO-BUILD PROFILE MODEL FOR AEROBATIC TRAINING

While this model goes together faster than competition type stunters with built-up fuselage, it yields little to them in the way of performance. The coupled wing flaps deliver the same responsiveness and precise maneuvering capability. Kit features include a pre-shaped balsa fuselage profile die cut fuselage doublers, die cut wing ribs, plywood wing tips and a hardware pack. You'll get into the air fast with a Twister and soon will be doing the full pattern.

KIT CL-22
ENGINES: .29 - .40
Designed by MIKE GRETZ
WING SPAN: 48" In.
WING AREA: 490 Sq. In.



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Czechoslovakia's famous Zlin has been a star performer at many full-scale World Aerobatic Championships. The lines of this ageless aerobatic performer have been blended into our CL stunt version. Full size plans detail the light but strong built up balsa construction. Among things provided the builder are a heavy duty nylon bellcrank, a nylon elevator horn, nylon flap horn, formed landing gear, molded plastic cowl, clear bubble canopy, lead out wires, a hardware pack and decals for decoration.

KIT CL-16
ENGINES: .29 - .40
Designed by MIKE STOTT
WING SPAN: 51 In.
WING AREA: 550 Sq. In.

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HENDERSONVILLE
The Hobby House
1211 Asheville Hwy
PH. 692 6683
HIGH POINT
Barnes's Craft & Hobbies, Inc
2291 English Road
KING
King R/C
Old Hwy 52
PH. 983-3969
NORTH DAKOTA
GRAND FORKS
McGillins Hobbies Unlimited
1228 9th Ave S.
PH. 701-772-5311
WILLISTON
C & C's R/C
R R 1, Box 87C
OHIO
ASHLAND
Hobby Dispatch
42 E. Main Suite 204
PH. 419-325-1691
BEAVERDAM
Buckeye Hobby Shop
7940 Lugabill Road
BERLIN HEIGHTS
Daniel's Hobbies
36 Center Street
BROOKVILLE
Country R/C
12450 Amity Road
CLEVELAND
The Hobby House, Inc
800 Huron Road
CLEVELAND
National Hobby, Inc
5238 Ridge Road
FINDLAY
Jim's Model Supplies
721 Rockwell Ave
LAKEWOOD
Wings Hobby Shop Inc
17112 Detroit Ave
PH. 221 5383
LANCASTER
Slater's Inc
Plaza Shopping Center
1141 N. Memorial Drive
LIMA
Callahan Hobbies
1229 E. Elm St
MANSFIELD
Top Flite
15 N. Main
TOLEDO
The Hobby Stop
4907 Summit Street
VANDALIA
Family Hobby Shop
304 N. Dixie Drive
WAPAKONETA
Dad's Toy Shop
120 E. Auglaize St
YOUNGSTOWN
Boardman Hobby Center
6820 Market Street
ZANESVILLE
Thompson Radio Supplies
110 S. 6th Street
OKLAHOMA
OKLAHOMA CITY
Campbell's Hobby House
3500 N. MacArthur
TULSA
House of Hobbies
6914 E. Admiral Place
OREGON
CORVALLIS
Trump's (DJ's) Hobbies
1875 N.W. 9th St
PH. 503-753-7540
MILWAUKIE
Roy's Hobby Center
11008 S.E. Main St
PH. 503 654 4916
PENNSYLVANIA
ARDMORE
Ardmore Hobbies
19 A Woodside Ave
BATH
Trach R/C Hobbies
RD 1 Box 262
BATH
Dick Weitzel's Hobbies
514 E. Main St
PH. 215 837 6681
BUTLER
Eberle's Hobby Shop
764 Pittsburgh Road
CLARKS SUMMIT
Taylor's Hobby World
312 S. State St.
LANCASTER
The Flight Box
Lancaster Shopping Center
LANSDALE
Penn Valley Hobby Ctr
837 W. Main St
LEHIGHTON
Carpenter Hobbies
R D 3 Box 111
MILTON
Kreb's Newsland
83 Broadway
PITTSBURGH
Bill & Wall's Hobby Shop
116 Smithfield St
READING
Iron Horse Hobby House
60 South 6th St
READING
Ott's Hobbies
536 N. 10th St
SLATINGTON
Valley Hobbies & Collectibles
102 Main Street
WARMINSTER
J.C. R/C Hobbies
13 York Road
PH. 215 672 5200
WAYNE
Hyatt Hobby House
Gateway Shopping Center
RHODE ISLAND
NORTH KINGSTOWN
Hobby Hut
7442 Post Road
SOUTH CAROLINA
GREENVILLE
The Great Escape
Pleasantburg Shopping Center
1426 Laurens Road
PH 803 235 8320 or 242 4229
MYRTLE BEACH
Ed's Hobby Shop
Hwy 501 Next to Fanjoy
Sign Company
SUMMERVILLE
FWP Hobby Shop
908 Bacons Bridge Road No. 4
TENNESSEE
KNOXVILLE
Tennessee Model Hobbies
Rt. 62 Oak Ridge Hwy. Soheay
PH. 615-482-2900
NASHVILLE
The Toy Mart
113 Graylynn Drive
PH. 615 883 1648
TEXAS
ABILENE
The Hobby Center
Westgate Mall
ARLINGTON
The Hobby Hub
903 A Pioneer Parkway West
AUSTIN
J & J Hobbies
610 Kennislon Dr
CORPUS CHRISTI
Leisure Time Hobbies
1326 Aurina
DENTON
Yellowbird Hobbies
117 W. Hickory
EL PASO
Hal's Hobby Shop
No. 57 Sunrise Center
PH. 915-755 1914
FORT WORTH
Hobby Stop
400 C. Seminary Dr. E
PH. 817-334-0197
FORT WORTH
Matt's Hobby Shop
7241 Grapevine Highway
PH. 817 281 0921
HOUSTON
Clear Lake Models
117 Camino S. Shopping Ctr
PH. 713-488 6315
HURST
Roy's Toys (For Big Boys)
1309 Norwood
SULPHUR SPRINGS
Miller's Hobbies
624 Bellview St
UTAH
OREM
Miniature Aircraft Prod
811 W. 400 N
PROVO
The Model Shop
42 W. 300 N
VERMONT
NORTH FERRISBURG
Yandow's House of R/C
Route 7
SWANTON
The Hobby Shop
RFD 1 Rt. 7
PH. 802-524 2715
VIRGINIA
ANNANDALE
Model Masters, Inc
6920 Braddock Rd
RICHMOND
Bob's Hobby Center
3002 Cary St
VIRGINIA BEACH
Hobby Craft Centers
#1 967 Providence Sq s/c
#2 62 Princess Ann s/c
WASHINGTON
BELLEVUE
R/C Model Shop
14020 N.E. 21st St
PH. 747 9914
BELLINGHAM
Hobby Hive (Graham's)
111 E. Mangolia St
KENT
Kent Hobby Craft
Kent W. Mall 1343 W. Meeker
PUYALLUP
Fargrows Model Supply
10611 136th St East
PH. 845-7675
SEATTLE
Webster Supply Co
17818 Aurora Ave N
TACOMA
Bill's Hobby Town
14914 Pacific Ave
PH. 206 531 8111
WALLA WALLA
Harley's R/C
Route 1 Box 277A
PH. 509 529 2618
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W. Washington St
WISCONSIN
BEAVER DAM
Park Electronics Hobby Hut
213 Park Ave
GALESVILLE
R/C Unlimited
825 Park Drive
PH. 608 582 2853
MARSHFIELD
Mid Wisconsin Hobby Center
Northway Mall
503 E. Ives St
MENOMONIE
True Value Hardware
1512 9th Street
1 Marl Shopping Ctr
MILWAUKEE
Casanova's Hobby
1423 S. Muskego Ave
PH. 414 672 2700
CANADA
DAWLF, ALBERTA
B & P Transport Ltd
Box 6
PH. 373 3953
CALGARY, ALBERTA
Hobby World Canada
Box 968 Stn M
CALGARY, ALBERTA
P M S Hobby Craft
Calgary North Hill Centre
WINNIPEG, MANITOBA
Cellar Dweller Hobby Ltd
1354 Main St
PH. 589-2037
WINNIPEG, MANITOBA
Gooch's Hobbies
646 Portage Ave
ST. JOHN'S, NFLD
Capitol Hobby Centre Ltd
6 Freshwater Road
DUNDAS, ONTARIO
Skycraft Hobbies Inc
139 York Road
SCARBOROUGH, ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave E
PH. 416-755 1766
WILLOWDALE ONTARIO
Keith's Hobby Shop
5205 Yonge St
PH. 222-4721
ARVIDA, QUEBEC
Le Modele Reduit Enr
118 Mathieu CP 341
PH. 418-548 2136
HAUTERIVE, QUEBEC
Le Centre Du Modeliste
Allard 1223 Laurier
MONTREAL, QUEBEC
Can Air Hobbies
5850 Gouin Blvd. Ouest
PH. 514 332 3565
ST. GEORGES, QUEBEC
Le Mur du Son
1050 152 Rue
PH. 418 228 1374
SASKATOON, SASKATCH
Collins' Aero Craft
238 First Ave North
PH. 652-4775
YORKTON, SASKATCH
Radio Control Hobbies
29 Betts Ave
WHITEHORSE, YUKON
Ken's R/C Supply
8 Tatchun Road
PH. 667 4984
AUSTRALIA
BRISBANE, QUEENSLAND
Underwood 4119
The Hobby Warehouse
30 Kingston Road
COLUMBIA S. AMERICA
Aeromode los Britannia Ltda
Apartado (P.O. Box) 52530
Bogota 2, Columbia
PH. 212-7309
ENGLAND
LONDON, N7 6NP
Henry J. Nichols & Son Ltd
308 Holloway Road
ISRAEL
REHOVOT
Tsvanky Rehovot
70 Derech Yavne
NETHERLANDS ANTILLES
CURACAO
Curacao Modelbouw N.V.
AVVC Building Room 13
Schouwburgweg 44
P.O. Box 3101
SPAIN
SITGES BARCELONA
Milo & Paul Pastecchi
Calle Juan Maragall 26
SWEDEN
S-871 02 HARNOSAND
Modell Produkter
Box 2060
VENEZUELA
CARACAS 1070 A
Hobby World, C.A. (Dist.)
Apartado Postal 75054
PH. (02) 34 33 02
WEST GERMANY
06092 KELSTERBACH
Aeromas R/C Modellbau
Am Gruenen Weg 2

CALIFORNIA (Foreign Dist.)
IRVINE
Exportations Ltd
17835 Sky Park Circle #E
PH. 714-957-1331

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

from Bill Northrop's workbench . . .

Is model building getting to be too expensive for you during these stressed economic times? If you're a *real model builder*, who gets as much enjoyment from relaxed building sessions as from the more active hours at the flying field, then you can still "get away from it all" by building and flying the kind of models that have been the backbone of the hobby from the very beginning. This is my "Pacific Ace", framed up from a "Lucky" Moody kit over five years ago, and finally covered and doped just before this last Christmas. Weighs just over two ounces with eight strands of 1/8 flat rubber.

WHITHER GOEST MODEL AIRPLANES?

Whenever I become involved in the preparation of an article for publication that delves into modeling activities during the Golden Age . . . from the early '30s up until 1942 and World War II . . . my mind comes back to a haunting question that has been with me for several years. . . Just what is the future of this hobby?

Fred Komlosy, newsletter editor for the Palm Beach (Florida) Aeronauts, has done a nice job of putting this concern into writing.

"In the September issue of the A.O.P.A. Pilot *magazine, there is an appealing story about a father introducing his 12-year-old son to the world of aviation through the construction of a stick-and-tissue model (Guillow) of a Stearman PT-17. Finding the usual plastic models were inadequate to teach the fundamentals of aircraft construction and flight, the father turned to the basic built-up model. It made a nice story.*

"One point that caught my eye in addition to the main theme was that the father couldn't find a 'traditional' type kit in the stores of his city. He finally had to order one through the Smithsonian Gift Catalog, which he happened to run across in a doctor's office.

"From it all, one cannot somehow but wonder about the state of the hobby of aeromodeling as a whole. There are strong areas of youth participation, but they seem to get fewer and further between. The age of the average modeler gets older and older. After Lindbergh's flight in 1927, membership in the national model associations (pre-AMA) ran between 400,000 and 500,000 from a lesser national population . . . and nearly all from Free Flight! Today, even with R/C, an AMA membership of 80,000 to 90,000 is considered phenomenal.

"Why is this? Identity. Years ago kids . . . young and old . . . could visit an airport and see, touch, and smell the airplanes. They could see the pilot, feel the prop wash and perhaps even for a few bucks take a hop . . . all stuff to build hopes and dreams on. Lindbergh financed, helped build, and flew his own airplane. Anyone could possibly do it themselves. People could identify. It was tangible.

"Today, tangibility is about gone. I don't have to describe a visit to a modern airport . . . where you may be lucky even to see an airplane. Military pilots are 'weapons systems managers'. It is all so expensive and distant. Sure there are the homebuilt group and the antiquers . . . and they are great, but on their own, they are not enough to inspire the youth of a nation. Inspiration is the key, really, which, engendered by the identity and tangibility years ago, had so many turning to model aviation as the next best thing or precurser to the real thing.

"Where are the young modelers of today? They have shifted (lowered?) their sights to more tangible things . . . automobiles, motorcycles, girls, Pac-Man, TV, and such . . . aviation has lost a great deal of its fascination. Fewer and fewer are inspired to build model aircraft.

"What is the answer . . . solution? The models themselves . . . as an entity and/or art form all on their own . . . almost separate from full size aviation. This approach sort of mitigates against scale (sob), as a good and true model per se is more like an Ugly Stik than a P-51 Mustang. (Lord, what am I saying?) Anyway, that may be the trend in due course. We have some of this now . . . interest only in the model. Will it be enough down the line? We must 'sell' our hobby to the public at large. Hopefully, youth of the future will pick it up for what models are themselves, or the hobby may well grow old with its present advocates and wither due to volume support. The hobby will never die, I'm sure, but it could get to the stage where the only place to find a model kit will, in fact, be the Smithsonian . . . and not for sale . . . just on display!

"So much for the soapbox! But it might also be noted and/or significant that the built-up model listed in the current Smithsonian catalog is a non-flying Space Shuttle!"

There's another factor in the decline of youngsters in the hobby which Fred did not mention . . . cost. Oh sure, the cost of everything is much higher than 45 to 50 years ago, but that's not what I'm talking about. In this modern, faster paced, electronic world, there are many more high-ticketed items in the hobby than there were in the '30s. The glamour of flying a model by radio control is in the forefront, and it's difficult to get a youngster interested in simple (but very educational) stick-and-tissue models priced under $5. The fact remains, however, that your older modeler came into the hobby by way of these inexpensive kits, which he could purchase at most any type of store.

WHAT ABOUT STICK-N-TISSUE?

In bad economic times, inexpensive hobbies grow rapidly, as people seek some escape from their everyday worries about jobs, finances, etc. However, you

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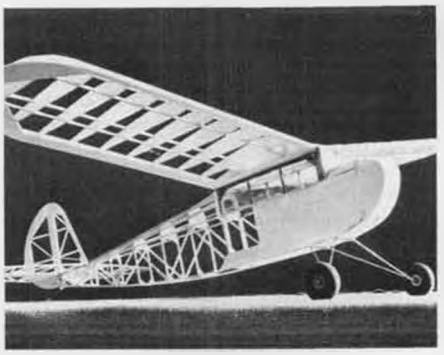
OVER THE COUNTER

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



Assembled Kloud King by Beehive R/C Models.

K&S Engineering's dies and die stock handle.

• Exciting things are being manufactured at Futaba these days. Take for example the new FP-DT Futaba Tachotimer. In the tachometer mode, a photoelectric eye detects propeller RPM up to 60,000. It can also "read" off flywheels for R/C car and boat use.

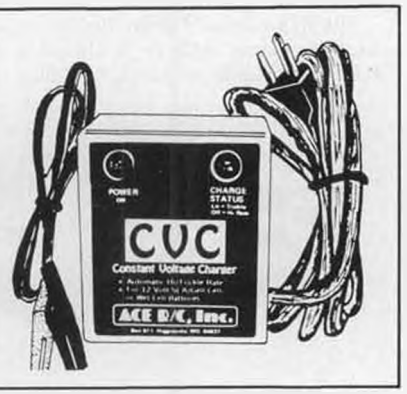
Built into the Tachotimer's micro computer are three timing/alarm modes with a variety of flying and racing applications. Included are an integrating meter for calculating battery life or charge (hold, count), plus count DOWN and count UP timers to accurately monitor elapsed time.

Specifications are: dimensions: 2.5x 6.1x9.9 inches; weight: 4 ounces; power requirement: 3.0 volt (2 AA batteries); display: 4 digit LCD, tachometer (low range): 100 to 30,000 RPM (plus or minus 100 RPM), tachometer (high range): 100 to 60,000 RPM (plus or minus 200 RPM), integrating meter: 0 to 60 hours (by minute units), UP timer: 0 to 60 minutes (second units), DOWN timer: 60 to 0 minutes (second units).

Also new in the Futaba line up is the FP-S32 High Speed, Miniature Precision Servo. This servo was specially designed for 1:12 scale electric car use, and it is very compact and light, as well as extremely responsive. Other features are: sealed carbon potentiometer with triple-segment wiper contacts; new Isopot design; exclusive, low-drain Integrated Circuits; PBT fiberglass case; cold molded precision resin gears; thru-hole plated, epoxy PC board; thick plated, gold mini-connectors; splined output shaft.

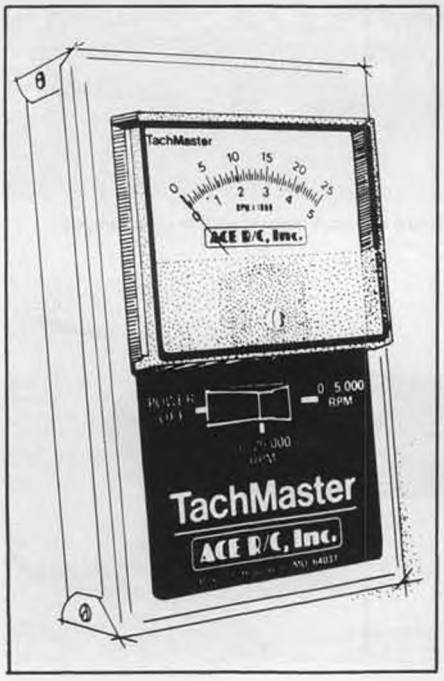
Last, but no less exciting, is the FP-G132 Voltage Regulated Rate Gyro. Futaba's new, single-axis Gyro Systems now offer the added feature of voltage regulation to precisely stabilize R/C model aircraft. Futaba Gyro Systems function identically to real aviation gyros, detecting and automatically correcting motion on a pre-determined axis.

Both the G132 (Standard Futaba) and the G152 (J-Series Futaba) gyros can be positioned for yaw, roll, or pitch correc-



Constant Voltage Charger from Ace R/C.

Schneurle ported .049, Kustom Kraftsmanship.



Ace R/C optically coupled analog tachometer.

Ultra Servo from Ace R/C; small and quick.

Servo Pacer from Ace R/C; slows servos.

Tachometer/Timer from Futaba.

tion in helicopters or airplanes.

Specifications: power supply: 4.8 to 6 volts (shared with receiver or separate); current drain: motor 100 mA (at 4.8 volts), amplifier 20 mA (at 4.8 volts); dimensions: gyro: 1.57x1.65x1.65 inches, control amp: 1.73x2.28x0.63 inches, control box: 0.94x1.34x0.59 inches; weight: 5 ounces (total system).

See your local Futaba dealer for prices and availability, or write to Futaba for further information: 555 West Victoria, Compton, CA 90220.

★ ★ ★

Schneurle ported Cox .049 engines are now available in two competition versions, racing or stunt, from Kustom Kraftsmanship, Joe Klause, P.O. Box 2699, Laguna Hills, CA 92653.

The racing version can be used for free flight competition as well as 1/2A racing. It comes with a rear facing exhaust port. The shape and timing of the transfer and boost ports is different for both versions. The stunt version is also available with a left, right, or rear facing exhaust port.

Coreless, lo-current, hi-torque servo by Kraft.

Single axis gyro; detects and corrects. Futaba.

The crankshafts of both versions are hard chrome plated, and they are honed and lapped to the crankcase. Special honing techniques are used on the engine cylinder. Further, a custom needle valve assembly and pressure backplate is installed, together with a re-machined venturi. The entire engine is hand fitted and assembled to ensure quality performance.

For complete information on these engines and other custom products, send 50 cents to Kustom Kraftsmanship, or call (714) 830-5162.

★ ★ ★

Wheels, wheels, wheels. Kraft Systems is spinning circles around its Rough Rider and Sand Scorcher R/C cars with the release of its new line of chrome plated wheel rims. Whether you are in the market for Solid Chrome Plated Wheel rims or rims with decorative holes, you can find front or rear wheels in 1-1/2 or 1-3/4 inch diameters for $5.95.

See your local hobby dealer or write Kraft Systems, 450 W. California Ave., P.O. Box 1268, Vista, CA 92083, (714) 724-7146.

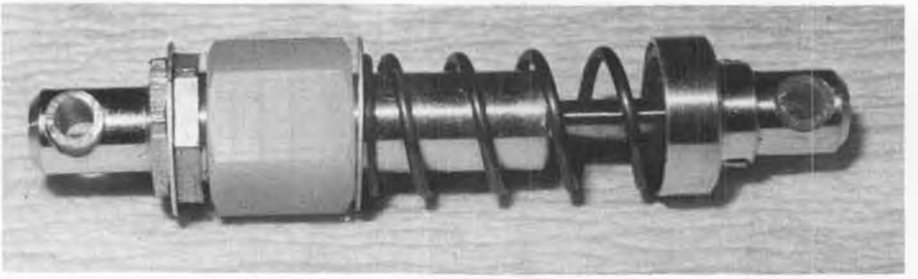
High speed, miniature servo by Futaba.

And while you're at it, why not order a set of the new KPS-28 servos? They are the latest in a growing family of Kraft servos. What really sets the KPS-28 apart from other servos is the coreless motor with high torque and low current drain. Other features include double ball bearing servo arm supports with O-ring seal which really makes this servo ideal for quarter-scale aircraft (60 ounce-inches of torque), cars, and boats. Transit time is .4 seconds for 100 degrees of rotation. Weight is 1.8 ounces.

No substitutions will be made in standard system packages. This servo will be offered in open stock only. Price is $54.95.

★ ★ ★

Old Timers are losing their "no time" excuses with the Beehive R/C Model Aircraft Company's "Kloud King" old timer. Now, even if you have only a few *minutes* a day to work on models, you



Associated Electric's new racing shocks for Off-Road racing. Features airless oil chamber.

Kraft Systems' 1-1/2 & 1-3/4-inch wheels.

Quarter-scale floats from Ikon N'wst.

Charger device for Rx and Tx battery packs from McDaniel RC.

World Engines' Robinhood 10 trainer for engines up to .15.

Kinner Sportster K from DGA Designs. Quarter scale for Quadra.

can have a "Kloud King" R/C-F/F replica in the air in a week or less. You see, the "Kloud King" can be purchased framed-up and ready for covering, or as a fast-building kit with pre-built fuselage sides.

The "Kloud King" is a 72-inch span, .29 to .40-engined, two or three-channel operated, quality airplane. Only the best, lightest balsa, spruce, and plywood go into the "Kloud King." Both kit and assembled aircraft come with formed spring steel landing gear/tail wheel assembly.

Prices are very reasonable at $149.95 for the assembled "Kloud King", and $89.95 for the kit with assembled fuselage sides. Write Beehive at P.O. Box 744, Layton, UT 84041, and include $3.00 shipping/handling with your order (Utah residents add five percent sales tax).

★ ★ ★

Ace R/C Inc., the company that brought you the Silver Seven transmitter, the Christie Mixer, Noise Traps, and a hundred other R/C goodies, now has a few more it wishes to introduce to the modeling world.

First, the Ultra Servo. The Ace Ultra Servo is a high quality, American made, top-of-the-line, precision servo. It uses a coreless motor which results in a small, compact servo with extremely quick transit time and high torque. Coupling the coreless motor to the Ultra gear train gives nearly zero backlash with 50 or more inch-ounces of torque. Gear integrity is such to allow this servo to be used in large, high performance aircraft. The output shaft of the Ultra servo is splined for output arm adjustability and of course, the output shaft is ball bearing supported. The Ultra Servo works with positive pulse systems.

The Ultra can be purchased assembled or in kit form with or without connectors. Prices range from $39.95 for the kit servo, less connector, to $49.45 for the assembled servo with Kraft or Futaba connectors.

The second new product is the Servo Pacer. This little device allows you to slow down the rate of throw of any servo for increased scale-like performance without sacrificing servo power. The Servo Pacer allows full adjustability of transit time up to eight seconds, plus full adjustment of end throws. Plugs in between receiver and servo. Again prices vary depending upon whether you want the kit or assembled versions with or without connectors: kit, less conn., $19.95; assembled, $29.95; assembled with Kraft or Futaba conn., $35.95.

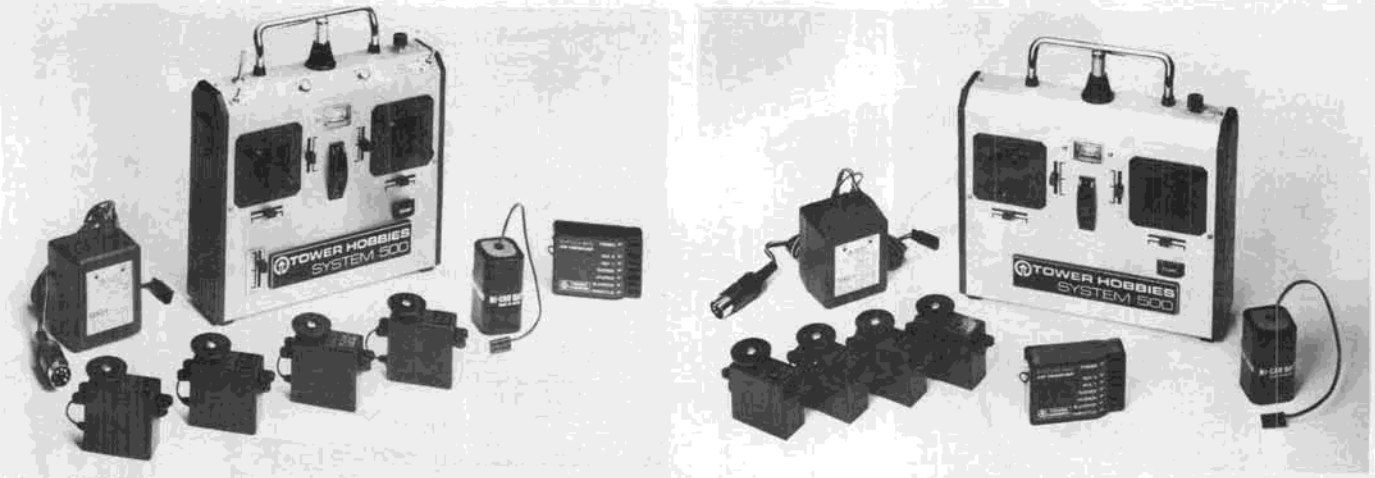
Next, we have the CVC or Constant Voltage Charger for 12-volt starting batteries. The CVC delivers a constant

Penetrator slope glider from J&M Glascraft.

OS Max 65 VR DF for ducted fan models.

Buzz Waltz Begin/Air trainer for H.B. .25 engine, 3 or 4 channel.

Modeler's Engine Test Stand from Larry's Model Products.



Tower Hobbies new radio systems: Gold Series System 500 six channel (left), and the Gold Series Mini System (right) with .65 oz. servos.

400ma high charge rate for 90 percent of the charge cycle then tapers to a 15ma trickle charge rate which will allow a safe, full charge of any 12-volt wet cell, sealed lead acid, or gell cell battery. Stop worrying about overcharging your 12-volt starting battery, use the CVC and charge with confidence. CVC kit: $24.95; CVC assembled: $29.95.

The Ace *TachMaster* is a new, optically coupled analog tachometer designed for easy construction and use. If you are in the market for an excellent, high quality tachometer that won't set you back a week's pay, then consider the Ace TachMaster; available as a kit ($29.95), or assembled ($39.95). The TachMaster's analog scale reads in two ranges 0 to 5,000 rpm and 0 to 25,000 rpm. Construction of this tachometer is simple enough for first timers.

Write to Ace R/C Inc., 511 D, Higginsville, MO 64037 and enclose $2.00 for its 100-page catalog.

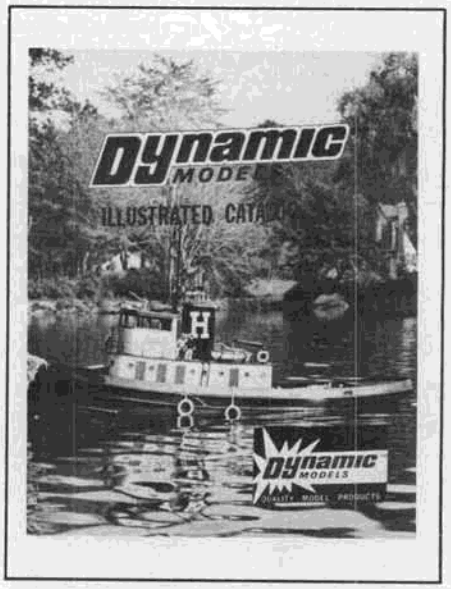
★ ★ ★

McDaniel R/C Service, 13506 Glendundee Dr., Herndon, VA 22071, (703) 435-5805, has announced the availability of a really super charging device which allows the user to charge transmitter and receiver batteries from the cigarette lighter of a car, either at the field or on the way to the field. The device is called a System Charger (Model McD R/C 05) and it is only $19.95 direct from McDaniel (plus $1.50 shipping and handling).

The System Charger uses a D.C. power source of 12.6 to 13.2 volts, and converts that source to 5.2 volts at 250 mah for charging receiver packs (4.8 volt, 250 ma cells max charge time is 30 to 45 minutes; 4.8 volt, 500 ma cells max charge time is 60 to 90 minutes; and 4.8 volt, 1200 ma cells max charge time is 4 hrs.), and 11 volts at 140 to 150 mah for charging 9.6 volt transmitter battery packs. Complete instructions for setup and use are in-

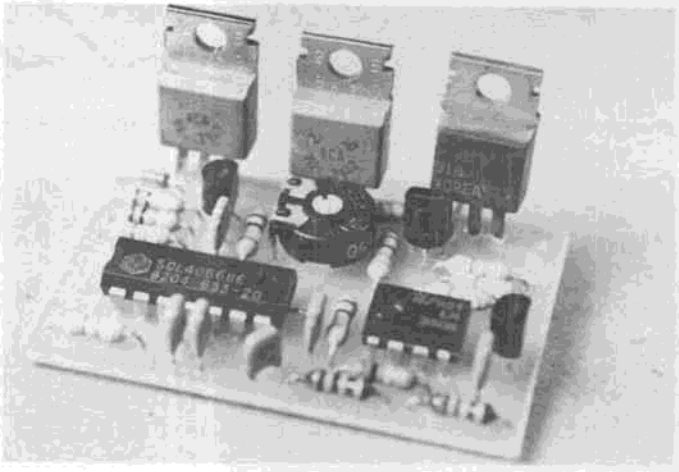
Continued on page 100

New reference book for WW-II jet fighters.



Catalog No. 5 from Dynamic Models. Boats!

New Tower Hobbies Mini Flight Pack: 3.5 ounce total weight.



Jomar Products speed controller for electrics.

Formula One-40 DeNight Special, built specifically for this event by Bob Wallace, Avon, Connecticut. Note muffler.

Line-up of One-40's by (l to r): Don McStay, George "Fuzzy" Denault, Ernie LaChance, and Mickey Fraser, all from Massachusetts.

PYLON

Why not try Formula One-40

By John Smith

Aircraft identification. Fuzzy DeNault holds up Little Toni. Ernie LaChance kneeling.

• After the regular racing season had closed, and the season standings in QUICKIE 500 and FORMULA ONE had been tabulated, and all the awards had been handed out at the annual P.R.O. (PYLON RACING ORGANIZATION) Dinner Banquet; you would think that we racers here in the Northeast would have had enough. Well, don't bet your last good prop!

Sunday, October 24, was the day of the GRAND EXPERIMENT. This experiment was to see if the racing of Formula One airplanes with stock baffle piston K&B engines and mufflers would be exciting enough to bring out any contestants. It did . . . eight contestants and at least 100 spectators showed up at the flying site of the South Shore R/C Club, Inc., in Bridgewater, Massachusetts.

The day dawned bright and sunny, but a bit windy, with temperatures in the 50's. Of the eight flyers who registered for the race, the majority had constructed airplanes to comply specifically with our rules. The rest converted older Formula One airplanes not originally built for this event. Five rounds were flown, with many heats producing exciting, close races. The Formula One-40 airplane proved itself to be considerably faster than the standard Quickie 500 flown in our area, and also much easier to fly.

While there were only eight registered contestants, I feel the event was a success, as there wasn't a lot of advance publicity for this "first-of-its-kind" race. Also, we had a full 1982 racing season here in the Northeast, with 1/2A Pylon, Quickie 500, and Formula One. Therefore, most would-be contestants had to spend the racing season flying, building, and/or repairing planes to be flown during the regular season. This made it difficult to find the time to construct or modify an airplane specifically for this new event.

Many racers from the New England area who were not able to find the time to get ready for our event, did come to our race to observe first-hand exactly what Formula One-40 was all about. We passed out a questionnaire to be filled out by both contestants and spectators

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Action at the starting line. One-40's are faster and prettier than Quickies, also proved easier to fly.

C.D. John Smith hands out First Place trophy to Keith Palmer, of Bristol, Connecticut. John is the force behind Formula One-40.

Magnificent 1/6-scale BE 2e, built by David Deadman, from Roy Scott design, as kitted by Practical Scale. OS 60 H engine. Rudder, elevator, throttle, and bomb dropping. Ailerons not working, and not found necessary.

R/C WORLD

By Bill Northrop

MODE . . . SCHMODE

Perhaps the "My Mode is Best" debate has finally been settled by Eloy Marez, in his *Electronics Corner* column this month. Basically, what he has said is that you should fly the mode that suits you the best and to h--- with what the "experts" say! Whatever system you learn to fly on will probably work best for you from then on . . . especially if you are self-taught.

It is only natural that if someone teaches you to fly, you're most apt to take up the mode used by your instructor. However, as you begin to grow away from the need for an instructor, and before your flying becomes totally instinctive, don't be hesitant to try a mode other than the one with which you started.

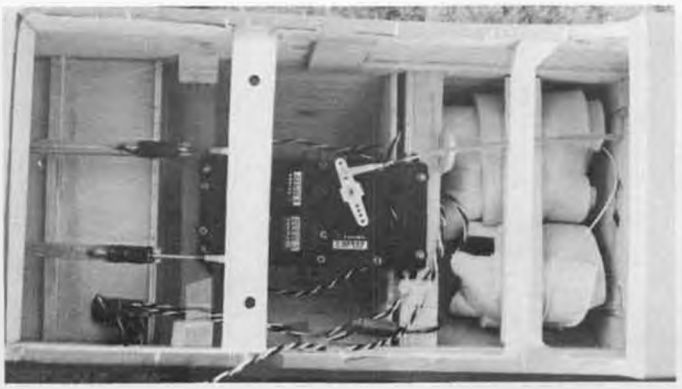
Actually "Mode This" or "Mode That" can be kind of confusing. I'm amazed at the number of fliers who don't stop to realize that a transmitter stick moves whatever servo is plugged into its corresponding outputs on the receiver. If a so-called Mode Two transmitter is used to fly a rudder/elevator glider, you don't normally plug the rudder servo into the rudder output of the receiver . . . you plug it into the aileron output so you can fly using the one stick on the right side of the box. If you're left-handed and want to fly the same glider using the left-hand stick, you don't have to "switch to Mode One", you just switch the throttle ratchet from the left to the right stick.

To avoid the Mode confusion, I usually ask if a transmitter is "throttle right" or "throttle left". The rest just sorta falls into place.

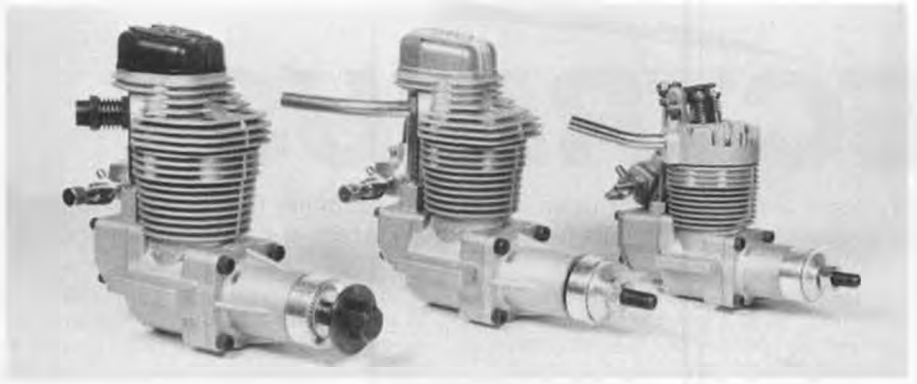
Having been a Galloping Ghost flier for many years before getting into reeds, and then soon after, into multi-proportional, it was only natural for me to go first for triple-function single stick (elevator, aileron, and rudder . . . on the knob) and then to Mode Two, where the right-hand stick followed through with the two basic functions of direction and

Beautiful Henry Struck "Ho-Cat", built from Model Builder plans by Joe Beshar. Was displayed at 1982 WRAM Show.

"Flies as pretty as it looks," says Joe, ex-president of S.A.M. Ship takes off easily with a mere .19 for power.



"Big John" built from M.E.N. kit by Jon Fast, Fairfield, Connecticut, and held by Barbara Grace, an Assistant District Attorney in Manhattan, N.Y. There's plenty of room for the Futaba radio. Power is an O.S. 90. Photos by Rachel Fast.



An advanced peek at the new Enya .90 four-cycle engine, far left, compared to Enya .60 and .35. Four-cycles enjoying tremendous growth in popularity.

pitch.

My first few "multi" aircraft were RET (rudder, elevator, throttle), and the very first Big John was also my first aileron model. You can't imagine what a trauma it was for me, after about eight years of rudder only, rudder/elevator, and rudder/elevator/throttle, on escapements and pulse systems, to make that first flight using ailerons. It was one of the last models in which I used my Deans 10-channel, relay-reed radio, and I had made a pre-flight decision to get B.J. into the air on rudder and elevator (and throttle, of course), and gain plenty of altitude before "risking" an aileron control. As it turned out, B.J. no sooner left the ground than the left wings dropped without so much as a twitch toward the rudder, my thumb just automatically went for the aileron toggle and zapped the wings back to level!

But talk about weird modes! When Lou Proctor's Antic first appeared, I built mine (covered with Silron and finished in metallic blue and silver . . . Monokote is quick and pretty, but oh my did that doped Silron look loverly!) with ailerons, but rigged it with the suggested dihedral for rudder/elevator control. Of course, like any Antic, it flew beautifully this way . . . except when I plugged the ailerons into aileron and the rudder into rudder. Now, flying in my normal single-stick manner with that old PCS Mode Two system, the ship merely yawed when I applied turn (aileron). I had to add rudder to get the model to turn properly (yes, I know turn-and-bank, turn-and-bank, but I was just learning). The solution to this was to use rudder and elevator on the right stick, and throttle and aileron on the left. I only used the aileron when I wanted to tighten what was already a decent, normal turn with rudder and elevator!

Like I said, mode . . . schmode, hook it up the way it works best and go for it!

FAST BIG JOHN

Speaking of Big John, Jon Fast, of Fairfield, Connecticut, built one from the M.E.N. kit, powered it with an O.S. 90, radioed it with Futaba, and covered it with red and white Super Coverite over Balsarite. The pretty gal holding the finished product is Barbara Grace an Assistant District Attorney in Manhattan, New York! All B.J. photos by Rachel Fast.

To answer your question, Jon, the Yogi Bear pilot came from a dime store, way back around 1963-4 when B.J. was first built. It was part of a soap-bubble pipe . . . a very differ-rent bear!

HO-CAT FLIES

Going from bears to cats, Joe Beshar, Oradell, N.J., former SAM president, built a beautiful model of Hank Struck's historic "Ho-Cat", from *Model Builder* plans. First, it won a static award at the 1982 WRAM Show in White Plains, N.Y. Then, as Joe describes it, "I finally got the opportunity to fly it. I was invited to

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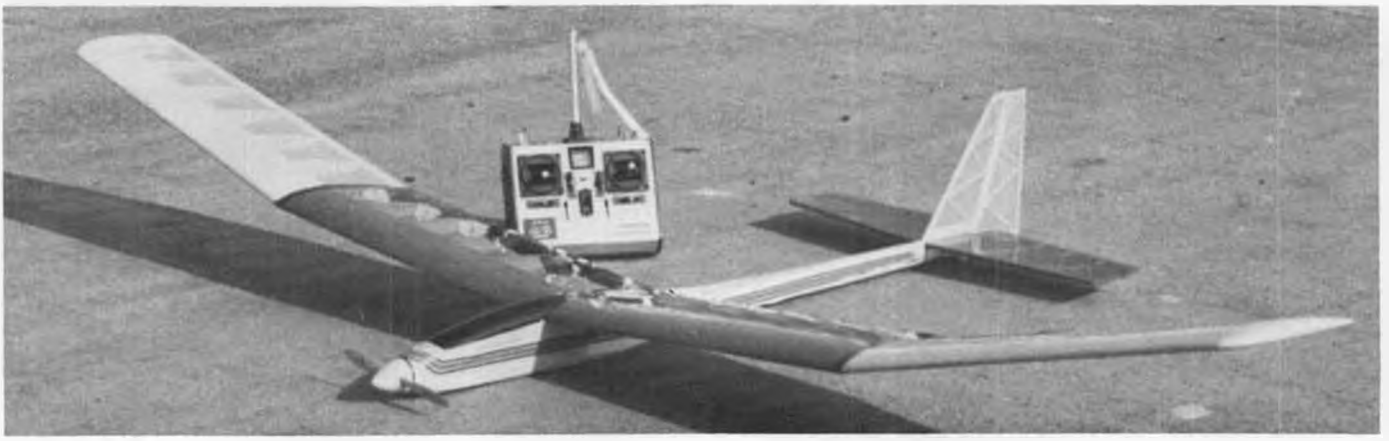
PM Magazine cameraman zeros in on Bud Gay's Spirit of St. Louis during special taping.

Leon Kusik "works" on his PBY for cameraman, but because of dry lake, he did not fly. Story in text.



ELECTRICUS

By LARRY JOLLY . . . Here's a really super 2-meter, direct drive, 05 electric sailplane that climbs like the proverbial "homesick angel" and handles aerobatic maneuvers like a champ. Perfect as a first electric model.

• As I promised in my last article, this month we are going to build an electric sailplane. Whether you are a novice electric flier or a veteran power jockey, pay attention and you can have a most satisfying model that you can fly literally anywhere, anytime, and you won't get caught, because the Electricus 205 flies very high, very easily, and of course very quietly.

How did the Electricus 205 come about? Well, it's a long story that started back in January of 1982. I had just flamed out of the Leisure Grand Championships with an overloaded micro-switch. Mike Charles went on to win with his two-meter design, Ultra II (featured in January '83 **MB**). I liked the looks and characteristics of Mike's airplane . . . and the fact that it won didn't hurt, either. Anyway, like any experienced modeler, I went home and slept on it.

As I fell into a deeper sleep, I started to dream. I found myself in a tunnel of darkness. I looked left, then right. To the right I saw a glimmer of light at the end of the tunnel. I started walking, then running, until I got to the end of that tunnel. As I peered out I saw that this was a strange land, not unlike a desert . . . with rocks, and cactus, and all that good stuff. A little ways out I saw a man standing on a ladder, working on what appeared to be an adobe house.

I walked over to the man and greeted him. Upon asking his name, he replied that he was, "The Bearded One, Guru of Sandia Crest, Keeper of all Knowledge pertaining to model airplanes." I thought to myself, "What a break. This guy can tell me everything I need to know about my next electric project."

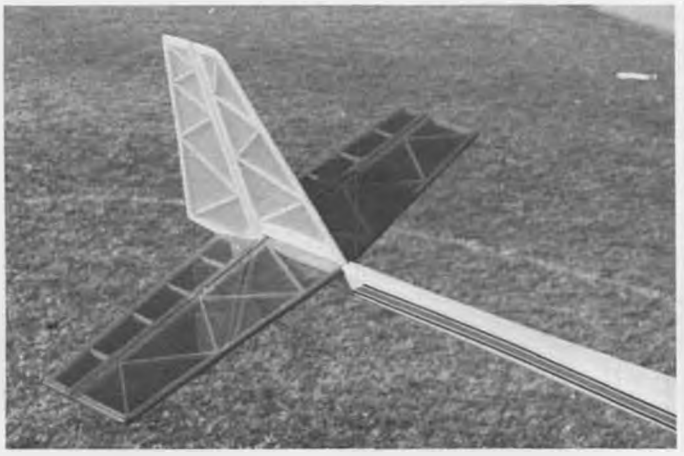
I told the Bearded One of my dilemma. He knew a lot about free flight power models, and suggested I steer my thoughts in that direction. He reminded me of the basic rule: More wing more glide, less wing more climb. Like any truly great Guru, he preferred for me to think out my design rather than have him draw the picture for me. I thought to myself, if I could get my model high enough, theoretically it wouldn't need to glide at all. If it started from enough height, it couldn't fall fast enough to touch down before the max time had elapsed. What I needed was something in between a balloon and a Saturn V.

As the parameters were laid down, the Electricus 205 started to take shape. Light weight was a key factor, for as you physics majors know, mass has a lot to do with acceleration. If I could build a model to 35 ounces all up, I could shorten the span and still have a reasonable wing loading. I asked the Guru about airfoils. I told him I was thinking about an under-cambered section to improve the glide. Looking at me like I was nuts, he replied, "Any good free flighter knows thin, flat bottoms climb faster than under-cambered sections. Didn't you ever hear of Carl, "The Wizard of the Chicago Armory," and his 8% flats that set the world on its ear in the late '30s?" You know, he was right.

Now, I was ready to build. I chose the Eppler 205 airfoil because of its excellent

Author/designer Larry Jolly poses with Electricus at a local flying site. Small model is a future MB construction article, "Whistler".

Larry demonstrates the climb angle of the Electricus. On direct drive, 4-1/2 minute motor runs equal OOS altitude.



Light tail structures are a must for decent wing loadings on electric sailplanes. Electricus weighs 34.5 oz; 8.5 oz./sq. ft.

The nose of the Electricus fairs into the prop spinner beautifully. You won't find ugly rubberbands over this wing!

handling characteristics, flat bottom, and its ability to cover ground. The Guru informed me that a place called Dukes was out of Jet, so I would have to go back where I came from to complete my model. Bidding me farewell, the Guru went back to finish his house. (You figure it out? Yes, the Guru in this case is Dave Thornburg!)

So this is how the Electricus was born. It has an exceptional climb and a wide speed range. If your idea of fun is contest flying, this is the model that is going to be hard to beat. The Electricus 205 is designed to take full advantage of a hot 6-cell, 05 motor and a small 2-3 channel radio.

For S.E.A.M. 2-meter rules, I would recommend a Leisure 05 racing or an Astro 05XL. Use a Rev-Up 7x4 prop for this class. For F3E or 7-cell contests, use the Astro-Cobalt Challenger and a 7x6 Rev-Up. But before you fly, contact NASA, otherwise they'll think one of theirs got away!

If you want to fly an Electricus 205 you have to build it, so Let's Go!!!

PREPARATION

I have found it much easier to scratch build if you start out by cutting yourself a kit. Check the plans over to see what you'll have to buy, in addition to what you now have. All wood should be "contest wood" for the best possible performance.

Cut the fuselage sides from two pieces of 3/32x3x36 matched C-grain, if you have it. The ribs are made by the sandwich-and-sand method. If you have trouble making your ribs, check the back issues of **Model Builder**. Dave Thornburg proved he knows more about making ribs than your local barbecue house ever thought of. If you have a table saw at your disposal, make the leading edge by splitting a piece of 1/4x 5/8 with a 30-degree cut. Follow this with a 10-degree cut on the bottom. If you don't have a saw, rough sand a piece of 1/4x1/4 to shape.

When you have everything prefabricated, set it out on a table and see if it looks as good as those photos the guys send in for their "before" pictures in their kit review articles. Now you're all ready, right? You have a straight, true building board at least 36 inches long, T-pins, knives, sandpaper, plus thick and thin instant glue. Let's do it . . . if we start now, we can chase the thermals Sunday morning!

BUILDING THE ELECTRICUS 205

The wing is the most time consuming construction to build, so let's start on it first. Let's begin with the left center panel, so we don't cover the internal construction detail.

1. Pin down the following: the bottom leading edge 1/16x3x18 sheet, the 1/8x 1/4x18 bottom spruce spar, the 1/4x1x 1/8 shaped T.E., and the 1/16x1/4 cap strips that go between the bottom sheeting and the trailing edge. Don't forget the center sheeting. When everything is straight, glue it in place.

2. Place ribs 3-6 in position and glue in place.

3. Add the top spar.

4. Now carefully fit and glue in place the 1/16 vertical grain shear webs. (Note: shear webs go in all bays, except the one at the tip dihedral break.) Also note this wing is bulletproof, but is only as strong as its weakest shear web.

5. Now is the time to glue the leading edge in position.

6. If you used instant glue to assemble the center panel, it is now dry, so you can raise it up to the 3-1/4 inch dihedral and build the tip right on to it, using the same sequence that you just used to build the center panel.

7. The dihedral braces are cross-over braces made from hard 1/8 inch balsa. Check the detail on the plans for their construction method. I like to cut a strip the full height of the brace, the full length. I then cut the proper angle to match the bottom spar and have found that the excess fits between the top of the brace and the bottom of the top spar.

8. Add the top sheet and the cap strips to the tip.

9. Sand the end of the wing tip flush and glue the tip block in place. I like to rough sand the tip block before I glue it in place.

10. Now build the right wing panel to the exact same point as you now have the left panel.

11. When both panels are complete, line them up on the board. Raise one wing 3-1/4 inches off the table while the other remains flat. See how they fit. If the match isn't perfect, rectify with a sanding block. Now glue the panels together. Add the two center plywood

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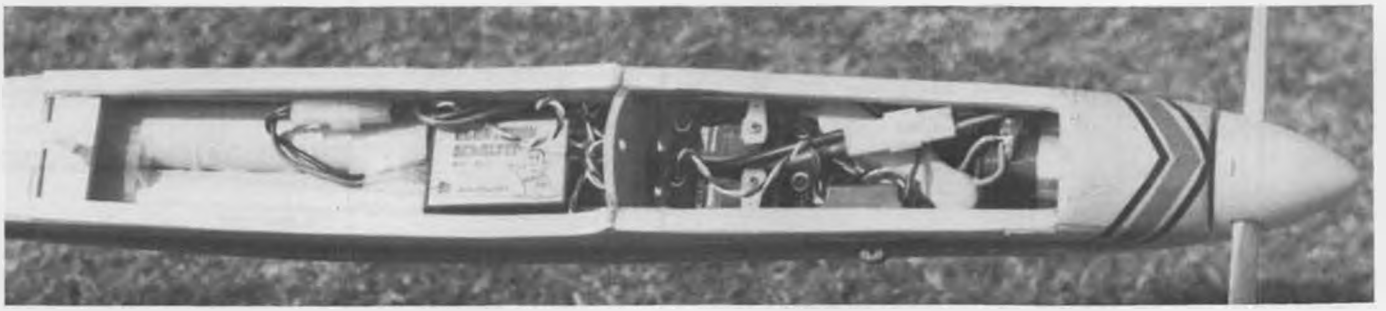
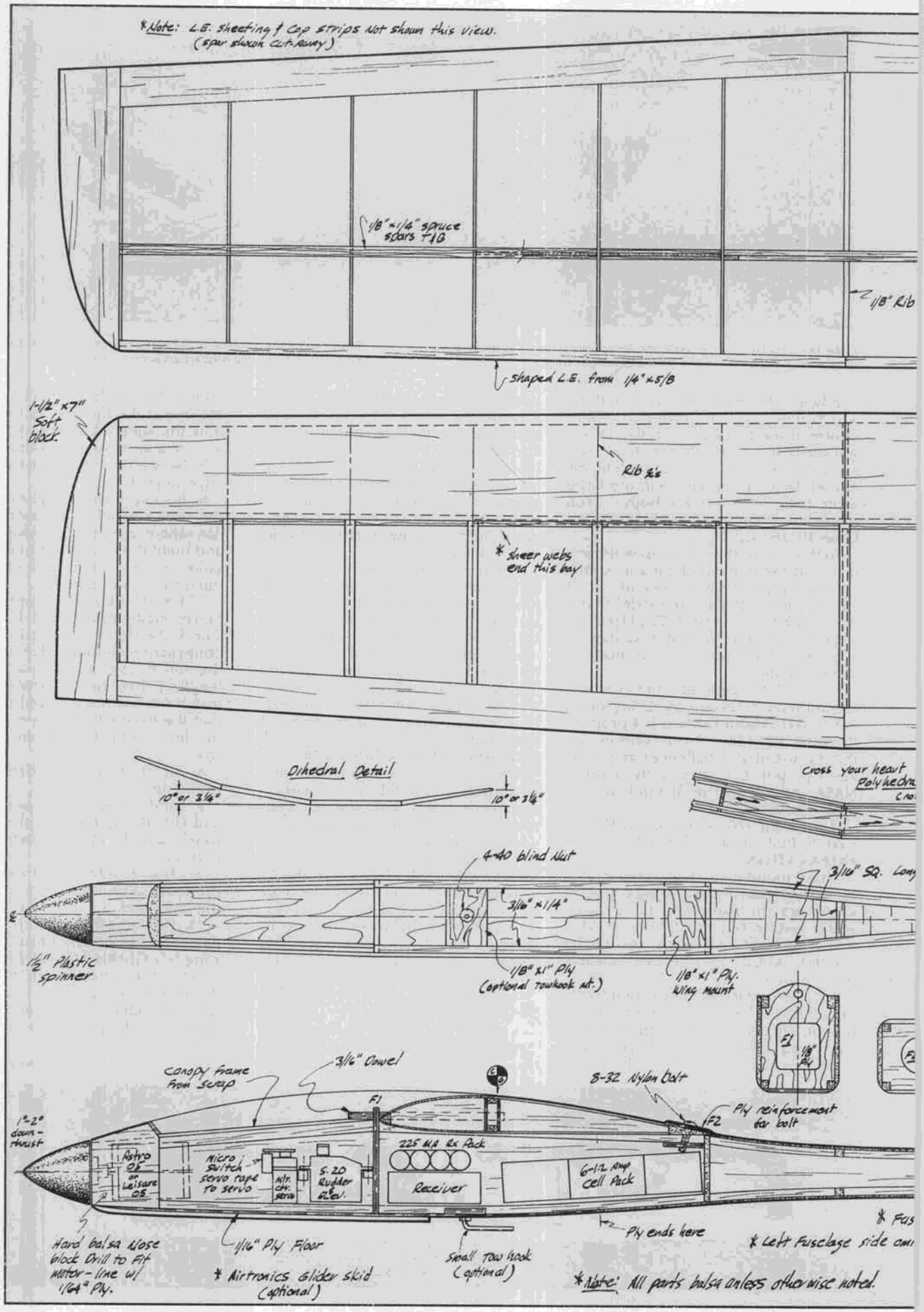
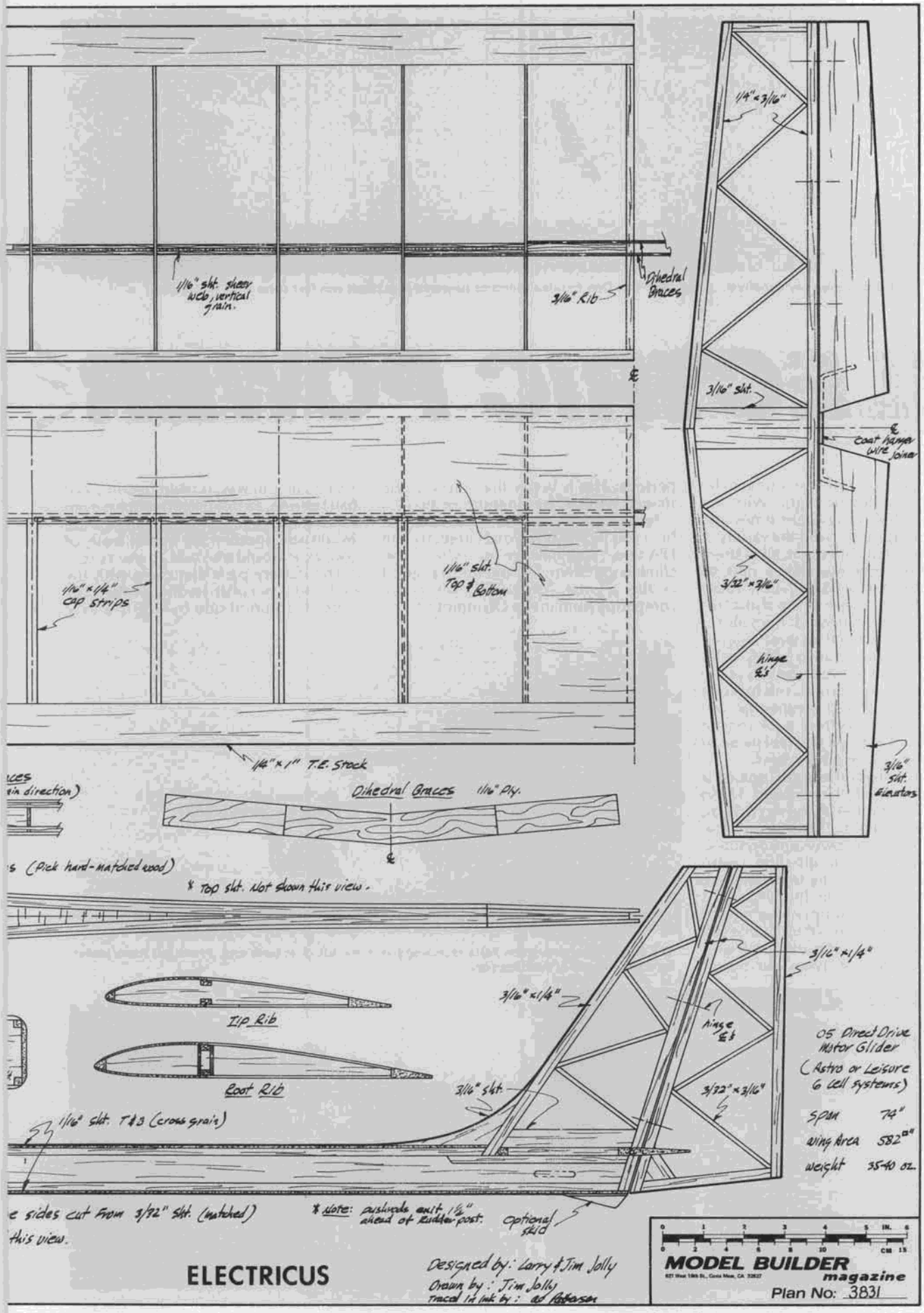
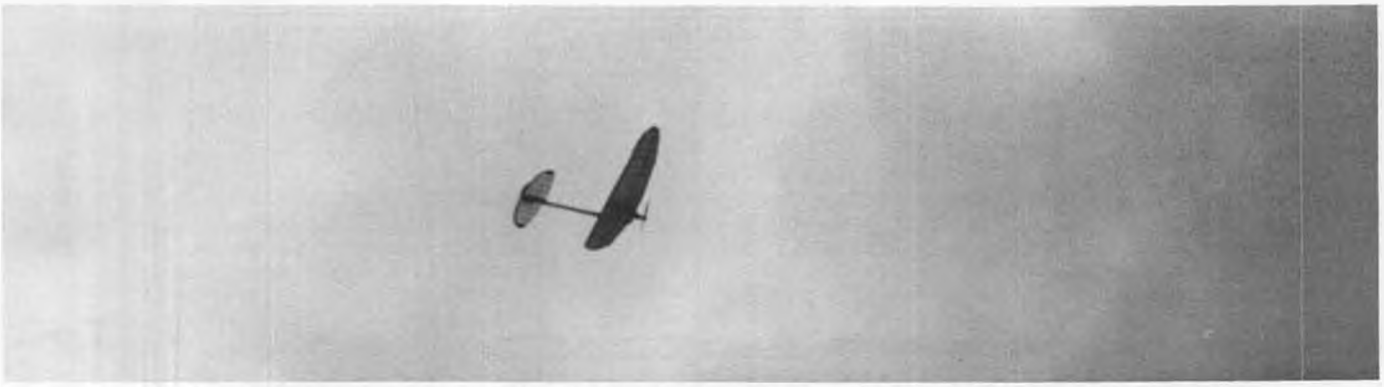


This photo shows the equipment layout in the prototype Electricus. Under the canopy are: rudder and elevator servos; 225 ma airborne battery pack; switch harness; 05 motor. Behind F-1 former are the Futaba 7G receiver, Geist speed controller, and six-cell power pack.


*Note: L.E. sheeting & cap strips not shown this view. (spar shown cut-away)
1/8"x1/4" spruce spars F1B
1/8" Rib
Shaped L.E. from 1/4"x5/8
1-1/2"x7" Soft block.
Rib 3/16
* Sheer webs end this bay
Dihedral Detail
10" or 3 1/4"
10" or 3 1/4"
Cross your heart Polyhedra
4-40 blind nut
3/16"x1/4"
3/16" SQ. Long
1/2" Plastic spinner
1/8"x1" Ply (optional towhook mt.)
1/8"x1" Ply. Wing mount
S1
1/8" Ply
Canopy frame from scrap
3/16" Dowel
F1
8-32 Nylon bolt
F2
Ply reinforcement for bolt
1°-2° down-thrust
Retro 05 or Leisure 05
Micro Switch servo tape to servo
Mtr. Cntl. servo
S-20 Rudder Servo
225 MA Rx Pack
Receiver
6-1/2 Amp Cell Pack
Ply ends here
* Fus
* Left Fuselage side cm
Hard balsa nose block Drill to fit motor-line w/ 1/64" Ply.
1/16" Ply Floor
* Airtronics Glider skid (optional)
Small Tow hook (optional)
* Note: All parts balsa unless otherwise noted.


1/16" sht. sheer web, vertical grain.
3/16" Rib
Dihedral Braces
1/16" sht. Top & Bottom
1/16" x 1/4" cap strips
1/4" x 1" T.E. Stock
Dihedral Braces 1/16" Ply.
(Pick hard-matched wood)
* Top sht. not shown this view.
Tip Rib
Root Rib
1/16" sht. T&B (cross grain)
sides cut From 3/32" sht. (matched)
this view.
* Note: pushrods exit 1/4" ahead of rudder post.
Optional skid
1/4" x 3/16"
3/16" sht.
coat hanger wire joiner
3/32" x 3/16"
hinge pts
3/16" sht. elevators
3/16" x 1/4"
3/16" x 1/4"
hinge pts
3/16" sht.
3/32" x 3/16"
05 Direct Drive Motor Glider
(Astro or Leisure 6 cell systems)
Span 74"
Wing Area 582 sq in
weight 35-40 oz.
ELECTRICUS
Designed by: Larry & Jim Jolly
Drawn by: Jim Jolly
Traced in ink by: Ed Anderson
MODEL BUILDER magazine
Plan No: 3831



It didn't even say goodbye . . . sob. Jim Van Den Eynden's electric powered free flight was lost soon after this photo.

ELECTRIC POWER

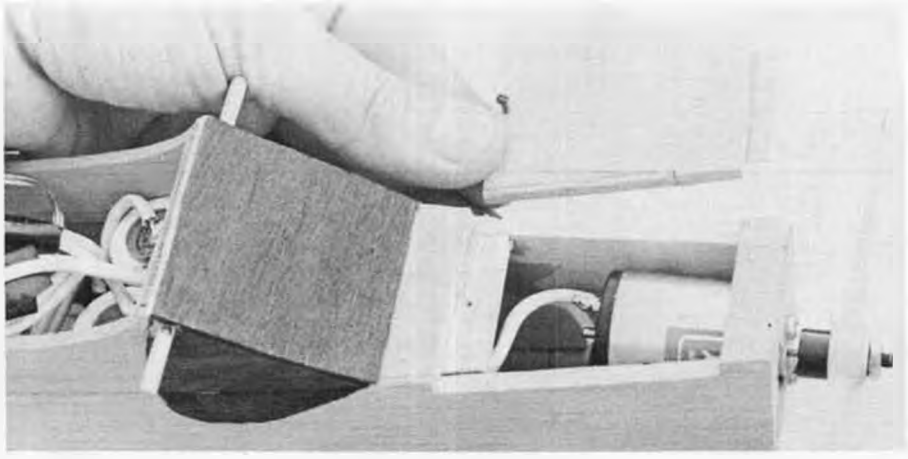
By MITCH POLING

• I think right now is the best time to be a beginner in electric flight. With the advent of sub-C cells, flight times and power went up, and so did the variety of systems that went with them, all of them good. Astro Flight now has a new 05 system, the Astro 05XL 7-cell sport system, which I have been flying recently, and I am impressed. It retails for $49.95, which is lower than most systems, and includes seven Sanyo sub-C cells. Considering that Sanyo is the top of the line in duration and power, this makes it a real bargain. It also means that you have an excellent battery pack for the cobalt 05 from Astro, if you feel inclined towards upping the power later.

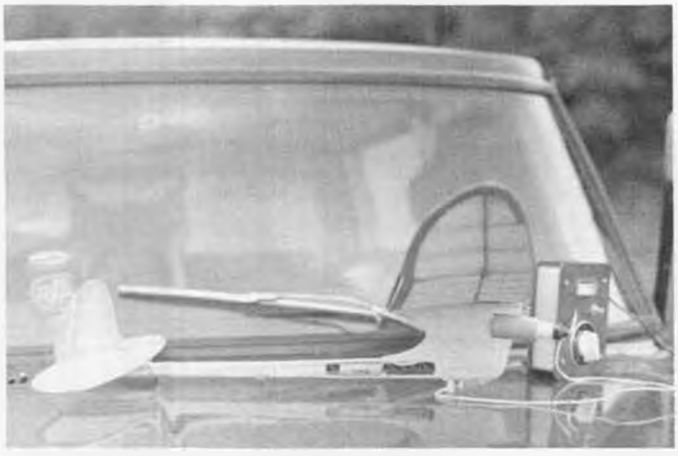
The power from the sport system is very good indeed; I measured 12,300 rpm on a Cox gray 6x4 on the Accu-Tach, at 10 amperes drain. This is a very low drain for this much power, and on sub-C cells this pays off in duration. Astro claims six minutes on the bench (where drain is higher than in the air), and I easily get over 10 minutes of flight (with on-off) with the Olympic 650. On a still day, with no thermals, I made 13 minutes from launch to land, with four on-off periods. This is better than most of the six-cell systems, by a minute or two.

Now, I know, duration is a matter of how you fly and how you charge, so, like EPA says, "your mileage may differ". The climb is excellent, I would rate it as good as the regular Astro 05XL, (six cells), comparing both in the Olympic 650. The motor, by the way, is plain bearing, not ball bearing, so this performance is even more impressive. I'd bet a ball bearing would add another 500 rpm at least; of course, it would also add to the cost.

The battery pack that came with my unit had a peculiar layout, all the cells were Hot Stuffed side-by-side in a long



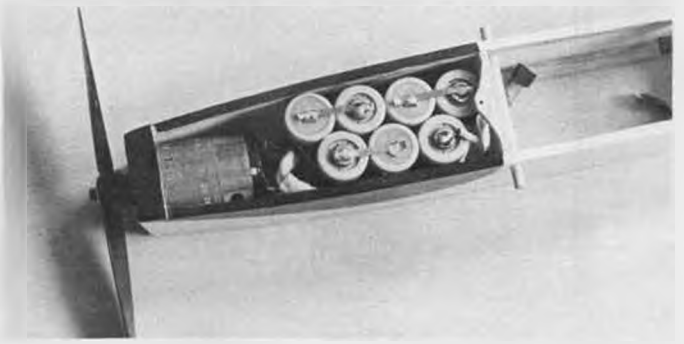
The author's hatch system. Note retaining screw and block at back end. Front tab tucks under forward portion of fuselage top.



Jim's F/F on charge. Uses 1940 Goldberg wing, simple fuselage. Easy to build. VL charger, variable to suit battery.

Jim and his VL 102 powered free flight. Ammeter follows charge.

Astro 05 Sport system, complete with detailed instructions, motor mount, seven-cell Sanyo pack, and wiring with charge jack.



Astro 05 Sport system in the 650. Pack comes in flat arrangement. Ask if you want setup shown.

line, seven cells long! This could not possibly fit into any of my planes, so I snapped them apart at the fourth cell, and arranged it in a 4x3 pack. This does require resoldering the battery connector, and tore the plastic jacket on one cell, which was easily repaired with tape. I asked Bob Boucher about his setup later, and he said that Astro will market the 4x3 pack as well. My feeling is that you should specify it when ordering, if that is the pack you want, otherwise you may wind up redoing the pack as I did.

The Leisure electric powered Playboy. A complete product review coming soon.

The "long pack" is more in the European tradition, where the pack is podded underneath the plane. Note also the instructions recommend fusing, yet nothing is said about how! See my column last month for details on how to do it, it is simple, easy, and fast (15 minutes or less to do) and will most surely save your motor someday.

I noticed also that the instructions do not specifically say what prop to use. The Cox 6x4, Cox gray or the 7x3-1/2 are excellent; I like the 7x3-1/2 best for climb. The recommended charge time is 20 minutes, which is conservative and safe. I charge in 15 minutes at 4-1/2 amperes, but I am also using a digital voltmeter (the Accu-Tach) so I can see when the pack has peaked. The volt peak method is really good for this. I would most likely stay with the slower charge (20 minutes, 3-1/2 amperes) if I were not using the digital voltmeter.

At this point, you will start asking, what charger? By now we have six, seven, and eight-cell 05 systems around, and you might get a fortune invested in chargers! The seven-cell systems, at least, have an easy answer . . . any charger designed to charge six sub-C cells will charge seven sub-C cells, just charge for 20 minutes instead of 15. Astro recommends its 4005 series, the Rapid Charger 4005 ($40) or the AC/DC Charger 4005 B ($70) have a variable dial so you can dial in 3.5 amps and charge for 20 minutes. These chargers are exceptionally versatile, as they can charge any pack from four cells on up in any rating from 100 mah to sub-C. These are the chargers I would recommend if you plan on having a variety of systems. Leisure Electronics has two chargers that can handle this same range, the Vari Charger, model 108, $50, and the Digital Charger, model 109, $100. Again, I would recommend these if you plan on a variety of battery packs.

The Astro Auto Charger (4005 A, $35, and the Astro 6-Cell Charger 4005 C, $25) will charge the seven-cell systems at an initial rate of 4 to 5 amps and drop to about 3 amps at the end of 20 minutes, which gives a full charge. So, there you have it, enough choices in chargers! I predict that we will see a lot of seven-cell systems coming on the market soon, due to their excellent power and duration. This size has been popular in Europe for years, but now we're beginning to catch on!

Last, but not least, there is a list of planes in the Astro 05 sport instructions that will fly well with the system. I notice that the Olympic 650 was left out, and I think this must have been an oversight.

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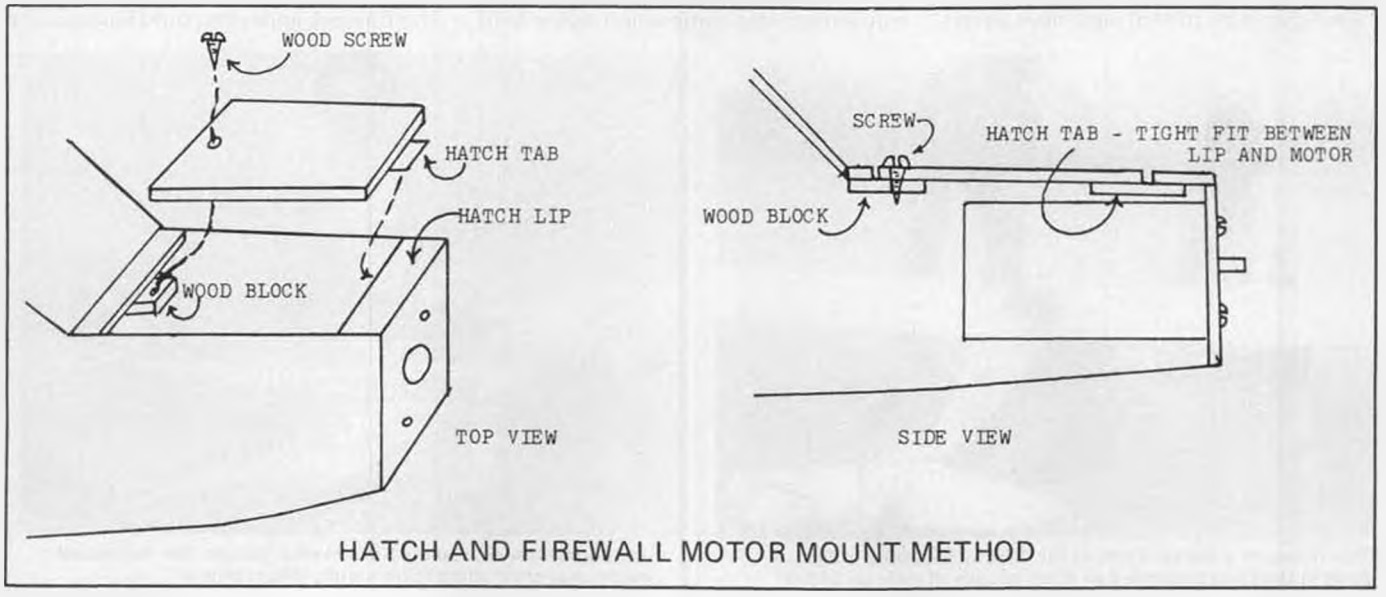
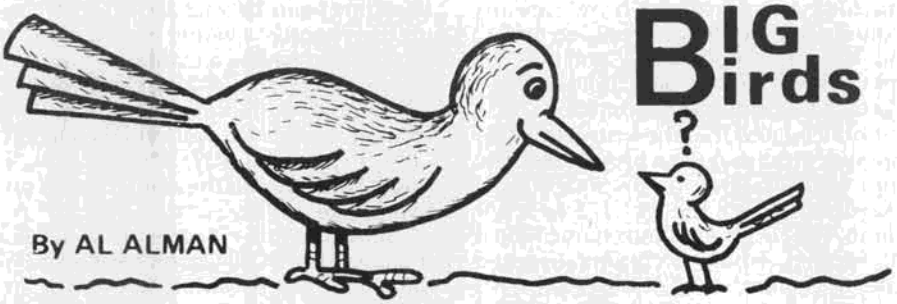


HATCH AND FIREWALL MOTOR MOUNT METHOD

Some of the fine looking BIG Birds that participated in the Double Nickel Squadron's First Annual Fly-In. They all flew as well as they look. (Jerry Peterson photo).



BIG Birds?

By AL ALMAN

• Well, it took almost two weeks, 2200 miles, and two large boxes of Alka-Seltzer Plus, but we finally made it to Puyallup. The trip took days longer than I had planned on because U-Haul trucks don't have much power to begin with; add a full load, plus towing a VW van full of "priceless" BIG Birds at an altitude of 5000-6000 feet, and the damned trucks then become absoluetly gutless. It was very frustrating to hump for seven hours at a time and barely cover 200 miles (and weather was never a problem).

According to U-Haul, renting their trucks is a stimulating experience and one everybody should try. Their slogan, "An Adventure In Moving," does attract to their philosophy by being brazenly painted on all their trucks. It so happened that before getting even halfway to Washington, I'd used up *all* the adventure my poor truck had to offer . . . which made the rest of the trip almost anti-climatic. But that's okay for whoever is gonna rent that same truck from now on 'cause they won't have anything to sweat. Moving is traumatic enough without it becoming too much like "The Great American Adventure."

Actually, outside of the protracted time element, we really didn't have any problems. No mechanical breakdowns or flat tire marred the trip, and the only true excitement came when trying to fit 50 feet of truck and van into some of the infrequent and small gas stations along the way (having only 11-foot vertical clearance, being able to fill up only from the right side, and finding it very difficult to back up this combination of vehicles, all added to the festive air).

The VW, having no seats in back, was literally crammed full of BIG Birds, which came through over two thousand miles of bumps, bounces, and bangs in great shape. In fact, after unloading everything and unhooking the van, only two casualties were noted: my first dicovery, the death of the VW's speedometer, could hardly be considered a serious loss as it had been flaky anyway (I never push the poor old wreck above 45, and can pretty well tell how fast I'm going by the sound of the engine); however, I almost went into a catatonic state when I saw the shape my R&R Models "Stinger" kit was in. Of all the many boxes and cartons full of kits, semi-kits, planks, stringers, cowls, wheel pants, covering, tools, engines and other breakable and treasured items, this was the only box that looked like both Uncle Sam's Postal System and UPS had joined forces to do their best (worst?). Most of the formers ands ribs could have passed

Dick Northam preps his Citabria for "Candy Dropping" flight. A glitch in the system dumped all three pounds of taffy on liftoff!

Jim Miura, Hawaii, and his R&R Models Stinger. Jim has several model mag cover shots to his credit. (Miura photo)

Phil Karafilis, San Ramon, scratch-built this 3.15 Kawasaki powered T-28 in five weeks, including own-design retracts! Dick Igaz photo.

Scratch-built, 1/3-scale Smith Mini-Plane by Dick Igaz. Just a little underpowered by 2.4 Kioritz, at 31 pounds, 2200 sq. in.

for Chinese noodles, so when I do start on this bird it'll be more like scratch building than working with a really nice kit. I should have waited till I moved before buying, instead of letting the "hots" get out of hand (the problem with passion is that you tend to confuse want with need).

Please don't get the impression from the above that Bob Johnson ships a poorly packed or protected kit . . . 'cause he doesn't. I set up the "inevitable" be removing (and not replacing) the plans, instructions, and some of the packing material, and then compounded the felony by not taping the cover back in place. That's what happens when you don't take those few extra seconds to do the job right. . .

All six fuselages traveled on the floor of the van (which is layered with carpeting) and had some old blankets and comforters draped over and around them for protection . . . and to help keep them from bouncing around. The wings, on the other hand, were cradled by three slings made from 3/4 inch thick nylon rope, spaced about three feet apart and anchored high up on the VW's sides with 1/8 inch "S" hooks. Loops to accommodate the hooks were made by simply doubling the rope ends back two inches, wrapping tightly with nylon string . . . and then letting Hot Stuff do its thing; fast, easy . . . and STRONG.

The length of the completed rope slings would depend on how many wings you had to transport, and just how much of a cradle you felt was needed. I grabbed at about a 10-inch bow in mine 'cause it looked good . . . and all seven wings did come through okay. And by the way, I had no chafe or burn marks on any of the wings; the thick nylon rope was soft enough and didn't have to be padded. Naturally, I'm leaving this wing carrier setup in the van: it makes transporting any BIG Bird a piece of cake.

So for those who may have to move or relocate . . . take heart, it can be done without damaging a single BIG Bird. If you don't have a van, I'd recommend either building, or renting, a trailer in order to safely transport those prized possessions. Once these priority items have been taken care of, you can then pay attention to the rest of the family. . .

MORE ON SAFETY

As with everything else, we also tend to suffer from tunnel vision when it comes to safety. We get so caught up in one facet of safety that we completely ignore, or don't allow ourselves to become aware of, other areas that also require prompt attention.

Two such areas have been bugging me lately . . . the first of these coming under the heading of field repairs. Yeah, I know, these kind of repairs are such a common occurrence that they've just about become a tradition at the flying field. Something breaks or cracks and, thanks to our advanced technology, we "fix" it with epoxy or one of the instant glues so we can continue to fly. We've

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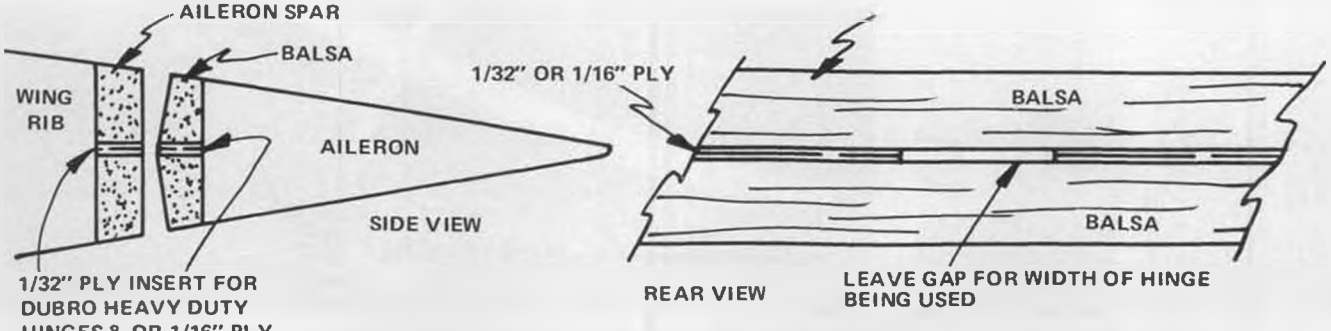
Joe Manuel blew up Cleveland plans for this Waco C-6. Power will be a Saito Twin-80 four-stroke. A beautiful bunch of bones! (Joe Manuel photo)



This technique allows nice clean openings for mounting hinges. Same approach can be used for the rudder and elevator. Then you can attach with epoxy and drill through with toothpicks to retain hinges.

R/C SOARING

By BILL FORREY Photos by the author

• That's Joli Giles smiling just as pretty as you please in the lead-in photo this month. She's posing with her husband Bill's SB-10 scale ship which he intends to aero-tow behind a Wilga tow plane of the same scale. Bill is a full-scale glider pilot when he's not flying models, which probably explains his fascination with the scaled down versions. I met Bill and Joli at a swap meet held by the Pacific Soaring Association last November, where they were selling a quarter-scale Glasflugel Kestral kit which I believe may still be for sale. If you're interested in buying it, I have their address, and their permission to give it to you (the address, that is) if you write to me and ask for it. I forget how much they wanted for the Kestral kit, but you can find out easily enough, besides, his asking price may have changed in the intervening months . . . if it's still for sale.

Q & A FORUM

I think it would be really interesting and helpful to the R/C soaring community to have a means of getting answers to questions and/or problems that arise during the normal (or abnormal) course of building and flying model sailplanes. I don't know of any such means outside of club participation and communication, i.e., newsletters which sometimes perform this service, but not everybody belongs to a club where these exchanges of information can and do occur.

What I propose is a section of this column devoted to questions and answers. I don't make any claims to "know it all," far from it, but I know a lot of knowledgeable guys out there who, put together, are quite an encyclopedia of soaring knowledge.

So, if you have a question or problem related to soaring that has been bugging you (perhaps it's already been answered for you), and you think that you would like to share it with others, let me know about it . . . you probably aren't alone with that question. As far as the "level of sophistication" of your question, don't let that stop you; there are more sport and novice fliers out there than any other kind, and we are all (novice and expert alike) learning. If you have a technical question, whether it be on aerodynamics, or structure, let me know of those questions too. I have several friends who are professionals in both fields, and I'm sure I can find answers for you there. Try me. Write to Bill Forrey, Q & A Forum, **Model Builder** Magazine, P.O. Box 10335, Costa Mesa, CA 92627. Do it now.

TEAM HOBIE

File this one under little known facts, or trivia if you will, but did you know that at one time there was a Team Hobie? There was actually a factory sponsored, competition team of Hobie Hawk fliers (that's the original *Hobie* Hawk, not Midwest or Martin) who competed in thermal and (get this) F3B contests in the late '70s. It was made up principally of two fliers: Jim Wiseman and Col. Bob Thacker (you know, the guy who flew non-stop from Hawaii to New York in a P-82B "Twin Mustang" to set various distance records back in 1947? Well, if you didn't know, now you do.).

Jim Wiseman demonstrates perfect Hawk launching technique. Anaheim, Calif.

Team Hobie flier, Jim Wiseman poses with Hobie Hawk in hand. The Hawk is now being produced by Bob Martin R/C Models, and is still one of the best slope gliders around.

"Mr. R.C.", Larry Jolly shows us how a national champ makes spot landings during competition. Model is the new Pantera. See text.

That's one way to keep people from accidentally stepping on your winch pedal. U-shaped bolts covered w/bright cloth.

Early on it was discovered that though the Hawk was an outstanding slope design for aerobatics, speed, and just plain old fun (and it still is), it left something to be desired in F3B distance and two-lap speed. It did thermal well enough, and handle well enough, but that alone *wasn't* enough! And Team Hobie was rather short-lived.

Jim Wiseman flies a Hawk to this day, and competes with it in thermal contests as well. I thought I'd include a couple of pictures of Jim and the Hawk for your files this month . . . the first of which PROVES that a glider guider can actually launch a Hawk *straight* from a winch single-handedly without scaring the pants off the guys at the adjacent two or three winches as he cartwheels down the field! Believe it or not, Jim even *lands* straight, occasionally, when he does a good setup and final approach . . . it must be all in the last-second, low speed flare-out.

All jokes aside, the Hawk is a really nice sailplane to fly, you jus' gotta practice with the thing if you want to flatland fly it. It has to be the most fun of all slope gliders ever invented for rudder/elevator fun flying and goofing around or showing off your aerobatic prowess. I hope the Hawk, now in production again, is around for at least a few more years . . . it's a classic!

SOARING CALENDAR

I received a letter recently from Govert L. Bassett, of Aero Smithing, 4420 Darventry Court, Charlotte, NC 28211, along with a four color flyer of the soaring calendar that he has for sale for $13.50, if you live east of the Mississippi River ($14 west of the river, $15 Canada, $15.25 overseas). The flyer depicts 14 scenes (1-1/2 x 2-1/4 inches) that appear in the calendar 11 x 19 inches. I only wish I could somehow show them to you . . . they are really beautiful! Two of my favorites are: a shot from the cockpit of a modern, full-size glass ship soaring over snow capped mountains far below, with a *hang glider* out in front, *leading the way;* and a Minimoa being car-towed from a grass field with a beautiful pine forest and snowy mountain range for a backdrop. Breathtaking!

Govert says that he has a friend in R/C soaring who frames these prints, which are the highest German quality, and uses them as trophies in contests. I just thought that was a great idea (I won a framed SSA poster at a contest once and loved it!), and I thought I'd pass it on to you CDs out there who may be looking for some really classy, inexpensive trophies, or wall decorations for the workbench.

NEW COMPETITION GLIDER

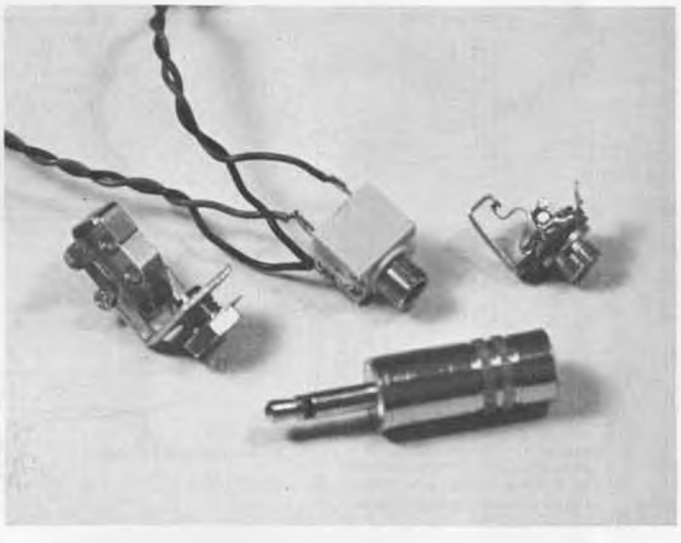
After a recent local club contest, I was offered the opportunity to fly a very interesting R/C sailplane. I had been observing this particular sailplane carefully throughout the contest as it was being flown by two accomplished fliers, John Brown and Larry Jolly, both Nats winners, as you are probably well aware. I was duly impressed by all three. Larry took first place, and John took third. Are you curious about the airplane yet?

You'll have to excuse me if I sound a little excited about this new sailplane,

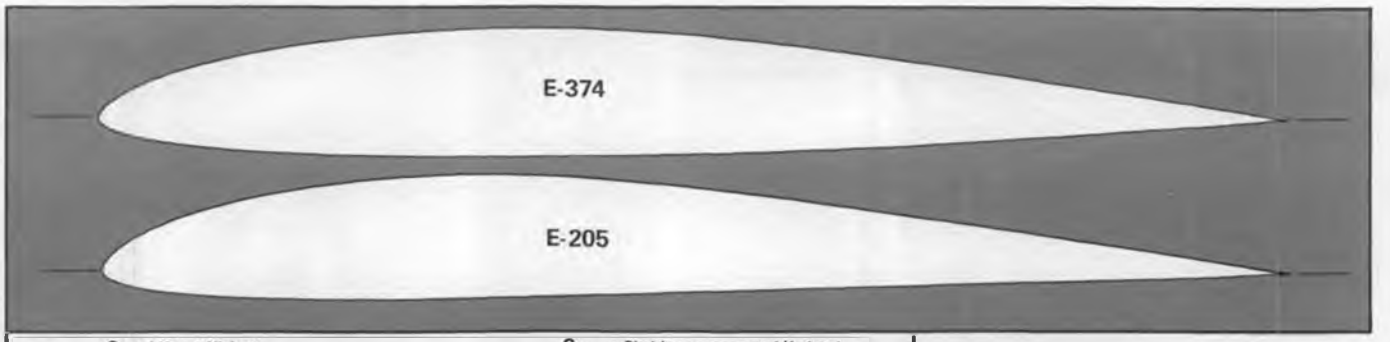
Flat contact patch makes this Radio Shack switch-jack less reliable than others.

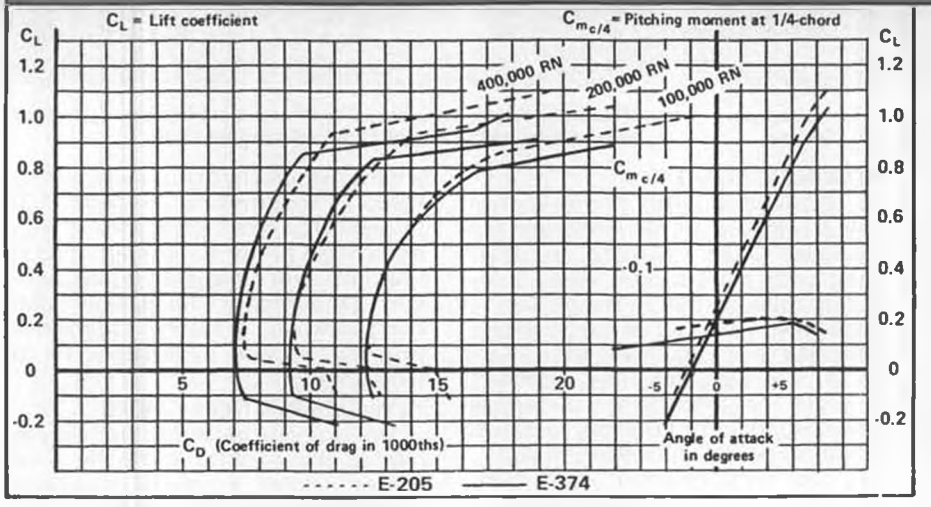
Single-point contact switch is a step in the right direction . . .

Ralph St. John's way of ensuring a "switch-on" launch for his Sagitta. See text for details of this on/off/charge switch.



Three different mini switch-jacks: (l to r) Radio Shack, 2-point, 1-point versions, and mini plug (actual size). Two-point is best.





Theoretical glide polars with pitching moment and lift vs. angle of attack graphs for Eppler 374 and 205 sections (for comparison).

Data from Model-Technik-Berater 1, "Eppler-Profile".

Eppler 374 coordinates (T.E. to L.E. to T.E.):

X:	100.0	99.64	98.61	97.00	94.86	92.21
Y:	00.00	0.045	0.204	0.485	0.846	1.264
X:	85.51	77.29	68.05	58.30	48.51	38.93
Y:	2.297	3.559	4.943	6.268	7.251	7.684
X:	29.82	21.41	14.05	8.035	3.589	2.003
Y:	7.506	6.815	5.732	4.349	2.778	1.970
X:	0.862	0.178	0.014	0.437	1.427	2.935
Y:	1.183	0.457	-0.124	-0.624	-1.133	-1.602
X:	4.949	7.454	13.84	21.86	31.16	41.32
Y:	-2.017	-2.371	-2.892	-3.177	-3.256	-3.165
X:	51.88	62.33	67.38	72.24	81.22	88.89
Y:	-2.932	-2.570	-2.334	-2.060	-1.451	-0.882
X:	94.78	96.96	98.59	99.64	100.0	
Y:	-0.432	-0.241	-0.091	-0.016	00.00	

but I can't help it. It's called the Pantera, and I think it's going to be a real hit in the contest circuits this year. Here's what it has: molded fiberglass fuselage that is joined together by the manufacturer (and it's as sexy-looking as any I've seen); two-piece, polyhedral wing of D-tube construction; spoilers that are very effective and cause minimal pitch change; all-moving stab that is 16 percent of the wing's area, with a long tail moment; a triangular shaped, molded fiberglass fin (actually one piece with the fuselage) that allows you to make the rudder as tall or short as you like (just in case you want to build another set of wings with more span or different plan form and want to adjust the rudder size accordingly); an *un*-adulterated Eppler 205 section (yipee!); machine cut ribs (no die-smashing); complete hardware (buy your own glue and Monokote).

I said earlier that I was given an opportunity to fly the Pantera . . . well, actually I had several, both from winch tow and hand launch. To say that I liked the airplane would be a gross understatement . . . I loved it! I have never before flown a sailplane using an Eppler 205 that had such a wide speed range. Oh, they all went fast, needless to say, but none went *slow* like the Pantera does. It was especially nice to be able to land it, spoilers fully deployed, at a jogger's pace, with the nose up in the air like some kind of snob unwilling to act disgracefully in front of a crowd. It was really that poetic, and very controllable too.

The Pantera was designed to be a high performance, AMA or club style thermal ship. I believe it's more than that. The

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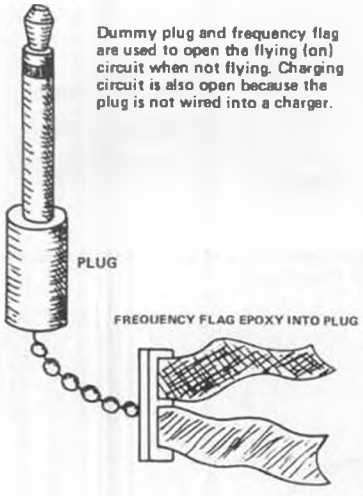
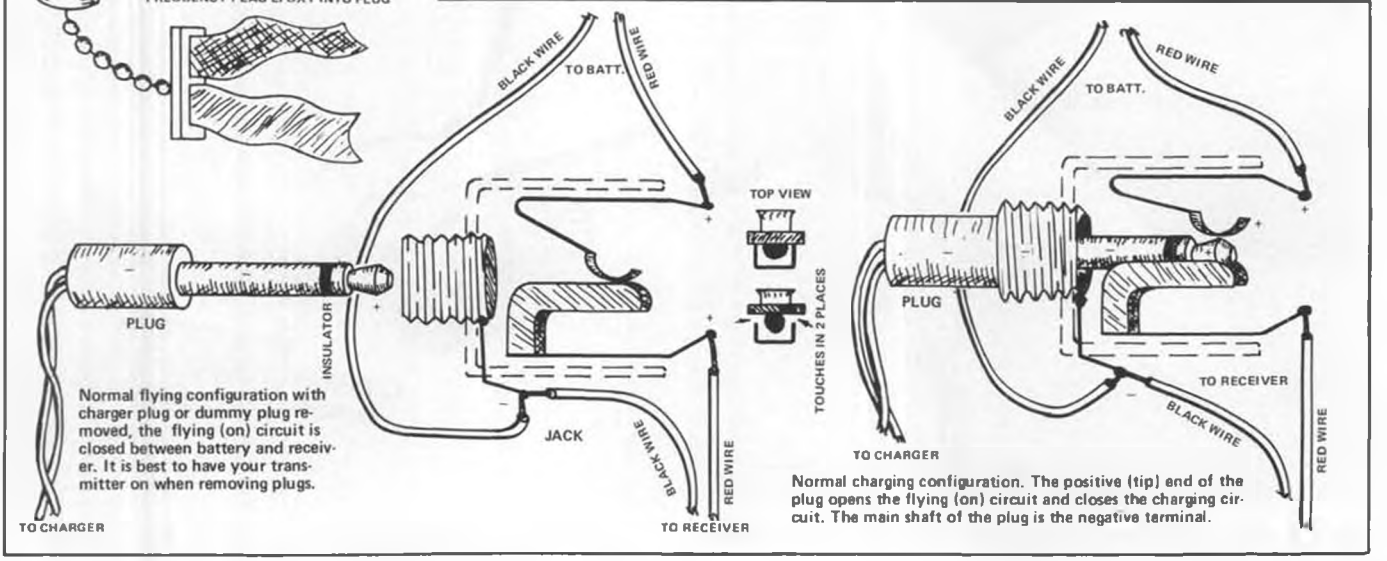
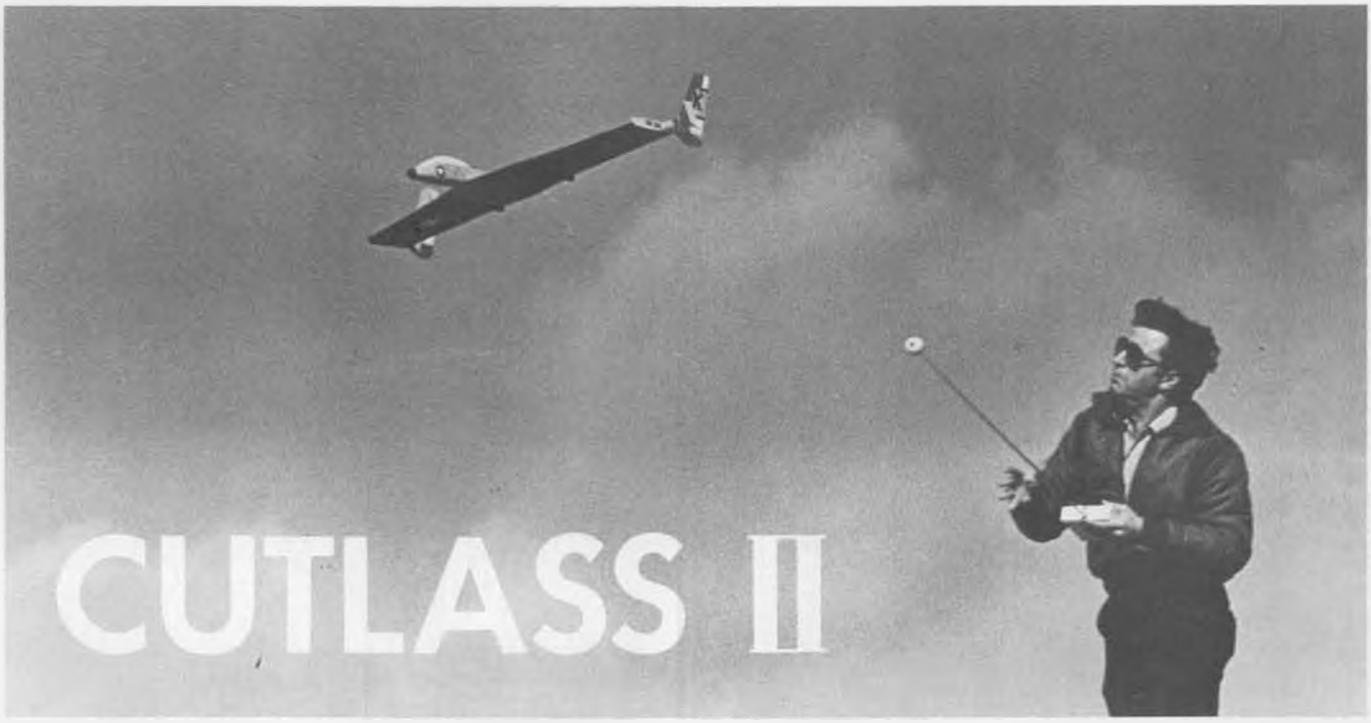






By LARRY RENGER . . . If flying wings are your thing, you'll love this very inexpensive, almost all foam slope glider. The Cutlass II was designed to resemble the Navy's first flying wing fighter, the F7U Cutlass.

• One of the most visually interesting of the early jet fighters was the Chance Vought Cutlass. This carrier-based Navy fighter had an impressive list of "firsts" to its credit. It was the first U.S. jet fighter designed from the outset to use afterburner, the first swept wing jet aircraft in the Navy, and first such to fly from a carrier. It was the fastest Navy aircraft of its time, and the first tailless airplane to go into production for U.S. service use.

I have always loved the look of the Cutlass, and flying wings in general. The Cutlass II is an attempt to capture the style of the original Cutlass without sacrificing the performance I want in a slope soaring glider. The Cutlass II has a comparatively high aspect ratio wing with a very modest sweep angle. The tip-mounted, toed-in vertical tails are more effective than the mid-wing verticals would have been. Control is by separate elevator and aileron rather than mixed elevons to avoid the problems of separating control sensitivities and neutral.

The engine configuration of the original Cutlass makes good sense for a full scale aircraft, but would produce high drag in a glider. As a result, I simulated wing-buried engines on the "II" to hint at jet power. The exhausts pivot up and down with the elevator, by the way. Consider what that would do for low speed control on a real aircraft! Lots of little touches such as fillets between fuselage and wing, and the paint scheme add to the air of authenticity. I have even had a few people think it was a true scale model of a full-scale aircraft. (If Grumman wants to use the design, I would be happy to settle for only a small royalty.)

One thing that flying wings won't do is compete directly in performance with conventional aircraft. The drag caused by use of an airfoil with inherent aerodynamic stability, or the short coupled stabilizing tips of the swept wing models causes a significant reduction in performance compared to a standard aircraft of the same wing area (total including stabilizer, to be fair). However! A flying wing, and especially this jazzy, military flying wing, will get you center stage attention at any flying site where you take it. In addition, Cutlass II is smooth, fast, and maneuverable.

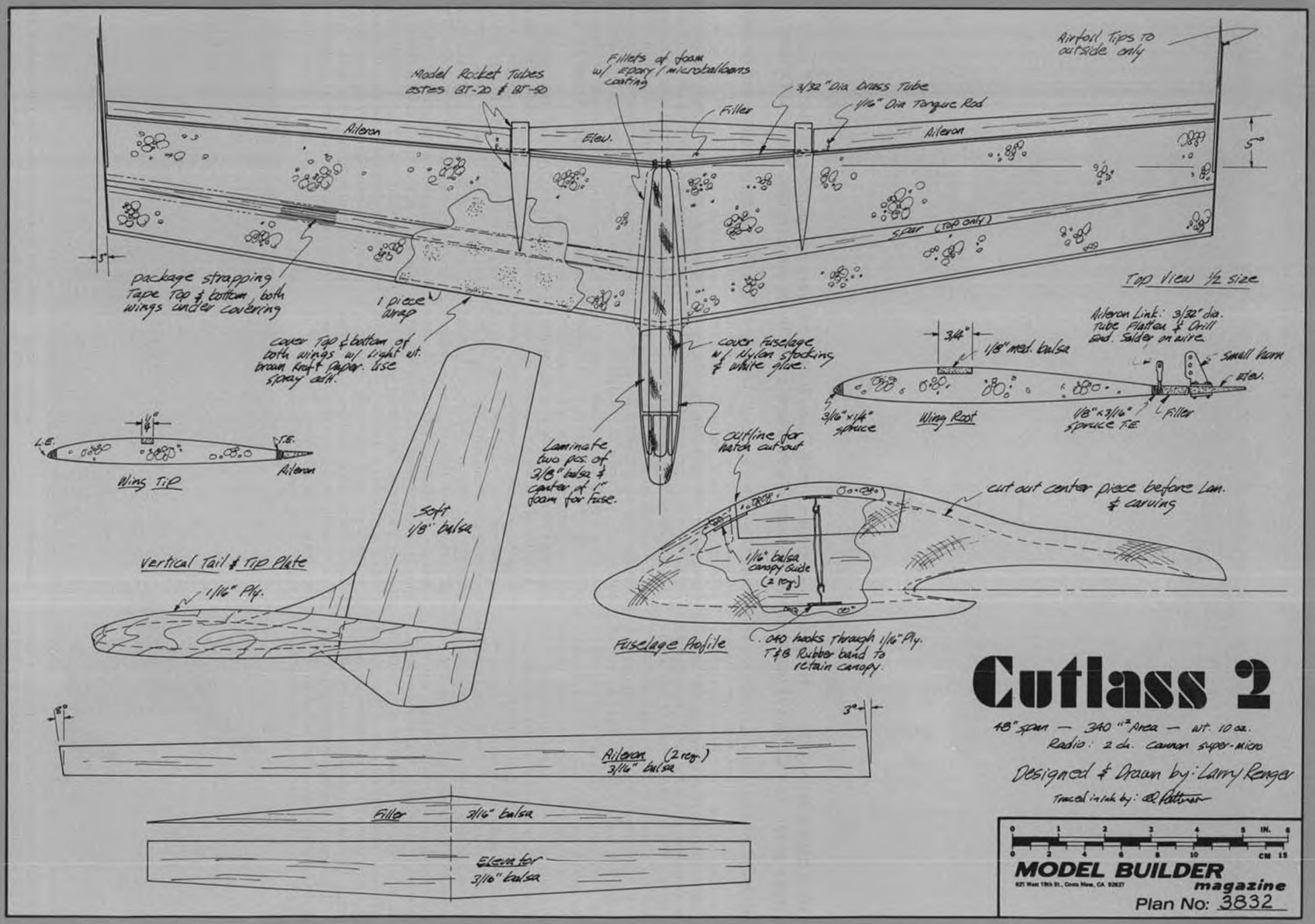
The model presented here has some interesting construction features which resulted in a completed flying weight of 10 ounces. Despite this light weight, the aircraft has excellent penetration, and flies smoothly and stably when balanced and trimmed carefully. As with all flying wings, correct CG location falls in a very narrow range. Balance points outside that region result in either a "Flying pig" or an unstable terror. More on trim technique later!

The keys to Cutlass II's light weight are foam wing cores covered with lightweight brown wrapping paper, a foam fuselage skinned with ladies' nylon stocking material, white glue, and, of course, a Cannon Super-Micro two-channel airborne radio system. The brown wrapping paper covering sounds strange, but was the ultimate selection after extensive search and weighing of potential wing skin materials. It proved to be half the weight per square inch of the next best material, 1/32 balsa! Wing rigidity is excellent, and the paper took very little filling to give a good finish.

WING

Unusual construction techniques yield a very light, inexpensive flying wing model. Semi-scale look gets attention fast.

Combat flying fantasies are hard to suppress with the Cutlass II and weather like this! Flights are fast, smooth, realistic.



Cutlass 2

48" span — 340 "² Area — Wt. 10 oz.
Radio: 2 ch. Cannon super-micro

Designed & Drawn by: Larry Renger

Traced in ink by: Ed Patterson

MODEL BUILDER magazine
621 West 19th St., Costa Mesa, CA 92627

Plan No: 3832

Author-designer, Larry Renger demonstrates the testing technique used for determining CG location and trim settings for maximum stability. Model is swung around right side up and inverted . . . when it flies like this, it's ready to fly R/C.

Construction starts with your foam wing cores. You can either cut them or buy them. I cut mine according to the methods described in the book, *Foam Wings*, by J. Alexander (RCM Press, P.O. Box 487, Sierra Madre, CA, $4.95). An easy alternative is to have your cores custom cut by an expert company such as Hi Johnson Model Products (11015 Glen Oaks Blvd., Pacoima, CA 91331) who, at last catalog, charged about $8 per wing panel. You supply the templates to their specifications as set forth in the catalog.

Please be sure to use the airfoils presented in the plans. The camber line used yields a stable, but low drag section. Any other section will cause drastic changes in balance location, stability characteristics, drag, etc. You may know, or find a better airfoil, but do so at your own risk. Flying wings are much more sensitive to airfoil changes than conventional models.

Once you have the basic cores cut and the surfaces sanded, trim the leading and trailing edges to fit the wood strips, and carve a groove in the upper surfaces to accept the spar. Epoxy all three pieces of wood to each wing panel. Add a stripe of fiber-reinforced package strapping tape top and bottom of each panel, and then sand the leading and trailing edges to shape.

Cover both panels with brown wrapping paper using 3M's "77" spray cement. The can has the instructions, read both them and the cautionary warnings! I covered each panel with a single piece of paper wrapped from the trailing edge, under the bottom, around the leading edge and over the top. Be especially careful here not to twist the wing panels. Once covered, you can't straighten foam wings. Also, note that there is a smooth and a rough side to the paper. Cover with the smooth side out for easy finishing. A nice feature of the brown wrapping paper is that it will both water shrink and heat shrink! You can easily get out any ripples left after covering. Painting the material then stabilizes it.

You are ready to cut the root and tip angles into each panel. Once the fit is perfect, epoxy the two panels together. The top surface of the wing should be flat; the taper comes from the bottom. Dihedral is not needed, but a couple of degrees and a nice visual effect. Reinforce the center joint with a one inch wide strip of fiberglass and epoxy. At this time, you make the aileron torque links from 1/16 piano wire and 3/32 brass tubing and epoxy it to the center trailing edge of the wing. Behind that goes the filler strip to provide a straight hinge surface for the elevator. The basic wing structure is now complete, so set it aside and make the other components to add

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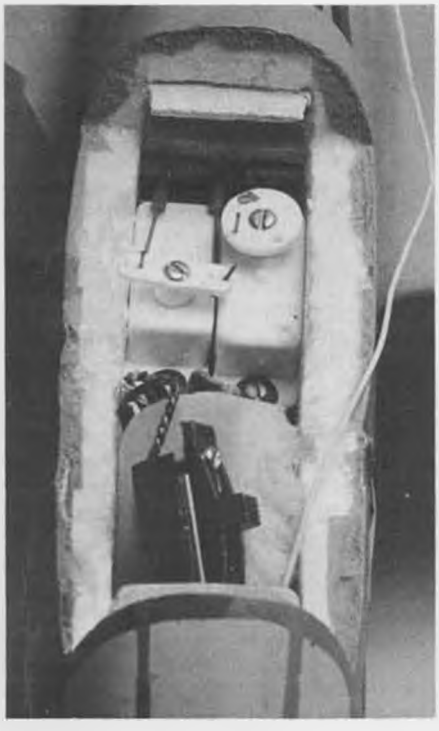
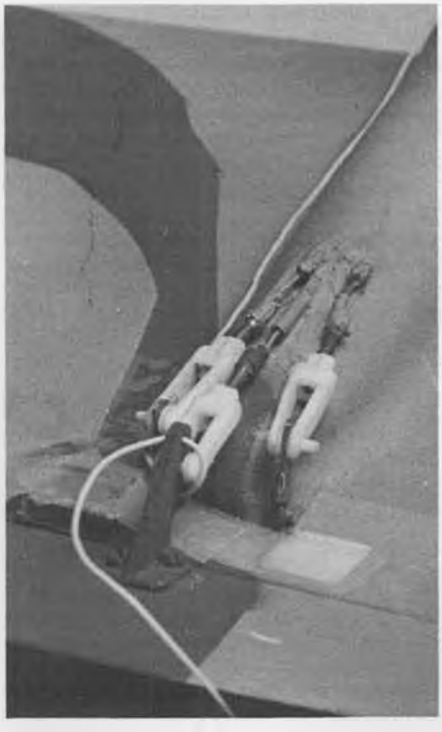


Cockpit details. Note: balsa canopy guides, long aileron output arms, foam construction.



Control horns are kept in the center to reduce drag. Testing revealed need for tail weight.

Simulated "exhausts" move with elevator. Help create that scale-like appearance.

sixth annual FLY-IN

By ELOY MAREZ . . . Our Electronics Corner columnist turns reporter/photographer to cover the QSAA Fly-In.

Wolfgang and Klaus Muller pose with their huge C-5A Galaxy. Model flies extremely well and easily took Best Multi-Engine trophy.

This year's trophy girl, Miss Barbara Boyce, with attention getting "Showboat" T-shirt!

• Dateline Las Vegas: October 28-31, 1982. Once again, actually for the sixth time, devotees of big model airplanes from all corners of the globe descended on this city, for the 1982 Quarter Scale Association of America's annual Fly-In. They came in great numbers; 169 airplanes were registered. They came from all over the United States; 14 states, from as far away as Florida, were represented, as were the countries of West Germany, South Africa, Canada, France, and New Caledonia. They came in all sizes; ranging from Bob Thacker's (San Clemente, California) four foot, six pound, .40 powered "Quickie", to an incredible 147-1/2 inch, 50 pound Lockheed C-5A "Galaxy", which was powered by four Webra .60's, and flown by West Germany's Wolfgang and Klaus Muller, and what must have been half of the Luftwaffe! They came to see old friends, and to make news ones, to show off the results of their efforts since the 1981 Fly-In, and to see what others have accomplished in that time. And most of all, they came to FLY . . . of the 169 entries, only seven were entered as static displays. For some, the reason was obvious, victims of the one ill that plaques all model builders, the lack of time! We look forward to seeing those in the air at the 1983 Fly-In.

Contest headquarters, as in the past, was the Showboat Hotel, located in the city, about a half-hour's drive from the flying site, which this year was a return to the dry lake, scene of pre-1981 events. The field might have some disadvantages, but one of them is not lack of space. Even with the multitude of vehicles of all sizes and shapes, manufacturer's display areas, concession stands, official's area, and acres of pits, there is still more than enough room for ample and safe takeoff's and landings, and all the clear airspace you could ask for.

The event officially started Thursday, October 28, with registration and model display in one of the Showboat Hotel's spacious ballrooms. Rex Perkins, QSAA President, Pat Bunker, Secretary, and a squadron of QSAA'ers, gave us a preview of what to expect for the rest of the event; fast speedy processing, well organized display and manufacturer's spaces, and ready answers to the million and one questions that always seem to need solutions. It was obvious from the beginning that someone had done all of the necessary homework for this one.

Flying started on Friday morning,

The launching ramp with V-1 Manned Buzz Bomb in position. That thing hanging out of the nozzle is part of the starting equipment.

Relative size of the V-1 can be seen here. Pilot Vorg Vogelsang poses with the "hardware" he took home to Germany.

All the way from France . . . Christian Tachet and his supporters, with an impressive airplane called a "Rallye" which featured a full cockpit and lots of detail.

officially at nine, unofficially when the sun first peaked over the Arizona/Nevada border. Even the weather cooperated; we were treated to two and a half days of excellent flying weather, with little winds and temperature from cool to warm, with no extremes at either end. Saturday afternoon gave us a little scare, with some high winds and a little rain that drove all but the most daring back to the city early, but we all took advantage of the time to get the oil and dirt off in preparation for the night's banquet, which was another QSAA rousing success.

It too, took place at the Showboat Hotel, at yet another banquet hall . . . I lost track of how many they have! And here, I will take a couple of lines to say thanks to the management and staff of that fine hotel. I can imagine the perplexity on the part of the hotel manager when he was first approached by Eddie Morgan's crew, "You want to do *what* in my hotel"? But they coped very well, all of them, from the bell hops ("Careful with that wing, son!") to the nice ladies who rapidly and efficiently served us a well prepared and warm dinner at the banquet. Most of us who travel with our models have learned to be satisfied with a warm shower and a place to plug in the charger . . . it is an unexpected pleasure to also be made to feel at home, Gracias!

At the banquet, after the excellent meal and a couple of cool ones to wash away the day's accumulation of sand, we were given the opportunity to express our appreciation to all of the organizers and other hard workers who made all of this possible. These things don't just happen, you know! In addition, we had the privilege of seeing what some of the notables, and our foreign friends in the audience look like, and to applaud their contributions to the big model hobby in particular, and to model aviation in general.

The winners of the various categories were announced; they were presented with suitable trophies and a smooch from trophy girl Barbara Boyce, of Edmonds, Washington. This event is somewhat different from most others that we attend, in that there are no assigned judges for either statis or flight points, the registered entrants themselves pick their favorites, and vote for them on a ballot received upon registration. This method has the approval of all concerned; it does seem to relieve a lot of the pressure of competition and allows you to enjoy the flying and camaraderie, which is what it is all about.

Winners for the 1982 Fly-In, in the various categories, were:

Best of Show: George Harlan, Irvine, California (Monocoupe).

Multi-Engine: Wolfgang Muller, and Lufthanza Sport Club, Frankfurt, Germany (C-5A).

Best Biplane: Wesley Vosburg, Santa Maria, California (Fly Baby).

Winner of Best Military Scale, Joe Zimmerman, Buena Park, CA, and his Quadra powered P-39 Airacobra, soon to be a kit.

Best Civilian Aircraft award went to David New and his Cessna 140. Impressive trophies are the rule with QSAA.

Wild Bill Stroman with his wing and tail warp-controlled Albatross. Wires at wing tips look like spider webs.

This is not a "first", it's an "again" for Pat Bunker as she adds another Powderpuff Trophy to her collection. Mooney Mite.

Powder Puff: Pat Bunker, Las Vegas, Nevada (Mooney Mite).
Best Civilian Aircraft: David New, Anaheim, California (Cessna 140).
Best Static Display: Bob Gillespie, Twin Falls, Idaho (Fairchild F-27).
Best Scratch Built: Mel Barber, South Africa (Sikorsky S-39CS).
Jr. Achievement: John Bashore, Fountain Valley, California (Super Chipmunk).
Mechanical Achievement: Jorg Vogelsang, Hagem, West Germany (V-1 Buzz Bomb).
Stand-Off Scale: Chuck Fuller, Seaside, California (AT-6).
Military Scale: Joe Zimmerman, Buena Park, California (P-39).
Best Scale: Bill Stroman, Norwalk, California (Albatross #4).
Best Finish: Dick Enos, Santa Maria, California (Fly Baby).
Best WWI: Brian Curry, Irvine, California (Sopwith Camel).
Best Electric: Tony & Addie Naccarato, Burbank, California (J-3 Cub).
Crapshooter: Duke Smith, Indian Springs, Nevada (Pitts).
Marathon of Flight: Es Hess, Poway, California (Mr Mulligan).
Longest Distance Travelled Mel Barber, South Africa.

Had there been a trophy for the most hard luck story, my vote would have been cast for poor Helmut Dressendorfer, of Nurnberg, West Germany. With all of his travel plans made, even to the point of advance shipment of his two ninety-inch models in a crate big enough to have sent the Hindenburg, said crate having arrived by my garage in Costa Mesa the week before, poor Helmut instead traveled to a hospital for an operation on his leg. We've sent off a "Get well" card, in the form of a space motiff 1983 calendar, signed by hundreds of us who attended the Fly-In, and I will once again repeat the message it contained: "Get well soon, we expect to have you with us at the 1983 QSAA Fly-In".

Facing yet another early morning, and another day's flying, most of us prefer to cut evening's like this short. It would have been nice not to have to waste time listening to what was probably supposed to be entertainment but wasn't . . . an opinion that was shared by many at adjoining tables. I am all for the presentations, and necessary business, but after that I would have liked to talk to friends with whom I had barely shared a "Hi, nice to see you, talk to you later". There is just never enough time to renew old acquaintances, make new ones, ask someone how he got that super paint job, or simply to say "well done" to someone who's workmanship or idea your particularly admire. It might be worth considering, for all who arrange such events, that before they turn over the microphone to anyone, they first check that his mouth is switched on to "low rate".

We witnessed a lot of exciting and interesting flying! For example, a group of enterprising Germans had a sky driver-equipped J-3, piloted by Otto Schulze. After first dropping a smoke grenade to check wind velocity and direction, in true sky diver procedure, the Cub would then eject the diver, who was then controlled by a second R/C system and pilot, through a free fall maneuver, chute opening, and landing . . . all R/C'ed! Another German group (Except for poor Dressendorfer and his doctor, I don't believe *anyone* stayed back there this weekend!), with pilot Jorg Vogelsang at the controls, had a 17 meter wingspan, 11-pound, pulse-jet engine powered scale V-1, the manned test model type. The ground equipment ▸

Randy Bloom, one of Frank Johnson's group, poses for the author's camera. Model is a .40 powered, Wescraft B-17: stable flyer.

Jr. Achievement winner, John Bashore, and Art School Super Chipmunk. Which weighs more, the trophy or the model?

Pattern Flying

By DICK HANSON

• In 1978 I joined the N.S.R.C.A. (National Society of Radio Controlled Aerobatics).

The society publishes a paper, the *K Factor*, which is a sounding board for various view points on pattern flying, among other things. Last year, there was an awful lot of comment on the forthcoming changes in pattern, mostly concerning the new so-called "Turnaround Pattern". Our pattern rules (AMA rules) are heavily influenced by the FAI (international) rules. Whether or not this is good or bad is a matter of personal view, but the facts are that the hobby is in a constant state of change due to technological advances, and the rules simply must change if we are to keep everyone's interest. Note the interest in "Tournament of Champions" type aircraft.

That's it for my soap box this month, let's get on with it.

During the last two months, we have been trying as much new equipment as possible . . . most of it electronic. The new ACE receiver (Silver Seven) is easy to build, with the possible exception of installing the servo leads. I installed Futuba "J" series pigtails, which use a slightly larger wire than the board was drilled for. Things got a little crowded,

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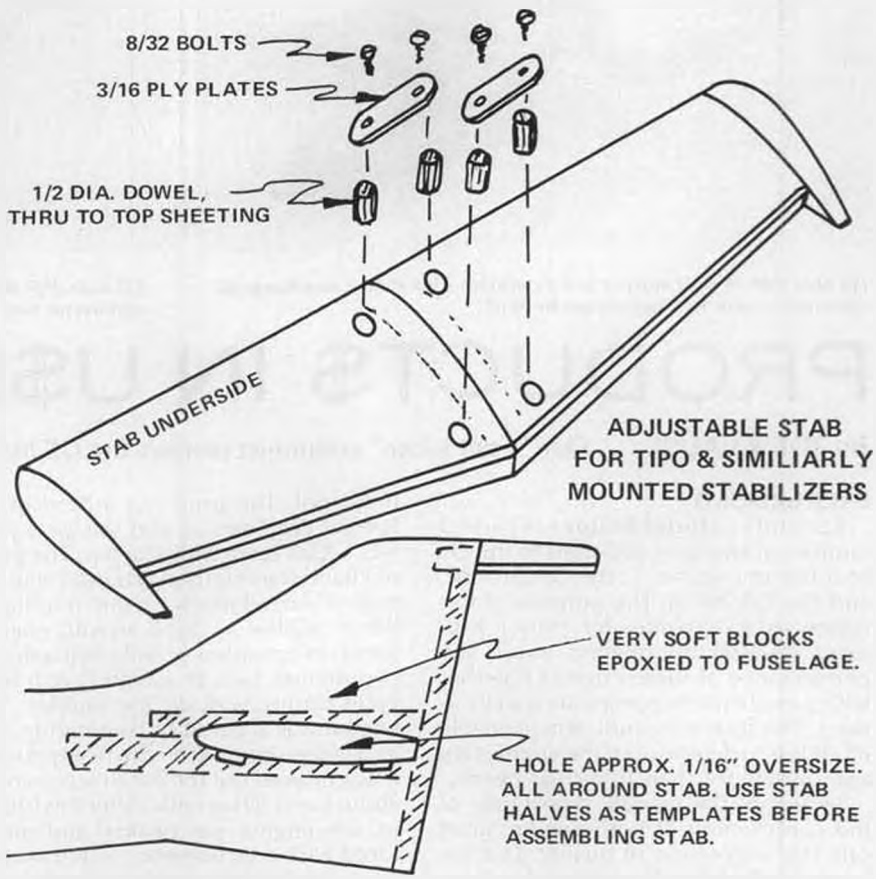


included compressors, ramps, and a high-start type of catapult assist, and is definitely not your common Sunday flyer model. Very impressive, and I am sure a satisfying project to get in the air.

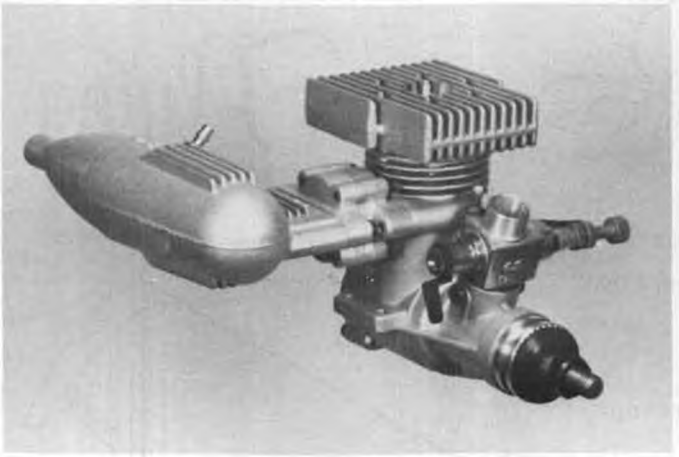
And while Herr Dressendorfer didn't make it to Las Vegas, his airplanes did, impressively flown by his old (and my new) friend, Juergen Rother, also of Nurnberg. For most of us, this was our first opportunity to see the Kavan FK-50 engine in the air; we were all suitably impressed, the engine performs as well as it looks. Impressive also was Bill Stroman's Albatross, which like the full size original, was controlled with wing tip and elevator warping, plus having home-made spoke wheels. He won't admit it, but I'm sure Bill has a trained spider in his workshop. How else could he get all those fine scale wires and cables in place?

We were also witness to some flights by what must be the world's first Quarter Scale electric R/C model, a Farman Moustique with 6-1/2 feet of wing, weighing only 23-1/2 ounces, built and flown by the prolific mother and son team, Addie and Tony Naccarato, of Burbank, California. *"I particularly 1981 IMS Show, also at the 1982 show,*

Continued on page 79

Bob and Susana Seigelkoff were married in Las Vegas during this year's Fly-In.

Lufthansa's future chief pilot, Jvergen Rother of Nurnberg, Germany, with Helmut Dressendorfer's CAP-20L. Both impressive.



OS Max 28F H with muffler and extension. This engine was designed specifically with R/C helicopters in mind.

OS Max 25F ABC with muffler and extension. Features an OS 2B carburetor with automatic mixture control device.

PRODUCT$ IN U$E

By JOE KLAUSE . . . Our "Fuel Lines" columnist reviews the OS Max 25F ABC and 28F H engines.

BACKGROUND

Recently, **Model Builder** received samples of two new additions to the OS Max line of engines . . . the OS 25F ABC, and the OS 28F H. The purpose of this review is to provide the reader with some general information about the performance of these engines together with some of their appropriate specifications. This should be sufficient to enable modelers to determine if the engines are appropriate for their particular needs.

To begin, the overall appearance of the construction of both engines gives one the impression of quality. This has been a hallmark of OS engines for many years. It's also comforting to know that such immediate feelings have been confirmed by the performance record of OS engines. Both engines were disassembled for measurements and photographing, and then they were just as carefully reassembled prior to running.

THE OS 25F ABC

The 25F ABC was first on the test stand. Fuel ingredients were 5% nitromethane, 20% Klotz KL-100 lubricant, and 75% methanol. The prop was a Rev-Up 9-5 Special Pro Series 3, and the glow plug was a K&B Long with idle bar. The good old hand start method was used, and the engine started nicely on the third flip of the propeller. As this is an ABC engine, break-in consisted of only half a dozen two-minute runs at a slightly rich two-cycle setting without the muffler. The engine was allowed to thoroughly cool in between runs. After the first two runs, it was peaked out for five to ten seconds about every 30 seconds. After this break-in, the engine was peaked and monitored with a tachometer. There was no evidence of rpm sag, and it ran very steadily. RPMs did not vary more than about 100. Under these conditions, the recorded rpm was 14,100. Next, the engine was run and tachometer monitored with the muffler installed. Again, the engine was steady with no rpm sag. The tachometer indicated 13,600. The engine comfortably and reliably idled at 3600 rpm. My conclusion was that this is a superb engine for sport fliers who want power without temperamental handling.

UNIQUE OR NICE FEATURES

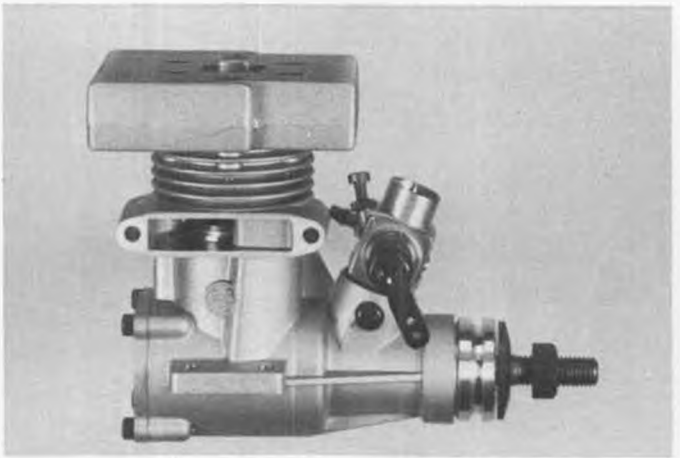
1. The sleeve and piston is referred to as being ABC . . . aluminum piston, and chrome plated brass sleeve. Actually, the plating is hard-deposit, electroless nickel. The plating, honing, and fit of the assembly are excellent.

2. There is a locating pin in the top of the crankcase that fits into a notch in the flange at the top of the sleeve. This assures repetitive accurate circular location of the sleeve whenever it is removed and reinstalled.

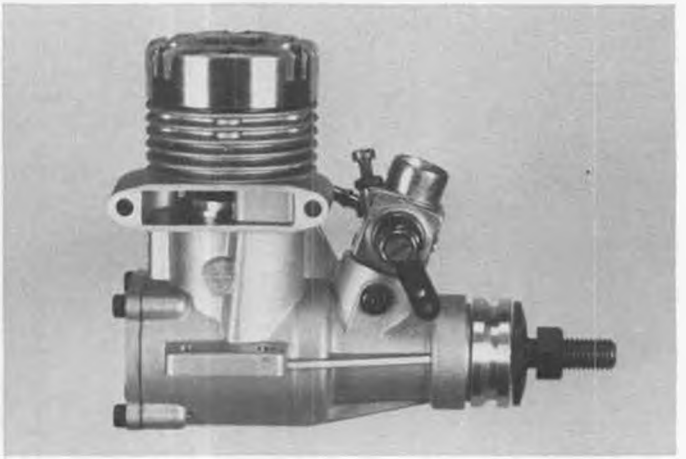
3. The die-cast head has a brass glow plug insert. This isn't new, but it is a quality feature of longstanding with various OS engines. There's much less chance of damage to the plug threads of the cylinder head when they are brass instead of cast aluminum.

4. Socket head cap screws are used to hold the head onto the crankcase and likewise the backplate. They are very superior to slotted or phillips head screws. Unfortunately, they are metric dimension, which makes them a bit more difficult to locate in the U.S.

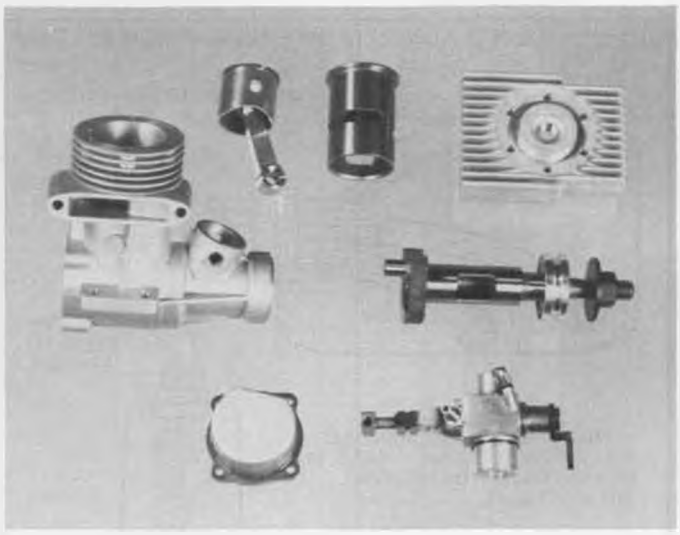
5. OS even included a short piece of silicone tubing for use on the carburetor



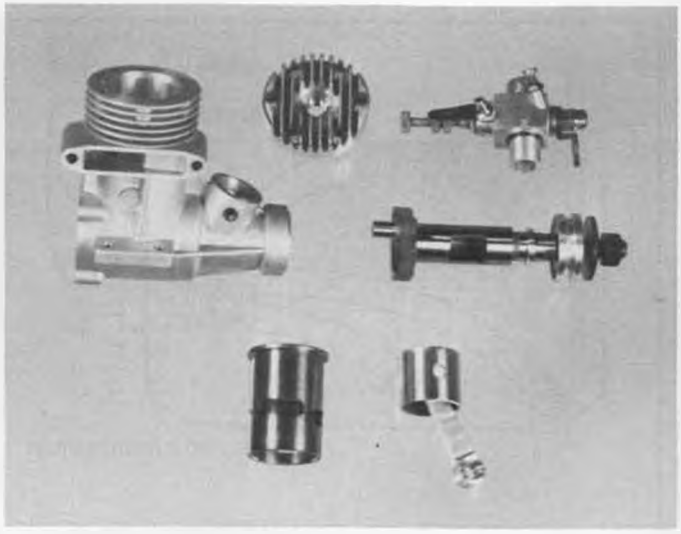
OS Max 28F H with muffler removed revealing exhaust port and throttle lever.



Side view of the OS Max 25F ABC with muffler removed to reveal exhaust port and throttle lever.



Partial tear-down of the OS Max 28 F H.



Partial tear-down of the OS Max 25F ABC.

needle valve. This helps to ensure that air does not leak by the threads and cause false or erratic carburetor settings.

6. The muffler has a fitting for use in pressurizing a fuel tank. However, it was also nice to see that a boss was provided on the backplate should the modeler choose to install a pressure fitting to use crankcase pressure.

7. The front bearing is shielded. A nice feature that helps to keep out dirt.

8. The engine is equipped with an OS 2B carburetor that incorporates an automatic mixture control device. This helps to ensure that the engine receives a balanced mixture of fuel and air at all throttle settings. It is simple but effective. It reduces the effective size of the fuel jet orifice as the throttle is closed, thereby preventing the engine from running too rich at low speeds. This eliminates the need for an airbleed, and as a result, maximum venturi efficiency is maintained at all times. This is beneficial when low throttle aerobatic maneuvers are performed. It's also interesting to note that I could not improve upon this mixture control setting as it came from the factory. The carburetor adjustments, other than the high speed needle, are properly set at the factory except for very unusual atmospheric conditions. Simply put, don't play with them out of idle curiosity.

In summary, with today's technology, it seems that it would be difficult to far exceed the quality and performance of this engine at its displacement and intended use.

THE OS 28F H

This engine is similar in many respects to the OS 25F ABC. However, it was specifically designed for helicopter use. Notable differences are the heat sink style cylinder head, the carburetor, muffler stand-off fittings, and the use of a pinned dykes-ringed-piston in an electroless, nickel-plated, brass sleeve. Additionally, the timing of engine breathing periods are particularly suited to the helicopter-type of engine operation.

The engine break-in conditions were the same as for the 25F ABC. However, the total break-in running period was about two and a half times longer to ensure seating of the ring. This is especially so with chrome and nickel plated sleeves versus an ordinary steel sleeve.

After break-in, the engine turned 15,400 rpm without the muffler. I was

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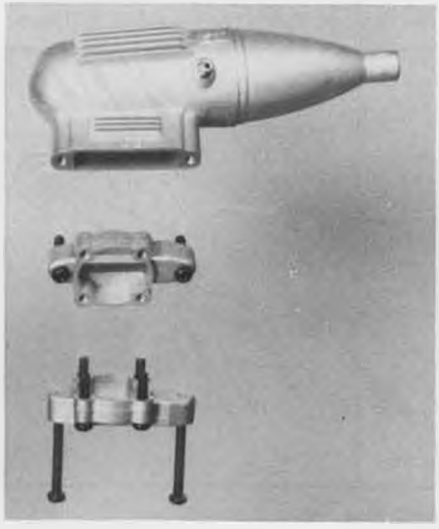
OS Max 25F ABC.



Unusual muffler extension of the OS Max 25F ABC.

OS MAX 25F ABC SPECIFICATIONS

Bore	18mm (.708)
Stroke	16mm (.630)
Displacement	4.07cc (.248)
Intake	
Open	42 degrees ABDC
Close	41 degrees ATDC
Period	179 degrees
Transfer Periods	122 degrees
Boost Period	114 degrees
Exhaust Period	152 degrees
Weight (without muffler)	219.2 grams (7.73 oz.)
(with muffler)	268.5 grams (9.47 oz.)
Mounting Lug Dimensions (hole, center to center)	
Lateral	38mm (1.496)
Longitudinal	15mm (.590)

OS MAX 28F H SPECIFICATIONS

Bore	18.5mm (.728)
Stroke	17mm (.669)
Displacement	4.57cc (.278)
Intake	
Open	60 degrees ABDC
Close	52 degrees ATDC
Period	172 degrees
Transfer Periods	98 degrees
Boost Period	88 degrees
Exhaust Period	124 degrees
Weight (without muffler and extension)	247.3 grams (8.72 oz.)
(with muffler and extension)	314.2 grams (11.08 oz.)
Mounting Lug Dimensions (holes, center to center)	
Lateral	38mm (1.496)
Longitudinal	15mm (.590)

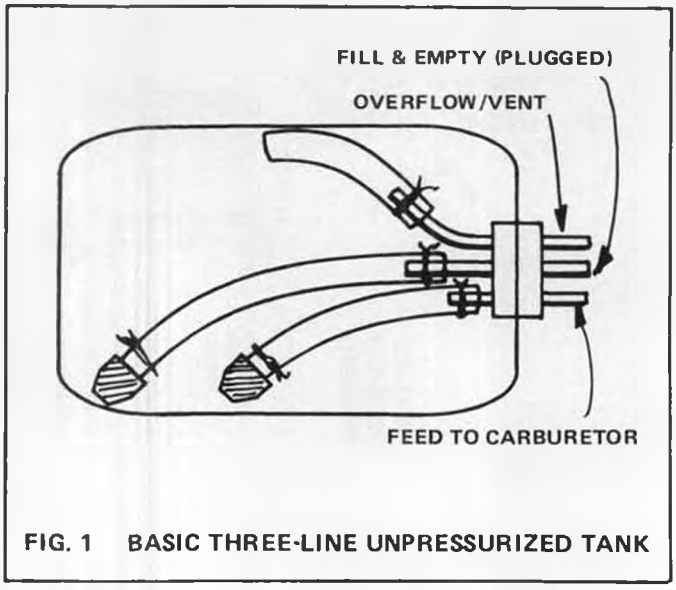
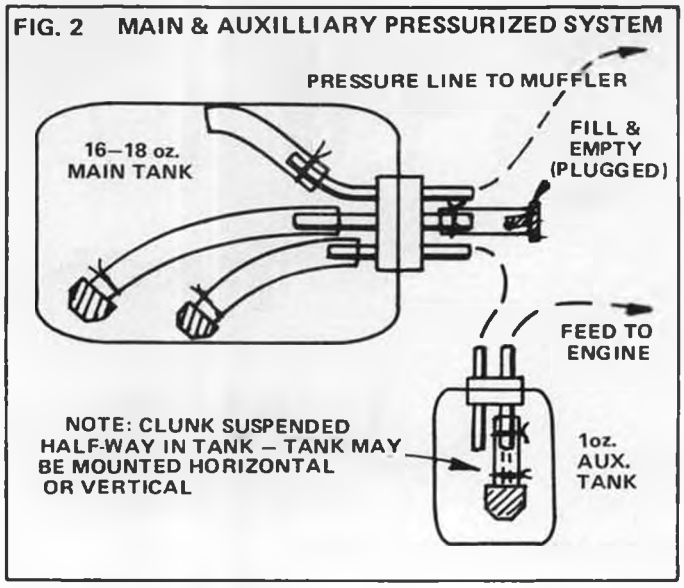


FIG. 1 BASIC THREE-LINE UNPRESSURIZED TANK



CHOPPER CHATTER

By RAY HOSTETLER Illustrations by the author

• Last month I started a discussion on fuel tank installations. We looked at the basic two-line unpressurized system and the two-line pressurized hookups. To finish up, I want to show you two types of three-line systems, and a two-tank setup for longer flights or aerobatics.

First, the three-line unpressurized system. Please refer to Figure 1. In the three-line unpressurized system, the overflow/vent line remains open. This line should exit *outside* the helicopter so you don't fill the fuselage with fuel when the tank is full! The fill/empty line should run to the back of the tank, and is used for filling and emptying the tank, naturally. This line must be plugged during flight so fuel won't leak out. The bottom "feed" line runs to the engine. Compare this setup to last month's two-line system, where the tank must be filled and emptied through the feed line.

Which system is better depends on your philosophy and what type of helicopter you're flying. If you have a simple frame helicopter where the tank and carburetor are out in the open, it is easy to use the feed line to fuel and defuel. On the philosophical side, using the feed line all of the time could eventually give you a pinhole leak, if you have to use a hemostat to connect it. This is not so much of a factor if you can always hook up the feed line with your fingers.

Now if you are flying a scale ship, where the tank is tucked away with the engine inside the fuselage, the three-line system is mandatory. Without the third line it, nearly becomes impossible to refuel using the feed line to the carburetor.

To make the present three-line system shown in Figure 1 into a pressurized system, simply connect a line from the muffler to the overflow/vent line of the tank. The fill/empty line continues to be used only for refueling, and must be plugged for flight.

The other major option you have is to use a main tank and a one-ounce auxiliary tank. See Figure 2. Here a pressure line is mandatory. The pressure from the muffler pressurizes the main tank, which feeds fuel into the smaller auxiliary tank. The engine draws directly from the auxiliary tank which is *always* full, and will feed continuously no matter what gyration the helicopter is put through. I do want to make a special note of the feed line in the auxiliary tank. Notice that it does not extend to the bottom of the tank. Rather, it is placed at mid-tank

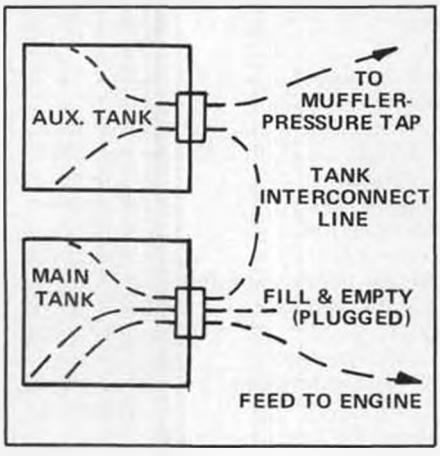


FIG. 3

Twin tank setup for duration, or two medium sized tanks for scale applications.

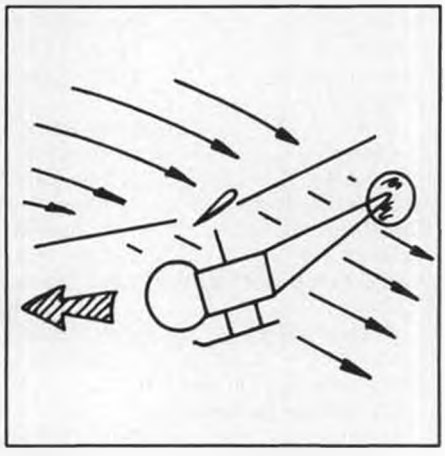


FIG. 4

Helicopter in forward flight. Airflow from above disk, positive pitch in blades.

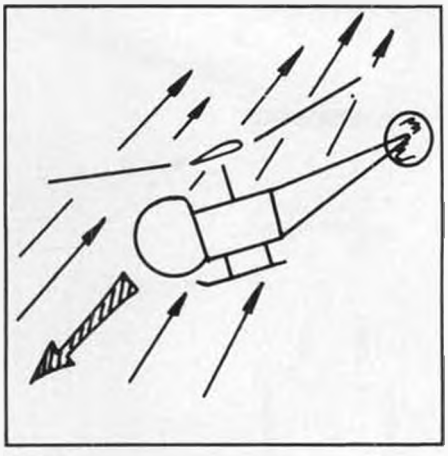


FIG. 5

Autorotation: air flows through disk from below, near zero pitch in rotor blades.

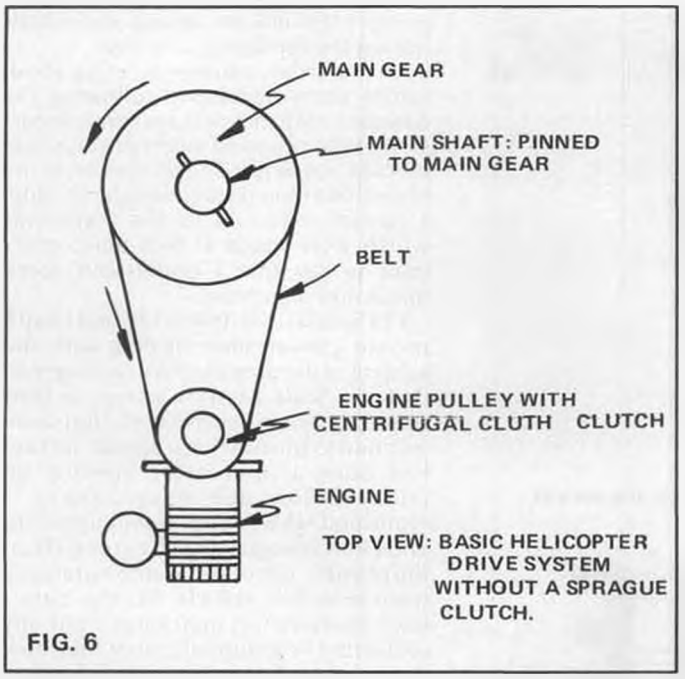


FIG. 6

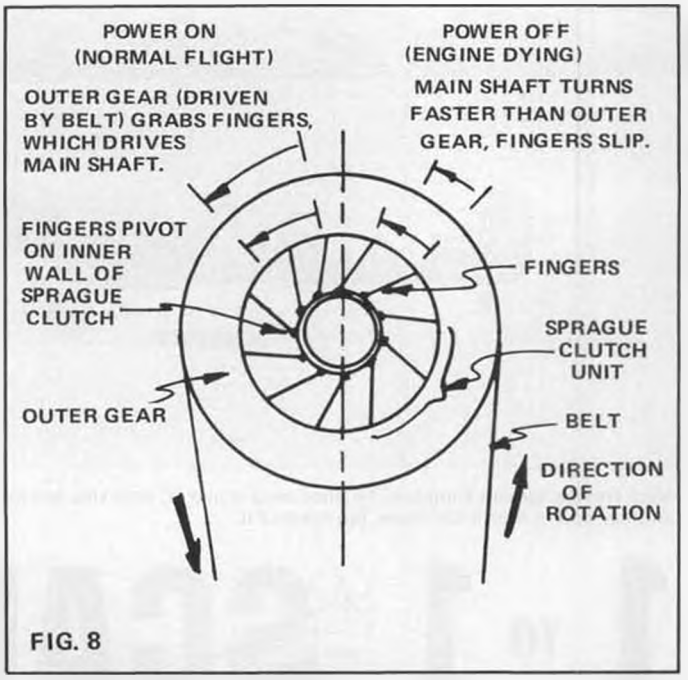


FIG. 8

for best fuel draw.

Another variation of the two-tank setup is to use a large tank in place of the small auxiliary tank. See Figure 3. Now you have a two-tank "duration" setup that will fly you twice as long as normal. In the old NRCHA grade level program, there was a 30-minute duration flight needed for one of the levels. This setup worked great for supplying the needed duration.

In some scale applications, two medium size tanks can be used on either side of the helicopter to give a full 16 to 20 ounce capacity. The setup is the same as shown in Figure 3.

You can see by all of the examples that there are a lot of variations in just setting up the fuel tank. Hopefully, these last two months have helped those of you who are new to helicopters to understand what type of fuel system should be used, and under what conditions.

FROM THE MAIL BAG

I received a nice letter from Brent Fowler of Fayetteville, Georgia. Brent asks some good questions that are easy to overlook... Maybe I should have covered some of this material back when I discussed collective vs. fixed pitch...

Dear Mr. Hostetler,

I am 14 years old and I have a Headmaster Sport 40 with a Futaba five-channel radio . . . I'm satisfied with this, but I'm very interested in R/C helicopters.

I know some about helicopters but I still have many questions I would like to ask you... If you have a fixed pitch helicopter in the air and the engine quits, is there any way to get it down without harm? Also, if you have a collective pitch helicopter set up with a "Y" connector off of the throttle servo driving a collective servo, how would you be able to practice autorotations without killing the engine?

Autorotations may be too farfetched for a pre-beginner to think about, I don't know... Thanks a lot! Brent Fowler

Thanks for writing, Brent. It's never too early to think about autos, just concentrate on the basics first and the autos will come soon enough. To answer your questions: About the fixed-pitch chopper autorotating: There is no way you can autorotate it without harm, for two basic reasons. Fixed-pitch helicopters do not have the capability to lower the blade pitch to reduce drag and keep rotor rpm. Also, fixed-pitch helicopters (and some collective ships too) do not have a sprague clutch (or free-wheeling unit). This special clutch allows the rotor to keep spinning as the engine is dying.

Consider Figure 4. Here we have a helicopter in forward flight with positive blade pitch as shown. Notice how the airflow pattern comes from above the rotor disk and is pulled down through. Assuming the engine fails at this point, the blade pitch must *immediately* be reduced to nearly zero degrees pitch (or flat pitch, full down pitch, etc.). This action reduces drag so the rotor speed does not decay excessively, and it also sets up a descent to change the airflow pattern for autorotation. If the collective

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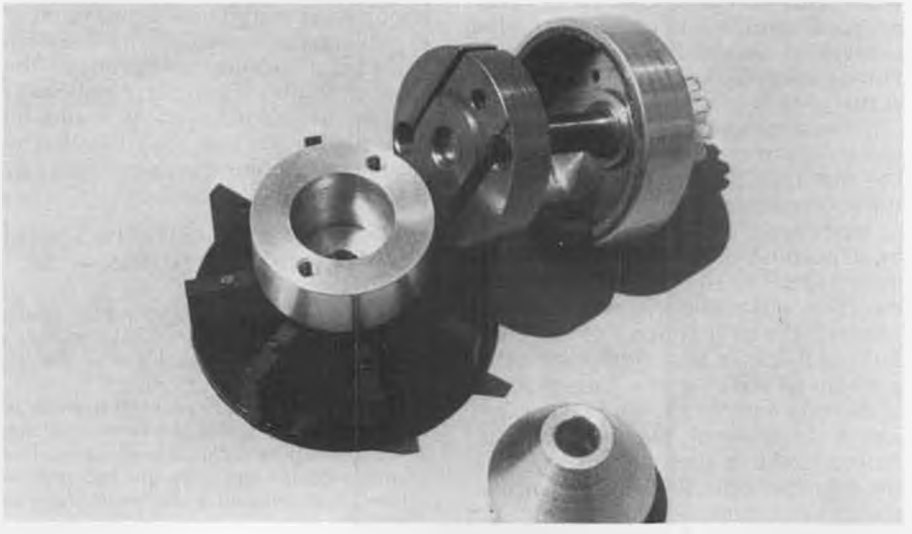
Photo 7. Centrifugal clutch. With this system autorotation is impossible because the clutch won't let go until main rotor blade speed is too slow for flight.

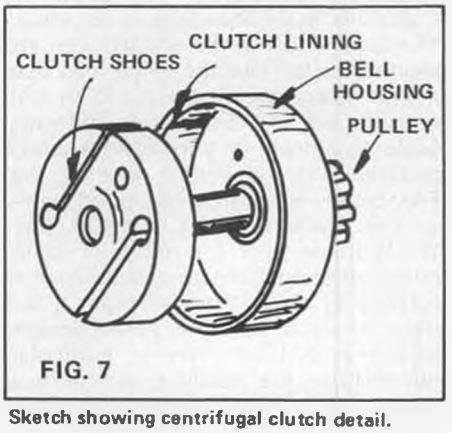

FIG. 7

Sketch showing centrifugal clutch detail.

Mick Reeves, United Kingdom, finished second in F4C with this Spitfire. He also entered another Spit in Stand Off Scale, but crashed it.

1 TO 1 SCALE

By BOB UNDERWOOD

• The information in *"One-to-One"* this month revolves around two documents which are of interest to those persons who might be inclined to participate in FAI World Championship competition. I recognize that this fits a rather small part of the scale modeling community, but it is important to pass on the information.

I first feel required to speak to a concern that was editorialized in the February '83 issue of *Scale RC Modeler* under the heading of "Et Tu NASA?!" I want it clearly understood that the following comments represent my personal thoughts and do not necessarily represent the National Association of Scale Aeromodelers (NASA) of which I presently serve as president.

I am not at this time certain exactly what person or group the editorial *represents*, as nowhere in the material is this specifically stated. The assumption is that it was written by Mr. Patrick Potega, but whether or not he was speaking offically for the Southern California Scale Squadron is not clear. The main thrust of the editorial centers around the fact that the writer feels that a very grave error was made in not considering the Southern California Scale Squadron, and its Scale Masters program, as a vehicle for selecting the FAI team to represent the United States in the Scale World Championships. While there were a number of other rather emotional and somewhat pointed references made, this one point is the basic concern. Certainly to the person who may not be privy to particular information, this would appear to be a most valid and well founded question. Indeed, the Scale Masters program, as constructed and operated by the Scale Squadron, has enjoyed a great deal of success. It was conceived by a vital, enthusastic group, and has managed to obtain some excellent backing. The program has attracted a significant amount of interest. The editorial did have one very serious ommision, however, which I feel is most important for interested parties to consider.

I was in attendance at the 1981 Scale Masters in Louisvlle, KY., at EP Tom Sawyer State Park as a contestant. During the static judging, which took place on Friday, I talked with a number of individuals who were present, including the Scale Squadron representative, Mr. Harris Lee. I distributed to a number of individuals, including Mr. Lee, a two-page proposal concerning the subject which Mr. Potega speaks about. That proposal is printed in its entirity in this column. It should be noted that Mr. Potega was given a copy of this proposal at that time.

In the afternoon of that Friday, there was an informal meeting chaired by Mr. Lee that took place on the balcony of the auditorium and included some 50 or so modelers and interested parties. The basic purpose of the meeting was, as I understood it, to discuss the future direction and management of the Scale Masters. The basic concept of the possibility of the Scale Masters being used as a means of selecting the United States scale team entered the general conversation. In spite of the fact that Mr. Potega spoke at some length extolling the basic concept, it was apparent that the general consensus of opinion did not favor such a development at that time. It seemed prudent for me to not attempt any so-called "hard sell" at this point. I did talk to various individuals during the remaining two days.

On Saturday, another meeting about future plans developed following the banquet. I felt that perhaps some discussion of the proposal might develop and elected not to join the discussion in the hope that a freer dialogue might develop. I cannot report as to the comments which were made at that time, other than to say that I understand some discussion did ensue.

On Sunday, Mr. Harris Lee and I had a private conversation dealing with the subject of the proposal. We both agreed that the Scale Masters group, at least those present in Louisville, did not seem inclined to pursue the proposal. Just as I had done at the earlier meeting on Friday before the entire group, I reafirmed NASA's and my willingness to enter into dialogue with the group about the possible use of the Scale Masters as a team selection vehicle. To this date I have received no indication from any individual or group, offical or informal, that would indicate that such dialogue is requested. It is most distressing to find that Mr. Potega feels that NASA has been a Brutus, when indeed he was involved in the events which occurred in Lousiville. He states that, "By not even considering the Masters as the logical candidate for such a selection program, they (NASA) have set up a source of friction and division which scale modeling did not need." I agree most certainly that we do not need division and friction, but I personally, am loath to accept the responsibility for such division if it exsists. Be assured that if any group wishes to explore the possibilities, that they will have a ready and willing listener in this writer. I will refuse, however, to enter discussions which are fueled primarily by emotional statements which only tend to inflame. They are counter-productive and never solve the problem at hand. I have enjoyed the true essence of modeling on many occasions at various contests and other gatherings. Indeed, I returned home from the 1981 Scale Masters with a very warm feeling after having shared time with a number of new aquaintences. Calm deliberation and communication can produce the same condition even in an emotionally charged situation, such as could be produced by Mr. Potega's editorial. The complete text of the proposal made by NASA in 1981 follows.

PROPOSED SCALE MASTERS PROGRAM AND FAI TEAM SELECTION — '83'

That Scale Squadron and NASA jointly organize and develop a Scale Master's program along the lines created in 1980 by the Scale Squadron.

The program would consist of from six to eight qualifying regional events plus the AMA Nats. These regional events would be mutually agreed upon by the two organizations and *selected from established all*

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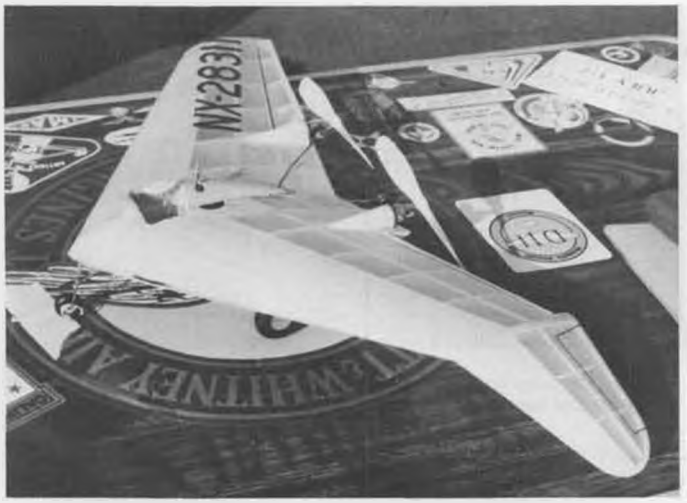


Northrop N1M Twin CO_2 powered scale ship, with pendulum control on the elevons, built by Daniel Walton, Liberal, Kansas.

N9M-A twin electric powered, retract gear, six-foot span, by Bill Young. A future MB construction article.

ANNUAL
NORTHROP FLYING WING-DING

By LARRY RENGER . . . A flying wing enthusiast (as evidenced by his Cutlass II construction article this month) reports on the models and flyers that competed at the 16th Northop Flying Wing Contest.

• There must be some connection between the Northrop Flying Wing contest date and the proximity of Halloween. No, I don't mean that the models or flying are frightful! Actually, the well trimmed models come surprisingly close to the performance of competitive conventional aircraft. What I was getting at, is that the configurations are weird, unusual, and downright strange.

Now take Brian Curry's semi-scale model of the N1M (I would if he offered it to me). It has no vertical stabilizer, no horizontal stabilizer, a pusher engine, no fuselage, heavy negative dihedral in the wingtips, and it flies terrificly! Brian was doing inverted snap spins with it (on purpose) and generally flying up a storm with only an .051 for power. Similarly, Bill Warner had a German designed towliner which not only had curved dihedral, but totally curved lines everywhere. He has built a lot of models, but he said that this one was the most difficult ever. Despite initial problems in getting a straight tow, Bill finally got some spectacular flights from the model.

I guess I am getting ahead of the story, though. So, to begin at the beginning, there is a contest every year in Southern California which is limited to flying wings only. Sponsorship is by Northrop Corporation (ignore what WCN has to say on the subject), and this unique annual event has gone on for 16 years now. For the past few years, the interest and entry has been dwindling, but in 1982 the contest came back strong!

November 14 dawned clear, calm, and warm. I got to Mile Square Park in Fountain Valley, took a while and held up a line of modelers while I tried to get the mechanical toll gate to give me change for a ten-spot, and arrived on the field at 8:00. Almost all the free flight contingent had arrived already, and were busily test flying.

Over on the other leg of the old runway, the R/C group was getting together and starting in on judging of the original design and scale model competitions. At Mile Square, you may not run engines until 9 a.m., so other than the putt-putt of the occasional

Ken Johnson, with blown-up "Bowthorne" as recently published in Model Builder.

Bill Warner and the "covering nightmare", a German designed towliner.

David Wade and his 1/2A free flight.

Sportwing for .049 engine, by Bruce Tharpe, designer of "Findragger", January '83 Model Builder.

Twin .60 monster, based on Midwest "Hustler" of bygone days, by Seth & Charles Abrahams, father and son team.

CO_2, or the whir of a rubber band, all was quiet for a while. Once the magic hour arrived, however, there were some pretty hot aerobatic routines flown by way of practice.

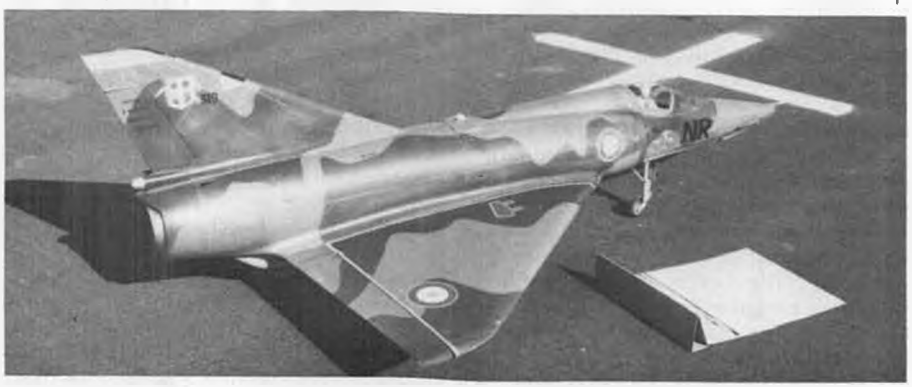
The Northrop contest's resurgence probably stemmed from two causes. Number one is that for the first time there were events in both the Free Flight and the R/C portions for scale aircraft. The second may be the recent success of Flying Wing type aircraft in air combat in the Middle East. A third factor could be the rumored existence of a Stealth Bomber flying wing configuration by Northrop. As a fan of the strange and wonderful, I was well pleased to see the large and enthusiastic turnout.

Enough of my random ramblings, let's look at what the people brought to fly. First up was David Wade, the cheerful looking chap with lots of geodetic structure in the wings of his model. David went all out on the design of this model in an attempt to create a design which would be competitive with conventional 1/2A Free Flights. Power, of course, was a Tee Dee .049, and he used a modified Tatone timer to provide variable incidence between power and glide, followed by tip deflection for dethermalizer. The aircraft had 450 sq. in. of area, and was covered in Monokote.

Next model was a humongous rubber model designed by Larry Sargent. The fuselage came from a defunct George Perryman "Great Yellow Speckled Bird", and a wing of his own design. Larry misnamed his creation the "Great Emu", 'cause it not only flew, it took first place!

Third photo is of one of the scale FF entries, a powered glider called the Etrich #1. This model was powered by a Telco CO_2 and had "remarkably scale flight performance" according to its builder, Carlo Godel. Every one of those ribs (spars?, stringers?, battens?, sticks!) is individually tensioned into the correct curve by a piece of string. It would seem that Etrich was completely unaware of the significance of flying wire drag in the performance of aircraft. Carlo did a beautiful job of construction, and all the structure was carefully stained a walnut color. It looks like a tinkertoy set gone mad. Wheels were by Hungerford. I saw one flight, the model was smooth and steady, though it didn't climb out that time.

The next photo is of a friend whom I had not seen in nearly 20 years, Don Larsen. Don had a couple of models out that day, a rubber model and a towline glider. The glider spanned 29 inches, 145 sq. in. area, and the airfoil was a nearly

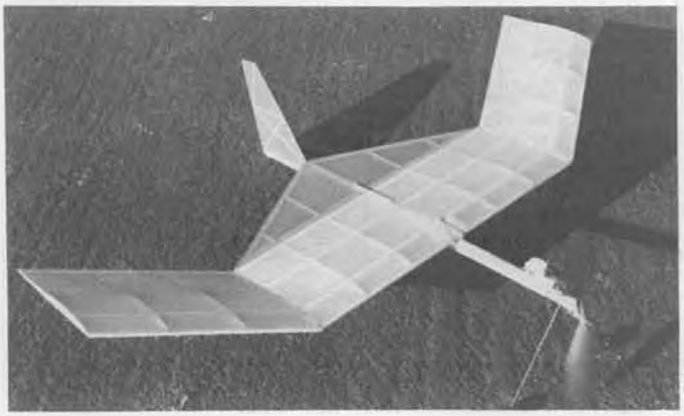


Mirage 3R by Jet Hangar Hobbies' Larry Wolfe. Power is a 7.5 K&B, driving a Turbax 1 fan unit. Very smooth, very fast . . . very nice.

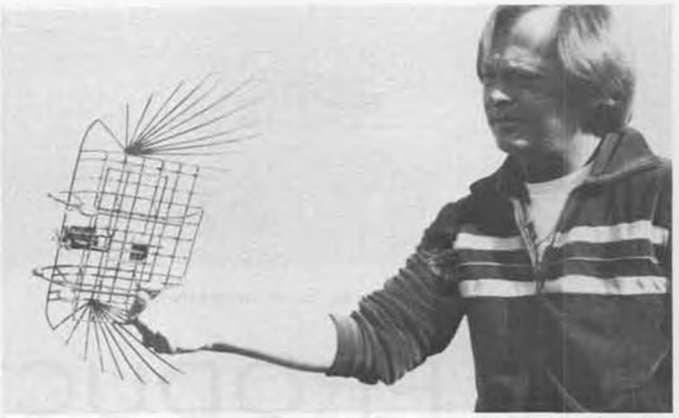
Semi-scale N1M by Brian Currey. Described in detail in the text.

Barnaby Wainfan' model meets P-30 rules. Note T-shirt art.

For something wild and crazy, you can depend on Joe Tschirgi . . . and they always fly!



Don Larsen's rubber powered wing with a D.T. Aft center portion pops up. Span 26 inches, seven-inch Peck prop.



"Etrich No. 1", by Carlo Godel. All framing is walnut stained. Telco CO_2 power. Flight was a bit flakey.

perfect "s" curve. Don had arranged a fuse-actuated dropping weight dethermalizer for this model.

Don's second model was a rubber job of 26 inch span and 130 sq. in. area. Prop was a 7 inch Peck-Polymers, and power was one loop of 1/4 inch rubber. An interesting feature of the plane was the airfoil, which was designed on a computer by Barnaby Wainfan. This model also featured a D.T., but in this case, center section of the wing pops up when the fuse burns down.

As long as we are talking about Barnaby Wainfan, we might as well look at what he brought to the contest. The rubber model is a completely legal P-30 model, and boy does it fly! I suspect that the model would have placed in the contest if it had been redesigned to unlimited specifications rather than the performance limitations imposed by the P-30 rules. Barnaby did get into the money with his .020 reed valve powered gassie. Sporting 30 inch span and 240 sq. in. area, the model had a terrific glide. Unfortunately, Barnaby was having problems with power control, and seemed limited to a tight circling climb rather than a steep altitude grabbing spiral.

The rather largish model in the next photo is the "Super Bowthorne", built by **MB** columnist Ken Johnson. Bowthorne, by the way, is a combination of Boston and Hawthorne, the name of a couple of indoor events. One is for a particular formula of weight, wing area, and fuselage cross-section, combined with pseudo scale requirements, the other is a flying wing only event (Northrop Corp. is headquartered in Hawthorne, California). The two events were combined and this model scaled up from the result. Ken said that there was a lot of Barnaby Wainfan's influence in the design. (Plans in August '82 *MB*.)

Bill Warner's glider has already been mentioned, but a few more details stand mentioning. The span is 70 inches, it is covered with silk, and it uses split panels which pop out of the rudder for a drag dethermalizer. This model provided one of the more exciting moments of the meet as it circled around and finally

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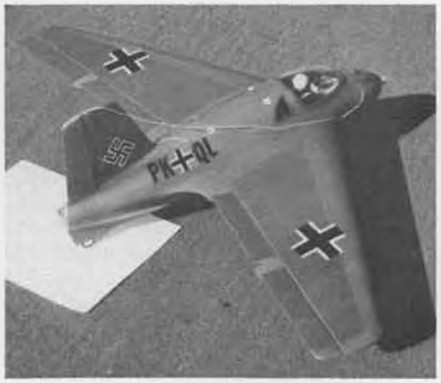
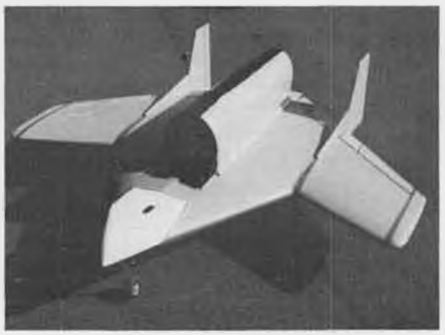
Larry Sargent's winger based on "Great Speckled Bird" fuselage. Superb flier.



Harry Apoian's ME 163 rocket boost glider. Fully described in text. It's wild!



Fan powered "Manta" by Bob Martz.

Barnaby Wainfan and his .020 F/F gassie.

Don Larsen and his towline F/F.

Note wide tread of the landing gear. Extra dowels probably for float gear.

Scale-like appearance is special appeal to beginners.

PRODUCT$ IN U$E

RAMCO'S FIRST STEP

By BOB POISSON . . . As the name First Step implies, this three-channel power plane is intended for use as a trainer by those fliers who may be thinking of taking a "first step" into the world of R/C.

• What should a beginner in this fantastic world of radio controlled flying look for when going to purchase that first kit? A B-29 with four engines, retracting landing gear, bombs that drop, and maybe a turret or two that turn? That's what he would like. But in reality here is the ideal first plane called very appropriately, the FIRST STEP.

The kit comes from RAMCO Ltd., 27 George Street, North Attleboro, MA 02760; phone (617) 695-6722. It was designed with the beginner in mind. The design has a flat-bottomed wing, cabin type fuselage, and a very wide landing gear for easy ground handling. The power requirement is from a .19 to a .40 cu. in. engine. For controls, all that is needed is a three-channel radio system (rudder, elevator, and throttle).

The plane is large enough to be seen very easily (60 inch span) The instructions are aimed at the first time builder, very explicit and written in such a way that the newcomer can understand them.

Basically there are two kits available of the FIRST STEP; the standard and the Deluxe version. As the name implies, the standard kit is just that; a very basic kit. The deluxe version has all the horns and whistles that you don't usually find in the kits you are accustomed to seeing in your local hobby shops today. Just a few things more are needed to get you in the air; covering material, an engine with a displacement of .19 to .40, a prop for the engine, some fuel, and a radio system with at least three channels.

Open the box and you'll be most surprised to see how much can be stuffed into the package. All parts are machined and sanded with the highest quality balsa wood being used throughout the kit. Not one part has to be cut by the modeler. The sides are marked where every piece should be glued. There is a pre-assembled landing gear, wheels, pushrods, throttle linkage, and fuel tank. Wait, there's more. The accessory package contains horns, hinges, wing clips, wheel collars, servo connectors, engine mounting bolts, blind nuts, wing saddle tape, and even a spinner. How's that for a complete kit!?

Enough looking; time to get started. A building board will be needed, or a suitable place to build the model, and a place where you can push pins into a surface. The method of gluing is up to you. Model cement works fine, white glue is another method. I used the new cyanoacrylate type glue available under many trade names. You'll also need

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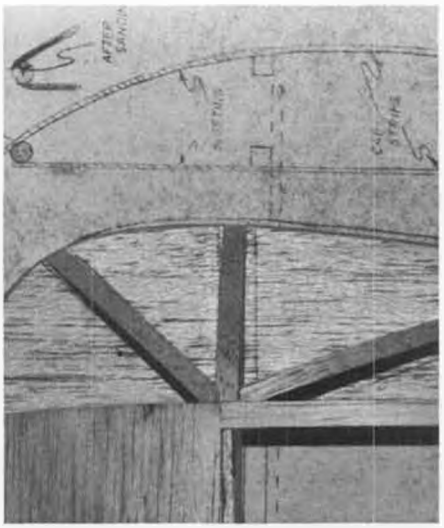
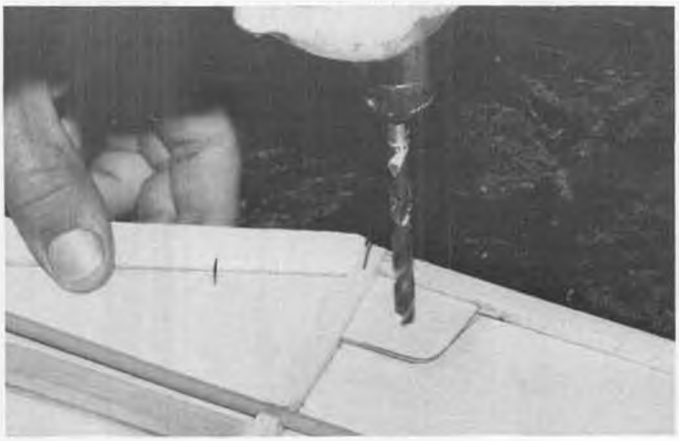
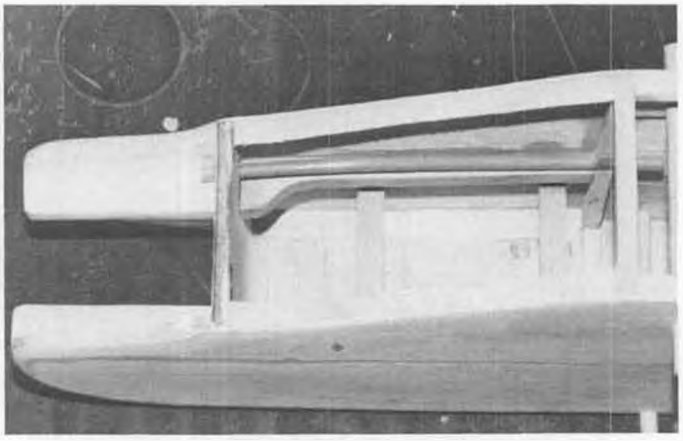


Note use of hardwood dowel for leading edge. C/L style wing tip.



Line up and drill dowel holes through both sides at once.



Generous size tank compartment. Note guide tube for throttle pushrod.

1. Peerless Panther used in 1/2A Texaco by Paul Forrette has proved that low-wingers can win. Dowling photo

2. Eut Tileston actually placed third in five-way fly-off, despite destroying his 1/2A Texaco version of Weathers' Westerner. Dowling photo.

PLUG SPARKS

By JOHN POND

One of the most attractive features of old timer flying is the fun derived from flying and associating with the flyers. Good natured ribbing and rivalry have sprung up, and this letter from SAM 21 to SAM 30 graphically illustrates the point.

"To all SAM 30 Members: SAM 21 issues you and your club a challenge. We know we can easily beat your club in 1/2A Texaco competition. We need to get even for the beating we took in your Team Challenge Event earlier this year. We think we can easily win for the following reasons:

1. We can fix Jim Kyncy's engine so it runs as poorly as it did at Colusa.

2. If Eut Tileston shows up, we will protest his engine as being illegal if he gets over a two-minute motor run.

3. We will give you Don Bekins. He probably has forgotten how to fly by now.

4. Tom Vincents' model will probably end up in a tree or powerline without our help.

5. Bill Burleson (editor and publisher) might get his model stuffed with newspaper.

6. That leaves only Harry Johnson, who is too new to the game to be a real threat.

7. Al Staben, Speed Hughes, and the rest of your competing members have time to build new planes, but we are confident that Nick Nicholau can't build planes that fast for all who need them.

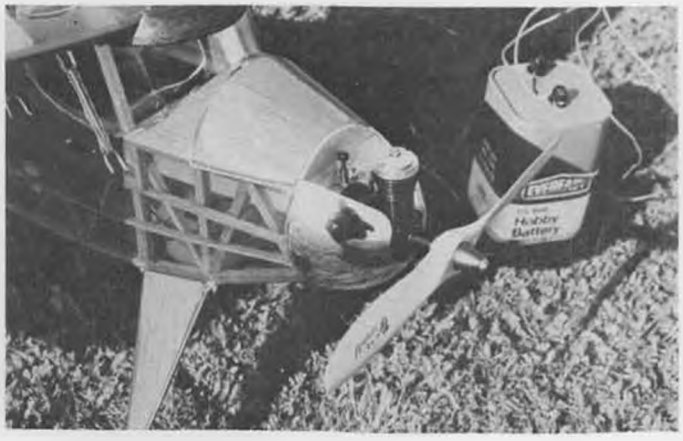
Challenge Rules: (1) Challenge to be held at SAM 30 November 6 and 7 Contest. (2) Current 1/2A Texaco rules to apply; no changes. (3) No Ringers, only SAM 21 and 30 members. (4) Scoring will be total of each club's entries divided by five, or the number of club entries, whichever is bigger. (5) **This is important:** *The losing club will bring two cases of beer to Nicholau's home Saturday night and help the victors to celebrate!"*

Now, how about that? Did that ever get the competitors out. Best of all, the weather was just fabulous in Marysville, for that time of the year.

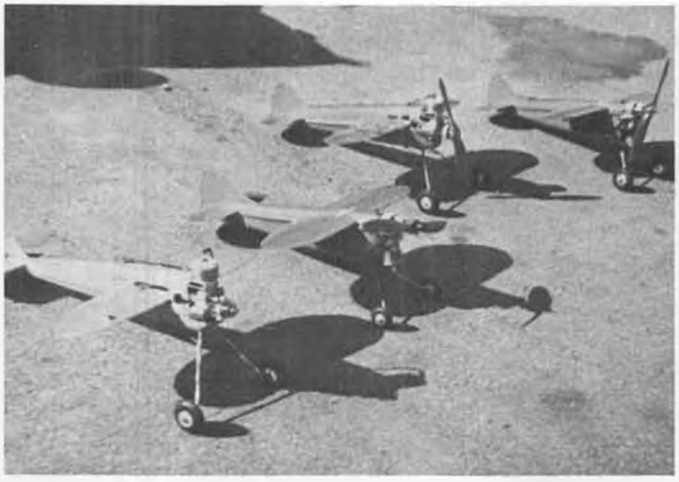
Yes, SAM 21 won, but they did admit

5. In 1941, Ted Kroll pioneered his own control line system on this Comet Clipper with his own design .71 engine.

3. Don Bekins finally returns to the wars with a brand new Hornet powered Sailplane. Note 'glass cowl. Dowling pic.

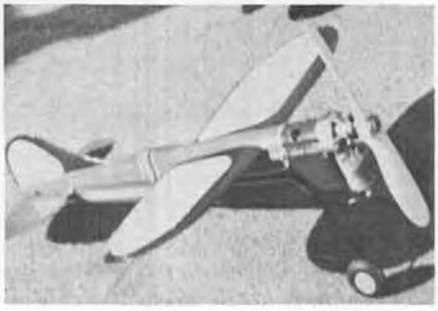


4. Shapely, shiny cowl on this Miss Tiny is made from a L'Eggs stocking container. Dowling photo.



6. Small portion of speed lineup at King City, Ca. C/L contest, 1943. Jack Albrecht's Hornet powered ship at left.

8. Very successful speed team, Jim Paysen and Jack Albrecht (1947-1950) at Tulsa, Oklahoma. Competed while in college.



7. Original "Sting Ray" as developed by Bob McMullen, King City, Ca., 1943. 100 mph.

9. Jack Albrecht was no exception when the Mustangs R/C Club built nothing but Schneider Cubs. Anderson Spitfire and Rockwood 5-channel reed radio. 1952.

to luck when in the five-plane flyoff, Don Bekins and Eut Tileston were unable to make it back to the field, getting a "zilch" flight for their trouble.

Lift was actually very good once you "punched" through the heat inversion. More 1/2A Texaco models were lost this way, as the lift simply took the models out of sight very quickly.

Typical of that experience was the low wing Peerless Panther used by Paul Forrette, as seen in Photo No. 1. This low wing has won before, but most of us figured that was a fluke. Actually, there is no real reason that low wings should not perform as well as or better than their pylon-cabin counterparts.

Another casualty in the 1/2A Texaco Event can be seen in Photo No. 2. Seems like Eut Tileston had scored his "max" and was in the process of bringing it down. Now Eut is a member of the Rancho Cordova Model Masters AMA Stunt Team on the West Coast, and of course, all sorts of dead stick manuevers ensued. Finally, while inverted, the wing gave way, the model plunged down, OFF the field, for a zero flight! Sometimes it's better to be lucky than good!

We have been kidding Don Bekins quite a bit for his absence at the 1982 contests, but to our dismay, he came out with some brand new models to torment the competitors.

Photo No. 3 shows exactly what we mean, as Don is shown holding a real neat Comet Sailplane powered by a Hornet 60. Needless to say, he made three straight "max" flights to win Class C. Of particular interest is the fiberglass cowl. A real beauty that hides the cumbersome looking Hornet.

Also, this columnist has been touting those egg shaped stocking containers made by "L'Eggs" as excellent for nose cowls. Photo No. 4 shows Lesher Dowling's Miss Tiny with one of those

10. Jerry Burk (noted engine collector) swaps lies with C.D. Jack Swain (right). Note simple frequency control rack.

11. Immaculate electric powered Laurie Experimental by Marion Knight. Folding prop, Geist motor. Photo by Buice.

12. Whatever happened to "Chicago Lou" Levine? Now in Ft. Worth area, flying OT R/C. Yates 10 ft. cabin. Buice photo.

13. Pretty Flying Quaker by Tom Joswiak, Arlington, Texas. SAM 29 Labor Day contest. Orange, green trim. Buice pic.

silver colored pieces easily adapted as a cowl. Best part about these commercial L'Eggs packages is that they come in a variety of colors to suit your model's color scheme!

We hate to keep picking on the "Hayshakers" (as we affectionately call the SAM 30 boys), but Al Staben simply has to quit flying off fenced areas. He did it again! Strained his latest jewel (or should we say shredded?) on the barb wire. SAM 30 Prexy Nick Nicholau intends to rig the fences so they will fall, jump out of the way, or something, to prevent Al from trying to knock the wires down.

As mentioned in the last issue, this SAM 30 contest was to be a test bed for the Electric Rules as developed by Jack Alten. Even Roland Boucher came up for this meet! Actually, the turnout was quite good at seven, considering the short notice and that four (including this writer) were no-shows.

Might mention at this time, at the behest of SAM President Mike Granieri, that these rules are not official or even provisional SAM Rules. The mere fact they were printed doesn't make them graven in stone. However, SAM 21, Jack Alten, and the trade are working hard to eliminate all bugs, glitches, and to keep it as a good sport event much in the line of the 1/2A Texaco Event. Present plans call for an .05 Event only plus an Unlimited Event for the hot dogs. Hopefully, this will make everyone happy and that the rules with the proper revisions can be submitted to the R/C Rules Board of the R/C Rules Coordinator for consideration by the membership.

An interesting gimmick will be tried out in the much maligned Antique Event. In the January contest, SAM 30 will allow the boys with four-stroke engines the same motor run as the ignition motors. Should be an interesting experiment!

Well, we have yakked enough; let's look at the results. Wherever possible, we will give the model and motor combination.

TEXACO (15 entries)

1. Don Bekins (Gas Bird/OS 60 4C)	89:25
2. Al Staben (PB-2/OS 60 4C)	80:42
3. Bill Burleson (Gas Bird/OS 60 4C)	24:56
4. Tom Vincent (Dallaire/Hornet)	24:36
5. George Steiner (Miss America/Cyke)	21:32

1/2A TEXACO (16 entries)

1. Grant Gordon (Bay Ridge Mike)	42:17
2. Tom Vincent (Playboy Jr.)	39:53
3. Eut Tileston (Westerner)	30:00
4. Ed Solenberger (Anderson)	30:00
5. Paul Forrette (Panther)	30:00

ELECTRIC (all 05 motors)

1. Jack Alten (Interceptor)	11:51
2. Jim Kyncy (Playboy)	11:19
3. Roland Boucher (Playboy)	10:35
4. Al Staben (Wasp)	9:10
5. Bill Burleson (Playboy)	9:03

ANTIQUE (11 entries)

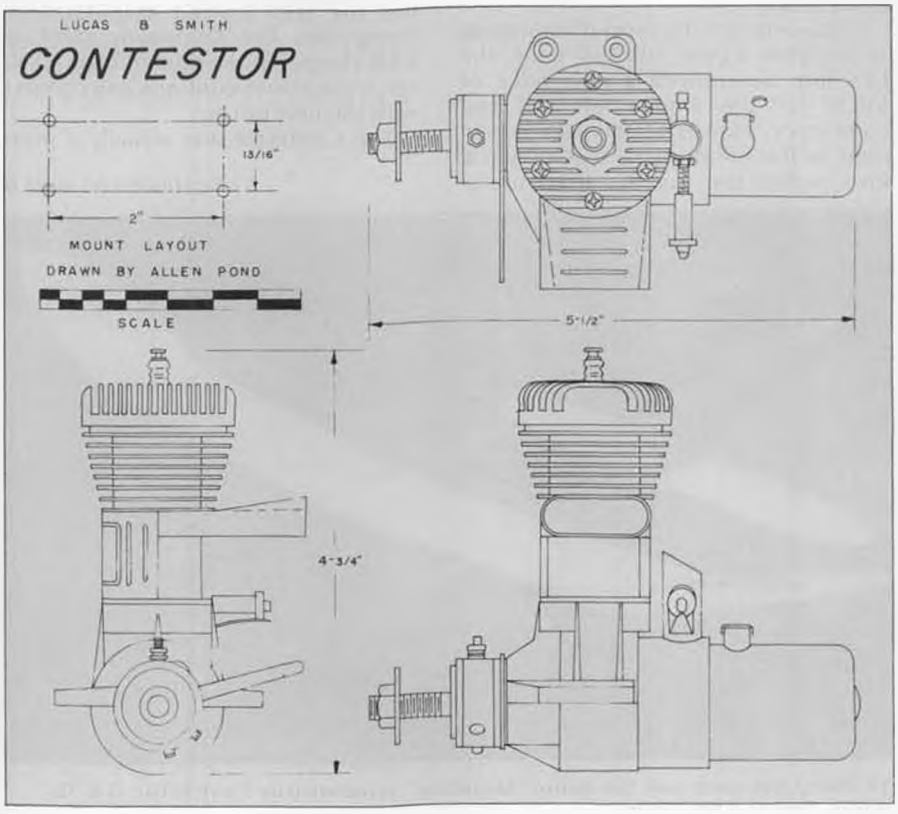
1. Jack Alten (Dallaire/HB60)	49:50
2. Bill Burleson (Dallaire/Dooling)	46:14
3. Tom Vincent (Cumulus/Hornet)	44:20
4. Don Bekins (Gas Bird/OS 60)	29:29
5. Grant Gordon (Lanzo/McCoy)	26:05

CLASS AB (7 entries)

1. Don Carrl (Playboy/McCoy 29)	21:00
2. Ed Solenberger (Playboy Jr./McCoy 29)	19:51
3. Don Bekins (Playboy Cabin/OS)	19:19
4. Loren Schmidt (Wasp/Torp 29)	15:15)
5. Al Staben (Playboy/Delong)	5:09

CLASS C (10 entries)

14. Neat Modelcraft Pacific Ace by Bill Nesbitt, New Jersey. Flew away.



17. Ted Dock says "slag" engines, like this Thor 29, run well if handled properly. Model is a Cleveland Viking.

16. "Ole Yaller", Bill Hale, COFFC, tunes Ohlsson 23 in his Megow Ranger. Wright Patterson AFB Fall Contest.

1.	Don Bekins (Sailplane/Hornet)	40:00
2.	Ed Solenberger (Playboy Jr./McCoy 60)	38:07
3.	Speed Hughes (Playboy/Spitfire)	31:13
4.	Jim Kyncy (Playboy Jr./Hornet)	19:41
5.	Jack Alten (Playboy Jr./McCoy 60)	19:37

ENGINE OF THE MONTH

This month's engine of the month was the last hurrah for Danner Bunch, as far as engine design and manufacture went. During the war, Danner had sold off all his engine rights and parts to various people.

During this time, Danner, like a lot of other engine designers, spent his time developing an engine that would be superior to all others. However, it was not until January 1947 that the first advertisements appeared for the Contestor. Bunch had found backers, Lucas & Smith, located then at 2636 Humbolt St., Los Angeles, CA, to produce his first post-war engine, the drum rotor version priced at $28.50 for the D60R model.

Sales were not the most encouraging at this time. In the July 1947 issue, the L&S firm announced a new price of $18.50 for the engine less coil and condenser. However, this was not in time, as the following issue, Ohlsson & Rice pulled the rug out from under practically every engine manufacturer by reducing their Ohlsson 60 from $18.50 to $11.95. With Ohlsson's unimpeachable reputation for good engines, no manufacturer could compete with an excellent engine priced so low. Not only was the 60 size engine reduced in price, but also the entire line of Ohlssons. Many a manufacturer went under when faced with competition like that.

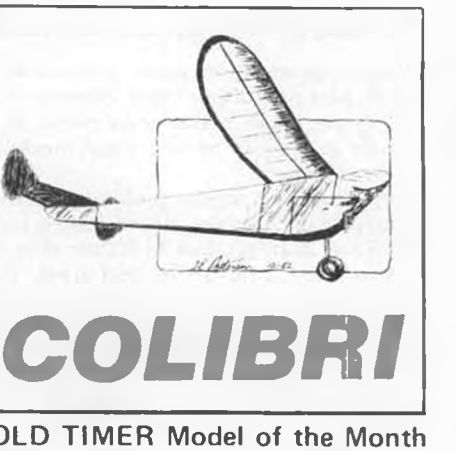
In a last ditch effort to regain the engine market, a variance of the Contestor was introduced, looking for all the world like a large size side port Bunch Tiger. There has been considerable speculation by the modelers who own these versions as to which runs the best. This writer regards the sideport as less troublesome and possibly easier starting.

Regardless of the engines being offered in two versions at a reduced price, the O&R price change doomed all but the well heeled manufacturers. Companies like Duromatic (McCoy), K&B (Torpedo), Herkimer Tool (O.K.), etc. were able to continue and compete with the new prices.

The Contestor was actually a pretty

Continued on page 85

15. Pretty, but rarely seen Ted Justice "Mousetrap" as recreated by Floyd Miller. O.S. 15 engine. Nostalgia Age design.



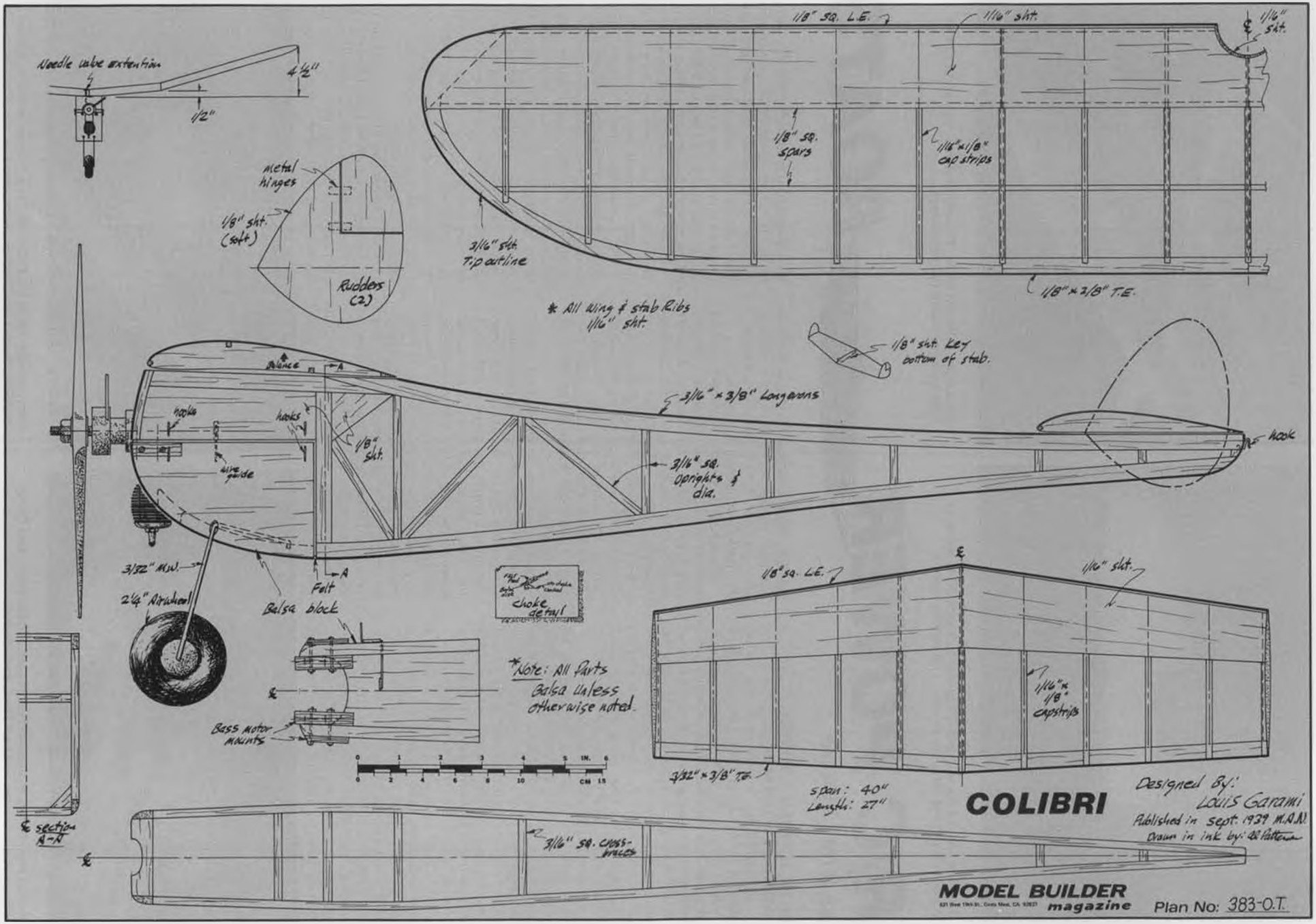
OLD TIMER Model of the Month

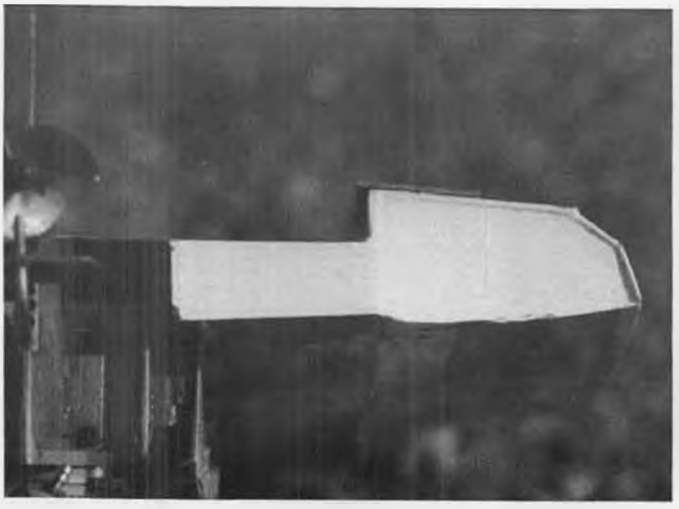
Designed by: Louis Garami
Drawn by: Al Patterson
Text by: Bill Northrop

• Designed to make the most of the difficult Class A gas model rules for 1939 (a minimum wing area limit of 225 sq. in.), the Colibri was created by Lous Garani.

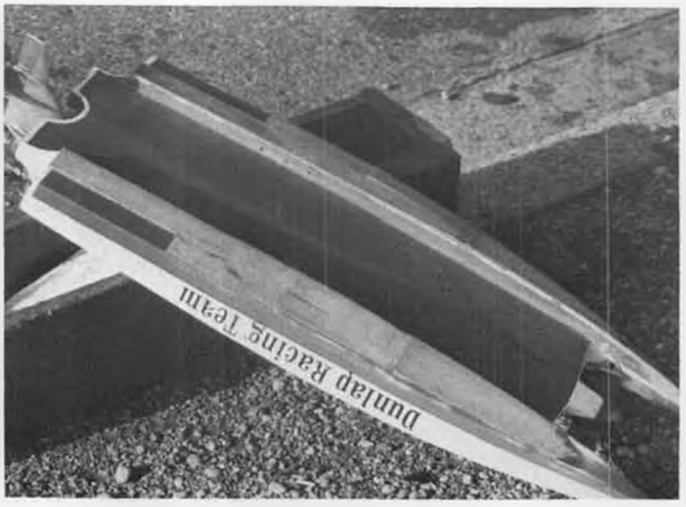
Published in the September 1939 issue of *Model Airplane News*, the plans must have frustrated most any modeler who tried to duplicate it. Top view of the fuselage shows parallel sides from the trailing edge of the wing on forward, yet a detail drawing of the removeable "engine housing" shows a taper . . . dimensionless, of course. The thickness of the sheet balsa twin rudders is not given (scales to about 3/16), and they appear to be glued to the ends of the stab leading and trailing edges, yet the instructions say to "make sure that the end ribs are perpendicular." A 1-1/2-inch diameter semi-circle is out of the wing leading edge at the center and capped with vertical 1/16 sheet. We can only guess that it was done to clear the engine cylinder head, if you mounted it upright instead of inverted as shown on the plans.

Oh well, we've drawn it as close as possible to the original without making any basic design changes. It should turn into a very high performance Class A Old Timer free flight. Garani's designs have always flown well. •


Needle valve extension
4 1/2"
1/2"
metal hinges
1/8" sht. (soft)
Rudders (2)
1/8" sq. L.E.
1/16" sht.
1/16" sht.
1/8" sq. spars
1/16" x 1/8" cap strips
3/16" sht. tip outline
1/8" x 3/8" T.E.
* All wing & stab Ribs 1/16" sht.
1/8" sht. Key bottom of stab.
Balance
A
hooks
hooks
1/8" sht.
wire guide
3/16" x 3/8" Longerons
3/16" sq. uprights @ dia.
hook
3/32" M.W.
2 1/4" Airwheel
Balsa block
A
Felt
Choke detail
*Note: All Parts Balsa Unless otherwise noted.
Bass Motor Mounts
1/8" sq. L.E.
1/16" sht.
1/16" x 1/8" capstrips
3/32" x 3/8" T.E.
span: 40"
Length: 27"
COLIBRI
Designed By: Louis Garami
Published in sept. 1939 M.A.N.
Drawn in ink by: AC Patterson
section A-A
3/16" sq. cross-braces
MODEL BUILDER magazine
Plan No: 383-O.T.



Transom view of the author's 3.5 tunnel hull racer. One-sixteenth plywood overhang helps cornering . . . no turnfin needed.



Same boat, different angle. This photo shows steps and strips of 1/16 plywood added to create sponson lips.

R/C POWER BOATS

By JERRY DUNLAP

HOW TO TURN A TUNNEL WITHOUT A TURNFIN

It should be mentioned that some model tunnel boats, the Lee Craft, and MRP tunnels, do turn decently without the use of a turnfin. It may or may not be of interest to some, but full-scale tunnel boats do not use turnfins. At least none of the full-size tunnel boats I've ever seen had turnfins. However, it's been my experience that most model tunnel boats need some type of turnfin to improve their turning ability.

A few issues back, the use of an external turnfin was discussed. This particular setup employs a dagger type fin attached to the right side of the hull. Although it hasn't gained widespread acceptance, it has been used by Bill Hornell and Ed Fisher very effectively on the 3.5 and 7.5 Prather tunnel boats.

This past summer and fall, I spent a great deal of time experimenting with various types of turnfins and steps on the sponson running surfaces. The success that Bill and Ed were experiencing fueled my desire to improve the performance of my 3.5 and 7.5 tunnels. At one time or another, my tunnels had various step configurations as well as external turnfins. To be quite honest, after an awful lot of "messin' around" I still hadn't accomplished much.

The external turnfin seemed to work well on my 3.5 tunnel. On the 7.5 tunnel, however, it caused the boat to bounce slightly and created some real handling problems when making a left turn. Then in a 3.5 tunnel race, I clipped a buoy with the external turnfin and tore the whole lashup and part of the side completely off the boat. That definitely wasn't too neat. I was still looking for the right combination.

I'd be the first to admit that I don't have all the answers for making boats go fast or turn better. In fact, I'm not even certain if I know the right questions to ask. One thing I'm not afraid to do, however, is find out why someone else's equipment is running well. Just because you didn't discover an idea doesn't mean you can't duplicate it. It has been my experience that most people who have good running models are willing to share their ideas with others.

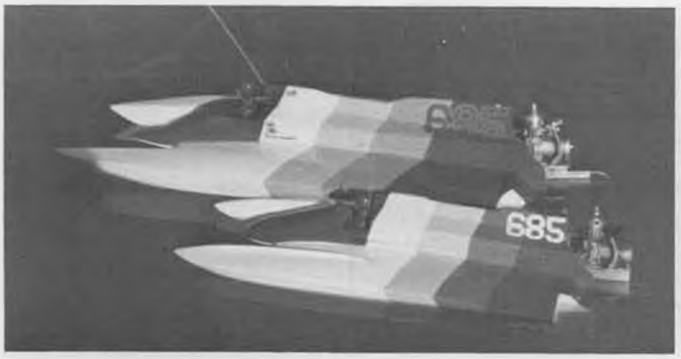
Two members of my local model boat club, Mike Wight and Leo Dreith, were also doing real well with their 3.5 tunnel hulls. It so happens that yet another member of our club, Rod Geraghty, had built Mike and Leo's boats. Model tunnel racing in my area is very competitive, and at the end of our 1982 District 8 Championship events, Mike was first and Leo second in the 3.5 tunnel class. That's a real fine performance for the Geraghty Tunnels they were driving.

The Geraghty Tunnel is very quick down the straightaways and handles the turns exceptionally well. The thing that impressed me most was the cornering, because the boat makes these fantastic turns without any type of turnfin. The fascinating part about it was that the "trick" was simply extending the sponson bottom 1/8 inch past the tunnel wall to form a slight lip or flange. This lip is very effective in preventing the boat from sliding out in the corners. It's such a simple idea you ask yourself, "Why didn't I think of that?"

Since I knew the trick worked on the 3.5 Geraghty Tunnels, I decided to try it on my 3.5 version of the Dumas Hotshot 45. I decided to keep the steps that had been glued onto the original sponson

Puerto Rico Marine Modelers (l to r): Luis, Bigote, Erick, and David with monohull racers. Lake La Rosa, background.

Harry Cooper holds his JVS Slick Trick. Fastest mono in its class in NAMBA District 20. OS Max .46 powered.



Phillip Kenney's Excaliber II (foreground) and Excaliber Also, an enlarged version for 7.5 outboard.

Excaliber Also in action, a successful racer in the Denver area. Phillip Kenney photos.

bottoms and add on a piece of 1/16 plywood strip to get my lip. The steps ran the full width of the sponsons and I had three of them on the bottom. What I did was to remove the inside half of the steps and run my piece of 1/16 plywood down the inside half of the sponson. This left the steps on the outside half of the sponson. The new runner that was added extended 1/8 inch past the tunnel wall. On my 3.5 tunnel, the 1/8 inch lip extends from the transom forward for 14 inches, and then fairs into the tunnel wall. It was an extremely simple modification to make.

So how'd it work? I made my first trial run using the same engine height and angle as used when the boat had an external turn fin. I launched the boat, let it get up on step, and gave it right turn. Hardly anything happened. The boat made a big arc in the lake. Something wasn't right. What wasn't right was the riding attitude of the hull. The boat was riding too positively and the sponsons weren't riding on the water. When you're using the sponsons to turn the boat it definitely helps to have them on the water. It was time to make some adjustments to the engine. Thank heavens for these adjustable motor mounts. I cannot imagine running a tunnel boat without an adjustable mount. I now lots of folks do it, but it makes no sense to me.

I lowered the engine slightly and moved the prop a little in towards the transom to settle the boat on the water. Those adjustments proved successful. The boat displayed good speed and cornered super. Left turns, a real problem with some tunnels, were no problem. With no turnfin to trip over, the boat can be turned to the left at full throttle. What a deal. I couldn't wait to try racing the boat with these sponson additions.

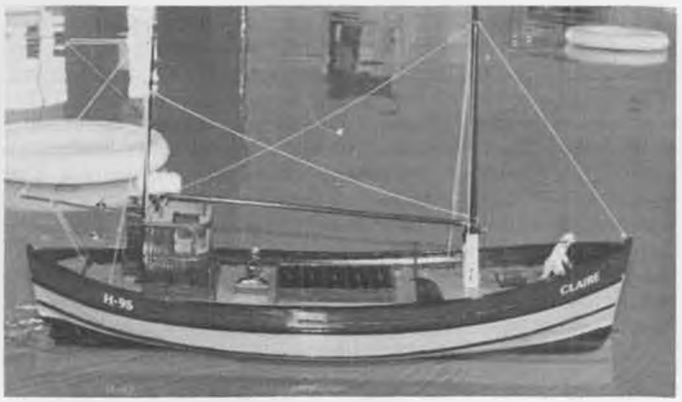
The opportunity to race the boat came at the Annual Turkey Race sponsored each November by the Rose City Model Yacht Club of Portland, Oregon. I don't want to confuse you, so I better mention that turkeys are the prizes, not those who enter the race! Even though I didn't win the first place turkey at that race, I was very pleased with the way the boat ran with those sponson modifications. It wasn't the boat's fault that in one heat I managed to snag a leaf on my lower unit and kill off about five miles-per-hour top end speed.

The sponson modification worked so well on the 3.5 tunnel I just figured it had to work on my 7.5 tunnel. I made a similar type of pad for the big tunnel and headed for the lake. The 7.5 tunnel did turn with the sponson modification, but it wanted to hook. I tried trimming the lip from 1/8 inch to 1/16, and reducing the rudder throw. That seemed to help reduce the tendency to hook coming out of the corner, but it didn't entirely eliminate the problem. I made a few more adjustments to the rudder throw and trimmed the lip a little more. As I left the lake that day after testing, I though I'd worked out all the bugs on

Continued on page 88

These scale model boat pictures were supplied by Wally Nussbaumer who shot them at a shopping mall display presented by the Capital Marine Modelers.

The scratch built tug "CaroLeigh" is put through its paces during a shopping mall demonstration put on by the C.M.M.



Another beautiful, scratch built model boat at the shopping mall.

Here's a really different faired and lowered Parma body BMW 320i. Delta Eagle chassis. Known locally as "Checker Cab."

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR

• I had thought that possibly we could slip in an article on the new Delta Super Phaser 1/12 car, but it didn't work out. The car just came in a couple of weeks ago, right when I was in the middle of building a new Pattern model (you know, the kind that howls around the sky burning more fuel that would seem wise), so at this time it is little more than a roller, still needing all the electrical stuff installed.

I refuse to stick my neck out on anything that is untested by myself, but the car really does look very good and from what I hear from other racers who are actually racing Super Phasers . . . well, before you buy a new car you best check out the latest from Delta.

TRACTION IN A BOTTLE. . .

A few letters coming in have specifically asked about all of the traction compound stuff now in wide use in 1/12 scale. Seems everybody wants to know what to use, how to use it, when to apply it, and so on. And more than a couple of racers don't like the fact that tire glue is allowed at all.

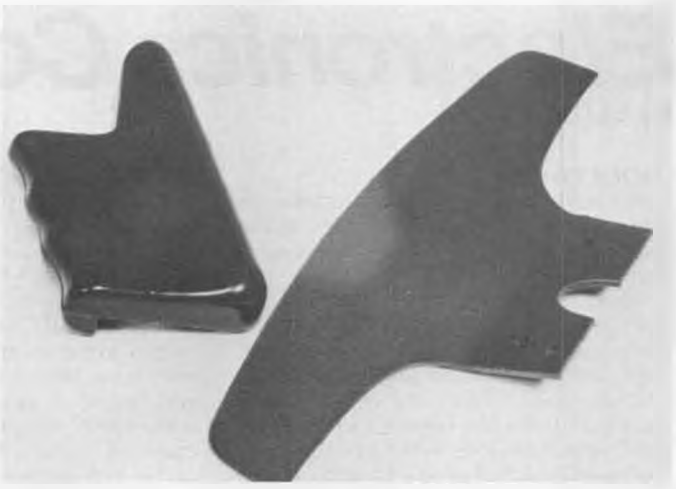
My own feelings are that I don't like the use of traction additives; it just seems to introduce another trick or speed secret thing to the racing. But the use of glue is with us now and will be for a long time, primarily due to a very poorly worded rule that was actually meant by the originator to completely ban all traction additives. The ROAR rule books says: *NOT ALLOWED — Tire cleaners and/or traction compounds applied to the tires that can can coat the track.* Some racer saw that and it (probably) immediately occurred to him that he should come up with a compound that worked, yet didn't leave a trail of gorilla snot. Far as I know, the first stuff to be judged as legal, and that was effective as well, was good ol' WD-40. When this was allowed, the dam burst and, like it or not, tire glue is here to stay. There is just no way to simply pass a rule saying no more, cease and desist. First, the rule wouldn't pass, second, everybody would ignore it. Once you get hooked on something that increases the performance of the cars, it is very difficult to go backwards.

So as long as it is here for the duration, what is good about it? Well, it does make the cars stick better, which raises the performance level. I still remember a conversation I had several years ago with Roger Curtis, except at that time we were discussing a proposed minimum weight limit for the 1/12 cars. Roger wondered if we should even have minimums on the weight, as lighter means faster and a higher level of performance would make 1/12 racing more attractive to many people. The weight rule did pass (with Roger's blessing, as I recall) but the point is still valid. Fast race cars are exciting, slow ones . . . well, they are just slow and ho-hum.

Another point that I feel very much favors the use of tire glue is that it can make many race sites usable that would otherwise be terrible. This past summer, the Dirty Racing Team went to this region's championship race, primarily to race 1/8 scale. But as long as we were going clear to Portland, Oregon, a couple of 1/12 cars were tossed in as well. Luckily, 1/8 went off pretty well, but 1/12 got rained on, so the club's indoor track was used as an alternate site. We decided to head for home, but just to see what the surface was like, I did make a couple of runs. It was really slick! My car was set up for a 6-cell pack, so I used it, but had the diff *real loose*, a ton of wing was bent in, etc. I could just get the car around. And I mean just get it around. There was no way I could actually race with somebody else, it took all-out effort to just keep from sliding into stuff. The car was just about like I use at outdoor races, meaning no traction compound (at least at that time I wasn't using tire glue, mainly because our club just sprays down VHT for races).

Anyway, that track was very difficult with a 6-cell car, even the 4-cell cars were sliding about. Not a race site to love. Then a fellow from Eugene drops his car on the track and starts hitting all kinds of stuff. Most of us knew it was his first race, so assumed he was just flat bashing the car around. I just happened to watch his car enter a tight 180 and it lifted the inside rear tire just before the apex of the corner. Now the car wasn't right, too much brake, high center of gravity, but it was a well-known chassis that wouldn't do rude things like lift a leg in corners if even half close to built properly. An excessive amount of traction had to be the answer, so I watched the car for another lap or so, and I'll be damned if it didn't sail into a 90° sweeper, pitch a little sideways from all the extra brake, dig the outside tires in,

Cooling fan from BoLink operates on a 12v power source for cooling hot battery packs prior to charging.



The Trans-Grip from Kimbrough Products (left) makes holding boxy transmitters easy. Also MRP's heavy-duty Kydex bumper for off-road.

and actually flip completely over! I've been to several Nationals where the traction was very high, yet I had *never* seen an RC car simply roll over from too much traction, a happening that is not too far removed from rolling a go-kart on a flat surface, something that is almost impossible to do.

So from my setup that was sliding all over the track without glue, this racer had the problem of too much traction. With glue, that race site was a pretty good one; without it, it was a joke.

With these two points in favor; increased performance and better race sites (or just more usable ones), I suppose that tire glue is OK, at least for the present. It also gives the fiddlers something else to experiment with, which may or may not be a positive side to the issue.

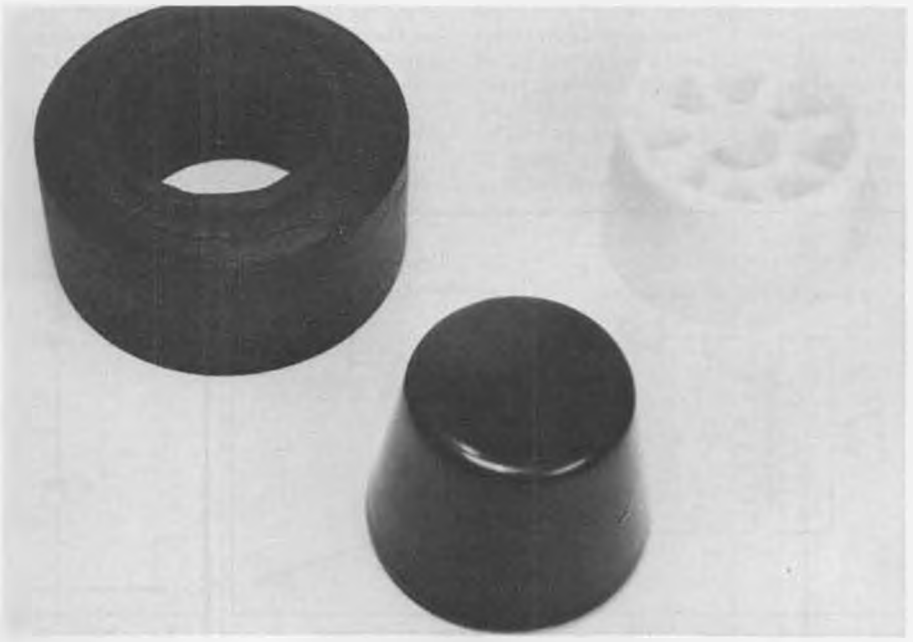
It did lead to an interesting conversation at a combination 1/8 and 1/12 race in Eugene, Oregon last summer. I was there to race 1/8, again had a couple 1/12 cars for grins. As there are only a couple of guys in Eugene with 1/8 cars, the 1/12 racing just having got off the ground, I was talking up 1/8 racing with a couple of guys in the pits. From a fellow who didn't know anything at all about 1/8 from first hand knowledge, came the comment that 1/8 cars are neat but they are so dirty. As he said this he was up to his elbows in applying messy, foul-smelling traction additives to the tires on his 1/12 car and his work table was covered with grease and crud the likes of which nobody has ever seem in my 1/8 pit area! Naturally enough I pointed this out to him, although I'm not sure he really understood. . .

Say, I'll bet you want to know what the guy was using on his tires; the stuff that caused the car to go loopity-loop. No real secret anymore, it was Johnson & Johnson Sunblock, R-15 rating. Understand that Coppertone, again the R-15 version, is used by many, in fact was the hot tip at the 1/12 World Champs. I have used both, not a lot but enough to know they do work.

Application is simple enough with the suntan lotion, just spread it on and work it in with your fingers. Wipe the excess off with a rag and try it. Leave too much on the tires and the car will be a reall squirrel for the first few laps, most seem to like to leave it on heavy for awhile, letting it soak in, then wiping off the extra stuff a few minutes before each race. You'll have to experiment. I haven't used it enough to know the best procedure. I did have to use it on both front and rear tires, by the way.

I would like to caution you about using too much of whatever glue you use; it would seem to me that the more traction you get, the shorter your runs will be. Those sticky tires aren't rolling along of their own accord, the motor has to overcome this added rolling resistance and that means a faster drain on the batteries.

Back a little, I mentioned that our club simply sprays the whole track with VHT (Very High Traction), which is some stuff the drag racers use for more bite off the line. We get it from a local speed shop, generally buying two or three cases at a time (four gallons to the case). VHT really is a glue, says so right on the box it comes in. It is simply misted on the track surface, using a heavy-duty lawn and garden sprayer, the kind you pump full of air. A light misting is most effective, and you have to keep racers from walking on it for 15 or 20 minutes. From then on it is great traction for all, which mostly helps the novice racers or those who can't seem to get their cars set up properly, and the level of traction stays fairly constant throughout the day, although it does get better when racing the 1/8 cars, as they lay down rubber and fuel residue. •



Kimbrough Products has a handy tool for fitting tires onto wheels, its called a Tire Horn (foreground) and it comes in 1/12 and 1/8 sizes, from dealers and Associated.

Electronics Corner

By ELOY MAREZ

MODE FOUR?

Pennsylvania has been heard from on the subject of transmitter modes, in the form of a letter from Robert Lipton, of Pottsville, as follows:

"Just recently, I reread your column appearing in July 1982 MB. In it was a letter referring to transmitter modes, and your explanation about transition, etc. basically discussing the Mode 2 configuration. The reason I write is two fold. First, I am interested in knowing if you ever heard of Mode 4 configuration (Elevator, Aileron on left, Throttle, Rudder on right), and if so, what, how, etc., did this person use this configuration. The other reason I ask, is because I have never met or heard of anyone beside myself who flies this way . . . I also do not understand why left-handed people would not learn this mode of flying. It is as natural as Mode 2 to a right-handed person.

"It is interesting. I basically learned by myself, and did this modification speed my learning curve! I guess what I'm trying to say is that the manufacturers of R/C equipment should consider this option, it sure makes more sense than Mode 1, and also R/C teachers should consider this when teaching flying to left-handers. There is a difference between your left and right hand in many sports because of the level of coordination difference in your strong hand.

Well now that I have thoroughly confused you . .

P S. Mode 4 was not coined by me, but by Bob Aberle, of Flying Models, *who once spoke about it in his column. . .*

Well Bob, one of the first questions that is bound to arise in the minds of some of our readers is, "What happened to Mode Three?" I have read a few times of Single Stick being referred to as Mode Three, though the term has never come into as wide acceptance and use as the others, probably because of the very small number of fliers using it. Maybe it is another Aberle-ism, he likes this method of flying, and recently wrote a lengthy treatise about its advantages.

Anyway, to your Mode Four, or whatever. Like you, I have neither met nor heard of anyone flying quite this way, though I would not be surprised to find others, as it does make sense for "lefties" who have been exposed to Mode Two and found it awkward. I do know of some other unorthodox methods. For example, quite a few Europeans, especially helicopter fliers, connect the throttle in what to us in the U.S. is backwards; forward stick movement gives low throttle. And Jim Kimbro, the designer of the well-known "Deception" pattern airplane, flies with the elevator backwards . . . you push the stick "Up," the airplane goes up! It does make some kind of sense when you think of it that way, and don't let your mind get all cluttered up with ideas about how they fly "real" airplanes. I see little similarity between flying a full size machine in which you sit, and flying an R/C model. And as you probably gathered from the above, I don't like the reference to "real" airplanes, I have a Quarter Scaler out in the garage that cost over a thousand real dollars. It may not carry a man, but it is "Real!"

Still speaking of different transmitter configurations, a few eyars ago I built a transmitter for a flyer whom I can only now remember as "Red," somewhere up in Pennsylvania, as a matter of fact, it was a regular two-stick case, with a three-axis single stick gimbal installed in the left side, and a normal two axis gimbal, locked to work only in the vertical plane, on the right. Red was missing his left hand, and flew by cradling the transmitter in his left arm, working the left gimbal in the normal single stick manner, and operated the throttle with his right forearm.

Which rings us back to what I wrote back in the early part of the year when I started the column. After discussing what to me are the advantages of Mode One flying, I concluded by saying "If you are a safe, competant flyer, and fly automatically, without having to think out each movement, whichever way you fly is best for you."

The question of which is absolutely the best method to fly will never be resolved, though us minority Mode One'ers like to point out to the tremendous success that Mode One flyers have had in such events as pattern and pylon, competing against great numerical odds. Even quantities cannot give us a lead. Though Mode Two is definitely in the majority in this country, it is not so world-wide; I would venture to guess that it is close to an equal quantity for the "other" way.

It's like the bumper stickers that say "If it feels good, DO IT!"

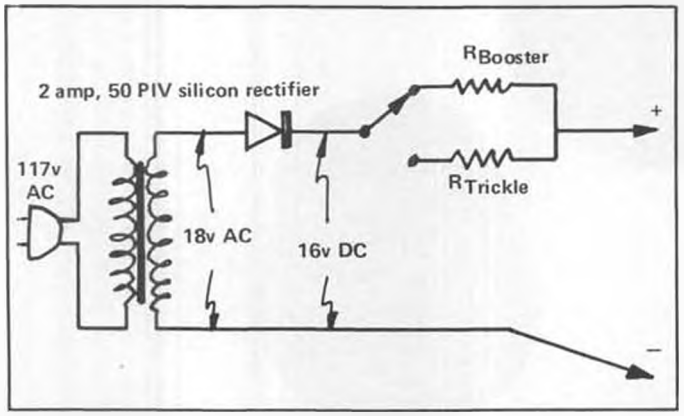
Looking closely at your method of flying Bob, I can only think of a couple of minor disadvantages. One is that you cannot fly your friends' models, and vice versa. And the other is that during the learning stages, it is hard on the instructor, who is being asked to accept responsibility for flying in a manner to which he is not accustomed. Most of us can fly all but the real way-out methods, I'm sure I could fly yours as long as things went well. But when something unusual happens, your reflexes trend to take over and then it is all over but the crying.

About the manufacturers, well, they do make transmitters in the mode that you describe . . . they call them Mode One ! In actuality all that you are doing is plugging the aileron and rudder servos into different receiver outputs, though it does get a little more complicated on the transmitter end if one is equipped with buttons and switches, which have to be located in a logical place relative to the main controls.

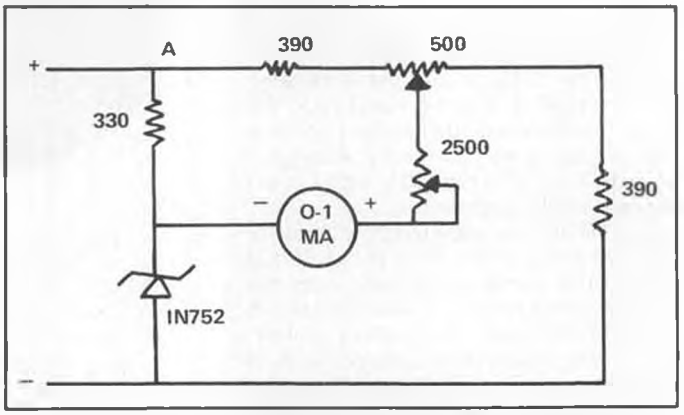
We'll see what we hear on the subject from the multitude, Bob. I guess the only ones not yet heard from are those that are connected so that left stick movement results in a right turn, and vice versa. No, I don't know of anyone who flies that way, but somewhere there is bound to be someone who does.

And you didn't confuse me Bob, I have been known to get that way on my own!

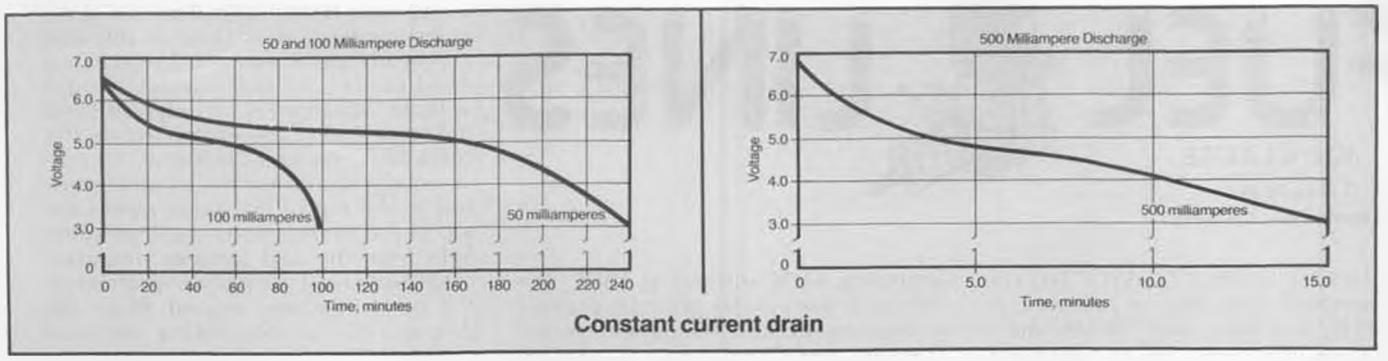
MICRO R/C



Bob Bostrom's charger circuit recommended resistor values are: two ohms, 20 watts at Rb, and 40 ohms, two watts at Rt.



Expanded Scale Voltmeter circuit, for testing 12-volt wet or gel cell batteries. Resistors are 1/2W, 5%, small trim pots for 500 and 2500 ohm. See text for instructions.



Constant current drain

Fritz Mueller and his experiments with ultra-small, ultra-light R/C equipment led to another letter on the same subject, from Joe Carter, Vienna, Virginia, as follows:

"I read your column in MB and I am interested in the micro receivers that Fritz Mueller, of Columbus, Georgia, describes. Could you give me his address, as I get to Georgia now and then. You really should write an article on the super-lightweight, super-small receiver actuator systems that have been used in rubber or CO2 powered models. One such system was in M.A.N. magazine in past years, from Sweden, I think, installed on a stick R.O.G. type model, 16 to 20 inch span. Do you have any info on this system?

"I think there needs to be published a circuit for an R.F. front end 1.2 to 2.4 volt (amplifier) that can be coupled to the superhet chips that are available and satisfy the FCC requirements. (The above problem is my stumbling point).

"Actuators are another problem area. Small Adams types are still acceptable, as are meter movement types, for very small, slow speed surfaces. Other types worth trying are fluidic controlled with actuator power from the CO2 engine bottle or the crankcase pressure in glow engines. Lots of effort to make this work! Actually, I think the fluidic system is a dead end, and just mention it for kicks, but there must be other types that you have heard about and might mention in your column.

"Polaroid throw-away batteries still have lots of energy even after the first intended use. A cheap LM-317 Radio Shack regulator drops the 6V to 2.8V or 4.8V, and supply 8 to 10 flights in R.O. (Rudder Only) Ace Receiver airplanes. These flat batteries can sometimes be sliced up smaller, but capacity is thus reduced. Old Japanese salt water batteries are very light, and will power small RC systems, but one in four is defective.

"I didn't intend to write all of this, but thought you may like to know there is interest in micro RC out here. . .

"P.S. The flat battery was used as a canard, so it sort of carried its own weight."

Joe, you have caught me with my battery somewhat discharged on this one, the last equipment of this type that I built used an XFG-1 tube! I do know that there is interest in this part of the hobby, and every year at the International Modeler Show, in nearby Pasadena, we are treated to a lot of interesting and exciting rubber, CO2, and R/C blimp flying, not all of which is controlled by Bill Cannon's equipment, some of it uses the type of stuff that you and Fritz describe. The show is now a month away as I write this, I'll see what is new this time, and report on it later. In the meantime, we'll ask other readers out there to let us know what they are doing, and share with you.

In the meantime, we can expand a little bit on a couple of the subjects you mentioned. First, the introduction of samarium cobalt magnets, with their light weight and high magnetic power, might lead to lighter or better actuators, or products such as the meter movements that you mentioned that might be modified for such use. Then too, there are some interesting receiver chips which might be worth looking into.

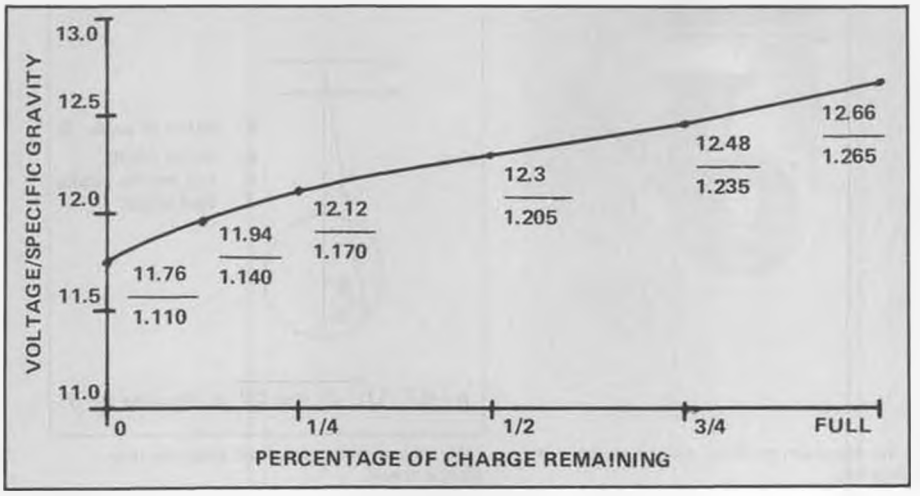
One is the ZN414, from Ferranti electronics. It is a 10 transistor TRF circuit, incorporating a complete RF amplifier, detector and AGC circuit, all in a T10- 18 package .22 inch in diameter and 1.9 inches high. A data sheet, including a circuit for a 27 MHz superhet receiver using this IC, is available from Ferranti Electric, Inc., 87 Modular Ave., Commack, NY 11725, (516) 543-0200.

A somewhat larger chip, in an 18-pin DIP package, is the LM1872 radio control receiver, from National Semiconductor. It includes the works; local oscillator, mixer, IF, detector, AGC, sync, output, and four decoded outputs, two proportional and two on/off. It is available for $2.49 from Jameco Electronics, 1355 Shoreway Rd., Belmont, CA 94002. A product sheet is available from the same source for 30¢, though there is a $10 minimum. Data sheets can also be obtained direct from the maker by writing to Charlie Smalz, National Semiconductor, 2900 Semiconductor Dr., Santa Clara, CA 95051, (408) 737-5719.

Another receiver weight and space-saving idea is seen in Ace R/C's new Silver Seven receiver. It uses a Siemens SO42P 14-pin DIP IC to do all of the oscillator and mixer functions. Only RF tuning and crystal are required, and you can go directly to the 1st IF amplifier. The chip, catalog number SS098, is available directly from Ace R/C for $5.00; its application in the Silver Seven receiver is detailed in the instructions for the receiver. I seem to remember that Ace sells instructions for its kit equipment separately, but I couldn't find such a listing in the current catalog. Anyway, I'm sure that if you mention my name and send a hundred dollars, Tom Runge won't refuse you a copy of the schematic and circuit description.

I love the idea of using the Polaroid battery for a canard! For those of you not familiar with it, it is a flat battery that is used to power the familiar camera of that name. It's dimensions are 3.730 high, by 3.04 wide, by .180 thick, at a weight of .95 ounces. As Joe says, even after it has done its job in the camera . . . it is replaced with each new film . . . it still has enough life for R/C applications in the feather-weights he likes. A new battery has a fantastic amount of electrical energy packed into it. I have included some current versus time charts that tell the whole story. Even at a

Continued on page 90



FUEL LINES

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

• If I were a Las Vegas bookie, I'd lay you tremendous odds that, at one time or another, you have said, "What time is it?" In a similar vein, being a modeler, you may have seen an engine, discussed it with an owner-friend, and asked, "What are the timings?"

Aha! See there! If you've ever been curious about the timing of an engine, you're obviously suave, sophisticated, worldly and very intelligent! (Ye gads! What a lead-in hook!)

Now, let's get to what it's all about. When we talk about the timing of a particular part of an engine, we mean some form of measurement. In this instance the measurement is in degrees of crankshaft rotation. By convention, one rotation is 360 degrees Thankfully, the Babylonians standardized that thousands of years ago. Incidentally, 360 is a very nice number. It's evenly divisible by every number from one to ten, except seven. Seven is also the easiest number to roll with a pair of dice, which some say the Babylonians also invented . . . Dichotomous to say the least. Whatever. What we're concerned about is measuring the degrees of crankshaft rotation between the opening and closing of intake, transfer, and exhaust ports.

Again, by convention, intake timing is usually measured as beginning after bottom dead center (ABDC) position of the crankpin. The piston is at its lowest point and naturally the crankpin is also. Intake closing is measured in degrees after top dead center (ATDC). The cumulative difference of degrees of rotation is referred to as intake period. In a somewhat similar manner, transfer (main, boost, etc.) timing is measured beginning ATDC and ending ABDC. The interval is the transfer period expressed in degrees. Exhaust timing and period are measured the same as transfer timing. Thus, we have a convenient degree-way to express when intake, transfer and exhaust occur. Naturally enough, there will be considerable timing differences between high performance and sport engines, just as there are between racing cars and family sedans. If you're a sport flyer, you may care less about all this, but if you're a competition flyer, you probably will sooner or later want to experiment with various timings. To do this, you must have a way to measure timing.

I know of two easy ways to do this on the very popular two-cycle engine. Although both work well, one of them may seem quite practical and the other more scientific. Judge for yourself. I'll call the first way the protractor method, and the latter the math mode.

For the first way, you guessed it, you'll need a protractor . . . a 360 degree one. The plastic one shown in the two accompanying photographs is three-and-a-half inches in diameter. You can usually find them in the school supplies section of your local super market. Additionally, a piece of one-sixteenth music wire, appropriately bent, will serve nicely as a pointer or indicator. A careful examination of the two photographs will help considerably in understanding how to set up the protractor method.

With the piston exactly at BDC, position the protractor and pointer to indicate 180 degrees. Logically then, bottom dead center is 180 degrees after top dead center. With the nuts and bolts securely fastened, you can begin measuring. Let's take the exhaust timing as an example. Hold the headless top of the engine under a desk lamp or shielded overhead light. Rotate the piston to top dead center . . . the pointer should indicate 360 degrees. As viewed from the front end of the engine, rotate the crankshaft counter-clockwise. Simultaneously, look into the exhaust port. Just as the top of the piston passes the top of the exhaust port, you'll see some light from the desk lamp or whatever. Stop! Now read the pointer-protractor. It'll be somewhere around 90 or 100 degrees or so, depending on your engine. Write the figure down.

Continue to rotate the crankshaft until the top of the piston passes bottom dead center (180 degrees) and then just barely closes off the top of the exhaust. Again stop. This figure, minus the first one, is the exhaust period. (Hopefully also, this latter figure when subtracted from 360 will equal your first one for the opening of the exhaust.) You've just measured exhaust timing . . . the opening, closing, and period. A moment of reflection or the experience of actually doing it will not only make it very clear, but also increase your comprehension of our two-cycle engine operation.

In a similar way, you can measure transfer timings by looking through the exhaust to see when the piston uncovers and masks these ports. For the intake timing of a front intake engine, as shown in the photographs, point the venturi part of the case towards the light, and from the rear of the case, look through the bore of the crankshaft. Again, use the show of light and protractor indication to measure degrees. With a rear rotor engine, you must install the backplate and rotor. You'll have to look a little more carefully for opening and closing, but the principle is the same.

Let's face it. You're now a master at measurement of engine timing. However, if you want to add some frosting to the cake, or if you have a penchant for a bit of mathematics, here's another way to measure timing.

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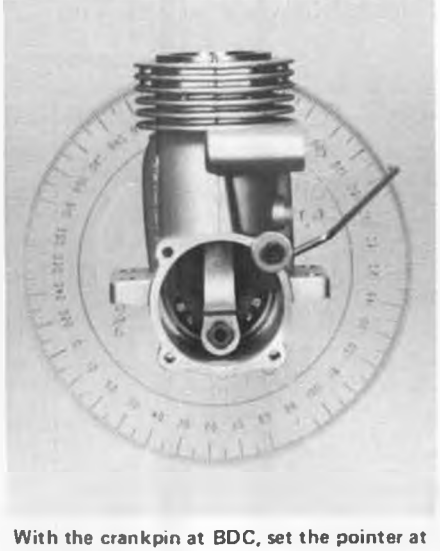
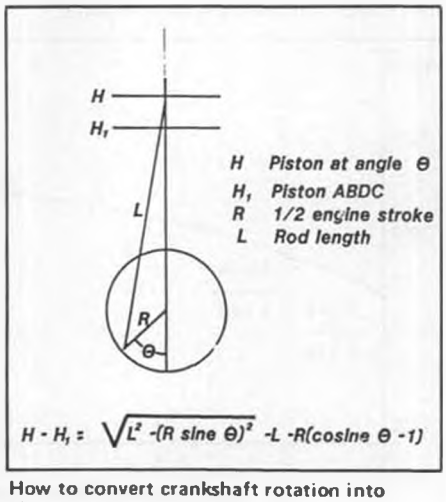
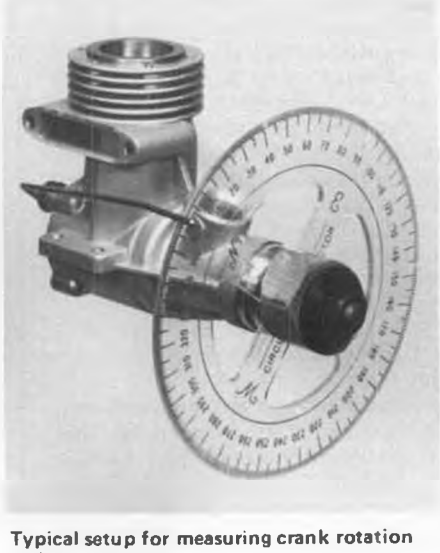


With the crankpin at BDC, set the pointer at 180 degrees.



How to convert crankshaft rotation into piston travel.



Typical setup for measuring crank rotation and port timing.

SPAIN '81

By Reid Simpson
CONCLUSION

• Daybreak of August 8th, F1A day, found us all on the field jumping around to warm up the old bodies . . . it was cold, and it was windy, windy, windy. Wilson, Livotto, and Dona immediately put up test flights and started making high wind adjustments. All went well until Dona had a model fail to DT. Not finding the problem, he elected to process an alternate model. After an hour of hunting, we gave up on finding a FENDA official for processing. Luckily, Dona found the problem on his DT and the ship was once again in good grace. As we hunted for the officials, so did everybody else. The Timers all arrived on their big bus. (Oddly enough, only Timers could be on that bus, and only contestants on another; and on yet another, the Team supporters were allowed to ride.) But having contestants and Timers are not enough to start a contest. The field was strewn with cars as test flights continued on past the 0830 start time. There were no officials on the test field, a starting line had not been established, and except for the CIAM officials and the fliers, no one else seemed to be even interested, let alone worried. Finally at 9:15, Sandy Piminoff and Ian Kaynes found the starting line coiled in a hangar and began laying it as far upwind as the field permitted (75 yards from a rock dump, but we didn't have to worry upwind today anyway). Finally, at 9:50, the first round began . . . just a little late.

Our first man up was Wilson. Our plan was for me to do the launching with Ghio upwind of the flier to help direct him towards other thermaling airplanes and away from traffic jams that could result in line crosses and damaged models. As Wilson unwound his line, he looked at Walt and me like, you got to be kidding me to fly in weather like this. Soon Jim was airborne, and for a few minutes he kited upwind and then he finally positioned his "Simple Toy" for a downwind circle. After a mad dash downwind, he caught up with the model and kited again. When trying a second circle, he had to allow his model to land as the wind pushed his model down hard with no chance of recovery. Our second flier, Juan Livotto, moved up to the line and was airborne almost instantly. Juan's model circled well and soon Juan was off for what we felt was a max. But after two high circles, he dropped out and was down in 92 seconds. Our third flier, Jose Dona, then launched and without circling, shot his model up and away for a solid 180. Our men downwind acknowledged his launch and almost simultaneously announced he was directly overhead of them . . . we knew we were in for some long chases today. As soon as Dona's bird hit 180, we hooked up Wilson. We still had 25 minutes left, so after watching others kite upwind, Jim launched and without circling zoomed his off for another 180. As we were observing a lot of models splat as they hit the ground or else just drop off for 75 to 100 second flights, we felt pretty good about our first round scores.

As the second round began, our plans ran afoul of the Timers' instructions. We could not have a man upwind. What had been allowed at Taft in 1979 was not allowed here. FENDA's rule was that all helpers must be at the launch point. So from that point on, Walt moved back to launch. (In a way, this was best as it freed me to maintain contact with our chasers downwind during the launch period.) What the Timers didn't seem to mind (although I don't think they paid any attention to us after the launch) was that Walt slowly moved out to where the flier was and continued to help them as planned. In watching the other fliers, we observed their techniques and saw their success. As it was almost too late to tow into their thermal, you had to pick air from the ground. Fluff was out of the question, so Walt and I went back to the old launch-them-in-the-calm technique, hoping the thermal was close behind so that kiting the model and waiting 5-20 seconds would hit the thermal.

The second round found Wilson and Dona hitting good lift for 180's, but what seemed to Livotto as good air rewarded him with a 48-second flight. Needless to say, Juan was down in the dumps following this. This didn't last long though, as round three produced three solid 180's and Livotto stuck one so far that we didn't think he would ever get it back.

Round four was started by Wilson and a release off of an unlatching by a gust of wind produced a 50-second flight for him. Livotto, flying his number two model, produced an 80-second flight. On this round's flight, Dona planted his number one model back into the woods. (This model, it turned out, was the only model we lost . . . even compasses didn't help enough when rivers and streams have to be crossed.) As we broke for lunch, two young boys from Burgos returned with Livotto's model lost in the third round. It had landed by a castle on the mountains over ten miles downwind.

The lunch, it turned out, was both filling and a little dangerous. Each person got two huge sandwiches, each on an 8 to 10-inch long bun (actually a small loaf of bread). They were nicknamed torpedos . . . turtles . . . footballs. One sandwich each day was a potato omelet, the other usually a port steak.

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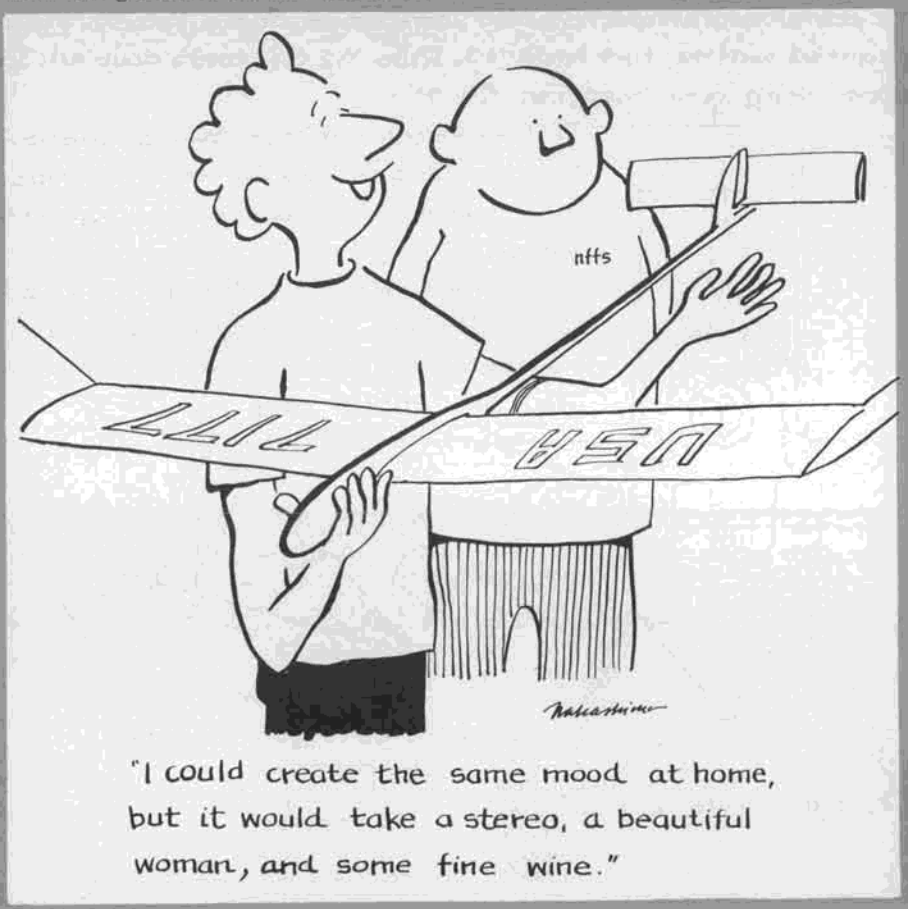
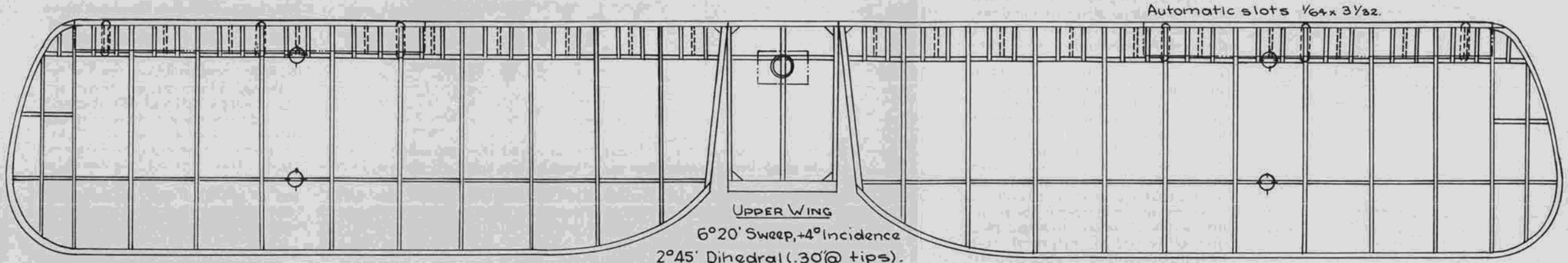
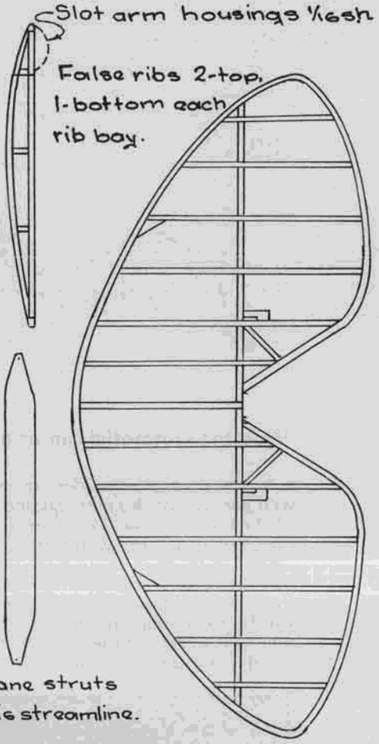






Interplane struts
1/20 x 3/16 streamline.

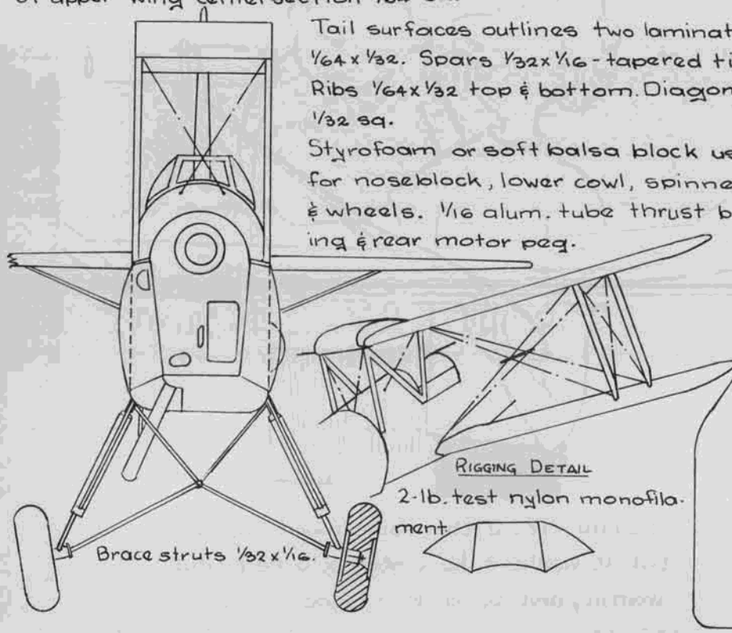
NOTES ON CONSTRUCTION:

Fuselage frame 1/20 sq., diagonals 1/32 x 1/20, stringers 1/32 sq. Formers 1/20 & 1/32 sh. Cowl & turtledeck 1/64 sh.

Wing leading edge 1/20 sq., tips & trailing edge all one piece each panel two strips 1/32 x 1/20 laminated. Spars 1/32 sh. strips to required widths - tips tapered. Ribs 1/32 sq. - roots doubled. Top of upper wing centersection 1/64 sh.

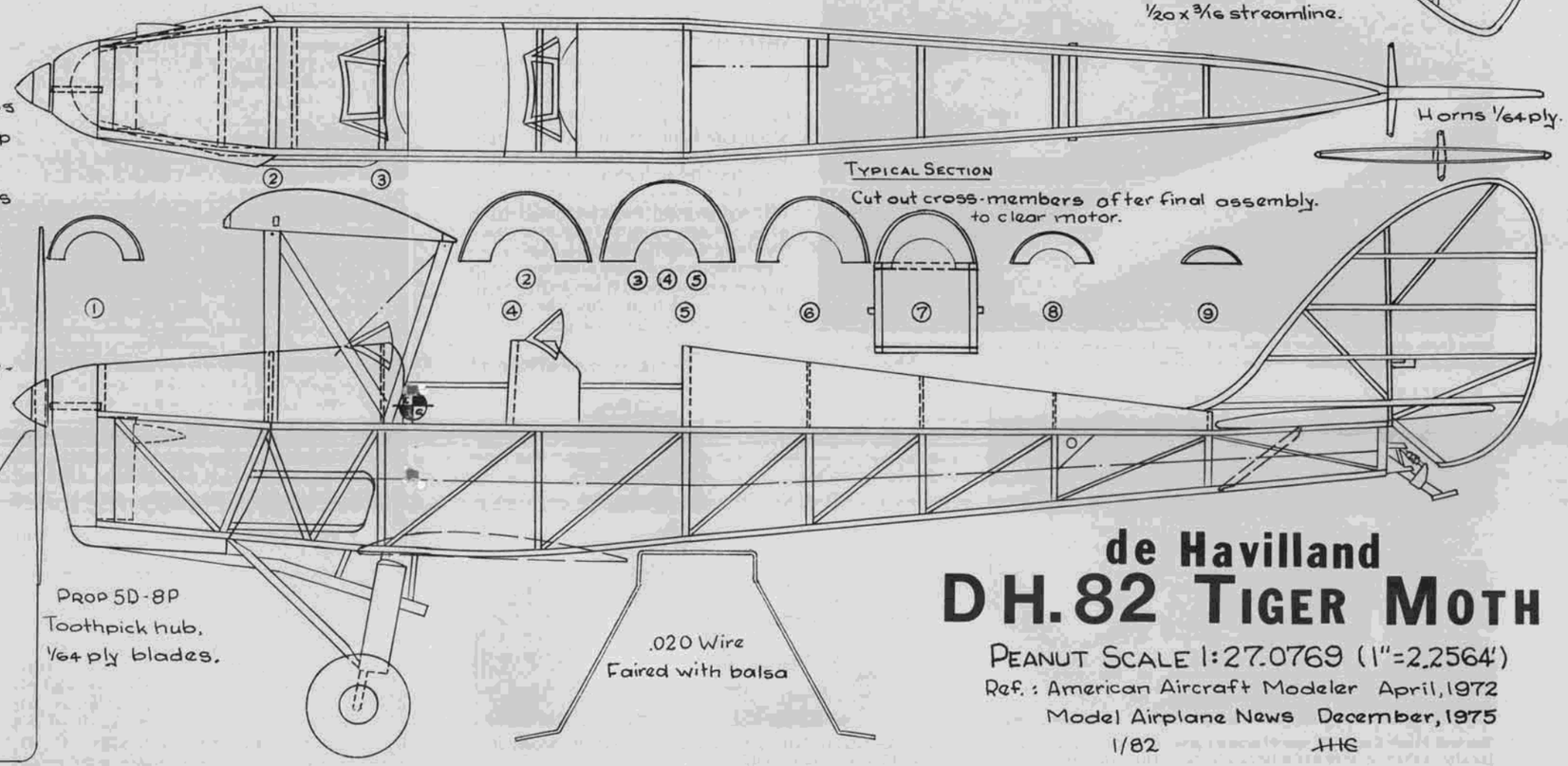
Tail surfaces outlines two laminations 1/64 x 1/32. Spars 1/32 x 1/16 - tapered tips. Ribs 1/64 x 1/32 top & bottom. Diagonals 1/32 sq.

Styrofoam or soft balsa block used for noseblock, lower cowl, spinner & wheels. 1/16 alum. tube thrust bearing & rear motor peg.



RIGGING DETAIL

2-lb. test nylon monofilament

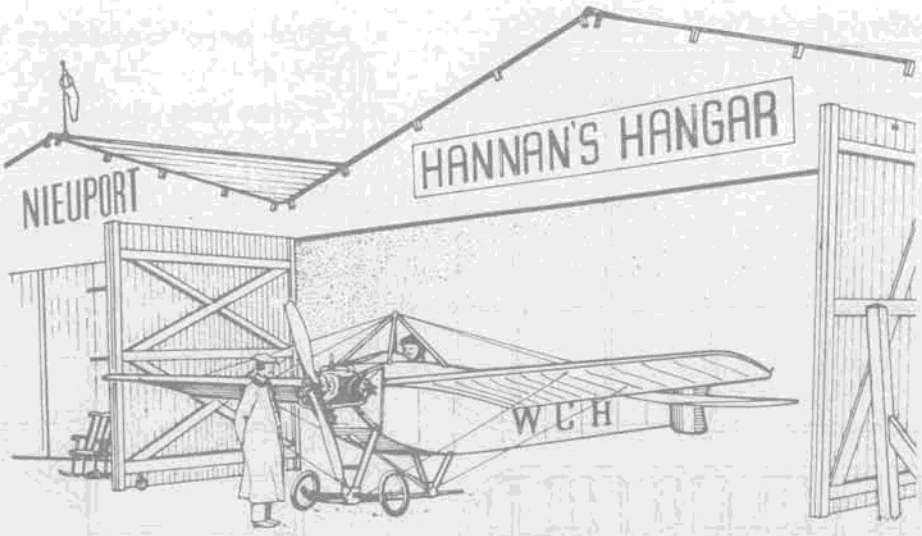


de Havilland DH.82 TIGER MOTH

PEANUT SCALE 1:27.0769 (1" = 2.2564')

Ref.: American Aircraft Modeler April, 1972
Model Airplane News December, 1975

1/82 HE



"Nothing substantial can be done in a hurry."

• Almost any model builder can identify with the above thought, quoted from 1880's *Essays* author, John Henry Newman. *American Artist* writer Fred Cooper agreed, as he pointed out in the December 1940 issue: "There is no substitute for craftsmanship. Cleverness may get you by for a while, but the acid test of time will weed out the poor craftsman . . . the sincere craftsman could never live long enough to know an hour of boredom with his chosen work.

"It all adds up to this: You blessedly happy craftsmen who have found your work do not need any tips on the subject; but all others are advised that in proportion as your standard of performance is below the best you can do, you are slipshod."

THAT PRESIDENT "P-FACTOR"

Propeller "P-Factor" seems to have gained a position alongside the downwind turn as a subject of perpetual discussion/argument. This alleged phenomeon assumes severe problems are created by the difference in blade angles on opposite sides of the propeller shaft. According to the theorists, each propeller blade may have fluctuating lift forces in difference areas of its travel arc. This, we are told, can happen when there is an angle of inclination between the thrustline and the air stream . . . as when a taildragger starts its takeoff roll, or an aircraft climbs steeply. The resulting condition is offered to help explain unusual behaviors, instead of, or in conjunction with, that ever-popular scapegoat "torque".

It is therefore particularly interesting to note this statement on the subject made after extensive testing with large diameter propellers, by the Hamilton Standard Division of United Aircraft Corporation, as reported in *Aviation Week* for July 21, 1947: "A major difficulty with "One P" vibration is that there are *no external symptoms* (italics ours, w.c.h.) because there is no vibratory reaction at the engine shaft." Rest in peace, P-Factor.

FIRST INDOOR FLIGHT

According to Ruth Newhall, writing in her book *San Francisco's Enchanted Palace*, Lincoln Beachey made the first indoor flight, in the Palace of Machinery, circa 1914. Nope, not a model, but a full-size V-8 engined pusher biplane!

SWEET SIXTEEN

The 16th Annual Northrop Flying Wing Contest took place recently at Mile Square Park in Fountain Valley, California. Originally held at the old Sepulveda Basin free flight site during 1966, the meet has retained its relaxed, low-pressure ambiance most successfully down through the years. New for 1982 was an event for scale model flying wings of any origin. Formerly, only Northrop designs had been eligible. As expected, this provision attracted a crop of new entries in addition to the more usual non-scale types. And also for the first time, a proxy entry was permitted, in

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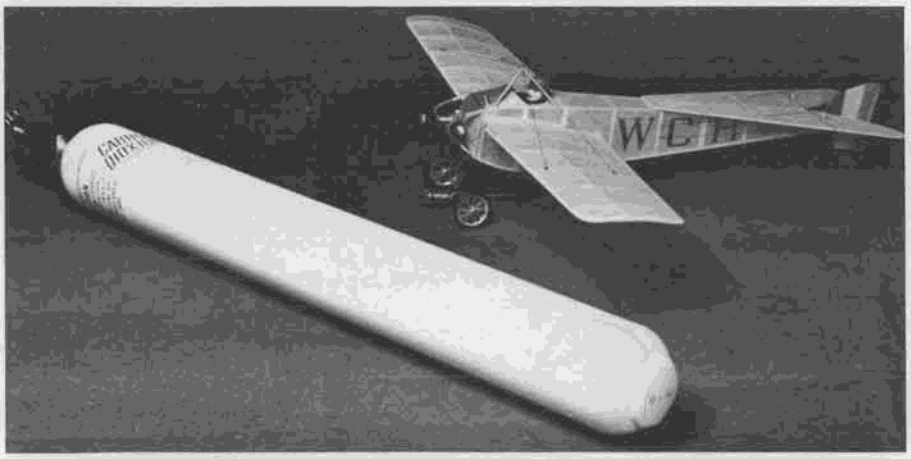


Cryo Dyne refilling cylinder dwarfs the Hangar Nieuport monoplane, which is powered by a Brown Junior CO_2 engine.

The late Frank Courtney, one of world's greatest test pilots, watches jovially as Walt Mooney packs turns into Peanut held by Warren Shipp.

Happy Birthday to Carl Goldberg, who just turned 70. "Model of a model", and photo by Bill Hannan.

PEANUT SCALE

de Havilland 82A TIGER MOTH

By HOBY CLAY . . . Here's a classic WW-I fighter to add to your Peanut collection that can be built under 6-1/2 grams.

• The D.H. 82 was the next generation development of the D.H. 60 Gipsy Moth, and first flew in 1931, using the inverted in-line air-cooled Gipsy II engine. The airplane was the primary trainer for the British and Canadian Royal Air Forces, as well as a number of other European and Middle East countries, throughout World War II. Thousands were built using the Gipsy Moth 130 hp and 145 hp and Menasco Pirate 125 hp engines, and many are still flying.

An excellent article by Don Berliner, with Bjorn Karlstrom's drawing, was published in the April, 1972, *American Aircraft Modeler*. A drawing in the December, 1975, *Model Airplane News* of the 82C series gives some excellent details of how the frame was put together. I modeled the 82A as shown on Karlstrom's drawing and colored it white and black to match the one which came to our 1981 fly-in to compete in the antique group. If neither magazine is in your files, and you should need a drawing for documentation or to check details, Repla-Tech International has the Karlstrom version. Ask for BK48.

All the scale structure is drawn, so you can choose how much of it to incorporate in your version. I put it all in and grossed out at 0.22 ounces (6.3) grams without the motor. The only intentional scale deviation is the McCombs flat-bottom airfoil instead of the reflexed, undercambered one used by de Havilland. Scale tail surface areas are adequate for a free flight model.

Select all your balsa carefully for needed weight and strength, but especially use the lighest sheet wood available for the rear turtledeck. Check these formers all over, after mounting, with a small straightedge. Sand off bumps and high spots and build up any lows to prevent deformation of the sheeting. I used styrofoam for the nose blocks and ended up adding about a third of a gram of lead in the nose, so balsa blocks are more suitable and much tougher.

Turned foam wheels are recommended, with four or five coats of thinned white glue to seal and harden the surfaces and protect them from attack by the paint. Leading gear brace struts should be left free at one end to allow the gear to flex. After tissue and trim is on, the parts can be sealed and a little gloss put on with a light spray of Scotchguard or Krylon Crystal Clear acrylic coating. The automatic slots on the upper wing can be detailed with tissue strips instead of the 1/64-inch sheet shown, which tends to slightly alter the airfoil.

When mounting the lower wing panels to the fuselage, lay it on your building board with the nose hanging over and the landing gear pushed back against the edge. Hold in position with a rubber band in minimum tension over the deck, on pins stuck into the board on each side. Block up at the tailpost three-quarters of an inch to establish the incidence angle. Cement the bottoms of the root ribs to the longerons where they make contact, and block up tips for the dihedral. The upper wing centersection struts are built accurately over the side view. Cowl sheeting is notched to allow them to set down on the top longerons. A jig is not needed. Just eyeball to make sure they're vertical. When nearly set, the upper wing can be cemented in place and carefully aligned. The interplane struts and the rigging are functional and shouldn't be omitted. Use two-pound test nylon monofilament instead of thread, if you can. It can be tensioned with a light application of heat.

A plastic prop can be used, but you're stuck with the blade area and molded-in pitch. The prop shown is, I believe, more efficient for light models, and pitch changes can be steamed-in. Build-in some blade twist to approximate helical pitch by soaking the blades and strapping to a two-inch can at about 15 degrees forward skew and curing a half-hour or more in a 200 degree oven. Drill the shaft hole in the middle of a round, birch toothpick and pin the parts down, blocking up the blade leading edges 13/32 of an inch at two inches from the shaft, to obtain initial pitch. Lightly epoxy them together. When cured, sand the hubs to blend with the blades and to balance. Start with a 10 to 12-inch loop of 3/32-inch Pirelli or equivalent. This should be about right for power if weight is in the six to eight-gram range.

I didn't build adjustable surfaces on this one. The tail moment is pretty long and the tail feathers must be kept light. In order to get it to fly well, I had to loosen them and block-up the stabilizer leading edge 1/64 inch and cock-in just a little right rudder. My biplanes tend to wind-in easily when allowed to fly left with torque, so I make 'em fly right.

I found this Moth version to be an attractive, stable model with the scale dihedral and sweep-back in the wings. It's a good flyer in stable air, capable of an easy minute duration at the weight mine finished-out. •

Who cares if it can't outfly a Fike in Peanut competition . . . it sure is a lot prettier, and flies well enough to satisfy most anyone!

Riley Wooten and James Mears make final carb adjustments prior to a flight at the 1982 Nats.

Mike Olson starts and Jeff Johnson holds combat model at the 1982 Nats. Both modelers from Fargo, ND. Note airfoil!

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

• As we do every couple of years and used to do every single year, it is now time to be making your contacts concerning rules. Or, more accurately, to voice your opinions about the rules proposals currently wending their way through the CLCB. In this little bit on rules we aren't going to discuss specific proposals, instead the following recently came to mind while on my way to do some sport flying recently, and this is that. . .

RESTRICTIVE RULES ARE LIKE SPEED BUMPS

I'll bet you have never made that connection, have you? No problem . . . let's talk about speed bumps for a moment. You know what they are, those stupid raised ridges, usually made from asphalt. Most every parking lot has them, and in many cases, they aren't a problem, slowing traffic down some so that those afoot don't get run down. But there are lots of speed bumps that are just a nuisance; in this example it is a couple that are placed in an otherwise passable road leading to a favorite flying site through Marymoor Park in Redmond, Washington. There is absolutely no reason for these things being there. So the die-hard driver (like myself) figures out a way to either bypass them or to at least attack them in a way that keeps forward progress from being slowed. There are several ways to do this, a couple of which I will mention just to get you thinking along the same lines as myself. The easiest is to just speed up and run over them about 10 mph faster than would at first appear comfortable. Most cars have a kinda magic speed at which to hit speed bumps. When you nail it just right, the suspension gives a real quick bumpa-bumpa and you are hardly even aware of it. It is a much gentler shock to the car and its occupants than if the dreaded speed bump is driven over slowly. Of course, the funny thing is that the speed bump, designed to slow you down, has actually caused you to speed up!

Another commonly used technique is to approach the speed bump, again at a much higher speed than would seem wise, and to quickly tap the brakes just before the front tires hit the bump. The front suspension collapses from the sudden shot of braking. As the bump is run over, the suspension is on the rebound and just magically absorbs the bump itself. The actual techniques is a

Continued on page 99

Goodyear racers Barbara Pratt and Larry Dziak try the old distraction tactic at the '82 Nats. "Whacha doin' after the race?"

Goodyear racer Glenn Lee "chomps at the butt" of his cigar while opponent Frank Williams attempts to pass. Nats '82.

ARADO Ar96V

By TOM HOULE . . . Originally intended as a trim and balance test bed for a later six-foot version, this 18-inch, rubber powered scale model of a German trainer has proved a worthy flier on its own merits.

• My motive for selecting the Arado Ar96V as a 1/2-inch scale subject is somewhat unique. Dave Gibson, a long time modeling friend, formerly of Wisconsin, now living in Canton, Ohio, had challenged me to design and build a six-foot span rubber powered scale model. Bill Winter, in an editorial years ago, described the flying of such models at dusk. He described the eerie sensation of a Nieuport silhouetted by the moon as it ghosted along . . . only the prop ticking over made any noise at all. Bill, in his way, turned us both on. We knew that six to eight-foot gassies were popular in the early '40s. But rubber scale with six-foot span?

As we all know that Bill Winter never lies, the gauntlet was thrown down. "Could it be done?" sez Dave. "You bet," sez me! But before I tore into that much balsa, I thought I had better select a subject and try it out in 1/2-inch scale first. Many trim and balance problems could thus be checked out.

After searching for a long time and being heckled for delaying the challenge, I ran across Kenneth Munson's little book *Fighters of the World 1919 to 1939*. In it I found the Arado 96V prototype. Its lines and moments jumped off the page. It had the required longish nose arm and also had a respectable tail arm. The swept back wing plan would allow an aft balance point. And it was aerodynamically clean and slim with retractable gear. It seemed that with a slightly enlarged stab and fin, I would have it.

The two-view in the book was blown up to 1/2-inch scale (18 inch span) and a plan was drawn. However, before I describe the construction let me tell you a bit more about the aircraft from an historical standpoint.

The Arado 96 entered German service in 1939. By 1940, it had become a standard German trainer type. The first prototype designated Ar96V1 (civil license D-1RUU) was designed and first flown in 1936. It was followed by the V2, which had modifications to the internal cabin enclosure.

These two prototypes formed the basis for the production model Ar96A-1. This version was powered with a 240 hp Argus AS 10C powerplant. Underpowered as it was, it still possessed excellent flight qualities. The conversion to a 350 hp engine in the V3 prototype proved that only additional power was required.

Two additional increases in hp were implemented before production ceased. Production units eventually evolved into the B-1 pilot trainer, the B-2 gunnery trainer, and the B-5 (similar to the B-2 except for the addition of radio equipment).

Interestingly enough a much developed model, the Ar 396, was produced after the war in France by SIPA and in Czechoslovakia.

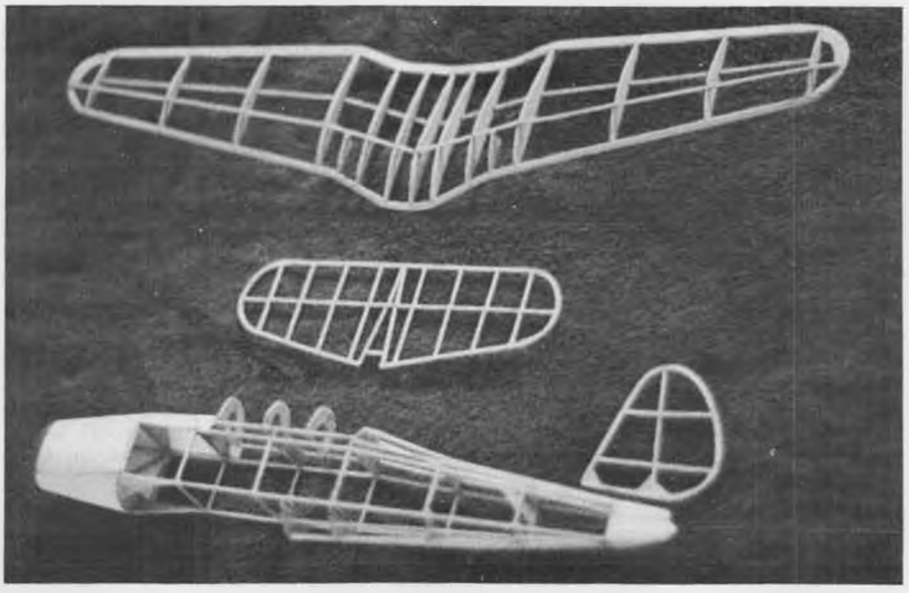
My model is built, marked, and colored as it appeared in K. Munson's book; the Ar96V prototype (probably V2) as it appeared in civilian markings in 1936. The overall color is Cub yellow. License numbers are black. The broad fin stripe is red and the swastika is black against a white circle background.

I would not rate this project as one for first model beginners, but if you have built a few stick-and-tissue kits there should not be any problems. Just don't get carried away with your glue. Most balsa wood joints will break before even a poor glue joint will let go. And please do not use R/C hard balsa. If in doubt, use the softer stuff. There is enough structural volume to enable the use of soft wood.

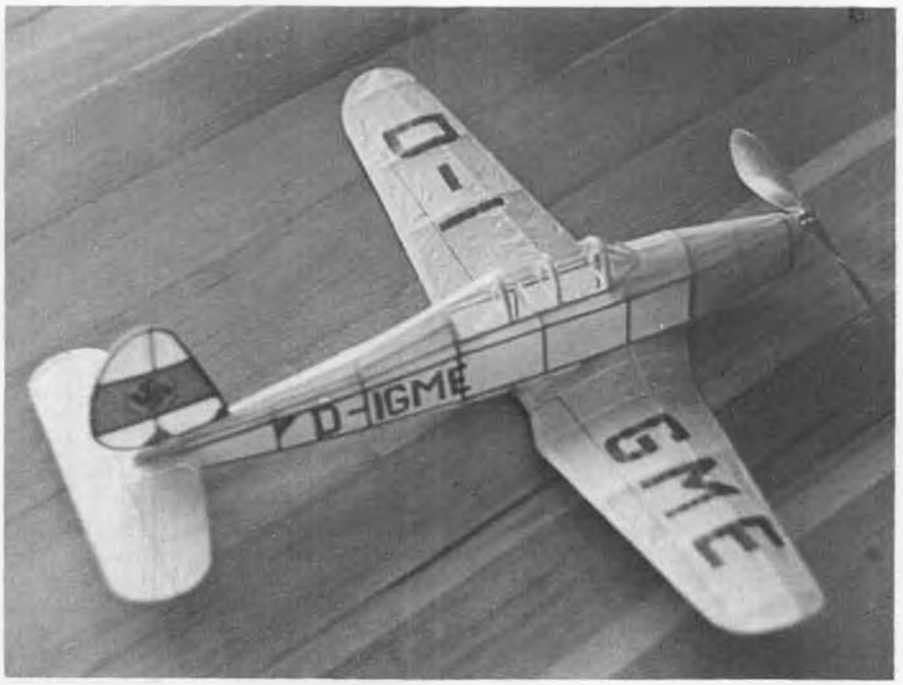
Let's start with the fin and stabilizer. Both require the soaking, laminating, and molding of two 1/32 x 1/16 strips around 1/16 balsa sheet forms. There has been much said about this process. Suffice it to say that the molded pieces should dry overnight before they are removed from their respective molds. Both the stabilizer and fin use 1/16 sq., except for the molded pieces. Pin them to the plan over clear plastic wrap and assemble in standard fashion. When dry, clean up the glue in the corners, lightly sand, and set them aside.

Now to the wings. They can be built as shown on the plans, in which case they will be plenty strong, or you can use the cracked rib method developed by the F.A.C. and others. It's faster and I think, every bit as strong, not to mention a weight saving. So try it. Just don't forget to make a 1/16 sheet internal spar, which should be located where the top 1/16 sq. spar is shown. Taper it per the front view, allowing for the 1/16 sq. ribs top and bottom.

The wing builds up in conventional fashion. Be sure to shape the 3/32 x 3/16 T.E. before attaching to the wing. If you elect to build the wheels-up version as I did, then use 1/32 sheet for rib #4, not 1/16 as the plan specifies. If you build the wheels-extended version, then the stuts are epoxied to these 1/16 ribs. The

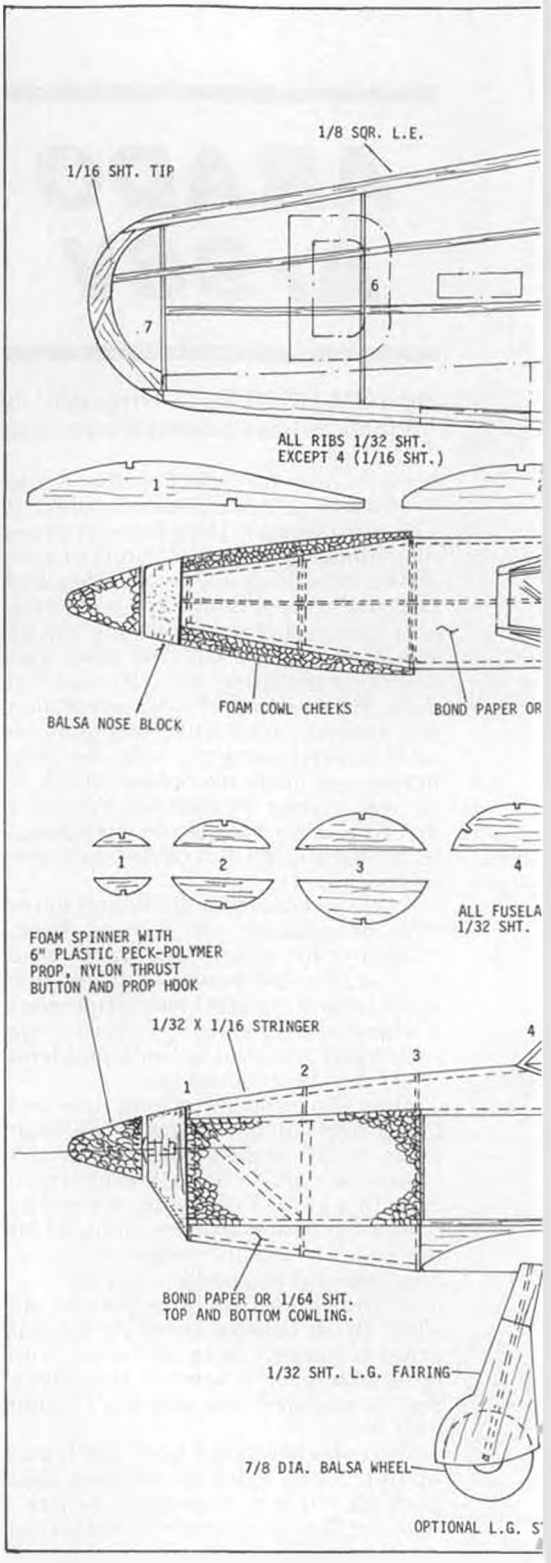


The Arado Ar96V all framed up, ready to cover.



The Arado Ar96V covered and ready to fly.

FULL SIZE PLANS AVAILABLE – SEE PAGE 104



license letters, aileron, flap and trim tab outlines are drawn in ghost lines. The license letters appear both top and bottom. Block up one wing 2-1/4 inches with the other securely pinned to the plan. This will give you the correct dihedral angle. Glue and let sit overnight.

The fuselage (what I like to build best) is a basic box with top and bottom stringers plus bond paper and foam forward of the wing. Sort of sounds like a craft project, doesn't it, what with foam, paper, and stringers? Start by laying out the two 1/16 sq. fuselage sides. Build them both over the plan, one on top of the other, separated by a piece of plastic wrap. That way they come out the same.

When the sides are thoroughly dry, separate them and erect the sides upright over the top or plan view. I always pre-cut my cross-members in pairs and have them ready to install once the two sides are in position. Install the cross-members and square up the structure. While you are waiting, clean up your finished wing assembly. It's probably loaded with little glue webs and the leading edge needs to be rounded off.

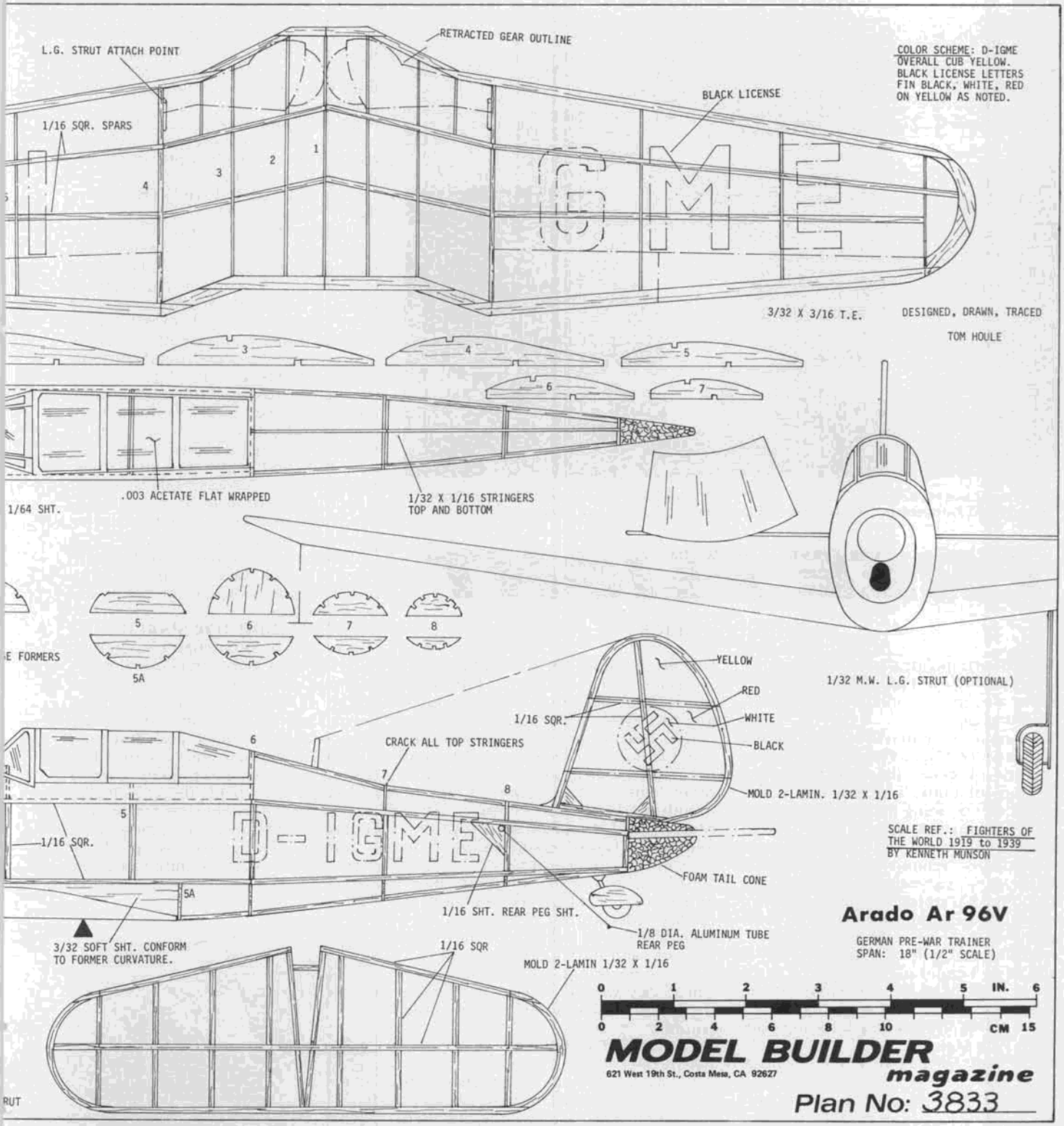
The addition of the formers rounds out the basic structure. Add the 1/32 x 1/16 top and bottom stringers and the foam cheek cowl blocks to the fuselage front sides. I use foam from ordinary meat trays plus whatever blocks I can pick up in the local hobby shop. Sand lightly with fine paper and it will shape beautifully. For much handled areas, coat the foam with Tite-Bond or Sig-Bond to form a smooth, hard shell. The tail cone is also foam. Cut it carefully to ensure the correct stab angle. The stab could be set perhaps another degree negative but not positive! I had to warp in just a touch more negative than shown. Coat the cone with a light film of Tite-Bond.

Cover the fuselage front, top, and bottom with white bond paper. Due to the top curvature, you may have to use two pieces. I did. If you can vacu-form the canopy, fine. It is ready to install. Be sure to install it before the tissue. That way it looks like it fits rather than being stuck on as an afterthought. If you don't have vacuum forming capability, then do what I did. Make two 1/32 sheet bulkheads from the front view to match the cockpit profile. Then flat wrap .003 acetate over each canopy section. A pattern is shown for the odd-shaped rear glass. You could also laminate these bulkheads from 1/32 x 1/16 strip over a form. Finish off the canopy with strips of bond paper covered with yellow tissue to simulate the canopy framing.

Prepare the nose block from a piece of scrap balsa. Allow at least a 1/8 inch deep nose plug to fit into the fuselage. This helps the nose block stay put when the rubber runs out. I have always used the Peck-Polymer nylon plastic thrust buttons. These are set up for 1/32 prop hooks and assure a low friction drive from rubber to prop. Cough up a couple of bucks and mail to Bob Peck for his latest catalog. It is well worth the money. Many wondrous things are in there awaiting the beginner's pleasure in rubber scale (including the 6-inch prop you'll need).

This completes the fuselage. If you have not shaped the cheek cowl foam blocks yet, do it now. *Do not use balsa here.* Unless you buy the lightest indoor grade, you will end up nose heavy. Mine balanced perfectly with the foam cheeks.

To match the Cub yellow of the prototype, I located a tissue in our neighborhood stationary store that was close. An airbrush and Flo-Quil Reefer Yellow would be even better. Work with whichever you have. The entire plane is covered with this tissue, except for the strip of tissue on the fin between the upper and lower cross-members. For this I used red tissue with an opaque white enamel circle painted on per the plans. Prior to applying the red tissue, I pressed on a black swastika cut from Zip-a-tone flat black film. The advantage of this stuff, available from art stores, is that it can be positioned directly over the plan and the swastika pattern lightly traced onto the film. It is then easily removed from its waxed backing and



burnished with a smooth blunt tool onto the circle.

The effect is striking when the bright red strip with its white circle and black swastika are placed on the yellow fin. The license letters are cut from the same film and pressed in place with the tissue held over the plans. By cutting generous sized tissue pieces, one can position the licensed tissue on the wings and fuselage where they are supposed to be. I used thinned white glue to attach all tissue.

Shrink the tissue with a light and fine atomized water mist. None of my subassemblies warped to any extent in spite of not pinning anything down. Note that the wings are covered before they are glued to the fuselage. Once the covering is taut, glue the wings in, checking to ensure that the dihedral is symmetrical and the wing incidence angle is correct. Do not let the leading edge be any lower than shown. If anything, it could be raised perhaps 1/64 to reduce rocket-like flight tendencies. More on that later.

With the wings in place, fill in the front and rear fuselage saddle openings with 1/16 sheet in front, and bond paper for the two aft openings. If the landing gear struts were installed, add the 7/8-inch diameter balsa wheels and 1/32 wheel covers. The struts, incidentally, are 1/32 music wire and are formed per the front view.

Before you rush off to your favorite gym or outdoor flying site, take a few minutes to let the one coat of thinned dope dry, and check for any warps,

Continued on page 100

Dick Covalt and his 535 sq. in. "Son-of-Pearl", with K&B 3.5, covered in red Micafilm. Took 1st at Wright Patterson in "B", less than a max short of Cat III record. Murphy photo.

FREE FLIGHT

By BOB STALICK

• Potpourri (po' poo re') n. 1. a mixture, as of spiced flower petals in a jar, used to scent a room. 2. a medley; sometimes, an anthology.

Potpourri describes this issue of **Model Builder** Free Flight. However, it is not a mixture of spiced flower petals, but a mixture of things free flight. It is the result of not being an active free flight writer for several years, and the need to re-establish some old connections in order to get the latest in front of the loyal readers. You can help future issues from becoming a potpourri, by dropping your latest experiments . . . or at least pictures and descriptions of them . . . into the mail to **Model Builder.** Now is the time. I could use your help.

As a result of the November issue, where I wondered "whatever happened to. . . ." I received some interesting mail. First, Pete Sotich:

". . .Well, Pete Sotich is very much alive and . . . has been gainfully employed. I have done considerable traveling since retiring from model aviation in October, 1974. I see all of the home games of the University of Notre Dame and the Chicago Bears. I still read all of the main model airplane magazines and am therefore well aware of what's going on in a truly great hobby.

". . .It was my good fortune to be involved with five FAI Free Flight World Championships in one capacity or another, as well as 28 national model airplane championships, as anything from a contestant to a contest manager. . . . I have been in very good health and hope that my good health will continue. I do miss the many friends that I made while involved in model aviation.

"Again, many thanks for the good words about me. So long and continued success to you. . ." Pete Sotich.

The neat engineering penmanship was still there . . . I knew it was Pete, and it was great to hear from him again. The other letters that came were from old friends, Carl Fries, Lars Olofsson, Harry Murphy, Bob Meuser, Dave Linstrum, and others. It was a good feeling to be back in the saddle again.

Along the line of "whatever happened to. . . .," J.C. Deck sent along a Spitfire timer just for old time's sake. I spent a little time trying to get the things to work, and then I gave up on it. . . I guess some things aren't around because they weren't the greatest when they were all that was. Well, on to the column.

DARNED GOOD AIRFOIL . . .
NACA 6409

It's always a bit humbling to think that you have covered all of the subjects . . . the definitive work on a topic, and then to discover some serious and obvious omissions. When I put together the Darned Good Airfoil compendium recently, I found some of those omissions. Beginning this month, I'll be filling in the holes.

This month's DGA is the NACA 6409. Gerald Ritz described it as the champion model airfoil of all time. This airfoil has a good lift/drag ratio of low Reynolds numbers, is reasonably stable and consistent in rough weather, and has sufficient thickness for a rugged construction. This section has been used on the model that has been my most successful gas ship in the last 10 years . . . the Dixielander. I like it. It's been used on all kinds of ships, including Wakefield and Nordic models. Although it's a bit on the thick side for contemporary gas models, it still holds its own.

If someone out there can send me a copy of the Goldberg G-5, with the coordinates, I'd really appreciate it. Are you reading this, Carl?

THREE-VIEW OF THE MONTH . . .
Norm Poti's Niblet 4

Thanks to Harry Murphy, editor of the *CIA Informer*, one of the best free flight newsletters published today, I received this advanced scoop of Norm Poti's Second Place winner in FAI Power at the Team Selection finals, held last year at Taft, California. Norm's model has some interesting features not found currently on state-of-the-art F1C ships, notably the built-up fuselage. However, current trends do stress placing the weight concentrations near the CG, which means that a lightweight fuselage rear, wing tips and the like are a good thing. Midwest flier Gil Morris utilizes similar structural techniques in his "Toothpicks" design. Norm's Niblet also incorporates a model finder device . . . a battery operated buzzer which is activated at launch. Take a good look at this month's three-view to find other unusual features.

MYSTERY MODEL FOR MARCH

Way back in 1963, when I was getting back into free flight after several year's absence, I was surprised to see the size of the 1/2A models that were being flown. The rules at the time allowed for a 15-second hand launch and 20-second VTO. With the new and powerful T.D. 049 engine, models kept getting larger and larger until fields became smaller and smaller. This ship represents the kind of model flown during those times . . . 420 sq. in. wing. 10 oz. weight, huge stab, etc., etc. With its undercambered

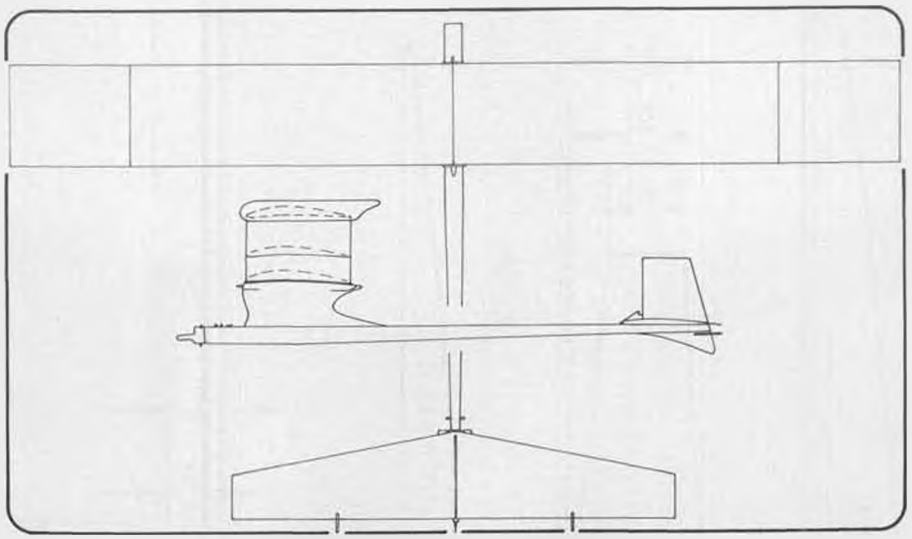
Neat Hutchinson "Maverick", by Russ Hansen, of Troy, Michigan. Murphy pic.

airfoil, it was obviously built for the glide. If you can name this California 1/2A giant, and if you can be the first one in line with the correct (earliest postmark, that is), Bill N. will send you a free subscription to my favorite magazine.

KOSTER'S DIGITAL TIMER
for F1A (Nordics)

For our readers who keep up with current trends, the fact that World Champ Thomas Koster is producing a digital timer comes as no surprise. Thomas has been experimenting with such gadgetry for years. This version is now available for sale. It can be set for time increments of 6 seconds, weighs 17.5 grams, and measures 66x18mm across the front plate. It is 14mm deep and takes a rechargeable battery that weighs another 17 grams. Dave Rounsaville writes that the price of $55 includes the timer and a rechargeable battery. The battery life is enough to allow 800 to 1000 actuations. Thomas is also readying a battery charger that should be available by the time you read this. The cost of the charger is to be around $25.

I don't have a picture to illustrate this wondrous device, but you can get the real thing by ordering from: Koster Digital Timers, Postbox 54, DK-3400 Hillerod, Denmark.



MARCH MYSTERY MODEL

For those of you who have had glider flyaways due to a poorly functioning d.t. timer, you can eliminate that excuse from your repertoire if you fly with the Koster timer. It should work well for Wakefield as well, I believe.

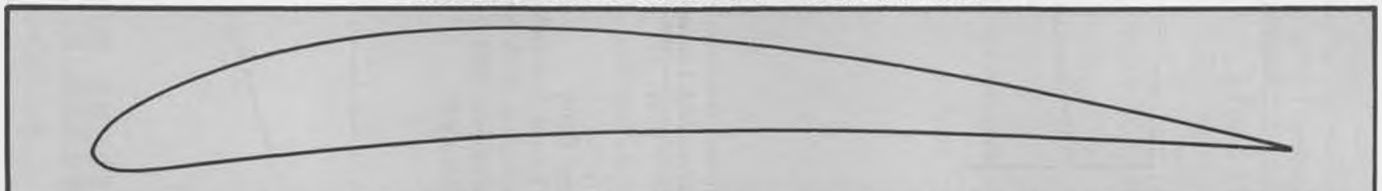
NEW KITS FROM FLITE RITE MODELS

Several years ago, **Model Builder** Free Flight featured a three-view of Phil Hainer's Kwik Flip 18 HLG model. Now, Phil has kitted this ship, and two others, under the manufacturing name of Flite Rite Models. The three ships are intended for relative newcomers to the

Old pictures never die! Bob Sifleet launches FAI Power model at mid-1970's FAI meet in New York.

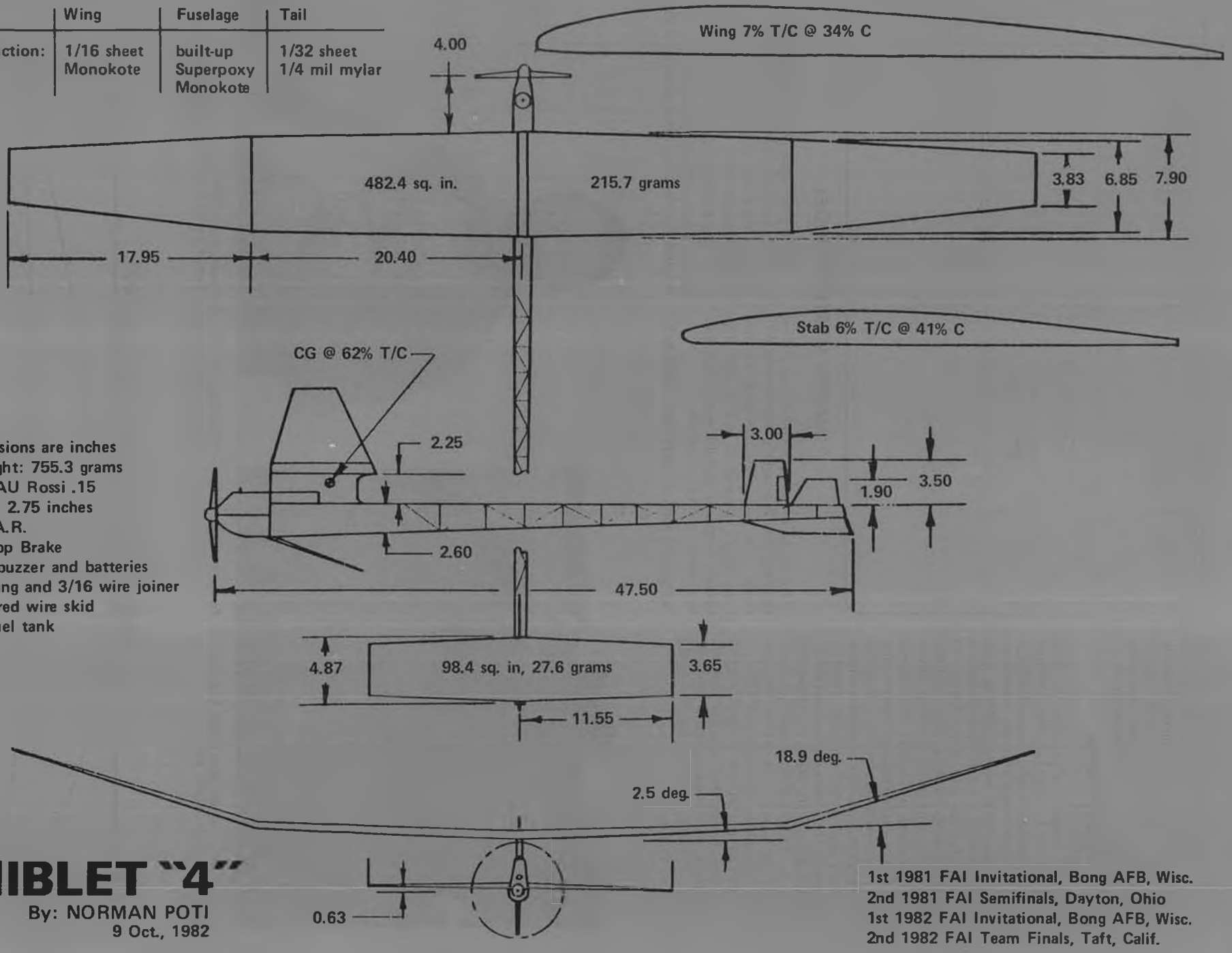
"Gumbandito" Tom Cashman, editor of *Bat Sheet*, with his latest rubber model, perhaps a prototype for a new Wakefield. Collins pic.

DARNED GOOD AIRFOIL – N.A.C.A. 6409



STATION	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
UPPER	0	2.06	2.96	4.3	5.42	6.31	7.78	8.88	9.65	10.13	10.35	9.81	8.78	7.28	5.34	2.95	0.09
LOWER	0	-0.88	-1.11	-1.18	-1.08	-0.88	-0.36	0.17	0.69	1.12	1.65	1.86	1.98	1.76	1.36	0.74	0.09

	Wing	Fuselage	Tail
Construction:	1/16 sheet	built-up	1/32 sheet
Finish:	Monokote	Superpoxy Monokote	1/4 mil mylar



NOTE:

1. All dimensions are inches
2. Total weight: 755.3 grams
3. Power: AAU Rossi .15
4. Prop.: 7 x 2.75 inches
5. V.I.T. & A.R.
6. Mattes Prop Brake
7. Location buzzer and batteries
8. 2 piece wing and 3/16 wire joiner
9. 3/16 tapered wire skid
10. Pacifier fuel tank

NIBLET "4"

By: NORMAN POTI
9 Oct., 1982

1st 1981 FAI Invitational, Bong AFB, Wisc.
2nd 1981 FAI Semifinals, Dayton, Ohio
1st 1982 FAI Invitational, Bong AFB, Wisc.
2nd 1982 FAI Team Finals, Taft, Calif.

Norm Poti at Sept. '82 FAI Finals, Taft, California, with three-view model of the month, Niblet.

"When I reached middle age, I thought tennis would save me. Then I thought fishing would save me. Then I thought religion would save me. Then I thought weight watchers would save me. But year after year, decade after decade, the only thing that saves me is modeling."

field of free flight, and newcomers who are interested in winning designs. Two of them are hand launch gliders . . . the Kwik Flip Jr., and the Kwik Flip II. Both feature tapered wing stock, and high quality print wood parts. In addition, each comes with excellent full size plans and complete instructions on how you can build and fly a winner. Very complete kits of very excellent models. The Jr. has a span of 13-1/2 inches, and the II has a span of 18 inches. Phil Jr. holds the current Open HLG outdoor record with his, and young Tim Bartel won the N.W.F.F. Champs Junior HLG event with the Jr. version.

Also from the stables of Flite Rite comes the Fun Bird "30", a nifty P-30 ship that is reminiscent of those older 1940's type rubber models. Excellent wood quality is featured throughout the kit. Print wood parts, real Japanese tissue covering materials, all wire parts, and 10 grams of FAI rubber to fit to the plastic propeller that is provided, give a complete kit for the newcomer and old timer alike. Again, complete and well illustrated plans and flight instructions are included. These should be available from your dealer, but if not, contact Phil Hainer at Flite Rite Models, 23401 104th S.E., Apt. 35, Kent, WA 98031.

Well, as this is being written during the Thanksgiving holidays, it is difficult to imagine that it will be read just before the Valentine's Day holiday. Here in the Northwest, February means that the indoor season is in full swing, and that the outdoor season is just ready to get underway with the annual Misery Meet. As **Model Builder** now has a full time honest-to-goodness indoor column, I will attempt to stay away from that phase of free flight. That means only outdoor stuff from me. So, next month, look for an easy-to-build P-30 model from my Canadian buddy, Bill Giffen. In the meantime, stay loose and build something for the 1983 outdoor season . . . it's nearly here. ●

NFFS MEMBERSHIP AND RENEWAL APPLICATION

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NFFS
707 2nd Street
Davis, CA 95616

Make checks payable to the National Free Flight Society

Subscription rates include annual fee of $ 50 for membership in the National Free Flight Society. The balance of the fee in each category is for subscription to FREE FLIGHT, the NFFS Digest. Subscriptions are not available without membership.

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Age 18 & under	1 yr. $7.50 ($ 50 membership fee plus $7.00 subscription)
	2 yr. $13.50 ($1.00 membership fee plus $12.50 subscription)

Subscriptions are not available without membership.

Ages are as of July 1 of the current year. Please circle applicable fees.

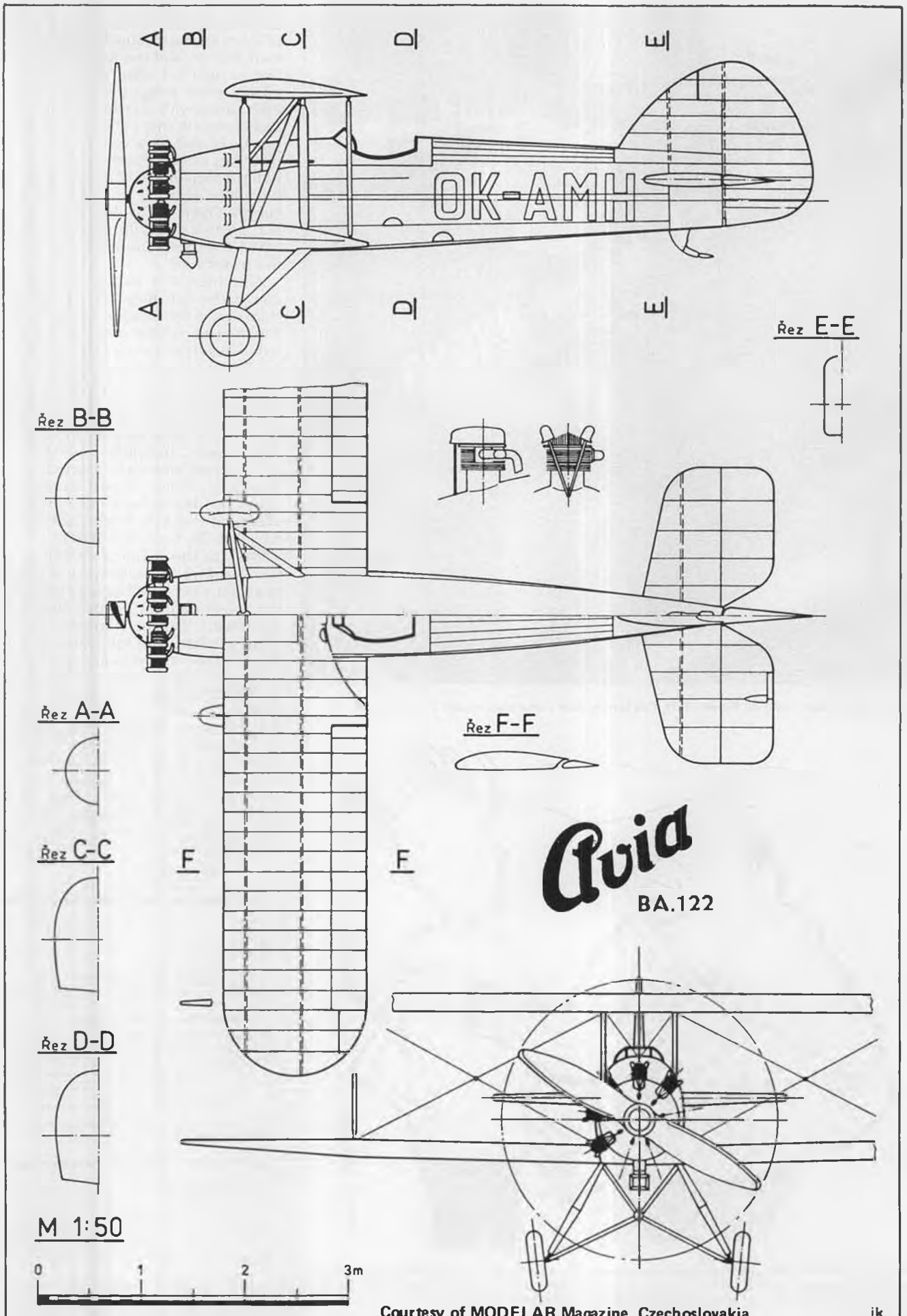
New member ☐ Renewal ☐ Address change ☐

Current expiration date: Mo. _____ Yr. _____

Name _____ AMA # _____

Address _____

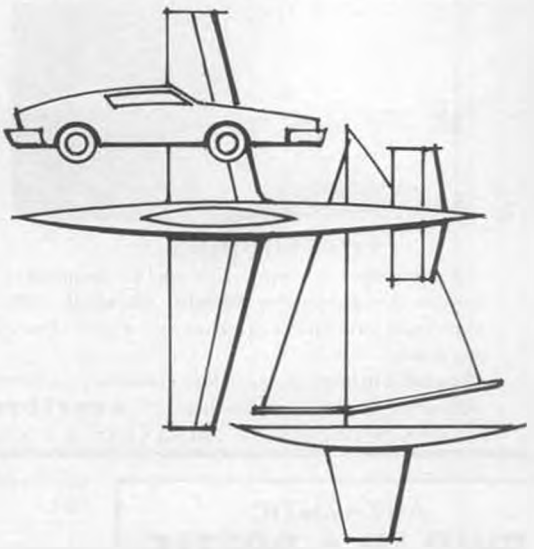
City, State _____ Zip _____



Courtesy of MODELAR Magazine, Czechoslovakia

jk

WRAM SHOW '83



Don't miss the greatest Radio Control Show in the East at the Westchester County Center, White Plains, N.Y. It's our 15th annual show and it's sure to be the biggest and best ever!

This year's WRAM Show is going to be the largest yet. Well over 150 manufacturers and other exhibitors have already signed up to bring you everything that's new in the hobby ... kits, engines, radios, accessories and everything in between. And, our famous Swap Shop will be in full operation with thousands of items, including built-up planes, almost new radios, engines and on and on and on with something for just about everyone.

ADVANCED TICKET SALES

Save time ... avoid long ticket lines — contact Ed Alexis, 1587 Central Park Ave., Yonkers, N.Y. 10710. 914-337-6632.

STATIC COMPETITION

Make sure your latest creation is finished up and polished so you'll have a chance to take home one of the dozens of trophies to be offered in these events:

- WWI
- POST WW I (Military)
- POST WW I (Non-Mil.)
- PATTERN
- SPORT BIPLANE
- OLD TIMERS
- SPORT
- GLIDERS
- HELICOPTERS
- SCALE R/C BOATS
- RACING R/C BOATS
- STAND-OFF SCALE
- JUNIOR EVENTS
- RC CARS up to 1/8" scale
- RC CARS over 1/8" scale
- BEST-IN-SHOW

Judging takes place Sunday afternoon. Entries accepted until 12 Noon Sunday.

Special admission area will be provided on both days for static display contestants with built-up models.

Registration of models will start at 8:30 a.m. each morning.

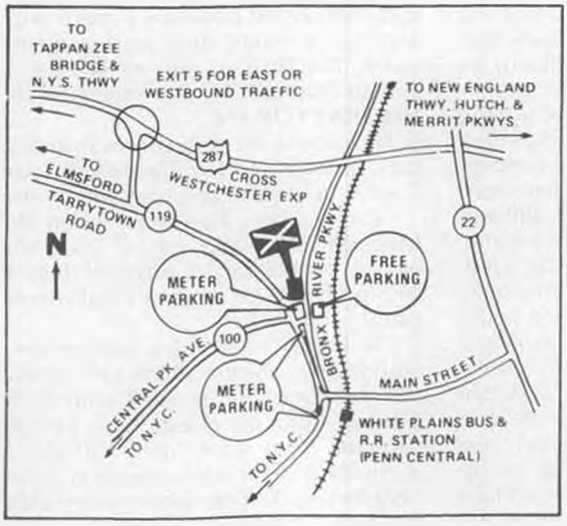
SWAP SHOP

The WRAM's Swap Shop has become one of the major show attractions with thousands of individual items changing hands. To help eliminate "registration crush," the Swap Shop will provide for preregistration forms. To receive these forms send a self-addressed stamped envelope to: John Isbister, 4 Devon Rd., Larchmont, N.Y. 10538.

SPECIAL NOTE

This year there will be no restrictions in the number of built-up models a registrant may place in the Swap Shop.

For further information, write to: Hank Nielsen, 56 Chadwick Rd., White Plains, N.Y. 10604 (914) 761-5998.



The Westchester County Center is centrally located in the city of White Plains, N.Y., at the intersection of Rt. 119, Central Park Ave., and the Bronx River Parkway. White Plains is just 22 miles north of N.Y.C.

WESTCHESTER RADIO AEROMODELERS, INC.

February 26/27

10 A.M. to 6 P.M.

One -40 . . . . . *Continued from page 11*

so that we could better assess their thoughts. I also received letters and telephone calls from racing organizations in various parts of the country, plus a personal call from Bill Northrop, of this magazine, all in response to the interest generated by our GRAND EXPERIMENT.

Many modellers not previously interested in 1/2A Pylon, Quickie 500, or Formula One, have shown a tremendous enthusiasm for this event. I feel it is possible that this event could become the single most important racing event in the Northeast, as it can be flown at virtually any flying field now able to accommodate 1/2A Pylon and Quickie 500.

In the Northeast, we are plagued by problems perhaps not found by clubs in the Southwest and West. There are severe noise restrictions at almost every club, and a majority of clubs are without the necessary room to run a standard Formula One meet. Formula One-40 was conceived as a method of getting around some of these difficulties. The event has proven itself to have all the excitement of Formula One, without the excess speed, noise, and expense that seems to limit Formula One in our area.

P.R.O., Pylon Racing Organization, is a group of racers organized to promote pylon racing, standardize rules and changes for events, and to schedule racing dates so as to eliminate conflicts in the contest schedule between clubs in District One. When I originated the event, I had hoped P.R.O. would recommend that one or two races would be held in the 1983 race season. However, much to my surprise and because of the overwhelming interest in our area, the P.R.O. racing schedule will include **seven** Formula One-40 races as part of the 1983 season.

It is my hope that this event will bring back the intent that I feel was originally envisioned by Pylon Racing Originator, Jerry Nelson. I and a fellow modeller will be making a proposal to the NMPRA and the AMA for a new and totally separate racing event, but I would like to give a brief run-down on the rules that we used for the first race, in the hope that racing groups or clubs would like to try this before the proposal comes out.

As far as the airplane goes, we use the basic Formula One rules that determine airplane type, wing area, etc., except for minimum weight, which has been lowered to four pounds. We allowed only the K&B baffled piston engine, Series 4011 or 8011 (stock) to be used. We also required a stock commercially made muffler, except no device could be used that increased the r.p.m. of the engine; i.e., tuned pipes, Magic Mufflers, etc. Any commercially available wooden propeller, modified on one blade only for balance purposes, was allowed. Also, the sponsoring group supplied the 15% nitro, commercially available fuel. The course flown is the Standard Quarter Midget.

There are many good Formula One airplanes currently on the market, all of which will not tax the average modeller's building skill or his pocketbook. They can be constructed relatively quickly for this event, as they do not require the excess strengthening with 3/4 oz. glass cloth and extra building steps normally required for the standard Formula One event; i.e. less speed. In fact, many of the contestants who constructed airplanes specifically for our event, covered wings and stabilizers with MONOKOTE or ECONOKOTE and only painted the fuselages.

I am including with this article a list, courtesy of Pete Reed, of Connecticut, of kits currently available.

It is my hope that people interested in racing will try this event. I myself have been involved in 1/2A Pylon and Quickie 500 for a number of years now, but never became involved in Formula One for various reasons which I won't go into now. I strongly feel that the Formula One-40 is the event for everyone now interested in racing, about to be interested in racing or even some scale modellers. There is something sexy and beautiful about the look of a Formula One airplane as it goes streaking around the course. It has in my case renewed my interest in pylon racing, as I was getting very tired of the ugly looks of the Quickie 500.

I hope any modellers who are interested in this event will correspond with me and will give me their thoughts or perhaps the results of any races they put on, as I would like to see this event run all across the country and grow and prosper in a way that I think that Jerry Nelson had originally hoped Formula One would. •

R/C World . . . *Continued from page 13*

fly by the Rockland R/C Club, which had a seaplane meet for the members at Congers Lake, which is in New York state. The Ho-Cat flew like a dream . . . took right off in a few feet, and in a docile manner, cruised around the lake. I was absolutely amazed. Everyone else had floats on 60-powered pattern ships, and had a rough time getting off the water. The Ho-Cat, with its lifting wing and an inverted .19, was envied by all."

HOORAY FOR PM

An interesting story comes from Bud Gay, Bristol Hobby Center, Bristol, Connecticut, who also took the photos.

"Know what happens when PM Magazine *calls and asks if your club would be willing to provide demonstration flights for their nationally syndicated program?*

"With only a week's notice, on a working day, frantic phone calls to all of the members of Central Conn. Radio Control Club. Big question . . . can you take off from work for a half day to participate? Be at the Farmington, Conn. field by two o'clock, with a decent plane ready to fly? A lot of, 'Gee I don't know if

the boss will let me off just to fly model airplanes,' kind of answers. So we are in a fog as to how many can really show for this once-in-a-club-time opportunity.

"Well, we showed up at one o'clock with our rudders crossed, hoping for the best. Wouldn't you know it, the egos took over. We had the biggest showing of flyers ever to visit the field at one time, and models that some of us had never seen before. A team effort if there ever was one.

"PM Magazine was not that prompt. They showed up at four o'clock for a two o'clock appointment. Nobody dared leave the area and sweated out the two-hour delay. When they did show, it was apparent they meant business. Very well organized. They had a meeting and told us what they wanted. Close-ups, fly-overs at low altitude, and right into the cameraman's face, plus little other things like balloon busting, inverted at two feet off the turf!

"It took two hours of consistent flying by the members to come up with seven minutes that were actually used on TV. Flying conditions were good but cold. Lady Luck allowed every one to take home their planes in one piece.

"The finished tapes were shown on the regular PM national production, and then re-run on a bunch of kiddy shows all over the country. All in all we were elated and kind of proud to be selected for this presentation."

HOBBYPOXY OMT

That concludes the 425th episode of "John's Other Knife", and next we bring you installment Number Four of the series with the world's longest title, *HOBBYPOXY COLOR MIXING FORMULAS FOR THE SCALE MODEL BUILDER*, sponsored by Pettit Paint Company, Inc., makers of Pettit 'Hobbypoxy', and also sponsored by the last two words of the title!

"This time we have three colors to offer, which will begin a series of Royal Air Force colors. The formulas presented this month are for aircraft in action during the early stages of World War II, 1940 to 1941, which includes the Battle of Britain. Most Hurricanes and early models of the Spitfire were finished in these colors. The upper surfaces were painted DARK EARTH and DARK GREEN and the lower surfaces were painted SKY TYPE 'S'. Here are the formulas:

DARK EARTH — *4 parts H65 Bright Red, 2 parts H49 Cub Yellow, 1 part H81 Black and 1 part H70 Gray.*

DARK GREEN — *6 parts H66 Dark Red, 2 parts H33 Stinson Green, 1 part H49 Cub Yellow, 1 part H81 Black and 1 part H10 White.*

SKY TYPE 'S' — *5 parts H10 white, 1 part H26 Lt. Blue and 1 part H70 Gray.*

"The reference source used to develop these RAF colors is BRITISH AVIATION COLOURS OF WORLD WAR TWO, published in 1976 by Arms and Armour Press, 2-6 Hampstead High Street, London NW3 1PR.

"The book was very generously loaned to us by Claude McCullough, who was instrumental in getting this color matching project started in the first place. We do not know if the book is still in print in England.

"Next month we'll have formulas for German aircraft camouflage of this same early period in the war, for builders of Messerschmitt Bf 109 E models who want to refight the Battle of Britain.

"Following that, we'll return to RAF colors for the later stages of the war and then Luftwaffe colors of the same period." •

Electricus . . . . *Continued from page 15*

braces, and the two center ribs in each panel.

12. Now add the top sheet and cap strips to the panel that is flat on the board. When complete, pin the other panel to the board and sheet it. The wing is now complete except for final sanding. Put the wing some place where the cat won't get it, and we'll build the fuselage.

BUILDING THE FUSELAGE

This is the easiest box you'll ever build, if it takes you more than an hour, you paid too much attention to those Charlie's Angels reruns.

1. Pin the fuselage sides to the board, bottom facing bottom. This ensures that you build a left and right fuselage side. Now mark the locations of the two formers.

2. Glue all the longerons in place.

When dry, sand the longerons at the tail so they come together as shown in the top view.

3. Notch both formers to accept the pushrods and whatever clearance for wires you might require.

4. Place the fuselage sides right side up on the board, longeron side in. Place both formers in location and pin the tail together. Check to see that all is square. If everything lines up hit it with the "instant sticker."

5. Note the fuselage sides overlap the outside of the nose block approximately one inch. Not mentioned earlier, but important, is the fact that final shaping of the inside of the block must be done after the block is glued in place. If you attempt to fit your motor before the block is glued in place, you'll find that it splits easily. Glue the nose block in place. Before shaping the fuselage, fit the motor and motor tube to the block. Make sure there is no up or side thrust. Two degrees down thrust is okay. It's a good idea to add 1/16 inch balsa scrap to the front of the fuselage sides, as it aids shaping later.

6. Glue the pushrods in place.

7. Add the 1/16 plywood floor and the 1/16 balsa top and bottom sheet.

8. The fuselage is now complete except for sanding to shape. If you have a broken motor, put in position with a 1-1/2 Goldberg spinner mounted in place. If you are using the motor you intend to fly the plane with, put tape over all entrances to the inside of the motor. Now sand the daylights out of the fuselage. The object is to blend the box fuselage shape into the spinner, and round the corners.

Let's build the tail surfaces. As the Electricus is not a flying wing, we have to have something stuck on the back to control pitch and yaw. Build the tail surfaces flat on the plan out of 3/16 thick materials. Note the photos show the built-up elevators I originally used. However, I substituted sheet for the elevators on the plans because the built-up ones are so much fun to sand, cover, and try to keep from warping. When the structures are dry, sand them to something resembling an aerodynamic shape, and put them aside. Don't sand the surfaces too thin, you don't want them to flutter.

FINAL ASSEMBLY

Make sure the entire model is finish sanded. Now glue the 1/8 plywood wing screw mount in place inside the fuselage. Place the wing on the fuselage and check the fit between the wing and the fuselage. If the fit is not good add wood, or subtract wood with a sanding block. Be careful that you don't change the incidence. Holding the wing carefully in position, drill through the front former into the wing with a long 3/16 drill. Glue the 3/16 dowel in place. Add the plywood reinforcement on the top of the wing. Now carefully line up the wing and drill through the wing and wing mount with a 1/8 drill. If everything looked good, open up the hole in the wing to clear an 8-32 nylon bolt and tap the plywood plate for the same.

Now build the canopy frame out of 3/16 scrap stock. If you want to, you can form your own canopy out of plastic, find one that fits, or order one from me. Instructions for ordering will appear at the end of the article. Anyway, trim the canopy to shape and glue to the balsa frame. Check that the tail surfaces mount square on the fuselage in relation to the wing. If everything looks good, cover the entire airframe with Super Monokote. Make the wings and tail a bright color for visibility. Now hinge the tail surfaces. Note you'll have to join the elevators with a piece of wire first. I like to use Rocket City Nylon Hinge Strip for my hinges. It's very simple to cut to shape and use. Don't use pin-type hinges on built-up surfaces under 1/4 inch thick. You have to remove so much material for hinge clearance that a shear point is formed, allowing damage that is very difficult to repair. Place the wing on the fuselage again and bolt in place. Now pin the tail surfaces in place, make sure the tail and wing are in line and square, and then glue in place. Add the control horns to the elevator and rudder and make up the tail end of your pushrods.

EQUIPMENT PLACEMENT

The following is my method for proper placement of the balance point without the necessity of adding ballast. It is applicable to any electric model, and for that matter, any conventional model that is not already too tail-heavy for the equipment to make any difference. As already stated, the Electricus 205 was designed for maximum performance from an 05, six-cell system. Because the airframe is small and light weight, to meet the performance criteria, you must also use a radio that has a small airborne system. If you are trying to stick a Heathkit GD47 in this thing, I feel for you, because it ain't gonna work! However, any modern equipment should at least shoe horn in place. If you don't have small equipment, and cannot afford a miniature airborne, make wider formers while building the fuselage to accommodate the bulky equipment. Note some performance will be lost.

Now back to the task at hand. Mark the balance point location shown on the plans, onto the fuselage. Put the prop and spinner on your motor and place in position in the motor tube. Place the motor battery pack in the back of the cabin area, as shown on the plan. Now place the servos and receiver, and battery pack in place, and check the balance. Rearrange your equipment until the Electricus balances properly. Now check that the servos move the right direction for their usage and mount your equipment in place. I use one inch rudder throw each way, and 3/8 inch elevator throw, each way. Set

THE LT50 FLIGHT SYSTEM: POWER TO SOAR TO NEW HEIGHTS.

The Miracle of Electric Flight.

We made practical, clean and economical electric flight a reality.

And, contrary to popular belief, we accomplished it over ten years ago.

Leisure Flight Systems have provided reliable electric power for all kinds of intriguing model aircraft, from agile pattern planes to gear-driven, converted Old Timers.

Best of all, Leisure Systems have the power and performance to make electric flying both challenging and exciting.

Modular construction makes the new Leisure LT50 a better motor . . . easier to maintain, modify or re-magnetize. Other outstanding features include machined case and end bells, precision brush tubes, shunted brushes, sealed ball bearings and adjustable timing.

The Leisure Playboy is an extremely stable sailplane, a perfect kit for beginners and contest flyers alike. Scaled from the winning free flight original of the 40's, our 67½" span Playboy is already 3-for-3 in Old Timer competition.

With Leisure's Gear Drive conversion (3:1) the powerful LT50 develops up to 2 lbs. of static thrust. Gear Drive also features ball bearings. Delrin/brass gearing and glass loaded polycarbonate housing.

Stunning Pattern Performance.

A good demonstration of our potent new LT50 Flight System is the performance of our prototype "Shoestring."

A ½A-sized, 34 oz. pattern plane, the "Shoestring" flies for up to 10 minutes on a single charge and can easily complete the AMA class A routine.

Leisure 109 Digital Charger. Gets the most from every charge with ±1% accuracy.

With limited sites and rising fuel costs, the electric RC pattern class could well be the wave of the future.

Leisure's LT50. 2nd Generation Electric Powerhouse.

One big reason for the phenomenal performance of the Leisure System is our exclusive LT50 ball-bearing motor.

Superbly engineered, the modular LT50 features removable light alloy end and brush caps for easy maintenance. Machined to precise tolerances, both caps are anodized black and air-vented for optimal heat dissipation.

Inside, the LT50 puts coil spring-loaded, shunted brushes up against the commutator in precision brush tubes to eliminate power loss and allow accurate timing.

Two LT50 armatures are available; our high-torque Pattern wind for direct drive applications and the high-speed Competition wind for gear drives.

Complete systems for both versions also include wired 6-cell NiCad batteries (7.2v/1200mAH), switch harness and prop adapter.

The Great Glide Off.

The Leisure LT50 also makes the perfect launch system for all kinds of radio controlled sailplanes.

In fact, soaring couldn't be any simpler than with reliable, convenient electric power.

That should explain the overwhelming popularity of Leisure Flight Systems for both direct and gear drive sailplanes at the 1982 Grand Championships.

Another favorite of the event was our newly-kitted Playboy Old Timer.

Finalists at Leisure's First Annual Grand Championships show off their sailplanes.

Discover exciting electric flight for yourself. Send a self-addressed, stamped envelope for our latest catalog and technical bulletins.

Leisure

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THE SECOND ANNUAL LEISURE ELECTRIC R/C GRAND CHAMPIONSHIPS WILL TAKE PLACE ON FEBRUARY 26 and 27, 1983. WRITE FOR MORE INFO AND PREREGISTRATION FORMS.

up your controls like this and adjust to suit your flying style.

I recommend that you set up your aircraft so that the motor battery is easily removed. This allows you to pull the pack out of the aircraft for charging. I have included a sketch of the S.E.A.M. approved switch harness for your electric system. Look at it and set yours up accordingly. Always mount your switch harness so that it is easily removed in an emergency.

Did I hear someone say "Fire"?! I personally use a 30 amp electronic on-off switch manufactured by Geist and sold through Wilshire Model Center. It's not necessary, but certainly a nice touch. By the way, in case you haven't noticed, all we have left to do is figure out how we're going to hold the canopy down, charge the radio, and cycle the motor battery. We're gonna fly this thing in the morning. I use a pin in the front of the canopy and two wire hooks on the sides at the back that loop under the front longerons holding the canopy in place. Figure out what will work best for your situation. I'm sure some of you will come up with such exotic systems as tape or a rubber band looped around the fuselage!

FLYING THE ELECTRICUS 205

Forget the proverbial tall grass for test gliding. The kid next door already smoked it all. Assemble your model without the propeller in place. Check the balance, that the controls move the right direction, and everything is stuck on good and tight. Have an experienced friend hand launch the model while you're ready on the controls. If everything is straight, your Electricus should glide out straight and flat. If necessary, adjust your trim and toss again. Now bolt a Rev-Up 7x4 wood prop on the nose of your airplane. Top off the motor battery and you're ready for powered flight.

Again have a friend hold the model. Have him stand clear while you turn the motor on. Does the prop turn the right direction, does your radio still range check with the motor on? If the answer is yes, then have your helper launch your Electricus straight ahead into the wind. The Electricus should accelerate and start to nose up into a steep climb. With practice, you will find the so-called step or maximum climb angle for your particular airplane. Don't ever try to climb straight up on elevator. Because our thrust-to-weight ratio is less than 1 to 1, we must use the wing to help our model climb. This means the wing must be working, and for the wing to work it has to have airspeed.

You will soon find that the Electricus can climb to amazing, sometimes uncomfortable heights under power. Be careful that you don't fly the model out of your vision. I have, and can tell you it is alarming to say the least. The Electricus 205 is a very nice handling airplane. She is very smooth and gentle, and yet with exaggerated control throws, is capable of basic aerobatics. The Electricus covers ground and thermals well, she is just the ticket for the new S.E.A.M. two-meter Sportsman class, or lazy summer evenings at the local school yard.

I hope you enjoy your Electricus 205 as much as I have enjoyed writing this article.

CANOPY ORDERING INFORMATION

Send $5.00 for your formed, plastic canopy to Larry Jolly Model Products, 5501 W. Como, Santa Ana, CA 92703. Shipping and handling are included. •

Electric ..... *Continued from page 19*

The 650 is the best combination I have flown yet with the 05's, try it, you'll like it!

Speaking of the Olympic 650, it uses a motor mount method that I particularly like, so let's spend a few words on it. The motor is bolted to the backside of the firewall with two bolts, and access to the motor is via a hatch in the nose. Previous to the Olympic 650, I usually have used the "motor in the tube" type of mount, which is streamlined but harder to install. I'm now a convert to the "bolt on" method, partly because it is so simple and easy to do, and partly because I have a Leisure 05, an Astro 05, and an Astro Challenger (cobalt) 05. These motors have entirely different cases, and the Challenger has two big brush holders sticking out as well, so there is no way I can mount all of these in the same plane using the tube mount. The bolt-on method, on the other hand, makes it all easy, I can use any of these motors, and interchange them in less than two minutes.

I start by installing the firewall at the side and downthrust angle that is specified (you can add shims inside the firewall later if you wish to change this angle), and then I build the plane *completely*, including the covering. Then I cut out the hatch in the top of the nose, large enough to easily slip the motor through. I always cut the hatch a half-inch short of the firewall. This leaves a "lip" at the front which is quite useful for securing the front of the hatch. Under the front of the hatch I glue a tab that projects out about 1/4 inch. This catches under the lip and holds the front securely. The back of the hatch is held down by a wood screw into a small spruce block glued in the fuselage. That's all there is, very simple!

You do have to take some care about the bolt lengths into the motor. A bolt that is too long can reach far enough in that it can strike the armature. Scratch one motor! It's generally safe to use a 3/8 inch bolt . . . the usual threads are 4-40 or 6-32. If the threads are metric or unusual, it would pay to invest in a tap, and rethread the bolt holes in the front of the motor to suit. Another more minor point is that the tab in the front of the hatch should be just thick enough to be firmly sandwiched between the motor case and the lip at the firewall so the hatch front will not go up and down (see the photos). So there you have it, a very simple and universal way to mount motors . . . it should be particularly easy to adapt gas kits to electric this way too. Oops . . . almost forgot motor cooling. A couple of 1/4 inch diameter cooling holes drilled in the firewall, that match up with the cooling slots in the motor, should do the job.

I got a neat letter from James Vanden

Eynden, who told me about his first experience in electric and how he solved the problems. This is what I like, when someone sticks with it and finds the answers! I'll quote Jim's letter:

"My first attempt at electric free flight was with a VL 102 (VL Products, 7871 Alabama Ave., Canoga Park, CA 91304) in a Sig Super Cadet. Unfortunately I built the plane way too heavy and crashed it on the first attempt. I was ready to give up, after I had spent so much effort on the project. Fortunately the flight system was unharmed and 10 months later I decided to try again.

"I bought a 1940 Goldberg Sailplane (020 size) from Midway Models and managed to build it at 5-1/2 ounces, well within the VL systems recommendations. However, I didn't compensate for the weight of the motor in the nose, and it turned out nose-heavy, even though the balance point was that on the plans. (Not nose-heavy, then. wcn) *So, on the first flight, a nose dive, and another one bit the dust! I found out later that I should have moved the wing forward to compensate for the weight of the motor.*

"Anyway, the wing and tail survived the crash, and I was even more determined to get this thing off the ground. The design in the photos came from seeing other free flight models, and with this one, I achieved a flight weight of five ounces. With very little trim adjustments, it made a good first flight. The model climbs out at a good angle and usual flight times are around three minutes. It uses a 100 mah battery inside the fuselage. Usual charge times are around three minutes at two amperes.

"I have had many successful flights with this setup, but unfortunately, the day these photos were taken I lost the model in a thermal and I never did find it. With heavy heart, I left the flying field, but am looking forward to trying again with a new design with the VL 102.

"It seems to me that the trick to electric flight is to keep at it until you find a good combination of flight system and model, and success will be had in the end. I'm sure there are other modelers who read your column who may have had similar experiences and maybe these words of encouragement will inspire to try again."

I agree Jim, with your observations. My first two electrics didn't work either, way back in 1973 (10 years ago, how time flies!), and it was all due to not knowing what the setups should be. Well, at this point I will say that what is really needed is a "how to" book for beginning modelers in electric, that gives *specific* instructions on how to do it all. I have been working on such a book for the last two years (I never thought it would take so long!) for Kalmbach Books, and it is almost done. I don't know when it will be printed (maybe by fall of '83?) but hopefully it will fill a need. It will include R/C, free flight, and U-control. I have already had requests for it, but, right now it is just in the final manuscript stage.

Roland Boucher wrote to describe some of his latest products from Leisure Electronics, and these look very good. Especially notable are the gearbox, in which you can interchange gears to get any ratio you want, and the Playboy old timer kit, which is of excellent quality. I have the kit, but due to the book, no time to build it . . . maybe by spring. You might like to ask for the catalog sheet, it has a lot of goodies, from Leisure Electronics, 11 Deerspring, Irvine, CA 92714.

Last, but not at all least, Leisure will be sponsoring a two-day contest, February 26 and 27. The first day will be at the Harbor Soaring Society field (near Mile Square) and will feature two-meter open sailplane, and pylon racing. The second day will be at Mile Square and will feature 05 old timers (gear reduction), scale, and Golden Age scale. The rules for these will be those that appeared in the SEAM newsletter. For details, write Leisure. Roland also mentioned that Leisure will be selling cobalt motors, perhaps by next fall. Leisure started the "six cell revolution", so I'm sure that their cobalt motors will be potent!

This is, for electric modelers, the best of times! Fly high, till next time! •

Big Birds . . . . . *Continued from page 21*

gotten so used to making these on-the-spot repairs that all too often, little or no thought is given to what has been repaired, i.e., whether or not it's a load carrying part of the airframe.

And in spite of the usual adverse temperature, our impatience to get flying again, and the fact that none of these glues will reach maximum strength for at least 24 hours, the repairs seem to hold. However, within the past few months I've witnessed three different birds (two BIG and one little) going out of control and crashing because the field repairs made minutes earlier were inadequate. In all three cases, repairs involved breaks and/or cracks in flying or control surfaces, and broken sheeting was butt-fixed.

The biggest problem is that we try to rationalize the damage away before we even get to the impact area. How many times have you heard the infamous words . . . "She didn't hit two hard; a little Hot Stuff and she'll be ready to go in no time" . . . and then the battered and often unsafe bird is carried back to the pit area for some real meatball first-aid.

Let's face it! The field is no place for an honest evaluation or repair of crash damage . . . because it's almost impossible to accept the fact that *your* flying fun is over while others are still tearing up the sky and terrorizing the local bird population. And I've been as guilty as anyone else in this respect. I can remember times when a close inspection made later in my shop revealed serious damage

I hadn't wanted to know about when making the "Mickey Mouse" field repairs. What kept those birds of mine and some of yours from coming apart during the next few flights? Just plain, old dumb luck that the Model Airplane Gods were in a happy and benevolent mood. . .

Take a really close look the next time instant repairs are being made. It's appalling how many functional stuts, wires, and braces and parts of stabs and assorted flying surfaces are being poorly patched and re-attached. With few exceptions, repairs should be done back in the shop where you've got everything going for you . . . the light, the time, the patience and the tools . . . insurance that the job will be done *right*.

The other safely item I'm up in the air about concerns record-breaking . . . specifically the recent press release by Quadra, touting Ed Ness' new world distance record of 329 miles. Now don't get me wrong, people, 'cause I have as much respect and admiration for this kind of achievement as anyone; I know about the myriad of technical, mechanical, and logistical problems faced by whoever trys to break this kind of record. It takes a special kind of person . . . one with exceptional knowledge, guts, patience and staying power . . . to get his act together well enough to be able to even start the hoped-for record breaking flight.

What I'm concerned about is the rather casual and off-hand way the takeoff weight of the record-breaking aircraft is being bandied around . . . as though this was a normal and perfectly safe gross weight. The average flyer, and especially anyone new to our hobby, is left with the unmistakable impression that there's nothing wrong with trying to fly a 44 pound bird with a standard 35cc Quadra, and that the extremely high wing loading of something close to 60 ounces per square foot is not only reasonable, but makes a plane even easier to fly.

I haven't seen, nor heard of, any statements qualifying the aircraft's specs for the intended task, or warning us that 44 pounds, about 1700 squares, and a 35cc engine do not compute into a safe formula for Sunday or sport type flying. Unfortunately, many folks don't pay any attention to the fact that it was an attempt to set a new world's record; all they come away with is the knowledge that no one qualified Ness' attempt to fly that 44 pound, nine foot MR. Mulligan with very marginal power . . . which means that wing loading and power loading are a bunch of crap, and it's okay for them to do what Ness did.

It would be stupid for me to say that records shouldn't be sought after by those who have the wherewithal to do so, and that this kind of achievement shouldn't get the publicity it deserves; but I do believe that any press release or report by model magazines should include a reminder or warning, or at least a caution, pointing out that similar out-of-the-ballpark wing loadings and power loadings should be avoided at all costs by us regular run-of-the-mill builders and flyers. What we don't need is for some inexperienced yahoo to think he's being encouraged to fly anything very wild and very woolly . . . And the best approach is to keep guys from building overweight birds in the first place, because once their plane is finished, they *are* going to try and fly it . . . come hell or high water.

A good example is the gentleman who called me up, wanting to know if I thought his Byron Pitts was ready to go. According to what he told me, he had paid attention to all the details: the Quadra had been run and adjusted; the bipe was balanced on the nose-heavy side; incidence and decalage had been checked, along with thrust angles; and he even knew to put a few degrees of toe-in into the mains. I was all set to pontificate and give him my blessing for that first flight when he dropped the bombshell; his Pitts weighed in at (gasp) 28-1/2 pounds . . . From that point on I tried to persuade him to hang it up and never, ever think of flying it. He agreed with everything I said about high wing loading and a narrow speed envelope, and that she'd probably snap of takeoff, or on the approach . . . but stubbornly insisted that as it was already built, he was gonna get her airborne.

The very next morning he called again, to let me know that he had, indeed, tried . . . and failed. In spite of giving her all the runway available, the bipe snapped seconds after lift-off . . . and was totalled. "I just had to try it," he said. Had he been able to get the bird up to altitude, he might have caused damage or injury when she came tumbling down out of control due to flutter or a high speed stall. An overweight BIG Bird is, in every sense, an accident looking for a place to happen . . . and it will!

BEAUTIFUL BONES

Joe Manuel, who hails from Texas City, Texas, has long had a love affair with Waco bipes. . .

"I built a C-6 back in the mid-forties when I was a teenager," Joe confessed, "and now that I've got a Saito 80 twin four-stroker, just couldn't resist building another one from the Cleveland plans (modified, of course)."

Joe also couldn't resist pinning all the pieces together and taking a few shots; "She looks so good," was his excuse. Joe's "nearly BIG Bird" features an on-board ignition for keeping both jugs firing at idle, a 69-1/2-inch wingspan . . . and, as she stands (sits?) now, weigh only 7-1/2 pounds. "She seems to balance okay, too," Joe tells everyone, "so I won't have to cram any extra weight on board."

He didn't mention what takeoff weight he's shootin for, but from the pix it doesn't seem like he's going to have that kind of problem. No target date was mentioned, but I get the impression that the farther along he gets on this beauty, the more work he's putting into getting

her ready to fly. I know that some folks don't like "regular" looking bipes, like Stearmans and Great Lakes, but how could anyone keep cool loins when peeking at any of the Wacos?????

DOUBLE NICKLE FLY-IN

Only scant months after Terre Haute's "Double Nickle Squadron" (IMAA Chapter #55) was founded, this small band of merry men held their First Annual BIG Bird Fly-In. Though only 11 members strong, these guys put together a most enjoyable day of flying for both pilots and spectators.

Bitten by the BIG Bird Bug, exR/C'er, retired auto racer, and soon-to-be-a-Double Nickle member, Randy Beeler, gives a good account of the happening.

"It was a great turn-out on Oct. 3, especially considering that this was their first effort. Thirty Giant aircraft were registered, with 25 of them actually getting airborne at the Terre Haute R/C Club's McKibben Field. Pilots and planes came from all parts of Indiana, Illinois, and Ohio to fly . . . and fly they did, with such enthusiasm that many guys lost track of time and often ran out of fuel . . . with the crowd wildly applauding every deadstick landing."

Randy pointed out that the Double Nickle bunch take safety very seriously: spectators were held back 65 feet from the flightline; four 20-pound fire extinguishers were positioned and easily accessible; a complete first-aid kit, with trained personnel was one hand; and each BIG Bird had to pass IMAA's recommended Air Worthiness Inspection before being allowed to fly. There's no doubt that good planning and attention to details paid off for Chapter 55; they even built, and carefully monitored, a new frequency board and impound area which kept any nasty gremlins from causing frequency problems or crashes.

Even the kids were given special attention. "Dick Northam, of Indy, gave them all a thrill when he dropped three pounds of taffy out of his modified Nosen Citabria. The plan had been to let the taffy go on a low, slow pass; however, the heavily loaded BIG Bird had ideas of its own. Barely three seconds after liftoff, the goodies were suddenly kicked out all over the runway, much to the surprise of pilot Northam, and much to the delight of the small-fry who thought it had all been planned that way."

And a new wrinkle was added when the pilots were asked to honestly note what they did and didn't like about the fly-in . . . with all this imput being used to help make some changes for the better in next year's event: they're gonna have a really good concession stand; parking facilities will be improved; and because the fly-in will be expanded to include both Saturday and Sunday, the complaint about not enough flying time should be well taken care of.

The Double Nickle Planning Committee has already scheduled their Second Annual Giant Fly-In for the first weekend in October . . . and it should be well

attended; they've already proved that they know how to hold a successful and fun-filled fly-in, and they're in an area that's chock full of BIG Bird activity. It's not too early to write to Ed Ice, 5010 North 15th Street, Terre Haute, IN 47805, and get all the particulars. . .

HOBBYPROXY TO THE RESCUE . . . AGAIN!

If you're into RAF warbirds and been wondering when the Hobbyproxy People were going to get around to helping you out . . . your wait is over.

Here are three formulas for colors used by RAF aircraft during those early (1940 and 1941) years. Most Hurricanes and early model Spitfires were finished in these colors; usually their upper surfaces were painted Dark Earth and Dark Green with Sky Type 'S' underneath. And here are the magic formulas:

Dark Earth . . . 4 parts H65 Bright Red, 2 parts H49 Cub Yellow, 1 part H81 Black and 1 part H70 Gray.

Dark Green . . . 6 parts H66 Dark Red, 2 parts H33 Stinson Green, 1 part H49 Cub Yellow, 1 part H81 Black and 1 part H10 White.

Sky Type 'S' . . . 5 parts H10 White, 1 part H26 Lt. Blue and 1 part H70 Gray.

The reference source used to develop these colors was *"British Aviation Colours of WW-II,"* published in 1976 by Arms and Armour Press, 2-6 Hampstead High Street, London NW3 1PR. By the way, this book may, or may not still be, in print in England.

Just so you Luftwaffe jockeys won't feel left out, Hobbypoxy promises to have German camouflage colors for the same early period of the war . . . so all you ME-109 lovers can get your helmets ready and those gunsights aligned. In fact, Hobbyproxy is planning, on alternate months, to come out with two different sets of formulas for both RAF and Luftwaffe aircraft. Won't it be nice not to have to fake those colors anymore . . .?

THIRD ANNUAL IMAA FLY-IN FESTIVAL

It's gonna be back to the Byron Wonderland in Ida Grove for the '83 Festival, and we're planning on having a full four-day affair . . . from Thursday, August 18th through Sunday, August 21st. So start making plans to attend *THE* Fly-In of the year: we're gonna make sure that whatever drew complaints in '82 will be vastly improved, and whatever didn't get complaints will be made even better just for the fun of it. By the time you read this (February), I should have all the specifics to pass on . . . so just drop me a line asking for the IMAA Festival Brochure.

And guys, please keep in mind that this is really more of a festival than it is a fly-in; in other words, don't come thinking you're going to get a bunch of flying time, 'cause you won't. You're gonna get to fly, alright, but the accent is on meeting and greeting old friends, making new friends, lying a little, and then getting to hear others tell their "war stories," talking shop, finding out how to do things a bit better, popping your eyeballs at other guys' handiwork . . . and just plain having one helluva good time. If maximum stick time is all you crave, then you'd be much happier staying home and flying at your own field.

Hope to see you'all at Ida Grove in August . . .

TIP OF THE MONTH

This is really more than just a tip; it's one of the secrets to my "success." Y'see, I've been fooling most everyone for 51 years by getting out of tight spots, whether at the flying field or a party: "When in doubt, stroke your chin (or beard) . . . and MUMBLE."

Al Alman, 2713 Alderbrook Court, N., Puyallup, WA 98373. And don't forget about your input, guys; I need your help to make "BIG Birds" work. Also, let's spread the word about YOUR fly-in . . . but remember that I'll need at least two months lead time.

FLYING SAFETY IS NO ACCIDENT ●

Soaring . . . . . *Continued from page 24*

Eppler 205 has been used on scads of highly successful F3B designs over the last couple of years. Its performance characteristics are well proven. The Pantera, like most F3B ships, has a sleek, clean, epoxy/glass fuselage and hingeless horizontal stabilizer. I think the Pantera might well be classed as a 100-inch, multi-task sailplane capable of thermal, distance, and speed events (with a little "beef-up" modification of the spar near the wing roots).

If the Pantera sounds like something in which you'd be interested, by the time you read this, it will be available from Larry Jolly Model Products, 5501 W. Como, Santa Ana, CA 92703. Price for the Pantera is $99.95 direct from Larry (postage and handling paid, California residents add 6% sales tax), or in a hobby shop near you.

THORNBERG/BROWN CHARGER-SWITCH

At a recent thermal contest I competed in here in Los Angeles, I spotted Ralph St. John carrying a two-meter Sagitta back to the pit area . . . not an unusual thing to see in itself, but dangling from his airplane was a frequency flag that caught my eye. When I asked Ralph what it did, I was very interested in finding out more. He told me that it was his on-off switch and charging jack all in one. When the flag was removed, the receiver was turned on. When a similar plug attached to his charger was inserted, he could charge his batteries.

Having disliked most of my switch setups for one reason or another, this one looked like a winner. Ralph told me that he got the idea from John Brown (AMA national champ), and was very

happy with the way the system was working for him. So happy in fact, he made his latest sailplane without a canopy! I like that idea. I think it's a natural for molded fiberglass fuselages that normally require a canopy opening and lots of reinforcement to keep the nose area strong. Just cut out the wing saddle and shove the foam wrapped battery pack and receiver into the nose; take up excess space with chunks of styrofoam or whatever, and hold in place with a half bulkhead or servo rail. Simple, strong, and aerodynamically slick!

John Brown gave me the details for rigging up the system, and I will pass them on to you. From your local electronics supply store (not Radio Shack, however), obtain two mini plugs and a jack like the two shown in the photos. The Radio Shack equivalent will not work reliably due to its flat contact patch which tends to make poor contact after a while (more sensitive to contamination from dirt, oxidation). The other two designs have one and two-point contacts which work much better in the long run.

The tip terminal of the plug must be soldered to the red wire from your charger, the other terminal to the black wire. The switch that comes with your radio must be removed. The red wire from the battery is then soldered to the terminal that is in contact with the tip of the plug when it is plugged in. The black wire from the battery is soldered to the terminal which acts as a ground on the jack. The black wire from the receiver is also soldered to this same terminal. Finally, the red wire from the receiver is soldered to the terminal that completes the circuit to the battery when the plug is removed.

The spare plug, with a bright ribbon or your frequency flag tied to it, turns off the receiver when plugged in. The bonus is, that you're less likely to launch without turning on the receiver!

Originally, Dave Thornberg described a charging jack system similar to this one in a magazine article somewhere and sometime ago. It was John who decided to take that idea a step further and have the system serve double duty as switch and charging jack. Thanks for the ideas Dave and John.

AIRFOIL OF THE MONTH: E-374

This month's airfoil, the Eppler 374, has been around for quite a few years. I first tried it on a slope racer in 1978, with very good results. I decided to give it a try after seeing a 72-inch slope racer built by Mike Bame out-fly everything in sight both in speed and aerobatics at a nearby slope in the Santa Monica Mountains. Mike demonstrated the outstanding stall characteristics of his little "Sand Piper" by flying directly into the wind over the slope and slowly feeding in more and more up elevator . . . it seemed to just keep on climbing and slowing down . . . when it did finally stall, it was gentle, and recovered quickly. I was amazed and impressed.

The Eppler 205 is enjoying a lot of popularity these days among F3B and AMA fliers who appreciate its excellent lift and drag properties. I must include myself as one of these people. However, the E-374 is looking really good to me lately as a possible equal or superior section for some applications.

Taking a look at the Lift/Drag polars of both the 205 and 374, we note that (at least in theory) the 374 has a distinct advantage in very low lift conditions (diving for speed, flying fast at low CL) over the 205. I believe this indicates that in a vertical dive, for instance, the 374 would have an advantage over the 205 because it doesn't begin to gain drag until after it has pulled a negative lifting force, -0.1 CL, whereas the 205 starts gaining drag before it reaches zero lift. This would permit small pilot errors in the dive, theoretically, without drag penalties. I admit that those penalties may not be significant, but they're there.

In a lot of areas, the two sections are very similar or identical. Eppler rates the optimum lift coefficient (most lift for least drag) at Reynolds Numbers of 100,000 and 200,000 for the 374 at 0.81 and 0.82 respectively. For the 205 it's 0.83 and 0.9. Minimum drag at the same RN for the 374 is 0.0123 and 0.0092; the 205, 0.012 and 0.0092 . . . identical. The 205 has a slightly higher pitching moment compared to the 374 (-0.046 vs. -0.036) which is good for the 374; zero lift occurs at -2.37 degrees for the 205 vs. -1.77 degrees for the 374; and the 205 is 10.4 percent thick compared to the 374's 10.9 percent, also in the 374's favor.

If you have tried the 374 on a 100-inch thermal ship or F3B ship, I would like to know what you thought about it. Does it need flaps for slow speed thermalling? Does it carry lead well? These are a couple of questions that I have regarding the 374.

An interesting thing to try is to blow up the E-374 to 15 percent thick and move the high point forward to 35 percent, then compare the airfoil you come up with to the Mike Bame sections featured in my October column . . . you will see quite a similarity!

TWO METER WORLD CUP UPDATE

Preliminary reports from contest officials of the Two-Meter World Cup are a bit incomplete as of this writing (November 30), however, some things *have* been decided upon, and I can pass those things on to you at this time. More information will be released as it becomes available.

Yes, there *will* be a fourth annual 2MWC this year. It will most likely be held in the Southern California area around the early part of June, possibly late May. Previous 2MWCs have been held in late January and early February as a means of providing an off-season contest for two-meter sailplane enthusiasts that wouldn't conflict with any other soaring contest; would provide snow-bound fliers a chance to compete in a major contest in the snowless deserts of California and Nevada when

not much else was happening; and give the 2MWC a good start. Well, it's had a *great* start over the last three years, and both the contestants and the organizers thought that it was time to bring the World Cup to a warmer, longer daylight time of the year, and to a place with a more stable climate, preferably Southern California.

As of this writing, only one club has sent in a proposal to host the 1983 2MWC, the Santa Maria Soaring Society, and if no others are received, they may be holding the contest somewhere in the San Luis Obispo area of California in early June. Stay tuned to this column for more details in subsequent issues, and start building your best two-meter sailplane design for this multi-task contest, the biggest two-meter contest anywhere. (See the May 1981 *Model Airplane News* and June 1982 **Model Builder** for accounts of previous 2MWCs.) •

Cutlass . . . . . *Continued from page 27*

to it in final assembly. Be sure to make right and left vertical tails, two on the same side won't work very well!

FUSELAGE

The foam and stocking fuselage is easy to make, but unusual, so I will detail the construction techniques for it. Laminate the core from one piece of one-inch foam and two of 3/8. Cut out the center of the one-inch piece before adding the sides. The parts are bonded with spray adhesive. Carve the fuselage contour with a *very* sharp carving knife, and sand to final shape with 100 grit paper. Then spray a light coat of "77" adhesive on the outside to help the nylon stocking lie down and stay when you slip the fuselage into one of its legs (be sure there are no legs in the stocking at the time!). My wife informs me that I used a lightweight support stocking . . . specifically, L'eggs Sheer Energy. Pull both ends to stretch the material down against the foam surface. You can make one end of the stocking come out in the area under the fuselage where the wing will join it. The other seam is placed under the nose. Brush a coat of white glue over the entire fuselage except where you will have to seam the front end. After the glue has dried you can trim and lap the front seam and then glue it in place. I found that about three coats of white glue were necessary to fill the weave. After that, I mixed in cornstarch and a bit of water to make a filler for about three more coats. At this point you have a rigid skin over your foam and you can trim around the wing joint, and carefully cut the canopy opening with a large razor saw.

FINAL ASSEMBLY

The next step is to bond the fuselage and wing together. Slow setting epoxy is the ticket here. Wipe away all excess and drips as they will get in the way of your fillets. Once the basic bond is made, use a slurrey of epoxy and microballoons to fill any gaps left in the joint. The fillets start as 1/2 by 1/2 triangular strips of wing core foam. Spray adhesive on the backsides and press the strips into the intersection of the wing and fuselage on the topside. The smooth contour is achieved by sanding with paper wrapped around a half-inch dowel. The fillet surface and the small fillets under the wing are done with the epoxy/microballoon slurrey. Two thin coats with sanding between should give a perfectly smooth surface.

Now you can add the vertical tails, hinge the control surfaces, add your decorative exhausts and intakes, guns, etc. I used Econokote strips in an over-and-under hinge arrangement because the surfaces are quite thin and the elevator is so close to the torque rod tubes. Trial fit your radio and rig the pushrods.

FINISH

On this Cutlass II, a urethane finish was used from beginning to end. I made a filler of two parts clear, one part thinner, and one part cornstarch (it is lighter than baby powder). Apply two coats of this filler to the entire model except down in the control surface gaps which are left raw to minimize binding. Allow a minimum of 24 hours between coats and sand both with 400 grit paper. The fuselage may require a couple more coats to get rid of the weave of the nylon stocking material. I did not try to eliminate all of the grain marks in the balsa parts.

The color scheme on my Cutlass II was a pale blue, glossy finish for the canopy and windshields, flat sand and flat olive drab camouflage on the top, and a flat gray on the bottom. Decals were scrounged from old kits, specifically the Midwest A4 Skyhawk, Estes Industries Interceptor rocket, and a variety of Sig decal sheets. Use one of the decal setting liquids to get a good bond to the flat paint finish, and overspray with flat clear if you are so inclined. Exhausts and radar nose are flat black.

FLIGHT

Trim, as mentioned, is highly critical to the performance of a flying wing. My Cutlass II balanced at 2-3/4 inches from the leading edge point at the center of the wing. In the photographs you can see me doing a swing test to get the approximate trim for the model. The trick is to tether the model at the leading edge of a wing tip, and whip it around at a fair approximation of flying speed. When the model is correctly trimmed, it will fly right side up just below even with your hand, and just barely lower upside down. This differential is your measure of the margin of stability. If there is too much stability (height difference in the swing test is due to forward CG and excess reflex), the model will porpoise in Free Flight, too aft a CG and it tends to flop end-over-end. Ideally you would keep moving the CG back and reducing the reflex provided by *both* elevator and aileron until the model is dead neutral and right on the verge of instability. Then stabilize it just a bit by moving the CG forward and increasing the reflex slightly.

I found that I needed maximum elevator and aileron sensitivity with the small arms on Cannon servos. As the model is now, I can do both loops and rolls when there is reasonable lift available. Flight is definitely fast, and the model will never be accused of being a "balloon" or "gas bag". It looks mean and authentic in the air. One comment heard at the slopes last time out was "WOW. I want one!" Well, I have mine, how about getting started on yours? •

Q.S.A.A. . . . . *Continued from page 31*

and will be flown again at the '83 show. Power is an Astro 035. wcn) I particularly enjoyed the flights of Frank Johnson's .40 powered B-17, built from a Wescraft kit. Not only does it bring back fond memories of my early days in full scale aviation, but to me, the B-17 is one of the most graceful looking big airplanes ever built.

We would like to add one more "Happy" to Addie Naccarato, who celebrated her "39th" birthday with us that weekend. And a firm congratulations to Bob Seigelkoff, of CB Associates, who was the only one we know of to hit a jackpot that weekend . . . he and the charming Susana Islas were wed on Friday evening. Good luck, Susana and Bob, may your flight be forever free of glitches, and may all your maneuvers be ten pointers.

Sunday it was back to the flying field, and another beautiful Las Vegas day. A few more flights, and then time to start the farewells, and the promises to "See you here next year" . . . and I'm sure, the many promises to oneself "Wait till they see my entry in the 1983 QSAA Fun-Fly"! We will be there, and looking forward to seeing all our flying friends once again . . . especially you. To all of you tired QSAA'ers who had a hand in organizing and running this great meet, your efforts did not go unnoticed, we don't have a trophy for you, unless you will accept a handshake from a hand that is all red from applauding! •

Pattern . . . . . *Continued from page 31*

but I succeeded by utilizing some heavy lenses and a few choice cuss words.

The reason for this was to allow the use of my new Airtronics model 94557 servos as well as my JR and Futaba servos. A little modification is necessary to the servo leads on the Airtronics (reverse positive and negative leads, plus trim the connectors slightly). If you are the timid type, I don't recommend you try to whittle connectors to fit. Just purchase connectors (aileron leads) from Airtronics and make up adapter leads. Most of the new Japanese servos utilize a 1.5 mil center, so mixing servos is not really dangerous.

These new Airtronics servos apparently have a metal gear train, and are the smoothest of anything I've tested. The extremely high speed is desirable, in my opinion, because it is not jerky, it simply follows the control stick. There is a rash of new servos on the market . . . some as cheap as $10, and they work! However, the resolution and power of the Airtronics 94557 is simply in another class (with a capitol C).

I'm really impressed with the excellent servos that the radio folks keep developing. The time lapse between stick movement and control surface movement is almost gone. It reminds me of the solid feel I got when flying a good control line (that's right, control line) ship. I'd swear I had a set of cables running to my Hippo Tipo when I do loops now. The feeling of direct control is uncanny.

One of our new birds is a CAP 21 powered by a 60 gear box engine. It is 1/4-scale, which gives over 900 sq. inches of wing. The inherent smoothness of these bigger models reduces the need for dual rate switches and eliminates any need for exponential controls. The super fast, super strong servos really pay off on these birds by eliminating any vague feeling such as noted when flying some of the early 1/4-scale .60 designs of the late '70s.

If I sound "hung up" on super servos and larger pattern birds, I plead guilty. The feeling of *control* is just so much better than it was when I was trying to fly smallish birds with 30 oz. per sq. foot wing loadings and four-wire servos!

I would like to address a different subject now. Adjustable stabs may be an unnecessary waste of time if you are building models with which you are very familiar.

If, however, you feel it necessary to fine tune a new bird, the adjustable stab is just the ticket. I have incorporated this feature on a couple of new projects for two reasons. One: to make the stab removable for transportation, and

secondly, to allow trimming to be simplified. The sketch is self explanatory.

Till next month — •

O.S. Review . . . *Continued from page 33*

most curious to observe its performance with the muffler and the rather unusual extension. As you can see from the accompanying photographs, the exhaust/muffler extension is not merely a straight-through piece of metal. It in fact has what can be referred to as a circular, enlarged, or expansion chamber in the center vertical-longitudinal plane. My initial conjectures were that it might either boost power, or help to modulate the engine at other than full throttle. Neither supposition appeared to be true on the test stand. The engine turned 14,600 rpm with the muffler and extension installed and 14,800 rpm with the muffler, but not the extension. Further, throttling appeared to be the same in either configuration. Unfortunately the manufacturer did not include any explanation or instruction sheets with this engine to explain this rather different style extension.

Regardless, the engine did perform extremely well. The throttle response was exceptional. The carburetor is an OS 7H that functionally has a different configuration of the needle valve taper than the 2B carburetor. It appears that the intent of the shouldered taper of this needle is to provide a more ideal mixture at the idle position. For practical purposes, however, it is sufficient to note that it would idle at 3000 rpm on the 9-5 prop, but it seemed steadier at 3500 rpm.

UNIQUE OR NICE FEATURES

The brass, glow plug insert in the head; shielded front ball bearing; nickel plated, pinned sleeve; cap screws; and carburetor configurations are all considered plus attributes just as on the 25F ABC. Additionally, the use of a dykes ring seems to be a wise decision considering the more extensive use of throttling in helicopter operations. Certainly it will ensure fine compression at all rpm's, whereas the ABC configuration is usually superior only at full rpm.

Lastly, the cliche to the effect that, "It's the little things that count," seems quite appropriate when one looks at the finger end of the high speed needle on the carburetor. It has a machined hole and set screw that enables the modeler to create a needle valve extension by merely inserting, and set-screw fastening, a length of 1/16 inch music wire. It's particularly neat and useful on a helicopter engine where it's often difficult to reach a standard needle valve.

So much for the general observations. For those who are interested, other exact engine specifications are included elsewhere with this article. Almost forgot the bottom line. The 25 is expected to retail for about $88; the 28 will be about $95. By the time you read this, they should be available from World Engines.

Choppers . . . . *Continued from page 35*

pitch is not reduced to flat pitch within a second or two at the most, the rotor speed will decay to a point where the blades produce so much drag that even the rate of descent will not rebuild the rotor rpm back to normal. The more inertia the helicopter has in its rotor system the less critical time becomes in the entry to autorotation. Helicopters with low inertia rotor systems can get into situations described above easier than higher inertia rotors. But that's another story. Refer to Figure 5.

Here the helicopter is in autorotation. Notice how the airflow is coming up through the rotor disk, and that the blade pitch is reduced to near zero. This is the same action as sticking a pinwheel out the window of a car as you're driving along. The inflowing air drives the rotor just as it drives the pinwheel.

As the engine dies, the sprague clutch also becomes a major factor in a successful auto. But first let me assume a belt-driven helicopter in Figure 6, looking down on top of the rotor shaft. Here the gear is pinned to the main shaft, and there is a *centifugal* clutch on the engine pulley. See Figure 7 for a photo of a centrifugal clutch.

The centifugal clutch merely engages the rotor as the engine speed increases just above an idle. The outer half-moon pieces (clutch shoes) are slung out by rotating (centifugal) force, and the shoes grab against the clutch lining/bell housing assembly. The engine gear is pinned to the top of the bell housing (just visible in the photo) which turns the belt to the main rotor gear. Follow me closely as I go through the next several steps. . .

If you start the helicopter at idle, engine speed remains below 2,000 rpm and the centifugal clutch keeps the engine disengaged from the rotor. As the throttle is advanced over 2,000 rpm the centrifugal clutch engages, and drives the rotor as engine speed increases through 4-6-8-10,000 rpm, an average engine speed while the helicopter is flying.

Back to the engine failure in flight. As the engine quits, the centrifugal clutch is still engaged until the faltering engine drops below 2,000 rpm. What happens is that *the dying engine drags rotor rpm down to nearly nothing until 2,000 rpm, when the centifugal clutch disengages.* By then, the rotor speed is much too far decayed to support flight. Quite simply, the rotor doesn't continue to turn and the helicopter doesn't continue to fly.

What is needed is a *sprague cloth* to *allow the rotor to continue to turn as the engine dies.* See Figure 8. In this figure a sprague clutch is attached to the main shaft. Under normal flight conditions the left half arrows of the figure apply. The outer gear is driven by the belt. The outer gear grabs the fingers and pulls them along. This drives the main shaft with the outer gear. The two units rotate as one.

When the engine dies, the right half arrows apply. The engine speed decreases (short outer arrow). But because the main rotor has a lot of weight (or inertia) in it, it wants to continue to turn as the engine is dying (longer inner arrow). Since the inner main shaft is now turning faster than the outer gear the fingers no longer grab, they slip. . . And *that* is how the rotor continues to turn during the engine failure.

To recap. The combination of immediately reducing the collective pitch and the sprague clutch automatically

slipping allows a successful transition to an autorotation. One without the other will not work. You have to have *both*. I hope that is clear to you.

On to the second question of Brent's letter. . . . You can't do full touchdown autos with both servos "Y" connected, you can only do "power recovery" autos. Let's say we enter an autorotation by pulling collective/throttle back to idle. The sprague cloth disengages and the helicopter starts descending. It continues to descend in the auto until about 10 to 15 feet above the ground. Here we start to flare with aft cyclic. This stops the rate of descent as well as bleeding off forward speed. Once the flare is nearly over, we give forward cyclic to level the ship and increase throttle/collective to make a power recovery. Increasing the throttle makes the engine drive the rotor again, and the increased pitch supports the three-foot hover at the end of the recovery.

To do a full touchdown with a "Y" connector the engine must be dead. Otherwise the engine will always increase as collective is used to cushion the touchdown, which results in a power recovery as above.

The thing to have is one of the new "helicopter radios" that has a "throttle hold" switch. In this case, the radio automatically lets the throttle and collective servo work together under normal conditions. But when you want to do a full down autorotation, you enter by reducing throttle/collective. On the way down, you snap the throttle hold switch on top of the tx. This holds the engine at idle no matter how the throttle/collective stick is moved. When the flare is completed and you add collective to cushion the touchdown, the throttle remains at idle as the auto is completed. Just make sure the throttle/collective stick is back to idle when you flip off the throttle hold switch. Otherwise the ship may fly off again before you're ready! I've never had one fly away, but I've had a few good scares. . .

Anyway, it's best to save the autos until you can fly the helicopter fairly well. Then make sure you do plenty of power recoveries before attempting full downs. It only takes one missed auto to give an unneeded rebuild job. And that goes for full size ships as well!

Next month a look at Circus Hobbies, and the increasingly popular Kalt helicopters that Circus distributes. See you then. •

Scale . . . . . *Continued from page 36*

scale contests. Consideration of the events would be based on such criteria as: site, available personnel, geographical locality, number of entries, etc. The contests will be operated using applicable AMA rules.

CONTESTANT QUALIFICATION

Contestants shall become eligible for the Master's event on the following basis:

1. R/C PRECISION — An open event with no qualifying required. (Based on present low numbers of available modelers in this classification.)

2. R/C SPORT SCALE — Eligible contestants taken from the Expert classification if event utilizes separate Sportsman — Expert classes. First five places shall be given invitations with the exception that contests with more than thirty contestants will recieve one additional invitation for each 10 additional contestants or major portion thereof. Contestants already qualified at a previous contest will not be included and the next person in the standings will be invited. No limit shall be placed on the number of qualifying contests the contestant may enter.

3. CONTROL LINE — An open event with no qualifying required.

MASTER'S TOURNAMENT QUALIFICATIONS

The final event will be rotated on the basis of geographical location, the first consideration to be the odd numbered years which are FAI team selection years. The initial six-year cycle would be selected by a drawing which would indicate East-Midwest-West. (East designation to be Coast to Indiana; Midwest designation to be Indiana to Colorado; West designation to be Colorado to Coast). The order would be established for 1983, 1985, and 1987. Sites within these general areas would be chosen by a committee from the Scale Squadron and NASA. These could be sites used by participating clubs as qualifying sites or sites other than these, but with ample manpower available to carry out contest needs.

The site would have to meet certain necessary criteria for a team selection. Such criteria will be agreed upon by the site selection committee but should include such considerations as runway size and condition, obstructions, housing, etc.

On the even numbered years, the site for the final event will be chosen from clubs holding qualifying events, again on a rotating regional basis.

At the final event, AMA rules will apply with the exception that on the odd numbered years the team selection process will *incorporate FAI specfications and rules for those wishing to attempt to qualify for the teams*. This is to in no way inhibit or alter the other aspects of the competition.

PERSONNEL

Personnel are to be selected, jointly, by the Scale Squadron and NASA based on known qualifications, past performance, and where possible, regional variety. Any renumeration made available for officials and judges will be in the form of token payment for mileage.

FUNDING

The Scale Squadron and NASA will work jointly to obtain funding through industry support, patch, or other promotional sales, private donations, etc. They will not allow one commercial enterprise to gain control of the event through the means of total funding.

Entry fees will be allowed in the event adaquate funding may not be available. It is recommended that any needed entry fees be kept as low as possible. FAI team selection fees and FAI stamps which may be required by AMA are not included in these considerations.

A budget will be worked out prior to the event. No deficit will occur to be charged to either Scale Squadron or NASA.

FINALIZATION

These mutually agreed upon guidelines will be submitted to both organization memberships for ratification. When such approval occurs, the program will be formally

submitted to AMA for approval and official status for team selection processes.

Bob Underwood
President, NASA

SELECTION OF 1984 FAI TEAMS

The proposal which follows was presented in an outline form to all RC and CL contestants in the form of a questionaire at the 1982 Nats in Lincoln. The same brief was mailed to NASA members. After about one month, to allow time for replies, the forms were tabulated and they indicated an overwhelming consensus that the proposal should be submitted to AMA for the team selection in 1983. In the communication to AMA President John Grigg, the names of those responding were included, as well as whether they represented CL or RC, and their status as to past team selection-participation, or actual team participation. At this writing, the site has been obtained and personnel are being selected. Further details will be available soon. Following the FAI meeting in Paris you will be apprised of any changes which might be pertinent to the selection. In the meantime, it is suggested that you carefully study the rules if you are interested in attempting to represent the United States in Paris, 1984. Take it from one who has been there . . . it is a really rewarding experience, both from the standpoint of modeling and the personal friendships and insights gained.

PROPOSAL FOR SELECTION OF THE 1984 SCALE TEAMS

The National Association of Scale Aeromodelers submits the following proposal for the selection of the 1984 Scale Teams.

The selection process is to occur at a single contest to be held at the Sawyer State Park in Louisville, Kentucky, during a three day period to be announced shortly.

The event will be open to any current AMA members possessing the necessary FAI stamp.

FAI rules and specifications will be used to conduct the contest. These rules are those printed in the FAI section of the offical AMA rule book. Since there is, on occasions, a time lag which exists between the printed rules and those that will be in effect at the following World Championships, the rules and specifications which will be in effect at the World Championships (1984) will be used.

Pre-registration postmarked no less than two calendar weeks prior to the start of the selection contest will be required. Forms for the registration will be available through AMA headquarters. Each contestant may enter each classification upon payment of the necessary registration fees. The registration fee will be $50.00 per event. Expenses for the contest will be taken from the registration fees but will not exceed an amount equal to the number of contestants times $25.00. The balance of the registration fees will be contributed to the Scale Team Fund. In the event any industry support is donated, recognition of the support will be made, however, no cash or merchandise awards will be made to the contestants. Plaques, trophies, or certificates may be awarded.

The event will consist of a three-day schedule. Friday, (day one), static will commence at 9:00am. Every effort will be made to complete the static judging on Friday. Saturday (day two), flying will commence at 8:00am. Weather permitting, one-and-one-half rounds will be flown on Sunday, beginning at 8:00am. The static judging order will be determined by random selection. The flying schedule will follow the same order.

The static and flying judges will consist of a panel of three or five judges, depending upon the availability of qualified personnel.

Immediately upon the completion of the contest and the determination of the three team members and two alternates for each classification, they will be polled for names of candidates for the position of team manager. These recommendations will be voted upon, subject to the individual's acceptance, and submitted to AMA for approval . . . This procedure will occur at the earliest possible time following the competition.

Judges and contest administrative personnel will be arranged for by NASA. Local clubs will provide support personnel. Future sites and dates will be recommended and approved in the even numbered World Championship year for the following odd numbered year, which will be the team selection year. •

Flying Wing . . . *Continued from page 39*

landed on the monstrous, twin .60 powered delta R/C flown by the Abrahams father and son team. We could all visualize a gaily colored spray of silk and balsa as the model went through that meat grinder. All was well, as it missed the props and slid to one side with no damage.

That gorgeous twin CO_2 model in the next photo was sent out from Liberal, Kansas, by Daniel Walton. Sadly it was not completed, and no flight attempts were made with it. It is a scale model of the Northrop N1M. The motors are Brown Jrs. run from a single tank. Weight is two ounces, and the wingspan is 24 inches. A significant feature of the model is the fact that the elevons are pendulum controlled. Daniel is a believer in the concept of proxy flying (originally encouraged in modeldom, but now fallen into disfavor except with the peanut pushers) and footed the expense of shipping out an unfinished model just to support the principle. Let me tell you that Daniel is one heck of a builder, and I'm sure glad that he sent the model, if for no other reason than that I enjoyed looking at it!

Moving over to the R/C area, let's look at the model which nearly outweighed the entire remainder of the models put together. Loosely styled after the old Midwest "Hustler" delta, the "XNB-1" was a remarkable project. The father and son team of Seth and Charles Abrahams decided that they wanted a BIG airplane, and designed this monster as a result. Materials used include corrugated cardboard, 1/8 inch door plywood, pecan wood and foam, with a minimum of balsa. Wingspan came out 6-1/2 feet, length 4-1/2 feet, weight is 22 lb. Power is by twin K&B .61s with the rear one converted to L.H. rotation. Total fuel capacity is 28 oz. To control this beast, they use seven servos run from five channels. Engines throttle separately, and steering is independent of the aileron control (no rudder control at all).

Joe Tschirigi showed up with an unusual model in that it was a seaplane! He used a separating dolly for the takeoff, and just skidded in for landings. In between, he did a very creditable job of flying sport aerobatics with an "S" curved, all sheet wing. The model sports three channels, with ailerons coupled to water rudders extended down from the air rudders. Power is by Max 10FSR swinging a 7x4 Taipan prop. Elevator is separate and is between the two rudders.

Next up is one of the real gems of the meet, a really nice scale model of the Northrop N9M-A. Although plagued by

radio problems at the meet, it did manage its required demo flight. This model sports two Astro .05 cobalt motors with extension shafts and ball bearing prop supports. Controls include retracts, flaps, motors, and elevons. Span is 75 inches, and all-up weight is 5.5 lb. Builder of this wondrous machine is Bill Young. *(A future* **MB** *construction article! wcn)*

For the more sport minded modeler, we have a lovely powered soarer style flying wing. The one shown is by Bruce Tharpe. He has a throttled Medallion .049 and rudder and elevator. The model is large and light, with about 600 in² area and a guestimated weight of 23 ounces. Climb was steady at about 20°, and I saw him do loops and rolls before climbing for some soaring altitude. Covering was transparent yellow Monokote.

Definitely not the model you would see at most flying fields, the fan powered "Manta" by Bob Martz presents some very interesting concepts. Combining the delta configuration with a swept forward flying wing, Bob has managed to have an all-wing configuration which uses the standard four channels. Ailerons are on the wing tips, the elevator and rudders at the back where they normally are. Contest day was only the second outing for this unusual model, and there was a noticeable need for more experimentation on c.g. location and possibly elevator sensitivity. Laterally the model appeared to be excellent, but there seemed to be an occasional twitch of pitch-down happening. Bob flies a conventionally powered Manta which performed well enough to take first place, so I expect that the fan version will get trimmed out soon. Bob's model is powered by a K&B 7.5 and a Turbax fan system from Jet Hangar Hobbies. Weight is 7-1/2 lb., and the area is 800 sq. in. Construction was from foam with 1/64 plywood covering. It even has retracts.

What weighs 16 oz., is painted red, sports a full set of Nazi markings, and flies straight up? Harry Apoian's Me 163, that's what! Harry modeled this classic fighter aircraft from WW-II in a sheet covered foam body and built up wing covered with silkspan and dope. Radio system is a two-channel Cannon Super-Micro. At the contest, something went wrong and the model crashed, but Harry has flight photos showing that the model has flown in the past. Successful flights were with Estes "D" engines for power. When he switched to an FSI "F" engine for the contest, it accelerates too slowly (my opinion, hotly contested by at least 10 other well informed analyses of the cause of the crash) and flight control speeds were never reached. Harry is rebuilding the model and it will fly again. As an ex-model rocketeer, I think that Harry's model represented a great step toward combining two hobbies which are very similar. That the current distance is maintained between model aircraft and rockets is incomprehensible to me.

I mentioned Brian Currey and his semi-scale N1M before, so I'll just fill in some technical details here. Span is 58 inches and the area is 600 sq. in. He uses a Tee Dee .051 turning a pusher 6x4 Tornado prop. Control uses an onboard electronic mixer to drive elevons on the inboard panels. Weight is 17 ounces with an Aero Sport receiver and World Engines micro servos. The wing is cut from foam and uncoated except for epoxy rubbed in for about a 5 inch radius around the engine area. The model has tricycle landing gear and handles great.

Last, but never least, we have Larry Wolfe's Mirage 3R. Larry is the driving force behind Jet Hangar Hobbies, and a superb scale modeler. That Mirage looks REAL. In the air it looks even more real. The aircraft looks kind of slow in the air until Larry brings it down for a low pass down the runway. At that point you find yourself holding your breath and your eyes bugging out. Actual speed in level flight is over 100; I shudder to guess what it is doing after a dive! The model weighs in at 9 lb., and static thrust is 7 lb. Larry says that unlike propellers, the fan picks up thrust for quite a while as speed increases, so performance is excellent. I certainly can't argue the last claim. Noise is provided by a K&B 7.5 driving, as you might expect, the Turbax 1 fan unit. The fiberglass fuselage is from a Kfir kit and the wing is foam with balsa covering. This has got to be one of the smoothest flying models I have ever seen. There just isn't any wobble in the rolls, and loops come out going the way they came in.

I guess at this point I need to apologize

to the numerous contestants (combined entry numbered 53!) I failed to mention in these paragraphs, but Uncle Bill does place some limits on space. I'll close this report with the comment that if next year is better than this one, I'll know that "Ah has done died and gone to heaven". I don't seem to remember seeing any bad models this year (May have to do with the fact that I didn't fly).

Especial congratulations are due in the contest organizers and sponsors: Carl Hatrak, Bill Stroman, Harry Apoian, the Bird Club, and an inspiration to us all, the Northrop Corporation.

Placings were as follows:

F.F. Towline
Bill Warner 213
Bill Bogart 167
Addie Naccarato 132
F.F. Rubber
Larry Sargent 334
Ken Sycora 220
Dick Baxter 177
Gas and Electric FF
Addie Naccarato 166
Jerry Huben 129
Barnaby Wainfan 108
Scale
Ferrel Papic Saab Draken
Ken Johnson Dykes Delta
Chris Johnson Dykes Delta
Original R/C
Bob Martz (conventional Manta)
Charles Abrahams
Tony Naccarato
Scale R/C
Larry Wolfe
Bill Young
Harry Apoian
Kit R/C
Hal Bloom
Wayne Sakamoto
Precision Flying, Kit
Wayne Sakamoto
Jim Whitacre
Andy Borgogna
Precision Flying, Scale
Larry Wolfe
Precision Flying, Original
Bob Marts
Andy Borgogna
Joe Tschinigi
Beginner Precision Flying
Bill Hill
Hal Bloom
Dan Spinks
Specialty Flying
Wayne Sakamoto
Tony Naccarato
Dan Spinks and Bill Hill (tied)

Hope to see even more of you out next year. This is a FUN contest! •

First Step . . . . . *Continued from page 40*

some epoxy. All the supplies you need are available at your local hobby shop.

Begin by pinning both sides of the fuselage to the building board (printed side up). Use waxed paper between the plan and the side, so you don't glue the side to the plan. If you choose to use the fast drying cyanoacrylate glue, you should be ready to remove the sides from the board in under an hour. Then you'll be ready to complete the fuselage by installing the firewall, bulkheads, top, and bottom sheeting. When the fuselage is complete, a coat of epoxy in the engine compartment will protect it from fuel penetrating the balsa. Sand the entire fuselage with 220 grit sandpaper and you're ready to cover. Put the fuselage aside for now and continue with the building.

The wing should be built next. The flat bottom wing is built in two halves directly over the plan. The bottom sheeting is pinned directly over the plan (waxed paper between). The ribs press firmly on the 1/4 sq. spar, each part is glued in place. The 1/4 inch dowel leading edge fits firmly into the notch provided. This makes a very strong leading edge. With the dowel securely glued in place, the two wing panels can be removed from the plan and joined, using the 3/32 ply dihedral brace provided. Epoxy the base in place. The remainder of the sheeting can now be put on.

The plan shows 1/16 vertical webbing. If you are going to use a .19 to .25 engine, the webbing can be omitted. But, if you plan a larger engine, by all means put the webbing in the wing. It doesn't add that much weight, so why not put it in anyhow. The cap strips can be added at this time. Install the wing tips, and your wing is just about complete. Epoxy the fiberglass cloth to the center section of the wing. When dry, sand the entire wing with 220 grit paper. Set this aside with the fuselage and continue the building.

The tail surfaces are all that is left to do. The stabilizer, elevator, rudder, vertical fin, and dorsal fin are all pre-cut from 3/16 sheet balsa. The hardwood elevator connector must be glued between the two elevator halves; use epoxy on this joint. Sand all parts with a small radius on the edges. These can go in with the finished parts now.

You're now ready to cover your hard work. There are many different types of covering materials available to the modeler today. There is the old reliable silk and dope covering. It does a great job, but is a little difficult to apply if you haven't done it before. There is also silkspan, another type that must be applied with dope. There are heat shrinkable fabrics, and the ever popular heat shrinkable films. I chose the film material because it is easy to apply and there is no odor. You'll need two rolls to do the entire plane. One for the wing and another for the fuselage and tail surfaces. Trim sheets are available to do the windows and any other decorations you may want. Prior to installing the tail surfaces to the fuselage, slot the parts for the hinges, install the hinges and control horns. Make sure you either epoxy or pin the hinges in place. Now position the vertical fin and dorsal in place.

Check the alignment to make sure they are square. The steerable tail wheel can now be added to the rudder.

Locate the engine between the wooden bearers per the drawing, and drill the mounting bolt holes. Use the blind nuts and bolts provided. Slip the fuel tank into place and connect the fuel and fill lines.

There is plenty of room in the fuselage for any radio system on the market today. The three servos should be mounted in a servo tray (usually provided by the radio manufacturer) and screwed to hardwood rails. Connect the push rods with the links provided. Make sure you have the surfaces going in the right direction. Standing in back of the model, the rudder stick on the transmitter (right side of transmitter), when pushed to the right, should move the rudder to the right. When the elevator stick (the same stick) is pulled back, the elevator should move up. The throttle (left stick on transmitter), when moved forward should open the throttle for high speed.

Wrap the receiver in foam rubber and locate in the fuselage. The battery pack should also be wrapped with a piece of foam, then sealed in a baggie, and located under the fuel tank (securely, so it doesn't move). Make sure you install the switch on the opposite side from the engine exhaust. The antenna is routed outside the fuselage to either the vertical fin or the dorsal fin. Make sure the radio system is fully charged before you go to the flying field.

Your new creation, the FIRST STEP is now ready to take its first flight.

Make sure you have an experienced flyer check your installation of equipment and determine that all controls functions are working perfectly. Rubber band the wing in place and check to see that you have enough rubber bands on the landing gear (a rough landing will break the bands not the plane).

Let the experienced flyer get your FIRST STEP airborne for you. He'll let you take the controls when its at an altitude where you can get the feel of R/C flying. In no time you'll be making touch-and-goes, and be the master of your FIRST STEP.

NOTE: When you've gained some experience flying the FIRST STEP, and want an aileron plane, RAMCO makes a wing kit that fits perfectly on the FIRST STEP to convert it to a four-channel plane. Its offered in either a flat bottom or semi-symmetrical airfoil.

When you have mastered your FIRST STEP there are more kits coming . . . the Mini Step, The First Step Jr., Next Step, Two Step, High Step, Mid Step, Quick Step, and First Step Senior. Try them all.

Plug Sparks . . *Continued from page 44*

fair running engine, rated all the way from 7,000 to 14,000 rpm. Half horsepower was claimed, but no strobatic tests are available to indicate the optimum propeller size.

The Contestor 60 was actually .596 cu. in. displacement, sporting a bore of .945 in. and a stroke of .850 in. Weight was 11 ounces, considerably under the other big engines such as Spitfire, Hornet, McCoy, etc.

For those who have a techincal quirk, the engine featured a polished cast aluminum head with fairly large cooling fins. The cylinder followed the standard Bunch practice of being carbon steel with by-pass and exhaust silver brazed in place. The cylinder is then broached and honed to final fit.

One interesting gimmick was the two rings, claimed to make for more positive starting and long lived compression. Crankcase was die-cast aluminum alloy employing a one-piece hardened steel crankshaft. To prevent connecting rod failure, this item was produced from drop-forged chrome moly steel.

Embittered by his lack of success, Danner Bunch died shortly thereafter, with many saying by his own hand.

30 YEARS AGO, I WAS . . .

This month we are indebted to Jack Albrecht for a series of old photos he has sent showing what he was doing then. Not too many modelers are aware that Hack Albrecht is the Service Manager for Kraft Systems, in Vista, California.

Unfortunately, some of the early photos like the one of Jack at very young age with his Comet Clipper have been ruined by age. This photo, taken at the Oakland Mud Flats in 1940, does show Don Foote in the background with one of his Westerners, sporting an experimental wing. This Jan. 1940 photo never did indicate whether or not they got the Mighty Midget started.

About this same time, Jack succumbed to the control line craze sweeping Northern California. Inasmuch as the United States had gone to war, free flighting was pretty much out of the picture, as any high flying free flight might be taken for a Japanese Zero.

Photo No. 5 shows a Comet Clipper (no, not Jack Albrecht's) built by Ted Kroll, one of the early pioneers of control line flying. He developed a system in the same time frame as Jim Walker. This shot, taken at the Polo Grounds in Golden Gate Park (1941), clearly shows Ted Kroll's own .78 cu. in. displacement engine. It was through Ted that Jack got interested in control line flying.

Photo No. 6 shows a small portion of the speed entries in the King City C/L meet, held in 1943. Jack Albrecht's Hornet-powered job placed third with 94.6 mph, while Wes Little's Super Cyke powered "Sting Ray" on the far right, won first with a speed of 98 mph. All the other models belong to Wes Little, being another "Cyke" Sting Ray, and a Hornet job similar to Albrecht's model.

Photo No. 7 shows the first commercially kitted control line speed job, the "Sting Ray", as offered by Offenbach Hobby Supply and designed by Bob

McMullen. The original, shown here, was powered with a Bunch Tiger, using a special hand carved prop, that set speed records in the 100 mph range.

Several years later, Albrecht enrolled at the Spartan School of Aeronautics in Tulsa, Oklahoma. With his contol line background in speed, he became associated with another student, Jim Paysen, and between the two of them, started to clean up in the local speed meets.

Photo No. 8 shows the successful team with McCoy 29 and 49 size speed jobs. Note Albrecht's shirt still says S.F., Calif. In reviewing the "Midwest Modeler", a publication put out in 1948 by the Midstates Model Aeronautical Association with headquarters in Wichita, Kansas, the P&A team did very well in 1948, winning two firsts at the Carthage, Missouri Skylarks Annual, and two thirds at the Enid Oklahoma Exchange Club Meet. To show their speeds were competitive, both the 29 and 49 versions did over 130 mph in 1948!

To fill in a little background for the next photo, the most popular control line club on the West Coast was the San Francisco MAC, bragging better than 150 members.

Dissatisfied with the policies of the SFMAC, Ray Regalia (the undisputed Northern Calif. Stunt Champ) and his friends bolted from SFMAC and formed a group known as the Mustangs. It was rather boring thereafter to read the results of the Stunt contest, as either Ray Regalia, Ralph Arista, or one of the Bazurto boys would win the Stunt event.

About 1949, Edward Rockwood joined the Mustangs Club, and interest in radio control developed, particularly when Rockwood hit on the happy idea of tuned reeds to activate the servos. This tremendous breakthrough enabled Alex Schneider to win the R/C Event at the Nationals three times in four years! (He missed one Nats!)

Alex Schneider developed a model based on the Capitol Piper Cub kit. A considerable amount of changes went into the re-design and became known as the "Schneider Cub". This design flew so well, it was adopted by all the members of the SF Mustangs as the club design. *(Presented in our famous R/C aircraft series, plans for the Schneider Cub are available from MB. WCN)*

Having gotten back to San Francisco in the meantime, Jack Albrecht had to build a "Cub" also. When he received his Second Lieutenant rating and was assigned to Ft. Bliss, Texas, Jack naturally took his Schneider Cub with him.

Besides the outstanding performance of the Rockwood reeds, the Mustangs also adopted the Anderson Spitfire as the engine to use, as its special two-speed ignition system worked admirably with the radio sets. Here was a "full house" radio model. No wonder Alex Schneider outstripped the other R/C competitors.

Photo No. 9 shows Jack Albrecht in 1951-52 at his Texas base with a Schneider Cub, complete with the 5-channel setup as described (rudder(2), elevator(2), and motor control). As a side note, when Rockwood's equipment won the Nationals so convincingly, the competitors copied his reed design and poor Rockwood never did realize the financial harvest he had expected. Disappointed, depressed, and frustrated, Rockwood took the hard way out. Truly a shame, as this mind might have spurred the radio manufacturing industry to better heights of capability.

To wrap things up, the Mustang Club became so strong they changed their name to Pacific Radio Control Society. When a federation of R/C clubs was formed, the name was released for use of the new association. This federation lasted only a short time, and was eventually supplanted by the Northern California Radio Control Society (NCRCS), which has continued to-date. In the meantime, the Mustang Club then adopted the name of the Pioneer R/C Club, which was incorporated by one of the members, "Andy" Anderson, a lawyer working for the FBI. The name change also avoided the objections of another corporation of the same name (Mustangs).

Started in 1950, reorganized politically in 1952, the Pioneers have gone on to become one of the most successful and *largest* (400 members now!) R/C Clubs in the world. It is amazing how it all started!

GOOD NEWS

In a surprise visit to this columnist's home, Granger Williams and Lorraine Barrera dropped in to announce their marriage intentions.

Most all modelers are familiar with Granger Williams, of the Williams Brothers manufacturing fame, plus the fact that Granger has always been an outstanding scale competitor.

Lorraine Barrera needs no introduction, as the wife of the late Russ Barrera, noted for his flying scale activities and his many years in the "scale cage" at the Nationals. Lorraine also inherited the Russ Barrera National Model Airplane Museum at the time of Russ's unfortunate demise. This has since been turned over to AMA for its upcoming museum.

By the time you read this, Granger and Lorraine will probably be married and honeymooning in one of the warmer climates of Hawaii or the Carribean. We can only wish them the best of everthing. Congratulations!

TEXAS TEA PARTY

There is absolutely no question the R/C/ O/T is sweeping Texas, after the termendous success enjoyed by the Ft. Worth Planesmen SAM 29 Chapter at the recent SAM Champs at Westover AFB. Fifteen out of 22 trophies. Not too shabby!

From this has grown the San Antoino group, spearheaded by George Aldrich, called SAM 1832, and in the Houston area where the local SAM chapter is known as SAM Houston 82. This columnist is anticipating a huge Tri-City meet in the future. It is inevitable.

In the latest letter from Dr. James "Bo Buice were several excellent photos, plus a write-up on the 7th Annual Planesman Regional Championships. In the attached newsletter, Contest Director and Editor Dave Benepe proudly pointed out that the contest was a huge success with 67 contestants 54 of whom were open class flyers. Entries were actually down somewhat, with 240 entries for 30 events. (Now you know why we can't list them!)

As can be seen in Photo No. 10, Jerry Burk is swapping lies with R/C Event Director, Jack Swain. This columnist might mention that Jerry Burk had the

idea for the Old Timers Reunion Banquet, the first one being held in conjuction with the Dallas Nationals in 1964. This one went over so well that this columinst has maintained it ever since. Really starting to get some whiskers on it now.

The main purpose in showing this picture, besides giving credit to Jack Swain for tireless and unselfish work, is to point out the extremely simple frequency control.

With all of the new frequencies now becoming available, it is simply a case of adding new sticks. Other clubs would do well to observe this simple system.

With electric power gaining popularity all the time, we had to run Photo No. 11, showing Marion Knight with his usual impeccable work. This time the model is a Tom Laurie Experimental, a design appearing in the 1938 Zaic Year Book, and so successfully used by Jim Adams on the West Coast.

Marion uses the latest hot electric motor, the Geist, with appropriate Carrera folding propeller. Needless to say, Marion won going away! Just as well there weren't any points given for beauty. The event would have been a real rout!

How many of you old timers out there remember the early SAM Champs held in the Denver area? If you do recall it clearly, you won't forget that little dynamo of energy, Lou Levine, who walked off with just about every trophy.

Lou dropped from sight at the Champs, and not too much has been heard of him in the last ten years. When Lou finally moved to Texas, it was a surprise to see him blossom out with a flock of radio controlled old timers. Photo No. 12 is the proof that Levine is very active in the Ft. Worth area.

The 10 ft. Yates Cabin model as shown is one of the designs dug up by Lou when he ran across Melvin Yates, who still had almost all of his pre-WWII models in various degrees of restoration. In less time than it takes to tell about it, Lou has drawn the plans of these models directly from the originals. Many of the Yates designs have proven to be quite popular, as evidenced by the gorgeous "Herky" which was featured in the 1937-38 Forster Brothers catalog.

Lest the reader think this meet was strictly radio control, the writer must hasten to point out that all free flight gas events were held, including rubber and flying scale, along with the latest 1/2A Nostalgia Event. Although the wind did act up, this didn't seem to deter the boys one bit, as they were out there flying up a storm.

We couldn't close off this report unless we ran a photo of that old classic, the Megow Flying Quaker, as seen in Photo No. 13. The black and white shot does not do this pretty orange and green model justice, but rest assured, Tom Juswiak did an outstanding job of contruction! We need more of these old turkeys on the field!

In the wrap-up, Benepe reports the club went to great lengths to clear the underbrush and mow the field. After two successive days using a "Brush Hog", the site was about a city block clear. Wouldn't you know it! The wind comes up from the east and all activities had the free flight site to the unmowed territory in the north and east. Rats!

If we didn't mention your name it is because we simply ran out of space extolling this very successful meet. Seems like just about everyone contributed something to the meet. As the old saying goes, "You only get out of something what you put in." Remember that men!

READERS WRITE

Received a real neat snapshot (Photo No. 14) of a Modelcraft Pacific Ace, as built by William Nesbitt, 933 Chisholm Ct., Toms River, N.J. 08753.

Bill is quite enthusiastic over this model, as it flew so well using a 9-1/2 inch Peck-Polymer prop, that he lost it on the third flight, meatballs and all.

Nesbitt says that doesn't discourage him one bit, as he plans to build other rubber models by Modelcraft, such as the Cloud Haunter (also known as the 40-inch Pacific Ace), Wrecker Wrecker, and a few others.

C.I.A. GOINGS

This month's column is extremely contest oriented this time, so might as well keep on describing the fun.

According to the *"CIA Informer"* as so ably edited by Harry Murphy, Wright-Patterson AFB was opened up for one contest in 1982. The Central Indiana Association (CIA), ever alert to this situation, immediately set up the 10th Annual CIA F/F Model Meet for September 26, rain or shine!

Although the emphasis was on standard free flight events, Editor Harry Murphy reports that Old Timers came in for their share of attention. "Murf" also mentions the fun when all systems stopped and all (we mean all!) eyes turned westward when the word was passed that Floyd Miller, the perennial Contest Director, finally brought a model to the field . . . to fly!!

As can be seen in Photo No. 15, Floyd picked out a little seen design by Ted Justice, known as the "Mousetrap". (Ya know, build a better mousetrap, etc.) This beautifully cowled Nostalgia design powered by an OS15 engine did not fly as spectacularly as was the fact that Floyd brought a model to the field! Great stuff!

It truly is a shame that Photo No. 16 has to be printed in black and white, as it fails to show why Bill Hale of Columbus, Ohio (COFFC) is called "Ole Yaller". His models are always impeccably finished in yellow with black checkerboard or stripes. Not only that, but Hale's attire features yellow hat, yellow trim in clothing, and yellow patches. It doesn't take any brain to figure out what color Bill Hale is partial to!

Might mention that Bill Hale's good flying Ranger with an Ohlsson 23 was barely nosed out by Bruno Markewicz's Sailplane. Another Sailplane by Buck

Zehr placed third, powered by a Spitfire. (Guess he swapped off the troublesome Orwick.)

How about Photo No. 17? Honest injun! Ted Dock says his Thor (sometimes called a "slag" engine) 29 runs well. Of course, proper fuel and running technique are essential, but for a Cleveland Viking, originally designed for an Ohlsson 19/23 combination, the Thor 29 is plenty of power for competition flying. So take heart men, all is not lost with the likes of Rogers, Genie, Buzz, and Thor engines!

For the one contest held at Wright-Patterson, Murphy concludes by saying the weather was just about perfect for the high climbing models. Some sensational times were recorded for these types, but the low altitude events such as glider, suffered accordingly. Best part of all, the drift was practically non-existent, and most of the chase bikes were simply parked. Need more meets like that!

ORWICK PARTS

Just received real good news in the form of an Orwick parts sheet being put out by William E. "Bill" Daniel of 8165 Castenada Lane, Atascadero, CA 93442.

Although he doesn't have any pistons, crankcases, or crankshafts, there are plenty of nine and eleven-fin cylinder heads, plus the all-important parts to Orwick timers. This is simply great news to those who have Orwicks that have lost their timers or the parts have worn out. Let's get those Orwicks out and see if we can get them running again!

Bill also lists some miscellaneous parts for sale, such as O&R stationary points, Baby Cyclone needle valve assembly, timer body for sand-cast Bunch engines, and other hard-to-find items. Best idea is to write Bill and get his list.

FOREIGN EXCHANGE

ENGLAND

We were going to have a terrific write-up on activities in England by SAM 35. However, Dave Baker has submitted many good photos and Alex Imrie, SAM 35 President, has written up the first O/T Exhibition. Alex also writes an outstanding column called "Vintage Corner" for Aeromodeller, wherein they always have 15 to 20 photos. This is great and most people prefer photos to reading. This author can readily see why the Aeromodeller magazine is being dominated by O/T reports, column, photos, and plans. It's simply the O/T movement revolution!

SWEDEN

Good news for those modelers interested in what is going on in the other part of the world. Just received the Number 1 copy of 1982 "Old Timer", a newsletter put out by the "Old Timer Sallskapet" (I'll let you translate that!).

Editor Sven Olv-Linden is again on the job and can be reached at Hoostavagen 15, 70363 Orebro, Sweden. Noticed in this issue the American language version of Frank Zaic's article on Emmanuel Fillon's Wakefield winner for France, as it appeared in Model Airplane News.

Also appearing was a reduced three-view drawing of Weather's Westerner as published in **Model Builder**. Makes for real good reading, along with several three-views of contemporary Swedish rubber models. We can only wish Sven Olv luck and hope he continues the good work.

ELECTRIC CONTESTS

Electric power for Old Timers is the latest rage (pardon me while I get repetitious) in California. To this end, the Boucher brothers have announced separate electric meets in February.

The first meet, called the "Ninth Annual Astro Electric Championships", under the sponsorship of Bob Boucher of Astro Flight, will be held February 5th at Magnolia High School, Anaheim, and on February 6th at Mile Square. Ten events are scheduled: five R/C, four free flight, and one control line. For futher info, contact Bob Boucher at (213) 472-6344.

Meanwhile, brother Roland Boucher, of Leisure Electronics, will hold the "Leisure Grand Championships" on February 26-27, with prizes ranging from $500.00 to second place Futaba radios.

February 26th will feature two-meter Sailplanes, Open Sailplanes, and pylon Racers (the latter a fun fly event). On Sunday, 27th, 05 Old Timer will be the feature with "Golden Age" Flying Scale ("uncontest type") with added Flying Scale events of non-military 1929-41 and regular scale. This contest will feature mostly 05 motors. Call Roland at (714) 552-4540 for details.

THE WRAP-UP

Ike Kerschner, of R.D. #1, Box 181A, Kunkletown, PA 18058, writes to say that a lot of fellows are interested in getting into old timer flying, but have no idea of how contests are run and what they consist of. He further states the rules are enough to stop anyone first starting out without help.

He has a myriad of questions about engines, plans, events, and kits, that would easily fill a column. Last month, we attempted to point out some of this information, but occasionally we do overlook the obvious. This columnist would be most interested in the reaction of the readers to that column.

Regardless, we will slant the column more to the beginner, the sport flyer, and the casual competitor. The writer has already compiled some ideas on what to write on, but would welcome any suggestions.

This is not to say we won't carry the latest developments, the contests, and the doing of the "hot shots", but will try to integrate it in such a way that you, the beginner, will be unable to resist the attraction of the old timer movement. That's our goal; everyone in old timers!

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

the 7.5 tunnel. We had a race the following weekend and I'd know then

how it would work.

The race provided some good news and bad news. The good news was the 3.5 tunnel ran superbly. Out of seventeen 3.5 entries, the boat turned in more laps in a single five-minute enduro than any other tunnel. The 3.5 tunnel ran great. But I didn't have the same success with the 7.5 tunnel. The boat still tended to hook coming out of the corners. In one five-minute enduro, I managed to run pretty well, but I didn't feel secure cornering the boat. I still didn't have the boat dialed in properly.

I believe the sponson modification will work on my 7.5 tunnel. However, I have to submit this article before I get another opportunity to test the boat. I think part of the problem might be that I'm running my 7.5 engine too high on the transom. Lowering the engine will put the turn skeg deeper in the water and should keep the boat from sliding. I'm just going to have to do more testing with the 7.5 tunnel. It may be that I'll have to go back to using a turn fin to assist the boat in the corners. I'll let you know in a future article what I find out about the things necessary to make this trick work on my 7.5 tunnel.

Will this idea work on all tunnels? One of the fellows in our boat club tried the idea on his Excaliber II tunnel, and it worked on that boat. It's an easy modification to make. If it doesn't work it can be removed.

I have found that engine settings both up and down on the transom and in and away from the transom are critical. Another thing to be aware of is that the boat will turn very quickly if it is slowed down for the corner. My 3.5 tunnel turns better the faster it runs through the corner. I'm sure it will take some experimenting to get the right combinations. On both of my boats, I'm running a front airfoil. Rod Geraghty suggested this to me to help carry the nose through the corners. I'm extremely pleased with the way this sponson modification is working on my 3.5 tunnel. There's no doubt in my mind that if a tunnel will turn adequately without the use of a turnfin, that it is a better way to go than using a turnfin.

EXCALIBER III?

Phillip M. Kenney, secretary/treasurer of the Rocky Mountain Marine Modelers of Denver, sent me a short letter and some photos of an upsized version of my Excaliber II for use with the K&B 7.5 Outboard.

"I've been meaning to write you all summer and show you what we have done to your Excaliber II that was in the *Model Builder* magazine in December, 1979.

"The small boat in the picture is the Excaliber II built exactly as the plans showed. The larger boat is what we call the Excaliber Also. Roger Miller took the plans in *Model Builder*, xeroxed a copy, and made a transparency of the plans. These were projected on the wall until the boat was 30 inches long. Roger did make a few minor changes to improve the 'eye appeal.' You can see it runs basically the same as the smaller Excaliber.

"During the season, I won one first, two seconds, and two thirds in seven races and didn't finish one heat. The boat is very stable and runs flat out through the turns. The only problem that we have to work on for next year is keeping the nose down in windy weather. In the two races in which I finished third, the boat blew over in the late afternoon wind. With the props I used this year, the hull was not quite as fast as the Prather hull, but was faster than the Dumas Hotshot 45 (sorry)." (So am I j.d.)

Thanks, Phillip, for sending the letter and photos. The boats look very nice. How about you and Roger working up a construction article for *Model Builder* on the Excaliber Also? I think there would be a lot of interest in a 7.5 version of the Excaliber.

SCALE BOATS, ANYONE?

Wally Nussbaumer, Secretary of Capital Marine Modelers of Ottawa, Ontario, Canada, sent me some photos of the electric scale boats belonging to members of his club. The photos were taken at an exhibit the Capital Marine Modelers presented at a shopping mall. They were able to put on a demonstration of their models in a pool inside the mall.

Wally's group is deeply involved with scale model boats, and would be willing to answer questions on this aspect of our hobby. This type of model boating has a great amount of appeal to many people. The Capital Marine Modelers can be reached by writing to their club address, 18-2669 Southvale, Crescent, Ottawa. Ontario, Canada K1B 4V2.

THE PUERTO RICO CONNECTION

Harry Cooper, of Puerto Rico, sent Vern Schmitt, of JVS Boats, pictures of model boating activites in that area. Vern forwarded the photos and a letter to me. Vern's letter is as follows.

"Most people are aware that Puerto Rico is a territory of the United States. But many people don't understand that the Puerto Ricans are also full citizens of this country with voting rights and freedom to travel or live anywhere in the United States.

"Puerto Rico is NAMBA District 20. Their District Director is Jose Bonilla and he is also club president of the Puerto Rico Marine Modelers. The Puerto Rico Marine Modelers has twenty-two members and the membership encourage youth to take part in model boating activities. They hold a contest every other week. To date, they are only racing mono class. From what I hear, they will soon be into hydros. A few outboards are beginning to appear, and by next season, they should have several more classes in their racing program.

"Harry Cooper first got the bug to race model boats when he watched a contest in Monterey, California, while serving in the Army at Fort Ord during the Viet Nam conflict. When he was discharged and adjusted to civilian life, he began model boating and found there were others on this island of thirty-five by one-hundred miles who also shared his interest.

"They have four large lakes and fifteen medium to small lakes. The climate has an average temperature of 73 in the winter and 79 in the summer. The trade wind blows daily, so sheltered lakes provide the best boating. They model boat 365 days a year, and frost is unknown to Puerto Rico. It is tropical, as can be seen from the background in the photos."

SPONSON MODIFICATION FOR THE 7.5 TUNNEL — ONE MORE TIME

Since submitting the article on the sponson edges, I've had the opportunity to further test the concept on my 7.5 Dumas Hotshot tunnel. I hope this will

arrive in time to be included as part of the article. *(It did. wcn)*

After having trimmed the lip on the 7.5 down to 1/16 and having problems with the boat hooking, I decided to try going the other way with the lip and make it bigger. I Hot Stuffed a 1/8 strip of spruce to the edge to give a 3/16 lip. The weather was unbelieveably cooperative for mid-December on the day I had hoped to try out this new addition. Just in case this wider lip didn't work, I brought along a couple of turnfins to attach inside the tunnel . . . they weren't needed!

This wider flange seemed to be the "trick" for the 7.5 tunnel. It did take a little "dialing in" to prevent the boat from oversteering while making a corner. The most important item in achieving a smooth cornering configuration was playing with the amount of throw on the rudder servo. This was an especially easy adjustment for me to make using the servo throw control on my Airtronics XL transmitter. These new "super" transmitters with all their adjustment capabilities are really something. With an older standard type of transmitter, I would have had to adjust the amount of servo throw by moving the control linkages around on the servo output arm and the control arm on the engine. That isn't all that difficult an adjustment to make, but it's sure neat to be able to make the changes on the transmitter while the boat is still running.

I found that not much rudder deflection was needed to make the boat turn. Too much movement caused the boat to hook. I was able to raise the engine as high on the transom as my mount would allow. I tried kicking the engine back and this resulted in a very wide turning radius. The engine was gradually adjusted to where the boat would make a rather tight corner without hooking. My boat will now corner at full throttle in probably a thirty foot or less radius. That is much less than the radius used in standard heat racing.

On the 7.5 tunnel, the 3/16 wide lip extends from the back of the sponson forward for 15 inches, and then blends back into the sponson wall in 4 inches. The lip on the left sponson is only 1/8, but this seems to be sufficient to allow the boat to make corners to the left without any problems.

I won't have the opportunity to see how this works under actual race conditions for a couple of months. However, I can see no reason it shouldn't work equally as well on the 7.5 tunnel as it does on my 3.5 tunnel. I'm looking forward to racing "finless" tunnels.

THEY SHOULDN'T MAKE FLAT BATTERY PACKS

Here's one for the "Boy, that's really dumb" file. The other day I was setting up the Kraft radio in my Coyote 21 rigger and had the different parts spread about my shop. I was interrupted by something, and aftera a while, got back to the task of setting up the radio in the boat. But when it came time to place the receiver battery pack in the hull, I couldn't find it anywhere. I spent considerable time searching under piles of this and clumps of that to no avail. In frustration, I rewired another battery pack and installed it in the boat. All the time I was doing that, I was muttering about how anyone could be so stupid as to misplace a battery pack.

As I was getting ready for bed that evening, I removed all the items I'd stuffed in my trousers during the course of the day. There was the usual collection; some change, a comb, my wallet, and . . . the missing receiver pack! Seems like I stuck it in my back pocket, and because it was flat, I thought it was my wallet. The good news is I now have a spare receiver pack for my Kraft radio. I'm not sure there is any bad news. But I sure felt dumb when I pulled that flat pack out of my back pocket. Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

Electronics . . . *Continued from page 51*

half amp drain, the battery will provide power down to the cut-off voltage of three volts for 15 minutes.

I don't believe the batteries are available singly from camera stores or even electronic stores, but they can be purchased directly from Polaroid. In fact, it has a Designer's Kit, #4155, which includes five new batteries, a battery holder, and data, for only $16.75. It can be obtained from Polaroid Corporation, Commercial Battery Division, 784 Memorial Dr., Cambridge, MA 02139, (617) 577-4228.

Joe's idea of using the LM-317 regulator to tame the battery voltage down to R/C values is a good one, and a circuit is shown that will do the job. To save weight and space, the 5K pot can be replaced with a fixed resistor of the proper value once it's size has been determined for the desired voltage. If 5 volts are desired, the 7805 can be used; it requires no adjustment, and is a little smaller and lighter. Every micro-gram counts!

While on the subject of power sources, let us not forget lithium batteries, which are now available in a wide range of sizes and capacities. Though they are not rechargeable, and somewhat expensive, they have some decided advantages, such as higher voltage, at three volts per cell, and what the battery trade calls an extremely high "energy density"; the measure of the available watts for the size and weight. Information on lithium batteries can be obtained from: Electrochem Industries, Inc., 9990 Wehrle Dr., Clarence NY 14031, (716) 759-2828; General Electric Co., Battery Business Dept., P.O. Box 861, Gainesville, FL 32602; or the same company, 3420 Ocean Park Blvd., Suite 1000, Santa Monica, CA 90405, (213) 450-8840; and Sanyo Electric Inc/Battery Division, 200 Riser Rd., Little Ferry, NJ 07643, (201)

641-2333.

Like I said before, I love the idea of using the Polaroid battery for a canard! Now, if we take half of one for a rudder, and. . .

CHARGING THE 12-VOLT WET CELL

Did you ever wonder why often the 12-volt wet cell battery is the only thing that lasts longer than the payments, and similar batteries, either the wet cell or the gel cell types that we use to power starters for our model engines, seem to all have such short lives? The answer is in the charging. An informative letter from Bob Bostrom, Santa Maria, California touches on the subject:

"By now, I have some working knowledge of the care and feeding of NiCd cells and the precautions re charge rate, etc.

"However I have found little in the R/C literature regarding wet cells, such as the motorcycle batteries we use in our field boxes. Specifically, I just bought a used cycle battery which had no charger, and I'd like to build one. I know these chargers are inexpensive, but just like the challenge of doing it myself and in the process learning more about the whole wet cell picture.

"As a starting point, MB for May, 1979 has an article (George Wilson) on building a trickle charger, supplying about 5 ma to a charged battery to keep it that way. 'Use your regular charger to bring it up. . .' Then, Popular Electronics *(Jan. '81, p. 66) has an article re building a combination booster-trickle charger for auto batteries, in which the author suggests 50 ma for the trickel function and one amp for the booster action. I suspect this would be much too high a charge rate for my 5-1/2 Ah battery, but should the current be proportional to the Ah ratings?*

"Each article uses rectified DC from a 25-volt secondary transformer, although the current capacities are far different. I don't think the secondary voltage is that important as long as the DC voltage is several volts above the cell to be charged. Although, too little a difference would result in a very long charge rate.

"My suggestion to you is an article in your column on this subject, and especially the results (hazards) of overcharging. Also, the best practical way to determine the state of charge (a hydrometer as used in automotive shops, or is there an electronic method?).

"Also, in the schematic shown, what values of R would you suggest? I have this old transformer with 18v. AC out; using a two-amp, 50 PIV silicon rectifier, the meter shows 16 v. DC."

Bob, you sound like my kind of guy, I too like the challenge of doing it myself, and learning about different things. I always feel that even if some of my projects get adjusted by "tuning for maximum smoke," I've learned a little from them.

Anyway, you are right in your assumption about the PE charger and its use with a 5.5 amp battery, as they do have to be charged at a rate determined by their capacity. The Yuasa Battery Co., one of the major suppliers of the motorcycle type of batteries that R/C'ers use in great quantities, recommends a tenth rate charge. Thus, for your 5.5 amp capacity battery, the charging rate is .55 amp, or 550 milliamps, for a recommended time of 15 to 20 hours. This is, of course, assuming a new, or completely discharged battery; a shorter period is required to "top off" a partially discharged one. Trickle charging, to keep the battery topped off, should be done at 1/10th of the charging current, 50 mA in this case.

Before we go further, let us touch on the dangers of overcharging. By doing so, at either too high a rate, or too long a period of time, you boil off the electrolyte, create deposits on the plates, and lower the capacity or ruin the battery completely. Extreme overcharging, especially wet cells without proper venting, will cause them to explode, as gas is given off steadily during the charging process. In the case of a gel cell, overcharging causes them to vent, to relieve the pressure, but also causes a loss of electrolyte, which, as it cannot be replaced remains a loss of capacity. But we'll stick to the wet cell, as this is your primary interest at the moment; it is important to keep the battery filled to the indicated level, with the proper electrolyte. In temperature climates, a sulfuric acid electrolyte diluted to a 1.260 specific gravity is recommended, while for warmer climates, a 1.240 mixture is best.

The method you mentioned, of checking specific gravity with a hydrometer is one way, but there is another way of checking for degree of charge. Fortunately, wet cells have a steeper voltage-to-percentage-of-charge curve than do Ni-Cds, making it possible to determine the latter with a voltmeter. However, the change is still small enough to require either a digital voltmeter, or an expanded scale analog meter. I have included a graph of the volts-to-degree-of-charge of a 12-volt battery, and an expanded scale voltmeter schematic that you can use to keep track of what your battery is doing.

Now, as for charging the battery! You are right, a voltage higher than that of the battery is required, but not necessarily one as high as the one used in the PE charger. Doing so only means that you have to dissipate more of the available voltage in the series resistors. You can use the PE circuit with your smaller transformer you have, and juggle the value of the resistors to obtain the desired results. More about that in a moment, but first, on this charger, with LED indicator, when you change things as suggested, you will have to change R4 to keep the LED current down to 15 mils or so. This resistor only controls the current through the LED and only an insignificant amount to the battery. To simplify things, you can combine R1 and

R2 into one unit, and connect the R4 to the junction of the F1 and R1; with a proper value for R4.

Unfortunately, the exact values of these resistors, as for those required for the circuit you submitted, cannot be exactly calculated because of the many variables involved. Ohms Law covers all circuits, but is exact only with fixed values. In this case, the battery resistance drops when a load, in the form of a discharged battery is connected, and increases as the battery charges. What do you do? Well, you cut and try, always starting on the high side and being so darn sure to keep your fingers out of the AC. I have given you some resistor values to start with. Install those, measure the current and adjust the resistor value as necessary to get close to the desired amounts.

As noted, the Expanded Scale Voltmeter circuit is relatively simple. It uses a Radio Shack 270-1752 0-1 mA panel meter, which in this circuit, when properly adjusted, will read from 11 to 16 volts with enough accuracy for this application. To adjust, it is best to find a friend with a variable power supply and an accurate meter. Apply 11 volts to the circuit, and adjust for zero reading with the 500 ohm pot. Crank up the voltage to 16, and adjust for top end reading with the 2500 ohm pot.

An alteranate method can be used, which requires two fresh 9-volt batteries and 820 and 160 ohm 5% resistors. Break the connection of the 330 and 390 ohm resistors, and connect the 12-battery, charged previously, to the input. Then connect the 9-volt batteries in series, with the negative to negative input, positive through the 820 ohm resistor to the temporarily loose end of the 390 ohm resistor. Adjust the meter reading with the 500 ohm pot for zero. Now replace the 820 resistor with the 160, and adjust the meter reading for full scale with the 2500 ohm pot.

In use, you can periodically test the battery voltage for the proper value, disconnecting the charger when you do so. You will find that the voltage will be higher immediately after charge, but will lower and settle down after a couple of hours, at about the same time gassing stops. This method might not get you a 100% charge every time, but you will be getting very close to it, and doing so safely!

The Popular Electronics charger circuit mentioned is of interest, but cannot be included here without a copyright infringement. However, if you are interested, drop a SASE and I'll send you a copy. And of course, if you have a successful charger, or anything, circuit, please share it with us. You can send it to MB along with your 25-year subscription payment, or directly to me at: 231 Cottage Pl., Costa Mesa, CA 92627. Have a good! •

Fuel Lines . . . . *Continued from page 52*

You'll need an inside, outside depth caliper . . . similar to the one discussed last month . . . to measure piston depth and connecting rod length in thousands of an inch. A depth micrometer will work equally well. With this method you simply measure the difference between the depth of the piston at BDC and any other position. Mathematically, you can convert this into degrees of crankshaft rotation if you also know the length of the connecting rod between centers of holes, and the stroke of the engine . . . normally found in the instructions accompanying each engine. The accompanying illustration provides the definitions and the formula. At first glance, the formula may seem somewhat imposing . . . engineers excepted. However, if you have a calculator, with trigonometry functions, solutions are quite simple. Here's how to go about it systematically.

1. Measure the depth of the top of the piston in the sleeve at BDC.
2. Measure the rod length . . . holes center to center.
3. Use these two figures together with the stroke of the engine, and plug them into the formula together with the sine and cosine of each angle from 0 to 90 degrees. You'll then have a list of height differences for each degree of crankshaft rotation.
4. Rotate the crankshaft to the appropriate opening and closing points for intake, transfer and exhaust, and measure depth of the top of the piston accordingly.
5. Subtract this figure from the depth at BDC and compare it to the list of height differences for degrees of rotation. The results are the appropriate degrees of rotation.

OK guys, whatever method you choose, record the data in a notebook. As you accumulate such data for various engines, you'll have more of a sound appreciation of how timing affects performance. Further, if you know what the design timing of a specific engine is, then you can check your engine against the manufacturers timing specifications, and you can make any necessary adjustments. This is what is often referred to as "blueprinting" an engine. You compare and adjust your engine to match the manufacturers blueprint.

Does this mean that manufacturers do not make engines according to their own blueprints? Not at all. There simply are manufacturing tolerances for each engine part. In some instances, they can become additive and amount to subtle timing changes. A degree or two may not seem like much, but it can noticeably affect performance. This is also why a custom tuned engine is more expensive than one from the production line.

In summary, if you are performance oriented, the measurement of engine timing is essential. Use whatever method you prefer, but above all, do it carefully. I think you'll find the results gratifying. There's satisfaction in just knowing

about the timing of your engine . . . even if it's a GHQ. Correction . . . *especially* if it's a GHQ! •

Spain '81 . . . . . *Continued from page 53*

Plus the ever-dangerous liter of dark red wine. Anyone who drank the entire thing wouldn't have been able to walk, let alone be able to compete the rest of the day. In our contingent, we opened a couple of bottles each day and passed them around through the hands of the 10 to 15 of us there. Any more of a thirst was quenched with our old trusty water jugs.

Round five gave Wilson a 113, Juan a good solid 180, and Dona, now flying his number two model, took an attempt while trying to circle in the wind and then a 111-second flight that dropped him from the all maxes group. As round six began, word came to us that we were holding in the top three teams. (We couldn't keep up with scores as FENDA had the scoreboard three-quarters of a mile away by the Airdrome Headquarters building.) Finding out this good news perked the Team up and all three responded with a 180 to keep us abreast of the other teams. Round seven started with ominous cold winds hitting us. Mind you, the wind had howled all day, but at least it was fairly warm. Now it was getting cooler and cooler. As the temp changes, so do the thermals. Our efforts in round seven were nothing to write home about, as only 33 out of the 86 contestants found lift for a 180. Wilson's 49, Dona's 100, and Livotto's 62 were typical of round seven scores and the Team slipped into 10th place. First place was Russia. And after watching them fly two positions to our left all day, it was easy to see why. Lepp was down to his number three ship (his calm airplane) by the fifth round, and to watch him delicately fly this high aspect model in the winds was a sight to see. Each time he carefully circled downwind one time only and then with the grace of a ballet dancer, kept the model lightly kiting for long periods of time until he would feel the lift come through. The Russians have as much trouble circling in the wind as anyone, but when doing so they were excellent at it. A well-deserved win. For the first time in years, a flyoff was not necessary as the winner, Vedensek, from Yugoslavia, was 7 seconds down, and Lepp of Russia in second was 29 shy, with Lagen of New Zealand 33 seconds short. All three fliers were flying models that owed their ancestry to Lepp's designs.

Later that night, at another Team Managers' meeting to straighten out some problems that had to come to light, we heard what must have been the wildest and truest statement of the Championships. When the President of FENDA was asked why the contest had not started on time, he replied, "Well, it's Sunday, and nothing happens too fast in Burgos on Sunday." The sad part of this was that FENDA was not concerned, then or at any other time during the Championships.

Wakefield Day dawned clear, crisp, and with very light winds. The winds would build during the day. Bad enough to put planes over the industrial areas, but not anywhere as bad as the gliders had been. Let me back up a bit here to tell how surprised I was to see Joe Fister up and flying on this day. As if Joe did not have enough problems with his heart, he had to leave the field during the second round of Glider competition with food poisoning. Thank God we had good Spanish-speaking American supporters with us, and I must give FENDA credit inasmuch as they did have doctors on call during the Champs. Hector Diez went with Joe and his wife to the dorm, and after contacting the doctor, was able to interpret for him and was able to get prescriptions filled. Following the Glider flying, Roger and I had visited Joe. He didn't look too tough. Roger was briefed on the characteristics of Joe's planes and was to proxy fly for Joe. But, when I came downstairs at 6 a.m. the next morning, there was Joe with his color back in his face and a twinkle in his eye. "Hope you're not mad at me for getting out of bed," he said, "but I feel great. I almost kissed him.

This morning, as the previous morning, found start time on us and no FENDA and no flight line. I guess you could say they were better though, as we started only 49 minutes late today. The only bad point was that the line was laid down the middle of a dirt road across the field, and everyone (officials, Timers, and spectators) wandered through the launch site. Many times we acted like Gestapos to clear the area for a launch.

Round one opened with the air setting good and solid. Without much fanfare, our fliers; Walt, Carrol, and Joe, in that order, knocked off 180's. Following this first round, Walt, Joe, Carrol, and Roger, moved the equipment to the next pole and then set about setting up the two mylar poles and Joe's and Carrol's graph thermisters. From that point on, all flights were based on this equipment. It should also be pointed out that from this point on, all flights were launched in good thermals. The flights when time was dropped was because of flight characteristics of the models, not bad air.

Round two was also three solid 180's, with the thermisters giving strong and positive indication of lift. But in round three, as the clouds moved in, our problems began. Our first man up each round was Walt. Just as he finished winding, the sky turned dark and the light wind grew cooler. As we waited for the thermisters to indicate air, we wondered how long we could wait on Walt's motor. Walt indicated it was a strong one, so we waited longer. As the time passed the 10-minute mark, we conferred with Carrol again on the hold time . . . no sweat we felt, if some good air came through which would help the climb considerably. Just as Walt and I

were agreeing that we had probably reached the limit, Carrol signaled that his thermister was indicating good air; Roger and Joe confimed on Joe's thermister. Walt and I nodded and Walt instantly shot his model up and away. The first part of the power burst looked strong and steady, but as his plane transitioned into its cruise, it sagged off to the left, and although it hesitated, it did not power stall. But we realized the energy just wasn't there to continue a good climb. The model held well in its glide, but finally started down. We all knew that with just a bit more altitude it would have been a safe max, but the resulting 162 showed that our gamble had not paid off. We had deviated from our max wait time decided on in the States prior to Spain, and we knew we had lost. Needless to say, all other flights were launched within the time frame or else a fresh motor was wound. Our second model up was Carrol Allen's; his launch was a bit shallow for his VIT setup, but his model climbed to an excellent height and a 180 looked certain. But as luck would have it, his glide tightened up twice, which cost him valuable height and he was finally down early with a 129. Just minutes later, the thermister indicated excellent lift, and Joe, who had wound during the latter part of Carrol's flight was up and away for another 180. Round four again gave mixed cloudiness and cool air as both Walt and Joe continued maxing, but Carrol, it seemed, was in the midst of some bad luck. Once again a sure max ended in a short 106.

Round five produced outstanding weather for the first two fliers and Walt and Carrol both maxed easily. However, when it came time for Joe, the air went dead and stayed dead. The ten minutes max waiting period passed, and although Joe agreed that a new motor was required, he did his share of bemoaning that it sure was a waste of one hell of a fine motor. But as if a reward for doing what was right, just as Joe finished winding, one of the biggest thermals of the day came in and literally sat overhead. Of course, Joe just grinned and nailed a beautiful 180.

Round six was windier and more turbulent. Walt was off first with a steady 180. Carrol followed shortly and once again good altitude did not prove the answer. Turbulence tightened his bird up and a devastating spin down resulted in a 159-second flight and a severely damaged model. It was at this point that Joe's string came to an end. A beautiful high climb and he was way out over the industrial area. We don't know if it was turbulence or what, but twice his model tightened and tucked down. Both times we thought it was coming in, but finally on the third spin it did come in with a 142. We figured damage here also, but Juan who was directly under it said it pulled out close to the ground and landed uninjured.

Round seven. Even though we are having our problems, we know we are sitting in the top two or three Teams. Three maxes will do it. Walt winds, waits, sees Roger's fluff going up, has the thermal confirmed on the thermisters, and is away for his 180. Two to go. Next up was Carrol, who as now down to his number three model. His launch into a good thermal allowed for an excellent climb, a beauty of a flight. But once again, our troubles held the trump. A small glide circle grew even smaller and a tremendous dive straight in resulted in a 44-second flight. What do you say at a time like that? Joe ended our team effort with a solid 180 which allowed both he and Walt to place in the top ten. Walt, who had flown a beautiful contest, was 5th with Joe sitting in 8th.

Three fliers prepared for their flyoff: Lother Doring of West Germany, G. Pierr-bes of France, and Allan Landeau of France. As they were making ready, we got our first glimpse of FENDA's ineptness in running a flyoff. As they did not know what was really required, it ended up falling into Sandy Piminoff's hands to set the pole positions, man them with timers, and establish the time periods. During this setup period, FENDA had a hard time establishing crowd control as their viewpoint and the fliers' viewpoint (based on other World Champs flyoffs) differed. They wanted everyone 30 to 50 yards back and were having a hard time enforcing it.

The first flyoff round found almost all three fliers launching into the same air

for their 4-minute max. The air was great and all maxed easily. The 5-minute flight found Pierre-bes first up in what turned out to be marginal air for a score of 126. Landeau was almost through winding when he blew strands in his motor. He immediately inserted his number two model into the winding jig. While he was preparing, Lother Doring found good air coming through and launched his model for a beautiful 300-second flight. Landeau having finished his winding held for a short time and then launched for a good flight. But his 190-second flight only netted him second place.

Ten tired Team members, plus their wives and in Walt's case, his father, headed for the dorms. It's hard to believe just how much work is required to move three Wakefield fliers seven times during the day. Thank God we had the helping hands of our supporters to assist us. As we went off the field, the sounds of the power fliers getting in some much-needed tests filled the field. Within about a three-minute time frame, we watched one Russian and two Cuban ships bite the dust. Ah, yes, tomorrow was going to be interesting.

The Power Day opened fairly warm and almost dead calm. The clear sky was welcome and the Team immediately started putting up some fine-tuned flights. It was a welcome pleasure to have ships go up and DT in walking distance rather than a long run or car chase. But what should have been just a short session of little tweak adjustments turned into a "just how much trouble can we cram into a short period" session. Trouble came to Roger and Charlie with Doug escaping. (However, Doug would also have his problems before the day was over.) All within a 10-minute span, Roger broke the wing tip off his number one model on DT and also had a crankshaft of his Cox break while just being held. At the same time, Charlie had the fuel system die on his number two ship. At this point, the benefit of a Team makes itself known. It was something to behold. While Roger and Charlie kept on test flying, the wing was fixed (beautifully) by Jim Wilson and Juan Livotto. The fuel system of Charlie's bird was investigated and fixed by Walt and Juan, and Roger's shaft was replaced by Walt. Just as this was accomplished, Jose brought back Charlie's number one model with a severly cracked wing *and* tip panel. These too were fixed by Juan and me. All during this time, Carrol Allen, Jose Dona, and Hector Diez were shagging the test flights. Finally, we had everything clicking. "Just maybe," I told the guys, "we have had our troubles early and they are behind us." In some ways I was right, but not in all ways.

Once again, FENDA was late in starting the event. But this time it didn't bother us as we had benefitted from it. Finally at 9:00 the contest started.

At this point, let me comment on the Team's attitude on this day. Every day since we had been here, during the testing and on the two previous competition days, the Team had been highly spirited, really hopped up and ready to go tear up the world. I kept wondering when the fatigue of the long days would set in. Finally in this last day's activity, it showed up. When they showed up this day, the shoulders were just a little lower, the spirits just a little more contained, and an attitude of "Well, we have a job to do today; let's get it over," seemed to prevail. Yet, at every point, every step of the way, the effort was just fantastic. Some of the chases during the day on foot and by car, when a second flight had to be flown because of overruns, were carried out with a determination of "We will do it, we won't be beat." And this was not only the Team, but supporters also — Steve Geraghty, Hector Diez, John Lenderman, and all of the wives who helped chase, and up at the launch site, provided the extra hands that are so necessary.

Round one opened with all three Team members scoring 180's by just sticking their birds up in the good solid morning air. Round two found good air coming through on both thermisters, with Walt and Joe using fluff and monitoring the equipment to our advantage. Their airpicking was just outstanding all day. Doug, and then Roger climbed high for easy 180's. Charles' model was soon up and away with a good climb, but our first of many overruns got him. A quick retrieve and a second flight scored him his second 180. Round three found us having more trouble with overruns. IT should be pointed out that there were two reasons for our overruns: One was that the timers had never seen power ships before, and as no one else on the field climbed as high as Doug and Roger, evidently we were overrunning. Also, a lot of people were using bunt systems, which gives a violent movement to the ship as the engine quits, or else the models were so far out of trim that the models stalled off the top. When all three of our models *"cruised"* into their glide with no abrupt movement, they had no idea of how to time them. Later when during a heated argument we asked them if they thought of watching for the white mist that comes from Roger's and Doug's pen bladders discharging excess fuel at flood-off time, "We," they said, "are professional timers. We know what we are doing." We found this hard to believe as Spain had only one power flier up to 60 days prior to the Championships.

During the third round, Doug was given an overrun. Roger then flew for a 180, and Charlie had the misfortune of dropping one second for a 179 score. When Doug came back to fly, he fiddled with his timer to reduce his motor run and evidently omitted resetting the DT portion. What should have been a close but safe 180 resulted in a 176 score. Round four found Roger and Doug once again putting up steady 180's, with Charlie's model losing power and climbing to only about 80% of his normal height for a 171.

During lunch, Charles' tool box was

opened and and engine transplant was performed. Several test flights for the entire USA Team were flown, and after some more football sandwiches and red wine, we were ready for our last three rounds. During the morning, we had been plagued with harassment from the local police on chase vehicles, and the starting and stopping of rounds with no flares . . . no announcements in any language, let alone English, which was supposed to be an official language. Appeals to the FAI Jury, and especially Sandy Piminoff, brought good results, but really little concern for the contestants from the FENDA officials.

Round five went off with no hitch, three 180's. But Doug was not happy with his power pattern, so as soon as the round ended and the 5-minute dead time started, we put him up on a quick test flight. Instantly all kinds of troubles began. The nearest timers (who would be ours in the next round) told us in Spanish that this was not allowed. Next, Senor Moratilla, our Nemesis head timekeeper, chewed on them for allowing us to fly and then berated us for this dastardly act. We were a bit taken back, as others were doing the same thing and no one had told us we couldn't. Later, the Jury said that we had been correct in doing so . . . just another one of FENDA's ways of running a World Championship.

Round six brought the fireworks which unfortunately cost Roger a shot at the Championship. Doug was first up and climbed high into a large beautiful thermal. As I looked at my watch, it read 6.035 with a clean cutoff. As I turned to the timers to see if there was any indication of an overrun, I heard and watched them click their watches . . . "Overrun, 7.4," they said. An instant argument ensued. Boy, when you're getting the pickle and you know it and they know it, it really gets to you. As the argument grew in intensity, Walt grabbed my arm and, pointing to the gaggle of ships still sitting overhead, he shouted, "Let's get Roger up." We got Roger going and away he went. But in the excitement of the moment, he got to straight a launch into the wind and the resulting horrible recovery gave him a 138-second flight. All three of us knew that the moment had just got away from us and it had cost us. Getting ourselves together, we put Charles and then Doug up for two more 180's.

Round seven was good for us. Once again another overrun. This time on Roger. But by picking four beautiful thermals, we scored three 180's. At last, it was over. I radioed the downwind Team members to come on in and then I headed toward the north end of the flight line, taking Jan Allen (Carrol's wife, with me) to gather an armload of beer for the Team. I had only gotten halfway down the line when I ran into Bill Hartill, who informed me that the Russians had told him that we had won the F1C Team Championships. About that time, Carrol Allen and my wife (fresh off her timer post) came running up with news officially the Team had been declared the winners. Needless to say, the beer and wine flowed as all ten Team members celebrated the victory.

The F1C Power flyoff was once again set up with Pinimoff running the show. In fact, he even walked down to where my wife Lynn was with the USA Team, and took her back to the flight area to be one of the timers, saying as he went, "I must have at least one good timer there who knows what they are doing."

Of the thirteen fliers, only seven made the four-minute round, and of those, only two made the five-minute round. Placing third, fourth, and fifth respectively, were Wuang of China, Moritta of Japan, and Faux of Great Britain. During these flyoff flights, I stayed close to where Verbitsky, of the USSR, was flying. Of particular note was his starting technique, which never varied. Instead of starting facing into the wind as most do, he faced away from the line. His starter was a hand-cranked manual effort tripod-based flywheel, with a small magneto attached with two short wire leads. This provided just enough juice to light up his glow plug and starts were easy to fire off. Once started, he turned to face into the wind, with the model pointed up at a 45° angle and held at about waist level. It was at this level that he would do two things: adjust the needle if required, and second, he would reach into his pocket and pull out a small rag with which he would wipe the exhaust side of his fuselage clean of oil prior to launch. All of this he did automatically without taking his eyes off of the sky or his competitors . . . whatever he was basing his launch on. Then he would carefully launch his model vertical to position it correctly for his bunt system to be fully advantageous. However, by the six-minute flight, he was down to his third model (he lost his 5-minute flight model) and, although he got off a beautiful launch, the model laid hard to its right and at the end of seven seconds was only about 30 feet up, moving straight across the horizon. His bunt system then came in and splat, an instant dive into the ground. Not having any other models, he saluted Mecznor, of Hungary, who had only to do better than 10 second to win. Mecznor carefully launched for a 202 flight and the World Championship. And a well-deserved win at that. He had been a member of the '58 and '61 World Champion Teams, and a long-time World Class competitor who, like Verbitsky, already had a second to his credit.

At this point I should be able to say we all received our trophies and went home with smiles on our faces. However, it didn't work out this way, due to an ugly incident brought on by FENDA officials, in particular, Senor Moratilla again. As is the custom, the last night of the competition is a time to celebrate, relax, and enjoy the comaraderie of many old and new friends. After a late supper, many of the modelers were drifting between the

University dorm and the Monastary. At just a few minutes after midnight in the lobby of the Monastery, the FENDA officials turned the State Police loose on some contestants. Why, I don't know. As the contestants were roughly pushed and shoved about, Lother Doring, of West Germany, tried to take a picture of the incident. This really set the police off. Doring's camera was taken, broken, and the film removed. As this was happening, Doring, who already had a bandaged, injured leg, was knocked to the floor and beaten and kicked. Those who tried to come to his aid were likewise treated. During this incident, witnesses related that Moratilla and a woman FENDA official shouted encouragement to the Police like a mad scene out of a horror movie. Finally, many were evicted from the Monastery, including legal residents, who had to sleep elsewhere.

As the night progressed, many Team Managers banded together and pleaded with Sandy Piminoff to find out what was happening. Some teams threatened to leave prior to the Banquet and actually did.

The following morning prior to the closing ceremonies, the Team Managers again met with Sandy Piminoff and, when no explanation was offered by FENDA, all nations refused to participate in the closing ceremonies, other than the trophy presentation.

During the trophy presentation, two great moments happened: One I observed, the other I participated in. The first was the slow trip to the winner's stand by Lother Doring, on crutches, to accept his World Champion trophy. The applause was fantastic, turning into a rhythmic clap of ovation. The second moment was when our F1C Team was presented their World Championship trophies, saw Old Glory raised, and heard our National Anthem played. Indeed, a great moment. Afterwards, Bill Hartill congratulated me on bringing home a World Championship trophy in F1C power, "The first time since another great manager did the trick in 1965." "Who was that?" I asked. "Me," he said with a wink. Taking credit for a win like this is out of the question. Three great fliers threw their birds into the air, but it took nine great fliers to keep the effort going.

In closing, I would like to compare our teams with the others. I know that we are always asking, how did our guys compare to the rest of the world? In F1A it would be hard to say, considering the wind. I do know that in watching the testing by the other teams, we were equal to any other on the field. In F1B, I honestly believe we had the three highest-climbing ships there. Walt's birds utilize a motor length that gives them an excellent burst, and yet a long cruise, to achieve great height. Joe's bird probably had the wildest skyrocket climb on the field, also great height. Carrol's bird was not flying as good as I have seen it before, but it still was holding its own. In F1C, I must honestly say that Doug and Roger had the highest climbs on the field. All of the tales we had heard of Koster and Verbitsky just didn't pan out. Roger and Doug both used big props at this altitude and it really paid off. The folding props by Koster and Verbitsky seemed to be undersized, causing over revving and no top end speed or power. The motors Roger and Doug both used were Cossies, Cox and Rossie combinations . . . great motors. Not meaning to slight Charles and his models, I must say that, although he did not climb to the height of Roger and Doug, he did put his model to excellent height, comparable with any other models on the field.

How would I rate our chances for future Team Championships? Excellent! In observing all other teams, I would have to say a lot of them have stars, but not three solid fliers like all of our teams had. •

Hannan . . . . . *Continued from page 56*

the form of a remarkable Northrop N1M mailed from Kansas by Beechcraft engineer Daniel Walton. Spanning 24 inches, the machine featured twin Brown CO2 engines and pendulum controls. Although it was not flown, it attracted many compliments, and demonstrated the practicality of shipping such a model safely. According to Contest Director Carl Hatrak, proxy-entries will be solicited for the 1983 meet.

AND SPEAKING OF PROXY MODELS

Reports were received from Roger Aime and J.F. Frugoli of France, regarding the Jacques Pouliquen Memorial Peanut Scale meet. The late M. Pouliquen had almost single-handedly introduced the class to his country where it was received with great enthusiasm, and these annual contests remain a tribute to his memory. Proxy participation has long been a feature, although it has been stymied in the past, by such things as postal strikes and inclement weather.

The 1982 event was conducted outdoors under beautiful conditions, and entries included models from Czechoslovakia, (a Turbo Lance by Lubomir Koutny) and the U.S.A. (Bob Peck's Volksplane, Bill Warner's Aero-Torpille, and a Farman Mousitque from the Hangar). Jean Frugoli was victorious with a Lacey, which managed one thermal flight of 3 minutes, 48 seconds, bettering the duration of his Coupe d'Hiver competition model! Next was Emmanuel Fillon, who entered two Hawker Furys and a Gotha 145; followed by Michel Frugoli proxy-flying the Moustique. Roger Aime placed Bob Peck's Volksplane next in line, in advance of his own Gotha 145.

Special recognition was accorded to M. Fillon for his heroic performance in rebuilding the Czech entry, which had sustained severe shipping damage.

AND FROM BELGIUM

F.L. Van Hauwaert and Benno Sabel supplied information about the Peanut Scale international contest held at Flemalle during September. A total of 58 models were entered, some in the "Peanut Duree" performance class; others in the "Peanuts Maquettes" event, which is oriented more toward scale accuracy.

In the Junior category, Peanuteer P. Orsini, of France, placed his Pottier 100 TS ahead of P. Matla, of Belgium, who flew a similar model. In the open duration group, results were as follows:

1. P. Martin (France) Castaibert
2. J. Delcroix (France) Pottier 100 TS
3. E. Fillon (France) Gossmer Condor
4. J. Delcroix (France) Trempik
5. S. Gloeckner (Germany) F.R.E.D. (as featured in M.B.)
6. A. Genther (Switzerland) C-3605

Other entries included a Pilatus Porter, Laceys, Jodel, Stahlwerke, Volksplane, Goupy No. 1, Ganagobie, Alco, Bellanca Skyrocket, Waco SRE, Interstate Cadetm Waterman Racer, and a Pietenpol.

The Maquette event required entrants to make qualifying flights of at least 15 seconds to be eligible for static judging. This was to encourage models with greater realism and more detail. Note that multiple entries were permitted:

1. A. Genther (Switzerland) Dufaux No. 4
2. E. Fillon (France) Hawker Fury
3. A. Genther (Switzerland) Bleriot XI b
4. A. Genther (Switzerland) Lockheed Orion
5. A. Genther (Switzerland) Fokker F VII a
6. G. Beaujean (Belgium) DH 9a

Other models competing in the class included a Wibault, a Tailwind, a Waterman, a Piper Cub, and a Caudron.

Proxy entries are encouraged for the August, 1983 contest, and additional information may be obtained from: F.L. Van Hauwaert, Grand Place 1/52, 4110 Flemalle-Haute, Belgium.

AND DON'T FORGET WEST BADEN!

It may be now or never for the 4th World Peanut Gran Prix, according to Dr. John Martin. It seems that the famed 100 year-old Northwood Institute will likely be closed, owing to financial difficulties. Wouldn't it be great if some Howard Hughes type in our audience could buy it for exclusive model use?

In any case, try to attend INDOOR WEEK June 12-18 in person, if possible, but at least try to send a Proxy Peanut. The trophies for last year were among the nicest we've ever seen.

Entry information is available by sending a stamped pre-addressed return envelope to: Mike Arak, 10900 SW 61 Ct., Miami, FL 33156 U.S.A.

SHORT SUBJECTS

To the opposite end of the flying scale model spectrum, we were interested in John Elliot's *R/C World* feature in the December *MB*, wherein he raised the issue of static scale judging the landing gears of R/C Sport Scale entries. John discussed such minutiae as brake drums, brake discs, hydraulic lines, scissors links, etc., but we were astounded that he did not mention the shortcomings (pun intended!) in the *length* of so many R/C model landing gears! Even a casual review of models featured in that *MB* issue (especially the larger ones) will reveal blatant travesties in the l/g height department.

For years, free flight rubber-powered models have been criticized for their *lengthened* landing gears (allowing larger diameter props), and now we're told that the R/C models must have theirs shortened "to improve ground handling". But really fellows, 1/4-scale models with 1/8-scale gear length?

SUPERFIZZ

Robert Davis, known for his diesel engine conversions, is also sales manager for the CryoDyne Specialty Gases company, which is now marketing a one-pound tank of CO_2 specifically intended for model engine filling use. Measuring about 18-3/4 inches long by 2 inches diameter, the cylinder is equipped with a nickel-plated high-pressure valve featuring appropriate safeties and a positive shut-off. Advantages claimed are: Thousands of charges, consistency from charge to charge, ease of handling, high degree of convenience and economy.

The cylinder is designed to accept a special Brown Junior CO_2 engine charging nozzle, which may be easily transferred to another cylinder when the gas has been exhausted.

We have been testing one of these systems here at the Hangar, and have found it to function quite efficiently. Not having to interrupt new model trimming sessions while changing "soda fizz" cartridges is indeed a real convenience, especially when testing recalcitrant subjects such as autogyros and flying wings! And while the initial cost of the CryoDyne cylinder seems high at $30 plus $3 handling and shipment fees, on a cost-per-fill basis, it doubtless figures out to be more economical than using the usual soda bulbs. The Brown Junior engine adapter adds another $7.95 to the initial investment, but should represent a one-time cost. If two or more modelers were to share in such an investment, the cost to each individual would be realtively small, and the outlay should provide for many weekends' worth of flying fuel.

The cylinders may be ordered directly from CryoDyne Specialty Gases, 445 State Street, North Haven, CT 06473, and they may be shipped by United Parcel to any address within the continental United States. The Brown Junior adapters may be ordered either from brown Junior Motors, P.O. Box 77, Pine Grove Mills, PA 16868, or from Peck-Polymers, Box 2498, La Mesa, CA 92041. Please tell 'em you heard about their offerings from *Model Builder!*

THE BELLANCA CF

Latest in the Smithsonian Famous Aircraft of the National Air and Space

Museum series is *Bellanca CF*, by Donald S. Lopez. The CF is a lesser-known example of Giuseppe Mario Bellanca's design genius, which has been restored by the museum. The machine is a rather strange but very attractive high-winger which would make a most suitable flying scale model subject in anything from Peanut size through 1/4-scale R/C. Everything needed for thorough documentation can be found in this book, including a fine cover rendering by John Amendola, full-color photographs of the restoration, many Zebrachrome (black and white!) photos of details (even the instrument panel), and a 3-view drawing by George H. Clapp.

The remainder of the publication features a history of Bellanca designs ranging from his early efforts, such as the CE biplane (featured as a Peanut in the October 1972 MB), the modified DH-4 mail planes, the Wright-Bellancas, the Pacemakers, Skyrockets, the curious push-pull Blue Streak, and others.

Criticisms? Very few . . . some minor errors, possibly not the author's fault, such as Russel Boardman's name changing to Russel Broadman within a few pages. And the page 37 photo captioned Fokker F III, which actually depicts the more attractive Fokker F II, as many builders of Walt Mooney models would know. We were somewhat amused by the page 57 photo caption stating: ". . .this early Pacemaker might almost be taken for a Fairchild 24, were it not for the lifting struts." Well, not by any of our readers, we hope!

Nit-picking aside, we consider this book an outstanding value, and confidently expect to see some model CFs flying in the near future. Our copy was purchased directly from the Smithsonian Institution Press, P.O. Box 1579, Washington, D.C. 20013, for $8.95 postpaid.

FAREWELL FELLOWS

We regret the passing of two aviation greats, George Meyer and Frank T. Courtney. Texan George Meyer was famed for his "Little Toot" full-size homebuilt biplane as well as for his many flying scale models and model engines.

Frank Courtney was a most celebrated test pilot, having flown prototypes for the Royal Aircraft Factory, Avro, De Havilland, Koolhoven, Boulton & Paul, Handley Page, Parnall, Gloster, Cierva, Curtiss-Wright and Convair, among others. He flew aircraft before and during World War I, raced during the Golden Age, was a ferry pilot during World War II, and remained active well into the missile age. He was also a lecturer and author, culminating his literary efforts with his autobiography *The Eighth Sea*.

Certainly both George and Frank left aviation and model aviation better, as the result of their activities, and we shall long remember them.

SIGN OFF

We thank Andrew Uminski for this parting thought: "May your number of takeoffs be equal to the number of landings." •

C/L . . . . . *Continued from page 58*

little difficult to explain with the printed word. If you know what pre-jumping a jump while riding a dirt bike is like, it is basically the same thing. Again, the purpose of the speed bump has been to slow you down, when in fact the best way to deal with this artificial menace is to go faster, not slower!

So far we have talked about common, ordinary speed bumps, the ones that can actually give some pleasure when tricked out of performing their sole function in life. But there are sometimes the odd speed bump that is real high and peaked sharply. These are terrible, the only hope is to buy a French car for crossing these turkeys. Or use them for a nice boost in pulling wheelies. As wheelying down the parking lot is frowned upon and few of us want a French car, these super-nasty speed bumps are simply avoided, to the point of refusing to even enter a parking lot so equipped. Last time I was in a lot that has these Super Speed Bumps, we tore a front air dam almost completely off the car, won't even take the van in there now! *(They also discriminate against Corvettes, and that's un-American! wcn)*

Anyway, restrictive rules. They really are like speed bumps, they get thrown in your way, initially to cause aggravation. Then, assuming you have decided to stay with the event in question, you start to think about how to attack these new rules, your equipment gets trickier and soon enough you are going faster than before the rules were in effect! What is often so funny about this situation is that many times the rules are dreamed up with the intent to slow the event down so that the novice fliers can have a better chance at being competitive. But when us older, more experienced guys start coming up with such things as ball bearing motors machined to accept a bushing (talk about going backwards!), 40's destroked to a legal 36 displacement, carbs equipped with swing weights, el tricko glass props, bag tanks, filler valves that can cost as much as a new motor, and so on, the poor novice, yes the same fellow we were trying to favor by passing restrictive rules, he gets shut out completely!

Hey, guy, glad you showed up to race. First time out, right? What event you gonna enter? Slow Rat, you say? Uh, I really hate to tell you this, but that Ringmaster you're holding will be so slow they'll probably ask you not to run it. Well, it'll be a hazard out there, most of these guys are running real fast. You throw that pig into a three-up heat and the other fliers will be passing you so fast there is just bound to be a mid-air. Yes, I know your model is legal for the event, yes again, the Slow Rat event was meant to be an entry-level event. Uh, it just

hasn't worked out that way. Fast as the boys doing the rules come up with new ones we figure out ways around them. Every year the speeds get higher, new rules or not. The RC area? Sure, it's right over there. Why do you want to know...?

So far we're only talking about rules that can be likened to your common garden-variety speed bump. What about the really nasty ones? We have those kinds of rules as well, although it seems they show up mostly in the FAI events. FAI Team Race has so many super restrictive rules that very few racers will even consider the event, its popularity here in the U.S. can hardly even be measured, there is so little activity. In FF, specifically FAI Power, the same situation exists. I know some very good modelers who have tried it, only to decide it wasn't worth it in time and money to be competitive. And have you ever seen one of these things fly? The level of performance is absolutely incredible, it is something that has to be seen to be believed. Like the bad and nasty speed bumps, the vast majority of us don't go near.

Enough about things that go bump in the road, but this cannot end without noting that there are some real silly proposals in the works for Slow Combat. Somebody wants the canopies to be larger, I think a minimum width is mentioned, another is concerned about the empennage, baggie tanks are addressed, and so on.

My own personal feeling on Slow Combat is that all it has to be is slower than regular AMA Combat. Forget the canopies, how big (or small) the stabilizer is, where the tank is located, how fuel is fed to the engine and all the other garbage that only makes the models more expensive and harder to build. But Slow Combat has to be *slow*, right? No problem; all engines must be fitted with a restrictor in the venturi, the size to be determined by actual flight testing. This size would hopefully be such that a trip to the hardware store for a number drill would yield an effective go-no-go gauge for checking everybody at the contest. With a restrictor rule in effect, we could just forget about all the other Slow Combat rules. Build a bunch of models for AMA Combat rules and simply slip a restrictor in place for the Slow Combat meets. Ok, you might have to also slip in a little extra tip weight for Slow, maybe even add some line rake. But that would be a lot easier than building a whole extra fleet of models, wouldn't it? •

Arado . . . . . *Continued from page 61*

particularly in the wings. Warps in the wings will definitely mess up your intended flight plan. And *do not dope* the foam areas. Tissue must be applied to the foam with thinned Tite-Bond or white glue. Dope will dissolve your beautiful carving. Thin with water and after the tissue is dry, brush on a second thin coat to harden the shell.

The prototype flew well with a Peck-Polymer 6-inch plastic prop and a 14 inch loop of 1/8 indoors and a similar loop of 3/16 SIG rubber outdoors. The balance point may look like it is too far back, but I can assure you it isn't. The long tail arm aids in providing more stabilizer power than you might think. The lengthy nose arm also eliminates any clay ballast on the nose.

A bit of downthrust is built into the plans for outdoor flying. If you use this, you may want to wash in both tips on your model, or add a touch of up elevator. Or you can build in zero downthrust and leave the stabilizer alone. I prefer the former because it allows more power for outdoor flying. This combo will enable slower flight, but the balance point must be moved forward, so take your choice. The settings shown on the plans represent a good starting point for indoor or outdoor.

My model weighed 19 grams all up with 6 inch plastic prop, nose block, and one coat of thinned dope. The rubber is not included in this weight. First flights were rocket-like. Indoors, even with a long loop of 3/16, it was just too fast. I attribute this speed to a clean airframe, too much thrust, and close to a 0°-0° wing/stab setting. Very little turn was possible due to the smallness of the gym and high flight speeds.

A switch to a 1/8 loop and a touch of up elevator cured the problem. It flies nice and slow with this setup, and the balance point shown. Outdoors, a loop of 3/16 will take it up at a steep angle. Without having to worry about indoor tight radius turns, it is a joy to watch the Arado climb outdoors like a happy student on his first solo.

The bright yellow covering also aids visibility and locating the model. All in all, the Arado 96 is both a different and quite successful flier. I am now looking at the possibility of a 36-inch schoolyard scale R/C version. It should be even better than its 18-inch little brother. As for the six-foot span project, it has been put on the back burner pending the location of a winder strong enough to handle up to 32 strands of 1/4-inch rubber. Funny how things work out. •

Counter . . . . . *Continued from page 10*

cluded. Model No. McD R/C 05 is supplied without plugs, however, it can be ordered with plugs for a $5.00 shipping/handling/labor charge plus the cost of the plugs (call for a quote). Also, this charger is diode protected, which means that if you happen to ignore the instructions (or simply made a mistake) and connect the wires in reverse polarity, it will not harm your batteries, (nor will it charge them).

Now there is a way for you to extend your flying time at the field without expensive, complex equipment. Write

to McDaniel for further information regarding this great little charger.

★ ★ ★

Buzz Waltz R/C Designs, 403 Industrial Place, Palm Springs, CA 92262, (619) 325-5494, recently announced the first in a series of kits, the Begin/Air Trainer.

The Begin/Air has been designed around the H.B. .25 R/C engine, which provides plenty of power plus the economy of a small engine. It requires either three or four channal controls (rudder, elevator, ailerons, throttle, or CAR) for easy flying. Wingspan measures 54 inches for a total wing area of 540 square inches. The fuselage is 37-1/2 inches long and three inches wide at the cabin for ample room for radio gear. Flying weight is 3-1/2 pounds.

The kit includes precision cut balsa and plywood parts, glass filled nylon engine mount, dural main gear, assorted hardware, plus full-size rolled plans with illustrated step-by-step instructions. Kit price is $39.95 and is available directly from Buzz Waltz R/C Designs.

★ ★ ★

O.S. has responded to the increased power needs of modelers working with ducted fans by creating the new O.S. 65 VR DF engine. The engine is a spinoff from the popular O.S. 65 VR Marine engine, using the same high exhaust timing for more power and higher RPM. The slightly increased bore also adds power, while still keeping the size of a normal .60 engine. This new powerplant should be particularly effective in the larger Byron and Scozzi type ducted fan units.

The O.S. Max VR DF is available exclusively from World Engines, 8960 Rossash Road, Cincinnati, OH 45236. Write to World Engines or call (513) 793-5900 for price or further information.

Also new from World Engines is the little brother of the popular Robinhood 25 kit. The Robinhood 10 model airplane kit is a "Stand-pretty-far Off" scale representation of the famous Curtiss Robin, a 1927 aviation pioneer that was one of the first of the "business coupe" cabin monoplanes.

The kit is based upon simplified construction techniques of the larger Robinhood 25, featuring plywood and stick fuselage, and a simple built-up balsa wing. All landing gear and hardware are included.

With its flat-bottom Clark Y airfoil, the Robinhood 10 is a stable flier on any engine up to a .15, and can be easily hand-launched. When a small engine is used, the plane is docile enough to be a child's trainer; with more power, the action can get frantic enough to test a seasoned pilot.

The Robinhood 10 is available exclusively from World Engines. Write or call for price.

★ ★ ★

Ikon N'wst, P.O. Box 566, Auburn, WN 98002, now has quarter-scale floats for all those Big Bird float planes or float planes to-be out there in the R/C modeling world. Two years in development and testing, the Ikon N'wst quarter-scale floats have proven themselves to work well in all kinds of weather. The floats are 46 inches long and will support up to 30 pounds of aircraft weight.

Construction is foam with balsa and fiberglass covering (included in the kit). The front bottom has plywood sheeting for extra strength. The wires come preformed for the Super Cub, but will fit similar planes. The water rudders, special bellcranks and transom are included also. These floats will add about three pounds to the weight of the airplane.

Send $1.00 for Ikon N'wst's complete catalog.

★ ★ ★

Listen up R/C car racers. Associated Electrics, Inc., 1928 East Edinger, Santa Ana, CA 92705, (714) 547-4986, now has a new custom racing shock designed for all out competition. This totally new design makes all other shocks obsolete. It has no air in the oil chamber, its hardened, ground and polished shaft is supported and sealed on both ends, and it has been race proven on the RC500s that won three six-hour enduros.

Part No. 5136 is the RC500 Custom Racing Shock. It comes as a set of four shocks in kit form, including all parts and instructions. Price is $60.00

Part No. 6150 is the Custom Racing Shocks for 1/10 Off Road Cars. This set of four shocks will greatly improve your car's handling. Parts and instructions, $60.00.

★ ★ ★

Here's something that modelers, craftsmen, and hobbyists can really use . . . a set of high speed steel, adjustable threading dies (3/16-inch diameter) with "U.N.C." (unified national coarse) threads and a carbon steel K&S "positive lock" die stock handle . . . available through, you guessed it, K&S Engineer-

ing, 6917 West 59th St., Chicago, IL 60638. (312) 586-8503.

The adjustable threading dies are available in the following sizes: 0-80 (Stock No. 415), 1-72 (No. 416), 2-56 (No. 417), 3-48 (No. 418), 4-40 (No. 419), all for $9.95 each. Die stock handle (No. 420) is sold separately for $9.95. Also, you may compliment this set of adjustable threading dies and die stock handle with K&S Engineering's five-piece, high speed steel precision hand taps with interchangeable tips and "tite-grip" collect handle in the same thread sizes (Stock No. 421). Call or write K&S for price.

★ ★ ★

D.G.A. Designs, 135 East Main St., Phelps, NY 14532, (315) 548-3779, recently announced the release of its Second Giant Scale Classic plan set. They now offer a 1/4-scale Kinner Sportster K in addition to the 1/4-scale Davis D-1K.

The Kinner specs out at a span of 117 inches, length 72-1/2 inches, area 2100 sq. inches, with Quadra power. (No weight given.) Flight characteristics are claimed to be "just like" the full-scale version used in flight comparisons and scale documentation.

Plans are rolled in a sturdy mailing box and shipped with an instruction booklet for $25.00 (N.Y. residents add 7 percent sales tax). Overseas orders should include an additional $5.00 for shipping.

As with the Davis D-1K, there is ample scale documentation for the Kinner Sportster K available in the form of a twelve-shot, 35mm glossy color print package for $7.25 ppd.

Additional information is available from D.G.A. ("Darned Good Aeroplanes") when you send a self-addressed, stamped envelope.

★ ★ ★

J&M Glascraft, 30820 Mayflower, Roseville, MI 48066, (313) 773-7069, is manufacturing a new high performance slope glider designed to "stay with the best of them" in performance and in looks. It has a wingspan of 48 inches, a 300 sq. inch wing, and a 9-ounce wing-loading. The "Penetrator," as it is called, is also available with a pre-installed firewall to accommodate .049 power. Further details can be obtained from J&M Glascraft.

★ ★ ★

For those modelers who have ever been Hot Stuffed, Jetted, Zapped, or Crazy Glued to something or someone . . . and didn't particularly enjoy the experience . . . there is a solution, or should be we say a solvent, to cure your problem. Golden West Fuels, Inc., P.O. Box 6400, Woodland Hills, CA 91365, has announced a new product called Ultra Super Solvent, which removes unwanted cyanoacrylate bonds, cleans up spills, and will even remove cured adhesive from clothing, rugs, tables, and more.

Ultra Super Solvent is a nitroparaffin based solvent nitromethane, and is claimed to be the very best available solvent for the cyanoacrylate super glues. It works by direct application to the bond. In two minutes the bond has softened enough to be pulled apart. When the solvent has evaporated, the parts can be resounded if need be. Two applications a minute apart, followed by rubbing with a cotton ball or lint-free cloth will usually remove the adhesive from skin, cloth, or hard surfaces. Beware that some materials and finishes may be attacked by Ultra Super Solvent, so test in an inconspicuous area first.

If this product sounds good to you, and you think you would like to give it a try, write to Golden West and send $3.95 for a two ounce bottle. Tell 'em Model Builder sent ya!

★ ★ ★

Jomar Products, 2028 Knightsbridge Drive, Cincinnati, OH 45244, has recently released a new product on the R/C market. It's an ultra efficient proportional speed control for electric powered aircraft. Using the latest in power MOSFET technology, this electric throttle achieves better than 95 percent efficiency and keeps power loss to an absolute minimum. Speed is continuously variable from full off to full on. It connects directly to the throttle channel of your receiver. Supplied as shown in the photo, less wiring and heat sink, the unit weighs only 3/4 ounce!

Overall dimensions are 1-1/4x2x3/4 inches. Prior to use, the unit should be mounted to a sheet of aluminum which serves as a heat sink which can be part of the fuselage surface area for optimum cooling. The throttle can accommodate up to 24 volts and continuous current in excess of 25 amps with appropriate heat sinking. A perfect companion to the Kraft Chipmunk or any 05 to 15 powered electric aircraft.

The unit is available from Jomar Products in two versions: SC1A Standard for $49.00, and the SC1B Assembled board less power MOSFETs for $29.00. Dealer inquiries are invited.

★ ★ ★

Attention WW-II scale modelers and aviation history buffs. *Scale Reference Data World War Two Jet Fighters* is a new release from Kalmbach Books that you are sure to find interesting. It contains extensive information on ten major types of airplanes built during the early days of jet aviation. This is an accurate, detailed reference data book that will prove worth its weight in gold on your next scale project. It even makes fascinating and entertaining reading for those of us who are interested in the history and development of the world's first jet aircraft.

The author, Don Berliner, has been an aviation and science writer since 1956. This 8-1/4x11-1/4 inch soft-cover book ($8.50) contains 16 pages of scale drawings by Bjorn Karlsfrom and 150 photos in 72 pages.

Included in *World War Two Jet Fighters* are brief background stories about each aircraft, close-up photos, photos of prototype and production aircraft, four-view 1/72-scale drawings, information about markings and color schemes, tables of specifications, list of

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Now you can have four of your own American Junior flying models. Two folding wing Jim Walker Sky-Divers, like Interceptor, and two A-J Ceiling Walker helicopters. For info send $1 (refundable with order) and SASE to A-J Fun-Pak, P.O. Box 548, Oregon City, OR 97045. Specify A-J Fun-Pak No. 1.

U/C PLANS. Nostalgia Stunt, Old Time Stunt. Send SASE for current list. Tom Dixon, Controline Sales, P.O. Box 27540, Contract Sta. #7, Atlanta, GA 30327.

WANTED: Royal Products, SILRON, model covering material any size or color. Cash or trade. Orval Lloyd, 1744 Rosecrest Dr., Salt Lake City, UT 84108.

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FORSTER IGNITION ENGINES, English & Chinese diesels. Parts and Supplies. Send SASE to M&G ENGINES, P.O. Box 6026, Denver, CO 80206.

versions and variations, and the locations of surviving examples of these aircraft.

Write or call Kalmback Books, 1027 North Seventh Street, Milwaukee, WI 53233, (414) 272-2060, for your copy or more information.

★ ★ ★

Squadron/Signal Publications has five new aviation books in print for the aviation history fan or scale modeler. They are: *Air War Over Korea* (No. 6035, $8.95), *Modern U.S. Fighters, Volume 1* (No. 6203, $9.95), *Phantom II, A Pictorial History of the McDonnell Douglas F-4 Phantom II* (No. 6010, $6.95), *Harrier in Action* (No. 1058, write S/S Pub. for price), and *SR-71 Blackbird in Action* (No. 1055, write S/S Pub. for price). Each book contains scores of black and white photos and color illustrations, as well as three-views and line drawings of all aircraft illustrated therein. If you aren't a scale modeler who is looking for scale documentation, color markings, or data, you will want to have these books in your library anyway . . . they are fascinating and entertaining reading.

Write to Squadron/Signal Publications, 1115 Crowley Dr., Carrollton, TX 75006, for your copies of these excellent books, and a list of many more similar books available.

★ ★ ★

Here's a handy little gadget for testing model engines. It's called, simply, a Modelers' Engine Test Stand, and it's produced by Larry's Model Products (LMP), 4300 West Genesse St., Syracuse, NY 13219, (315) 468-6544.

The solid maple stand comes in kit form and is easily assembled in five minutes. It features a revolutionary "uni-beam" construction which adjusts simply to accommodate engine sizes

from .049 to .90 . . . designed for modelers by a modeler. There is a space to afix a fuel tank in-line with the engine. The "uni-beam" construction helps eliminate vibration found in many upright stands, by allowing the motor and general unit to be clamped securely on the same beams.

The suggested list price is $14.95 (engine and tank not included). If not available in your local hobby shop, contact LMP directly. Dealer inquiries invited.

★ ★ ★

Dynamic Models, P.O. Drawer C, Port Jefferson Station, NY 11776, has just announced the release of its new, 64-page catalog No. 5. This new, fully bound catalog and manual not only displays Dynamic Models' extensive line of R/C scale fiberglass hulls, kits, and fittings for the R/C scale model boater, but also includes full instructional material to enable the newcomer to the hobby to successfully build an R/C scale boat model. Also included in the new catalog is a copy of their popular "Hobbypox" warning sign which is perforated for easy removal and display.

The new Dynamic Models catalog has over one-hundred new items in it, including a new full line of electronic sound systems (horns, sirens, battle alarms, and four different engine sound systems), new motors, a full line of chain, a new line of ship armaments in 1/8, 1/4 and 1/2-inch scale, 1/2-inch scale figures, two new full kits, and numerous new detailed fittings in all scales.

This new catalog from Dynamic Models is available for $4.00 (via First Class Mail), which is refundable on your first order from the new catalog. Most Dynamic Models dealers also stock catalogs for sale to the R/C scale model boater.

★ ★ ★

Tower Hobbies has entered the "whistles and bells" radio system arena with the introduction of its totally new System 500. The System 500 radios are available in both the Silver Series and Gold Series, and in either four or six-channel configurations.

The Silver Series is the basic System 500 radio. It is a flawless performer . . . practical, economical, and straightforward; perfect for any basic application.

The Gold Series is the deluxe version of the System 500. It features the same high quality as the Silver Series with the additional features of servo reversing on the four primary channels, and dual rates on the aileron and elevator channels.

the four-channel system provides precise control of the four basic Mode II functions. The throttle stick (left stick) is positionable with fine tooth ratcheting for a precise throttle setting.

The six-channel system has two additional functions. The fifth channel is a toggle switch, on-off channel used primarily for bomb drops, retractable landing gear, or any other non-proportional function. The sixth channel is a proportional, lever operated tab just to the left of the transmitter label. It can be

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No. 2761 DRAGONFLY $4.50
R/C funship, looks like giant rubber stick model. Superb trainer. By Tex Newman

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Easy to build & fly semi-scale R/C home-built, like C.W. Jr, .09-.15. Chris Moes.

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Sport scale biplane for 3-4 channels and .19 engines, 40" span. By Bill Northrop.

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No. 2801 TIPORARE $6.50
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Profile C/L stunt ship for .29 to .36 power, 42" span. Easy-built. Mike Parenteau.

No. 8781 R/C VELIE MONOCOUPE $9.50
Light-weight 1/4-scale for belt reduction electric power, 90" span. Bob Boucher.

No. 4733 PEA POD $4.50
A 36" long R/C sailboat easily made of 1/8" Luan mahogany. Clever sail control. Full size patterns. By Tom Protheroe

No. 5761 ALBATROS $5.50
R/C sport scale post-war German light plane. Span 74", .36 eng. By Jeff Breece.

No. 176 O.T. KORDA WAKEFIELD $2.50
The classic of all rubber powered competition free flights. By Phil Bernhardt

used for anything you choose.

All systems are available on all 72mhz frequencies including the new ones which should be approved by the time you read this. As always, each system is backed up by a one-year parts and labor warranty, with full service available directly from Tower Hobbies, Inc., P.O. Box 778, Champaign, IL 61820.

System 500 prices are $134.95 for the Silver Series four-channel, $149.95 for the Silver Series six-channel system, $144.95 for the Gold Series four-channel, and $159.95 for the Gold Series six-channel.

Flight pack specifications are: **receiver**: size: 2.4x1.7x8 inches, weight: 1.5 ounces; **servos** (TSS-50 and TSS-51): size: 1.6x1.56x.8 inches, weight: 1.5 ounces, torque: 44 oz. in.

Also new from Tower Hobbies is the Mini R/C System and Mini Flight Pack. The Mini System features the new four-channel Gold Series transmitter with servo reversing on all channels, dual rates on the aileron and elevator channes, and the standard built-in trainer system compatable with all System 500 radios. It has an incredible, mini flight pack (available separately) that is so small that the entire four-channel rig will fit in the palm of your hand. The receiver is one-third smaller than a standard size servo, occupies smaller than a standard size servo, occupies only 1.2 cubic inches of space and weighs a remarkable 0.8 ounces! Two TSS-10 servos (0.64 oz. each), and a 100mah NiCd battery with miniature switch harness round out the package for a total weight of only 3.5 ounces.

If you are an experimenter, this new system opens the door for you to new concepts in R/C flying: indoor R/C, rubber power R/C, R/C hand launch gliders, R/C blimps, and small power models. In 2-meter glider or 1/2A racing competition, the four to six ounces saved (as compared to a regular airborne pack) could mean the difference between winning and losing. The same one-year warranty applies as above, as well as the available frequencies.

Specifications are as follows: TSS-10 servo: size: 1.1x1.1x5 inches; torque: 14 oz. in.; receiver: size: 1.7x1.2x.7 inches; battery: size: 1.5x1.2x.6 inches; weight: 1.2 ounces.

Prices are $144.95 for the system, and $99.95 for the flight pack by itself. Call or write Tower Hobbies, P.O. Box 778, Champaign, IL 61820, (800) 637-6050, for additional information or to place an order. •

Workbench. . . . *Continued from page 6*

cannot escape worries by adding to your financial difficulties. This is where the model airplane hobby has literally priced itself out of business. But this doesn't have to be the case.

Recently, I finished framing up a Pacific Ace, the 30-inch span rubber model that is becoming so popular in the old-timer activity. And now, after about a 35-year layoff, I'm trying to apply tissue, water-shrink it, and brush on a few coats of thinned nitrate. It's a ball! With the magazine just about killing any time for me to build and fly radio control models, it's amazing how a few minutes here and there with stick-and-tissue can be so satisfying.

I can almost hear some of my rubber free flight modeling friends snicker and say, "We knew it all along." Well, if you stop snickering, I'll stop snickering at those of you who staunchly said you'd *never* touch a dumb old R/C model, and who are now total R/C nuts!

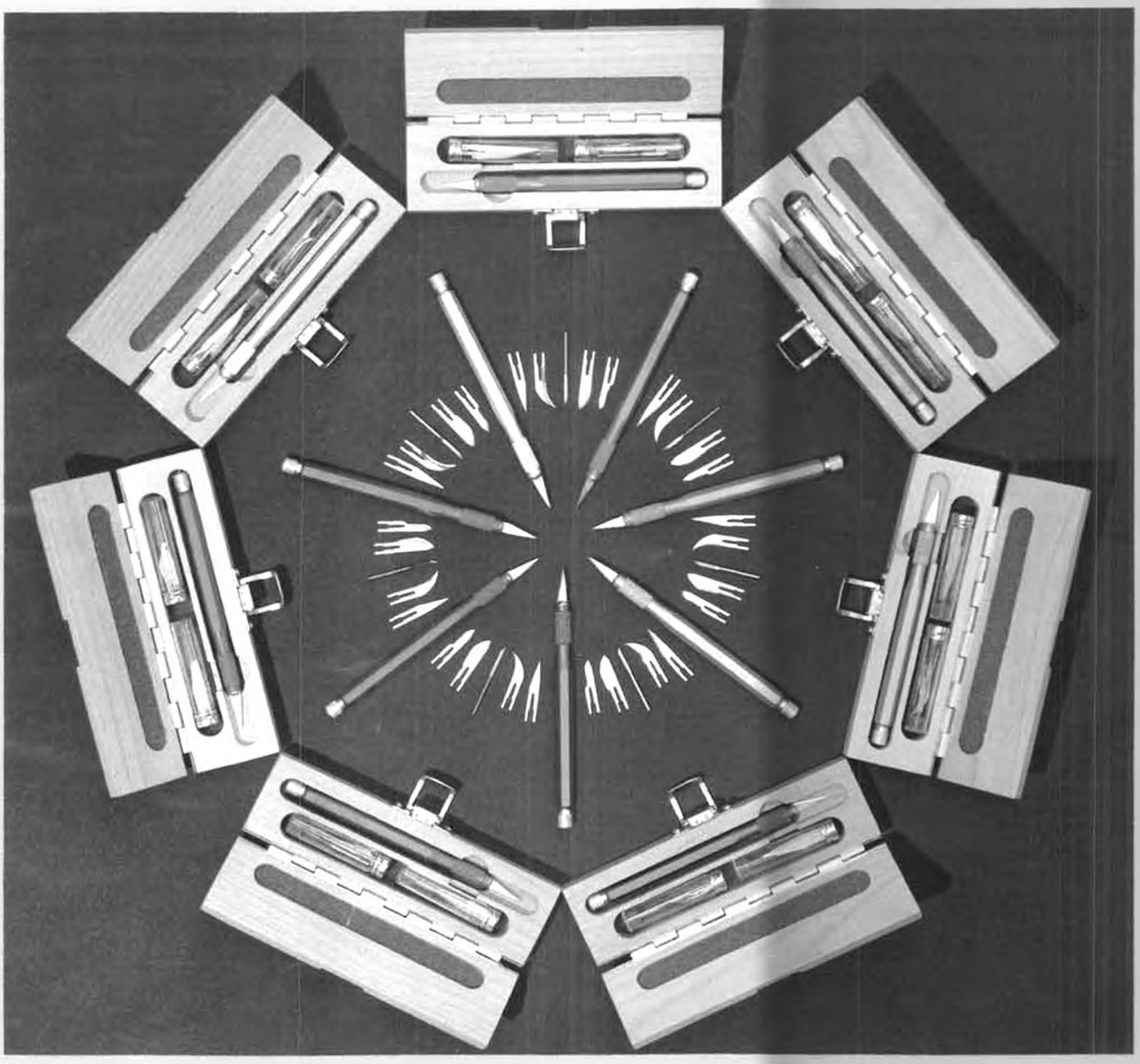
But really, if you genuinely enjoy cutting, shaping, and sanding balsa wood to a fine finish; if the smell of an open jar of nitrate dope turns your memory bank back to those happy rubber powered free flight days of yore, and if you keep looking at parks and school athletic fields to see how many trees you'll have to climb, you really ought to give it a try. The results may be a pleasant surprise.

Lessee now . . . where did I put that rubber winder and bottle of lube?

EASTERN NATS

Just received confirmation that the Nationals will finally return to the East Coast after an absence of 14 years (the last Eastern Nats was at Willow Grove NAS, near Philadelphia, Pennsylvania, in 1969). The '83 Nats is scheduled for July 24 through 31, at Westover AFB, near Chicopee, Massachusetts.

IN THE BEST CIRCLES, IT'S **über skiver**



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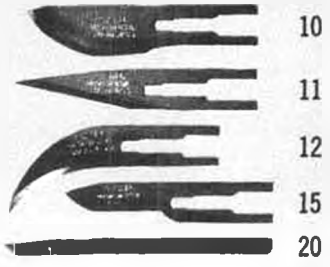

Available in seven satin anodized handle colors: silver, blue, red, green, gold, copper, violet. Complete set in fitted hardwood case; includes uber Skiver, together with two vials containing four No. 11, and one each of Nos. 10, 12, 15, and 20 . . . . . $14.95
Individual handles (specify color) $5.95
Vial of 6 blades (No. 10, 11, or 15) $2.10
(No. 12 or 20) $3.30

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Still under investigation are sites for free flight and indoor in the same general area. If Westover is used for F/F, two-minute maxes would be required, although this is better than having the free flight entirely separated from the Nats, and in a completely different part of the U.S.

Perhaps this could also bring back a very spectacular part of the Nats that has been missing for many years . . . the hangar full of row after row of work tables, covered from end to end with all sorts of models, in all sorts of condition, with modelers in a constant frenzy of building, repairing, and comparing, day or night.

In any event, we suspect this will be the biggest Nats in many a year, based on number of entries. Eastern Nats always draw the largest number of modelers, if for no other reason than the high population density of the northeastern United States.

BYROSSI . . . ER . . . ROSSI/BYRO JET

Should have suspected something when we met Ugo Rossi in the Byron Originals office on Monday morning after the big Ida Grove/IMAA weekend last August. Word now comes from the Iowa model manufacturer that it will be offering a special Rossi engine for its Byro-Jet ducted fans. The new R81 RC RV features a rear valve, rear exhaust, and an oversized cooling head. It is reportedly a marine version that has been specially modified for use in the Byro-Jet. The Rossi/Byro-Jet combination produces a full 13 pounds of thrust at 19,600 rpms on only 5% nitro fuel.

A special package offer, consisting of Rossi .81, Byro-Jet, custom tuned muffler, header pipe and fasteners, is available directly from Byron Originals. Price of the Rossi/Byro-Jet combo is not yet determined, but according to Bruce Godbersen, it will be surprisingly reasonable.

THINGS TO DO

The Central New York Model Aircraft Association is holding its 7th Annual Model Airplane Show and Symposium on Saturday, February 5, 1983, at the Art and Home Center of the New York State Fairgrounds, Syracuse, New York, from 9 a.m. to 6 p.m.

Included are continuous movies, talks by well-known modelers (John Grigg, Ed Izzo, Bob Noll, and others), informational and educational booths by area clubs, static display and competition, and flying demonstrations (weather permitting).

For further information, contact Walt Throne, 4300 W. Genesee St., Syracuse, NY 13219, phone (315) 468-6544, or (315) 488-8935.

★ ★ ★

The Butler (Pennsylvania) Area Radio Flying Society . . . yes, they also go by the initials . . . is holding its annual R/C Auction on Sunday, February 20, 1983, from 10 a.m. to 5 p.m. Attracting modelers from Ohio and West Virginia, as well as Pennsylvania, the auction grows in attendance every year. Auctioneer commission is 10%, and admission is $1, which includes a free raffle ticket. Refreshments available. The site is Butler County Community College Convocation Center, Butler, Pennsylvania. For further information, contact Harry Seth, 205 Metzger Ave., Butler, PA 16001.

★ ★ ★

The Tri-Valley R/C Club of South Bend, Indiana, and the Elkhart County Flight Masters R/C Club of Elkhart, Indiana, are co-sponsoring the Ninth Annual Radio Control Model Show, at Concord Mall, U.S. 33 South, Elkhart, Indiana, on Saturday and Sunday, March 12 and 13, 1983. Hours are 10 a.m. to 9 p.m. Saturday, and 11 a.m. to 5 p.m. Sunday.

The show draws modelers from Illinois, Michigan, and Indiana. Eighty-five entered last year, and close to a hundred are expected in 1983. For further information, contact Larry Miller, 56657 Brightwood Blvd., Elkhart, IN 46516, phone 293-7974, or Marty King, 56632 Boss Blvd., Elkhart, IN 46516, phone 273-4358.

CHALK UP ANOTHER ONE

Although it's only December 21, 1982, as this is being written, wishing you a Merry Christmas and a Happy New Year will be old hat by the time you read it. However, better late than never . . . like if you forgot to trip the engine cutoff timer! •

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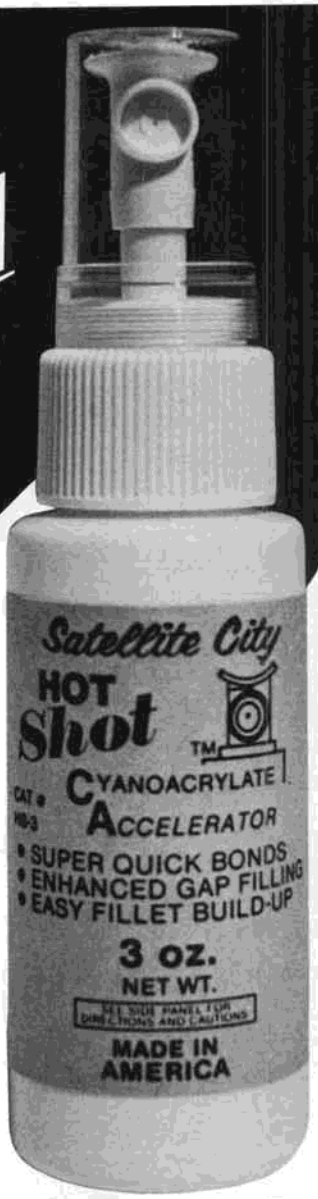

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Receiver FCC certified • Operating voltage: 4.8 volts • Operating frequency band: 72 MHz • Intermediate Frequency: 455 kilohertz; • Selectivity: ±5 kilohertz 6 dB down • Sensitivity: 5 microvolts • Typical current consumption: 10 milliamps or less • Dimensions: 1.5" x 2.3" x .83" • Weight: 1.55 oz. • Antenna Length: 39½" • C-MOS integrated circuit decoder • Receiver Type: Superheterodyne, double tuned shielded front end • Crystal controlled oscillator circuit

Servos 2 provided, operate in standard direction • Idle Current Consumption: 10Ma or less at 6 volts • Size: 1.6" x 1.7" x .8" • Weight: 1.6 oz. • Three different style output discs supplied for each servo • Amplifier powered by dual inline integrated circuit and two external motor drivers • Rotary output torque: 41.6 in-oz. • Splined output gear shaft for easily trimmed output • Heavy duty, 3-piece servo case to resist crash damage • Powerful 17mm motor

System Features One year limited warranty • Servo hardware provided • Frequency flag provided • Battery case and switch wired together for simplicity of hookup and maintenance • Detachable transmitter antenna for easy storage • Small size receiver fits in most electric and gas R/C vehicles • Only 10 Alkaline cells needed for operation rather than 12 as in most other units

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Acoms 4-Channel System with 4 servos, nickel cadmium battery pack, dual output charger, transmitter, receiver, switch harness with charging jack, servo trays, frequency flag. ***Featuring:***

Transmitter RF input: 700 milliwatts • Modulation System: AM • Pulse Time Neutral Position: 1.4 milliseconds • Pulse Time Minimum Position: 1 millisecond • Pulse Time Maximum Position: 1.8 milliseconds • Operating Voltage: 9.6V to 12V • Typical Current Consumption: 150 milliamps • Dimensions: 7.1" x 2.3" x 6.02" • Weight: 1.4 lbs • Frame Time: 18 milliseconds • Large easy-to-read battery meter (D'arsonval meter to monitor battery condition) • Integrated circuit encoder for precision reliability and low current drain • Transmitter frequency: 72 megahertz band • 34 click stop trim levers for precise control • Positive throttle ratchet • FCC Type Accepted • Diode protection on charging circuit • Easy to grasp knob switch • Neck strap attachment • Handle grip provided • Crystal controlled oscillator circuit • Knurled metal finger grips for positive grasp • 8 nickel cadmium rechargeable batteries supplied

Recevier FCC Certified • Operating Voltage: 4.8 to 6 volts • Operating Frequency: 72 megahertz • Intermediate frequency: 455 kilohertz • Selectivity: ±4 kilohertz 6 DB down • Sensitivity: 5 microvolts • Typical Current Consumption: 10 milliamps or less • Dimensions: 1.6" x 2.4" x .8" • Weight: 1.55 oz. • Antenna Length: 39½" • C-MOS integrated circuit decoder • Receiver Type: Superheterodyme, double tuned shielded front end • Crystal controlled oscillator circuit

Servos Four servos provided • Three operate in standard direction, one servo operates in reverse direction • Idle Current Consumption: 10 milliamps at 6 volts • Size: 1.6" x 1.7" x .8" • Weight: 1.6 oz. • Three different style output discs supplied for each servo • Amplifier powered by dual inline integrated circuit and two external motor drivers • Rotary Output Torque: 41.6 inch-ounces • Splined output gear shaft for easily trimmed output • Heavy duty 3-piece servo case to resist crash damage • Powerful 17mm motor

System Features One year limited warranty • Servo trays supplied • Frequency flag is provided • 500 milliamp hour nicads supplied for receiver and servos • Dual output charger with light emitting diodes to indicate receiver battery and transmitter battery charging • Receiver and transmitter batteries can be charged simultaneously or independently • Switch harnesses with charging jack for easy charging

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