Review: Davey Systems' Cessna 150

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MAY 1989
ICD 08545
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volume 19, number 207

CONSTRUCTION

BIG R/C: Humongous Sage Hen

OLD TIMER Cabinette

The Brimfield Float Fly

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MODEL BUILDER

MAY 1989

volume 19, number 207

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FEATURES

CONSTRUCTION

COVER: On October 26, 1925, "Jimmy" Doolittle flew one of three specially prepared Curtiss R3C-2 racing biplanes to victory in the Schneider Cup seaplane competition held that year at Baltimore, Maryland. This was to be the first of three major race victories that would catapult Doolittle to national hero status. (The other two were the 1931 Bendix and 1932 Thompson races, already commemorated as *Model Builder* cover paintings.) It is interesting to note that the R3C-2's flown on floats in the Schneider were the same aircraft used for the Pulitzer landplane competition flown only weeks earlier. The other two R3C-2's were U.S. Navy airplanes and were finished in medium blue and yellow; Doolittle's Curtiss was an Army airplane and was the only one painted blue-black and gold.

The second-place finisher was the British Gloster IIIA, flown by Henri Biard, who was to have flown the Supermarine S-4 which in fact suffered structural failure during pre-race trials. The position of the Gloster serves to illustrate the aggressiveness with which Jimmy Doolittle flew a low, tight, precise race.

The acrylic-on-canvas original painting is available for purchase. Collector prints of this, as well as all the earlier Classic Air Race cover paintings, are available. Please call or write Robert A. Benjamin Aviation Art, 1222 26th Ave. NE, Olympia, WA 98506, (206) 352-2602 for information and a free illustrated print catalog.

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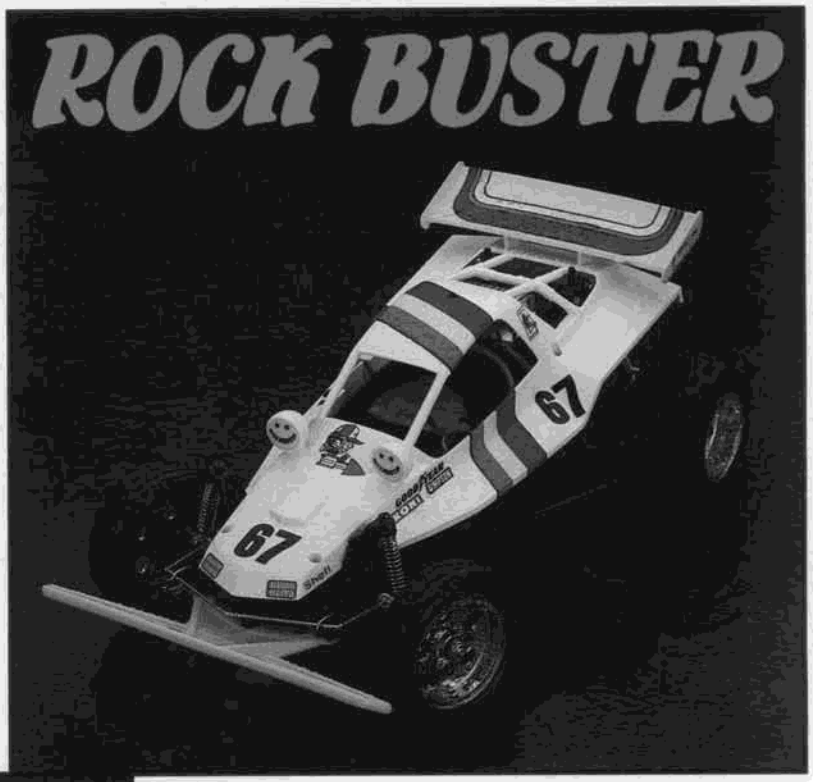
Two for the *off* road.



The Rockbuster line of 1/10 scale two wheel drive radio control cars are just the thing for the beginner. They are easy to assemble and operate for the young and old alike - even those who have never built a R/C car kit before.

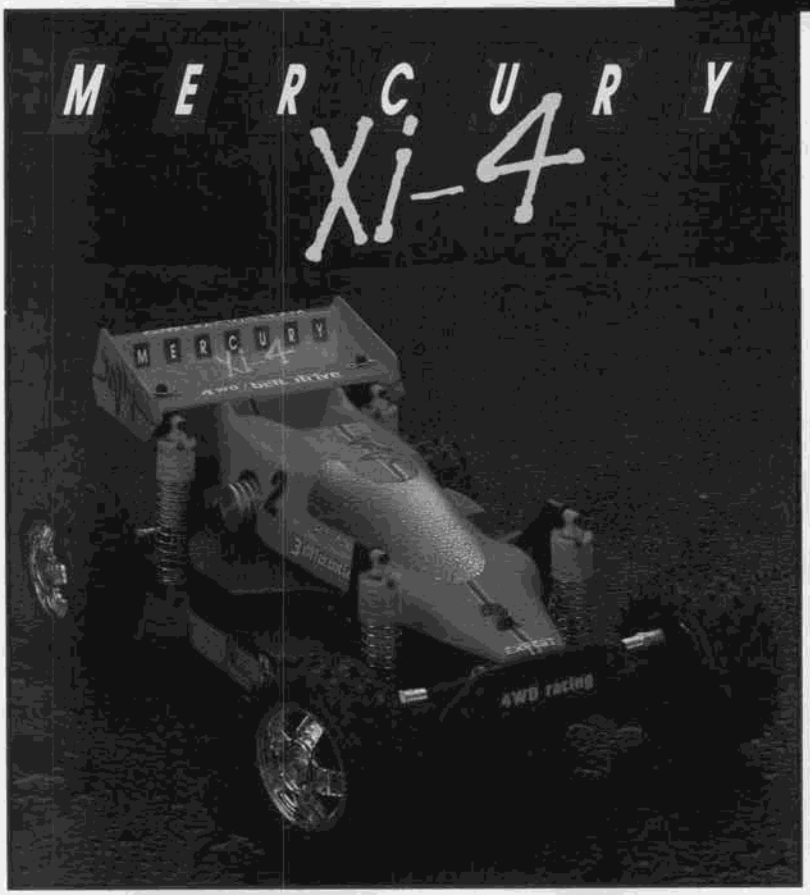
The Original Rockbuster is an entry level car. It comes standard with a RS-380 motor, spring shocks and independent front suspension. A 3 speed forward/3 speed reverse servo- operated speed controller is also included. The rear differential is housed in a sealed gear box. The Original Rockbuster comes in ready to assemble kit form or a 90% pre-assembled form.

The Hopped-Up Rockbuster follows the same concept as the Original Rockbuster, but is more of a competition level car. A RS-540 motor is standard and the rear spring shocks are replaced with adjustable oil dampened shocks. The front end receives a torsion bar to keep the front tires on the ground when taking those high speed corners. A 3 speed forward/3 speed reverse servo-operated speed controller is also included. The Hopped-Up Rockbuster also comes in ready to assemble kit form or a 90% pre-assembled form.

All four versions of the Rockbuster require a 7.2v hump pack and a 2 channel radio system to operate.

ROCKBUSTER TECHNICAL SPECIFICATIONS:

• Overall length: 14.56 inches (369mm.) • Overall width: 8.87 inches (225mm.)
• Overall height: 6.37 inches (162mm.) • Weight: 35 ounces (992g.)
• Wheel base: 10 inches (254mm.)



The Mercury Xi-4 is a truely affordable ready to assemble 1/10 scale four wheel drive radio control car. This car is not for the beginner, but can be easily assembled by most any R/C car enthusiast who has kit building experience.

Great strength and low center of gravity have been designed into the shielded monocoque frame. The body and rear wing are molded from durable polycarbonate resins. All radio, battery and drive train components are protected.

The gear drive system consists of fully assembled front and rear differentials, plus an adjustable center differential. Drive power comes from a RS-540 motor and dual lightweight toothed belts which provide instant acceleration with minimum power loss. Belt maintenance and tension is simple due to several access hatches located along the drive train. The durable low-profile pin spike tires are mounted on lightweight one piece chromed wheels for easy maintenance.

The suspension is a independent wishbone system. This system has adjustments for wheel camber and toe-in as well as shock tension and wheel travel. Four universal 'dogbone' drive shafts relay full driving power to all wheels for perfect traction.

The Mercury Xi-4 requires a 7.2v flat pack and a 2 channel radio system with battery eliminator circuitry to operate.

MERCURY XI-4 TECHNICAL SPECIFICATIONS:

• Overall length: 13.78 inches (350mm.) • Overall width: 9.61 inches (244mm.)
• Overall height: 6.19 inches (157mm.) • Weight: 56.44 ounces (1600g.)
• Wheel base: 10.63 inches (270mm.)

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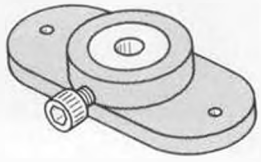
THE ANSWER TO AN AGE-OLD PROBLEM

WHEEL PANT MOUNTS

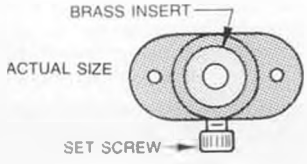


Wheel pants add class and style to your model, and are a must for some scale models. But fitting wheel pants to a wire landing gear can be a difficult and frustrating problem - that is, unless you have these handy little mounts from Sig! Made from tough molded nylon with an imbedded brass insert, the mounts use a socket-head set screw for maximum tightening power.

The smaller wheel pant mounts come in two sizes to fit 1/8" or 5/32" diameter wire landing gear and are just the right size for up to .60-powered aircraft. The larger mounts were designed specifically for giant models and also come in two sizes to fit 3/16" or 1/4" diameter wire. Each package contains a pair of mounts, four mounting screws and two set screws.

SH-726 For 1/8" Axles
$2.95 per pair

SH-727 For 5/32" Axles
$2.95 per pair



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SH-721 For 1/4" Axles
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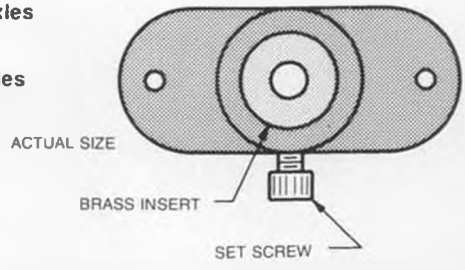

X-LARGE LEAF-SPRING TAILWHEEL ASSEMBLY

This super strong tailwheel assembly was developed for giant-sized models weighing over 15 pounds. It features a unique molded nylon tailwheel bearing with scale-like appearance, hardened spring-steel leaf springs, complete hardware, and a formed 1/8" dia. tailwheel wire that will accommodate up to 2-1/4" dia. tailwheels. The molded nylon steering arm and heavy-duty rudder control horn are connected by high-quality coiled steering springs. The shock absorbing ability of this unit will insure years of trouble-free service on even the roughest of flying fields.

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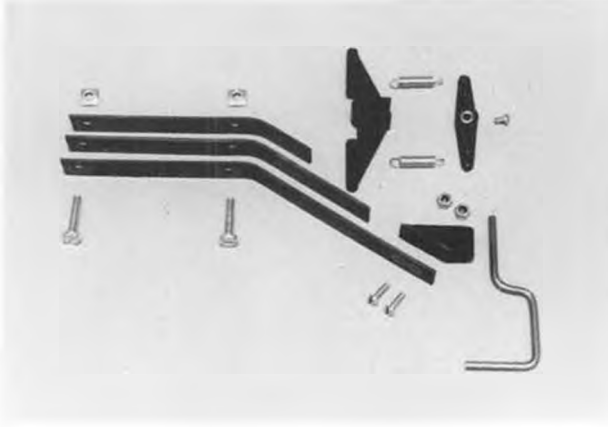

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YUMA
The Hobby House
507-E 22nd St
ARKANSAS
FT. SMITH
Duke's Model Airplanes
5305 Towson Ave
FT SMITH
Village RC Hobbies
7423 Highway 271 S
PH 501-646-3701
LITTLE ROCK
Sherrill's House of Hobbies
3408 S University Ave
LALR Plaza Shopping Center
PH 562-8230
LITTLE ROCK
Sims Discount Hobbies
9501 Rodney Parham Annex 7
CALIFORNIA
BAKERSFIELD
M & M Hobby Center
8401 White Lane, Suite 108
BAKERSFIELD
Van's Discount Model Mart
1029 Baker Street
BURBANK
T & A Hobby Lobby
3512 W. Victory Blvd
PH 818-842-5082
COVINA
Covina Hobby Center
140 N. Citrus Ph 331-1910
GLENDALE
Robin's Hobby Service
1844 W Glenoaks
HAWTHORNE
Chuck's Model Shop
14005 Hawthorne Blvd
LAKEWOOD
Hobby Warehouse
4118 E. South Street
LANCASTER
Smith Brothers Hobby
1223 W Ave. I Ph 943-6984
NAPA
Carl's Hobby Shop
2532 Jefferson St.
PH 226-2833
NORTH HOLLYWOOD
Mid Model Products
12420 Burbank Blvd.
NORTHRIDGE
Smith Brothers
8941 Reseda Blvd. Ph 885-8636
SACRAMENTO
Graphic Hobby House
2610 Marconi Ave.
SACRAMENTO
Sacramento R/C
3360 "X" Street
SACRAMENTO
R/C Country Hobbies
4191 Power Inn Rd Unit A
SAN FRANCISCO
Franciscan Hobbies
1920 Ocean Avenue
SAN LUIS OBISPO
S.L.O. Hobbies
1356 Madonna Road
SANTA MONICA
Evett's Model Shop
1838 Ocean Park Ph.452-2720
SANTA ROSA
Toy & Model
711 Coddingtown Mall
PH. 528-1468
TORRENCE
Flying Machine Model Center
24208 Crenshaw
VALENCIA
Smith Brothers Hobby
23132 Valencia Blvd
PH: 805-259-5995
VAN NUYS
Smith Brothers Hobby
16053 Victory Blvd.
PH: 818-786-6383

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ARVADA
Action Hobbies
10372 Ralston Road
AURORA
Tom Thumb Hobby Center
10718 E. Colfax Ph: 361-6159
COLORADO SPRINGS
Custom Hobbies
2813 E Pikes Ave
GRAND JUNCTION
The Hobby Hut
811 North 12th Street
CONNECTICUT
BERLIN
Banner Hobbies
162 Mill St. Ph: 828-1775
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Bristol Hobby Center, Inc
641 Farmington Ave
Bristol Plaza PH: 583-7273
BROOKFIELD
Vinnie's Hobbies
847 Federal Road
DANBURY
The Hobby Center
386 Main St PH: 748-9884
GLASTONBURY
Davis Hobbies
45 A Welles Street
Fox Run Mall PH 633-3058
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Radio Active Hobbies
374 New Haven Ave
Farmer's Market Plaza
PH: 203-877-8200
NEW MILFORD
Class Act Hobby Shop
27 Old State Road
NORWALK
Al's Hobbies
54 Chestnut Hill Road
WATERFORD
Eric Fuchs Hobbies
Crystal Mall
WATERFORD
Shore Line Crafts
5 Hayes Street
DELAWARE
WILMINGTON
Brandywine
1918 Zebley Road
FLORIDA
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G & G Hobbies
3489 W. Boynton Beach Blvd
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11433 U.S. 19 So.
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R/C Hobbies
6800 N. University Dr
FT. MYERS
Carl Wilson's Clear Track, Ltd
3343 Fowler St
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Hobbyland USA
850 S. 21st St., Unit N
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Orange Park Hobby World
7273 103rd St
MIAMI
Crown Hobbies
7439 Coral Way
MIAMI
Hobby Land
14530 S.W. 142nd Ave.
PH 305-238-4387
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1478 Park Ave
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Bob's Hobby Center, Inc.
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Colonial Photo & Hobby, Inc.
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Bobs's Hobby House
6719 North W. Street
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Universal Hobbies
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PH 305-581-9380
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Hobby House
6393 9th St. N. Ph:521-4148
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Ace Hobbies
2127 So. Ridgewood Ave
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Pam & Allen's Hobbies
1196-A Capital Circle N.E.
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Charlie's Discount Hobbies
7530 W. Waters Ave.
PH. 813-882-4007
TAMPA
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4839 E. Broadway
PH 813-248-3314
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Sergeant's Hobbies
1506 20th St.
WINTER SPRINGS
Forensics Hobby Center, Inc
420 W. State Road 434
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1857 Lavista Road
PH. 633-8741
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2825 Deans Bridge Road
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2829 West Main Street
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4734 N. Milwaukee Ave
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111 - 113 North Main St
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Tony's Hobby & Key
830 - 15 Ave

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Al's Hobby Shop
121 Addison
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716 S Main St
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Pat's Hobbies & Crafts
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The Hobby House, Inc.
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Orland Hobbies
18952 Oak Park Ave
PH: 312-429-9611
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Lake County Hobbies
37632 N. Sheridan Road
PH: 312-662-4544
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Phil's Hobby Shop
1722 Lake Ave Ph 426-5056
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Radio Control Center
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1639 47th St. N.E.
PH 393-4383
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Hobby Haven
Airport Entrance Hwy 75 S
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R/C Extras
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3201 Viking Dr Ph 255-8190
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Hobby Towne
6906 Airline Highway
COVINGTON
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301 N. Hwy. 190, Suite E8
PH. 504-893-RCRC
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1545 Lapalco Blvd.
PH 504-392-6622
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19709 Frederick Road
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17800 E. 10 Mile Ph 733-8294
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3417 So Westnedge
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23326 Van Dyke
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Don s Hobby Co
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Apache Plaza
RICHFIELD
Hub Hobby Center
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ROBBINSDALE
Hub Hobby Center
4114 Lakeland Ave N.
ST. PAUL
Jolly's Hobby & Craft Center
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2127 Hudson Road
W. ST PAUL
Jolly's Hobby & Craft Center
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OXFORD
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GRANDVIEW
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& 10801 Hickman Mills Dr
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Flying Models Hobby Center
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Mark Twain Hobby & Craft
1201 S 5th St
ST. LOUIS
J & J Hobbies
5511 So. Lindbergh
SUNRISE BEACH
J & S R/C
Rt. 2, Box 575
MONTANA
VICTOR
Murph's Hobbies
238 West View Drive
NEBRASKA
BELLEVUE
Gary's Hobbytown
701 Galvin Road 50 No. 103
NORTH PLATTE
Patterson's Hobbies
103 No. Jeffers Ph 534-1038
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LAS VEGAS
J.J.'s Hobby Den
4972 S. Maryland Parkway#8
NO. LAS VEGAS
Peterson Hobbies & Crafts
3262 B Civic Center Drive
RENO
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CT Hobbies
49 Eaton Road
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780 Hevey St PH 623-6913
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Kearsarge St
SALEM
Bill's Hobby Barn
326 S. Broadway
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CJ Hobbies
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GB Hobbies
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MERCERVILLE
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Carl's Hobby Center
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Hobbymasters, Inc.
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Dan e Crafts & Things
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Edmund's Hobby Shop
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Walt's Hobby & Craft
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128 Swannanoa River Road
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FARGO
Valley Hobby & Raceway
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Lee's Wheels Stop & Hobby
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Modeler's Haven
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Hobby Hive
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Webster Hobby Shop
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Sunset Radio Control
P.O. Box 718
ROCKY MTN. HOUSE, ALBERTA
JB Crafts & Hobbies, Ltd.
Box 539, 4818 - 50 Street
DUNCAN, B.C.
Pins Bins R/C Supply & Access
1058 B Canada Ave
VANCOUVER, B.C.
Silvering Hobbies
2636 E. Hastings St., Unit 118
VICTORIA, B.C.
Royal Oak Hobbies
4464 W Saanich Road
BRANDON, MANITOBA
R/C Hobbies
48 Confederation
WINNIPEG, MANITOBA
Cellar Dweller Hobby, Ltd.
1354 Main St. Ph: 589-2037
ST. JOHN'S, NFLD.
Capitol Hobby Centre, Ltd.
6 Freshwater Road
BURLINGTON, ONTARIO
Skycraft Hobbies Inc.
141 Plains Rd W.
PH: 416-529-0559
800-263-8301
COURTRIGHT, ONTARIO
Plane Crazy
428 #80 Hwy. RR1
PH: 867-3102
KITCHENER, ONTARIO
Plas Craft Model Co
1595 Victoria St N
LONDON, ONTARIO
Plas Craft Model Co, Inc
1700 Dundas St. E
MILTON, ONTARIO
R/C Ready Models
175 Mary St.
PH: 416-875-1554
MISSISSAUGA, ONTARIO
Hobby Hobby, Inc.
128 Queen St. South
SCARBOROUGH, ONTARIO
National Hobby, Inc
1875 Lawrence Ave. E
PH: 416-755-1760
WILLOWDALE, ONTARIO
Keith's Hobby Shop
5205 Yonge St PH. 222-4721
CHARLOTTETOWN, P.E.I
Jim's R/C Supply
132 Nassau St Ph 368-1858
FLEURE MONT, QUEBEC
Shar-Hobbies
1086 12th Ave Nord
LAVAL, QUEBEC
Carl's Hobby Shop, Ltd
1500 Cure Labelle Blvd., Chomedey
MONTREAL, QUEBEC
Can Air Hobbies
5850 Gouin Blvd Ouest
PH: 514-332-3565
ST. GEORGES BEAUCE, QUEBEC
Place Bureau Enr
1215, rue des est Ville de
VILLE ST. LAURENT, QUE
Hobbyville
902 Decarie PH: 744-6280
REGINA, SASKATCHEWAN
Aero Specialties
200 Sherman Road
SASKATOON, SASKATCH
RC Hobby World
108 - 2301 Ave C North
Hessenig Centre Ph 652-4775
TORONTO
Radio Control Hobbies
221 Roslyn Ave PH 783-4747
ENGLAND
NORFOLK, NR17 1DG
Pegasus Models, Ltd.
Caston, Attleborough
NEW ZEALAND
HASTINGS
Hastings Model Supplies
523 Frederick Street
THE NETHERLANDS
DEN BOSCH
P. Tooman Model Shop
Minderbroedersstraat 32
PH 073-140104
NORWAY
PORSGRUNN
B.B. Hobby Import
Lyngv. 3c
SWEDEN
S-871 02 HARNOSAND
Model Produkter AB
Box 2060

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

from Bill Northrop's workbench

• As occasionally happens when the work load outweighs the manpower at RCMB INC, something has to give. Most times, some extra daily hours and/or weekends will solve the problem, but in rare instances, stronger measures must be taken. A combination of deterrants focused in on us during the recent holiday and year-end season which caused one of our magazines, this one, to slip behind its production schedule by two weeks.

What happens next is reminiscent of the relentless wave after wave of broomsticks in Walt Disney's classic "Sorcerer's Apprentice," as the publication deadlines keep coming at an uncontrollable rate of one a month, no matter what (actually, two-and-quarter a month, when counting all three magazines)! As with Mickey and the broomsticks, we have no control over the march of time or the demands of our newsstand distributor's schedule, so the only recourse was to combine the March and April issues. This action instantly moves our schedule from two weeks behind to two weeks ahead. However, this maneuver is not recommended in the business world, as it cost us the loss of one month's income from this publication.

Our Plug Sparks columnist for 15 years, John Pond, received a Distinguished Service Award at last year's Old Timer Nats, in Vincennes, Indiana. John is largely responsible for the tremendous growth of O.T. activity today.

Latest version of Skip Ruff's R/C Martian Spaceship sports triple tail fins for much improved stability. Two little ones are F/F gliders. More in text.

Let us hasten to remind subscribers, that with one deft maneuver at the computor keyboard, all subscriptions have been extended by one month! Incidentally, the decision to make this adjustment occured at too late a date in production to include an explanation in the combined issue.

INTRODUCING

Another change in the last *Model Builder* also took place on such short notice that there was no time for an explanation.

Our March/April issue featured a new "Chopper Chatter" columnist, James Wang. Actually, "Chatter" isn't really a fitting tile word for James' writing. A better description might be "technical effervescence." This young gentleman is bubbling over with enthusiasm and investigative knowledge on the subject of helicopters. A few moments of conversation with him, and you're totally ready to believe his comment in the introductory paragraph of his first *MB* column, ". . . I already have tons and tons of R/C helicopter ideas packed in my mind, to the point my head is about to explode." Looks like our biggest problem with James will be controlling his desire to turn *MB* into an all-helicopter magazine!

James, in his first column, has already outlined his qualifications in theory and his practical background in the field of full-size and R/C model helicopters. We also note that he has the necessary writing skill for communicating in non-technical terms, yet injecting just enough theory to keep our readers' minds on their toes.

We look forward, as we're sure he does, to the day his byline will be changed to **Dr.** James Wang.

REPORT FROM MARS

The saga of the R/C Martian Space Ship continues. This month we see the latest revisions on the R/C model, based on Skip Ruff's experiments with the smaller free flight foam models. Rather than doubling the original fin area, as shown on one test ship, Skip opted to increase the vertical fin area by enlarging the tip chord of the stab and adding tip fins. R/C flight tests show a dramatic increase in stability. The glide is still extremely steep without power, however, now that control is better, Skip finds he can add power just before touchdown to flatten the glide angle, as originally speculated.

The civilian population of Taft, California, a leading U.S free flight site, is still a little restless when stories get back to town about the strange object in the skies overhead!

FORTIETH ANNIVERSARY

The Fox engine in the photo is kinda special. It marks the 40th anniversary of the Fox .35, the world's most copied model airplane engine. The anniversary engine, identified as 13500 35 Fox Stunt, retails for $59.95, including a matching Fox muffler, and the

Close-up of the logo detail on the new 40th Anniversary Fox .35; see text.

"hanging ribbon" engraving on the crankcase to commemorate the occasion. Our wandering columnist, Stu Richmond, sent the photo, noting that when Duke came out with the engine, he matched the mounting holes of the then dominating engine, and smartly added a bit more displacement to get a bit more power. . .with outstanding success!

THINGS TO DO

Faced with still another less-than-satisfactory site for indoor free flight at the AMA Nationals for 1989 (A low ceiling with obstacles!), the National Free Flight Society has again decided to conduct its own Indoor Championships. As pointed out in a letter from NFFS president, Tony Italiano, the Championships will take place on June 1-4, 1989, at the East Tennessee State University MINI-DOME, Johnson City, TN.

* * *

The 1989 Reno National Championship Air Races, the 26th annual, will take place on September 14 through 17, 1989. Tickets are available through BASS and Ticketron agencies, but we understand that hotel and motel accommodations are already sold out. It appears that everyone signs up for the next year before they leave Reno. Unless you are able to pick up a cancellation, have a friend who lives in Reno with an extra bed or space for a sleeping bag, or you have "connections," you'll just have to read about it in *Model Builder.* Felix has a room!

* * *

Have you tried R/C Combat? An organization called W.A.C.O (World Air Combat Organization), at P.O. Box 111, Jasonville, IN 47438, plans to have its first annual championships on October 9, in Jasonville.

Basically, the aircraft specs call for a .21 maximum engine size, two operating servos allowed regardless of available channels in radio, and a maximum fuel capacity of two ounces. No restriction on aircraft design or control systems used (except two servos only). Matches are flown for five minutes. One point per second for air time and 100 points per cut, automatic win for leader cut (string leader) or "Kill."

Sound like fun? Write for more details at the above address. Control line combat fliers will know who's at that location!

* * *

November 10, 11, and 12 are the dates for the Giant Scale Schneider Cup Reenactment at Lake Havasu, Arizona. Chaired by Bob Martin, of Bob Martin R/C Models, this promises to be a giant affair in addition to the scale size of the models. The eleven races, which began in 1913, and continued with occasional interuptions, such as World War I, until 1931, brought out some startling and developmental aircraft that have established their niche in aviation history. *Scale R/C Modeler* magazine is the event sponsor, and has carried several articles about the coming affair. Our cover this month depicts one of the classics, the Curtiss R3C-2 flown to victory in 1926 by Jimmy Doolittle, and the first to break the 200 mph mark. For more information about this event, write or call Bob Martin at 1520 "C" Acoma Lane, Lake Havasu City, AZ 96403, phone (602) 855-6900.

PEANUT MOD

If anyone may have contemplated building that complicated 1908 Kapferer III by Benno Sabel, published in our August '88 issue, here's a mod that will take away some of the pain of building it. Benno has discovered through additional research that there was no curved deck on the top surface of the fuselage, from the engine back to the cockpit. In Benno's plan, this was shown as a piece of delicately hollowed out blue foam. Relax, it's just flat. There is, however, a tapered wind deflector starting at the front of the cockpit and tapering to flat at the next station forward. Its maximum height is about the same as the former curved deck shown on the plans. •

ADVICE FOR THE PROPWORN
—By Jake

Dear Jake:

I have been having trouble with something you might be able to help me with.

All of the plans that I have seen are WHITE in color. I keep losing track of my (also white) hinges and things. I learned to fly with the "Tossette" from January 1986 Model Builder *even with its white plans. Somewhere around my latest project I have a white yardstick, it's been lost for months.*

Seeing that you are well known in the industry perhaps you could influence all the kit manufacturers and plans printer people to slightly color the paper that they use.

Grumpy Roy in Columbia, Missouri

Dear Grumpy:

I know just what you mean. I laid a sugar cube down on some plans next to a cup of coffee, and then I couldn't find it for two weeks until a trail of cockroach droppings led me to it. Lucky for me the roaches didn't leave white droppings.

I have found a couple of solutions that don't require bothering the manufacturers about the color of their plans. One way to eliminate white plans is to wear tinted sunglasses when you build. Rose-colored works good and makes everything look pink.

Another excellent alternative, and one that I discovered quite by accident, is to spill something (preferably greenish) on the plans. This works so well that I have taken to tossing a mug of Cup-a-Soup on any new set of plans that I get.

Finally, consider taking a slide photo of your plans and projecting it onto a blue wall. This eliminates the color problem, but objects you lay on the work surface while building have a very strong tendency to roll off onto the floor.

Good luck, and let me know how you make out.

Jake

* * *

Dear Jake:

It's well known that you are a legendarily bad pilot, but I've also heard that your driving isn't any better. Any comment?

Patrolman in Petaluma

Dear Patrolman:

That's entirely untrue. I am an extremely safe and thoroughly law-abiding motor vehicle operator. The only ticket I ever received was for doing 0 miles per hour in a no parking zone.

Jake

* * *

Dear Jake:

Not too long ago, I tried to improve the endurance of my free flight model by filling the Monokoted wing and tail surfaces with hydrogen. The weight did go down a few grams so I thought it might work. But when I went to light the dethermalizer fuse, the model blew up and perforated the timer's hat. I was disqualified for use of a hazardous material, and I had to buy the man a new hat. Guess I won't try that again.

Foiled in Fresno

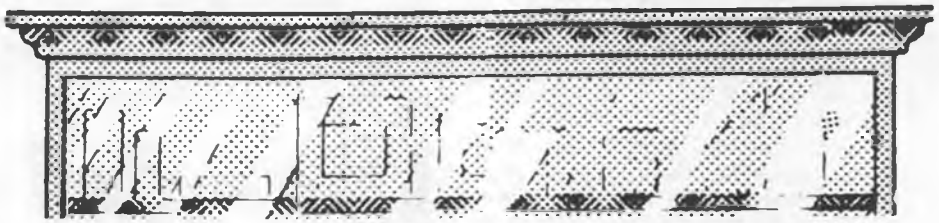
Dear Foiled:

You could have saved yourself a lot of time and trouble if you had just lit the timer's hat. That way you would have still been disqualified, you would have still had to buy the guy a new hat, and no one would have been endangered by the hazardous hydrogen. Next time you get the urge to do something stupid, call me first because

Continued on page 100

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 MB does not constitute an endorsement of that product, nor any assurance as to its safety or performance by MB.



• Ace R/C sent us info on a number of new products, three of which we'll tell you about this month. First is their new FlexMaster 16 gauge wire designed especially for electric powered models. Made of 665 individual strands, this wire is extremely flexible and offers far less resistance to the flow of current than smaller wire. FlexMaster comes in packages of two (red and black) 24-inch lengths, for $3.49.

"Add-A-Trickle" is a nifty device that wires into the leads from your overnight R/C system charger and lets you switch to a trickle charge rate (10 ma) after the normal overnight charge cycle is finished. At such a low charge rate your batteries can be left on charge indefinitely without damage, keeping them always topped off and ready to go on a moment's notice. Two versions of Ace's Add-A-Trickle are available: one has single input and output leads and sells for $6.95, the other has dual leads (for transmitter and receiver) and retails for $9.95.

Lastly, to try and clear up some of the confusion surrounding the 1991 R/C frequency situation, Ace has put together a two-hour video that explains the whole thing in detail from beginning to end. Radio experts Tom Runge and Fred Marks talk about the technical aspects, and Bob Underwood explains the AMA's viewpoint on the subject. In all, this is a very valuable educational tool that both individuals and clubs alike should own. Price of the video is $26.95.

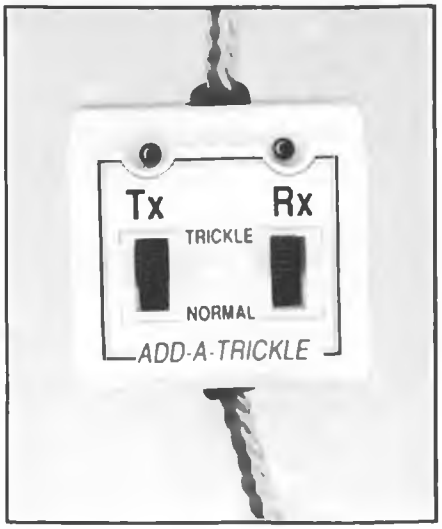
From Ace R/C, 116 W. 19th St., P.O. Box 511, Higginsville, Missouri 64037.

* * *

Cleaning the messy gunk and crud off of your model at the end of a day's flying is never a fun job, but Sig's new "Blue Magic" cleaner can at least make it easier and quicker. Blue Magic is nonhazardous, nonflammable, biodegradable, odor-free and best of all, it's cheap! Sig claims the stuff dries without streaking and is completely safe for all painted finishes and plastic iron-ons. The price? A 16-oz. trigger spray bottle sells for $2.95. Refills are available in pints, quarts and half-gallons, the latter going for only $3.50. Certainly worth a try, especially since it comes from one of the most respected names in modeling.

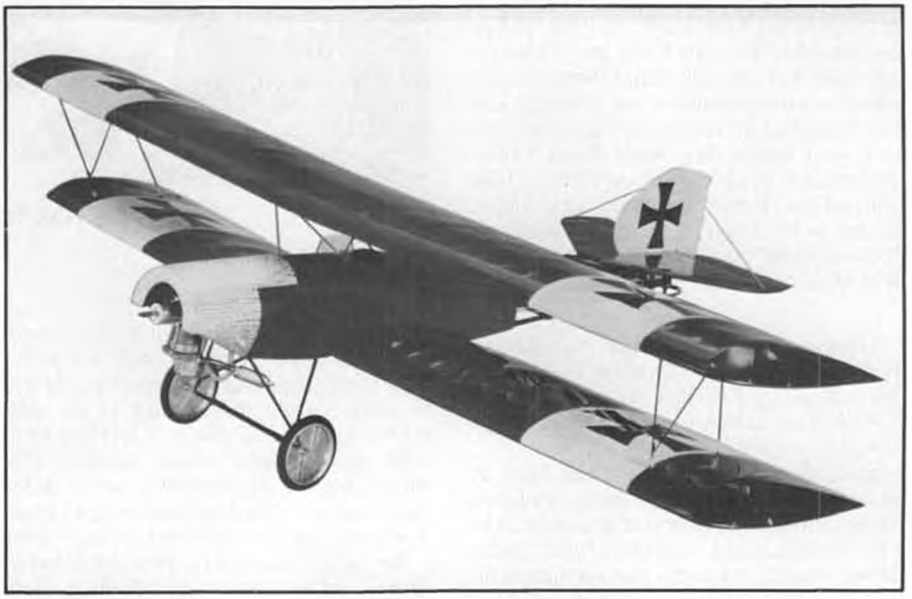
From Sig Mfg. Co., Montezuma, Iowa 50171.

* * *



Ace's 1991 R/C frequency video (above) and "Add-A-Trickle" charging accessory (right).

The folks at Top Flite have decided to go one better on their popular antique-looking "Elder" sport R/C ship by making a biplane version, which should be on your dealer's shelves by the time this issue hits the stands. Not much information was supplied on the kit itself, so we can only assume that it is as complete and of the same high quality as the rest of Top Flite's line. We can tell you, however, that this is a pretty big model, with almost 1,500 square inches of wing area. Other specs include a span of 65 inches, length of 50-1/4 inches, and a flying weight of 7-1/4 to 8-1/2 pounds. Engine recommendations are a .45 to .75 two-stroke or .60 to .90 four-stroke. In all, the Elder Biplane is an attractive model that should prove to be very popular with R/C sport fliers.



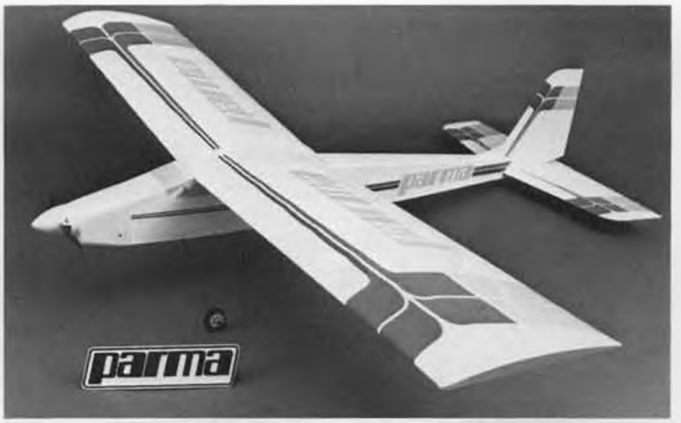
Top Flite's "Elder Biplane," two-winger version of the popular Elder sport R/C model.

From Top Flite Models, 2635 S. Wabash Ave., Chicago, Illinois 60616.

* * *

There has been a lot of talk lately in Old Timer circles about the new 1/2A Texaco motor that Cox has developed for this fastest growing of all O.T. R/C events. For the uninitiated, 1/2A Texaco is a duration event open to any recognized Old Timer design, scaled or otherwise, powered by an essentially unmodified Cox reed-valve .049 with an 8cc integral tank, and swinging a prop of 8-inch maximum diameter. A "max" flight is 15 minutes.

Obviously, with only a given amount of fuel, the best approach is something of a



Electric "Aero-Tiger" (above) and "Aero-Sprint" (right) from Parma.

compromise between power and fuel economy, and that is the idea behind the new Cox engine, known officially as the Texaco .049. The engine has been detuned somewhat as compared to the widely used Black Widow, thus increasing the engine run time. Performance figures supplied to us are 9,100 to 9,600 rpm with a 7x3-1/2 prop, with a running time of five to six minutes. The engine is easily recognized by its black crankcase and red tank; also, the engine sports a plastic tank back and a hex-shaped prop driver with a centering boss.

Also new from Cox is the Silhouette, an ARF R/C glider featuring molded foam flying surfaces and molded plastic fuselage. Span is 55 inches, the airfoil is an Eppler E-214, and the wing loading can be as low as 7.9 oz./sq. ft., depending on the radio used. The model is available both with and without a two-channel R/C system, and both versions are supplied complete with a high-start.

From Cox Hobbies, 1525 E. Warner Ave., Santa Ana, California 92705.

* * *

"Mirage 550" is the name of Goldberg's latest kit offering, a 54-inch span racy looking high-wing design aimed at the 05 size electric sport/trainer market. This is an all-balsa kit and features an exceptionally complete hardware package, which includes the motor, pre-wired switch harness, prop, spinner, special lightweight wheels, and formed plastic cowl and wheel pants. Additional items required are a six or seven-cell Ni-Cd pack and charger, and of course a two or three-channel R/C system. We received one of these kits (which looked very nice, by the way) along with the press release and have since sent it out to be built and reviewed for an upcoming "Products in Use" article.

From Carl Goldberg Models, 4734 W. Chicago Ave., Chicago, Illinois 60651.

* * *

Great Planes sends word on two new O.S. engines now being made available to U.S. modelers. One is the O.S. .32 F ABC, which is based on the popular .32 F-H ABC helicopter engine. Features include dual ball bearings, Schnuerle porting, and the proven O.S Type 3 R/C carb. Output is claimed to be over one horsepower. If you're looking to give your sluggish .25 powered model a real boost you'll want to take a close look at this new powerhouse from O.S.

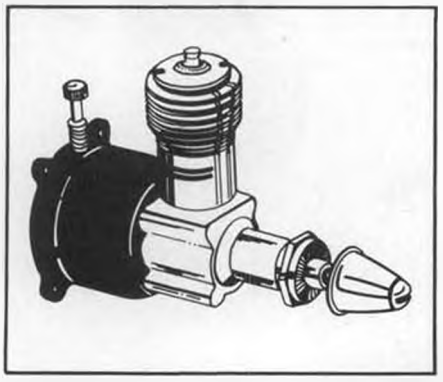
At the other end of the size spectrum is the massive FF-320, a flat-four four-stroke very similar in appearance to the familiar FF-240—just bigger, is all. At 3.2 cu. in. displacement (over 50cc!) this is the biggest engine O.S. has produced, and we have to assume it has the increased power to match.

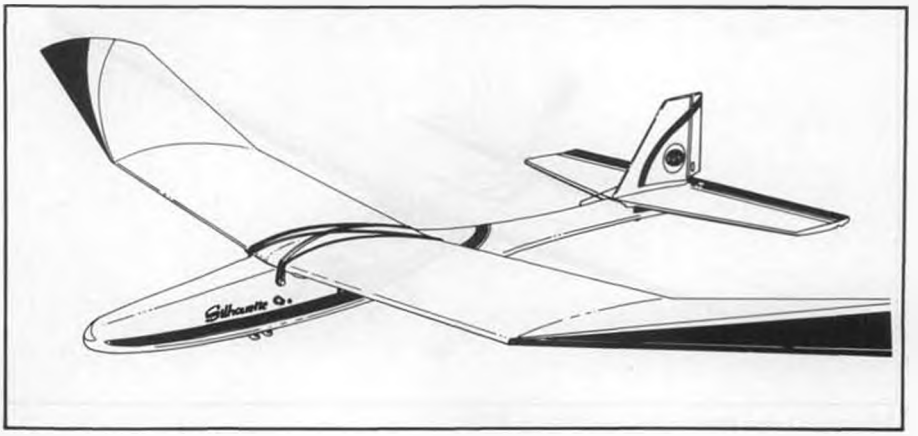
From Great Planes, P.O. Box 4021, Champaign, Illinois 61820.

* * *

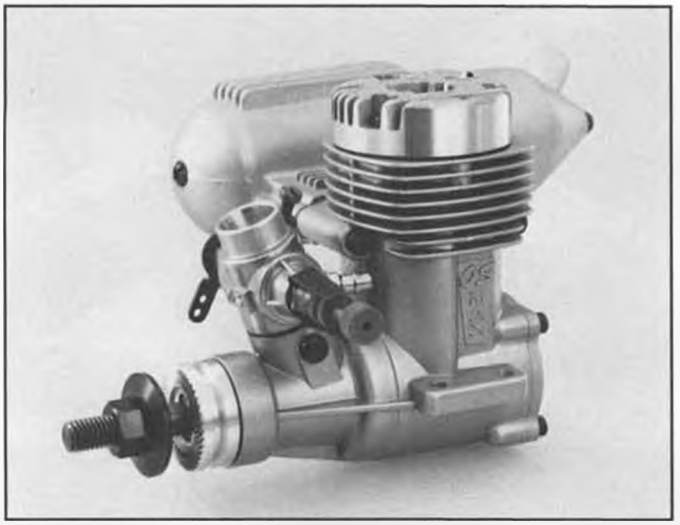
Emil Agosta of Dry Ridge Models is offering plans for a 1/4-scale model of the popular "Spacewalker" homebuilt (see his ad elsewhere in this issue). Something not mentioned in the ad is that the plans outline a few suggested power and design combinations that will let you tailor the performance as you see fit. Slow, scale-like flying

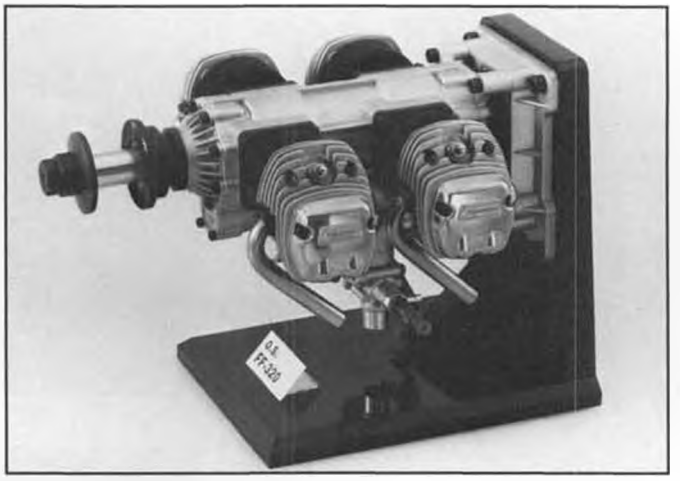
High-performance sport/fun-fly model from Midwest, the "Hots II."





New from Cox, the Texaco .049 engine (above) and "Silhouette" R/C glider (right).





Latest from O.S., the giant FF-320 four-cylinder four-stroke (above) and .32 F ABC engine (left).

can be had by using a .46 two-stroke and a non-scale 4415 airfoil. Use the same wing and a .61 two-stroke or .90 four-stroke for zippier performance. Using those same size engines and switching to the scale 2412 airfoil will make the Spacewalker fly like a pattern ship, and for the real hot-dog pilot, the plans detail the construction of a clipped-wing version of the plane. Variables in incidence and dihedral for all types of performance are also spelled out on the plan. Refer to the ad for plan prices and availability of fiberglass cowls and wheel pants.

From Dry Ridge Models, 59 McCurry Rd., Weaverville, North Carolina 28787.

* * *

Midwest Products has a new version of the "Hots" high-performance R/C sport/fun-fly model called, strangely enough, the "Hots II." Design improvements over the earlier Hots include a one-piece removable wing, larger fuselage for easier radio installation and access, a larger fuel tank compartment for longer flights, and a fully cowled engine for a more streamlined appearance. Specs on the airplane are: 45-1/4 inch span, 436 square inches of wing area, flying weight of 3-3/4 to 4-1/2 pounds, and an engine size range of .40 to .45 (two-stroke) or .40 to .50 (four-stroke). Suggested retail on the new Hots II kit is $89.95.

From Midwest Products, 400 S. Indiana St., P.O. Box 564, Hobart, Indiana 46342.

* * *

Hobby Lobby's catalog #13 is now available and is filled with all sorts of interesting goodies. The Hi-Max four-stroke engine shown in one of the photos is a good example. These are English-made engines of .91 and 1.20 cu. in. displacement; going prices are $269 and $319 respectively. No information was given on the internal construction features, however the performance specs rate the .91 at 1.45 bhp at 9,000 rpm and the 1.20 at 2.05 bhp at 9,500 rpm. Both engines feature built-in radial mounts.

Another neat item shown in the catalog is the Como Microturbo 2 hand-held drill/grinder. The drill itself is attached to a variable speed AC/DC power supply transformer via a lightweight cord. Four different size collets and 16 tools are included, and everything packs up neatly into a compact carrying case. Also, since the drill uses a DC motor, it can be used at the field simply by hooking it up to a battery. Price on the complete Microturbo 2 drill set is just $69.90.

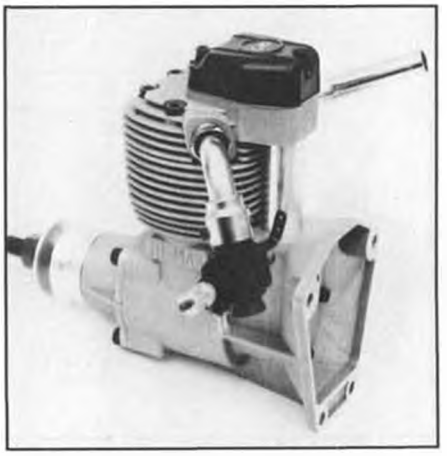
Hobby Lobby's catalog #13 is available free for the asking. Call or write Hobby Lobby at 5614 Franklin Pike Circle, Brentwood, Tennessee 37027, (615)373-1444.

* * *

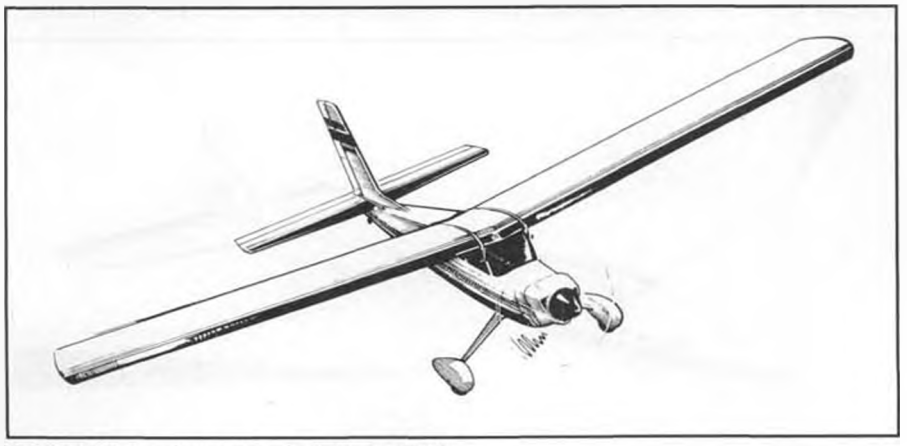
Parma International, one of the biggest names in R/C electric cars, is getting started in the R/C electric airplane field by introducing two 05 size high-wing sport/trainers, the Aero-Tiger and Aero-Sprint. The latter is an ARF, requiring only assembly of the major components and radio system. Motor, folding prop, spinner and wheels are all included; radio, motor battery (six or seven cells) and charger are up to the buyer to supply. Going price on the Aero-Sprint is $149.95.

The Aero-Tiger, in contrast, is an all-wood kit (the Aero-Sprint is also of wood construction, by the way) featuring machine cut and sanded parts. Two versions of the Aero-Tiger are available, the basic kit selling for $59.95 and the deluxe kit for $149.95.

From Parma International, 13927 Progress Parkway, North Royalton, Ohio 44133.



Como Microturbo 2 drill/grinder (top) and Hi-Max four-stroke from Hobby Lobby.



Goldberg's latest electric kit, the "Mirage 550."

IMS ATLANTA *Preview*

A brief review of the premier 1988 model show indicates a little of what you can expect to see this May.

• About a month from now, that is if you have just picked up this issue as it hit the newsstands, the Second Annual IMS Model Sport and Hobby Show (IMS Atlanta, for short) will be opening in Atlanta, Georgia. To be exact, the show takes place on Friday, Saturday, and Sunday, May 12, 13, and 14, at the Georgia World Congress Center, 285 International Blvd., N.W., in downtown Atlanta.

There will be model manufacturers from all parts of the U.S. on hand to show their latest products, including radio controlled model aircraft, boats, and cars, R/C systems, model railroads, and modeling accessories. A huge car track (60 x 110 feet) will be available for live demonstrations of all types of R/C cars and motorcycles. . . even the big quarter-scale gas powered models! The 32 x 48-foot boat pond will provide plenty of aquatic action, and there will also be a skeleton crew from the Blacksheep Squadron under the direction of Burbank, California hobby shop owners, Tony and Addie Naccarato, who will again head up the twice-a-day live demonstrations of free flight gliders and rubber powered models, including indoor HLG, Penny Planes, microfilm, followed by electric powered control line scale models, featuring carrier landings, all capped off by Tony's exciting flight demonstration of the seven-foot span antique Farman scale R/C model which weighs a mere 25 ounces! In addition there will be continual flying of radio controlled balloons and blimps.

Don't come to the show on Friday unless you are in the hobby trade as a dealer, distributor, importer/exporter, manufacturer, etc., with business card and personal I.D., as this is the Trade-Only day for industry members only. The show goes public on

Dorothy Adler, of New York, builds a Delta Dart. Free plane, free instructions to anyone.

Donna and Tom Runge in the Ace R/C booth.

Airtronics' Jack Albrecht looks happy with the PCM Vanguard.

Ted Davey, Davey Systems, with the electric-powered Eindecker. Combo kit with electric motor is bargain.

Walt and Tim Schoonard are justifiably proud of their X-cell helicopter.

MRC's Peter Giammarinaro shows Clod-buster monster truck to interested dealer.

Hobby Stores Distributing, East Hartford, CT, on hand to check the merchandise.

John Sermos, Stamford, CT, has the very best connections.

Saturday and Sunday, starting at 10 a.m. each day, and closing at 6 p.m. and 5 p.m. respectively. Remember, selling is permitted by exhibitors, at their option. Of course, trade members are welcome on the public days too, but with the increased people-traffic on these days, it's kinda hard to talk serious business with the exhibitors.

Modelers are invited to enter the free static model competition, to win nice trophies or ribbons. There are 48 model categories to enter, including 19 R/C aircraft, six R/C boat and ship, six R/C cars, three control line, eight free flight, two rocket, and four assorted plastic, plus Best of Show. You can enter as many categories as you wish, but only one model per category, please! IMS show flyers are available at hobby shops in most of the Southeast, giving more details, or you can call (714) 645-8830 for more information. Also, by mailing an S.A.S.E. stating what you want, we will send you copies of the Model Entry Form, which you can fill out and turn in with your model when you bring it to the show (do not mail filled-out form back to us). Mail your S.A.S.E. to: International Modeler Show, P.O. Box 10127, Costa Mesa, California 92627-0031. We will accept machine copies of the form, in case you have more models to enter or you wish to supply some for your friends. Forms will also be available to fill out at the show. The flyer explains the days and hours during which models will be accepted for the competition, including Thursday and Friday.

Repeating last year, Delta Airlines' Special Meetings Network is again offering its personalized services for the Atlanta IMS show. Provisions have been made to afford a 40 (forty) percent discount off Delta's domestic full round trip day/night coach fares, including Alaska, Hawaii, and Puerto Rico. In addition, a 35 (thirty-five) percent discount off Delta's full round trip day/night coach fares will be offered for Canadian travel. For all of the above, reservations and ticketing must be made a minimum of seven days in advance. Any changes to the outbound reservations must be made with

Mike Sriver's steam powered R/C launch cruises by as small R/C submarine stays clear.

Some of the 1/4-scale sprint cars that provided lively demonstrations during the show.

Peanut-scale rubber powered model sits on the seemingly large trophy it won.

Electric powered R/C racing boats provide lively action in the 32x48 pond.

Addie Naccarato launches the 7-foot span R/C electric-powered Farman for son, Tony.

Alabama modelers check out the Byron P-40 as Al Tuttle thinks about an answer to the last question.

Robert Gorham, world class R/C helicopter pilot, proudly displays the GMP Legend.

seven days advance notice of the new flight. Changes to the return flight may be had at any time. There are no penalties for changes or cancellations, when using these discount fares.

A 5 (five) percent discount is also available to you on Delta's domestic published excursion fares, including instant savers. If you elect to use the 5 (five) percent discount off any excursion or instant saver fare, all rules and conditions of the fare will apply.

In all cases, seats are limited, so you are encouraged to confirm reservations as soon as possible. To take advantage of these fares, follow these simple rules:

1. Contact Delta or have your travel agency call (800) 221-1212 and ask to speak with Delta's Special Meetings Network.
2. Refer to Reference File Number K14090. THAT'S IMPORTANT!
3. Valid dates of travel are May 7 to May 19, 1989.

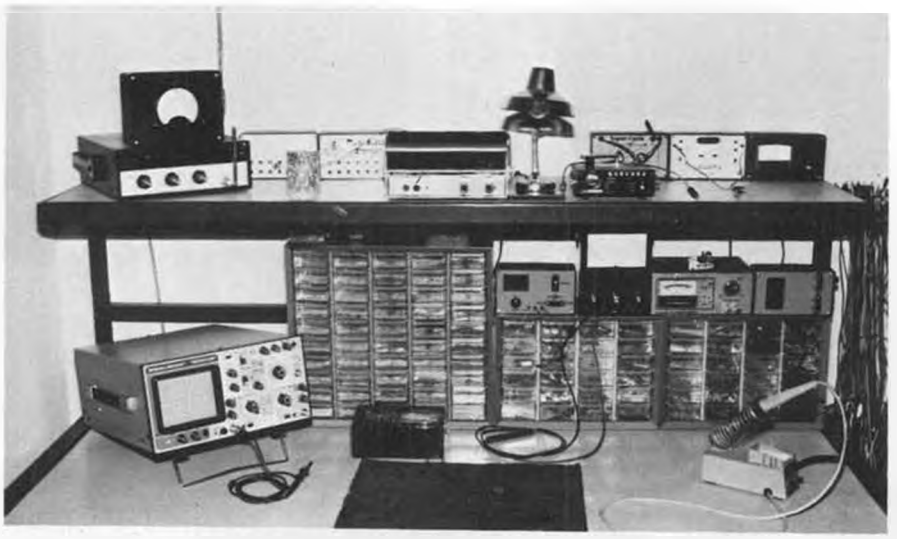
Delta is open from 8:00 a.m. to 11:00 p.m. Eastern time to receive calls for making these reservations. Call soon, and don't forget that File No.K14090.

Finally, a special treat for modelers is being offered this year, co-sponsored by AMA and the International Modeler Show (See why we use IMS?). It's a presentation of the Super Stars of Radio Control. Special booths will be set up near the AMA display in which top modelers from the various facets of the R/C hobby will be on hand to talk with the spectators and answer questions which they are certainly more than qualified to handle. At the time of this writing, National and World Champion Dave Shadel will be representing Pylon Racing, the one and only Dave Platt will hold forth in Scale, R/C Helicopter pioneer Horace Hagen will answer your questions on choppers, R/C Soaring champion Brian Agnew will be there to talk about silent flight, and though the experts are still to be chosen, electric power and pattern flying will also be represented. Don't miss this chance to go one-on-one with the best!

It's all happening in Atlanta on May 13 and 14. Y'all come on down y'hear? •

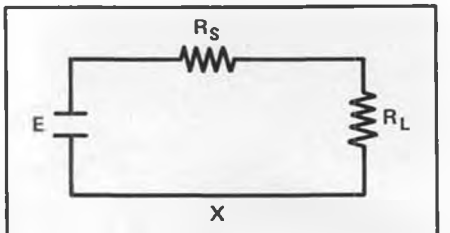
Between Patty Violett, the Viper, and Marcia (Violett) Jones, the Bob Violett booth offers a super visual display.

Hazel Sig-Hester, Hall of Famer, waves from the cockpit of her Space-walker. Bob McDaniel's "1/4-scale" Ni-Starter ready to fire up engine.



Electronics Corner

By ELOY MAREZ



The circuit used to determine the value of dropping resistor R_S. In the first example discussed in the text, E is 9.6 volts and R_L is an LED. In the second example, E is 2 volts and R_L is a glow plug. An ammeter inserted at X would indicate the circuit current.

• This month we are starting off with a quite basic R/C item: the glow plug. The subject is raised by "Stoney" Jasper, of Washington DC, who writes:

"What resistor would I use on a two-volt rechargeable battery to bring the voltage down to 1-1/2 volts for my Cox glow plug?"

Well, as those of you who follow EC well know, I am not going to tell Stoney something like, ".6743 ohms at 8.3 watts" and let it go at that! In fact, I'm not going to tell him to use a resistor of *any* value, but we'll get to that later. Actually this is one of those instances that should be solved with a simple application of Ohm's Law, and let's run through that procedure first. We are dealing with a form of the common voltage divider, a simple resistor in series with some type of load. It is called, of all things, a series dropping resistor, and is there to reduce a high voltage to the proper voltage required by the load.

We can figure its value with the usual form of Ohm's Law for calculating resistance: R = E/I. However, in the case cited above, all we know is two voltages, that of the supply battery, and the voltage rating of the plug, and we can't work the formula with those. It is possible to obtain other values, but let's keep it simple at this point and use another example with known fixed values.

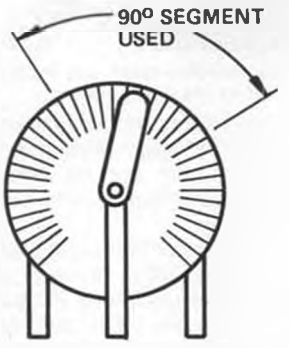
Assume that we want to add an LED indicator to our transmitter. We know we have 9.6 volts for the supply battery, and that common LED ratings are 2 volts at 25 milliamps. The object is actually to add a resistor in series with the LED to limit the current to 25 mils; the voltage drop across the LED will then be exactly 2 volts, the resistor having to drop the excess 7.6 volts. Refer to the simple sketch to see things clearer. Now the formula: R = 7.6/.025 = 304 ohms. (Remember that all values used have to be in full units only, thus the conversion of 25 milliamps to .025 amps.)

Anyway, we now see that to power our 2 volt, 25 mil LED from 9.6 volts, we need to add a 304 ohm series resistor. Since 300 ohms is a standard value for 5% resistors, one would use that size resistor. Now, how about the wattage rating? Another form of the law is: $W = I^2 \times R$, which works out to .025 x .025 x 304 = .19 watt, for which a quarter-watter would be perfectly safe.

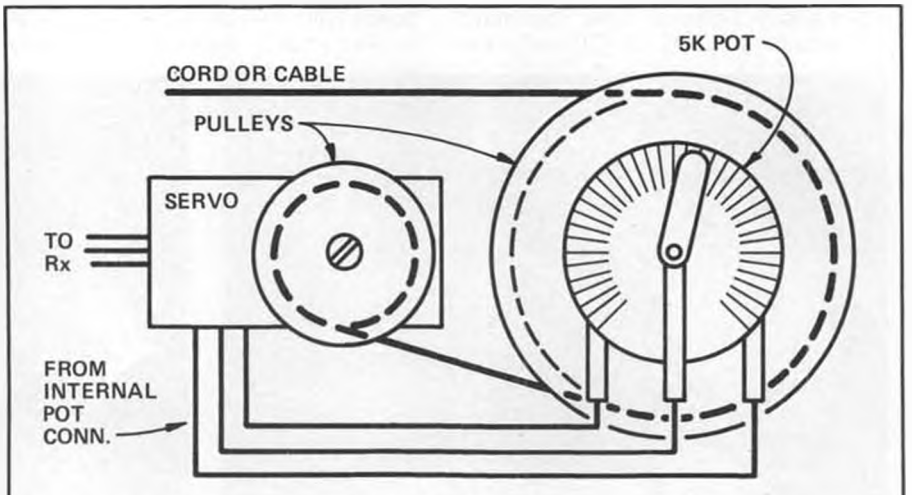
For confirmation, let's run that 304 ohm resistor through Ohms Law, to figure the voltage across it in this case. We know its resistance, obviously, and the circuit current. Therefore: E = I x R; E = .025 x 304 = 7.6 volts exactly. Which leaves 2 volts for the LED, right? Well, we can't confirm the voltage drop across it with our formula, since we don't know its resistance, do we? Or do we? Let's see, we are sure of the current, and really can take that 2 volts for granted, so let's play with the numbers. The resistance of the LED would be: R = E/I; 2/.025 = 80 ohms. You can take it from there if you want to confirm anything else for yourself.

Now let's take a look at that glow plug circuit, shall we? Electrically, it is the equivalent of the LED circuit. But we know little about it, and need to know more. Even one more circuit value will help, as we know that by using Ohm's Law we can calculate anything else we need. It would help to

Continued on page 85



Mechanical illustration of a servo pot. It is connected directly to the servo output shaft and thus rotates only 90° of its possible 270° of travel.



Mechanical and electrical connections necessary to convert a regular servo to winch operation. Ratio between servo and pot pulleys will determine total rotation of servo. Pot still rotates only 90°. See text for explanation.

HUMONGOUS SAGE HEN

By BRUCE EDWARDS and AL ALMAN. . . What this lightweight seven-footer lacks in sexy curves, it more than makes up in its ability to be easily built and flown by the rank beginner. It's the ultimate R/C trainer.

• This design originally started out as a dandy little 18-inch rubber-powered model manufactured by Peck-Polymers. Then, because he liked it so much, Bob Peck kitted an even dandier .10 to .15 powered version called the "Prairie Bird 50" that turned out to be a superior basic trainer; it was easy to build, very slow, very stable and very forgiving.

But for all its inherent goodness, Mr. Peck's Prairie Bird 50 needed improvement in one area: it was kinda small and therefore hard to see at any real distance or altitude.

So, since we can't offer the world what it sorely needs. . .a five-cent cigar. . .we decided that the next best thing would be to out-dandy the Prairie Bird by making it into an 84 inch Humongous Sage Hen. Our basic philosophy was based on a very simple fact of life, that BIG BIRDS FLY BETTER!

But why 84 inches? Well, what really happened was that Bruce's old calculator had a stroke when first turned on, coughing up a factor of 1.68 just as it expired. . . and since this happened on his birthday and remembering that he was born on the cusp, Bruce was convinced that 84 inches had been predestined. ("It was written in the stars," is what he actually said.) Of course, in the face of such an overwhelming scientific argument, Al had to agree that 1.68 was a very nice factor, indeed.

By this time you're probably looking for the wild and extravagant claims usually found in most other construction articles. . . promises that the plane will be great for both training and aerobatics along with subtle hints that bad breath, body odor and a shallow personality will also improve once you've got this terrific new design flying.

Well, surprise, surprise. . .we're not about to blow any smoke about the Sage Hen because like the five-cent cigar, there also ain't no free lunch.

In other words, this bird can't and won't double as a basic and aerobatic trainer. Like any aeroplane it would be too severely compromised to do both jobs well.

Our one and only promise is that built and powered as recommended, the Hen will be the best possible trainer for a beginner. It'll make learning to fly a most enjoyable and low-stress adventure, allowing you to build up confidence, solo and then progress on to an intermediate trainer in jig time.

The problem is that all too often guys will end up with the worst design to learn on, with the result being: 1) they're so intimidated by the airplane that they never feel comfortable enough with it to even try to solo. . . usually because it's too fast, leaving them with the terrible feeling that their reflexes are hours behind the bird and will never catch up with it; or 2) they finally do solo, but only after an unnecessarily frustrating and protracted period of time. . . and even then remain quite shaky if a competent pilot isn't standing beside them during each and every flight.

The fact is that too many people are lost to our hobby because they start with the wrong airplane. . . and end up with a learning curve that is too flat. Where is it written that learning to fly must be less than enjoyable, and full of nervous frustration, anger and an overpowering feeling of inadequacy?

Three prototypes of the Humongous Sage Hen were built and have racked up something over 100 hours of wonderfully relaxed flying time so far. And nine youngsters (ages 8 to 65) have discovered how satisfying and easy on the nerves it can be to learn R/C by starting with the Hen. . . a plane so well suited to a beginner's needs. Four of the students never flew before and the other five had been trying unsuccessfully for years with the wrong type of "trainer." All nine, including Al's eight-year-old, Adam, zipped through training and soloed with ease. . . mainly because this airplane builds gobs of self-confidence and self-reliance.

Even experienced pilots can enjoy this gentle bird. We personally accounted for well over half of those 100 hours doing touch-and-go's, chasing thermals, taking photos and dropping candy. . .with skis and floats planned for the future.

Obviously we had nothing to do with this

Co-designer Bruce Edwards poses with his and Al Alman's first two Sage Hen prototypes. The little one in the middle is the Sage Hen's predecessor, the Peck-Polymers Prairie Bird 50.

design's remarkable stability. She started off "right"; a light, flat-bottomed airfoil cabin design with ample dihedral and a long tail moment coupled with a very generous amount of tail area.

But by enlarging her wing area to 1,265 square inches, Bruce came up with a size that's not too big . . .yet at a nominal 7-3/4 pounds she's very lightly loaded (about 14 oz./sq. ft.) and therefore flies effortlessly on the wing with only a Saito 45 for power.

Which brings us to a few words about engines and control systems. You don't need or want anything much more powerful than a Saito 45, nor do you want scads of rpm or too much speed. All three prototypes flew outstandingly well with Saito 45's (one also flew well with a Davis Dieselized World Engines Brat 25) and large props . . . like a 12x4, 12x5, 13x4 and 14x4. If you use a two-cycle engine don't go over a .40, and do try something larger than the typical 10x6.

The Sage Hen was *not* meant for aerobatics. She's a putt-putt. You can, however, push her into some wide barrel-rolls and loops by carefully trading altitude for airspeed . . . but cramming in an oversized, more powerful engine would be a bad move.

Also, she was designed to fly with three channels (rudder and elevator on the right stick and throttle on the left stick). Messing with ailerons would be an absolute waste of time because they wouldn't be anywhere near as effective as the rudder, and you'd be lugging around a bunch of dead weight to boot.

What's that, bunkie? You say that you can't fly without ailerons? Not so! All you've gotta do is plug the rudder servo into the aileron channel. Neither the plane nor the radio will know or care what you've done, and once the stick twiddling starts it's not going to matter to you, either.

Some folks like to argue that starting with three channels is bad, that it makes the inevitable transition to four channels (ailerons and elevator on the right stick and rudder and throttle on the left stick) a problem. We've found that this just isn't so. Learning to fly a well-mannered three-channel bird first builds up a very solid foundation of the aforementioned self-confidence and self-reliance, allowing a fledgling to transition smoothly to four channels.

However, if your transmitter has an aileron/rudder coupling switch you can put it to good use and simulate four-channel operation right from the start. Turn this switch "on" and connect your rudder servo to the rudder channel as you normally would when using four channels. Now both the aileron and rudder sticks will control rudder movement; you can use the left stick for taxiing and initial takeoff corrections, and then switch to the right stick to complete the takeoff and for normal flying.

In regards to the Hen's straight lines and square corners, you can, of course, round off those corners and tips and customize the bird . . . but the "square" straight-lined Humongous Sage Hen presented on the plans should be a lot easier for beginners and inexperienced builders to duplicate.

About glue: We used Hot Stuff, mostly "Special T," for all construction. If you also use a cyanoacrylate (CA) glue, be sure to first spray the foamboard with Pacer Tech's Z-Foam Primer so the CA won't eat the foam. (The exception to this is Satellite City's new Hot Stuff UFO, which requires no primer for gluing foam.) Of course, epoxy or cabinet maker's aliphatic glue can also be used, but there is a very real weight penalty involved when using these adhesives and a much longer curing or drying time. An important fact to remember about any glue is that too much is a no-no. A thin layer of glue is all that is needed if the joints fit right.

And be absolutely certain that your work board is flat and true, otherwise all kinds of warps will be built into the airplane. Try a hollow door; slightly damaged ones cost a mere pittance, they're easy to push pins into and most always are warp-free.

TAIL FEATHERS

1) Cover the plans with clear plastic.

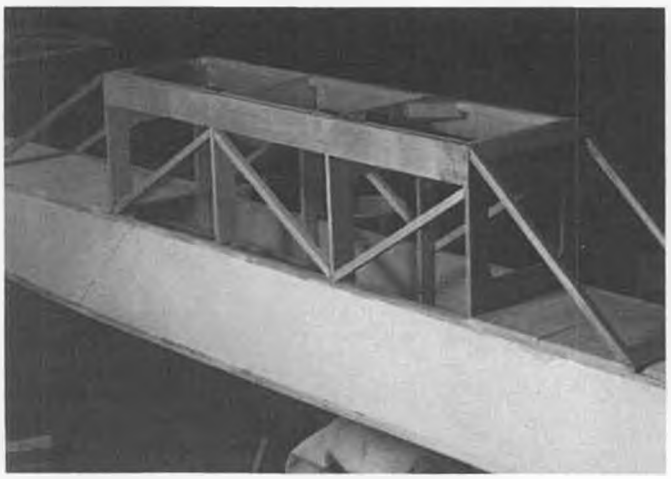
2) Cut all 1/4-inch balsa pieces to fit and glue together—and don't forget to include the hardwood gussets for tail bracing and control horns. Build the stab, elevator, fin and rudder separately.

3) When the glue is dry remove the parts from the board and sand lightly, rounding off all edges.

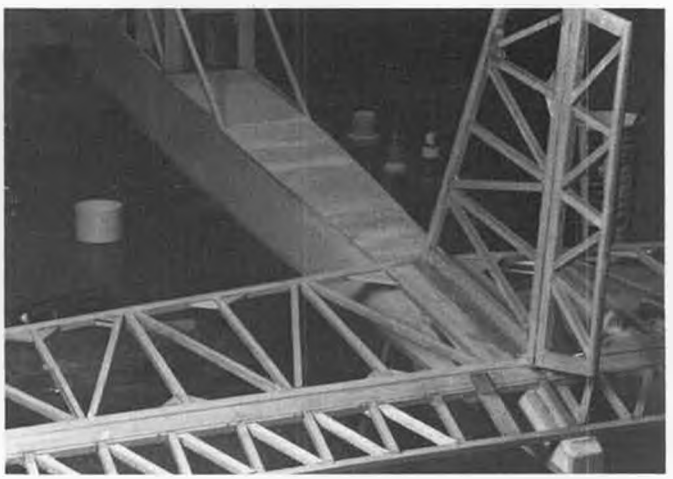
4) You can prepare the control surfaces for hinging before or after covering with your favorite iron-on. Either way, a good choice would be Sig's new Easy Hinges. As the name implies, they're easy to install and a drop of regular (thin) CA on each side anchors them permanently.

5) After all tail pieces are covered, install the control horns on the hardwood inserts.

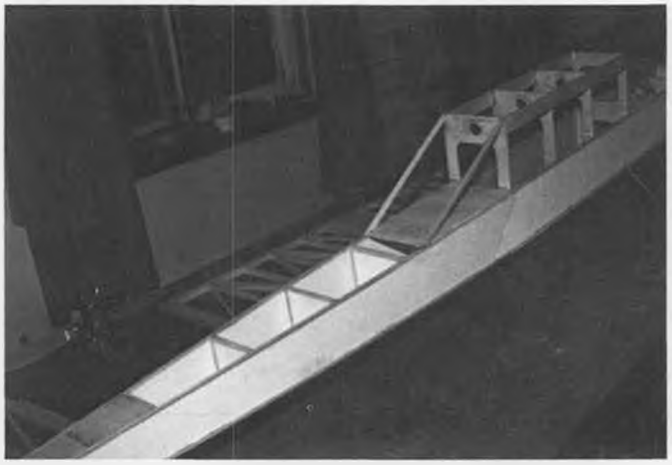
6) Glue the base of the fin into the slot in the horizontal stab. Make sure that the fin is perpendicular to the stab and that this glue joint is wood-to-wood and free of any covering material. Install Easy Hinges at this time. Make sure that the bottom center part of the horizontal stab that glues to the top rear of the fuselage is also free of covering.



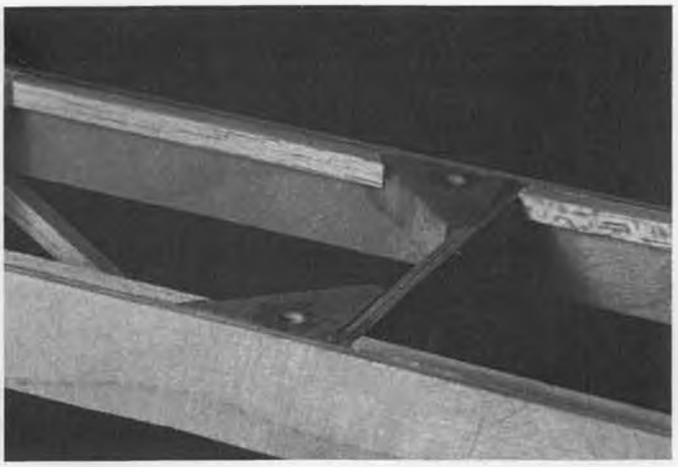
Cabin structure is quite sturdy with all that plywood and diagonal bracing. Fuselage sides are Sig foam-board with spruce longerons.



Tail surfaces are about as easy as you could want. Plan shows a shorter fuselage tail end than was used on the prototypes.



Basic fuselage structure, ready for installation of the pushrod tubes and the top and bottom fuselage sheeting.



Hardwood wing mounting blocks are epoxied in place, then drilled and tapped for the nylon wing hold-down bolts.

WING CENTER SECTION

1) Cover the plans with clear plastic.

2) Cut out the bottom 1/16-inch balsa sheeting and pin in place over the plans.

Note: Only the middle five W-1 ribs are completely sheeted top and bottom. The rest of the center section is sheeted on the bottom only from the leading edge to the first spar and on the top and bottom from the rear spar to the trailing edge.

3) Glue the 3/8-inch leading edge dowel in place on the top front of the leading edge sheeting.

4) Glue the 1/8-inch square hardwood strip to the rear of the trailing edge sheeting.

5) Carefully mark the position of the lower front 1/4-inch square spruce spar on the sheeting and then glue the spar in place.

6) Carefully mark the position of the lower rear 1/4-inch square spruce spar on the sheeting and then glue the spar in place.

7) Glue lower capstrips in place.

8) Glue all centersection ribs (1/8-inch balsa or foamboard) in place. Angle the left and right outboard ribs to the 15° dihedral angle of the outer wing panels.

9) Glue the top front 1/4-inch square spruce spar in place.

10) Fabricate the hardwood wing mounting blocks that are built into the center section. Drill 1/4-inch holes in the blocks using a drill press and glue the blocks in place as shown on the plans.

11) Shape the balsa wedges that go in the center section trailing edge areas. Be sure the blocks fit and are in place before sheeting the top of the center section.

12) Glue in all front and rear 1/8-inch balsa shear webs. Make sure that the grain is vertical.

13) Lift the wing from the plans and carefully extend the three 1/4-inch wing bolt holes through the bottom sheeting.

14) Replace the wing on the building board and glue on the top 1/16-inch balsa center section and trailing edge sheeting. Glue the upper capstrips over the top of all other ribs.

(Note: The upper capstrips are much easier to install and will curve to the top airfoil shape if a knife handle or dowel is rolled along their full length.)

15) Remove the wing from the board and carefully extend the three 1/4-inch wing bolt holes through the top sheeting.

LEFT AND RIGHT WING TIP PANELS

The building sequence for both tip panels is essentially the same as for the center section, except that there are of course no angled ribs, no center mounting blocks or bolt holes, and no center section sheeting. Final step is to glue on the 3/8-inch balsa tips.

WING ASSEMBLY

1) Trial fit the left outer panel to the center section. Make sure that the front and rear plywood wing joiners fit and that the leading edge, trailing edge, and spars mate properly.

2) Repeat Step #1 and trial fit the right outer panel to the center section.

3) Pin the wing center section flat on your board and, placing the dihedral guage under the left outer panel wingtip so that it's jacked up to the correct angle, glue this panel to the center section. Make sure that the plywood wing joiners/dihedral braces are securely glued to the spars.

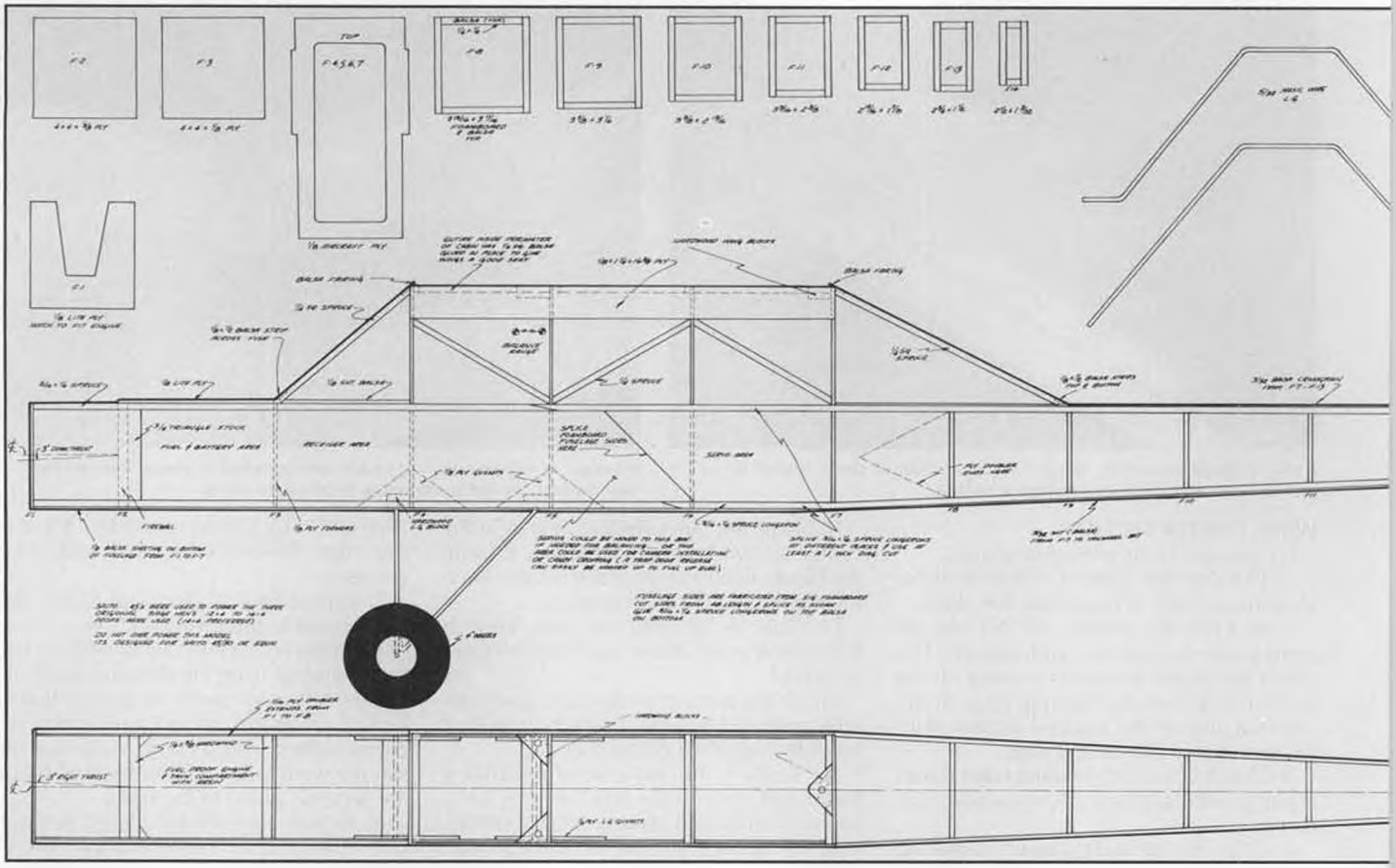
4) Repeat Step #3 for gluing the right outer panel to the center section. The dihedral guage should insure that both tip dihedral angles (15 degrees) are the same.

5) Sand the entire wing in preparation for covering.

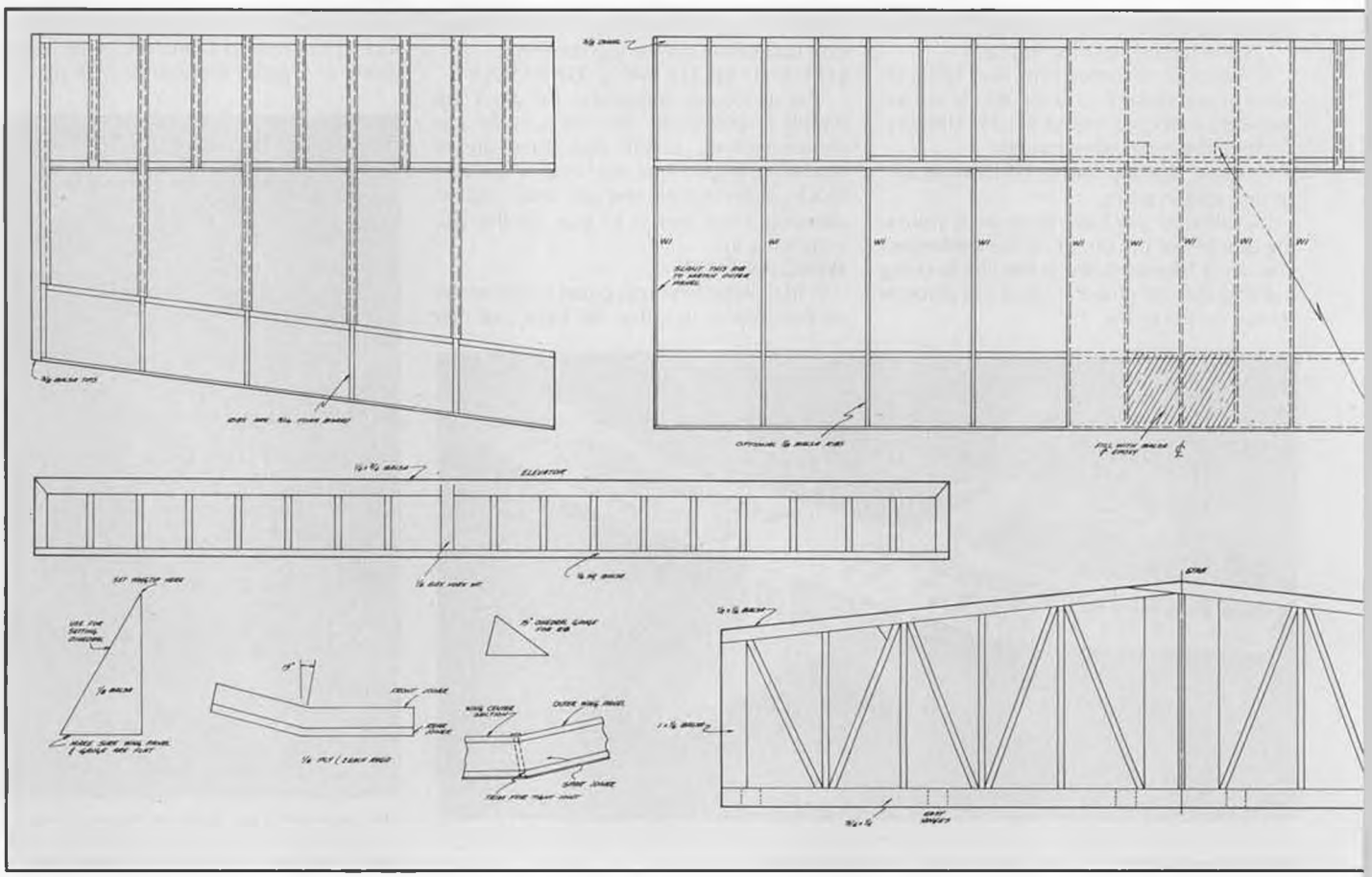
6) You must balance the wing or else your Hen will always want to turn toward the heavy tip. This can and should be done before it is covered. Turn the wing upside down and place the middle W-1 rib on a

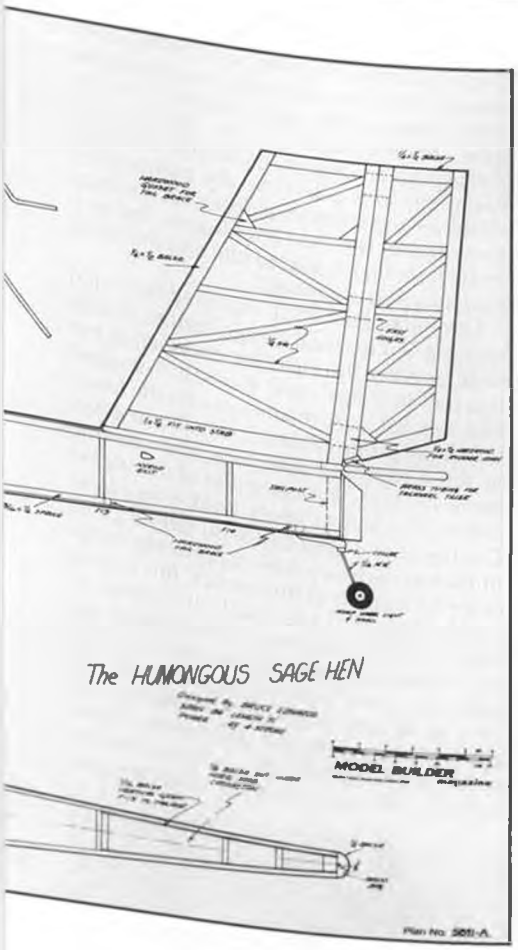
Wing construction has been modified since this photo was taken (see plan) by deleting the forward spar and extending the half-ribs back to the main spar.

The Sage Hen's tail surfaces are wire braced. One-inch strips cut from nylon cable ties were used to attach the wires to the structure.



FULL-SIZE PLANS AVAILABLE — SEE PAGE 106





One of the prototype Sage Hens about to make a touch-and-go. You can see why she flies so well; lots of dihedral, a long tail moment, and mucho tail area.

straightedge. Bring the lighter panel into balance by gluing small fishing weights or sheet metal screws into the inside of the tip rib.

FUSELAGE

1) Cover the plans with clear plastic.

2) Splice the four spruce longerons to be glued to the fuselage sides, making sure that each longeron is spliced at a different point along its length.

3) Cut out the 3/16-inch Sig foam core fuselage sides and splice as shown on the plans.

4) Glue the spliced longerons to the top and bottom of each foam core side.

5) Glue the 1/16-inch ply doubler to the inside of each fuselage side.

Note: Make sure that you end up with a right side and a left side.

6) Lay the two foam core sides flat on your building board so their fronts are even with each other and their top longerons are running parallel to, and touching, each other. Be sure that both sides are identical. Consult the plans and, using a square, draw the firewall and former locations on both sides simultaneously.

7) Cut the firewall (F-2) to size, drill holes for the engine mount and install 6-32 blind nuts.

8) Lay the right fuselage side flat on the workboard and, using a triangle or any tool that has an accurate right angle, glue the firewall, 3/4-inch triangle firewall supports and formers F-4 through F-7 in place. Make sure that all formers are vertical.

9) Glue the left fuselage side to formers F-4 through F-7, making sure that each former is properly located where marked.

10) With the forward, bottom part of the fuselage secured in place over the fuselage top view, pull the tail section together directly over the centerline. The whole idea here is to make sure that when gluing the tail post in place, the fuselage ends up symmetrical and not shaped like a banana.

11) Install all of the remaining formers and the 1/8-inch plywood strips that go on the upper sides of F-4, F-5, F-6 and F-7.

12) Install the landing gear blocks and gussets.

13) Glue the 1/16-inch balsa doubler in place (grain vertical) that's located under the horizontal stab.

14) Glue the 1/8-inch sheet balsa stab seat in place between the two rear fuselage sides.

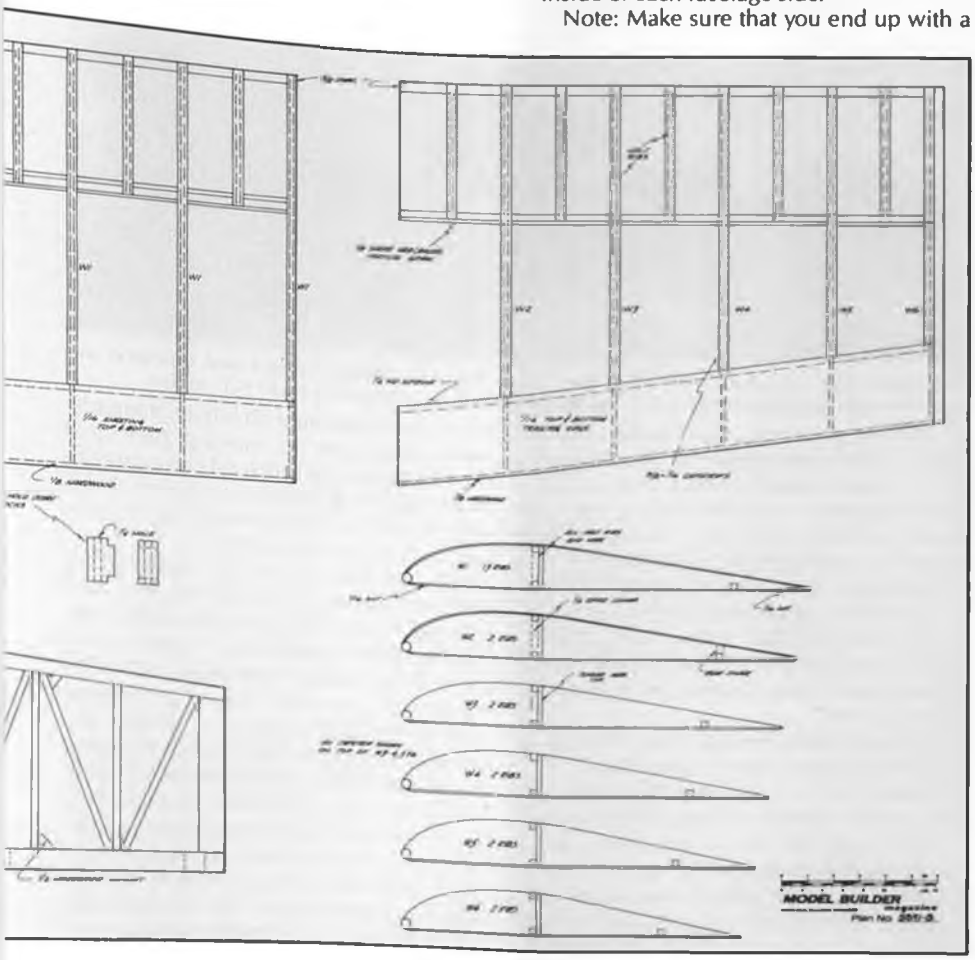
15) Install the 1/4-inch square hardwood tail wire brace mounts on the rear bottom of the fuselage so they will be flush with the outside surface of the sheeting.

16) Install the outer Sullivan Gold-N-Rod casings for the elevator, rudder and throttle.

17) Sheet the remaining fuselage areas (top and bottom) as shown on the plans.

18) Glue on the 1/2x1/8 balsa strips at the front and rear of the cabin so that heat-shrink covering can be applied with ease.

19) Fabricate a 1/8-inch lite-ply hatch cover for the fuel tank/battery compart-



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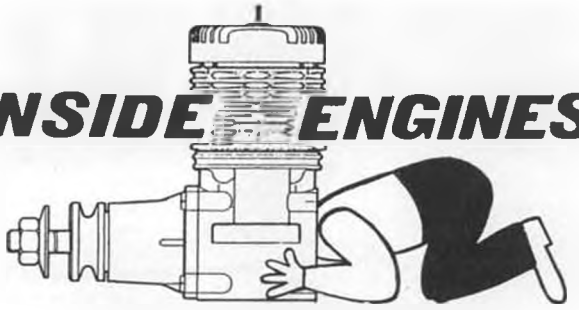


INSIDE ENGINES

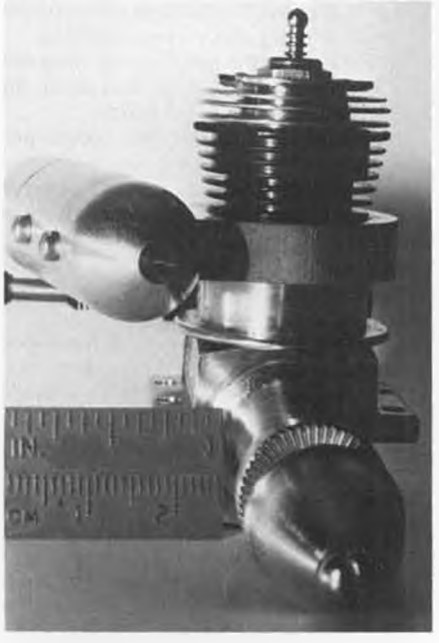
WITH **STU RICHMOND**

Cox .074 Queen Bee

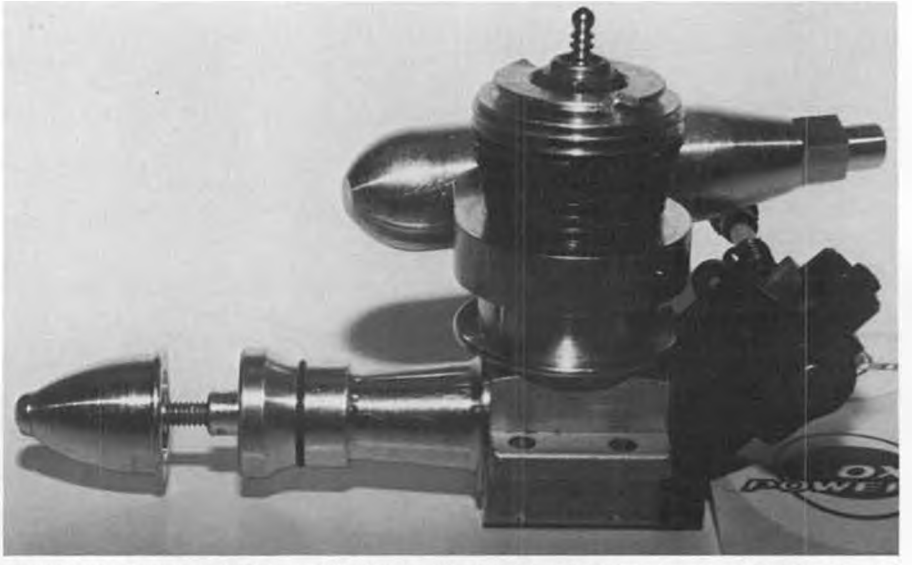
• One of the most treasured model engine books I own has the outline of a Cox engine embossed on its cover. The book details model engine history from 1848 up to today's technology. Subjects include theory and practical applications, ignition, diesel and glow, chemistry of fuels and combustion, tuned pipes, props, metallurgical transformations, and it includes hundreds of photos and engineering drawings. The book is *Miniaturowe Silniki Spalinowe*, published in Poland and I can't read a word of it! But by having the Cox engine on its cover, you get some idea of the respect these fine American-made model engines enjoy all around the world.

So, as the world waits for sunrises, the world's model builders have been waiting for the new Cox Queen Bee .074 R/C engine to become available. Cox's initial order is a huge one going to Europe, but a trickle of the engines should be available as you read this review.

Regular readers of "Inside Engines" know the emphasis I place on usable speed ranges of R/C engines. The rotating Ace exhaust collar has been a substitute for carbureted speed control on Cox engines. I've raced Cox TD's in 1/2A pylon and sport flown the 1/2A's a lot and until now, there has not been a really effective speed control in these small engines. The new Queen Bee features a standard design Cox piston/cylinder and uses the Teflon reed induction valve. But now a precision molded R/C carburetor is included, along with an effective muffler. You small model R/Cers now have available a *real* R/C engine for your small models!



The .074 Queen Bee should bring out a whole new generation of small R/C models. Latest production run should be ready by middle to late April.



The Queen Bee turns a 6x3 about like the familiar Tee Dee .049, but does it with quietness and can idle down for better than a 4.5: 1 speed range. A truly throttlable small R/C engine.

Our test engine is a very early version, and as production progresses there are sure to be minor manufacturing changes and improvements—all manufacturers *want* us to be satisfied customers. I can see great growth in small field R/C flying now.

A few quotes from the instructions follow:

"A break-in period in the ordinary sense is not necessary; in fact, a slow, easy break-in is not desirable. Most of these engines will develop full power within one minute of running time."

"Thirty minutes running time will add a few RPM for peak contest operation."

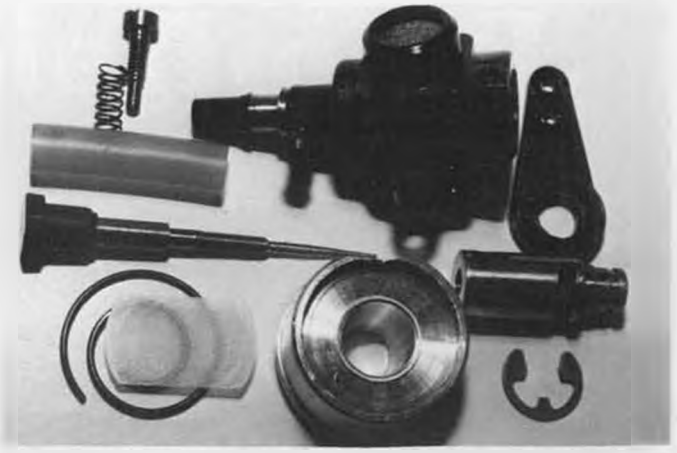
"Remember—your Queen Bee engine is designed to perform its best at high speeds. Let it wind up. Do not use oversized props."

The engine comes with a Fox short non-idle bar plug. By adding two additional washers, a Fox Miracle plug or a K&B #4520 idle bar plug can be fitted without the top of the piston hitting the bottom of the plug. Although these two alternate plugs almost always improve idle performance of an engine, testing them in the Queen Bee showed no advantage. Undoubtedly these two plugs stick down into the combustion chamber and somewhat upset the combustion pattern. The short Fox plug worked perfectly from high speed to idle and the same plug survived all testing.

Cox Super Fuel #551 was used for initial running. An unusual design feature of Cox engines is that the top of the connecting rod is a ball in shape—and the ball is swaged into a socket that's machined into the lower side of the piston crown. The ball is inserted in the socket and then precision tooling peens or closes the lower skirt of the socket *around* the ball to freely hold it in place. Cox has always used castor oil (about 20%) in their proprietary fuels to provide maximum lubrication to this socket. But I sense a trend towards lower total oil content in fuels for today's engines. As unburned castor oil exhausts from an engine it carries away much heat from combustion, so an excess of oil can lower performance in engines. As oil content is decreased engine performance (at both idle and top speed as well as acceleration from idle) improves until the total oil content no longer offers adequate protection to moving parts and failure follows. Too much oil can cause unsteady wavering speeds in engines. I discuss this only to help you understand fuels used in this particular review.

Although the instructions state that no break-in is necessary, in running the Cox # 551 fuel I found the more the engine was run the better it performed. I made a long series of full-speed, heat-raising short (30-90 seconds) runs and allowed a complete cooling between these runs. Initially the test engine showed high speeds wavering up and down 300 to 400 rpm at full throttle as well as at the 5,000 idle speed I tried. Had I simply put the new engine in a model and gone out to fly it after a minute of running I think I would have not been satisfied with the performance due to unsteady, wandering rpm's at *all* throttle settings. I de-

QB pretty much follows traditional Cox practice. A notable exception is the normal glow plug in place of the familiar Cox glowhead.



Disassembled carb. Note the teflon reed (laying on the coiled retaining ring) which serves as the inlet valve for the fuel/air mixture.

tail this so that in case you experience this unsteadiness, please recognize that *more high speed running*, along with cooling, will allow the engine's moving parts to better seat and give you optimum performance. Unsteady initial running is often an indication that something is too tight a fit, is expanding with heat and causing a metal-to-metal bind that brings rpm's down. Lower rpm's are caused by metal-to-metal galling. The *best* protection against galling the metal surfaces and causing damage is, in the case of the Queen Bee, to initially use the manufacturer's recommended heavy castor content fuel! The first fuel through this engine really ought to be a pint of Cox #551 Super Power fuel. But high castor content can also cause varnishing on the piston/cylinder walls and the instructions address this problem too. I feel the simple fix is, after the first hour of running, to switch to fuel that is a castor/synthetic blend with detergent cleaning action and use somewhat less than 20% oil. After the Queen Bee testing was done on Cox fuel I made a switch to a castor/synthetic fuel of less oil percentage —this was after about 90 minutes of total running and the engine smoothed out at *all* speeds and became a real honey to run. Going back to the Cox #551 all-castor fuel brought back the varying rpm performance. The purpose of "Inside Engines" is to enable you to get the *best* performance from your purchase and to show/tell you what's inside your engine that yields this performance. While on this long discourse on fuel for the Queen Bee, let me tell you I made a mix of 35% nitro and 22% castor to study the nitro/rpm performance and feel that the lower 15% nitro, as Cox Super Fuel contains, is the better nitro choice.

After the first hour of running, performance was noticeably improved. The 5,000 rpm idle speed was lowered to 4500 by adjusting the barrel closure and the needle valve while at *idle* speed. This same needle setting technique finally yielded an ultra-reliable idle at 4250 rpm on a 6x3 Cox gray prop! This is truly great for such a small engine—while holding your hand behind the engine at 4250 you felt very little prop blast. The exhaust from the pretty aluminum muffler offered more "squirt" on your hand than the prop blast. I walked away

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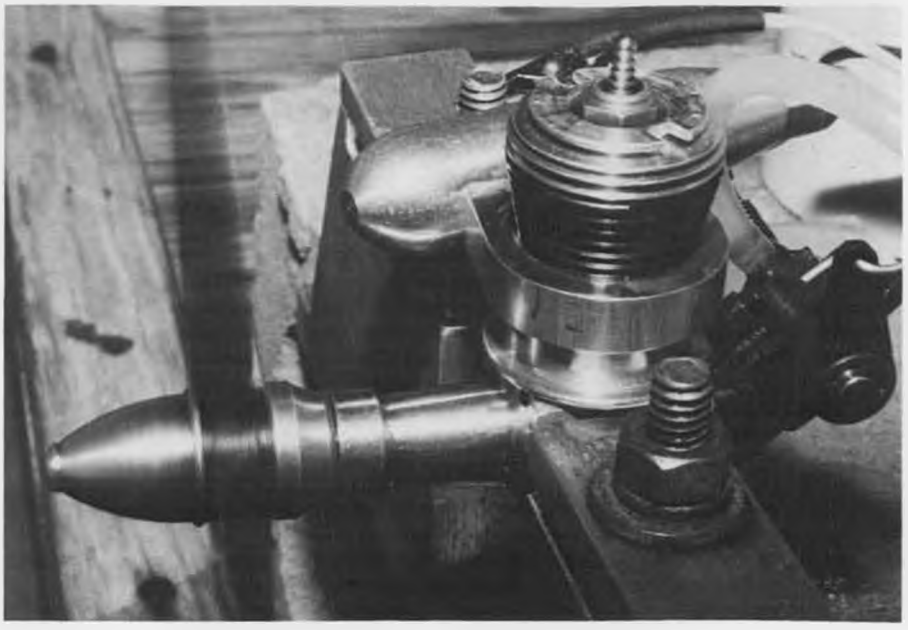
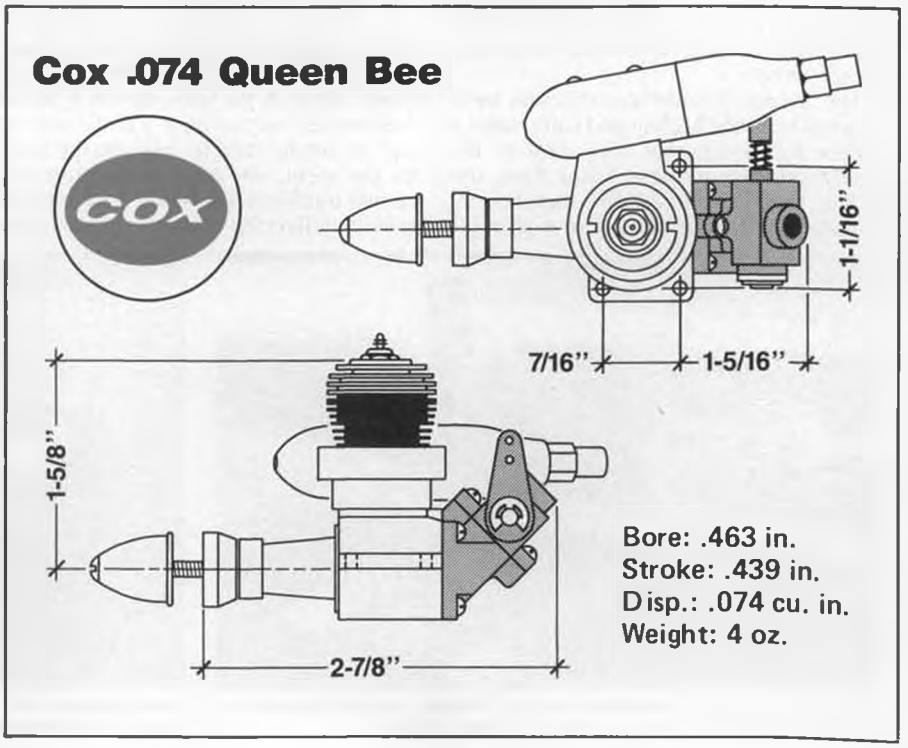


The Queen Bee turns a Cox 6x3 at 16,000 to 18,000 rpm, depending on the fuel and needle valve setting, but will idle beautifully at less than 4,500 rpm.



Brimfield Float Fly

By STAN JONUTIS. . . Among R/C seaplane fliers, the Brimfield biannual fun-fly is considered the biggest and best. Come along as our reporter reviews the action at last September's gathering.

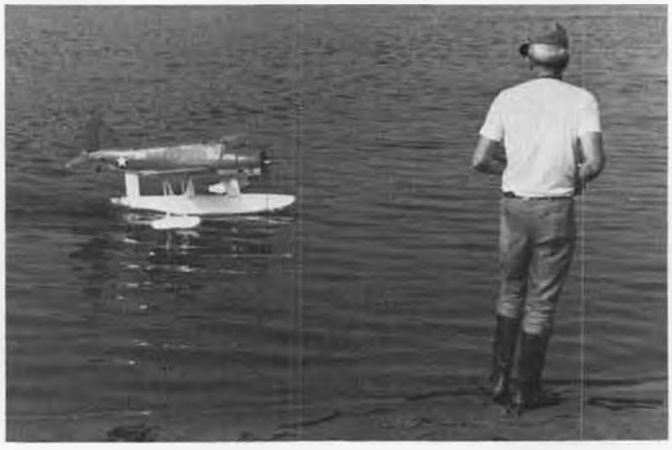
• The Brimfield Float Fly has been a Mecca for New England seaplane fliers for several years now. The event is sponsored twice yearly by Don Foster of Gee Bee Products. Located in the heart of Massachusetts ten miles from Worcester and just outside of the historic re-created colonial village of Sturbridge, the Streeter Reservoir offers a nearly perfect base from which to operate seaplanes. The only problem is that it is normally a swimming area and only open to seaplane fliers twice a year; the weekend before Memorial Day, just before swimming season, and the first weekend after the Labor Day holiday, when the swimming season closes.

The first day of September's two-day meet dawned beautifully clear and calm. Later a breeze kicked up that kept most of the smaller models and less daring fliers, unwilling to risk their creations, shorebound. Unfortunately, yours truly spent most of his time with the latter, watching the others cavort through the waves and puffy picture-perfect clouds. There was a lot to watch and there were nearly always two or three seaplanes in action.

This being my first stab at journalism, I was kept busy running around taking photos and trying to catch up with the builders and fliers. I neglected to look at the registration board but estimate about 40 fliers were present with about 60 seaplanes; many modelers brought more than one. Don Foster brought the most. His collection, with the exception of his Heinkel He 51, was composed of his kits: the Mallard, a 12-year-old twin Mallard, Islander, and Sea Hawk. Don is the driving force behind these meets and has quite a battle with red tape to get the state to open up the beach for the meet. We need many more concerned modelers like him to look after our ever-dwindling flying sites. In New England especially, sites are being lost to development at a high rate. Thanks, Don!

On to the winged stars of the meet and their creators. The first craft that caught the eye of many admirers was a Lockheed Sirius, built by Lloyd Roberts, in what appears to be 1/5 scale. This craft was patterned after the seaplane flown by the great Charles Lindberg and wife in the process of charting great circle routes for future airline use back in the '30s. The original seaplane

Absolutely gorgeous Lockheed Sirius in 1/5 scale, possibly built from Hostetler plans. Proud builder/pilot is Lloyd Roberts.



Doug MacBrien put on quite a show with his 1/5-scale OS-2U Kingfisher built from original plans. Had 1/6-scale version also.

Two beautiful scratch-built Schneider Trophy racers by Leo Mariani, the Gloster IV B in 1/4 scale (above), and 1/5-scale Curtiss R3C-2, which also appears on our cover this month. The Gloster wasn't quite finished, but the Curtiss flew up a storm.

Author's two original twin-engine seaplanes, the Sea Hornette (left) and Supermarine Frigate. Sea Hornette, with only a 48-inch span, is a real wild machine with two Cox Conquest .15's.

is now on display in the National Air and Space Museum in Washington D.C. Workmanship was outstanding and its flying characteristics were most scale-like, right down to the motor noise on the fly-bys. The Sirius (pronounced like "serious") suffered a mild dunking, and Lloyd did not return for the second day.

One of a few seaplanes I didn't get the builder's name for in the excitement was the PBY-5 built from Sid Morgan plans. Craftsmanship was immaculate right down to the thousands of rivets. Two K&B .61s provided more than enough urge. Its only flight was delayed by a dead transmitter battery (be sure to double check your equipment before every session), and then it had problems with the large waves and the small scale tip floats not quite coping with the engine torque, subsequently doing many water loops on takeoff.

Some of the most-flown models were two OS-2U Kingfisher WWII U.S. Navy seaplanes in 1/6 and 1/5 scale. Doug MacBrien has been campaigning the 1/5-scale version for over six years. It has very scale characteristics with a Quadra Q-50 hauling its 27 pounds around in graceful aerobatics. Touch-and-goes were highlights of each flight. The craft was very seaworthy in the breezy conditions. A tip float torn loose by a water loop finally retired it on the second day. The 1/6-scale version performed in similar fashion to its big brother, with the only drawback being its unreliable engine, which necessitated a couple of canoe trips out to retrieve it.

There were few splash-ins, surprisingly enough. I had about the only serious one—that of losing control of my scratchbuilt Sea Hornette twin and diving vertically into the water from 50 feet. Surprisingly, little damage was done; just the two floats sheared off and a hole in the wing. I changed the radio for the next day's flight. Being a prototype for a twin project of mine, the Hornette is not quite right yet and a handful to fly. It is only slightly larger than a quarter midget racer but is powered by two very potent Cox rear-exhaust racing .15s. The twin sound in the air was something. On the second day I managed one perfect flight with a splash down right-side-up and a taxi back to the beach. On my last flight the Sea Hornette torque-rolled into the water on takeoff due to a broken rudder horn. Preflight your planes before every flight just like the big boys, guys! Again, due to the soft water there was no damage. The only other major prang I was aware of was a gust of wind catching a 1/4-scale Cub after landing and tearing the wing root open. It got a little waterlogged while the retrieval was made. In all, three 1/4-scale Cubs were present. All put in spectacular slow flight performances, indifferent to the stiff breeze.

The longest takeoff runs were by three Northstars, kitted by Balsa USA. They had great handling on the water and featured a novel nose water rudder. Landings were equally spectacular with a pancake splash-down and speedboat run back to the beach.

In the area of beginner craft, a beautifully done Sig Kadet Senior with an O.S. .61 four-stroke on B.J. floats by Bob Cavicchi did very well in the breeze despite its three-channel controls (no ailerons). Bob says the Senior is one of the early original kits sold by Sig and the craft has always been on floats. My flying buddy, Ron Sayers, brought along a Goldberg Eagle with an O.S. .40 Surpass on Goldberg floats. Engine problems kept it from taking off even after much tinkering and prop changes. When we did get it off unexpectedly, we stalled it into the water and spent the rest of the day drying it out. The model had great handling in the water and Ron had no problems taxiing around the lake without regard to the breeze. Next time an O.S. .61 FS goes into the nose!

Two cute scratchbuilt Schneider Cup racers were brought by Leo Mariani: a really tiny 1/5-scale Curtiss R3C-2 and an English Gloster IV-B in 1/4 scale. The Curtiss is modeled after one flown by Jimmy Doolittle in the 1925 Schneider Cup race (won by Doolittle). The Gloster is modeled after one entered in the 1927 Schneider Cup race in

Sponsor of the Brimfield Float Fly is Don Foster of Gee Bee Products, brought this flotilla of models. Seen here are a Heinkel 51, Mallard, Twin Mallard, Islander, and Sea Hawk.

Good looking Kadet Sr. by Bob Cavicchi was built from an early Sig kit and has always been on floats. O.S. 61 4/C power.

A burst fuel line kept this Grumman G-44 Widgeon beach-bound. An immaculate building job by Ed Zemaitis, from Sig Morgan plans.

Venice. It was powered by an O.S. 1.08 but had an incomplete radio installation and did not fly. The little Curtiss flew up a storm, however, darting across the sky like its big brother with an O.S. .61 for power. It's hard to imagine these small craft are really 1/4 and 1/5 scale until you realize the real craft had wingspans of barely 20 feet—and over 900 horsepower up front! The July, August, and September 1988 issues of *Wings and Airpower* have an excellent series of articles on the Schneider Cup racers. It would be fantastic to create an event for 1/4 scalers to compete in actual races. There is just such a meet planned for November 10, 11, and 12, 1989, at Lake Havasu, Arizona; The Schneider Cup Event. It's hosted by the Desert Hawks R/C Club and held at the Nautical Inn Beach on an island in the middle of Lake Havasu. Watch your calendar!

Leo demonstrated quite unintentionally what a wet radio can do after a mild dunking. He took off after a drying-out period only to dive back into the water immediately after takeoff. Wading out to get the Curtiss I found the servos chattering like mad even though there was no damage. Water can and will do all sorts of strange things to your radio. Good waterproofing is a must.

Another flier who spent more time in the air than on the beach was Jimmy Jenkins, flying a Lazy Ace powered by no less than a Sachs 3.7 gas two-stroke. Now, the Lazy Ace was originally designed for a .60! A demonstration of its power was an overshoot landing that ended up on the beach. Jim just goosed the engine, turned the plane around 180 degrees, taxied across 10 feet of beach back to the water, and took off again! Its low rpm also sounded most scale-like.

Another beauty from Sid Morgan plans is this PBY-5 by an unidentified builder. Power is two K&B .61's. Model is shown only partially assembled, which is why the wings seem to droop.

My own Supermarine Frigate (actually a Scapa/Stranraer combo; two flying boats built by Supermarine in the '30s) was taxied but was not flown due to my need to take photographs for an article I've been working on. My model, Azucena Pilapil (a relation of Corazon Aquino of the Philippines), couldn't show until the second day, and the Frigate had to sit on the beach. It really wanted to fly but I was reluctant to give it a maiden flight in front of a crowd. The weather did not cooperate for a test flight on the second day and started out breezy, unlike the perfect calm of the first morning. The Frigate spans 8 feet, 6 inches, weighs about 12 pounds, and is powered by two Enya .46 four-strokes turning four-bladed Australian Bolly fiberglass props. The 11x7 four-blade prop seems to be made for the engine. I discovered this by accident after breaking my last prop for the Enya .46 engine and bolting on the Bolly I had bought for a collector's item while on a working trip to Australia. It worked great with less noise and a super idle, with all that extra flywheel weight out front. Les Bollenhagen originally designed this prop for pattern .60s. I liked the combo so much I ordered a special batch of props from Les before I left the great land of Oz, as Aussies affectionately call their country. Bolly does export his props to the U.S. Stu Richmond has an excellent series of articles on the Australian modelling scene in the 1987-88 issues of *Model Builder*.

Another beach-borne craft that unfortunately did not fly was a Grumman G-44 Widgeon, built from Sid Morgan plans by Ed Zemaitis. The craft was done up in a striking Coast Guard scheme. Powered by two O.S. .61 FS engines and spanning about six feet, Ed worked hard to get the reluctant engines going, only to have an internal fuel line break and damage the immaculate fin-

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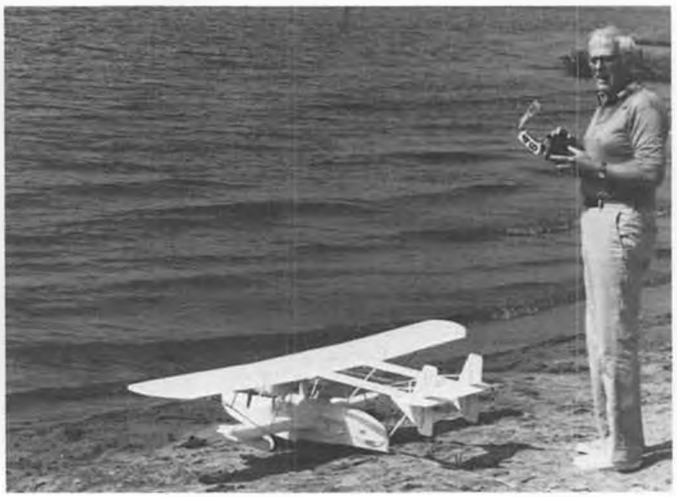

Above: John Nicolacci's huge Martin Mariner has been a fixture at Brimfield fly-ins for years. Two .90's, span is about 12 feet. Right: One of a number of Nelson Whittney's electric seaplanes was a delicate looking Sikorsky S-38 with two Astro 25's.

ELECTRIC POWER

By MITCH POLING

• Many new electric designs have been appearing on the market, showing the expansion of interest of electrics. As always, however, the most-asked question always seems to be: "I am starting in R/C and want to begin with electrics. What plane should I choose?" I have two top recommendations: the Leisure Playboy kitted by Leisure Electronics and the Brigadier, available as plans from *Model Builder* (No. 9822, $8.50). These two planes can literally fly themselves, no pilot interference needed. They are Old Timer designs, originally free flight, and they have kept the ability to "self fly." They also have the disadvantage of Old Timer construction, and many beginners find the built-up stick construction daunting.

Next on the list are planes that are easier to build, but take slightly more attention to fly. The Goldberg Electra and the Leisure Amptique are the two top ones in this category (my opinion, of course). They fly beautifully, but are not quite as quick to recover from odd attitudes and maintain level flight. They are far easier to fly than most of the "trainers" that are advertised. However, the complete beginner may have never built a model at all, and would like to get a ready-to-fly. In that case, I would recommend the Cox Electric Malibu. It is completely ready to fly and is as easy to fly as the Amptique and the Electra with one exception: It has a strong tendency to respond quickly to right turn commands, but is slow to turn to the left. You must be very careful not to turn too quickly going right, and give it all you've got to turn left. This can be corrected by giving the motor a bit of left thrust, then control will be equal both ways.

The usual advice is to find someone experienced to help you with the first flights. This is very good advice. I did not do this when I learned to fly and had many crashes. The best advice is to be stubborn. Repair the plane and try again! Pick up *all* the pieces, put it back together just as you would a jigsaw puzzle, and fly again. My planes fly best after they have been "broken in" by crashing a couple of times!

Another commonly accepted piece of advice is to start with a bigger plane, because "they are easier to fly." My opinion is to the contrary. I fly both large planes and small ones and the small ones are just as easy to fly, and in some ways easier. The usual saying is that "big ones handle wind better." Yes, they do, but a beginner has absolutely NO business trying to learn to fly in any wind over 5 mph, *period*. If that means getting up at 5 a.m. so you can fly with no wind, do so. The great advantage of electrics is that early morning flying is practical and easy.

Yet another piece of "usual advice" is: "Get a radio with aileron (or rudder) and the elevator on the right stick, everyone flies that way, and if you don't, you'll never learn to fly four channel." Again, I disagree. The beginner *needs* the elevator and turn control (rudder or aileron) on *separate* sticks. The transition later to having them on the same stick is easy once you know how to fly. Every beginner I have ever taught, with no exceptions, clutches the stick and vastly overcontrols. Along with shaking knees goes shaking hands, and the stick is doing a little rotary dance! This means the beginner is mixing in a liberal amount of random elevator control with the turn control, and things quickly get out of control. If the elevator is on another stick, this problem goes away. If you are learning and have this problem, shift the elevator over to the left stick, and watch that tiger tame down!

Speaking of clutching the stick, a very successful way to avoid overcontrol is to push the stick with one finger, then let the stick spring back. The whole action from start to finish is done in a count of "one." If

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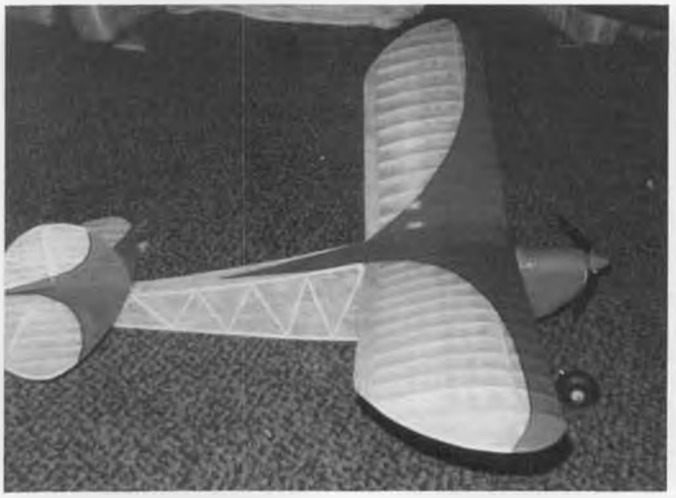
Our columnist rates the Cox Electric Malibu as one of the best electric ARF trainers for beginning fliers. See text for additional comments.



The lightweight construction and inherent stability of Old Timers make them outstanding candidates for electric power. Colin McKinley's 7-ft. Powerhouse (left) uses an Astro 60 on 24 cells; the 67-inch Quaker Flash (right) by Howard Lazerson is powered by an Astro 25 on 14 cells.

CHOPPER CHATTER

By JAMES WANG

• This month, let me show you some of the state-of-the-art equipment in R/C helicopters. Competition always brings out the best in everything. To give you a good idea of where the technology is, Table 1 is a comprehensive compilation of the equipment used by all the fliers at the most recent biennial F3C R/C Helicopter World Championships held in 1987 at Bern, Switzerland. If you are a competition flier, or aspire to be one, then you ought to seriously check out what the top honchos use. A famous Chinese strategist, Sun Tze, said two thousands years ago, "If you know thy enemies as well as yourself, then thou shall win all battles." The Third F3C World Championships will be held in the summer of this year at Tidewater, Virginia. Hopefully, I can be there to report for you.

Since 1987 there have been a lot of new developments in the R/C helicopter industry. This month I will tell you about some of the newest products that I saw at the recent 1989 International Modeler Show held at Pasadena, California. Helicopter radios seem to be where the heat is. The top three manufacturers, JR, Futaba, and Airtronics, are battling for a piece of the cake in the top-of-the-line heli radio market ($800-$1200). All three manufacturers are pulling out all the stops and are boasting fancy programmability that is extraordinarily impressive. The features on these special heli radios just go on and on. Frank Dyke in the Hobby Dynamics booth gave me a 15 minute lecture on only part of the unending features on the new JR PCM-10 to be released in April. Bob Renaud and Gene Engalgau, the software wiz at Airtronics, spent 45 minutes with me discussing their new, designed in the USA, 16-bit programmable Vision radio line which will be ready around late summer. Ron Heib and Eloy Marez of Futaba also gave me a run-through on their 1989 product line.

There is an overwhelming selection of helicopter radios on the market. It is getting to be very confusing. To make it easier I have compiled the data for all the available heli radios and they are shown in Table 2. All the radios listed can be ordered with different grades of servos. The prices given in Table 2 are the manufacturer's suggested retail price. The prices at the store will almost always be significantly less.

All of the 1989 helicopter radios listed in Table 2 (except the JR 6H) employ FM transmission and also meet the 1991 FCC regulation. Thus, they require no modifications for legal operation in the 1990's. However, if you have radios that were manufactured before Fall of last year, then almost surely you will have to send them back to the manufacturer for upgrade to meet the 1991 FCC regulations. The reason is that by 1991, the FCC will require tighter tolerances on the spacing of radio frequencies. There will be other users, such as repeaters, sharing our adjacent channels. If you do not convert your radio to narrow band, then you are risking having your helicopter shot down. The cost of converting an older radio to narrow band will generally cost around $70. If it is of 1970's vintage, it might not be convertible at all. Check with the manufacturer.

To give you an idea of how good modern radios can be, let me give you two examples. My Airtronics Module 7H radio has a dual conversion, narrow band receiver. When I turned on another older radio that is also on the same frequency, the Module 7H continued to work flawlessly, while the old wide band radio just went haywire. Why? I don't know. High signal to noise rejection ratio? I might have an electrical engineering degree from M.I.T., but I still don't have any educated explanation. Usually when I open up the back of a modern radio, I am just as perplexed as most modelers. I definitely do not mess around with the inside of a modern radio.

Spectators at IMS Pasadena '89 were captivated by the video at the GMP booth. GMP had a whole slew of choppers on display, including the new flybarless and flybared Legend.

JR helicopter radios and the slick Kalt Jet Stream and Baron 60EX were displayed at the Hobby Dynamics booth at IMS Pasadena '89.

Airtronics' new Vision Series radios. They have a 16-bit microprocessor and the fastest scan rate of any of the PCM radios.

Another example: the other day, as I was helping a beginner set up his new X-Cell, another of our group went out to fly his airplane which happened to be on the same frequency. The fellow took off and crashed immediately. The surprising thing is that we did not even realize that he had turned on his radio; I was hovering the X-Cell with a Futaba 512 PCM and I did not even feel a glitch. The PCM did not go into the failsafe mode, either.

What are some of the features on modern heli radios? The JR PCM-10 and Galaxy can memorize programmed settings for seven different models. The modeler can select mode 1 or mode 2 by simply pushing buttons. There are no buttons on the PCM-10; you actually press the touch-sensitive LCD screen to input changes. Very trick stuff. It also has a pair of the smoothest open gimbal sticks that I have ever felt. I have flown the JR Unlimited 8 and Century 7 since 1983, and I think the PCM-10 is the best of the best JR radios. The shape of the PCM-10 transmitter feels just perfect. Both the Galaxy and the PCM-10 allow the user to select either PCM (pulse coded modulation) or PPM (pulse position modulation). It has features like subtrims, and a U-shaped engine curve for high idle so you can fly inverted without using the invert switch. The $1200 retail price might be steep, but I think it's worth it for the serious enthusiast. Besides the PCM-10 and the Galaxy, Hobby Dynamics offers seven other helicopter radios to meet any budget. JR also makes a new 18-inch long whip antenna to replace the original telescoping antenna on JR transmitters. It will retail for $39.95.

Airtronics also showed some interesting new radios. The Module Series 7H and 7Hi (includes invert switch) are the least expensive Airtronics heli radios. They still have plenty of bells and whistles, more than you will ever need for sport flying. Most helicopter fliers will never even use the throttle hold, or high idle switch in the first year of their learning. However, I do recommend that all potential helicopter pilots spend the extra bucks and buy a helicopter radio, rather than a less expensive four-channel airplane radio. It can only help you fine tune the machine, fly smoother, and learn quicker.

FIGURE 2 – HELICOPTER RADIOS AVAILABLE IN THE U.S.

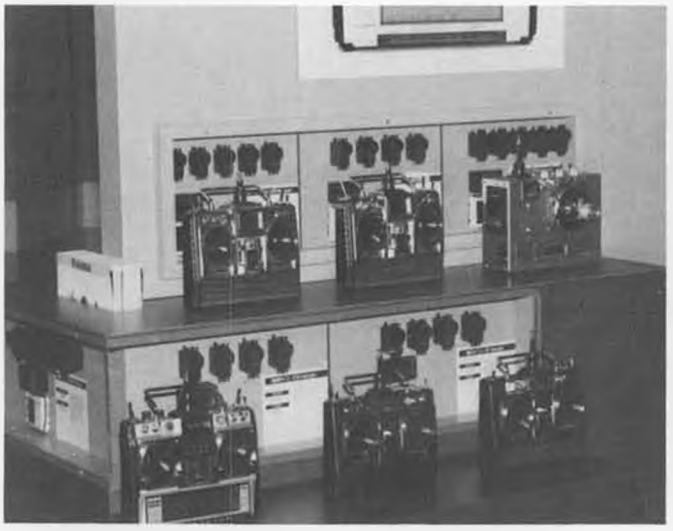
Brand	Type	Ch.	Tx Coding	No. & Type of Servos	Battery (mAh)	Suggested Retail Price
Futaba	9VH	9	1024 PCM	(5) S9201	1000	$1199.95
	8SSH	8	512 PCM	(5) S9201	1000	$1179.95
	7UHP	7	1024 PCM	(5) S5101	1000	$799.95
	7UHF	7	PPM	(4) S5101	1000	$649.95
	6NHP	6	PCM	(4) S148	500	$599.95
	5NHL	5	PPM	(4) S148	500	$399.95
Airtronics	Vision	8	PCM or PPM	(5) 735	700	Summer '89
	Quantum Qm-8H	8	PCM	(5) 735	700	$949.95
				(5) 741		$899.95
	Spectra Sp-7H	7	PCM	(5) 735	500	$769.95
				(5) 741		$719.95
	Module 7Hi	7	PPM	(5) 735	500	$654.95
				(5) 551		$629.95
	Module 7H	7	PPM	(5) 735	500	$629.95
				(5) 551		$604.95
	Vanguard	6	PCM	(6) 102	700	$450.00
	Vanguard	6	FM	(6) 102	700	$350.00
JR	PCM-10	10	PCM or PPM	(5) S4031	1000	$1299.99
	Galaxy 8	8	PCM or PPM	(5) S4001	500	$929.99
	PCM-9	9	PCM	(5) S4001	500	$899.99
	PCM-9 (single stick)	9	PCM	(5) S4001	500	$999.99
	Max 6	6	PCM	(5) S501	1000	$499.99
	Max 5	5	PCM	(5) S570	1000	$399.99
	Century 7 PCM	7	PCM	(5) S501	500	$564.99
	Century 7 (single stick)	7	PPM	(5) S501	500	$649.99
	Century 7	7	PPM	(4) S501	500	$529.00
	6H	6	PPM	(4) S505	500	$244.99

The Airtronics 7H, 7Hi, Spectra, and Quantum, the JR Century 7, Apollo 7, and Unlimited 8, and the Futaba gold color FG7Hi and 512 PCM are considered "second generation" helicopter radios. The third, and also the newest generation radios are the JR PCM-10 and Galaxy, Airtronics Vision, and Futaba 1024, which all have software programmability. Hence, you are actually programming a minicomputer-like microprocessor, rather than adjusting pots with a screwdriver which are called hardware programmable. These third generation heli radios have solid state memory. Like the Airtronics Vision, the memories are stored on an EEPROM chip, so the memories will be there even when there is a power loss.

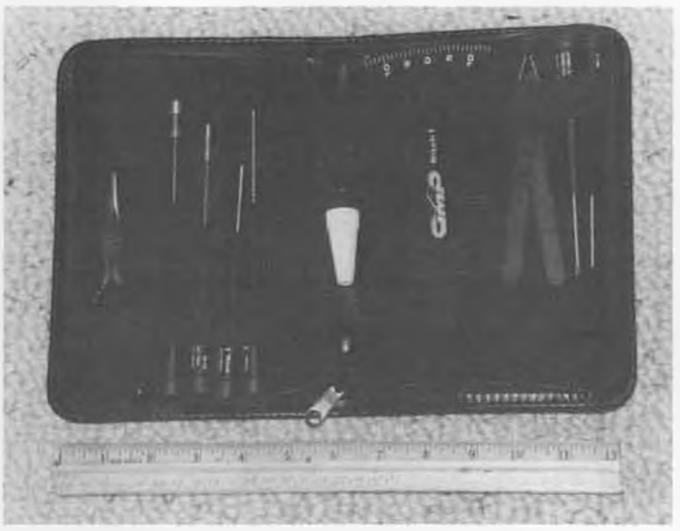
The first generation helicopter radios were the Futaba 5H, the old Sanwa Championship Series, and JR 6H. They were good for the early 80's, and are still fine for sport flying, but they lack that few percent of edge needed if you want to compete seriously. Sure, competition is a judge of pilot skill, but why not put yourself at an advantage even before the game begins?

For now, the Spectra and Quantum are Airtronics' top-of-the-line radios. The Quantum is the only helicopter radio on the market that has SES (synchronized elevator system), to allow a movable horizontal tail surface to be electronically mixed in

Continued on page 96



Futaba offers six different helicopter radios to satisfy the demands of all pilots, from novices to world-class professionals.



GMP's helicopter tool set includes chrome vanadium handtools, a pitch gauge, ball link plier, and Loctite. Less than $50.

TABLE 1

Place	Contestant's Name	Country	Model	Weight (kg)	Diameter (mm)	Main Rotor Blades					Main Rotor RPM	Collective Pitch°		
						Chord (mm)	Weight (g)	Airfoil	Twist	Mtl.		Hover	Aerobatics	Auto-rotation
1	Curtis Youngblood	USA	Competitor (Gorham Model Products)	4.9	1397	64	200	Sym.	0	Wood	1700	3 ~ 5	– 9 ~ 9	– 9 ~ 9
2	Iyobe	JPN	Jet Ranger (TSK)	6.5	1540	57	147	S-Sym.	0	Wood	1260	– 4 ~ 8	– 2 ~ 6.5	– 4
3	Josef Brennstiner	AUT	Long Ranger (Schluter)	5.5	1480	60				FRP	1580			
4	Stefano Lucchi	ITA	Eucureil (Robbe)	4.53	1485	65	164		8	FRP	1200	– 1 ~ 6	0 ~ 8	– 3.5 ~ 12
5	Ishikawa	JPN	Bell 222 (Kalt)	4.7	1560	56	150	S-Sym.	6	Wood	1300	– 3 ~ 8	– 1 ~ 7.5	– 3.5
6	Robert Gorham	USA	GMP Cobra Ranger (GMP)	4.76	1435		170	Reflex	0	FRP	1525	2 ~ 8	3 ~ 8	– 5 ~ 10
7	Ikeda	JPN	Jet Ranger (TSK)	4.65	1560	56	160	S-Sym.	6	Wood	1260	– 4.5 ~ 8	– 2 ~ 6	– 4.5
8	Taya	JPN	Jet Stream (Kalt/TSK)	4.6	1580	56	150	Sym.	4	Wood	1200	– 5 ~ 8	– 6 ~ 7	– 7 ~ 10
9	Mike Mas	USA	Champion (Schluter)	4.08	1321		148	Sym.	0	FRP	1550			
10	Ewald Heim	FRG	Lockheed 286h (Heim Helicopter)	4.2	1400	65	160	Reflex	0	FRP	1600	2 ~ 4	4 ~ 8	– 2
11	Daniele Graber	SUI	Jet Ranger (Sitar)	4.3	1530					FRP	1600	– 4 ~ 8	– 4 ~ 10	12
12	Colin Bliss	GBR	Cobra Ranger (GMP)	4.8	1500	62	166.6		0	FRP	1720	– 6 ~ 8	– 6 ~ 8	– 6 ~ 12
13	Volker Heine	FRG	Long Ranger (Schluter)	4.95	1400		150	Reflex	0	FRP	1400	2 ~ 5	4 ~ 7	– 4
14	Peter Dappen	SUI	Star Ranger (Graupner)	4.75	1445					FRP	1750	– 3 ~ 9	– 3 ~ 9	11
15	Ueli Muller	SUI	Lockheed 286h (Graupner/Heim)	4.2	1400	65	400		5	FRP	1600	– 2 ~ 5	– 4 ~ 7	12
16	John Wallington	GBR	60 Baron Long Ranger (Kalt)	5.1	1600		200	Sym.	0	FRP	1500	– 4 ~ 9	– 8 ~ 8	– 8 ~ 12
17	Michael Davideit	FRG	Long Ranger III (Schluter)	5.18	1400	65	150	Reflex	0	FRP	1500	– 4 ~ 7	– 4 ~ 7	11
18	Len Mount	GDR	Long Ranger (Kalt)	5.7	1560	62	184			FRP	1640	3 ~ 5	– 5 ~ 8	– 7 ~ 11
19	Kees Verplanke	DUT	Mystere (Original)	4.5	1500	65	160		0	FRP	1800	2 ~ 8	2 ~ 8	2 ~ 8
20	Thierry Verbrugge	BEL	Long Ranger (Schluter)	5.2	1560	70	160	Sym.		FRP	1670	– 4 ~ 7	4 ~ 7	– 4 ~ 7
21	Jean-Pierre Dupont	BEL	Star Ranger (Schluter/J.P. Dupont)	5.24	1560		220	Sym.	12	FRP	1600	– 4 ~ 8	– 1 ~ 8	– 4
22	Maurice Depigny	FRA	Lockheed 286L (Lynx Modelisme)	4.28	1216		510	S-Sym.	8	FRP		3 ~ 8	4 ~ 7.5	– 4
23	Giancario Saragosa	ITA	Star Ranger (Heim)	4.75	1490	65	150			FRP	1700	~ 5	– 3 ~ 8	– 3 ~ 10
24	Paulo Mella	ITA	Agusta 206 (Mella/Heim)	4.6	1490	65	164		8	FRP	1400	– 3 ~ 4.5	– 3 ~ 8	– 3 ~ 12
25	Christian De Maeyer	BEL	Gold Ranger (Original)	4.75	1400	70	160			FRP	1600	– 5 ~ 9	– 5 ~ 9	– 5 ~ 9
26	Thomas Cedergren	SWE	Star Ranger (Graupner)	4.4	1410	65	160			FRP	1600	– 4 ~ 8	11 ~ 11	– 4 ~ 10
27	Kaj Henning Nielsen	DEN		4.7	1490		150	S-Sym.	0	FRP	1800	– 2 ~ 10		
28	Ulf Johannson	SWE	60 Baron EX (Kalt)	5.0	1400	65		S-Sym.		FRP	1500	– 3 ~ 8	– 3 ~ 8	11
29	Rune Nessen	NOR	Champion (Schluter)	4.67	1450		160	S-Sym.	0	FRP	1850	~ 3	8 ~ 8	3 ~ 4
30	Jan Verhagen	DUT	Lockheed (Kavan/Original)	4.6	1500	65	155	Sym.	0	FRP	1800	– 8 ~ 2	– 2 ~ 5	– 3
31	Gerard Weil	FRA	Star Ranger (Heim)	4.7	1400				15	FRP		– 2 ~ 5	– 2 ~ 5	– 2 ~ 6
32	Per Nordstroem	SWE	Star Ranger (Graupner)	4.4	1410	65	160			FRP	1600	3 ~ 8	11 ~ 11	– 4 ~ 10
33	Joop Vanlent	DUT	Star Ranger (Graupner/Heim)	4.8	1500			Sym.		FRP	1600	2 ~ 8	2 ~ 8	8
34	Michael Nyegaard	DEN	Lockheed (Heim)	4.8	1420	65	160	Sym.	5	Wood	1800	5 ~ 8	5 ~ 8	10
35	Kit Flammang	LUX	Lockheed 286h (Graupner/Heim)	4.28	1490	63	165			FRP	1630	2 ~ 3	3 ~ 8	10
36	Pedro Caldentey	SPA	Lockheed 286 (Graupner/Heim)	4.5	1500	65	180	E182	0	FRP	1600	– 2 ~ 4	– 4 ~ 8	– 4 ~ 9
37	Konstantinos Sfiris	GRB	Champion (Schluter)	5.2	1448		160	Sym.		FRP	1700	– 3 ~ 9	– 4 ~ 7	– 1.5 ~ 13

TABLE 1 Continued

Place	Contestant's Name	Country	Engine	Muffler or Tuned Pipe System (TS)	Radio Equipment					Fuel	Yrs. Exp. in R/C Helicptrs.	Yrs. Exp. in R/C Airplanes	Flying Sessions/ Week	Age
					Transmitter	Mode	Servos	Gyro	In-Flight Sens. Adj.					
1	Curtis Youngblood	USA	OS61 ABC	Hirobo	JR Century 7	S	5	JMW	N	K&B 500	4.5	7	10	18
2	Iyobe	JPN	Enya 60 XF		Futaba FP-8 SGH-P	I	5	Futaba FP-G153BB	Y	MG 500K	12	14	1	24
3	Josef Brennstiner	AUT	Webra 61	Schluter	Webra Space	II	5	Robbe	N		15	20	5	40
4	Stefano Lucchi	ITA	Rossi	Robbe (TS)	JR Apex Computer	II	6	Robbe	Y	Rossi	6		15	31
5	Ishikawa	JPN	YS60 FSH		Futaba FP-SSG HP	I	6	Futaba FP-G153BB	Y	MG 500K	7	4	6h	35
6	Robert Gorham	USA	OS61 VF-H	Hirobo	Futaba PCM Heli	II	5	Futaba 153BB	Y	K&B 500H	6	2	2	27
7	Ikeda	JPN	YS60 FSH		Futaba FP-8 SGH-P	I	5	Futaba FP-G153BB	Y	MG 500K	11	11	6h	28
8	Taya	JPN	YS60 FSH		JR Apex Computer	I	5	JMW	Y		14	22	1	36
9	Mike Mas	USA	Enya 61 ABC		Futaba PCM	III	5	Futaba	N	K&B 500H	17	25		41
10	Ewald Heim	FRG	Webra61 RCH	Heim (TS)	Graupner/JR	II	5	Graupner/JR		Graupner G5	17	20	2	41
11	Daniele Graber	SUI	Webra61	Robbe	Robbe CM Lex	I	5	Robbe	N		11	20	5	32
12	Colin Bliss	GBR	Enya60 XLF		JR/Futaba	I	5	Futaba 153BB	Y		5	7	6	25
13	Volker Heine	FRG	Webra RCH	Schluter	Robbe/Futaba	II	5	Robbe/Futaba	N	11	17	2	31	
14	Peter Dappen	SUI	Webra Speed61	Hunziker (TS)	Multiplex MC Royal	III	5	Futaba 153BB	Y	Kindler	7	18	5	32
15	Ueli Muller	SUI	OS61 SF	Heim (TS)	JR 5016	II	6	Futaba	Y		13	19	4	37
16	John Wallington	GBR	YS60	Spreng Brook Heli Pipe	JR PCM-9	I	6	JMW	Y	Original	6		3	32
17	Michael Davideit	FRG	Webra61 RCH	Schluter	Graupner/JR	I	5	JR	Y	Graupner G12	12		1	35
18	Len Mount	GDR	Enya60		JR PCM-9	II	6	Futaba 152	Y	LM Glow Bright	19	25	10h	44
19	Kees Verplanke	DUT	Rossi	Merker (TS)	Robbe/Futaba	I	6	Robbe/Futaba	Y	Original	10	5	5	36
20	Thierry Verbrugge	BEL	OS	Heim (TS)	Robbe Promars Rex	I	5	Robbe	Y	Original	5	5	2	38
21	Jean-Pierre Dupont	BEL	OS	Schluter	Robbe Promars Rex	II	5	Robbe Expert	N	Original	14		6h	52
22	Maurice Depigny	FRA	OS61 SF ABC	Heim/Graupner (TS)	JR 128H	S	5	JR NES101	Y	M.R.C.	7		2	38
23	Giancario Saragosa	ITA	Rossi60 ABC	Robbe (TS)	JR 128H		5	JR 1001	N	80 + 20	5		10	32
24	Paulo Mella	ITA	OPS	OPS (TS)	JR 128H	II			Y	OPS	7	15	4	38
25	Christian De Maeyer	BEL	Rossi61 ABC	Robbe	Robbe Promars Lex	I	5	Robbe Expert	Y	Original	8	1	2	31
26	Thomas Cedergren	SWE	Webra/OS	Graupner (TS)	Graupner/JR	II	5	Futaba	N	Original	7	10	2	20
27	Kaj Henning Nielsen	DEN	Rossi60	Vario (TS)		II	6	JMW	Y	80 + 20	11	20	15	44
28	Ulf Johannson	SWE	OS61 RF-H ABC		JR PCM-9	II	5	Futaba FP6153BB	N		15	29	5h	37
29	Rune Nessen	NOR	OS61 SF-H-P	Schluter	JR 12811	II	5	Graupner/JR	Y	Webra	5	16	4	32
30	Jan Verhagen	DUT	Rossi		Robbe CM Lex	II	6	JR	Y	Original	16	20	5	37
31	Gerard Weil	FRA	Enya	Haim/Graupner (TS)	Robbe/Futaba	II	5	Robbe/Futaba	N	Original	7	15	5	37
32	Per Nordstroem	SWE	OS61 SF	Graupner (TS)	Futaba PCM	II	5	Futaba	N	Original	10	20	2	29
33	Joop Vanlent	DUT	OS61 FSH	Graupner/Heim	JR/Graupner	III	5	JR/Graupner	N		14		2h	42
34	Michael Nyegaard	DEN	Rossi	Rossi (TS)	Robbe Promars Rex	II	5	Futaba FP132	Y	Original	5	5	8	25
35	Kit Flammang	LUX	OS61 Longstroke	OS (TS)	JR/Graupner	III	5	JK/Graupner	Y		12	15	3	27
36	Pedro Caldentey	SPA	OS61 ABC	(TS)	JR PCM-9	I	5	Futaba	N		5	10	6	27
37	Konstantinos Sfiris	GRB	Enya60 XL	Enya	JR PCM-9	II	5	Futaba	Y		4		2	29

BIG BIRDS

By AL ALMAN

WIGHT QUADRUPLANE

Like most of us, Larry Ladd enjoys an ongoing, never-ending love affair with BIG Birds. And his craftsmanship speaks for itself. Anyone who's seen his superbly finished Waco CRG can tell that Larry knows how to hand massage a plane into shape.

Well, here's a pic of Larry with his latest project . . . and no, you're not seeing double; this bird does have four wings. I'll let Larry explain:

"What could be better than a biplane . . . except two bipes on one fuselage?

"Seriously, it's a Wight Quadruplane, an English design from 1916. As you can imagine, only one was built, but it did fly at R.F.C. Test Fields during 1917 and 1918.

"The model has a span of 57 inches, which is quarter scale. But the wing area comes out to 15.5 square feet. Power will be an S.T. 2500 with C&H electronic ignition.

"Should be ready to test in 1989. . .and I guess you can understand why I have that worried look on my face."

Larry didn't say how well the original design flew, but I'd imagine that wing alignment and incidence angles would be prime concerns. By the time you read this, the Quadruplane should be ready for her maiden flight.

TWICE-SIZED SAILPLANE

Here's another super-sized flying machine from Al Doerr's workshop. He just couldn't resist taking Carl Goldberg's beautiful Sailplane and scaling it up by a factor of two. I didn't get much data except that this magnificent bird is hauled around by an O.S. FF-240, 2.4 cu. in. four-stroker.

And in a recent phone conversation, Crash Evanson (who can't spell too well, but who can cram more coherent single-spaced typing onto both sides of a sheet of paper than anyone else I know) informed me that Al Doerr's 1/2 scale Piper Cub built a few years ago found a good home in Israel . . . and is now flying quite well since being retrofitted with a new 100cc engine.

Two questions immediately come to mind: Is the Cub flying better because this new engine is kosher? And has the plane become part of the Israeli Air Force?

UFO

Like everyone else I couldn't help but notice Satellite City's catchy "UFO" ads. According to the hype, their two new Hot Stuff products, "UFO" Thin and "UFO" Thick, are honestly and truly User-Friendly & Odorless. Their brochure sez:

"The ODORLESS quality of 'UFO' is an unparalleled breakthrough in instant glue technology that makes 'UFO' user-friendly to those who are otherwise cyano-sensitive. For most people the curing fumes of instant glues are of no consequence, except under the worst of circumstances (poor ventilation). Although the curing fumes are non-toxic, these fumes are very uncomfortable to many. These people cannot even be near typical cyanoacrylates in use, without discomfort. If you or someone you know has a sensitivity to instant glue, try 'UFO', the User-Friendly instant glue.

"Another unique quality of 'UFO' is that it will not attack white foam. Until now, the bonding of white foam has been a real limitation of instant glues, which dissolved white foam on contact. Since 'UFO' does not attack white foam, it allows full joint coverage of all bonds, even foam to foam. This means that no areas of the bond are dissolved, resulting in maximum strength. The use of 'HOT SHOT' or 'KICK-IT' accelerators speeds curing time. For maximum bond strength do not use any type of primer with 'UFO'."

Satellite City's claims sounded almost too good to be true, so I just had to give their new 'UFO' stuff a bloody go.

First, I tried to glue pieces of white foam together (these were leftovers from some wing and float core experiments), using both the old and the new 'UFO' Thick. I fully expected to end up with at least some pitting of the foam where the 'UFO' was used but, although the older Hot Stuff did its usually great job of dissolving the foam, the 'UFO' did nothing . . . nothing, that is, except to weld both pieces of foam solidly to each other. Then I tried gluing scraps of bass, balsa, spruce and ply to the foam with equally outstanding results.

To check for fumes I cured a large amount of 'UFO' by glassing a simulated wing center section. This 12 x 6-inch area was covered with medium weight glass cloth and soaked thoroughly with 'UFO' Thin. At this point I normally have my respirator on to keep the fumes out (and was ready to reach for it), but found I didn't need it this time. Usually you can see and smell the fumes coming off of CA as it's curing, especially from large areas . . . but with the 'UFO' I couldn't detect anything.

There is one more change that Bill and Bob Hunter made to their Hot Stuff line, but it's not mentioned in any of their poop sheets. I guess they were so pleased with the new glue that they plumb forgot about having put the stuff into dandy oval-shaped containers.

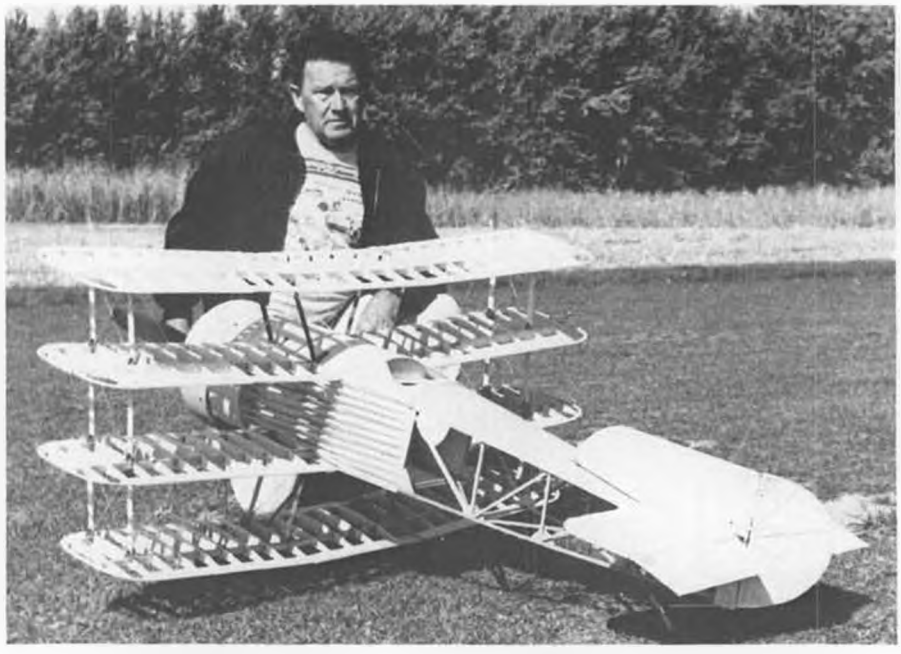
Now I normally use the 2-ounce bottles because they hold a lot and yet stay squeezable. But however convenient I thought the older soft, round bottles were, these new oval-shaped ones are even easier to hold and use. And, because they're not round, they won't roll all over the bench or onto the floor when knocked over.

This new Hot Stuff is *good* stuff!

AEROBATICS

Most everything I've seen published

Continued on page 71



As you can tell from the expression on Larry Ladd's face, he's not too sure what he's gotten himself into. His Wight Quadruplane is a 1/4-scale replica of a 1916 English fighter.

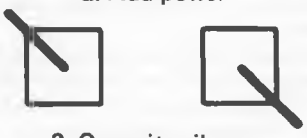
BASIC MODE II CONTROL STICK POSITIONS FOR VARIOUS AEROBATIC MANEUVERS, as compiled by Tom Triol

LEFT SPIN

LEFT INVERTED SPIN

1. Normal spin

2. Add power



3. Opposite aileron

FLAT SPIN SEQUENCE

RIGHT INVERTED SPIN

1. Left snap roll

2. Add down elevator

LOMCEVAK

RIGHT SPIN

LEFT SNAP ROLL

LEFT INVERTED SNAP ROLL

LOMCEVAK WITHOUT SNAP FIRST

RIGHT SNAP ROLL

RIGHT INVERTED SNAP ROLL

1. Left snap roll

2. Add down elev. & opp. aileron

LOMCEVAK

STEWART ROLL

Crash Evanson's 90-inch original doesn't have the smoothest lines in the world but really tears up the sky with a Cobalt 60 in the nose. Four years old, still looks new.

Al Doerr did an especially nice job on this double-size (13 foot) Goldberg Sailplane, powered by an O.S. FF-240 four-stroke.

MODEL DESIGN & TECHNICAL STUFF

By FRANCIS REYNOLDS

• In the December issue I mentioned Rohacell foam, available from Composite Structures Technology, 3701 Inglewood Ave., No. 268, Redondo Beach, California 90278-1110. Matt Gewain, owner of Composite Structures was disappointed that I did little more than tell you that Rohacell foam is expensive. He has a point. Rohacell is rated at four to five times the compression strength of other foams of equal density, and it will take much higher temperatures without softening. Matt also points out that Rohacell is not dissolved by polyester resin and other model adhesives and finishes that will dissolve the polystyrene foams. It is like polyurethane foam in that respect, and also like polyurethane foam it should not be cut with a hot wire because of toxic vapors. It is available in many thicknesses, and in two different densities.

In past months we have looked at stability, scaling and load factors, weight, strength, materials, and composite structures. It is time for a change.

PRELIMINARY DESIGN

Deciding what kind of an airplane one is going to build is certainly a fun part as well as very important part of the design process. It is an area where the decisions may be made purely by emotional preferences, (preferring biplanes over monoplanes, for example), or they may be made by high-tech commercial projects, employing thousands of engineers and costing millions of dollars. Other words meaning about the same as "preliminary design" are "configuration studies." In doing these things right, sets of requirements, objectives and ground rules are formulated first. Model designers are frequently less formal than this, and may have only a mental or even subconscious list of things they wish to accomplish and rules they will abide by. I recommend getting it all down on paper. When we force ourselves to write, we must think, and thinking is a prerequisite to intelligent designing.

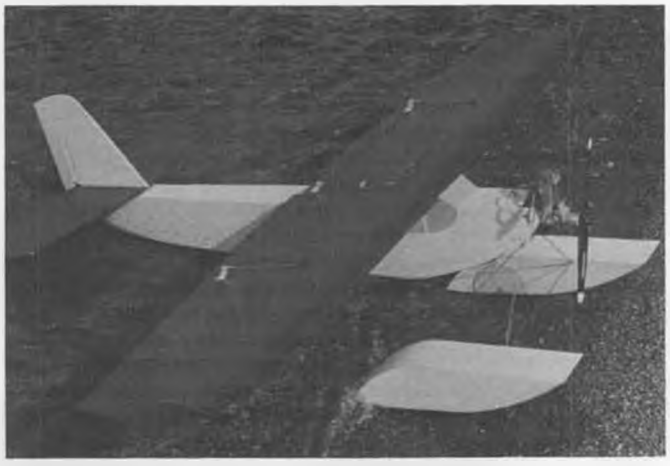
"I asked myself the question, 'Which are better, floatplanes or flying boats?' Let us try to apply the logic for which we humans are noted and find out."

SEAPLANE CONFIGURATION STUDIES

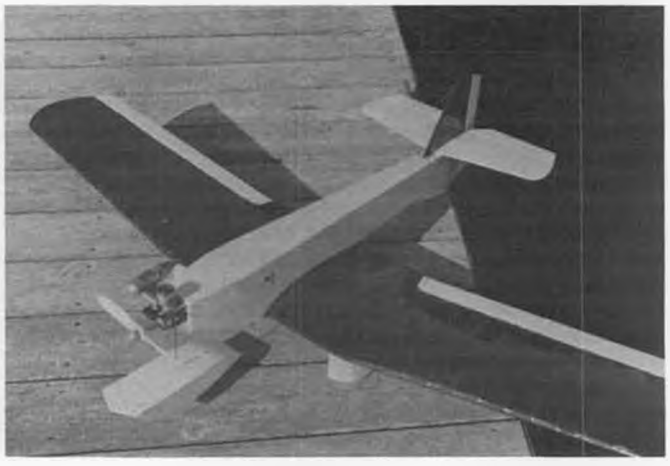
Since R/C seaplane design is my specialty, I will use it to illustrate the art of configuration study, as well as hopefully to contribute some useful thoughts on my favorite type of model. To follow my own advice and put objectives on paper, I fly mostly R/C seaplanes instead of landplanes because: 1) I live on Lake Sammamish in the state of Washington and can fly seaplanes from my own dock; 2) The challenges of seaplane design intrigue me because of the interesting interacting hydrostatic, hydrodynamic, and aerodynamic requirements; 3) Water is a little bit softer than most land, and crash damage is somewhat less, if I design well structurally; 4) No trees to hit (only boats); and 5) No waiting for my frequency to be available, as I'm a safe distance from the local model field.

The word seaplane, incidentally, means "hydroaeroplane" and includes both floatplanes and flying boats. The distinction between floatplanes and flying boats sometimes disappears however. A single-float seaplane where the float is an integral part of the fuselage is a flying boat. If the single float is mounted on struts, however, it would be called a floatplane. We can't say that floatplanes must have two floats. Some floatplanes, including my recent ones, have three floats, and one of my seaplane designs, called "Quadrafloat," had four.

When I was a teenager, I designed and built a seaplane that wouldn't "plane off of the sea." The mistake I made was to use a single main float and put the "wing" floats at the ends of the stabilizer. It seemed to make sense to use the stab for float mounting, since it was already there. You guessed

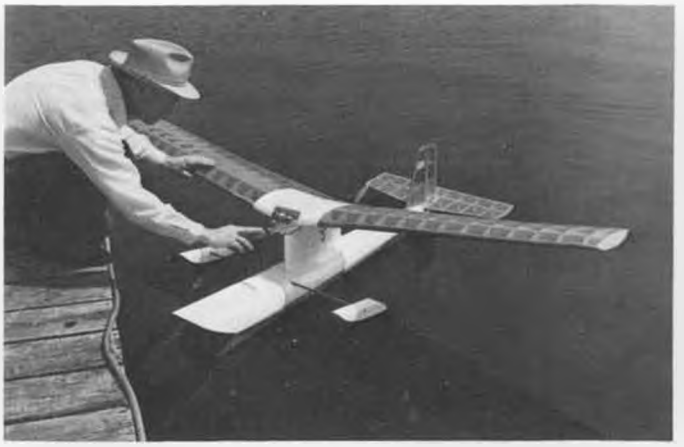


Author's triple-float seaplane, "SAM II," uses the rear of the fuselage as the tail float. Model is actually an amphibian, has thin plastic wheels mounted on the two main floats.



"Quadrafloat" features four separate floats; nose float is steerable like a tricycle-gear landplane. Steerable nose float proved to be not as effective as a water rudder.

Ultra-clean "Seatract" features retracting floats (dark-colored areas on side of nose). Small scale model was used to develop the retract mechanism geometry.

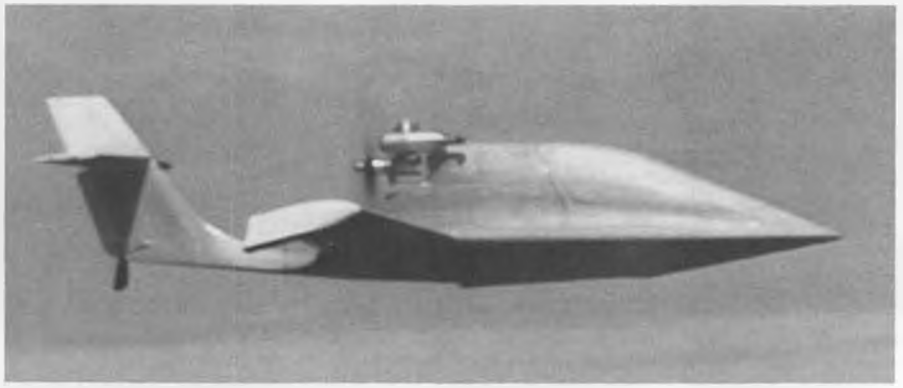


Author's world endurance record attempt seaplane had stabilizing floats (sponsons?) attached to the fuselage instead of the wing. Flew well, but radio problems did it in.

it: inadequate stability on the water. The least little cross-wind would blow it over onto a wing tip and it could not recover. This lesson, like many others I have learned, had enough pain content that it won't be forgotten.

FLOATPLANES

The floats of most floatplanes are designed to completely support the airplane on the water. I think this is a mistake. In order for twin floats to hold the tail of the airplane out of the water, they must have considerable displacement (therefore added weight and drag) aft of the step. "Considerable" because the moment arm between the aircraft's balance point and this tail-supporting volume is very short. Furthermore, if we use conventional twin floats, a water rudder extension of the aero rudder usually doesn't work well—if at all. It needs to be too long to reach the water, and any pitching of the plane in waves makes the water rudder's penetration anything but constant. Sure, we can put a water rudder on one or both floats, but that is extra mechanism, weight, and drag. Another problem area on conventional floats is the steps. They are a bit hard to build, need to be deep and/or ventilated for good hydrodynamic performance, and have high aerodynamic drag.



High-performance "Sea Era" flying boat by Paul Weston uses the bottom of the wing itself for flotation, doing away with conventional tip floats.

TRIPLE-FLOAT SEAPLANES

By designing and building our floatplanes with three floats instead of two, we can reduce or eliminate all of the above problems. I'm not the originator of the triple-float configuration, but I'm certainly an advocate of it. You have probably noticed photos of the Proctor Antic and other (usually antique) models on three floats. One of the accompanying photos shows "Sam II," one of my three-floaters. You can't find the third float? It is the rear of the fuselage.

Incidentally, Sam II is an amphibian with *fixed wheels*. You may be able to see one of the thin transparent plastic wheels in the photo if it doesn't get washed out in the printing. The plane in the photo that heads this column every month is also one of my fixed-wheel amphibs. For an explanation, see my construction article in the December 1986 issue of *RCM*.

Three floats instead of two, that is, two main floats and a tail float, have less weight and drag than regular twin floats because the main floats are much smaller and only a very small tail float, if any, is required. On the main floats, we can eliminate everything aft of the step, which amounts to a third or more of the total float volume. Since the "step" is now at the aft end of the float, it is no longer a true step but a transom. As such, it is easier to make, and can be aerodynamically streamlined (from above).

The tail float is attached to the aft end of the fuselage, or better yet it *is* the aft part of the fuselage. The plane will now sit at a positive angle on the water both statically and at idling taxi speeds. This provides plenty of rotation angle for takeoff and landing, and like taildragger landplanes, it provides more prop clearance at low speeds.

Photo from 1940 shows our columnist with an 8-foot, Super Cyclone powered F/F flying boat. Took off easily but proved to be spirally unstable.

With the rudder down at water level, we have a perfect setup for a water rudder extension of the aero rudder. Our triple-float configuration is comparable to a taildragger with a steerable tail wheel. The customary twin-float arrangement performs more like a tricycle gear job, but without the advantage of a steerable nose wheel. My Quadrafloat had a steerable nose *float*. It worked, but not as well or as simply as the three-float configuration with a water rudder. I also built an R/C model of the 1910 Fabre Hydravion canard with a steerable nose float. (See my construction article in the March 1984 issue of *Model Builder*.)

The question I asked myself, and the one I'm sure some of you are asking at this point is, "How come?" How come the only triple-float designs we see are a few antiques? How come modern designers always design twin-float planes if triple-float planes are better? Designers are no doubt influenced by tradition, but I think the chief reason for the preponderance of twin-float jobs is that these planes weren't originally designed as floatplanes at all but as landplanes. There is seldom enough market for seaplanes to justify a strictly seaplane design. (When there is, the plane usually ends up a flying boat. That comes next.) Most twin-float seaplanes are landplanes with

Continued on page 84

R/C SOARING

A look at IMS Pasadena '89

By BILL FORREY

• The 1989 International Modeler Show was held this past January in Pasadena, California. For model sailplane enthusiasts who attended, it was a virtual treasure chest of old and new models. There were so many sailplanes at this show that my original ambitious intention to completely cover all of them here had to be abandoned. This is quite a contrast to previous hobby shows of 1988.

Hopefully avoiding any favortism in this report, I'll simply report on as many exhibitors as I can in alphabetical order starting with A and ending with U.

Ace R/C, Inc.

Big news in this booth on two fronts. First off, Ace has purchased all the kit manufacturing rights to the Off the Ground Models sailplanes and power planes. The AMA Nats winning Prodigy, the relatively new, high performance Quasoar foam and fiberglass contest ship, and the Skyhawk trainer are the three of greatest interest to my readers. Prices may change a little to keep the line profitable for Ace and allow for dealers to make a fair margin, but the overall care and quality of the kits will remain very high.

The other news regards radios. As yet unnamed, Ace's newest eight-channel rig uses a microprocessor computer to mix any channel with any other channel(s) stacked up as deep as you wish. This gives the intermediate to advanced sailplane flyer *total* flexibility in fine tuning aircraft handling.

With this radio you have your choice of linear or exponential throws with dual rate capability in either case on the three basic functions. All eight individual servo end points are fully adjustable in hundredths of a second pulse width from .90 up to the neutral point (1.5) and from 2.10 down to the neutral point (1.5). All mixing functions are adjustable in one percent increments from 0% (no mixing) to 100% mixing. Mixing functions can be engaged or disengaged using an external switch. Mixing functions are programmed using the actual sticks which will be used in flight as value changers on the buttonless, single line, LCD readout. Memory for four different aircraft setups is on hand via a four-position rotary switch atop the TX case. A built-in clock will keep track of total on-time since last charge. Ace is planning to add a count-up or count-down stopwatch also. Externally, this sophisticated transmitter is a Silver Seven lookalike, with the exception of the LCD display, of course.

Available by April 1989, this rig will be coming with Ace's 1991 quality "1991" seven-channel AM receiver and four servos. It is expected to fall in the $500 range. (Later versions will be available in 1991 FM.) Contact Ace R/C for more information: 116 W. 19th Street, Higginsville, Missouri 64037, (816) 584-7121.

Airtronics, Inc.

Introduced as a concept prototype last April at the Toledo Show, shown again as a prototype at the Chicago Model and Hobby Show in October, and finally shown as a production model at this year's IMS, the all new Vision 8SP radio was on working display. Available now through normal channels (i.e., local dealers, mail order houses, etc.), the Vision 8SP looks like it's going to be the number one gun with contest or performance minded sailplane modelers.

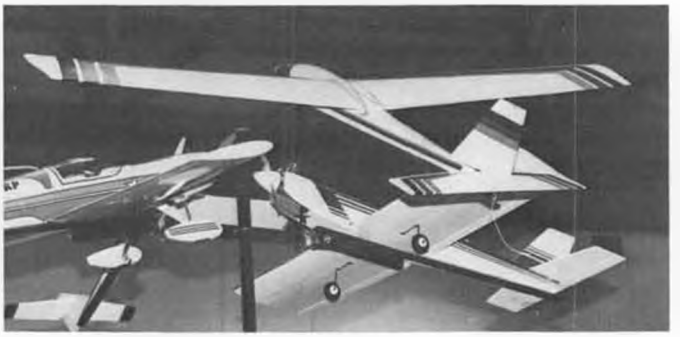
Very similar in basic function to the Ace radio just mentioned, the Vision 8SP uses the well-proven "ATRCS" (pronounced "A-tracs") microprocessor computer developed by Control Systems Laboratories. The ATRCS LCD control panel with its six push buttons does all the programming, from servo reversing and end point adjustment to multi-function mixing. Access protection levels keep unwanted "users" from tampering with your aircraft's mixing programs. Experimenting with a new mixing setup can be made safer with the use of the "alternate

Combat Models' F-16 displayed in the ASD booth is one of the best power scale slopers.

Rollin Klingberg (left) and ASD's Gary Anderson with Future Flight's latest: B2, Terrific Trainer (background), and Klingberg Wing.

High-performance "Rotor" slope machine by Ken Stuhr uses pivoting wings to achieve the effects of ailerons and elevator.

Bob Martin's "Bobcat" aileron ship is as popular as ever. Bob reports his famous Duralene fuselages will be back in production soon.



Eagle SI ARF sailplane imported from Taiwan by Cermark Electronic & Model Supply Co. Also comes in electric or gas versions.

Hobby Lobby's Dave Martin displays his Electro-UHU imported from Germany. A highly successful, high-performance motorglider.

Sheryl Hambelton, DCU owner Mark Hambelton's better half, shows off DCU's "Stryker" (left) and Dragon Fly. Super Dragon Fly in back.

setup" switch which can engage or disengage a new setup at will. Memory for four sailplane setups is provided. A three-position switch allows for three preset elevator trims (these could be set up for launch/thermal, cruise, and speed). Mode I, II, or III stick configurations are easily changed by the user. Dual rate switches are provided for aileron and elevator controls, as is a fully progammable exponential capability.

The Vision comes with an AMA type 1991 certified seven-channel PCM receiver. Airtronics is the first (and to my knowledge, the only) manufacturer to comply with the AMA Frequency Committee's 1988 recommendation for tighter 1991 specifications than those legislated by the FCC. The Vision transmitter is 1991 "gold stickered" for use on either simple FM (PPM) or FM/PCM. Switched to FM carrier, the optional Airtronics 1991 micro FM receiver can be used.

High capacity 700 mAh SCE Ni-Cds are standard equipment for Tx and Rx. The system will be available with your choice of (probably) three different servos, four standard servos, four ball bearing micro servos, or four high- speed competition servos. Ask your favorite supplier which types he can get you. The typical selling price on the Vision 8SP will start at about $550. More information may be obtained by contacting Airtronics: 11 Autry, Irvine, California 92718, (714)830-8769. Look for a full product review on the Vision 8SP here in *Model Builder* in the next few issues.

Robert and Larry Pettyjohn are the fellows kitting the Cheetah. New molds and molding process result in much improved fuselages.

American Sailplane Designs

This company specializes in all forms of model sailplanes, including a few non-R/C ones! ASD is a mail order company which manufactures and distributes to the public. If it glides, Gary Anderson of ASD probably carries it!

Per square foot, there were more sailplanes in the ASD booth than any other at the IMS. I will not be able to list them all here, but I will try to highlight some of the most interesting ones.

Rollin Klingberg of Future Flight was present in the ASD booth with a couple of new surprises. All charged up from his highly successful first year of marketing the Klingberg Wing, Rol came back to the IMS with what he hopes is a successful new approach to the two-meter trainer market.

The Terrific Trainer ("TT") as it is called, is a nice looking, simple to build, versatile little model of 72-inch span. It is intended to be flown either as a thermal or slope glider, as an electric motorglider, or as an .049 gas powered motorglider. It has a wing area of 420 square inches, a flying weight as a glider of 20 ounces, and 30 (claimed) ounces as an electric motorglider using six 800 mAh cells and a Kyosho AP-29 motor.

I'm guessing that the TT has about 60 pieces to assemble to complete the basic airframe. This is about 1/3 as many as the usual trainer kit. The wings are four panels of molded white foam with balsa spar caps and trailing edge pieces. The fuselage is a simple box structure with plywood doublers front and rear. The tail surfaces are sheet balsa. The whole basic glider assembly process should only take about one day.

The most outstanding thing about the TT is its instruction booklet. It is 40 pages long

John Pond's Old Time Plan Service has plans for several pre-war gliders such as the Frank Zaic "Floater" shown here.

Neat two-channel ARF electric motorglider, the "RC-Uno-E," displayed by John Gill of Robbe Model Sport.

Two sailplanes displayed in the Hobby Shack/Global Hobby Distributors booth were the Mini-Racer (left) and Sitar Special 100, both imported from Sailplanes International. Mini-Racer would make a good aileron transition model; Sitar Special is an all-out F3B or F3F machine.

and is a very complete supplement to the full-size plans. This booklet guides the absolute rank beginner from his selection of glues and tools through radios, safety, repairs, and reference books for learning more about the subject of building and flying models. It has photo illustrations throughout and a very nice exploded isometric view of the kit as it goes together. There is even a section devoted to electric and gas motorglider conversions.

The Terrific Trainer comes with complete hardware (even rubber bands!) and sells for $39.95 suggested retail. It is available at your local hobby shop or favorite mail order house.

Next we were shown a prototype model for a potential power scale slope glider kit. Inspired by the recent unveiling of the top secret B2 Stealth Bomber and information gleaned in an *Aviation Week* magazine article, Rol decided it was next on his list!

The full-size B2 has a span of 172 feet and an overall length of 69 feet. The model B2 is scaled down 1/30th to a wingspan of 5.75 feet. Incredibly, the model B2 has a wing area of 1100 square inches! The basic structure is foam and balsa which gives it a total weight of about four pounds.

Four test flights have shown that some minor modifications will need to be made to make the model B2 more commercially acceptable. Among these mods was the addition of more tip washout for better stability.

Expect to wait for this project, if it tickles your fancy. Rol says this is likely to be a 1990 kit.

The other kit prototype is an all balsa and ply, X-wing canard model for gas power or motorless slope soaring. It has a 36-inch wingspan (upper and lower), a five-inch constant chord wing (upper and lower), and a 20 ounce glider flying weight. An .049 engine will be needed for the motorglider version.

The X-winger will be called the X-cel. Don't expect it to be available as a kit until about Christmas of this year. It is expected to come in at about $35 to $40 retail.

Cliff Hanger Models is getting into the power scale slope movement full bore. Steve Peacock (left) and Marty Silberstein are currently producing half a dozen kits, with more planned.

The ASD booth was also home to Ken Stuhr and his VS Sailplanes "Rotor." This is a really slick, 58-inch span, pitcheron control, aerobatic slope racer. The wings are the only surfaces that move, the T-tail being bolted on tightly and immobile. Both pitch and roll functions are handled by the wings.

The Rotor is built from conventional slope ship type materials: blue foam core wings, obechi veneer, spruce leading edges, lite ply fuselage, and balsa tail surfaces. The Rotor is actually a very simple model. The plan shows how to achieve the pitcheron control with or without electronic mixing.

The specifications for the Rotor tell much of the rest of the story: 58- inch wingspan (optional 78-inch wings available); 44-inch length; 6.5-inch root chord; 4.5-inch tip chord; 11:1 aspect ratio; 305 square inches of wing area; thinned Eppler 374 airfoil (7.5%); 31 ounce flying weight; 15 oz./sq. ft. wing loading; two 50 oz.-in. servos required. Call ASD for current price and shipping charges.

Other models present in the ASD booth were the Whitney Models Paraphrase RCHLG, the Combat Models F-16 power

JADE models included (from top): the Equis, Toucan and a gas-powered Telos canard.

Richard Jarel of JADE shows off "Shogun" sloper, will probably be the next JADE kit.

Possible future Sig kit is the "Ninja" slope glider, here displayed by Hazel Sig-Hester.

scale slope model, and a nifty little all-foam free flight sailplane which some people believe might make a unique little single-channel R/C slope flier. Call Gary Anderson about any of these models and he'll be glad to fill you in on any missing details: ASD, 2626 Coronado Ave., No. 89, San Diego, California 92154, (619)429-8281.

Bob Martin R/C Models

Bob Martin says he's just about ready to crank up production on his famous Duralene fuselages once again. The new molds and molding facility in his relatively new Lake Havasu, Arizona, manufacturing plant are almost done, and by the time you read this they will be turning out parts. The Katie II will have a sleeker appearance (maybe it should be called the Katie III?), the Coyote aerobatic sloper should be back in production as should the Griffin II flying wing. Many of your favorite indestructible replacement fuselages will once again be available: Olympic 650 or Wanderer type, and Paragon or Oly II type.

These Duralene fuselages will join the already very popular line of wood kits including the Bobcat aileron trainer, the Pussycat basic trainer, and the hot dog sloper Talon. If you need further information or a flyer on the Martin sailplanes, call: (602)855-6900.

Cermark Electronic & Model Supply Co.

Cermark is a Fullerton, California based mail order company and hobby wholesaler. It had one new and one not-quite new sailplane revolving on a display tree inside its booth at the IMS. These were the Lynx 140 imported from Thailand, and the Eagle series of gliders and motorgliders imported from Taiwan. Both looked like very good quality models.

The new Eagle series includes the SI version for soaring, the EP version for electric power motorgliding, and the IE version for internal combustion engines (.049). Each of the Eagles is fully built from balsa and ply and covered in a very attractive, neatly and colorfully silk screened vinyl film. Assembly should only take one hour, two hours for the electric version.

Specifications for the Eagles are: 67 inch wingspan; 494 sq.in. wing area; 37 inch length, and 30-37 oz. flying weight (electric power version). The Eagles are your basic flat-bottom wing, rudder/elevator trainer types. The Eagle EP would require a third channel for motor on-off control. The EP includes a motor, prop adaptor, spinner, folding prop, and a wire harness which appears to include micro switch, toggle switch, and Tamiya style plug. This is a very complete package at a very reasonable price of $129.95. The SI version goes for $109.95.

The Lynx 140 has appeared in these pages once before. It is a 95% RTF, wood and foam core, three-channel, aerobatic slope sailplane that is attractively covered in a four-color MonoKote scheme. It uses aileron, rudder, and elevator controls, has a

Charlie Morey is editor/publisher of Slope Soaring News. Text has subscription info.

span of 56 inches, and weighs 27 ounces. It is currently going for a sale price of $119.95 (normally $129.95) which is a real bargain considering the quality and how very little work is remaining to get the Lynx 140 airborne!

Contact Cermark at P.O. Box 2406, 107 Edward Avenue, Fullerton, California 92633, (714)680-5888, for more information and a free product flyer.

Cheetah Models

Cheetah Models has made a good thing even better with the announcement of improved molds and part pulling for its Cheetah and Super Cheetah slope combat or aileron trainer models. Wall thickness of the indestructible plastic over the entire length of the fuselage has been nearly doubled without adding any extra weight. How

Continued on page 92

Scale sailplanes can be documented easily by using the color Foto-Paaks from Scale Model Research. Above example is a Schleicher ES-49, built in the early 1950's.

Steve Grochowski of Sun Fair Aircraft Designs shows his new "Split-Image" basic/advanced trainer. Kit includes two different wings.

The U.S. F3B Soaring team, from left: Larry Jolly, Don Edberg (manager), Richard Tiltman (asst. manager), and Rich Spicer.

1. Photo taken in John Pond's room the night before last year's SAM 49 Fall meet shows Pond (right) and Phil Bernhardt trying to get some last-minute work done on John's Folly II while hecklers Ken Myers and Marge Bernhardt (back to camera) clown with the Folly's cowl.

2. Getting the cumbersome Folly weighed in was a bit of a chore, took both Myers and Bernhardt to do the job. Twelve-foot model checked in at 12 pounds.

PLUG SPARKS

By JOHN POND

• Continuing with the idea that Old Timers should be *fun*, we again engage in a description of a kind of model flying that most every competitor has gone through at one time or another. This columnist calls this the "Midnight Ace." This is where most of the night is spent getting a model ready for next day's flying.

It recently happened to us in November of last year, when SAM 49's Ken Myers confided that he had a rare O.S. .90 four-cycle open rocker engine, eligible for the SAM 60% rule. This meant the engine would be classified as .54 cu. in. displacement. Upon discovering this item, an arrangement was made to utilize this engine in the columnist's twelve-foot Folly II that had been flown about four years ago and shelved for lack of power, and to fly it at the SAM 49 Fall Annual.

Phil Bernhardt of 77 Products got into the act and converted the engine to spark ignition. Here was a distinct threat for the Texaco event. The model was pulled down from the rafters and found to be in good shape. Packing was something else as the one-piece twelve-foot wing barely fit inside the Ford LTD Crown Victoria station wagon.

Friday night at Taft was the usual early hospitality gathering at Jack Albrecht's room for the serving of "cheese, cerveza, and vino." During dinner some "careful planning" resulted in taking a group back to Pond's room for installation of the ignition system, which had not been installed due to lack of time.

Of course, the coil being one of the transistorized models sold by 77 Products meant that Phil Bernhardt would lead the installation team of Steve Roselle, Ken Myers, and John Pond to get the Folly ready. It wasn't all hard going as seen in Photo No. 1, with Ken Myers clowning with the Folly cowl, which is loaded with two pounds of lead ballast. Actually looked somewhat like a fez.

About one a.m., the bleary-eyed group finished the job and left for their respective rooms. At about three a.m., this columnist sat bolt upright from a sound sleep with the realization that I didn't bring a fuel tank for the model!

This was confirmed at breakfast the next morning. At the field a round two-ounce Sullivan tank was commandeered and installed. Everything worked! Now to enter the monster!

Photo No. 2 shows the problems of weigh-in. With such a huge wing, the existing cantilever weighing arm and scale had to be disconnected and two people employed. With the huge wing area (slightly less than 20 square feet) and a flying weight of around 12 pounds, the model made weight by only six ounces! This meant, with an ignition engine, that the model received 4cc per pound, or 48cc total! With such a load of fuel, get the calendar, not a timer!

The engine ran and performed very well. The model rose gracefully into the soft breeze and climbed gently. Of course, Myers was on hand to watch his rare O.S. engine perform with many admonishments not to have a "thumb glitch."

The O.S. .90 was disappointing in that it

3. Completely busted in half! There are, however, some practical aspects of the crash as Charlie Critch uses the forward section as a beer stand.

4. R/C O.T. gliders, anyone? Seen here is Bob Munn preparing to launch Dick Bringgold's Beaumont Soaring Champ at SAM 49 meet.

5. A rare one! SAM 51's Brad Allen re-created Joe Weathers' "Go-Getter" for R/C 05 Electric. Surprisingly good performance.

was not as economical as hoped. After only a six-minute run the tank was empty. The model exhibited an excellent slow glide in the early morning and for its first flight did a creditable 16 minutes plus.

Encouraged by this flight, our redoubtable heroes immediately fueled up for another flight. After a minute and a half the engine quit; later investigation revealed the point lead had fatigued. Regardless, the model still hung in the low lift until a stall developed that Pond was unable to recover from. The model hit rather convincingly with considerable damage to the fuselage. Inspection showed that the two-pound cowl had fallen off during the flight, making the model grossly tail-heavy.

Phil Bernhardt retrieved the model, it breaking completely in half while bringing it back. Photo No. 3 shows Charlie Critch with a very practical bent of mind using the forward part of the fuselage as a beer stand. In the background is Pond disassembling the Folly for shipment home.

Undeterred, Myers and Pond are now planning to reactivate the columnist's huge 10-foot "Super Clipper" that used to fly quite well with a glow version of an O.S. .60 four-cycle. Being slightly underpowered with this setup, the O.S. .90 is confidently hoped to be a first-class threat, with the model's super glide resembling that of a Valkyrie.

The main purpose in presenting this saga is to again prove that more fun is derived from flying big, slow models, this one going to the extreme end of the spectrum.

Contest-wise, what else can you say when Don Bekins takes three firsts, two seconds, and two thirds in seven events entered? What a performance! We could list the results but suffice to say that Lanzo Bombers took fifteen of the first three positions in eight events. Fifteen out of a possible 24 is a tremendous tribute to the flying ability of this design.

Another photo of one of the more interesting events is presented. Photo No. 4 depicts Bob Munn of SAM 41 holding a Beaumont Soaring Champ built and flown by Dick Bringgold of SAM 31, Arizona.

This good looking glider is going through its trimming pains and structural revisions needed to accommodate radio and the stress of the high-start. Dick is getting closer all the time!

O.T. ELECTRIC

Photo No. 5 is a shot of a little-seen 1940 design, the Elbert Weathers "Go-Getter." This model is unique in that it features swept-forward wings and a fully enclosed engine (in this case, an 05 electric motor). Brad Allen, holding the model, reports the model is surprisingly stable. Further flying reports will be run in this column.

As proposed by Jack Alten of SAM 21, a new special competition class of electric Old Timers is being introduced for larger electric power systems. This event, called Class B Electric, is being spearheaded by Alten in the north and by Ken Myers in the south. For those who read the saga of "Flat Tires" Myers several issues ago, Ken is seen in Photo No. 6 with an electric powered

6. Good shot of "flat tires" Myers, shown working on his electric Playboy Cabin at Taft. Ken is a very enthusiastic R/C O.T. flier and is currently president of SAM 49.

7. Ted Houston stands guard over his Father Ed's Lanzo Record Breaker. With a hot Hornet 60 this ship really moves.

8. Just one of many competitive Chet Lanzo designs is this RC-1 built by Bob Grice of SAM 51. Uses a Saito 65 four-stroke for good climb.

Leisure Playboy Cabin. Myers always brings his fold-out picnic type table for his work area.

About this time, this writer also received a letter from Bill Preston, a member of SAM 8 in Washington, suggesting a larger electric event. Those interested in such an event will find the standard Playboy Senior makes an excellent starting machine.

In a nutshell, this new proposed Electric class differs from the 05 Electric event we fly on the West Coast in that 12 to 14 cells are specified, with a maximum capacity of 900 mAh; the motor definitions have been completely rewritten to allow any type of readily available motor; proportional speed controls are now allowed; and motor runs have been changed to 60 seconds for both cobalt and ferrite. Sounds like another fun event!

ENGINE OF THE MONTH

No finer tribute could be paid to the genius of Bill Atwood than the longevity of the Torpedo. Credit also goes to Johnny Brodbeck for the continued improvement and manufacture of the ongoing Torpedo line. This engine has been the most copied motor of all.

In this month's write-up we have presented the 24, 29, and 32 Torpedo engines as a group, as they were basically all derived from the 29 case. As noted on the engine drawing, the only Torpedo engine carrying an engine displacement size was the 32. This was done as the 29 and 32 were practically identical in outward appearance.

K&B (Lud Kading and John Brodbeck) were exceptionally successful with sales of their engines. No effort was spared to introduce the engine to the modelers as at least one of the partners would be seen at a major meet answering questions, repairing engines, and giving advice and info on the running traits and methods of handling the Torpedo.

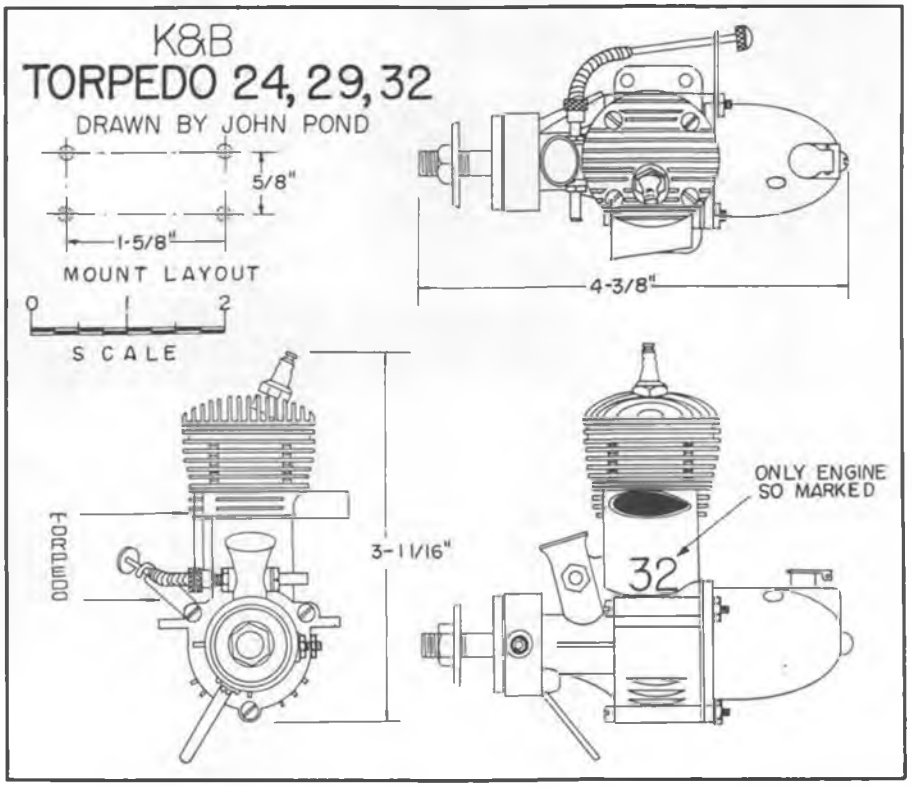
The Torpedo was popular enough as an ignition engine, but when the glow plug was introduced it was found that the engine adapted itself to nitrated fuel beautifully. For quite some time, the engines were turned out in glow versions with the lugs and fixtures on the castings for the ignition timer housing. Finding one of the old "Glow Torps" nowadays is a real bonanza as it is no great trick to convert them back to ignition. Conversions are still being made by Les Payne, 881 S. Josephine, Denver, Colorado 80209.

Comparing the sizes of the 24 and 29 Torpedo engines, one finds the 24 weighed 5.75 ounces while the 29 was 6 ounces. The 24 had a bore of .662 and stroke of .729, while the 29 had a bore of .725 and a stroke of .724. The 32 was a slightly bored 29. Needless to say, all engines ran excellently.

The engines were die-cast from lightweight aluminum alloy, the major parts being the crankcase, cylinder head and connecting rod. Naval bronze was provided for crankshaft and conrod bearings. The piston was machined from Mehanite bar stock, ground and lapped to each cylinder. The crankshaft was manufactured from high

9. Runner-up R/C sweepstakes winner at last year's SAM Champs was Joe Percy, of Texas, seen here with hot Class B Kerswap.

10. Bill Paget (left) and Larry Jenno, photographed in Seattle in 1945 with a Consolidated "Roamer," previously called the "Pursuitaire" and kitted by Model Developments, Inc.



11. Don Lefferts produced this good-looking Belgian "Corsaire," modified with a different airfoil and ailerons. Uses Laser 61 four-stroke.

13. Sune Stark (right) readies his original 1950 Wakefield design while Ake Roggentin holds. Sune was 1951 Wakefield champ.

tensile steel, hardened and ground to precision tolerances.

The gas tank was a formed magnesium pressure casting complete with Gits filler cap. An enclosed timer was employed to keep the points free of dirt and grit, even in crackups. Cast from aluminum, the timer case featured a unique adjustment point setting.

Prices in 1948 for the Torpedo 24 were $16.50, and $18.50 for the 29. At this time, they were sold minus coil and condenser, giving the modeler the option of running glow or spark. In addition, a special high-compression glow head was marketed for $1.25.

Strobatic tests by the *Air Trails* test team gave figures on the Torpedo 29 of 8,000 rpm with a Ritz 11x5 prop, 7,800 rpm using a 10x8 Mercury prop, and 10,400 rpm employing an 8x10 High Thrust propeller.

Factory recommendations for propellers were an 11x6 for free flight use and a 9x10 for control line stunt flying. Regardless of the style of flying, one could not go wrong with a "Torp."

FIFTY YEARS AGO, I WAS. . .

Encouraged by the comments of Al Ward about flying in Chicago, Otto E. Curth of 2107 Center St., Northbrook, IL 60062, writes to say that fifty years ago he was a 14-year-old youngster at Lane Tech High School in Chicago.

"This school was located right across the street from Carl Goldberg's Model Research Laboratory (MRL) which specialized in that fabulous MRL brown rubber. This writer hasn't seen anything like that since.

"Earlier, I belonged to the Hearst newspaper syndicated column, 'The Junior Birdmen.' I attended their indoor contests arriving by streetcar. I designed and built a seven-and-a-half foot gas model that I called the 'Miss Chicago' using a Brown Jr. for power. I figured if Maxwell Bassett could call his models the Miss Philadelphia, I could do no less. This model only flew three or four times.

12. Gorgeous R/C Red Zephyr by Bruce Thompson of Toronto, Canada. Note the faithful reproduction of the original trim scheme.

"The Lane High School had an active model airplane club. Milton Huguelot was a senior and the 1938 Nationals Champ at the age of 16. Barney McShane was President and built the third Zipper ever made. Mark Heller and D. Deschick (third in the 1938 Nats gas event) were sophomores.

"Meetings were held once a week and gliders were flown every day after classes in the fifty-foot high auditorium. Contests were scheduled on a two to three week basis. Generally times of 40 to 44 seconds would place as the auditorium's hard-backed seats were murder on the leading edges of the gliders and at times snapped the tail boom. Paper R.O.G. models were also flown. Only one drawback: if you flew too close to the 10 ft. square ceiling exhaust fan, the model stuck to the grille until the fans were turned off at 6 p.m.

"At MRL, all the talk was about the Chicago Aeronuts. They held their meetings at Gage Park on the south side, about a half hour ride on the streetcar. I started to attend meetings in the Fall of 1938. Wally Simmers was President that year. Other famous members included Carl Goldberg, Ed Lidgard, Milt Huguelot, Wally Fromm, Pete Vacco, Sid Axelrod, Jerry Ritz, Dick Obarski, and others I had read about. What a thrill for a frosh!

"At that time, to become an Aeronut member, one had to pass certain flight requirements. Took me a year and a half to meet the Junior requirement in indoor HLG. In doing so, I broke Huguelot's Junior Class A record. At that time, the Chicago Aeronuts held more National records than any other club.

"I was pleased to read Al Ward's comments of early Chicago modeling as I had not known his whereabouts for the past 30 years. Al got my address from Bill Baker and wrote. We graduated in the same class from Lane H.S."

SLAM CLUB

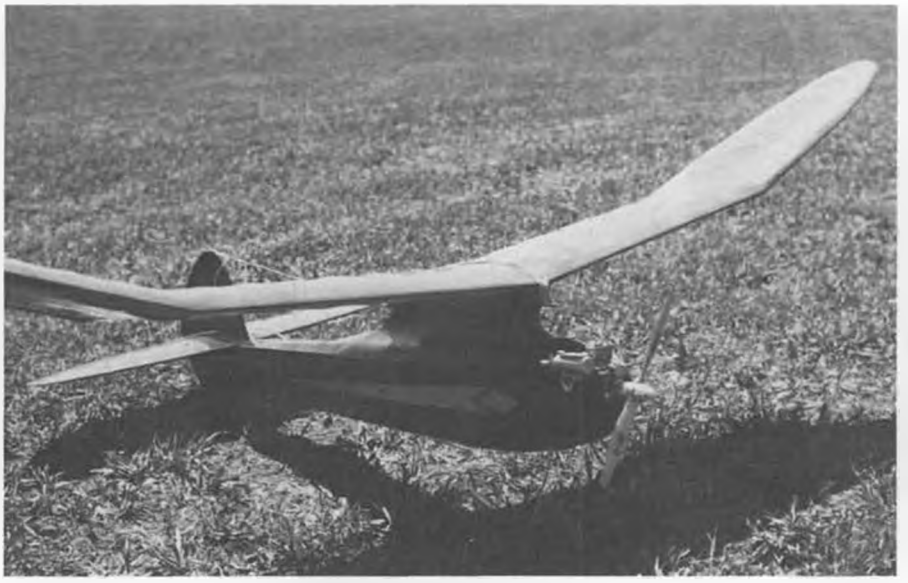
Finally heard from Lin Haslin, the spark plug of the Salt Lake Antique Modelers, in the form of a single-sheet newsletter called *The Condenser*. Lin sent in some info on the club's activities, ranging from a "Weenie Roast" to glider and gas events.

Of special notice is the new flying site, the Watts-Whitney pasture, one-half mile east of the KSL towers. Their present fun meet will start at 4:00 p.m. and close when dark. . .then the weenie roast! They have the right idea; concentrate on fun!

PHOTOS, PHOTOS, PHOTOS

Everyone wants to get his picture in the paper and this writer does the best he can to accommodate all.

As a follow-on to the SAM 49 Annual report, Photo No. 7 is submitted of former SAM 49 President Ed Houston's son, Ted, with a Lanzo Record Breaker. Ed won the



14. A nice building job on this R/C Scientific Flagship by SAM 53's Mark Glammier. Mark says the ship Dutch-rolls like crazy. Does anyone know of a SAM legal cure for this? Mark would sure like to hear from you!

Pure Antique event with this model using an ignition Hornet for power and registered a perfect score of 30:00. Beat Don Bekins by two seconds!

On thing for sure at O.T. R/C contests, Lanzo designs dominate the field in winning. Bob Grice's RC-1 is shown in Photo No. 8, powered by a four-stroke Saito 65. This pic was taken at the 1988 SAM 26 Pond Commemorative at Taft.

About time we got around to acknowledging one of the big winners of the R/C portion of the Old Timer Championships at Lawrenceville, Illinois. Seen in Photo No. 9 is Joe Percy, one of the very active members of SAM 29, the "Planesmen" out of Fort Worth, Texas. Joe is seen holding his successful Class B Kerswap. Joe has always placed with this hot model.

HERB'S MODEL MOTORS

In response to my request, Herb Wahl of Herb's Model Motors has written me a four-page letter describing what engines are available, time interval on delivery, production figures, etc. Needless to say, Herb is busier than a one-legged man in a rump kicking contest! His letter has been edited and here is what Herb has to say:

"Just got through working on the lathe at 1:30 a.m.; have been at it since 9:00 a.m. Just another typical day! With the loss of two men (one died and the other retired), this really puts the onus on me.

"Sometimes I wonder if I will ever get caught up as no one can realize the amount of time I spend on not only new engines, but a terrific backlog of Browns and others to be repaired and overhauled. Enough of this, let's get to the engine status.

"Bunch engines: I am about halfway through the order list, with 170 engines shipped. I don't dare run any advertisements on these engines as most fellows are not aware of my system. Takes time (like a year or two) until I get really rolling.

"My progress with the Bunch engines has been good but slow. The Bunch engine was a much more difficult engine to make than I anticipated. As an example, I was able to ship 30 to 40 Ohlsson engines per month but am only producing 16 Bunch engines per month. Matter of fact, some months only show 10 shipped. The good news is that this engine is great, runs very well and smooth. I consider it a pleasure to provide these engines to those who have been so patient.

"Right now, Bunch engines can be ordered but will receive a number which puts the buyer on a 'wait' status. Sooner or later, they all get their engine.

"Brown Jr: I am still providing the Brown, but only the Custom or Special models. I keep a small order list for them at all times. I work, time permitting, on the parts needed to finish a group of 40. I will probably fit these between the Bunch engines and possibly have some ready in the next three months. As it stands, there are only 20 engines on order, so for a change, I will actually have a small stock on hand.

"My new Brown engines have a different

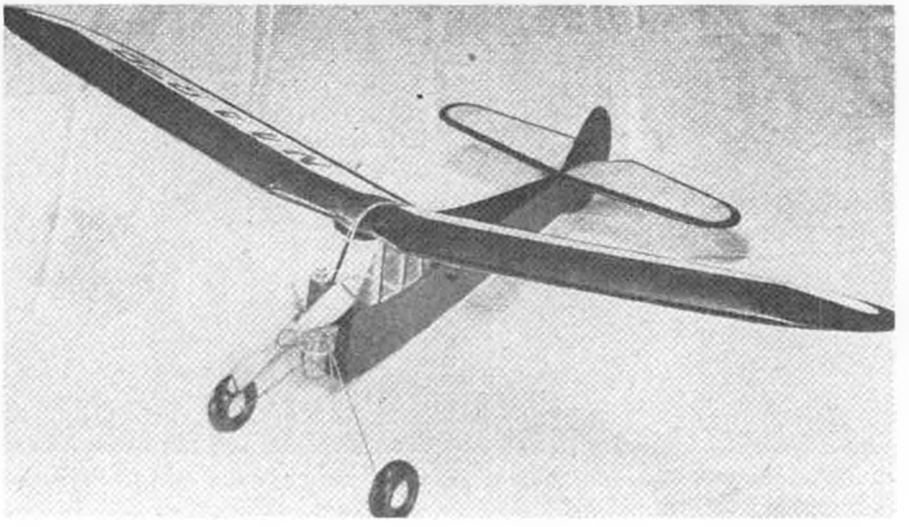
Continued on page 88

G.E. "CABINETTE"

Designed by Frank Ehling

Plans drawn by Al Novotnik

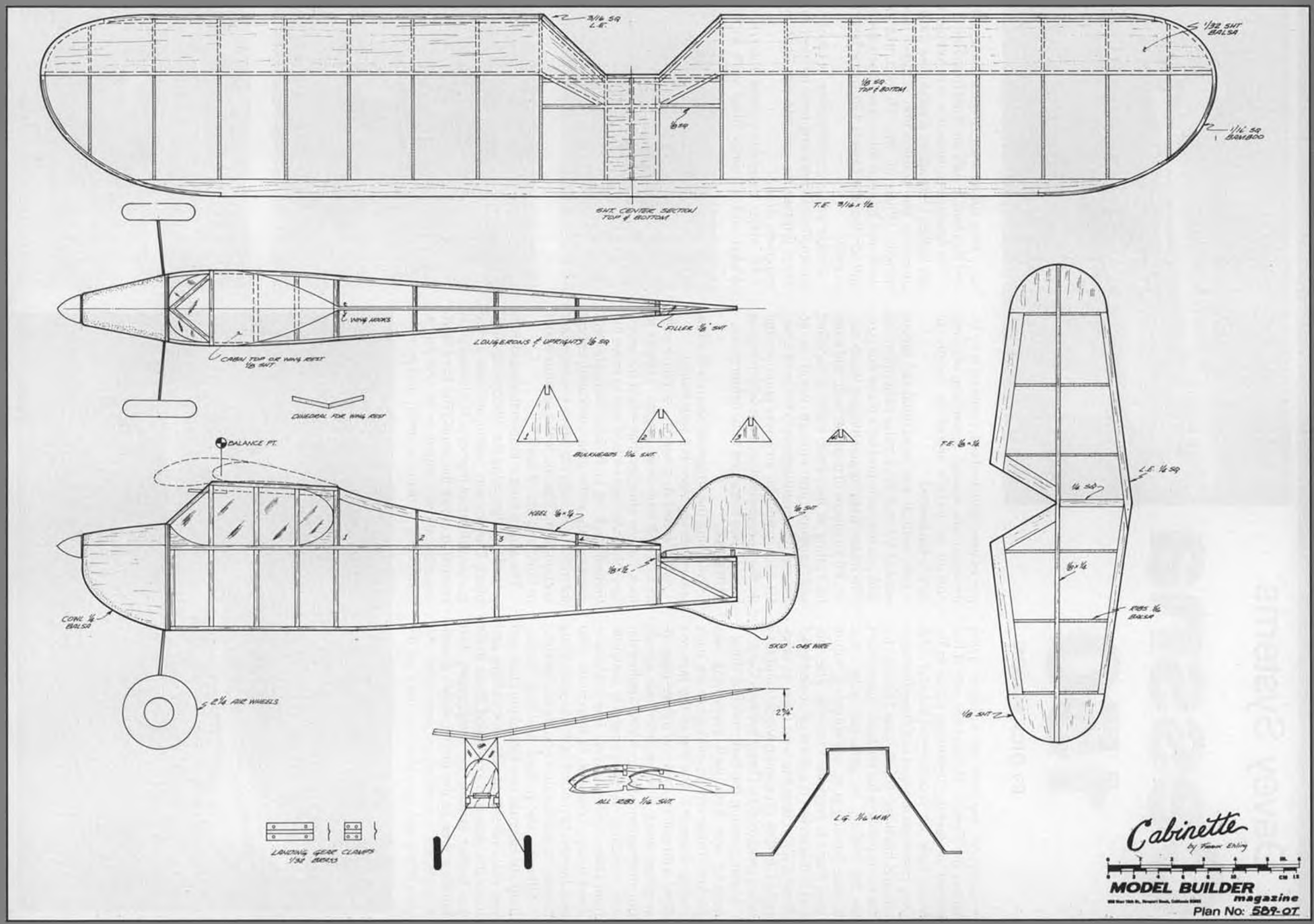
Wingspan	36-1/2 in.
Planform Wing Area	192 sq. in.
Overall Length	23 in.



• It's unfortunate, in a way, that SAM Old Timer competition is 100% duration oriented, because it means that scores of interesting, eligible models are dismissed as being "uncompetitive" and never get built. One such example is the model we're featuring this month, Frank Ehling's G.E. "Cabinette," from the June 1942 issue of *Model Airplane News*. This is a classic little three-foot cabin ship with a distinctive razorback fuselage, oversize wheels and a cut-in leading edge at the wing center section, the latter being done to effectively shorten the nose moment for better pitch stability. Original power was an Atom .09.

No one would build the Cabinette for serious O.T. F/F competition today, but as a small-field 1/2A F/F sport flier it would be hard to beat. It might have some potential as an R/C 1/2A Texaco model—a 20% enlargement would put it right in the ballpark—and with the already V'd stabilizer and full-depth fin, the addition of control surfaces would be a cinch.

The cowl that draftsman Al Novotnik has shown is the sexier of the two different ones included on the original plan. The original photos show the engine completely uncowled, which looks OK because the unusually tall Atom dominates the whole firewall. With a smaller 1/2A engine you might want to add *something* in the way of a cowl, if for no other reason than to avoid a "sawed off" appearance. •


3/16 SQ L.E.
1/32 SHT BALSA
1/8 SQ TOP & BOTTOM
1/8 SQ
1/16 SQ BAMBOO
SHT. CENTER SECTION TOP & BOTTOM
T.E. 3/16 x 1/2
WING MOUNTS
FILLER 1/8" SHT
LONGERONS & UPRIGHTS 1/8 SQ
CABIN TOP OR WING REST 1/8 SHT
DIHEDRAL FOR WING REST
BULKHEADS 1/16 SHT
BALANCE PT.
KEEL 1/8 x 1/4
1/8 SHT
1/8 x 1/2
CONE 1/8 BALSA
SKID .045 WIRE
2 1/4 AIR WHEELS
T.E. 1/16 x 1/2
L.E. 1/8 SQ
1/16 SQ
1/16 x 1/2
RIBS 1/16 BALSA
1/8 SHT
2 3/4"
ALL RIBS 1/16 SHT
L.G. 1/16 M.W.
LANDING GEAR CLAMPS 1/32 BRASS
Cabinette
by Team Ehling
MODEL BUILDER magazine
Plan No: 589-OT

Davey Systems' Cessna 150

By DICK MASON

PHOTOS: SKIP RUFF & ALAN DAVIS

• Everyone involved in full-size flying knows the Cessna 150 and the role it has played in teaching beginning pilots to fly. Many have sat shoulder-to-shoulder with their instructor to sweat out those first take-offs and landings. The Cessna 150 does for the flying public what the basic trainer does for the military. Its generous wing area, tricycle landing gear, and forgiving nature have made it everyone's favorite. The subject of this review is a stand-off scale model of the C-150, complete with flaps, as originally kitted by Champion Models and now being produced by Davey Systems Corp.

Upon opening the box, the first thing I noticed was how well everything was packed. There was no damage to any parts during shipment. The top of the box was filled with rolled plans and a three-page instruction sheet. Also included was a scale documentation sheet, AMA application and a catalog of other products available from Davey Systems Corp. The instruction sheet is very complete to help those who may be new to modeling. It lists everything needed to build, finish and fly the model.

Although the printed building instructions are minimal, one look at the plans and you will understand. The instructions and isometric drawings contained there make any further explanation unnecessary. Fast building time of the model shows a well-thought-out construction procedure. All die-cutting was excellent and once all the pieces were punched out, I noticed very little wood was wasted, something very important in today's shrinking supply of choice balsawood.

Both vertical and horizontal tail pieces were of 1/4-inch thick balsa rather than the 3/16 you normally find on a plane this size. This makes shaping and hinging much easier. All kit pieces fit together well, and careful cutting of the sheet material supplied will produce just enough wood to go around. The manufacturer's choice of wood for each particular area was good, except for the fuselage bottom sheet which was so heavy it was discarded for a lighter piece.

BUILDING

Following the suggested steps will allow you to quickly assemble your model.

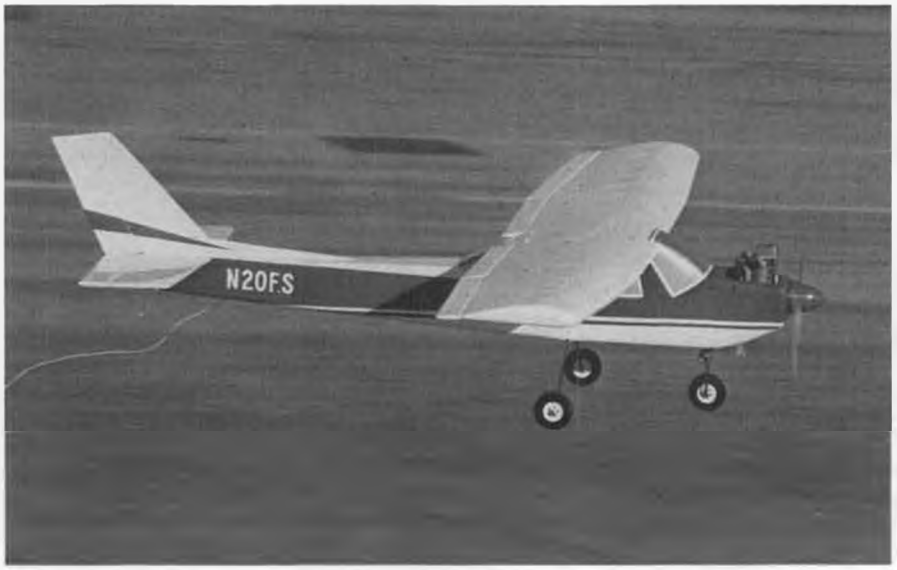
As I planned to power my airplane with an O.S. .20 four-stroke engine, I began to look for any changes that might be necessary. The only one I found was to move the firewall back 1/4 inch. Everything else was done exactly as the plans indicated, except for making an extra rib where the two outer sections join. This made the sections easier to build and attach later.

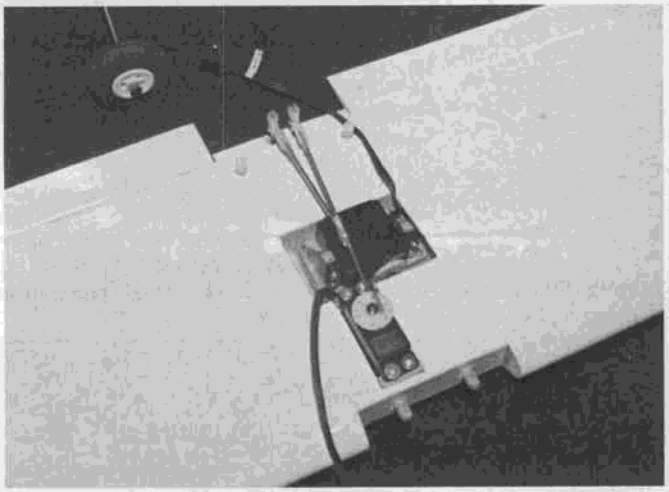
The wing is built in four sections and then joined together using the dihedral jigs supplied. They are very helpful and take all the guesswork out of that step. No fiberglass is needed at any of the joints. The front leading edge sheet is glued on in one piece, connecting all of the assembly and producing a very strong wing. Aileron bellcranks and flap torque rods are then installed.

The fuselage construction is as simple as any trainer. Here again, if you follow the instructions the construction is quick and straight. When all the 3/8-inch triangle stock and 1/4-inch fillers have been added and sanded, the Cessna 150 shape begins to show.

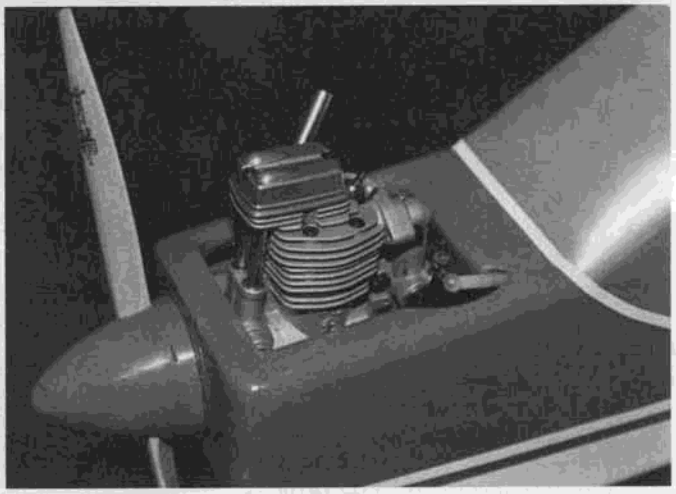
Weight was a consideration because of the small four-stroke engine to be used, but when finished the airframe was light and extremely strong.

All major assemblies were then final sanded and all dings filled with Model

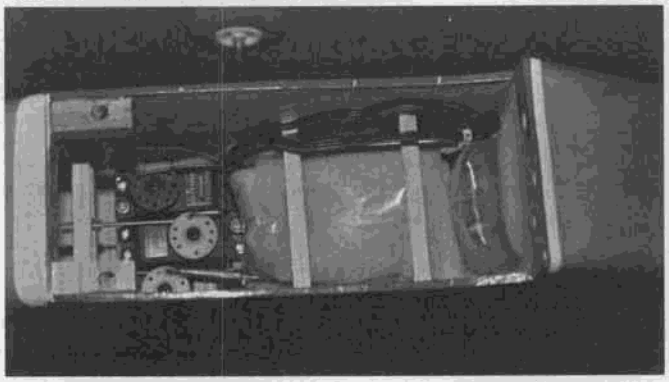




Bottom view of the finished wing shows the aileron and flap servos installed. Flaps are optional but worth the extra effort.



Author used an O.S. 20 four-stroke but admits the model could use more power. O.S. 26 Surpass would be a good choice.



Airtronics radio installation in the Cessna. Lots of room for any of today's modern radios.

AHA! It turns out our author had some help building the Cessna after all!

Magic Filler. The airframe was covered with red and white MonoKote. The windows were done with silver MonoKote.

The radio installed was an Airtronics 7SP Module using five servos. All hinging was done with a new Sig product called Easy Hinges. This has to be one of the greatest time savers in the hobby today. You slit your covered surfaces with a #11 blade, install all your hinges, flex the joint the amount of deflection needed, apply two or three drops of your favorite thin cyanoacrylate adhesive, and it's done.

Last but not least, Aristo Craft sponge wheels were used to help lighten the load. Wheel pants are included with the kit but I chose not to use them because of the added weight. If a larger engine is used later, the wheel pants will be added.

FLYING

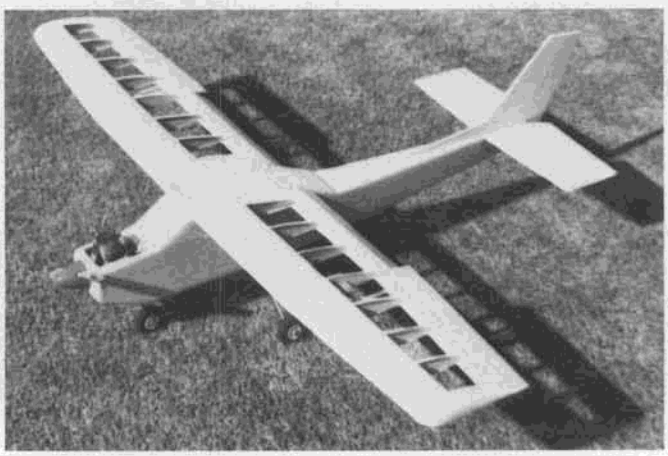
The O.S. .20 four-stroke engine was the smallest recommended for this kit and I will admit I was unsure of how well it would fly the Cessna. With 410 square inches of wing and a flying weight of 3-1/4 pounds, the wing loading figured out to about 21 ounces per square foot. Not too bad! So off to the flying field we go.

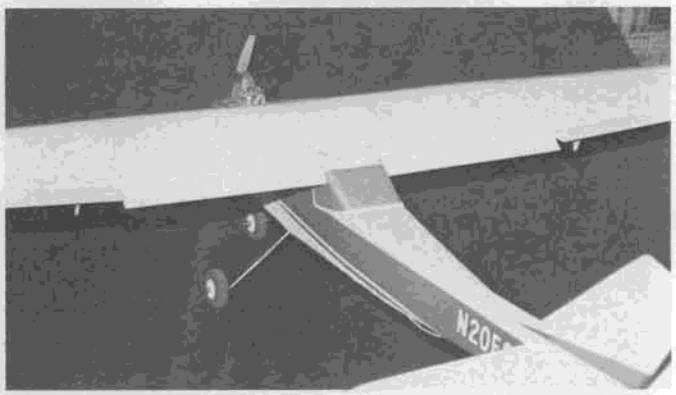
The plane was fueled using a home brew of 10% nitro, 10% oil and the remainder methanol.

The little four-stroke came to life and the plane was taxied out to the runway. I gave it full throttle and in about one hundred feet she was airborne. Everything trimmed out perfect. The 150 is no screaming banshee but we estimated an airspeed of about 65 miles per hour. The little Cessna really flies well. It grooves through the sky with the only shortcoming being a lack of horsepower on vertical maneuvers. With a .30 two-cycle engine she would be a powerhouse. The flaps are very effective and make the model float like a feather.

SUMMARY

Although the kit box says the airplane can be built in a few hours, it still takes a lot longer to construct than advertised—mainly because you are dealing with a stand-off scale model and not just another .20 sized trainer. The construction is well engineered and assembly time is cut considerably. It is an enjoyable plane to build and fly and I would highly recommend it.•





Before and after covering. Even with the squared-off corners, the C-150 shape is apparent. Good looking model.

ALL ABOUT ARFS

By ART STEINBERG

• To me, an ARF is a model airplane which requires little or no building to get it into the air. I think most of us will more or less agree with this definition. However, we tend to think of ARFs as coming from large factories, done up in all kinds of fancy boxes with handsome multi-colored pictures pasted all over the top and sides. This used to be essentially my idea of an ARF, until one day on an overseas trip I arrived at a rude awakening.

My wife and I were spending a month motoring around England in a rented Rover, and whenever we came to a model shop, I made a point of stopping and having a chat with the owner. We were very cordially received, especially as I had wisely decided to carry with me a number of American model magazines to distribute to my new-found friends (in exchange for which I was usually given some current British and other European model magazines). After visiting a number of shops, I noticed that many of them were displaying the identical ARF hanging from the ceiling, a really attractive cross between a large trainer and an old timer. The model was beautifully made, with a wingspan of close to seventy inches. The covering material appeared to be one of the new types of heat-shrinkable fabrics, and it was expertly applied. A conventional tricycle gear was mounted, and all that was necessary was the installation of an engine and radio. I was highly impressed by the immaculate workmanship, and the price was extremely reasonable, especially when the dealer offered to knock off the fifteen percent tax for an overseas customer. After making my decision to purchase the model and arriving at an agreement on the price, the dealer brought out a stepstool and proceeded to remove the model from the ceiling, at which point I said I would prefer him to trot out one packed in the box for me. He gave me a peculiar look and said, "Sorry guv, they don't come boxed. The gent what builds them delivers them ready to fly just like you see it." He went on to explain that this ARF was built by a one-man operation, and was supplied completely assembled. Even the wing was in one piece, so that pretty well precluded any ideas I has of bringing one back to the States on an airliner with me.

"Just because it doesn't come in a factory carton is no reason to think an airplane does not qualify as an ARF. Throughout this country there are scores of accomplished builders who provide R/C airplanes for other fliers."

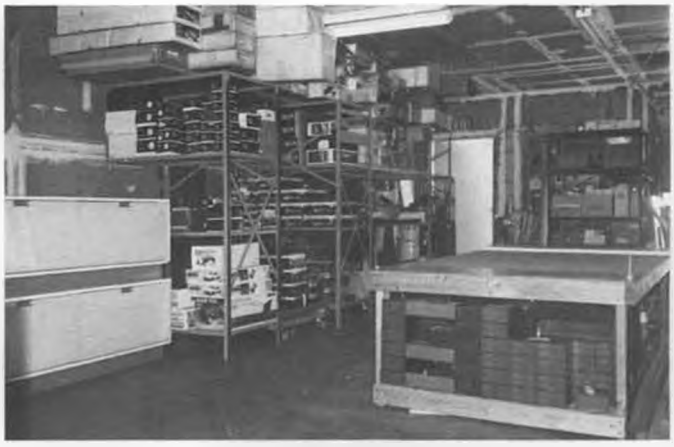
Kind of cluttered at the moment, but this is where custom builder Charlie Strange turns out his masterpieces. Models in this photo range from old timers to ducted fans.

But all this brought me to the conclusion that just because it doesn't come in a factory carton is no reason to think an airplane does not qualify as an ARF, and that is the point of this narrative. Whether it comes from a high-volume production line or is laboriously hand-built one at a time, an ARF is still an ARF.

And that leads us to the topic of this month's column, the "custom built" ARF. Throughout this country there are scores of accomplished model builders who provide R/C airplanes for other fliers. After all, whether a friend or a stranger or a large corporation builds a model for you, you have acquired an ARF, an almost-ready-to-fly, or a completely ready-to-fly model. How much you pay for it or where you get it makes no difference. The work is done for you and you end up with a finished product. Accordingly, let us take a closer look at a few of the custom ARF builders around

Charlie with Webra .90 powered Martin Baker MB-5. Model was given the usual single test flight and put up for sale.

Miss Arpiem old timer shows that Charlie is a versatile builder. Model flew very well and quickly found a ready buyer.



Two photos showing part of the production and storage facilities of Models in Motion, based in Tampa, Florida, and run by Walt Popaden Jr. Models in Motion turns out a number of excellent performing ready-to-fly airplanes, both gas and electric pwered.

and investigate what they have to offer.

Beginning on the west coast, in Southern California, where flying is a year 'round activity and the R/C sport requires an unending supply of models, we have a builder by the name of Charlie Strange, Captain, Dental Corps, USN (Retired). A very prolific builder, Charlie averaged about one plane per week until his recent retirement from the service. With additional time on his hands, there is no telling how much he will be able to increase his production. Not only is he a fast builder, he is quite gifted in his ability to turn out jewels of model construction. He doesn't advertise, but his output is almost completely consumed by friends and those who happen to hear about him. Some of his models are also sold in local hobby shops, and his prices are well within reason. Charlie builds models for the love of the hobby, and he seeks only enough remuneration to reimburse his costs and help out with his modeling expenses. While he does fly his own personal airplanes now and then, his real interest is in building, and he is happiest when toiling at his workbench.

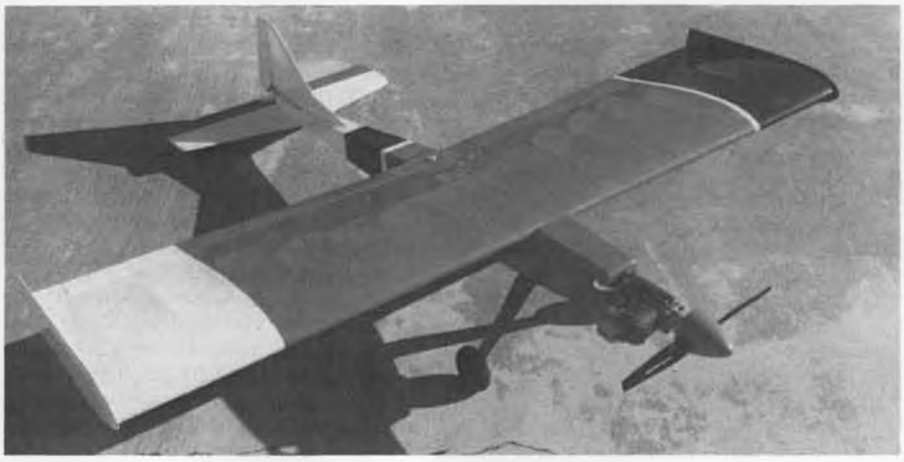
The manner in which Charlie builds models is more of an art form than a craft or a hobby, and this approach manifests itself in the fact that he virtually never builds the same airplane twice. Also his artistic leanings do not permit him to build to someone else's desires. He will rarely accept an order for a specific model, and if you wish to purchase one of his creations, you just have to ask him what he has in stock at the moment. In a manner similar to buying wholesale diamonds from DeBeers, you have to take what he has or forget it. He does seem to lean toward old timers, but he also turns out a great number of scale models, varying from quarter-scale giants to full-bore ducted fan military jets. Some models are painted, some are doped. He uses every brand of plastic heat shrink film, plus silk, dacron, or a combination of any of the foregoing. He sometimes sells a model complete with engine and radio, sometimes with engine only, sometimes without engine or radio. As when dealing with a well-known artist, you buy what he has to offer. I have purchased a number of Charlie's models and some of them are so beautiful they kind of bring tears to my eyes. They repose in a place of honor in my home as befits fine works of art, and while I know they are splendid flying machines, I derive all the pleasure I need just from looking at them. For those connoisseurs who want only the very best and are not seeking to purchase a particular model, Charlie Strange can be contacted at 3215 Donna Drive, Carlsbad, California 92008, telephone (619)729-1823.

Conducting his custom ARF operation in an entirely different manner is Gary Walker, of Cocoa, Florida. To quote Gary:

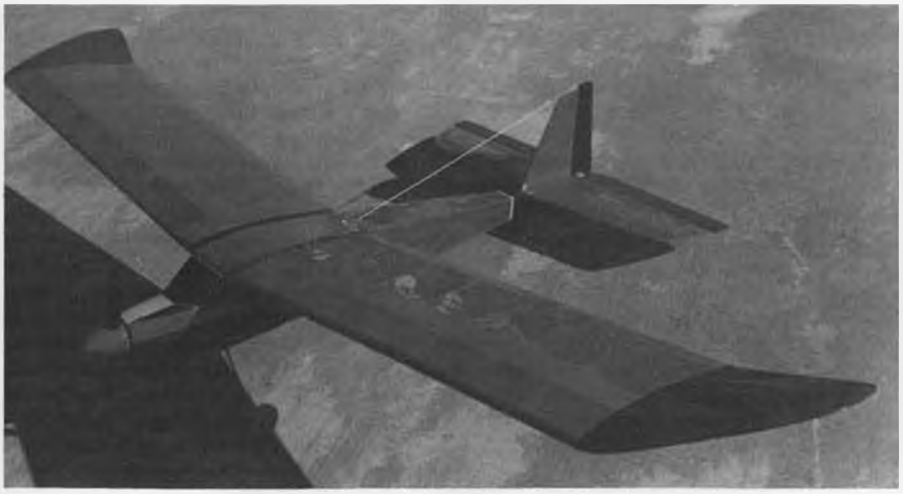
"I enjoy reading your column. ARFs and custom built-to-order models have a place in our hobby. Some guys can't build or just like to fly. I see no reason for anyone not being able to enjoy any aspect of the hobby. I've assembled some commercial ARFs myself and I like the EZ line.

"You mentioned in your column that a pre-fab ducted fan would be of interest. I supply Violett Vipers in various stages, from a pre-fab kit to a completely finished and painted model, ready to install radio. I think we will see a surge of interest in ducted fan models.

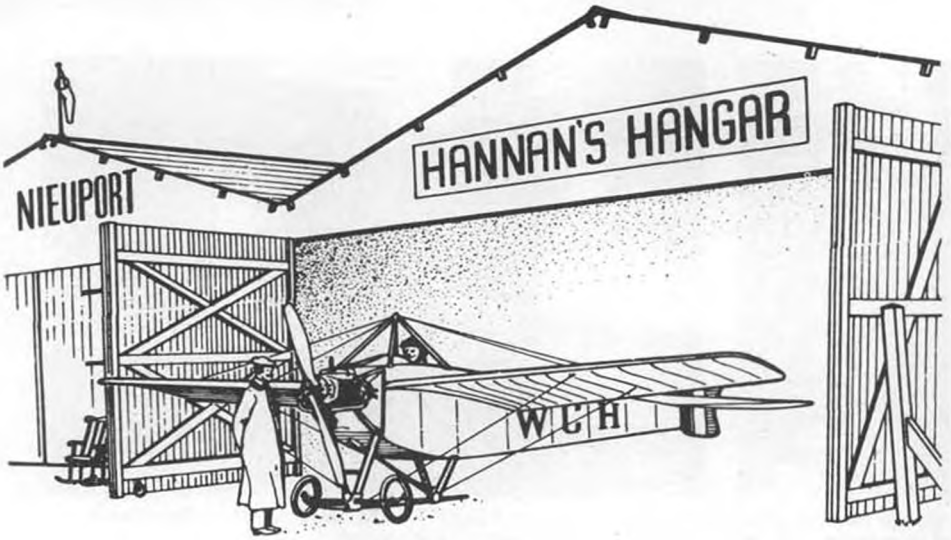
Continued on page 65



Clean and trim, this taildragger looks like a real snappy performer. It's just one of several high-performance RTF ships available from Models in Motion.



One of the RTF electrics from Models in Motion is the "Ohm-Bre," designed by Ernie King. Workmanship looks to be first-rate. Plans are also available; see text for info.



"There's only one way to do it right, but an infinite number of ways to do it wrong!" — Walt Mooney

REFLECTION TIME

• These ramblings are being composed in late 1988, even though you will be reading them during early 1989. Certainly '88 passed rapidly here at the Hangar. . .our personal model production was down, however our mail correspondence was up, *way up*, confirming that our audience had an exceptional year of model building. We thank all of you for your continuing support, encouraging words, holiday greeting cards and marvelous photographs.

Our gratitude is also extended to Editor/Publisher Bill Northrop and the entire crew of *Model Builder*, for renewing our Hangar lease for another year!

A YEAR IN REVIEW

Stuart Van Dorn, of Buffalo Grove, Illinois, winds up 1988 by sharing his thoughts with us:

"After a year of flying rubber scale, etc. (I've) seen some interesting sights, learned some interesting things and wondered out loud if maybe, just maybe, modeling isn't sometimes the sport of the seriously demented.

"But that's just based on observation and action. I guess I was an active builder this year: sixteen No-Cals, twelve Peanuts, four two-footers, one Jumbo, two Embryos, one P-30, one CO_2, bunches of Phantom Flashes and others. . .

"Observations: Favorite designer, A.A. Lidberg and his profile scale models. For a beginner these are the best planes to build, fly and learn from. My favorite was the Beechcraft Staggerwing, which I eventually gave away to someone who wanted it more than I did.

"Best Peanut ship: Hah! Until you learn to build light, I'd suggest bigger planes and profiles. . .it wasn't until about my tenth Peanut that I actually got one to fly farther than the ground. Peck-Polymers has the best kits, but my best outdoor flyer is from Gene Dubois, whose 'Big X' has averaged over a minute every time I let her go.

"Best plane over 24 inches is from Golden Age, a Rearwin Speedster with which I actually won two Flying Aces Club mass launches.

"Best buys: A Wilder winder. . .and a rubber stripper by Oppegard. These are very much worth the price and I suggest every beginner buy one now!

"Best clubs: The Calumet Aeromodelers, IMAC and of course, the Chicago Aeronauts. The combined brain trust of these three is enough to scare any beginner. Not to mention the teasing you get when one of your roughly-trimmed planes flies like a drunken bumblebee.

"But hey! This is a big thanks for all the help. A thanks to all the modelers I talked with, all the suppliers I bought from. . . And you know what? Those who believe Free Flight is dying are not aware of what's going on out there.

Charming Leina Osada of Japan upstages the Brown Jr. CO_2 powered Howard DGA-9 built by Ian McQueen.

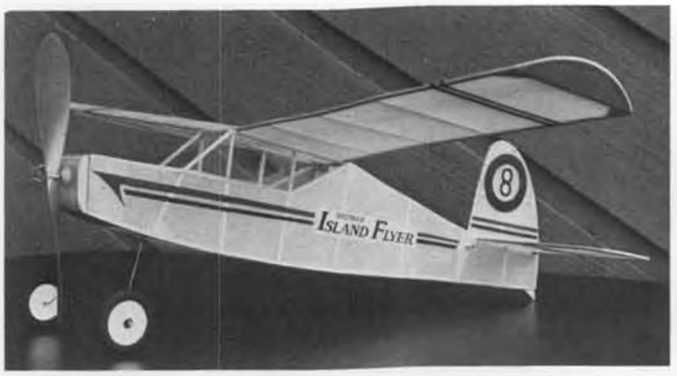
"Matter of factly, I think Free Flight will grow. Consider the facts: the Flying Aces clubs are growing and they have made flying scale models fun; there is a trend in society to return to traditional values, there is a recurring fascination with the airplane; the antique airplane. After all, people flock to the EAA, they fill the parking lots at airshows; our love affair with the airplane is far from over. It is, in fact, just beginning.

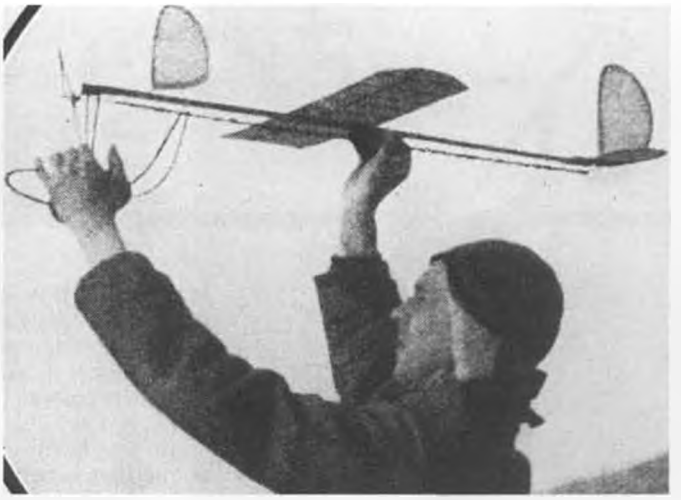
"What is needed is for all of us to realize that we are diplomats. To see that each of us has the job of representing what is best in our segment of the hobby. To tell others and show others how to build, fly, and most of all, enjoy watching something we've created fly.

"We all build models for different reasons, but the Free Flighter builds with two goals in mind: aesthetics and performance. My goal is to learn to build models that perform as well as they look. After a year I have learned that I am on the right road with the right friends. This has been the best part for

Peter Koutney holds as Ivan Simolik winds his fine-flying Zlin 2-50M during Czechoslovakian contest. Photo by Tonda Alfery.

Oklahoma's Stan Denton built this Pistachio-scale "Found" from shrunken Walt Mooney Peanut plans. Photo by Larry Kruse.





Above: One of nine (!) "Island Flyers" built by Clive Wienker, of Friday Harbor, Washington. Three of them have gone OOS. Right: Karlo Eisele of Germany unearthed this historic photo of famed aircraft designer Alexander Lippisch flying a rubber-powered stick model circa the 1930s. Note the forward fin and the wire "hoop" to protect the prop.

Fine action shot by Bob Jones shows Lindsey Smith launching his Peanut Martin SC-1 float-plane in the hangar at RAF Upavon, England.

me."

FLYPAPER

Wink Peck's *Journal of Folded Paper Flight* newsletter, Volume I Number 4, arrived recently, and features, among other tidbits, a dual-rotor paper autogyro. Model autogyros are seldom seen, even in powered form, but this one is even more remarkable since it is a hand-launched glider! Designed by James Zongker, the model is claimed capable of flying up to 35 feet, and is constructed entirely of paper, even the rotor axles.

Flypaper also offers reviews of publications devoted to the art of paper airplanes, as well as miscellaneous commentary (even some mentions about *Model Builder* magazine). A 4-issue subscription is available for $10 ($12 foreign) from: FLYPAPER, Box 47186, Wichita, Kansas 67201.

STICK AND TISSUE COMICS?

Model builders have always been an imaginative group, and Jim Longstreth, of Portland, Oregon is proving that tradition in a big way! Issue Number 45 of *AIRBOY*, published by Eclipse Comics, incorporates three of Jim's stick-and-tissue flying models into an adventure story. One of them, a Bostonian, appears on the comic book's front cover, piloted by the hero of the story. Also featured in the bizarre adventure are Dr. Kate Mulligan and her alter ego, who is to ornithopters what mermaids are to fish. If you are "into" model metaphysics, pick up a copy of this comic book at your local dealer.

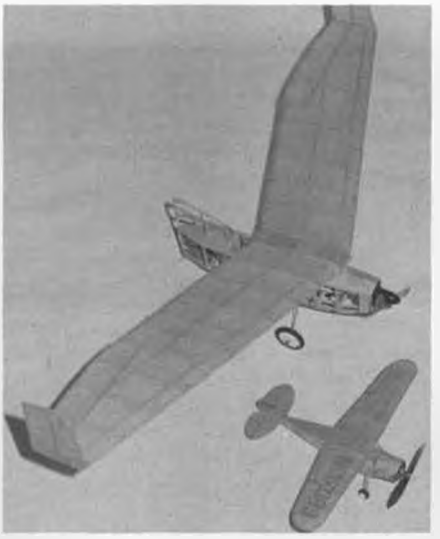
WHAT'S IN A NAME?

Gerald Martin, of Hereford, Texas, said our mention of Henry Farman having coined the term "aileron" reminded him that the late great Art Scholl used to carry a little dog with him in his aerobatic Super Chipmunk. The dog's name was "Aileron", and upon Art's command, he would promptly perform an aileron-roll.

As an aside, Gerald says that his own pet is named BoBo, and that he will occasionally BooBoo. . .

THE VALUE OF HISTORY:

According to George Townson, of Willingboro, New Jersey, "You have to know what failed before so you won't do it again!"



Electric powered 1933 Lippisch "Storch" IXb tailless, by Dan Walton, contrasts with his Peanut Cessna Airmaster. The full-size Storch was a successful machine, but Dan says his is quite a way from being fully flight trimmed.

AND SPEAKING OF HISTORY

Ed Whitten favored us with an article about famed industrial designer Raymond Loewy. From it we learned that Loewy had designed a rubber-powered model airplane during 1908, patented it, and registered its trademark "Ayrel". Further, it was a huge sales success, firmly establishing Loewy in the design and manufacturing business. And, oh yes, he was only fifteen years old at the time. . .

SOUTH AMERICAN SAFARI

Roald Tweet, of Rock Island, Illinois, recently toured Brazil, Ecuador, Peru, Bolivia, Paraguay and Argentina, with a group of students:

"Among other things, I spent my spare time looking for evidences of modeling in those countries. Until Argentina, I found almost none: no hobby stores, few kits in any stores aside from American and Japanese plastic kits, and not many of those. Certainly no indigenous model industry.

"Then we visited Buenos Aires, where modeling is alive and well: many hobby stores with the latest R/C equipment, notices of contests, school programs for model building, etc. I even found *Model Builder* for sale at many kiosks or street newsstands all over town. It cost 89 Australes there—the equivalent of about $5.50 U.S. dollars.

"Argentina, too, was the only place I found native model kits produced. What is interesting is that the designs ought to be very familiar to readers of *Model Builder*—they are cousins if not twins of our models. (At least one was an exact copy. . .w.c.h.) You might call them the 'Pecks of the pampas'.

"A small shop in Ecuador was run by an old man who made kits and toys. One of the things he did was to take cheap plastic toy planes (imported) and cover them with copper. I've never seen anything quite like it.

"Our group visited a number of small Indian villages in Peru and Ecuador, in several of which I had native children flying paper models. The children became amazingly good at it, given that they had never seen a paper plane before."

Continued on page 63

Free Flight

By BOB STALICK

• No more soapboxes about the weird rule change proposals! No long tirades about the Nats Indoor site! No political speeches about this and that! I promise that this issue of *Model Builder* Free Flight will feature only useful items so you can concentrate on enjoying the hobby of your choice. So, let's get on with it.

APRIL MYSTERY MODEL

O.K., Bill Darkow. You keep telling me to present a Mystery Model that you don't know. Get something hard to identify, you say. Here it is! If you get this one, then I've failed again. I can't let it go at that, though. Here are a few hints. This model was designed by a free flighter who was well known, and is still well known, for his rubber powered ships. As you can see, this Myster Model is an ornithopter, and it was featured in a national publication in 1947. Like many ornithopter designs of the period, it looks like all of the others. The trick here is to come up with the exact name of this design. If you can do it, then fire your entry off to Bill Northrop at *Model Builder*. As usual, the first correct answer wins a free one-year subscription.

MAY THREE-VIEW—CROWN AGENT COUPE, By Peter Carter

This is a rubber model that looks like a rubber model should look—it has a built-up, tissue-covered fuselage, wing, and stabilizer, just as we should expect from a British free flighter. This design has been featured in a couple of newsletters recently but in an odd scale. This version is presented in 1:5 scale for ease of enlargement. The rib patterns and the propeller pattern are presented full size for the same reason.

Although the plans don't indicate flight directions, a studied look at them shows that the fin is airfoiled so that a right turn is built in. The 3 degrees of right thrust also indicates climb direction. Build both of these features into your model and plan to have it fly right power and right glide.

To me this looks like an easily built model that should fly right off the board. If you are thinking about a Coupe that would be a starter model for you, this might be it.

MAY DARNED GOOD AIRFOIL—GARD 7%

John Gard has been a serious rubber-powered model flier for many years, but in addition, he has conducted many experiments with these designs and published his results widely in the free flight press. This example of a Gard airfoil is intended for use on a Wakefield model or other rubber-powered model of similar size and characteristics. It should be useful on smaller Coupe designs and on any of the smaller unlimited rubber models. Typically, Gard's airfoils use a turbulator or two on the front upper surface. If this section piques your curiosity, then I would suggest that you experiment as well with turbulators. The turbulators are made from monofilament or dacron fishing line about 1/64 inch in diameter. They are glued to the wing surface after covering and doping. Placement of the fore and aft turbulators should be at approximately 5 to 7% and 14 to 15% behind the leading edge respectively.

John Gard's airfoils have been successfully used by many competition Wakefield fliers and should be considered strongly for such use.

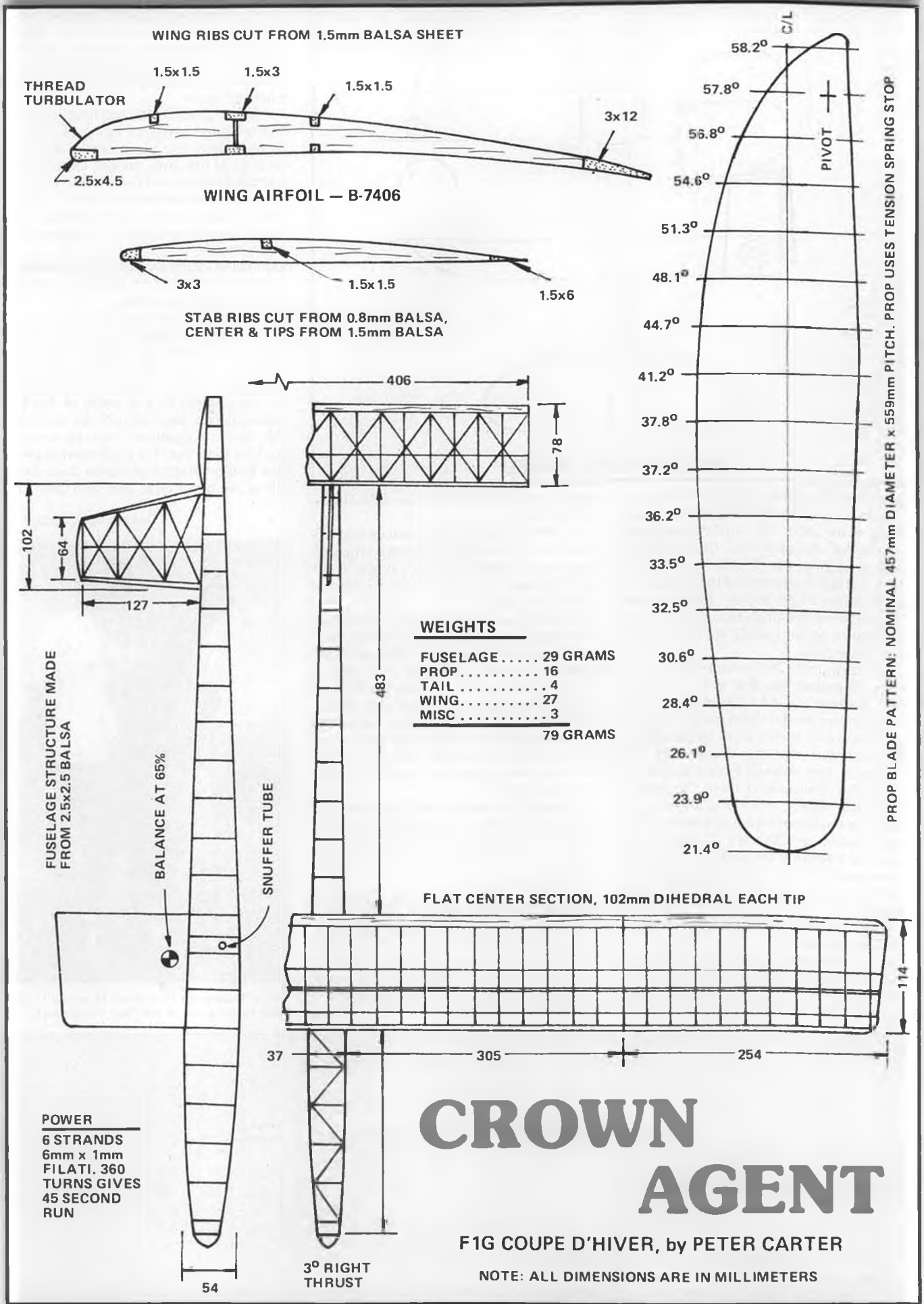
World-class F1A flier Lee Hines with the ship he flew at the Sierra Cup meet, Taft, CA.

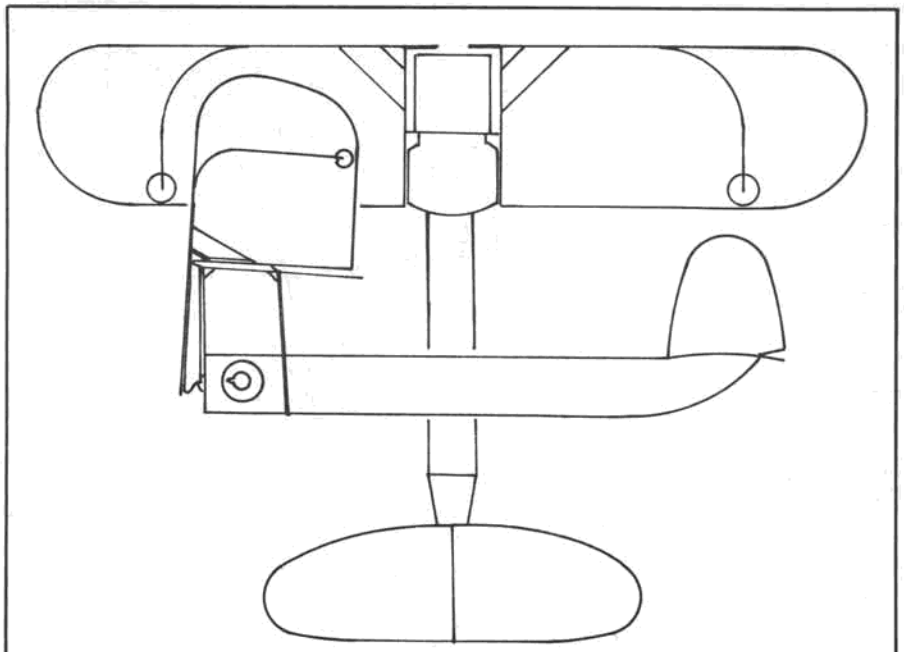
WALLY SIMMERS ON THE GOLLYWOCK AND PETE SOTICH RESURFACES

The January issue of *Model Builder* featured the real Gollywock design by Wally Simmers. After it was published, an old friend, Charlie Sotich, sent a copy of the

Randy Archer gives his F1C model a mighty heave in flyoff for 2nd place at the Sierra Cup. Flyoff action ended with Roger Simpson (in background, holding model) winning 2nd, putting Randy 3rd.

First place winner in F1C was Doug Galbreath, seen here at the moment of launch. Randy Archer (right) gets ready for another flight. All Sierra Cup photos this month were taken by Bruce Augustus.


WING RIBS CUT FROM 1.5mm BALSA SHEET
THREAD TURBULATOR
1.5x1.5
1.5x3
1.5x1.5
3x12
2.5x4.5
WING AIRFOIL — B-7406
3x3
1.5x1.5
1.5x6
STAB RIBS CUT FROM 0.8mm BALSA, CENTER & TIPS FROM 1.5mm BALSA
406
78
102
64
127
483
FUSELAGE STRUCTURE MADE FROM 2.5x2.5 BALSA
BALANCE AT 65%
SNUFFER TUBE
WEIGHTS
FUSELAGE ..... 29 GRAMS
PROP 16
TAIL 4
WING 27
MISC 3
79 GRAMS
C/L
PIVOT
58.2°
57.8°
56.8°
54.6°
51.3°
48.1°
44.7°
41.2°
37.8°
37.2°
36.2°
33.5°
32.5°
30.6°
28.4°
26.1°
23.9°
21.4°
PROP BLADE PATTERN: NOMINAL 457mm DIAMETER x 559mm PITCH. PROP USES TENSION SPRING STOP
FLAT CENTER SECTION, 102mm DIHEDRAL EACH TIP
114
37
305
254
POWER
6 STRANDS 6mm x 1mm FILATI. 360 TURNS GIVES 45 SECOND RUN
54
3° RIGHT THRUST
CROWN AGENT
F1G COUPE D'HIVER, by PETER CARTER
NOTE: ALL DIMENSIONS ARE IN MILLIMETERS



MAY MYSTERY MODEL

three-view to his brother, Pete. For the newcomers to this hobby, Pete Sotich was, among many other accomplishments, the mainstay of midwest free flight contest directors during the 1950's through the 1970's and was instrumental in forming the National Free Flight Society. Pete decided to "retire" from free flight activity about ten years ago or so, and rarely appears on the scene these days.

The reason that Charlie sent Pete a copy of the three-view was that Pete works for Wally Simmers, at K&S Engineering (the folks who provide the sheet metal and tubing that you buy at your local hobby shop). Wally Simmers was the designer of the Gollywock. Pete showed the three-view to Wally, who pronounced them "accurate." Additionally, Wally sent along a few comments that might be helpful to anyone planning to build and fly one of these little gems. The following are quotes from Wally Simmers as relayed to me in Pete's letter:

"1. The model as presented in the plans is authentic.

"2. The bamboo tips on both the wing and stab are correct.

"3. A rudder made from 3/32-inch thick balsa was not too feasible back in 1942. There were not as many grades of sheet balsa available in those days. Too much weight in the tail would not be advisable—too tail heavy.

"4. The best overall performance was obtained with a 13-1/2 inch diameter prop (the three-view showed a 12-inch prop). A 14-inch diameter prop was tried but with not as good results.

"5. Wally used 1/8-inch wide T-56 brown rubber to power the model. If by chance a strand broke while winding, the load on the remaining strands would not be as great.

"6. The fuselage was covered with bamboo paper and was doped on both the inside and the outside. The reason for doping on the inside was to minimize damage to the fuselage construction because of the splashing rubber lubricant while the motor was unwinding.

"7. When the model was launched, the model was to be banked slightly away from the turn so as to give the desired vertical climb. The wing could be skewed to give this effect.

"The Gollywock is a very good model—easy to build and is a good model to fly."

One other item, not in Pete's letter, was that if you looked carefully at the Gollywock three-view in the January issue, you will notice that the dihedral angle dimensions were omitted. For your information, the correct dihedral was as follows: three inches under each tip with the main panels flat and one inch under each main panel.

For anyone who would like to know what Pete Sotich has been up to these days, he included this in his inimitable hand lettered engineer's print:

"I am in good health and have joined an EAA chapter. Went to many Fly-Ins and Drive-In Breakfasts this past year and spent six days at the 36th Annual Experimental Aircraft Association Fly-In and Convention at Oshkosh. Also, I saw all of Notre Dame's home football games and thus far have seen nine Chicago Bears games. So long for now, Pete Sotich."

REPAIRING RIPS IN YOUR COVERING

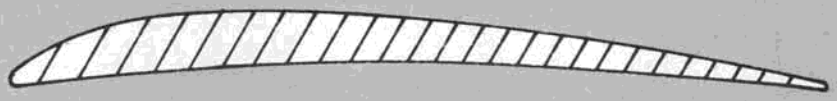
Ralph Prey shared this tip in a recent issue of the *Satellite* newsletter:

"While at the Las Vegas VAMPS Annual, I got a tear in the silk on the wing of my 800 Lucky Lindy Nostalgia model. You know the kind. . .about 2 inches long and L-shaped to boot for another 1/2 inch or so. I was cussing my luck to some of the fliers when Sal Taibi pops up with the comment, 'Oh, that's no problem. Here, let me show you how to fix that.' He proceeded to get his glue bottle, which is a plastic 2 oz. bottle full of Ambroid type glue and cuts off a

Continued on page 72

Marty Thompson flew this F1J model (1/2A FAI) to 1st place at the Sierra Cup meet.

DARNED GOOD AIRFOIL – GARD 7%



STA.	0	1.25	2.5	5	7.5	10	15	20	25	30	40	50	60	70	80	90	100
UPR.	.400	2.00	3.24	4.67	5.81	6.76	8.10	8.86	9.33	9.43	9.24	8.67	7.81	6.48	5.05	3.05	.86
LWR.	.400	.00	.100	.38	.76	1.14	1.62	2.10	2.48	2.76	3.33	3.52	3.52	3.14	2.38	1.33	.00

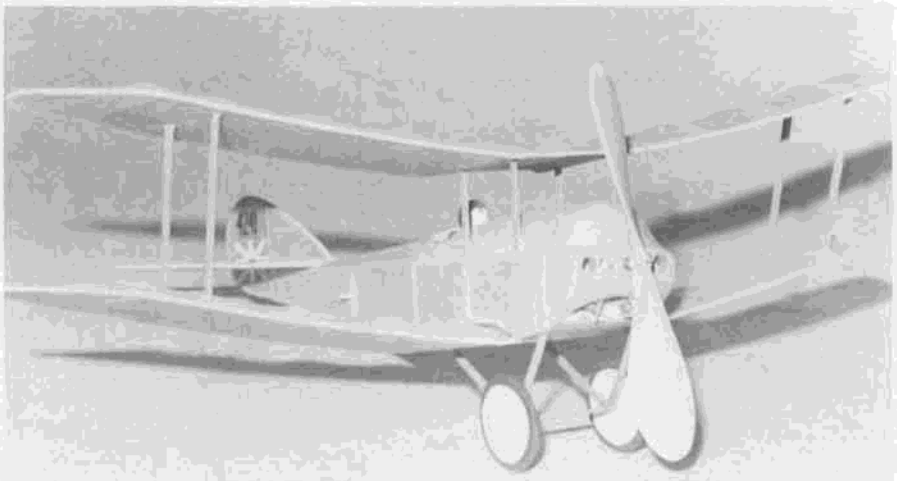
Martinsyde S-1

By JOHN BERRYMAN. . . This 1914 British design is more successful as a Peanut Scale model than it was as a WWI fighter/reconnaissance aircraft. Simple design makes it a fine choice for a first-time Peanut biplane.

• In the fall of 1914, the Martinsyde company introduced an airplane that surely must have caused charges of industrial espionage to flutter around Blighty. As you can see, the Martinsyde S-1 looks very much like a Sopwith Tabloid, except it's got a real landing gear! Yes, the nose moment is still tiny, and the stabilizing surfaces could always be bigger, but those accident-prone nose-over skids that Tabloids have are *gone!*

Sad to say, the Martinsyde didn't have much of a career. About sixty of the 80-hp Gnome-powered craft were ordered, deliveries taking place until October of 1915. Only six of the ships made it to France, where they were not well liked due to the poor lateral control furnished by the S-1's tiny ailerons. To add insult to injury, the Martinsyde was slow (87 mph) and climbing performance was poor. The narrow landing gear must have made ground-handling a bit thrilling, as well.

After flunking out in front-line service, some S-1's were sent to Mesopotamia, where sand and indifferent maintenance further degraded their performance. The S-1's last chance at front-line glory came when a few of them were armed with an assortment of bombs, grenades and incendiary darts for use as anti-zeppelin aircraft. One S-1 based with No. 6 Squadron, Royal Flying Corps, is described as having been armed with a Lewis gun carried on the center section.



Dummy cylinders add a nice touch of realism. For rigging the wings, try using the fixtures described by Fernando Ramos in his "F/F Scale" column this month.

Later versions of the aircraft employed an angular Bristol Scoutish horizontal stabilizer. To further complicate the issue, very early examples used a cumbersome four-wheeled undercarriage. I simply built the version that I thought was the prettiest.

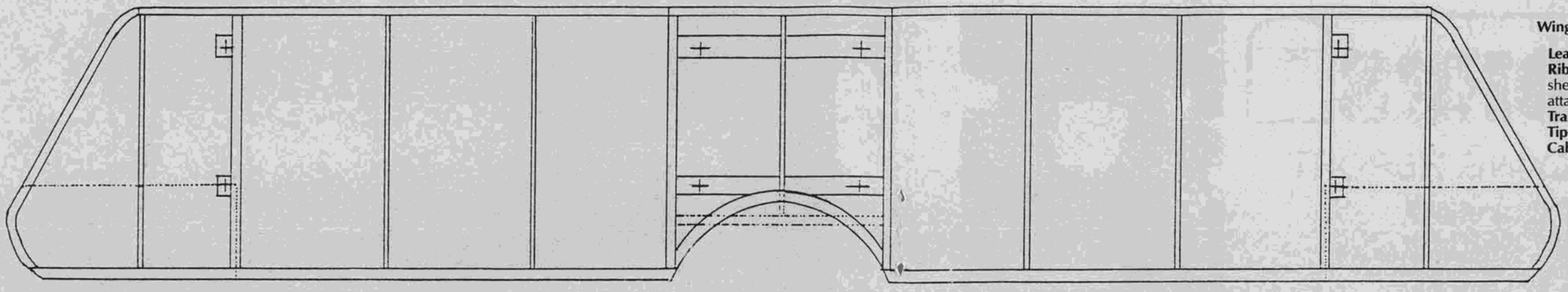
In my version of the aircraft, the stab and rudder have both been enlarged, and the dihedral increased to 5/8-inch per panel. Peanuts are, after all, *flying* scale models, and if a bit of judicious tweaking will increase my odds of success, I'm inclined to tweak away.

While not a beginner's aircraft, the Martinsyde is a fair flier, and can be made to fly with less heartache than some. The rubber motor is admittedly short. My feeling is that a short motor in a light airplane is better than a longer one in an airplane that has to carry performance-robbing ballast.

FUSELAGE

Nothing fancy here. Build the sides over the plans, and on top of each other, in the usual manner. Note that the cabane struts are part of the fuselage. If you cut them *carefully*, assemble the fuselage with temporary bulkheads, and *check alignment carefully*, you will build in one degree more positive incidence in the top wing than in the bottom wing. Gurus tell me that this will allow the upper wing to stall before the bottom wing. The bottom wing keeps on flying, and being further aft, effectively adds to the nose moment, bringing the nose back down. I dunno, it seemed to work for me. . . . Use stiffish 1/20-inch balsa for the longerons, cabanes and motor-peg-mount,

Continued on page 66



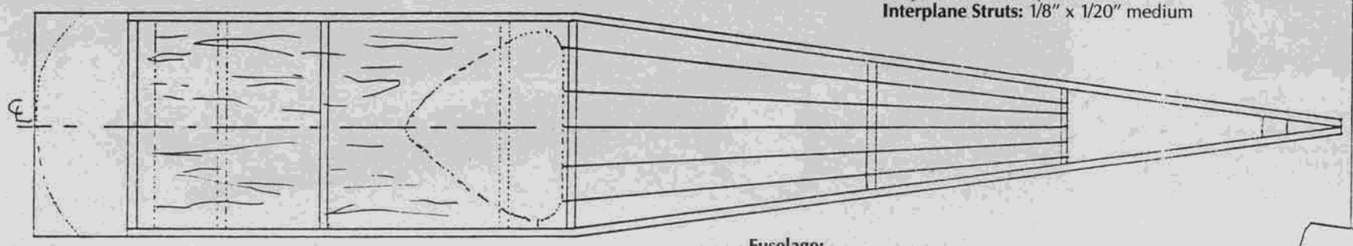
Wing:

Leading Edge: 1/6" x 1/16" firm
Ribs: 1/32" light sheet, exc. 1/20" light sheet as indicated at cabane and strut attach points
Trailing Edge: 1/16" x 1/8" medium
Tips: 2 laminations light 1/32" x 1/16"
Cabane & Strut Attach Points: 1/8" block

MISCELLANEOUS:

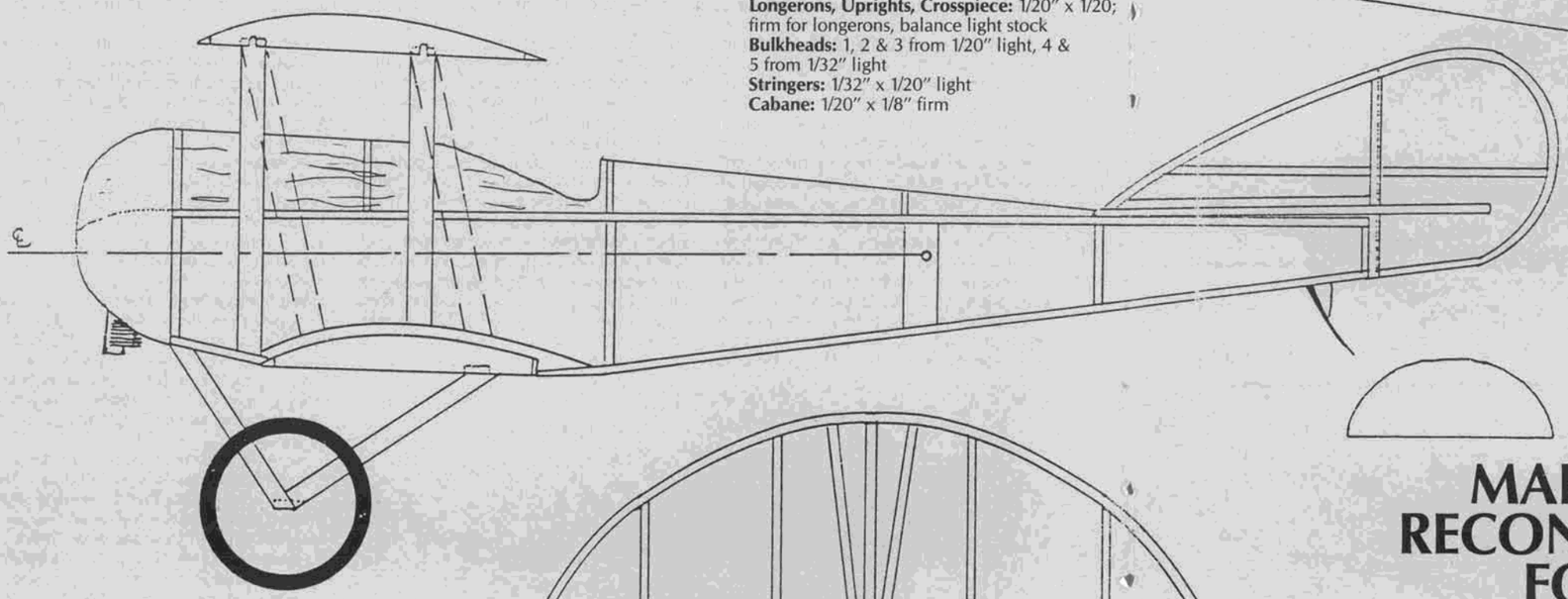
Gear Legs: 1/8" x 1/20" firm
Wheels: 2 laminations 1/20" light, bush w/ 1/16" birch dowel

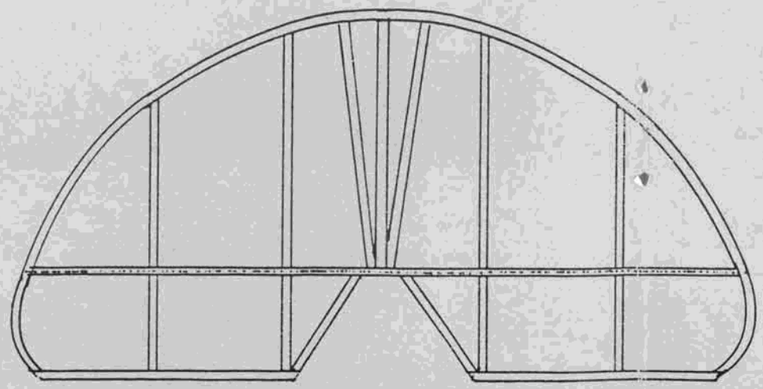
Cowl: 1/32"-1/64" very light
Nose Block: Soft balsa, hollowed
Cylinders: Williams Bros., 1/2" scale
Propellor: Peck Polymers 4-3/4"
Interplane Struts: 1/8" x 1/20" medium



Fuselage:

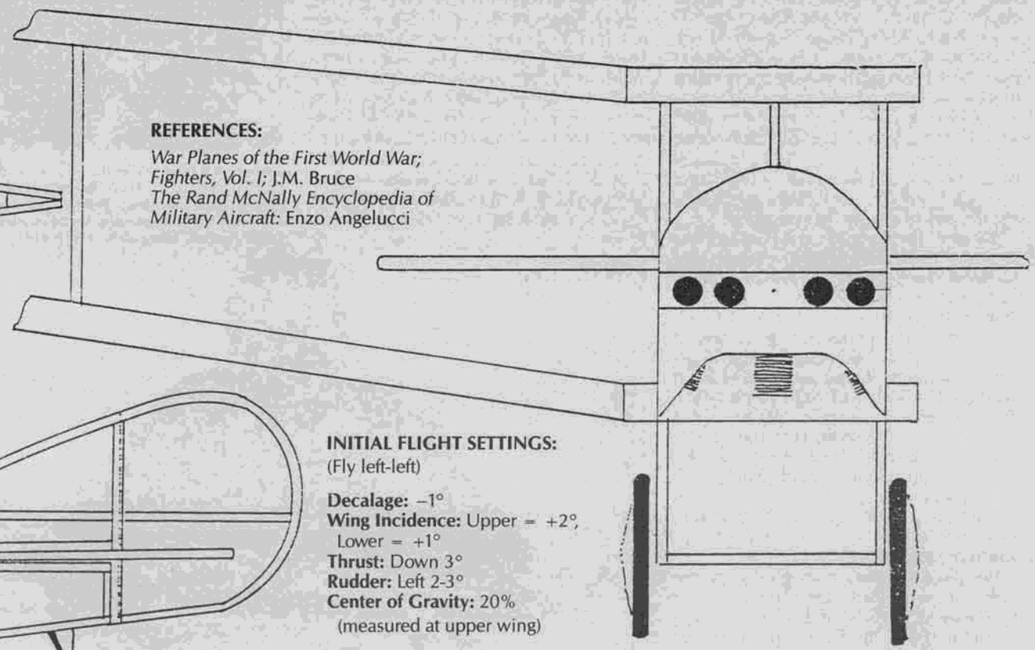
Longerons, Uprights, Crosspiece: 1/20" x 1/20; firm for longerons, balance light stock
Bulkheads: 1, 2 & 3 from 1/20" light, 4 & 5 from 1/32" light
Stringers: 1/32" x 1/20" light
Cabane: 1/20" x 1/8" firm





Rudder & Stab:

Outlines: 2 laminations light 1/32" x 1/20"
Structure: 1/20" x 1/20" light



REFERENCES:

War Planes of the First World War; Fighters, Vol. I; J.M. Bruce
The Rand McNally Encyclopedia of Military Aircraft: Enzo Angelucci

INITIAL FLIGHT SETTINGS:
(Fly left-left)

Decalage: –1°
Wing Incidence: Upper = +2°, Lower = +1°
Thrust: Down 3°
Rudder: Left 2-3°
Center of Gravity: 20% (measured at upper wing)

MARTINSYDE S-1: A 1915 RECONNAISSANCE AIRCRAFT FOR PEANUT SCALE

Designed and Drawn By John Berryman

COLOR SCHEME:

Overall: Dr. P.H. Martin's "Yellow Ochre" used to dye tissue ("antique")
Cowl and Nose Block: Silver
Insignia: Red, white and blue Union Jack on rudder
Struts and gear legs: dark brown ("wood")
Numbers: Black
NOTE: Ailerons on both upper and lower wings

the INSIDERS

INDOOR FLYING REPORT

By DAVE "VTO" LINSTRUM

• The Pancho Barnes TV movie that appeared on national television in November of last year caught the eye of many an "Insider" aeromodeller. Jose Tellez of Laguna Beach, California actually knew Pancho when she had her "Happy Bottom Riding Academy" flight school out in the desert near what is now Edwards AFB. He notes that Valerie Bertinelli did a good job of portraying Pancho and that the planes used were exciting, if not all of the proper era. Jose says that the Pancho Barnes he knew (when he flew sailplanes out of El Mirage) was a bit earthier, particularly in speech, but the movie was still fairly accurate.

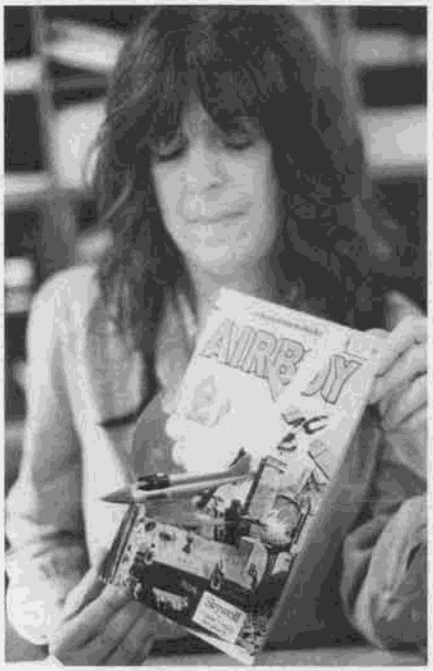
"Insider" Jim Longstreth of Portland was so turned on by the great flying scenes that he decided to replicate the featured plane, her Travelair "Mystery Ship." She crash landed this in the movie, but his 24 inch span FAC scale model is a great flier. It weighs in at 2 ounces and is accurate in detail with an authentic red and black finish. It was based on Björn Karlstrom 3-views and a book of reference photos. We present a photo for your viewing pleasure. If you want more details about the great solid models or small flying models that Jim has in his stable, send an SASE to: Swan Island Replications, 2546 S.W. Vista, Portland, Oregon 97201.

AIRBOY FLIES STICK 'N' TISSUE

Way back in 1943, a cartoonist by the name of Fred Kida created a youthful air hero named "Airboy" and a fantasy flying machine named "Birdie" for his weapon in fighting WWII singlehandedly! The exploits of this superhero were an inspiration to those on the homefront and to servicemen who enjoyed the comics of the era. Now "Airboy" comics are back on the racks thanks to the publishing genius of Dean Mullaney and Catherine Yronwode of Forestville, California. In this lovely little village in the Russian River valley north of San Francisco, they produce a line of comics using a MacIntosh computer, artists nationwide and Federal Express. They are the perfect example of the wave of the future: work at home and network the rest!

Airboy's flying machine is an artist's concept, not based on real-world aerodynamics, but after all, comics are fantasy-based! She is a bat-winged ornithopter, complete with a flapping joint, but powered by an internal jet engine for forward motion (the WWII version was prop driven, converted to a jet in 1953) and external machine guns/weapons pods. "Birdie" has a mind of her own and has a psychic interface with the pilot, often enabling her to get out of tight combat scrapes.

In "Airboy" this month (issue #45) Jim Longstreth and Chuck Dixon have written a story that has the hero flying a stick 'n' tissue model plane, not "Birdie" due to her suffering from "bad dreams." Along with his cohorts Valkyrie and Saburo (both former WWII aces) he ventures into the "dreamtime" in a Jim Longstreth Bostonian. This model, as well as several other of Longstreth's semi-scale sport models, is featured on the cover and in the story. To get your copy of "Airboy" or back issues, send an SASE (or $2.50 for #45 postpaid) to Eclipse Comics, Box 1099, Forestville, California 95436.



Catherine Yronwode is the editor for Eclipse Comics' "Airboy." Note the model of the hero's flying machine, "Birdie," mounted on the cover art. Latest issue features stick 'n' tissue models. More details in text.

Portland's Jim Longstreth with three of the flying models used in the latest "Airboy" comic. Jim did the comic layouts, too.

Another of Jim Longstreth's outstanding models is this Travelair Mystery Ship, inspired by the recent TV movie about Pancho Barnes. Model spans 24 inches and flies very well.

Just two of the many excellent rubber scale kits offered by David Diels are the Lavochkin LA-5FN/LA-7 (left) and F8F Bearcat.

OBSCURE AIRCRAFT

This month, we present a photo of the Russian Lavochkin LA5-FN/LA-7 fighter from WWII, as built by David Diels. While it has not been modeled before by others, it is an excellent flying model with great proportions for a Peanut or FAC scale.

DAVID DIELS KITS & PLANS

From out of Ohio come some of the best Obscure Aircraft flying scale kits and detailed plans that any dyed-in-the-wool aeromodeller could desire. We will try to list some of the most obscure (little known or seldom, if ever, modeled) but you will certainly want to send $1 and an SASE for the full catalog and order form to: Diels Engineering, Box 101, Woodville, Ohio 43469. Overseas readers should send appropriate International Reply Coupons with the self-addressed envelope.

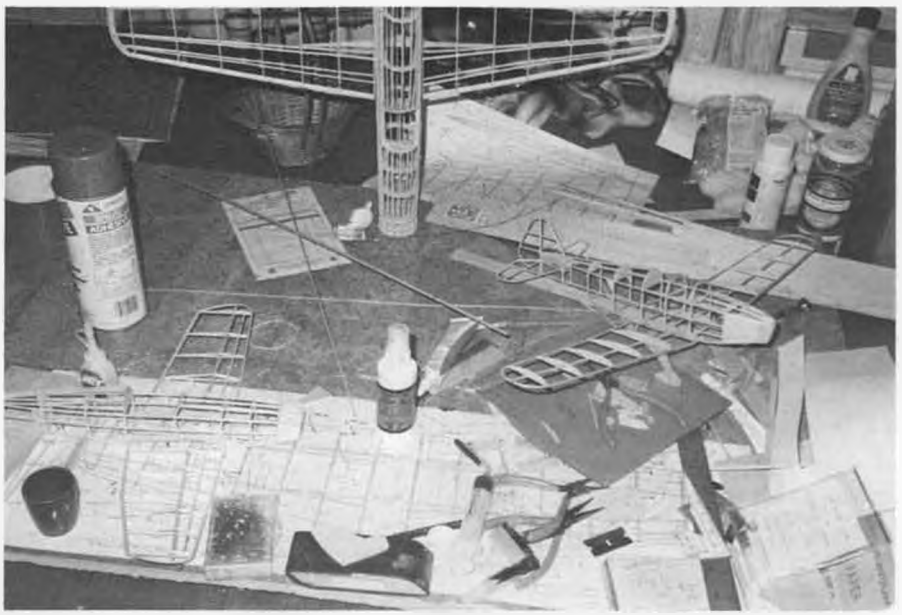
Over the years, by networking with other dedicated scale fliers, David Diels has built up an astonishing collection of plans. He now offers kits as well, based on the more popular designs. Our favorite is the 4-in-1 Peanut kit, where in one box you get plans, 1/20 inch printwood and strip, molded canopies, tissue, prop, bushings, rubber and complete decal sheet. This box will get you into a building orgy like nothing else! Imagine having a quartet of Peanuts to fly at your next Insider session!

In the following kit list, the first price is for kit, then postage in USA 1st Class. In the 4-in-1 kit ($26/$2) you will find the Brewster F2A2 Buffalo, Vultee P66 Vanguard, French Bloch MB-152, and the Japanese Mitsubishi J2M3 Raiden (Jack). What a great combo for an FAC WWII mass launch event!

Other kits include the 15 inch span F4-B2/P12-C in 1/24 scale ($10.50/$1.50), the aforementioned Lavochkin LA-5FN ($12/$1.50), the fat Navy Grumman F8F-2 Bearcat ($12.50/$1.50), the famous Chinese "Flying Tiger" Peanut P-40 Warhawk/Tigershark ($10.50/$1.50), the Curtiss A8/A12 Shrike ($17.00/$2.00), and the famous Curtiss SBC-4 Helldiver from the late 30's ($13.00/$1.50). Available soon are the Douglas TBD-1 Devastator and the Supermarine Sparrow II Peanut.

If you are a dedicated scratch builder, you will enjoy these highly detailed plans for obscure Aircraft Peanuts ($2.00/75¢) that really fly: Northrop N23 Pioneer trimotor, Fairey Spearfish WWII torpedo bomber, Blackburn Firebrand torpedo bomber, 1934 Kreider/Reisner (Fairchild) XC-31, Macchi C202 Folgore from WWII, and the Ryan FR1 Fireball piston/jet combo fighter.

We know that once you see the great variety that David Diels offers, you will be as turned on as we were. He is a dedicated, thorough designer of high-quality kits and plans. As a cottage industrialist, he deserves your support. Send for that new catalog (fully illustrated with profiles of the designs) today, or better yet, put a check in the mail for a kit to build this weekend. Be sure to tell him that Insiders/Model Builder sent you. Enjoy your next stick 'n' tissue flier from Diels. We are building one for the next MIAMA meet at MacDill AFB, Tampa, Florida.



Insiders Workshop photo from Chicago shows that Ted Kowalczyk is busy building a Dornier "Phiel" (top), an Allied Sport (right), and Heinkel 100 (left).

INSIDERS WORKSHOP

Ted Kowalczyk of Chicago send us a great photo of his workshop, with several scale models under construction. Readers would like to see *your* workshop, so send us a photo and a brief description of what is going on in the shop, like this one from Ted: "I recently returned to the wonderful world of aeromodelling after a seven-year absence. College and Law School conspired to take up much of my time and through my own inattention, I let model building slip on by. This year when I saw *Empire of the Sun* my interest in aeromodelling was rekindled by this movie. The plot was poor and extremely convoluted, but the cinematography and the models were excellent. My favorite scene in the movie was when the Mustang buzzed the prison camp. Mustangs have always been a favorite and after seeing them in the film I ran out and bought a Comet P-51 kit and built it. As you can guess, some of the skills and tricks were a bit rusty, but slowly and surely I found them all coming back to me.

"Since my rediscovery of our wonderful hobby, I have been reading your column religiously each month. It's nice to know that there are some fellow gum-band nuts out there. Your 'Insiders' column has been a great source for supplies, plans and building inspiration! Between you and Doc Martin, I have found sources for all those goodies and supplies that I could not get my hands on when I was younger.

"As you have requested I am sending a photo of my workbench. I converted an old kitchen table in our basement into a work

Continued on page 62

Control Line

BY JOHN THOMPSON

• A workshop is a very personal matter. Most modelers spend much time getting them set up *just so*, for efficiency and comfort while producing their beloved airplanes. It starts with a basic layout, and gradually, over time, things are added (modelers never throw *anything* away).

Then, just when the shop is the picture of efficiency (or a monument to uncontrolled clutter), comes the dreaded *moving day.*

This is when you really find out just how much you have accumulated over the years you've worked in that particular shop.

Guess what your C/L columnist has just been going through! I am happy to relate that everything that made the "traveling squad" (sad to say, some old items didn't make the cut) arrived safely in the new residence (about two blocks from the previous one; oh, so near, but yet, so far!). Unpacking is another matter. At the time this is written in December, the designated workshop area of the garage is nothing more than a tall heap of. . .well. . .stuff. My goal is to get it sorted out and set up by the time you read this.

On the bright side, a move is an opportunity to make modifications in the layout of your shop that suits you as a builder. Some careful planning, based on the good and bad points of the shop you just left, should result in an even better shop. In my case, I've had to think out some new ways to store things. . .and a lot of shelves are in my future. I don't plan to move again soon, so I want to get it right this time!

As mentioned in a previous column on workshops, I invite pictures of workshops and tips about how to set up and use them that might help others, particularly newer fliers, get theirs into shape. Now, on to the *real* topic of this month's discussion. . .

CUTS & KILLS

No, we're not talking about what happens when your knife blade slips or you squash a bug on the workshop floor.

We're talking about what happens in the grass circles at C/L meets across the country during one of the hobby's most popular and exciting activities: combat.

This is the next in a series of "how to get started" discussions. We've already discussed racing and precision aerobatics.

Combat is the event in which the flying draws the most attention of spectators, particularly those who are not familiar with model competition. It has a fairly recognizable objective and it is fast and furiously exciting.

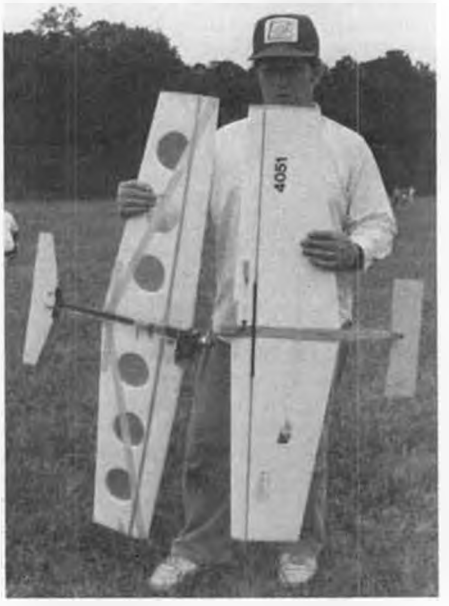
It's an event that looks difficult to the casual flier but, like all other competitive activities, the difficulty is overcome by practice. As opposed to some of the more demanding go-fast events, such as rat race, combat is something that can be done by virtually any person of average intelligence and skill. True, there are outstanding talents, but for even those fliers, the true road to success is paved with practice. Though it is an event of speed and horsepower, it is not absolutely necessary to have the fastest equipment to win. Here, flying is the most important commodity. And in combat, unlike in some of the other events, any flier can beat any other flier on a given day. With a little luck and practice, the winner's circle is open to almost anyone.

However, getting started can be a mystifying puzzle to the new recruit. There are a half-dozen different combat classes, varying rules, etc. Where to start? 1/2A? AMA? FAI? Slow? FoxDoo? Biplane? Super Slow?

The answer is that it's possible to start in "all of the above." However, as always, a planned approach is most successful and enjoyable. I recommend selecting one class (I'll help with that in a moment) and developing basic combat skills before moving on. My prediction would be that if you do so, you will eventually feel like branching out into several combat categories, and then will gradually drop out of some of them and focus on one or two favorites. Along the way, you will progress slowly in your flying skill until you become a veteran and maybe even build a reputation as an expert (you'll know that's happened when about half the fliers don't want to fly against you and the other half can't wait to get at you).

My observation has been that the typical flier moves through several "plateaus." periods in which he doesn't seem to make much progress, followed by seeming leaps in ability. One such leap is the ability to avoid or to fly out of line tangles. Another is the point at which you stop crashing. Another is when you develop the ability to see what's happening in a match and begin to take control of it, rather than just hang on to the handle and hope to get lucky. Another is the point at which you improve your ability to avoid collisions. Another is when you acquire the ability to keep your concentration properly focused from the beginning to the end of a match. . .no easy chore with things happening so fast. Another is when you actually begin to be able to aim your plane at a moving target (streamer), and to make small adjustments necessary to hit it.

As you make plans for your combat career, you might want to think now about where you want to end up. Most fliers in the United States eventually move to fast combat, the purest, simplest and most exciting



Typical modern foam AMA Combat planes. Dave Childs holds his own (left) and our columnist's "Underdog."

A good example of a typical Slow Combat ship. Fliers just getting into this event should pick a simple design with very few pieces.

You can expect to bust a few models at any combat meet. Here Tom Strom gets packed for the Northwestern Regionals.

Gary Byerley (left) and our columnist mix it up at a Bladder Grabber, with Mt. Rainier in the background. Photo by Charlie Johnson.

of combat events—the Indy car equivalent. However, in other countries, or for those with international aspirations, the goal may be FAI combat, a considerably more complicated event but the one in which the world championships are decided.

You also should go into the event with some sense of how long it will take to acquire proficiency. With intensive effort and a lot of flying and competing, most fliers can become fairly proficient in a year or two. However, most of the best fliers are still studying and learning about the event after 10, 20 or more years.

I've observed an interesting phenomenon about new fliers: A new flier often finds great success in his first year or two, possibly even winning some contests. Then, he will hit a long period, perhaps another year or two, of frustration before beginning to resume his winning ways. I attribute this to an elevated "luck factor" in matches involving new fliers—their rough edges cause unpredictable situations in matches that can result in some wild and crazy wins. As they begin to fly better, their experience makes the matches become more conventional, the luck factor diminishes, and the more experienced opponents take the wins away. Then the real serious apprenticeship begins. Does this sound like a challenge? You bet. Combat is a challenge, and that's what makes it forever interesting not matter how long you've done it.

* * *

First, let's talk about the basics. What is combat?

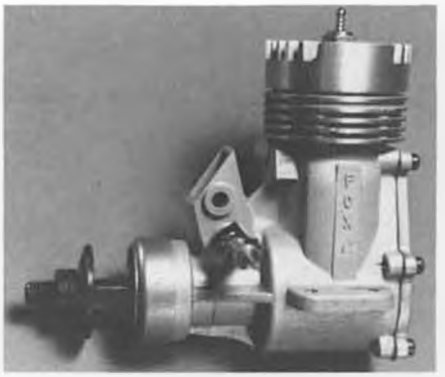
There are two planes, each towing a crepe paper streamer, separated from the plane by a length of string. The object is to cut or remove that streamer. Points are scored for cuts and for time in the air. In some classes, cutting the string constitutes a "kill" and ends the match.

Here is a brief description of the most common combat events. After that, we'll talk about some possible routes into combat activity:

AMA Combat—In the rulebook, it's just "combat," the event that all the others evolved from. It's commonly referred to as "fast combat." Airplanes are unlimited in design. Engines are unlimited except that they must be no larger than .36 displacement. The event is flown on 60-foot .018 inch braided steel lines. Matches last a maximum of 5 minutes from a cold start, scoring 1 point per second of air time and 100 points per cut. Kills end the match, with the win going to the killer. Average airplanes travel about 100 to 120 mph. Average foam-winged airplanes cost (scratch built) about $10 each, more for kits or all-balsa planes. New engines cost $80 and up, but the $80 Fox Combat Special is competitive without further expense. Airplanes are generally quite simple to build, requiring 4-5 hours each. Five or six spares are needed per contest.

"Combat is the event in which the flying draws the most attention . . . it is fast and furiously exciting. This is the next in a series of 'how to get started' discussions."

Slow combat—Airplanes must be profiles with 24-inch fuselages, 300 square inches of wing, canopy, horizontal stabilizer, elevator and vertical fin (see rulebook for details). Engines are limited to .36 displacement and suction fuel feed. Same lines as AMA combat. Scoring is the same as AMA combat except that there is no kill. Speeds range from 75 to about 100 mph. Cost of airplanes is about $20, engines are in the same price range as AMA combat. Four or five airplanes needed.



Fox Combat Special, THE engine for Fast and Slow Combat events. Mike Hazel photo.

1/2A combat—This event is identical to AMA combat except that the engine size maximum is .051 and lines are .012x35 feet. Speeds are 50-60 mph, but the reaction time is about the same as fast combat due to the shorter lines. Engines cost about $24, planes about $5. Two or three planes are enough for most contests.

FAI combat—Airplanes are basically unlimited; engines are .15 size with some restrictions on design. Lines are 52 feet long. Matches last four minutes from a running start, with one point scored per second of air time and one point deducted per second of down time. There is no kill. Unlike all of the above, two airplanes are allowed per match. Speeds are in the 100-mph range, but the planes seem quicker due to the shorter lines. Cost of airplanes is roughly the same as AMA combat; expect to pay $175 and up per engine. Ten or 12 planes needed for any major contest.

FoxDoo combat—This is an unofficial event run in many places by local rules, but it is mentioned here because of its growing popularity and appeal to beginners. In most places (rules may vary by location), the required equipment is a Goldberg VooDoo airplane or accurate reproduction and a stock Fox .35 stunt engine. Rules are otherwise the same as AMA combat. Speeds are around 80 mph. Airplanes cost around $20,

Continued on page 76

A 1/2A Combat plane built and "decorated" by (are you ready for this?), "Sir Charles Matheny III, Undisputed King of 1/2A Combat."

Mike Keville took this shot of Chris Gay, of the So. Cal. Combat Team, launching at a recent meet at Whittier Narrows.

Free Flight Scale

By FERNANDO RAMOS

• I am still trying to figure out why I chose to build a Sopwith Triplane for the F.A.C. Nats, considering how I dislike building wings. However, while building this model, I incorporated a few ideas that worked out quite satisfactory, so I would like to share these with you.

To start with, I normally attach the landing gear permanently to the fuselage, but on this model I made it removable. The gear fits into grooves under the fuselage and is held in place with small straps and screws. I did this for two reasons: First, I planned to make the gear scale with the split axle typical of Sopwith aircraft, so that the wheels are provided with a nice flexing action. Secondly, without the gear mounted and screwed in place, the fuselage can lay flat on the board for squaring the wings and tail for rigging.

Another consideration is that with a model this size (weight over a pound), the gear needs to be fairly stout. On smaller models with the gear permanently installed, I let the trailing part of the gear flex inward into the fuselage. This works out just fine in smaller or lighter models but not so in this particular case. At any rate, I like being able to remove the gear if it becomes necessary.

I ran into an interesting problem when it came time to rig the control cables of the rudder and elevator. Since both of these surfaces were going to be movable, the cables had to be attached in such a way that they could be moved also. I took two pieces of 1/16-inch I.D. aluminum tubing, bent them as shown in figure 1, and mounted one on either side of the fuselage where the elevator cables go. Interestingly, the radius of the aluminum tubing is a bit critical because the braided control line wire I'm using cannot be pushed through if the radius is too small. Naturally, you want to try this before permanently mounting the tube in the fuselage. The idea here is obvious but it does allow the cables to move when the elevator is adjusted for trim.

The rudder was done the same way except the aluminum tube did not require as small a radius as the elevator. Incidentally, if you want to use silk thread instead of control line cable, place some ZAP or other CA glue on one end of the thread and let it dry. This will make it rigid enough to allow you to push it through the tube. Only the absolute tip of the tubing should be tangent to the covering, otherwise it will look pretty crummy. As soon as the model is covered, poke a hole where these openings are while you can still see them. After painting these openings cannot be seen clearly, and what you don't want are a bunch of small holes in your finished product. Wonder how I learned that one?!

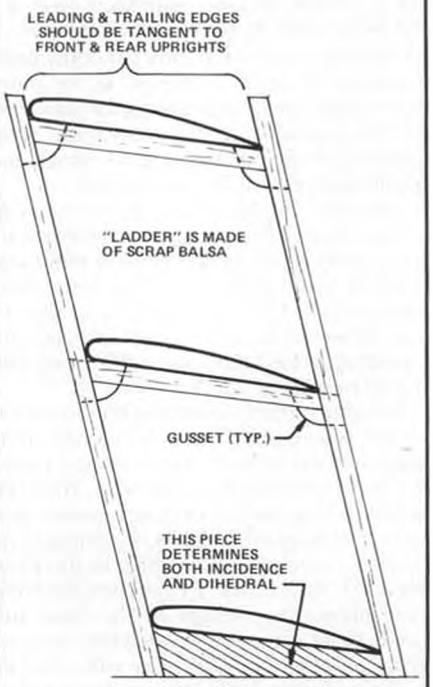
One of the most interesting aspects of this model was aligning all three wings. This involves several points. One is the correct incidence angle of all three wings. Another is the correct and equal dihedral for all three wings, plus having them at right angles to the fuselage. This is no mean task, however, with a couple of simple devices, it didn't turn out too badly.

Take a look at figure 2. The first item I made was two identical ladder-like structures. Notice that they incorporate two of the three points just mentioned. They provide the correct incidence angle and the correct amount of dihedral. Also, by having the trailing edges tangent with the back of the ladders, the wings will have the correct stagger as well.

All that is left is making certain the wings are at right angles to the fuselage. I accomplished this by placing the fuselage on my rigging board on a center line, then I drew right-angle lines at the exact location that the trailing edges of the lower wings should go. I glued small blocks on these lines, tall enough so when the lower wings are plugged into the fuselage with the correct dihedral angle, the wings are still up against the blocks. With the lower wings in the proper place and on the ladders, the other two wings follow suit. This same setup will be used for correctly rigging the model during its completion.

As I think about it, this setup should also work quite nicely for biplanes. The key, of course, is being able to place the fuselage

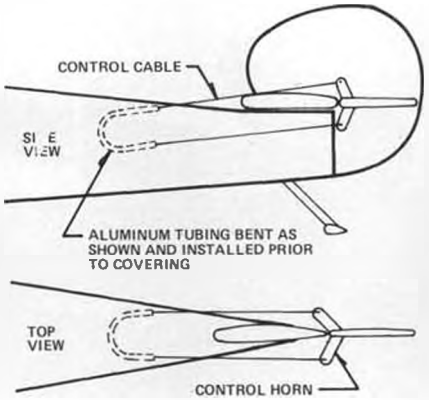
FIGURE 2



FERNANDO'S "LADDER" FIXTURE FOR INSURING PROPER STAGGER, DIHEDRAL ANGLE AND INCIDENCE ON MULTI-WING MODELS

FIGURE 1

THIS ARRANGEMENT PROVIDES FOR THE INSTALLATION OF SCALE CONTROL CABLES, YET ALLOWS THE SURFACES TO BE ADJUSTED FOR FLIGHT TRIMMING



The diesel-powered Sopwith Triplane that gave our columnist fits until he devised a fixture for accurately aligning the wings.

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on a large flat surface on a center line with right-angle lines locating the lower wings. There are instances where the trailing edge of the lower wing drops below the lower longerons of the fuselage. I use a large sheet (3 x 4 feet) of plywood for rigging, so it would be an easy task to cut out a small section near the fuselage wing root using a sabre saw. Since most lower wings have dihedral, the cutout section only needs to be near the fuselage.

With the Sopwith Triplane it was necessary to pre-rig the model completely before covering, because there are flying wires that actually intersect the middle of the center wing. Also, there are a pair on each side which cut through the leading edge as well. Even though this was extra work, it proved to be worthwhile when the model was rigged for the last time.

I used Fulton Hungerford's fantastic wire wheels on this model. I tried to find a photo of a Sopwith Triplane without the wheel covers, but that was not to be. The only thing I could do was cover these beauties. The first idea was to try and vacuum form the covers, but the results were not all that great. I then tried Solartex but found the adhesive would not adhere to the metal rims. Now what? Finally, I hit on the idea of gluing the Solartex onto the rims using Super Seam glue, which is used for attaching fabric onto full-size aircraft.

I began by cutting out four discs of Solartex using a compass fitted with a sharp blade. I made a small hole in the center of each one so it could pass over the wheel's hub. Glue was liberally and carefully applied (you don't want any on the tires). Then the disc was applied. I let this dry for quite awhile before I tried usjng heat to shrink the fabric. Even though the glue had properly dried, I applied heat with care. The results were very satisfying. Around the hub the fabric shrunk enough to expose the spokes underneath. I purposely left in a few wrinkles, as most photos of WWI aircraft show the wheel covers anything but smooth. I was pleased with the overall effect.

Initially, I wanted to make the version of the Sopwith that had an unpainted aluminum cowl and panelings. There is a company out here that makes reasonably priced cowls but he did not have the exact size I needed. The cost to have one custom made was more than I cared to pay. So, I used the version with painted cowl and panels.

I had to make my cowl out of fiberglass which turned out easier than I imagined. The first step was to make a wood plug that would be turned down to the correct shape and diameter. I made the plug out of four pieces of pine glued together. When dry, I cut a circle about 1/8-inch undersize of the actual diameter required. This was cut out using a bandsaw. I blew off the sawdust and coated the disc with a thick layer of Bondo. (This is a body putty used primarily for body work on cars.) The front of the disc was also coated. When the Bondo dried, I turned the disc on a lathe. The Bondo cuts beautifully on a lathe! The cowl was correctly shaped and measured while still on the lathe. When finished, I had a very smooth mold.

I acquired some plaster of Paris and a cardboard paint bucket. I mixed a sufficient amount of plaster and poured it into the paint bucket. The cowl mold had been previously greased with silicone and was then pushed, face down, into the bucket of plaster. A weight was required to keep the plug from floating to the surface. I let this dry for 24 hours. (Incidentally, I cut down the top of the bucket making it no deeper than was required).

I wish I could say that all I had to do was reach in and remove the cowl mold. Well, it was almost that easy. It wouldn't come out easily, and as I didn't want to damage the female mold, I drilled a quarter-inch hole in the bottom of the bucket near the center of the plug, all the way through the plaster. If you drill a little into the plug, no harm. Next, I took an air hose and blew air into the hole. In a few seconds the wooden plug popped out, leaving a super female mold behind.

The plaster mold was still damp so I gave it more time to dry, then it was rubbed with plenty of silicone grease. Strips of fiberglass cloth were placed in the mold and saturated with epoxy. I used two layers. When this dried, I removed the cowl from the mold with air as before. I had a few pinholes that I filled with Bondo. The cowl was trimmed, sanded and primed. The results were well worth the effort and, actually, it wasn't all that bad.

I hope these hints help you. If you think this is too much work, just remember that anything worthwhile takes effort and work. To me, there is a lot of self-satisfaction in testing one's ideas! •

Insiders. . . . . *Continued from page 57*

area. I understand that a workbench should be clean and uncluttered, but we do not live in a perfect world. *This is how a real workbench looks!!!* It looks as if a bomb hit it, but that is the way I like it. I am sure that you are interested in what is being displayed in the picture, so let me describe them to you.

"Starting from the top and going clockwise: this is a Dornier 'Phiel' built from Dave Diel's plans. I have purchased his P-40 and 4-in-1 Peanut kits and am quite pleased with the quality of the wood and the plans. I also ordered a number of his plans and they are of top notch quality as well. What I especially like about his plan assortment is the variety of the planes modeled; there are

more than just a few that make you stop and say *Huh?*.

"To say the least, this was a challenging model. Quite frankly I am afraid to cover this beast and fly it. The complexities of its push-pull features really worry me. So far, building airplanes has not been the problem, I just don't seem to have any great luck in flying them. In his plans, Dave mentioned that with a simple mechanical device you can prevent the second motor from starting until the first motor was down about 30-40%. I have tried to envision such a mechanism but I cannot for the life of me come up with one. Maybe you or one of your readers have a suggestion. I am open to anything.

"The second model is an Allied Sport, built from a Golden Age Reproductions plan. The structure is simple and straightforward. I made very few alterations to the basic plan. Most notably I laminated the wing and tail feather outlines. I am a big fan of lamination. True, it is a little extra work, but I think the results are well worth it. The structure is stronger, lighter and much more beautiful. Anyway, back to the model. She has a 20 inch wingspan and she looks like she will be a honey of a flier. The wings are nice and big, the fuselage is just right and she has a decent set of tail feathers. Some day I plan on building a Pistachio version of this plane.

"The last model is a 13 inch Heinkel 100 from an old issue of *Crosswinds*. It is the clipped-wing version of the plane. The construction is relatively straightforward. Years ago I built a Flyline Heinkel 100D; this model was the first one that was caught up in the gentle hands of 'Hung.' It was during a contest and as you can imagine, it was not an official flight!! I like this version, but I would prefer to build a Peanut of the 100D with the normal wingspan. Maybe if I get really ambitious one day I'll draw up my own set of plans."

INDOOR WEEK/USIC 1989

The world's largest Indoor model Airplane Competition will be happening during June. This "Indoor Week" (5 days of flying) is being sponsored by NFFS. It will be held at the Mini-Dome, East Tennessee State University, Johnson City, Tennessee. Build your models and enter this spectacle so you can be an *active* participant and also enjoy associating with the indoor flying greats!

The United States Indoor Championships, which will include the F1D contest, will run from June 1 through June 4. Think of it! Twenty-seven events! This will be like indoor heaven! The MIAMA Peanut Grand Prix will also be flown. For full entry info send a large SASE to Tony Italiano, 1655 Revere Dr., Brookfield, Wisconsin 53005. •

Hannan. . . . . . *Continued from page 49*

THOSE STEALTH AIRCRAFT

Ed Whitten, Mark Fineman and Florence Bakken favored us with newspaper and magazine clippings related to the so-called "Stealth" fighter and bomber, which were recently unveiled (well, sort of). The incredibly expensive B-2 (acknowledged to cost *at least* $500 million per copy) has a Navaho-blanket look about its trailing edge, while the fighter, identified as the F-117A (whatever became of the F-19 designation?) looks quite Medieval in configuration. The estimated cost of these are from $85 million to $100 million each. Which lends credence to a theory advanced by aerospace engineer Norman R. Augustine, in his book *Augustine's Laws*, in which he concludes that the unit cost of aircraft have been steadily increasing by a factor of four every 10 years throughout aviation history. By extrapolating from existing statistics, Augustine anticipates that by the year 2054, one military aircraft will cost approximately 1 trillion dollars! As he puts it: ". . .the entire defense budget will purchase just one tactical aircraft. This aircraft will have to be shared by the Air Force and Navy three and a half days per week except for leap year, when it will be made available to the Marines for the extra day."

Our thanks to Bill Baker for alerting us to *Augustine's Laws*, not that we find them very reassuring. . .

AT THE OPPOSITE END OF THE PRICE SCALE

Vince Leah, of Manitoba, Canada, enjoys low-cost modeling:

"*Model Builder* is by far the best model magazine for us fellows who build stick-and-tissue types. I have been building model airplanes since 1930, when my interest in model flying was the stepping-stone to a career in newspapering. . .I am 75 to-

day and I guess some people think I'm ready for the men in the white coats, but I love flying things. In the past few years I've been researching and designing kites with an airplane configuration. I have been building little fellows in the Peanut and Pistachio range. The ones with only five-inch wingspread, made from cigarette papers, fly bravely on 20-foot long cotton thread fastened to a 6-foot dowel.

". . .I also have a dozen or so electric-powered Peanuts flying round-the-pole. When the rest of the local modelers shut down for the winter, I fly Peanuts indoors in the cellar. No mess, no pollution, just an inspiring hum of the motors."

THEN AND NOW

Reader Mark Sheffield reports:

"I have just returned to the hobby during the past year, after 20 years away, during which I went to college and started a family and career, and more or less got all those things I *had* to do out of the way. And so now the priorities have shifted once more and have rearranged themselves. I find myself once again living in the basement amongst my slivers of balsa and scraps of paper. And loving it.

"There are two large differences that I notice in my perception of the hobby before, and the hobby now: First, I seem to know how to do things much more easily and readily now, than I did when I was in my early teens. There is much less frustration in building things, and that pays off directly in self-satisfaction. And second, there is some money to be spent on the hobby, which not only allows me to do things that are new, but also gives me second chances on things that I mess up on with my first attempt.

"I wouldn't say that either of these are of earth-shaking moment, but reinforce some basic philosophy that all things have their time and place. And the wonderful thing is that there are many more things to do, and much, much more to learn."

SIGN-OFF TIME

If your model building projects never seem to reach completion, you might care to consider the Robinson Crusoe system: Have all your work done by Friday! •

Inside Engines *Continued from page 21*

from the engine for several minutes while it idled, returned and slammed the throttle arm forward. Acceleration was good with no tendency to load up. Darn nice performance. This means we now have a small, powerful Cox engine that will allow a model to sit still on the runway and idle slow enough to work like an airbrake for shooting touch-and-go's. As the instructions say, the engine was happiest running at high rpm on small props. It was not easy running on the 7x4 and 6x4. It happily screams out a muffled bunch of power with the 6x3.

All props you run on this engine should be very carefully balanced. . . best to simply shorten the tip of the heavy blade. My test engine seems to have a vibration mode around 17,000. The needle valve tended to back out so a 3/4-inch long piece of medium fuel line was used to replace the needle valve's spring, and that minor problem was easily solved. It simply is not possible to stop a single cylinder engine from vibrating.

TECHNICAL SPECS

Crankshaft diameter is .250 inch at the front and rear surfaces. There's minor anti-drag relief down to .245 inch between the two bearing surfaces. The piston and connecting rod assembly weighs a scant four grams! The top of the piston, in Cox practice, is copper plated to promote uniform heat across the piston. The cylinder head is machined from aluminum and will accept any 1/4-32 glow plug. The head seals to the cylinder with a single .006-inch copper gasket. The cylinder looks scaled-up from a TD .049 sleeve. . .twin exhausts and twin bypass flutes. Most Cox engines have sub-piston induction, that is, with the piston at TDC the bottom of the piston skirt uncovers a minor bit of the exhaust ports for additional combustion air to enter—great for high speed, but it inhibits pumping at idle speeds. The Queen Bee has no sub-piston induction and idles beautifully. The distance from the top of the piston up to the head's squish band measures .029 inch at TDC and the cylinder head has a single bubble .325 inch in diameter surrounded by the .070-inch wide squish band that is not angled. The bottom of the Fox short plug fits well down into the combustion chamber instead of being flush with its roof. The exhaust timing measures 153 degrees. Top I.D. of the cylinder is .463 and the bottom is .465 (slightly tapered as is so modern).

I suspect the hop-up experts will have lots of fun with this new engine—and that some of their tricks will eventually find their way into factory production. There's room to experiment with the exhaust manifold and the passageway between the manifold and the beautifully turned muffler. The engine should respond well to running on a muffled tuned pipe. Some may experiment with balancing by removing metal from the disc of the crankshaft on both sides of the crank pin.

This is the very first production of an entirely new Cox engine. It's a great piece of made-in-America model machinery which will cost you about $40.00. If you completely wipe one out in a crash a total rebuild will only cost you $21. plus $4. for postage and handling. I see tremendous growth in smaller R/C enthusiasm, a fine

engine for a new breed of ready-to-fly models and a resurgence of small hand-launched R/C pylon racers and a new generation of designs and kits for the Sunday sport flyer to enjoy. The engine is a honey! I'm so enthused I'm building an original design three-channel open cockpit model with a shoulder wing and trike gear and I'm calling it—you guessed it—"Honey Bee"!

PERFORMANCE COMMENTS

Full throttle on a 6x3 prop yields four or more minutes running per ounce; a two-ounce tank is sufficient for sport flying. I had lots of easy hot restarts. The rear of your props will need to be drilled out with a #3 drill bit. The muffler makes the engine plenty sociable. General performance matches a Cox TD .049 at high speed, except the Queen Bee is much quieter and throttles beautifully. The engine will run backwards just as happily as forwards. The single needle valve controls both high and idle speeds so adjustment becomes a trade-off between the two rpm extremes. A slightly rich safer setting yielded lower figures—a slightly leaner setting yielded somewhat higher figures. The test engine was "uncomfortable" and strained on the 7x4 test prop; it wasn't at its best with the 6x4 either. As the directions state, the Queen Bee is happiest at highest rpm and I'd advise using *only* the 6x3 prop size.

Performance with Cox #551 fuel and Cox props:

Prop Size	High Speed		Idle Speed
6x3	16,200 . .	slightly rich . .	4250
6x3	17,500 . .	slightly lean .	4750
6x4	13,400 . .	slightly rich . .	3500 (erratic)
6x4	14,300 . .	slightly lean .	4000 (erratic)

With fuel containing only 10% oil (half castor, half Klotz), and 10% nitro (a four-stroke fuel mix) and after 1-1/2 hours running:

6x3	16,700 . .	slightly rich . .	3600
6x3	18,000 . .	slightly lean .	4250

The last set of high/low rpm figures yields a 4.64:1 speed range at the safe, slightly rich setting which is truly astounding for such a small engine turning such a light prop. I didn't think the Cox accessory engine mount is quite stiff enough (it's being improved) and there are minor dimensional errors quoted in the instructions. I cannot find fault in the .074 Cox Queen Bee engine itself. It's great! •

ARFS..... *Continued from page 47*

"I'm working with another builder and we can only produce one or two models a month and have a waiting list. I also try to stock a few ready-to-cover airframes (sport stuff.)"

Gary is an example of a true custom builder, as he will undertake to build just about any airplane you wish, including trainers, old timers, sport/aerobatic, pattern, pylon, sport/scale, and ducted fan models. He will supply these in any of four stages as follows:

Stage I consists of a completely built fuselage, wing panels, stab and fin, kit plans and hardware.

Stage II is the same as Stage I but includes a joined wing with glassed center section.

Stage III is completely built and covered in Super MonoKote.

Stage IV is completely built and covered, with engine and radio installed.

As all work is done on a truly custom basis, certain additional services are available. For example, models can be supplied primed ready to be finish painted. Gary will also build individual components (wings, fuselages, etc.) to order or as replacement parts for customers' models if they are damaged.

As far as the cost of such services, it is obvious that there is such a wide spread from one model to another that prices can only be quoted on a specific basis. For ordering information contact Gary Walker Models, Custom Building Service, 2200 West King Street, Cocoa, Florida 32926, telephone (407)637-5116 during working hours or (407)632-3164 evenings.

The builders discussed heretofore are probably most typical of the great number of modelers who build for others. Some are faster than others, some are more skilled than others, and some charge far more than others. But in the main, they are talented craftsmen who love to construct models and take great pride in their work. They are so taken up with the hobby that they just happen to turn out more models than they need for their personal use, and so they have looked to their fellow R/C enthusiasts to purchase their surplus production.

Then we have the builder who has

progressed a step or two further and has devised a system which produces ARFs in quantity. However, he still manages to retain a custom quality in his product, and just such an entrepreneur we find in Walt Popaden Jr. of Tampa, Florida. Let's let Walt tell us about his operation:

"I currently have over 150 planes built-up in stock at my warehouse. I have a full-time designer, Ernie King, and two full-time builders. I also use as many as six part-time builders during the year.

"I provide ARFs in both electric and gas versions. I currently have four new very competitive electric designs by Ernie King which I offer as a plans package for $39.95, or as complete, ready-to-fly units. As an example, I offer the Amp Eater, a sport electric for 035 to 05 power systems, with three-channel operation (Cannon micro radios installed) as a complete ready-to-fly package for $595. I offer gas sport planes in two-cycle .28 cubic inch or .40 four-cycle; a .40 cubic inch two-cycle or a .61 four-cycle; and a .60 cubic inch two-cycle completely ready-to-fly from $495 to $895 with the latter price range including engines and radios.

"My client list spans ten years and numbers over 200 with many being repeat orders, some buying as many as two or three models a year. I fully agree to refunds if the plane is not used and my customer is not satisfied with the workmanship. My designer and I use the logo 'Models in Motion.' We also have some special performance oriented four-cycle designed sport planes in a four-plan set offering for $39.95."

I'm highly impressed with everything Walt has to say, and I think we can all agree that his is no garage type operation. He maintains an inventory and fills his orders in a thoroughly business-like manner. He has invested a great deal of time and effort in providing the customer with an excellent selection of models from which to choose. While I haven't yet had an opportunity to personally examine or test one of Walt's designs, the photographs of his models indicate that he maintains a high degree of quality. For further information, contact Walt Popaden, Jr., Models in Motion, P.O. Box 22083, Tampa, Florida 33622, telephone (813)725-1900.

For those readers who have never purchased a custom built model before, we have endeavored to provide some insight into what is available and what kinds of builders are catering to the R/C community. We have dealt with three typical operations ranging from a single individual working as a hobby in his home all the way to a full-blown model construction business.

Who would be the buyer most interested in these models? Probably well-experienced R/C fliers who appreciate quality as represented by outstanding workmanship and for one reason or another do not or cannot build their own models. Most such individuals normally buy standard factory-built commercial ARFs, but there is always the person who hates to run with the crowd and can afford to spend a bit more to indulge in his taste for quality and status. Such are the folks who keep Mercedes, BMW, and Rolex thriving. Probably a goodly number of these consumers of custom models are entirely capable of doing outstanding model building themselves, and because of this they are discriminating in the caliber of models they buy.

Another buyer of ARFs may purchase a particular airplane only to place it on display. There are significant numbers of model buyers who are actually collectors. They are interested only in purchasing finely made models to place on display and would no sooner fly one than they would expect the Smithsonian to fly their museum airplanes. They buy these just for the sheer pleasure of looking at them, and as conversation pieces. There is also the collector who may buy models as an investment, as there is a lively resale market for truly high-quality airplanes.

So, whether you are an active flier of custom ARFS, or interested only in collecting models, or a rank beginner who can afford to buy the very best in an R/C trainer, take a good look at the offerings of the custom ARF builders. They are a small but valuable group and we are most fortunate to have them in our hobby/sport. •

Peanut. . . . . . *Continued from page 53*

and softer stock for uprights and cross-pieces. The sheeted portion of the fuselage is made from very light 1/32-inch stock, and the stringers are 1/32x1/20 medium. The forward bulkheads (to the point where the

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stringers start) are soft 1/20, while the two aft bulkheads are soft 1/32 stock.

WINGS

The top and bottom wings are identical, with some minor differences in the center section. The solid lines shown on the plan in the rear of the center section show the construction for the upper wing; the dotted lines are for the lower wing. There is, naturally, one exception to this rule. The piece of 1/8x1/20 that is shown in the rear of the upper wing's center section (part of the cabane attachment structure) should be duplicated in the lower wing, and will form the attachment structure for the rear ends of the landing gear legs. The leading edges are made from springy 1/16 square stock, the trailing edge from soft 1/20x1/8, and all ribs from soft 1/32 sheet, except the ribs in the center sections and at the strut attach points. These ribs are made from soft 1/20-inch stock. The wing tips are two laminations of 1/32 that have been soaked in water, glued, and bent around a waxed cardboard form.

TAILFEATHERS

Remember, this airplane has *no nose*. Keep the tailfeathers *light*. If you don't automatically weigh your balsa, now is a fine time to start. I used 5 lb. stock. Once again, the outlines are formed from two laminations of 1/32x1/20 soaked and bent around a waxed cardboard form.

MISCELLANEOUS

The landing gear legs are made from some 11 lb., 1/20 stock. The only wire in the gear is some .020 that is sandwiched between two pieces of 1/32, and forms the crosspiece. The wheels are two laminations of soft 1/20 stock that have been bushed with small pieces of 1/16-inch birch dowel. The inner wheel covers are discs of bond paper that have been covered with tissue and glued to the wheel. The outer wheel covers are larger discs from which a pie-shaped segment has been removed, allowing them to be bent into the flat cone shape shown on the plans. The cowling is fabricated by the time-honored method of choosing a soft block of balsa, and carving away anything that doesn't look like the cowling. I did some additional hollowing of the finished block as well, more to give me room to install dummy cylinders than to reduce weight. The cylinders are the smallest Williams Brothers models, gussied up with balsa heads and wire pushrods and spark plugs. The prop is a 4-3/4-inch Peck unit. I'm not out to set any records with this airplane, and the Peck prop is very durable.

FINISHING AND COVERING

My references showed about six photos of the Martinsyde, all in that wonderful shade of gray that exists only in WWI photography that could equally well represent khaki, olive drab, doped linen, or metallic magenta. I made a judgment call, and opted for "antique." To get this mysterious parchmenty shade, I used Dr. P.H. Martin's Radiant Transparent Water Color (yellow ochre) applied to the tissue with an airbrush. First, mount the tissue in a shrinking frame of some sort. Then mix 1-1/4 oz. water, 1-1/4 oz. isopropyl alcohol, 2-3 drops household ammonia and about a quarter bottle of Dr. Martin's in a 3-oz. airbrush bottle. Spray this mix on the tissue. The first coat is *awful*—but have faith. Allow it to dry, and repeat until you get a nice "aged" look. Do let it dry between coats, as it's hard to judge the shade you're getting when the tissue is wet. Though the photos don't show it, I got a bit carried away, and my Martinsyde is, I'm afraid, a bit more orangey than antique.

The nose block and the portions of the fuselage shown in the photos are silver. The numbers on the rudder are black, and the Union Jack consists of a blue field, broad white crosses with thinner red crosses superimposed on them. These markings, by the way, appear on an actual Martinsyde S-1 shown in *War Planes of the First World War, Volume One: Fighters*, by J.M. Bruce.

The wings have no spars, and if you were careful, the tail surfaces are very light. This translates to a *gentle* application of alcohol to shrink the tissue, followed by pinning the flight surfaces to a flat surface until the alcohol dries.

ASSEMBLY

Meditate for a while, since itty-bitty bipes are a pain to assemble. If you've been careful with the fuselage assembly, careful with the lengths of the cabanes and careful with the alignment of the fuselage sides, you shouldn't have too much trouble. Another big assist comes from leaving little "nubs" on the cabane and interplane struts. Then I use a needle file to drill holes in the balsa mounting positions in the wing center section and outer wing panels. The strut "nubs" then glue into the holes. I find this locks the structure in place nicely. If you've got a better system, by all means use it. I put the tail-feathers on first (using a piece of 1/32 balsa under the stab to provide the decalage called for on the plans), then the lower wing (measuring between the stab and the wing to assure myself that the wing is aligned properly with the stab), and then finessed, tweaked, teased and torqued the upper wing to fit. The interplane struts are added last. This is a fine application for a Titebond type of glue, as you'll want time to move parts around. Last, the landing gear is installed.

My ship weighed just under ten grams, sans rubber and ballast.

FLYING

I firmly believe that no two Peanut scale models of the same aircraft exhibit the same initial flight behavior. Given the size of the models, I'm not sure that one fellow can really duplicate another's weights, incidence angles, etc. In any event, here's how *my* Martinsyde behaved: using a loop of .100-inch rubber about twice the hook-to-peg distance, I needed a lump of lead putty (great stuff, found in fly-fishing stores) about 3/4 the size of a pea to bring the balance to the 20% point on the upper wing. Powered flight showed a pronounced power stall-spin to the left. I added down and right thrust, and wash-in on the left wing panels. Then a tad of left rudder was added to help the turn.

I found the Martinsyde to be challenging enough to hold my interest, without being difficult enough to make me think about

taking up origami. With its old-timey looks, it's a great crowd pleaser, as well. I hope you enjoy your Martinsyde!

Electric. . . . . . *Continued from page 25*

one nudge doesn't do it, use another. Never hold the stick to one side. The plane should never make a steep bank; ten degrees is maximum. Over that, and the plane will start to dive. A dive will require up elevator to control, and most beginners will fail to do it successfully. This is where an experienced flier can step in and save your plane. The only two exceptions to this situation *that I know of* are the Leisure Playboy and the Brigadier; if left alone they will recover by themselves. Almost all other planes will not.

The beginner should leave the elevator alone. Overcontrol on the elevator can lead to a stall which can turn into a spiral dive, or a roller coaster which often turns into a spiral dive. Most beginners will not be able to recover from a spiral dive. Elevator is not needed in turns if the turns are shallow. A good trainer should be able to land without elevator inputs. It may land nose low, but that is much better than using up elevator, stalling, and hitting straight in. A nose-low landing is very hard on gearboxes, though, so I recommend that the landing gear be extra long, or use large wheels.

The best procedure for a beginner is to leave a little bit of left or right turn trimmed in, so the plane will fly around all by itself in large circles. If it's stalling, it usually is caused by too much up elevator trim or not enough downthrust in the motor. Put in a little down trim. If you can turn off the motor, do so and see if the plane settles down. If it does, you need more downthrust on the motor. This is very common, especially in powered glider designs like the Electra, Amptique, and Electric Malibu.

Last, but not least, never let the plane get far away. You should always be able to easily tell what the airplane is doing. If it gets too far away you cannot tell which way it is turning, and most beginners will (you guessed it) spiral it in! If you do teach yourself, you are brave. It can be done, but be ready to do a lot of repair.

I recommend 100 watt motors (05) with six cells, either direct drive or geared. I personally prefer direct drive, as it is simpler and costs less, but geared does have a better climb on powered glider type models. Any sub-C six-cell pack on the market will do a good job, as will any charger designed for six sub-C cells. A beginner can use anything from a cheap two-channel radio to the four-channel; choose what you prefer or can afford. Two channels with the on-off slaved to elevator or rudder works just fine. On-off is all a beginner needs, but a speed control is certainly handy if you want and can afford one.

Some do want to start with planes larger than the 100 watt size, which are usually in the 2.5 to 3.5 lb. range. You do have more financial investment in larger planes, and more emotional factor. I recommend either the 15 or the 40 size motors. Unfortunately, there are almost no kits or ready-to-fly planes for 15-40 electrics, much less beginner's planes. The Astro Porterfield is a nice flying plane, and would be a good one, but it is so pretty that a crash would be disheartening. My guess is that the Telemaster type planes sold by Hobby Lobby would make excellent electrics, but adapting them would be part of your learning experience. Larger Old Timers are excellent, and John Pond has a wonderful plans service for just about any you could want. This is the best way to start with large electrics, I think. The Buzzard Bombshell and the Buccaneer would be good ones. Those who are starting in electrics but who are already good fliers will find that the Bridi kits, the Sig Seniorita, and Senior Kadet will be a good start. The 15 and 40 electric sizes are "right" for flying at club fields, as they are compati-

ble with the flight habits of everyone else at the field. I am very interested in your experiences; if you have taught yourself to fly on your own with an electric, or are flying the 40 size electrics, drop a line and a photo and you too can be famous!

Colin McKinley sent a photo of his Powerhouse, powered by an Astro 60. This is a good example of what I said earlier about Old Timers making good large electrics. The Powerhouse uses twenty-four 800 mAh cells, weighs 7 lbs., has 1200 sq. in. and uses a 14x8 prop. It climbs about 800 plus feet per minute. Thanks, Colin, for the info!

Howard Lazerson flies his 67-inch Quaker Flash with an Astro 25 direct drive, fourteen 900 mAh cells and an Astro speed control. It weighs 4-1/2 pounds and uses a 9x5 Top Flite prop. It flies well and takes off in less than 20 feet. Howard thinks it would do well on floats. The Quaker Flash is a Hobby Horn kit; for those who would like to build Old Timers without the necessity for scratch building, it would be well worth your while to take a look at the Hobby Horn kits. Thanks, Howard!

For now, start the year right, fly electrics!•

Brimfield. . . . *Continued from page 24*

ish around the port engine cowling. Ed will be back after corrective surgery.

Nelson Whittney brought a collection of intricate electric-powered craft. The most outstanding was a Sikorsky S-38 flying boat powered by two Astro 25s. The small size of the model could not cope with the waves, and a water-caused short prevented it from flying. Construction was not unlike a large scale rubber model, with dozens of struts, wires, and working hatches. The radio is carried in the upper wing.

The largest model by far, and the one that attracted the most attention, was a monster Martin Mariner PBM built by John Nicolacci. Even at about 1/12-scale it was huge. Not as well known as the Catalina PBY, the PBM was the second most numerous U.S. flying boat in WWII, with over 1,400 built. It also has the curious honor of being the only flying boat to alight on dry land and take off again, after the repair of an engine problem and passing an airworthiness inspection. I understand the model was originally built for a movie and then retained by the builder when he learned the movie company was going to scrap it after the filming was done. The PBM has made about every Brimfield meet and was entered in the 1985 Nats at Westover AFB, Massachusetts. The crowd was in awe at the scale JATO (Jet Assisted Takeoff) using several Estes rocket motors. The craft also sported on-board electric starters. The design was well thought out, with many access hatches able to be popped on and off in a blink. The wings are attached in an unusual manner: the roots have matching piano hinge sections that are mated with lengths of wire that normally serve as the hinge, but in this case, lock the wing roots rigidly to the center-section. The realistic flights were marred only by the loosely attached tip floats, designed to prevent damage, which came off in the waves; John had to taxi back by careful use of his differential throttle feature. Overall construction is foam and fiberglass and power is by two .90s.

Reluctantly, we all had to pack up and

leave before 5:00 p.m., when the park people closed and locked the gates. Barring wild weather, the next Brimfield Float Fly promises more action. This time I vow not to be a beach-sitter and will get in more float time. You have to experience the thrill of flying off water. Come to Brimfield with your creation this spring and let's do some spash-and-goes! •

Big Bird. . . . . . *Continued from page 31*

regarding aerobatics and maneuvers (the AMA Rule Book is a good example) usually include sketches showing what the plane should do and a blurb describing how to get the plane to do it.

However, Tom Triol decided to take a different approach in getting pilots to understand the "how-to" of many standard maneuvers. He simply drew pictures showing the position of the sticks (Mode II) for each maneuver.

Remember that these drawings show basic positions and that in many cases control surface throws may have to be increased, balance points moved back a tad and stick twiddling refined and polished in order to achieve the desired results. But the accompanying chart should get you moving in the right direction (sorry, but I couldn't resist the pun).

BIG BIRD SOCIAL CALENDAR

June 9-11: The Billings Flying Mustangs (International Miniature Aircraft Association Chapter 203) will be hosting the very first IMAA Regional Fly-In at their B-I-G flying site just outside of Billings, Montana. They figured that since the Annual IMAA Rally Of Giants is kinda far away, it'd be easier for folks up here in the Northwest to meet old buddies and enjoy three days of flying fun if there was only a day's travel time involved to get to the fly-in.

There's unlimited space available for campers, RV's and such, and motels are only 12 miles from the field. Food, drink and sanitary facilities will be on hand and there are no external frequency problems to sweat.

Write to Event Director Donald Herington, 1401 Central Avenue, Billings, Montana 59102, for the flyers.

June 14-18: This is the Big One, IMAA's Annual 5-Day Rally of Giants at Odessa, Texas. The West Texas Magnum Squadron (IMAA Chapter 172) is in charge and they've been working their collective tushes off to make sure everyone's gonna have an outstanding time.

Registration forms/flyers are available from Festival Manager Robbie Carson, 6576 Amber Drive, Odessa, Texas 79762

(I've also got some) and are chock full of anything and everything you'd want to know about the flying site, the city and the 5-day Fly-In schedule. Also, be advised that Channel #12 is not operational on the Rally Site and that a fire extinguisher is required.

July 29-30: The Puget Sound Rocs (IMAA Chapter 108) 7th Annual BIG Bird Bash & Tea Social will be held, as usual, at the Rocs' Roost in Yelm, Washington. Event Director Bruce Gale (811 9th Ave. S.W., Puyallup, Washington 98371) knows how to treat guest pilots and how to make a fly-in memorable. If you need or want more info, contact Bruce (or me) for flyers.

And in case you're not familiar with IMAA, here are a few things you should know: 1) these fly-ins are sanctioned by both IMAA and AMA; 2) they are low-key and noncompetitive so that you can really let your hair down and *enjoy*; and 3) the minimum size requirements for aircraft registered at IMAA sanctioned fly-ins are 80 inches for a monoplane and 60 inches for a bipe.

How About This One . . .

Excited female voice on the telephone: "Help, police! There are 40 dogs on my front lawn!"

"Forty dogs! Are they mad?"

"Thirty-eight of them are!"

Play it safe for the new flying season: cycle batteries and test-run engines before making that first flight.

And don't forget that your questions, answers, ideas and photos are what make this column work. Al Alman, 16501 4th Avenue Court East, Spanaway, Washington 98387, (206)535-1549. •

Free Flight. . . *Continued from page 52*

piece of Saran Wrap about 3 inches square. Next he puts glue on the tear lengthwise, and along the edge of the 'L' 1/2-inch tear, and then places the Saran Wrap on top of the entire L-shaped tear. The part of the covering that usually curls under as a result of the tear sucked right up against the Saran Wrap, and the glue spread out evenly over the entire two sides of the tear. He gently pulled the Saran Wrap tight in all directions while the silk tear held itself tight up against the Saran Wrap.

" 'There,' Sal said, 'leave it dry and when it's dry, just pull the Saran Wrap off the tear.'

"I could hardly say anything. It was simply amazing the way the silk adhered to the Saran Wrap and how the glue spread out evenly over the tear. I had trouble keeping from pulling the Saran Wrap off too soon, but I bided my time and when dry, which was only a few minutes in the hot Vegas air, I pulled the Saran Wrap off and presto! The tear was repaired perfectly. No gaps or curls, and you could hardly see it was torn. The payoff was when Sal sez, 'Don't throw the Saran Wrap away, you can use it over again.'

"Now, this has to be one of the simplest, yet most efficient ways of repairing a nasty tear in open silk covered structure I've ever seen. What's more, it works on tissue covered surfaces, too. It sure took the cuss out of repairing."

TWO MORE TIPS FOR YOUR FREE FLIGHT ENJOYMENT

From the pages of the VAMPS, Vegas Antique Model Plane Society newsletter (Editor: Phil McCary, 532 College Dr., Henderson, Nevada 89015), comes the following, courtesy of club member Lee Rose:

"1. In order to hold the winding tube inside the fuselage on a rubber ship, Lee uses a small piece of Velcro on the tube and on the front of the fuselage to hold the tube in place. When he is finished winding he just pulls the Velcro apart and presto, he can slide the tube out of the fuselage. Neat trick!

2. Lee also uses a small piece of clear plastic fuel line under the needle valve spring on those Cox .020 and .049 engines to keep air from leaking into needle valve assembly and giving those erratic engine runs. It works, so give it a try."

Phil also proclaims proudly that the 1989 SAM Champs will be held in the Las Vegas vicinity.

AND STILL ANOTHER TIP— MOP HEAD PUNK

I know, you've seen them on the malls and hanging around on the streets, right? Wrong! The kind of punk I'm talking about here is the kind you use to light your fuse (it rhymes, doesn't it?). Bill Gaiser showed up at a recent WMC meeting with this little tidbit. It seems that some of the mopheads sold in stores are made from 100% cotton. If you look closely, you will notice that the mophead is made up of dozens of foot-long cords. Buy the mophead, and pluck out one

of the cords. You will see that the thing looks strangely like a dethermalizer fuse, except a bit more loosely woven. It is probably not adequate for use as a fuse in the airplane, but it is certainly adequate for use as a punk, which will save some of that good fuse for in-air use. On top of all of that, these mopheads are cheap.

F1J AT THE SIERRA CUP

Bruce Augustus took the trip to Sunny SoCal and flew in the 1988 Sierra Cup for his first time last October. He filed a brief report of the meet with me, and I am excerpting part of it for this column.

"For the first F1J event ever flown in this country, no one showed up with anything exotic. Just good flying Cox powered 1/2A models. Some were multifunction, but no radical designs or materials, and nothing built especially for F1J. Martin Gregory's airplane was a Half-A Night Train, a typical British design with profile fuselage and engine mounted sideways on wood beams. Elliptical surfaces and a very nice Ray Monks multifunction timer produced a heavy but consistent model. Martin hails from Essex, England.

"Marty Thompson won F1J with a Union Jack multifunction design which he says is aging gracefully. Fine craftsmanship on both of these models. There was no flyoff because Marty was the only competitor to max out. Walt Ghio entered a RamRod in F1J, and although it flew very well, there have been design improvements in the last three decades. I found my Hutchinson Maverick to be well suited to the event. It was fun flying 1/2A gas in the FAI format, and I hope the event gains popularity. It appears that any competitive 1/2A model will be suitable for F1J as long as it isn't too large for the 7-second engine run."

Bruce also mentioned that the meet was consummated with a white tablecloth awards banquet on Saturday night. A very fine affair, Bruce thought, with a full bar and superior meal at a reasonable price. He recommends the Sierra Cup experience most highly.

Thanks, Bruce, for the report. It strikes me that the F1J event and last month's Vee-wing 1/2A Concept model might be a match.

ROHACELL CONSTRUCTION MATERIALS

Just received a small box from Composite Structures Technology, a mouthful of a name describing Matt Gewain's new company. What Matt is doing is marketing a bunch of hard-to-find exotic and semi-exotic building materials including the nicest quality foam I have ever seen anywhere. The foam is known as Rohacell and is available in 3.1 lb. and 1.9 lb. per cubic foot densities, so it is very light weight. Additionally, it is easily worked with the same tools you would use to build with balsawood. The 1.9 lb. stuff is close to the same strength as 6 lb./cu. ft. balsa, and the 3.1 lb. stuff is right in the same strength range as 6 lb. balsa. You can use any adhesive that doesn't depend upon evaporation, so epoxy, polyester and slow drying cyanoacrylate work well. Any finishing material can be used with it, including epoxies, dopes, paints, etc.

It is truly a modern miracle for modelers. As the description that came with the sample indicates, it can be used for either ribless shell types of construction or in a solid core arrangement.

Rohacell comes in different widths and lengths up to four feet. Thicknesses are from 1mm to 50.8mm. Not all thicknesses are available in the two listed weights.

Matt also carries some other neat stuff as well, for example, fiberglass cloth in very light weights, special laminating epoxies, Kevlar 49, and other stuff.

If you are interested in trying out Rohacell and would like more information, drop Matt a letter (enclose an SASE) at Composite Structures Technology, 3701 Inglewood Avenue #268, Redondo Beach, California 90278-1110. You'll be pleased you asked.

NEAT BOOK FROM DON ROSS

Don Ross has been a contributor of rubber powered model airplane designs to the hobby for many years. I first ran across some of his work in the short lived publication, *Sig Air Modeler* magazine. Well now, Don has put forth his energy and talent into a new book for the person who wants to get started in or get better at building and flying rubber powered free flight models.

Don's book is entitled (strangely enough), *Rubber Powered Model Airplanes,* and it provides 168 pages jam-packed with designs, great drawings, illustrative photographs, and explanatory text material for the beginner and expert alike. If scale model building and flying is your thing, "it's in there!" If you are into outdoor competition building and flying, "it's in there!"

The publication should be a success, as it is being marketed through one of the larger mail order houses, Motor Books International, P.O. Box 1, Osceola, WI 54020. The book sells for $12.95 each plus $3.95 postage for however many books you get. School programs would really benefit from this text as well as individuals. The local library would be a good bet as well. It has a soft cover but a regular binding. I suggest it highly. Three cheers for Don's success.

TO LOSE OR NOT TO LOSE,
By Ed Lidgard

Recently, I read this article in the Thumb Print Newsletter (Thermal Thumbers of Metro Atlanta, editor: David Mills, 10-D Pine Circle NE, Atlanta, Georgia 30305). I immediately ran a copy of it and gave it to fellow club member Clarence Bull, who is constantly losing his free flights even if they drift just a short distance. After some thought, it occurred to me that most clubs probably have such a member, and that you could do yours a favor if you bought this issue of *Model Builder* for him, and highlighted the following article. It is priceless information in my opinion.

"It's a universal problem. How to find models in weeds, crops, and other pretty green things. It's a good thing I don't have to put out a nickel for every hour I've spent walking a search pattern in tall weeds, grass, or corn. Almost every time that I find the model search was difficult, was because two bad habits were exercised: not thoroughly establishing a line on the model and remembering where the last sighting was made from, and not estimating the distance away from the launch or last walking or bike sighting spot. Here's how.

DON'T MOVE

"1. Stop. . .before the model hits the gound. Look beyond it and establish a sighting point. Mentally describe it to yourself in detail. Repeat to yourself. Don't move. Establish where you are for reference. Tie a handkerchief to the tallest nearby object. Determine a reciprocal sighting point so you have a point to walk back to.

"2. This is tough. Try to pick out some object that is beyond where the model landed and between you and the model, to establish distance.

THE SEARCH

"1. Assuming the model is 'right over there' is an error. Think about the location so it is defined and your head is in gear. Now move toward the model. Before you have travelled the estimated distance to the model, start zig-zagging to cover an area wider than normal vision while walking straight. Constantly check your sighting point and its reciprocal so you cover the defined area. People do not normally walk in a straight line, so correct yourself.

"2. Still don't see it, eh? Stop! Review how you arrived at the point you are now. Hurrying causes incomplete eyeball sweeps. (Haven't you ever stepped on the model you are looking for or run over part of it with the bike?)

"3. Walk or ride back to the handkerchief marker. Carefully re-establish where you started and re-walk your first sighting point again. Here is where the sighting point mental picture is valuable. If the second walk or ride to the sighting point is not productive, then broaden it. First, re-estimate the distance and go further. No luck, eh? Return by walking a zig-zag pattern at least 150 feet wide and narrowing it as the search point is reached.

"4. Re-evaluate all pertinent locations. Question all decisions. Start over, widening the width of your search area and condensing the distance forward of each zig and zag. Keep at it. It's got to be on the ground. Remember the direction the model was travelling when it hit, so your mental picture of it during the search will be clearer. Distinctive coloring is essential.

HOW TO BE PREPARED

"1. Carry a binocular or monocular with you. Get it out before the model lands and hold the impact point while you memorize the sighting point. Some binoculars have a built-in compass. Take a compass heading at your standing point. A sighting compass is excellent for keeping yourself in line.

"2. I'm going to make a lightweight pole ten feet long with a bright balloon on top and a metal spike on the bottom. When I launch the model, start the watch, I'll pick up the pole and go. When the model gets close to the ground, I'll stop and set the pole in the ground, grab my monocular and look very closely when the model lands.

"3. Notice: no hurrying. A good line and one walk on the line is better than a long search, and another and another. . . .

"4. If you are in tall corn and are near the model when it comes down, stop. Determine the direction the model is from where you are and make a line in the dirt in that direction. If other modellers are near, yell and get them to come to you and go out from you in the estimated direction.

"5. Trees are another story. Ask Perryman; he has never had a model in a tree. Carry long poles that telescope, climbing irons, a slingshot with heavy lines, polypropylene rope and when all else fails, an ox. When you are sending up a line, stand under the branch you want to pull or shake and send a weight up so it comes down a slight dis-

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tance over the branch and straight down. Having the weight wind around the branch loses the line, thank you. If a fifty-pound line is not enough, pull up a 1/4-inch polypropylene line and shake harder. If that isn't enough, get help to pull harder. Don't get violent.

"6. Isn't all of this fun?"

* * *

These suggestions are really helpful, and I would like to add my two cents' worth to two of the items. I like the idea of the lightweight pole mentioned in item 2 above, except I intend to make mine from an old telescoping auto antenna. I will braze a large nail or sharpen the bottom in some way so it can be poked into the ground as specified above. I will carry a large, brightly colored cloth (a yard of red or orange silk would be easy to carry and very visible) in my pocket, and when I reach the point where I need to use a reference, I will extend the antenna and tie the cloth onto its top before I jab it into the ground. The antenna I have extends to about six feet, so it can be seen from a distance. The ability to collapse it for ease of storage and carrying are more appealing than carrying a long pole with me.

Finally, for those of us who fly in the northwest, the prospect of retrieving models from trees is everpresent at a couple of our flying sites. If a model is trapped in a tree with low branches, a pole usually will do the trick of knocking it out. If the model is caught in high branches, it is much more difficult. We have had success with a bow and arrow using a very light line tied to them (one end on the arrow, the other end on the bow). The arrow is shot over the branch, and the light line is used to pull up a heavier cord. This cord is then tugged and pulled to shake the model loose. On occasion, a rifle or shotgun is used to blast the limb off the tree, and on a couple of occasions, we have used a chain saw to cut the tree down completely. Although these methods are successful in the majority of cases, sometimes the model gets to spend some time in the tree. Almost without fail, the model will eventually fall down, get blown down or otherwise dislodge itself. Twice, in my own experience, I have been called by hunters or others walking through the woods and finding my model on the ground. These are the times that you value having your name, address, phone number and the words REWARD IF FOUND plastered on the ship. In both cases the models were returned even if weathered. One ship needed recovering, the other rebuilding. In both cases, the engines were undamaged.

So, some good model retrieval tips for your Spring flying activities. Thanks, Ed.

TIME TO GO FLYING

Looks like I really got carried away this month, so it's time to put the old word processor away for another 30 days. Let's go flying and catch some thermals. •

Control Line. . *Continued from page 59*

engines about $35. Many contests restrict the number to one or two per contestant.

* * *

Now that we know what the events are like, where do we start?

Well, you could start with AMA combat. It has been done, but I wouldn't recommend it for the following reasons: you will be devoting more expense and workshop time per hour of competition than you would with some of the other choices, and you will find the flying more frustrating to learn—everything just happens too fast for a novice, resulting in a lot of crashing, line tangling, etc. Secondly, a novice flier, state-

of-the-art combat equipment and the excitement of a match create a potentially dangerous situation. I'd recommend sneaking up on this event through the others, some of which are designed for just such training.

Ruling out FAI as far too complex and difficult for all but the most ambitious expert, that leaves us three options: 1/2A, Slow or FoxDoo. In choosing between these three, you really can't go wrong. Let met give you some pros and cons of each.

1/2A: This is the cheapest to get involved in. These planes are the least susceptible to damage. Fly in tall grass and a well-built plane will seem almost indestructible. Because they are lighter, pull less and are on strong lines, the planes also are somewhat safer for both contest and practice flying. This makes the idea of practicing actual combat flying—outside of contests—practical from a time and expense standpoint (very few people care to practice non-contest combat flying with their fast combat planes). The planes are a little tricky to build straight, light and true and can be doggy if not built well. The trick is to find a sturdy, light, good-flying design—and they *are* available. The engines are a little more cranky than the big ones, particularly in cold weather, but can be mastered. If there's a drawback, it's that the flying skill required is near to that of fast combat. This is offset by the fact that you can practice much more with these planes and may learn more quickly. When you begin flying fast combat, these planes will remain useful for practice.

FoxDoo: This event, I believe, is the easiest to begin in. The planes are incredibly easy to build and build well. The engines are cheap and easy to start and run. At 80 mph on 60-foot lines, the planes are slow enough that the average novice (assuming he has modest aerobatic skills) can keep up with them even in a match situation with a modest amount of practice. With the restrictions on the number of planes, combined with the fairly strong design and slow speeds, it is a low-cost, low-destruction, high-payoff event.

Slow combat: This is the official AMA rulebook training event, and can serve as such, but it is not as easy as it might look at first glance. The airplane size restrictions make them larger, more work to build and more expensive. With the increased size, the challenge of making them light and good-flying increases; a doggy plane can be a distasteful experience to compete with. When they hit the ground, they tend to break. Suction fuel systems can be a bit mystifying to operate, as opposed to bladders allowed in the other events, which are quite simple and reliable. And, in this event, you will notice a fair spread in equipment and skill level between the novice and experts. All those things understood, slow combat can be a good training ground because the planes are slow enough to keep track of. The engines are transferable to fast combat when you desire to move up.

You can see by my remarks that I favor FoxDoo or 1/2A as a beginning event, with slow combat as a viable alternative. I think fast combat and FAI should be left for later,

when you have built skills in the others. Ultimately, however, I think that most fliers will find fast combat the ultimate challenge and the most fun and rewarding in the long run.

* * *

Once you have selected an event, what next?

I would like to repeat something I've written here before: Find and attach yourself to an expert flier, and watch and listen. His help will be invaluable. Go to as many contests as you can and learn as much from the people already competing as possible. And practice—both at your local field on weekends and at as many contests as possible. If you have the time and money, fly in several categories for a while, just to get lots of flying in.

I won't say much about designs other than to suggest that you examine what others in your area are using (except in Fox-Doo, where all planes are the same). There are a multitude of good designs to choose from. A few guidelines to look for:

1/2A: A small tapered foam wing plane will be easy to build and, if light and straight, will fly well. However, a good balsa design (such as the Cheap Imitation published by Mike Hazel in this column a couple of years ago) will be an excellent choice for sturdiness and good flying. Weight is critical. Look for a design with a one-piece plywood motor mount, a one-piece fuselage, a one-piece stabilator, and a maximum weight, including Cox TeeDee .051 or .049 engine, of 5-1/2 ounces.

Slow: look for a simple design with as few pieces as possible. Foam makes for good flying wing planforms but balsa makes good, light, strong planes. Search out a good *tank* for your engine, such as a Virginia Craftsman chicken-hopper tank. Tank is about 80 percent of good engine runs in this event. Try for a maximum weight of 25 oz., including Fox Combat Special engine.

AMA: When you get there, look for these features in a design: double-tapered foam wing, one-piece fuselage, simple motor mount design, and one-piece stabilator with simple hinge. Many fast combat designs are just plain more complex than necessary. When in doubt, check the winner's planes. Some of the experts use planes that weigh no more than 18 oz. including Fox Combat Special engine, but up to 22 ounces is acceptable if the design is right.

In regard to any of the events, when examining the airplane options, watch them in flight before deciding what to build. Don't just look for how fast the plane is and how sharp it turns. The following factors are equally important:

- Does it stay tight on the lines? Many of the most spectacular turning planes are a bit loose on tension, leading to periods of vague control and sometimes even crashes or flyaways. Remember, scoring is not based on how well a plane turns, but on how well the pilot can control it to score cuts and kills! Some key factors in line tension are like rake (where the leadouts exit the wingtip), wing leading edge taper, wingtip weight, elevator travel and moments (distances between the balance point and the prop and elevator).
- Does it fly well out of the launch? A plane that's hard to control on launch is a tipoff to poor stability and line tension. Key factors include tip weight, line rake, leading edge taper and balance.
- Can it be flown level without bobbing around, and still turn quickly? If it's hard to fly level, it's tailheavy, indicating that the design moments may be inherently incorrect. A good combat plane is stable in eyes-off level flight but turns quickly when control input is applied. Key factors include balance, moment arms, size of elevator, elevator travel, control linkages and airfoil shape.
- Does it hold its speed through consecutive turns, or does it slow down and start to wallow? This is a tipoff to nose-heaviness or incorrect moments requiring too much elevator travel to induce turning, the opposite of the instability problem mentioned above. Key factors include moments, airfoil shape, elevator size and travel.
- Does it fly well upwind? Many a promising combat design has been scuttled by its inability to use the whole circle. Key factors include line rake, airfoil, wing taper.
- How fast is it? Airfoil shape and wing planform can make great differences in the straight-ahead speed of a plane and its ability to keep up its speed through turns. Bear in mind that, for a beginning flier, the fastest plane may not be best; you are searching for a plane that you can *control* and *fly combat* with, not win races! For beginners in AMA combat, for example, I have promoted the Undertaker, my design which was published in *Model Aviation*, as a plane with all the right handling characteristics but an airfoil that holds the speeds within a novice's ability level. My own competition airplane at present is basically the same design with a different wing planform, Gene Pape's Underdog, a plane that adds speed to the equation while still passing all the above tests. In addition, a rather plodding builder can crank either design out in 4 to 4-1/2 hours per plane.

* * *

By now you may have selected an event to start in and picked out your airplane design and engine type. How do we translate those

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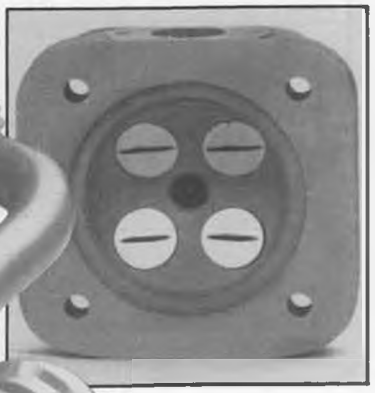

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decisions into combat planes and flying? Let's begin in the workshop.

The usual rules of good construction practices apply. You *must* build your planes straight and pay attention to weight. Combat planes, by their disposable nature, may appear on the flying field to be a bit crude. . . undecorated and lacking the spit and polish of stunt planes. If they've been flown and repaired a lot, the acquire a tattered look. Do not be deceived—the important factors must be attended to: weight, alignment, drag, strength, etc. The last item, strength, is tremendously important, particularly as you move into the faster classes. Most combat fliers use space-age materials such as carbon fiber to add strength without excess weight. Cyanoacrylates, epoxies and white glues are the adhesives of choice, depending on the material. With the high rpms turned by the engines and the wild flying, the structure must be strong enough to withstand both extreme twisting forces and vibration.

Take your time with your early construction efforts to make sure that you pay attention to the above details. With modern construction and finishing techniques, building a plane with proper alignment is not too difficult. Foam wings and plastic coverings make after-construction adjustments for warps feasible, but such things as elevator alignment must be handled in the construction stage. Lest you think such matters are unimportant, ponder for a moment the spectacle of a 120-mph combat plane coming to visit you in the pilot's circle because of the warp you built into it!

Safety is another factor that must be considered. Your motor mount must be absolutely secure, and for good measure many pilots are now attaching a wire from the bellcrank mount to the engine to prevent parts from flying off through structural failure or collision.

As you begin construction, you will want to come up with methods of assuring alignment. Use of a drill press, squares, rulers and triangles, jigs and weights to hold parts in place, etc., are invaluable aids to checking alignment. Your local expert can show you some of his clever tricks.

If you are serious about combat, you will soon want to learn methods of construction using foam. Some good foam airplane kits are available from such manufacturers as the Core House and Dox Generix, but you eventually will want to cut your own. I hope to devote a future column to foam cutting, but for now, you may want to research the magazines for some tips. I recommend Gene Pape's *Model Aviation* article on the FAWF several years ago as a good foam-cutting primer.

For now, I'll just give this quick description of the foam-cutting process:

Foam is cut with a hot wire, running around templates of a hard material such as formica, plywood or aluminum. The wire can be held in place by various methods, with tension adjusted by springs or other methods to a degree determined by experimentation. Electrical current is applied to the wire through some sort of device such as a model railroad transformer or, the simplest method, a series of light bulbs wired into the circuit to step the power down (adjust the wattage of the bulbs to adjust the heat of the wire). Expect to use up a lot of foam as you learn the process; once you master it, there will be little waste. I cut my wings, core out the centers and cut the spar notches, all using the hot wire. Look for more details in a future column.

For adhesives, you should use a slow-cure epoxy on motor mounts and bellcrank mounts, white glue or 5-minute epoxy for bonding foam to fuselages and spars, and cyanoacrylate for non-stressed parts.

In finishing, even though you may not choose to decorate the planes to be pretty, you should use sandpaper to make sure they are smooth and clean, to minimize drag. Most combat fliers use plastic covering for wings (FasCal is the most common) and epoxy glue or epoxy paint for wood parts. In my own planes, I use FasCal for wings and elevators, colored low-temperature covering (Solarfilm, Econokote, Quickcote, etc.) for tips and fuselages, and epoxy for motor mounts.

A few general construction tips:

Your design and control system should work together in such a way that a large elevator has a relatively small amount of travel for the amount of arm movement by the pilot. This combination results in a plane that is stable and easy to fly eyes-off, but turns quickly. I use planes with 3 by 12 inch rectangular elevators, Fox bellcranks with the leadouts in the outer holes, the pushrod in the inner hole, extra-tall elevator horns with the pushrods near the top, and EZ-Just Hot Rock handles (4-inch line spacing).

Bicycle spokes, available cheap at your local bike shop, make excellent pushrods, because they have a keeper already on one end. Solder the threaded kwik-link end of a 4-40 pushrod (available in the R/C section of your hobby shop) to the elevator end of the spoke to provide an adjustable linkage. Do not use smaller than 4-40 kwik links.

Use blind nuts for your motor mounts to save engine-changing time (you may have to change in a match) and cut the bolts off flush to reduce drag.

Bush your leadouts at the bellcrank by sheathing them with small brass tubing where the leadouts go though the bellcrank holes, to prevent sawing the leadouts off. Use Sullivan C-D leadouts.

Combat planes generally should balance at about 25 percent of the chord behind the leading edge of the wing, which in most designs is approximately on the spars. A balancing tip: Build your first plane of any particular design with the motor mount finished last. Rubber-band the engine onto the mount and temporarily attach it. Move the engine back and forth until the plane is balanced properly, and then drill the mount holes. It it comes out right, you can base other planes on this one.

For power, I recommend starting with the stock engines available at reasonable prices. Do not try to rework an engine if you don't know what you're doing. You are searching for reliability as you begin; reworking comes later, once you've had the

chance to learn from an expert how to do it. Many new fliers take good engines and ruin them by trying to hop them up without knowing how. For fast or slow combat, use the Fox Combat Special .36 engine, available direct from the factory for $80. Earlier versions, the Mk III and Mk IV, are often available from local fliers much cheaper, and they still are excellent and competitive engines. For 1/2A, use Cox Tee Dee engines, available at any hobby shop. FoxDoo uses standard Fox .35 stunt engines, available from the factory or most hobby shops. For FAI, dig deep in your pockets and buy the Nelson .15 from Kustom Kraftsmanship (nobody said being a world champion would be cheap!).

Learn and practice the use of bladder fuel systems, which almost any current combat flier can help you with. This is another topic for a future column.

Study different propellers for your particular event; see what people are using at contests near you. Starting out, try these props:

1/2A: Top Flite 5-1/4x3 or 5-1/4x4, Tornado 5x4 or 5-1/2x3, etc.

Slow: Zinger 9x6, Rev-Up 9x6, Taipan 9x6, etc.

AMA: Top Flite 8-1/2x6-1/2 *pylon racing* prop cut to 8 inches.

FoxDoo: Top Flite 9x6 or 10x6, Rev-Up 9x6, Tornado 9x6, Zinger 9x6.

* * *

Once you've built your planes, it's time to start flying combat.

First of all, you need to practice to develop the ability to start your engine quickly on signal. This means you have to learn to prepare it for instant start (fueling, priming, warming, etc.).

Secondly, you need to fly the planes a lot, first to get them trimmed out (equalizing up and down turning through kwik-link adjustment, adjusting elevator travel for optimum maneuverability without stalling by moving the kwik link up or down the elevator horn, adjusting for warps by shrinking the covering to twist the wing or bending trim adjustments into the foam trailing edges, etc.), and secondly to get familiar with how they work. You should try to set up the planes so that they all fly exactly the same—you want to be able to fly them without looking at them in a match, so you have to know how they are reacting to your control inputs.

Now, I'd like to puncture one of the thoughts that's in the mind of most new combat fliers: strategy.

Listen, fliers, there is only one strategy that works, especially for beginners: Cut the string (or, if there's no kill, cut the streamer). If you make it any more complicated than that, you'll have lost before you get a chance to try your tricky moves. The best defense is a good offense. If you are chasing the other guy, he can't chase you. If you try to hide, he'll find you.

OK, you insist on being told some strategy. All right. I'll contradict myself and give you just a little: It applies to the first few seconds of the match. After that, you're on your own. I believe this is the only strategic information you need to know at this point.

The most important period in a combat match is the start. Here is the key word: *FOCUS*. If you aren't paying attention to business now, kiss your streamer goodbye.

You must see the other airplane when the horn is blown to start combat, and you must keep track of it in those first few seconds until the planes are together flying combat. You must never after that let it out of your sight.

In order to see the other plane at the start, you must be looking at the opposing plane, not your own, during the two pre-combat laps. This is not as easy as it seems, because there's usually a speed difference. If the other plane is faster, it may move around out of your sight as the horn is blown (officials are not always precise at blowing the horn when the planes are 180 degrees apart as the rulebook says). How do you keep it in sight? By varying the height of your own plane. Other plane creeping ahead? Fly higher; you'll equalize the rotational speed. If he's falling behind, fly lower to equalize rotation.

The horn has blown—what do you do? Should you scream over and attack his string or wait and react to his first move? The answer lies in who got into the air first.

If you got up first, you can be as aggressive as you want. Go for the kill or cut right away, begin jockeying, or wait; it's your choice. If you jump right on him and get it, you win (or lead, if there's no kill). If you collide, you win on air time. If you miss and give him your streamer, well, you gambled and lost, but the odds were 2-1 in your favor.

If you were the second plane up, a more cautious approach is advisable because the odds of a quick encounter are in the opponent's favor. If you jump right on him and collide, you lose, so you have only a one-in-three chance of a quick win.

After that first encounter, what I said at the outset applies, be aggressive and don't distract yourself by thinking about strategy. Try to get the other guy's streamer and don't keep doing the same thing over and over again. That's all there is to it.

Is there ever a time to play defense?

In any event with a kill, no. You will rob yourself of a chance to score the kill and the other guy will still be hunting you. In a 5-minute match, he'll get you no matter how well you hide.

In an event with no kill, maybe. If you

build up a substantial lead and think you are a good enough flier to keep away, you might try playing defense, particularly if the opponent doesn't have much streamer left to shoot at. Because you aren't subject to a kill, you may be able to preserve your lead without as much risk of a kill. If you must play defense, keep the other plane in sight. If you just run away without watching, he'll pop up somewhere unexpected and get you. The best way to hide is to stay behind the other guy. Run away and come up behind him. As long as you're behind him, you're safe.

Some other tips:

What do you do in a line tangle? Answer: Fly combat! If you can remember how you got in, adjust your maneuvering to fly back out (if you came in with an inside turn, fly outside turns). But never, never forget that the object is to cut the other guy's streamer. If you start worrying about the tangle, you're going to give your streamer away and lose the match. Rule #1 of tangles: Fly combat first, and clear the tangle if it's convenient. If the match is decided, then you can, by talking with the opponent, work together to clear the tangle. If the other guy starts to chatter about the tangle while the match is still going on, don't let it distract you! (Exception: If the tangle is so serious as to threaten lines parting and be a safety concern, go ahead and work on the tangle.) When clearing a tangle, don't tug on the lines. If one plane is down, the down pilot should work to clear the lines. Pit crews should stay out of the circle until the tangle is clear, and should not pull on the downed plane. You can avoid tangles in the first place by being aware of the way they occur. Avoid consecutive loops around the other plane, and if you do them, remember which way they went and reverse them. Consecutive maneuvers of any kind are dangerous anyway because they set up a pattern opponents can pick up on. Learn to avoid them.

In the pits, preparation and practice is important. What about equipment? You should take to the pits a "pit box" that contains your fuel, battery, tools, spare plugs, bladders and props, hand protector, some repair materials (cyanoacrylate glue, kicker, foam primer), and a spare engine. You don't want to take any more than you might conceivably need, because it will get in your way when you're looking for what you do need. (You'll never need epoxy in a 5-minute match! Don't take six spare props, one or two is enough.) Spend a few hours building a box that is logically organized so that you can reach right to the tool you need. This also helps in packing to make sure that you have everything. My own box includes the following: Syringes, bladders, plugs, props, hand protector, Hot Stuff, kicker, foam primer, baking soda (for repairs with Hot Stuff), wire cutter, pliers, screwdriver, hemostat for pinching tubing, plug/prop wrench, No. 4 and 6 hex wrenches (for engine and motor mount screws), spare needle valve, spare fuel filter, battery, electrical ties (for bladders and tubing), and spare prop nut, washer and thrust washer. All of these are in their own slots and displayed for easy access. Nothing is hidden away in drawers, cans, or boxes.

Combat is a very intense activity, but one characterized by sportsmanship among the competitors. They all help one another, with sharing of equipment, knowledge, pitting help, etc. A new flier can make friends quickly by observing these unwritten rules of sportsmanship:

- Be polite and understanding of judges, even when there's a question or dispute. They have a tougher job than you do as a flier and they are unpaid volunteers.
- Be friendly to your opponent. Cooperate by clearing tangles at the appropriate times and trying to avoid them in the first place. Use courtesy in and out of the circle. Don't kick, gouge and wrestle in the center. Get out of the way when you are down, etc. Don't deliberately tangle or collide, even if it's to your advantage.
- Don't accept cheap wins. It's not written anywhere, but you'll build respect among your peers by coming back up to fly when you've got the match won if you stay down (OK, maybe not at the Nats, but certainly in local contests!). If there's a questionable call by the judges that awards you a match you didn't deserve, agree to a rematch.
- Treat other fliers, crews and judges as you'd like to be treated yourself. You'll enjoy the hobby and so will your fellow fliers.

This information should get you started. Now get in the shop and build and get out there and practice. I'll see you in the center circle!

Next month we'll return to the mailbag, as we have a number of interesting bits of correspondence to share. As always, questions, photos and comments are welcome. Note my new address: John Thompson, 1520 Anthony Ave., Cottage Grove, Oregon 97424. •

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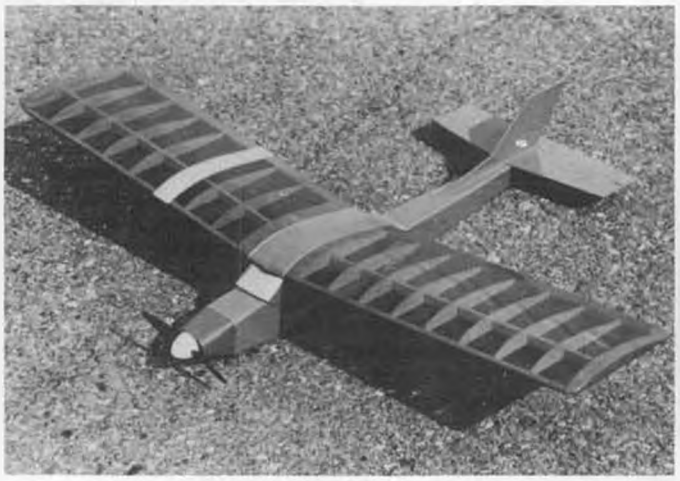

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The Astro Sport is a cute little high wing sport trainer that is specially designed for schoolyard fun. Install the Astro Cobalt 020 Motor and you have a gentle and forgiving trainer that is very easy to fly. Install the more powerful Astro Cobalt 035 and it becomes a real schoolyard show-off doing snappy rolls, loops, and other schoolyard maneuvers. The kit contains all machine cut and sanded parts and is super easy to build. Wing Span 37 inches; Wing Area 292 sq. in.; Eppler-195, Flying Weight 22 to 28 ounces. **Kit # 1019 ..... $ 39.95**

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THE ASTRO CHALLENGER NATS WINNER

Bob Boucher's Astro Challenger won the 84 Reno Nats its first time out and has been winning electric sailplane contests all over the country ever since. Powered by an Astro Cobalt 05 Geared Motor turning a 12 inch folding propeller, the Challenger climbs almost out of sight in 45 seconds, and can repeat this climb three or four times on a single battery charge. The distinctive wing planform with elliptical tips maximizes aerodynamic efficiency and minimizes tip stalls. It's gentle and forgiving nature make it perfect for beginners too. Kit features all machine cut and sanded balsa parts. Wing Span 72 inches, Wing Area 612 sq.inches, Airfoil Eppler 193 Flying weight 39 ounces. **Kit#1020..... $ 49.95**

THE PORTERFIELD COLLEGIATE

The Porterfield Collegiate makes a great sport scale electric model. It's gentle and forgiving nature make it perfect for beginners, but at the same time it can be quite responsive in skilled hands. The large wing and light wing loading lets the Porterfield climb steeply to and land short. Just what you need for flying in your neighborhood park or schoolyard. Beginners to R/C should install the Astro Cobalt 15 Geared Motor. More experienced flyers can install the Astro Cobalt 25 geared motor for very realistic scale like maneuvers. Wing Span 69.5 inches, Wing Area 690 sq inches, Airfoil Eppler 193, Flying Weight 4 to 5 lbs.

Kit # 1018 .....$ 79.95

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Tech. Stuff. . . *Continued from page 33*

floats substituted for the wheels. The aft end of the fuselage is usually not designed for buoyancy or even to get wet. The floats must hold the tail, as well as everything else, well clear of the water. Twin floats do that, with the disadvantages we have discussed. But we are interested in *model* airplanes, and unless we are building scale, we need not be concerned with how the big boys do it. If it makes more sense for us to design and build taildragger seaplanes, we should do it.

Let me call your attention to the fact that we have just conducted a design trade study on the question of two floats versus three. A brief, simple, and non-quantitative effort to be sure, but we conducted a trade study by examining the pros and cons and arrived at some conclusions (at least I did).

FLYING BOATS

I have designed and built about fifteen model seaplanes in the past 50 years, all of them different. About half of them were floatplanes and half were flying boats, although some were so weird they hardly fit either category. All of them had disadvantages, since I was usually stepping out into uncharted waters in one or more respects.

I finally asked myself the question, "Which are better, floatplanes or flying boats?" Let us try to apply the logic for which we humans are noted and find out, while we are still in the trade-study mood. First we must settle on a definition of "better." To me an R/C seaplane is better if it is lighter, cheaper, easier to build, more rugged, better looking, and/or has lower drag or is better performing in the air or on the water. We will never agree on an order or importance for these factors, so let's just say the configuration with the most of these goodies wins.

What is the configuration of the best flying boat we could design? I think it may be one where as much as possible of the flotation is furnished by parts of the airplane that have to be there anyway. Why carry extra flotation if the fuselage is more than enough to float the airplane, and why bother with wing floats if the sealed wing itself will keep the plane from tipping over sideways? The answer is that trying to make such structures multipurpose isn't easy and the results are usually far from optimum for either the aerodynamic or the hydrodynamic requirements. I've designed and built several flying boats where I tried to use the bottom of a low wing for flotation. The results varied from wouldn't work to unsatisfactory. Not to say that it can't be done; several full-scale flying boats do it to a degree, and my friend Paul Weston has been the most successful of any model designer I know in using the wing for flotation. Have a look at the photo of Paul's "Sea Era." It gets off the water right now, and does it fly! Among other things, it is famous for its Lomcevaks. But this is a difficult special seaplane design, and we won't get into it here.

We will take as our flying boat basis of comparison, a fairly conventional configuration, except that I feel the same way about buoyancy aft of the main step on flying boat hulls as I do about buoyancy aft of the step on twin floats. The flying boat hull we will be talking about will stop at the step, so the aft end of the fuselage will hydrostatically keep the tail just out of the water and allow us to use a tail water rudder. Incidentally, this aft-fuselage-acting-as-tailfloat doesn't have to have a "planing bottom." Like a taildragger landplane, the high thrust line and the low hydrodynamic drag line, plus stab lift, will raise the tail at quite low speeds. So a conventional fuselage will do just fine, as long as it is sealed and will float. We do need to have a fairly deep section at the rear of the fuselage to keep the stab out of the waves, or we can use a T-tail or semi T-tail.

So much for the ground rules. Floatplane or flying boat? It would be difficult, time consuming, expensive, and perhaps inconclusive to try to determine which is best by comparative tests, but I think we can determine it by logic, with reasonable accuracy.

If we assume that our floatplane and our flying boat will weigh the same (not a strictly valid assumption), then we must plan for the same amount of static buoyancy in either case. In the case of the flying boat that buoyancy is mostly under the balance point of the hull, which is an extension of the fuselage. In the floatplane the main buoyancy is split in two and spread out for lateral balance. We have to add a little more buoyancy to each float when we make that split, to assure that one float doesn't sink in a crosswind or in a turn. The extra we have to add may be about the same as the extra buoyancy we have to add on a flying boat for wing floats, so let's call that trade a draw.

Speaking of wing floats, look at the photo of my world endurance record attempt seaplane. On this model, because of the high wing, I chose to mount the stabilizing floats on the fuselage instead of the wing. They worked fine, but I didn't know whether to call them fuselage-mounted "wing" floats or strut-mounted sponsons. No, it didn't establish an *official* record; it crashed during the official flight due to radio failure, but in a test flight it flew for 2-1/2 hours and only used half of its fuel. At that time the world record was an hour and ten minutes. Ah well, back to our trade study.

By the nature of the beast, a floatplane must have struts to connect the floats to the airplane. Wing floats on flying boats may be attached directly to a low wing or strut mounted to a higher wing. Wing float struts, if any, are small, light, and simple compared to the structural strut system required to mount floatplane floats. Herein resides my case. The strut system unique to floatplanes is heavy, hard to design and build, expensive, subject to damage, hard to maintain and repair, and has more drag than anything comparable on a flying boat. Furthermore, spray from twin floats is often thrown toward the propeller, and waves have free access to the propeller. On a single-engine flying boat, the hull bow wave is thrown clear of the prop on both sides, and the hull tends to shield the prop from other waves. 'Nuff said. Our second

trade study is complete. Flying boats are better. Write and present your case if you disagree.

Also, in my opinion, flying boats are better looking than strut-laden floatplanes. There is a saying in design circles that if it looks good it probably *is* good, and vice versa, but beauty is in the eye of the beholder. I once competed nationally with an original-design R/C sailboat with a rigid sail that looked a lot like an airplane wing (thirty-five years before Stars and Stripes won the Americas' Cup with a wing sail). Some people thought I had a beautiful boat, but some old time sailors thought it was ugly because "it doesn't look like a sailboat." To me it was beautiful because it was highly functional.

Next month we are going to design an R/C flying boat in this column, and separately present a construction article on building said model. Until then, designing logically is more important than designing technically.

Francis Reynolds, 3060 W. Lake Sammamish Parkway N., Redmond, WA 98052. (206)885-2647. •

Electronics. . . . *Continued from page 14*

know the resistance of the plug, and we should be able to read that with an ohmmeter, right? Wrong! The hot resistance of anything that goes incandescent when current is applied is considerably lower than its cold resistance! Well now, it is a 1-1/2 volt plug, and if we apply that to it, and insert an ammeter in series, we can read the current and then calculate all manner of things, right? Well, right in theory this time, but wrong in practice, as I will attempt to explain.

The practice described above is common, but a lot more successful when working with higher voltages and currents than is normally found in solid state R/C equipment. The reason is that the ammeter itself has resistance, and inserting it into any circuit is going to affect its operation in some manner. In the simple LED circuit shown, inserting the meter at the "X" will increase the total circuit resistance and lower the current through it. In fact, at these values, the meter will have enough effect to visibly reduce the brightness of the LED.

In recent months you have probably read reviews of R/C systems in which the writer somewhat proudly reports that the current output of the system charger for the subject radio system is a "measured" X milliamps, implying that he actually tapped into the circuit and reported its reading. Not with any degree of accuracy, if done with the usual $19.95 Radio Shack meter, he didn't. It takes a good quality meter, for which the manufacturer furnishes the proper specs which have to be understood and used to calculate the true current after the meter is removed from the circuit. If you care to test this out for yourself, set up a test circuit at about a hundred mils, and then switch ranges on your inexpensive meter. The widely differing readings you'll usually get are due to the different in-circuit resistance of the meter on different ranges.

Now for our glow plug current readings! You will find that with an ammeter in the circuit, you will read somewhere between two and three amps. A lot of current for such a low voltage, but then that glow plug is almost a dead short. In fact, just for the heck of it, using an average of 2.5 amps, the plug resistance calculates out to .6 ohms! You will almost immediately discover for yourself why the ammeter method of measuring the current in this case is so questionable. You will notice that the reading will vary as you move the meter leads, change to different leads, move or use different plug connectors, etc. And you will definitely notice a change in the plug's glow with and without the meter in the circuit.

What then is the answer? Well, as much as I dislike hacking at something, I can also be practical when necessary, and this is one of those cases. You start out with a handful of low value, less than one ohm resistors, and with the wiring and connectors you will be using, try different resistance values until you get the glow that looks right. . . .

Unscientific, to say the least. But I'm not going to disappoint you—I have a better solution. Use a power diode to drop the voltage. Right, any power diode rated at more than three amps (five is better, such as Radio Shack's 276-1141), connected in the proper polarity, will very effectively drop the voltage of Stoney's two-volt cell to a quite acceptable voltage at the plug. Why so? Well, any silicon diode causes a voltage drop of .7

volts in any circuit into which it is introduced. Actually, I think the real figure is .7315689—and a half!—but we can live with .7, right? The end result in this case is that the voltage at the plug, less that of the leads, is 1.3, enough to light the plug to a healthy glow and definitely enough to start any engine that is going to run. After all, the greatest percentage of glow plug power currently in use is a single Ni-Cd cell at 1.25 volts, so the 1.3 will work just a tad better.

* * *

Airplane markings were mentioned back in January, as I pointed out an interesting article dealing with the subject that appeared in *RCM*. Admittedly it was a tongue-in-cheek mention, and those of you who bothered to look it up and read it will understand why. Anyway, soon after, I was reminded by Art Morgen of Vinylwrite Custom Lettering that there are easier and more modern ways to accomplish the same thing. Instead of hours of measuring and cutting, all you have to do is pick a print style, size and color, and mail off your order. In a few days your custom-made lettering arrives, pre-aligned and pre-spaced, ready to apply to your latest dream flyer. The actual markings are 2 mil thick vinyl, which come on an application strip which is applied to the airplane surface intact. After rubbing the letters, the strip is peeled off, to leave the individual letters and numbers. Neat, neat, neat!!!

Vinylwrite offers you a choice of character heights in 1/4-inch increments from 1/2 to 12 inches, eight character styles, and seventeen colors including brushed metallic silver and gold. Expanded or compressed text is available, as well as forward or backward slant up to 40°. Considering how much time and money many of us invest in some of our models, the cost of these markings to make our ships authentic or merely to personalize them is minor. Complete descriptive material including foolproof ordering instructions are available from Vinylwrite at 16043 Tulsa St., Granada Hills, California 91344, or you can call (818)363-7131 from noon to 6 p.m. PST. I have samples of this lettering and am impressed by the quality in all respects. I am further impressed that my name is spelled correctly, and not Elroy, as so many of my correspondents address me even after seven years of EC. But Art—pink? Pink!

Another service I want to share with you this month is A.C.E. No, not Ace R/C, whose useful and high quality products I have mentioned here a number of times. A.C.E. in this case stands for "Aviation and Computer Enthusiasts," a group whose interests lean towards—you guessed it—airplanes and computers. They offer program reviews, book reviews, and information related to aviation and airplanes in general, but also including computer programs for aircraft modelers. Membership in the organization costs $10 annually and brings a newsletter every two months detailing aviation computer programs, events and related information available to A.C.E. members. For information, contact Aviation and Computer Enthusiasts, 2009 Camelot Dr., Las Cruces, New Mexico 88005; (505)526-5645. Sounds just like what some of you need to help you get in a BIT of flying. . . .

* * *

The eyes of Texas are upon us this month; my home state is heard from in the person of Larry Mitschke, of Houston. Larry writes:

"I am in need of modifying a servo to act as a winch. I recalled an article in *RCM* (Feb. 87, Page 141) that described such a modification, but it did not go into detail. Could you elaborate a little on this modification and give an idea of what is going on in operation?"

Well, this sounded like an interesting modification and as I went looking for the article mentioned, I wondered how I could have missed it completely. There was no question why when I reached the proper place, it being buried in what might have been an interesting project had it not ended only in making the aptly named Ugly Stik even uglier. I like my model airplanes to look like airplanes, not things! It is only an opinion, I know, but in my humble one, airplanes have canopies, and pilots, and cowled engines, and resemble those that full-size people fly in. No, I don't like flying Big Macs or lawnmowers either. Flying soapboxes? Well, a little, I guess!

Anyway, for our fellow flier in the Lone Star state: All servos include an internal potentiometer, usually 5K ohms in value, connected as a voltage divider. It is internally geared to the output shaft, and the pot wiper is moved across the element in exact step with it. Since the servo output generally turns 90 degrees, so does the pot wiper. Now, the pot element is made in a 270 degree arc, so if the pot wiper moves across it for 90 degrees, it is varying the resistance exactly 1/3 of the total 5000 ohms—1666

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ohms to be exact. An important fact to remember here is that the wiper is not necessarily centered on the pot element at servo neutral. The active one-third of the element is always off towards one side or the other.

Now, when the servo is commanded to move off center, an error voltage is produced, whose amplitude is determined by the amount of travel to take place. As the servo operates and the wiper simultaneously tracks across the pot, a voltage opposite in polarity to the error voltage is produced by the voltage across the pot. When these two voltages are equal, the servo is commanded to stop. If this opposite voltage is not produced, the servo will continue to run.

This then is the secret to the winch operation described. The feedback pot is disconnected inside the servo, the connections being brought out to an external pot of the same value. Here it gets tricky, and the requirements will vary for each individual installation. As the servo is commanded to run, it has to also be linked mechanically to the external pot. In the diagram, the servo is equipped with a pulley that winds up a cord or cable. The cord also drives another pulley attached to the pot shaft. It then becomes a matter of ratio: if the servo output and the pot turn the same amount, the servo will stop after its normal 90 degree rotation. However, if the coupling is varied mechanically, as with different diameter pulleys in, say, a 2:1 ratio, the servo will operate 180 degrees. A ratio of 3:1 will result in 270 degrees of rotation. Regardless of the ratio used, operation of the servo will still be fully proportional as before. Now you've got the idea, right?

There are a couple of things to consider yet. One is that most servos have some sort of internal stop on the output gear to prevent full 360 degree rotation. This stop will have to be identified and removed. Secondly, as stated earlier, servo neutral is not necessarily pot neutral. To adjust one to the other, the servo is set to its desired neutral, and after power and a signal are applied, the pot is turned until the servo stops. When both neutrals are synchronized, the mechanical drive is connected and the installation in the model is complete.

However, there is an easier way: Futaba's S110 Sail Winch servo, rated at 122.3 ounce-inches of torque, with a 21.8-inch stroke in 3.8 seconds. But it's fun to tinker, and we sure hope Larry's project is not an even Uglier Stik or some other flying abomination.

Next month, the subject is voltage regulators, so stay plugged in! And don't be bothered by the fact that not all of your friends understand your interest in the inner workings of our R/C equipment. Just remind them that ELECTRONIC TECHNICIANS DO IT WITHOUT SHORTS! •

Plug Sparks. . . *Continued from page 42*

look about them as I now have 14 thinner fins rather than 12. I feel the engines run cooler and better. Also, the cylinders now come finished in Electroless Nickel plate (like the Bunch engines). This is a much more durable and less risky plating process. Did I tell you I lost 47 cylinders in a cad plating attempt? No more cadmium! Orders are accepted but produced in small batches.

"Ohlsson engines: In the same vein, I still build Ohlsson Gold Seal engines, although I must admit none have been shipped in about 15 months. I guess I make it too emphatic when I say no more Ohlssons after the initial offering of gold plated Ohlssons.

"Right now I provide the Gold Seal engine in a plain steel version. These are functionally like the Commemorative Ohlsson I built. However, the status of Ohlssons is that they may be ordered, but delivery is limited to a group completion.

"Hurleman: At present, I am not accepting orders for the Hurleman 48 or the Twin. Although I consider the 48 a good engine, I am doubtful if I will ever make anymore. It would have to be a heavy demand to get set up again.

"Lykens Brown: Here is the engine that has been the bane of my existence. Bill Brown makes the Lykens. I got involved when Bill asked me to announce, advertise, ship, and otherwise handle the distributorship of his Lykens. That was four years ago!

"This situation has caused me a terrible amount of grief, a lot of time answering queries, availability, etc. Never again will I

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get involved in someone's project. I feel my reputation has suffered somewhat on the order of the Morrill-Atom situation, where John Morrill got a black eye for nothing.

"Biggest problem with Brown is that he has finally finished his home after all these years. Bill is actually back working on Lykens engines for a half day with the other portion being devoted to his equally neglected CO_2 motors.

"I have tried to help by brazing all the intake pipes to the cylinders and then having them nickel-plated. Brown still has the pistons to do. . . hopefully, some progress is being made.

"The status of the Lykens motors can be summed up in one word: *uncertain*. I have no idea if Bill is going to complete this project or not. Frustrating!"

Those who are interested in some fine engines, write to: Herb's Model Motors, Box 61, Rt. 87, Forksville, Pennsylvania 18616.

LAS VEGAS

While at the home of Larry Jenno for the Las Vegas VAMPS F/F Annual, Larry displayed an old photo that should bring back the memories of a lot of the readers who put in a "hitch" with the service.

Seen in Photo No. 10 is Bill Paget and Larry Jenno in full Navy seaman dress. They are jointly holding a Consolidated Roamer with an engine that fails identification.

Not many of the old timers are aware that the Roamer was originally called the "Pursuitaire," a model by Model Developments, Inc. of Brooklyn. Just before the war started an amalgamation of hobby dealers and manufacturers occurred when Bay Ridge Models, Burkhard Models, and Jerry's Hobby Shop (which included the Pursuitaire design) got together. Eventually, Art Hasselback emerged as the number one man in charge of running the firm, known as Consolidated.

Consolidated continued well after the war producing many control line kits in response to the latest modeling craze. At last reports, Art is still alive and kicking in the Brooklyn area.

SIMPLY SENSATIONAL

That is about the only way to describe the dedicated effort of Jim Alaback, newsletter editor of SAM 41, a revival of the old San Diego Aeroneer Club.

Alaback is not only to be commended for his efforts to have Joe Weathers put in the AMA Hall of Fame, but also for his tremendous amount of work tracking down all of the Weathers designs.

This writer was recently the recipient of two compilations of Elbert "Joe" Weathers designs and newspaper clippings. The first is rather astonishing in the respect that this writer thought he knew almost all the Weathers designs. Alaback has been successful in making up three-views with details as sketched originally by Weathers.

This first booklet of 36 pages is chock full of Weathers plans ranging from gliders, rubber designs, and gas models. The booklet covers the period of 1933 to 1948, truly the most prolific years of his career.

Booklet #2 contains a tremendous amount of newspaper clippings in chronological order. (Makes this columnist wish he hadn't lost his priceless scrapbook.) Included in the publication are numerous mementos, such as newspaper and magazine clippings, contest announcements with entry forms, lists of contestants, and numerous sketches, logos and advertisements. Truly a tribute to Weathers in his illustrious career of modeling.

This columnist is not sure if these booklets are going to be made available to the modeling fraternity or not, but one can find out by writing to G.J. Alaback, 16634 Diaz Drive, San Diego, California 92128.

For those truly interested in the career and models of Joe Weathers, Jim Alaback informs me a section of the San Diego Air Museum will feature much of Joe's fine work. I can think of no finer tribute to Weathers.

READERS WRITE

Don Lefferts, who runs Vintage Auto Restorations, Inc., 27 Rear Catoonah St., Ridgefield, Connecticut 06877, sends in a pic of a very well built O.T. Belgian design by Van Wymersch known as the "Corsaire." This design appeared in Frank Zaic's 1938 Year Book.

Don says he enjoys reworking some of the Old Timers that resemble full-scale into R/C aircraft. He further admits to some liberties with the plan as produced by John Pond O.T. Plan Service by reducing the dihedral

Flight School.

It's elementary with the Professor.

Go to school with the Professor, the radio control trainer that makes electric flying easier than ever.

Extremely stable design and ARF assembly are just a few of the features that make the Professor ideal for novice flyers.

The complete Professor kit comes out of the box ready to assemble.

Clean, quiet flying excitement is as close as the schoolyard. Let Futaba and the Professor show you how simple it can be.

Advanced, lightweight materials are used for the fuselage for exceptional strength and rigidity. And built-up, pre-covered wing, tail and stabilizer eliminate the need for special assembly skills. Simply join the wing halves, attach stabilizer, tail and pre-installed linkages. Mount the propeller to the gearbox of the powerful Mabuchi RS540SH motor, install radio and batteries and you're ready for takeoff.

PROFESSOR SPECIFICATIONS	
Length	35.04" (890mm)
Wingspan	48.82" (1240mm)
Area	446.5 sq. in
Weight (w/rec. system)	39 oz.
Motor	RS540SH w/3:1 reduction gearbox
Recommended system	Futaba 4NBL/MCR

REQUIRES: 7.2v/1200mAH NiCd battery pack and charger, 2-4 Channel radio control system (electronic speed control optional).

Futaba MCR-4A Integrated MOSFET speed control/receiver (Not included) required for optimum performance. Specifications: 4 Channel; 1.5 oz. (excluding switch and connectors); 1.24" x 2.92" x 0.63" BEC Voltage regulator.

Electrifying fun for the more advanced pilot. Aerobatic Hirobo/Futaba Chipmunk (Available soon).

Futaba.

Futaba Corporation of America
555 West Victoria Street Compton, CA 90220

and using a NACA 2312 semi-symmetrical airfoil and ailerons (horrors!).

As can be seen in Photo No. 11, the model is powered by a British Laser 61 four-stroke engine. This well built model was an excellent showpiece but as Don says, despite flying very well, he succeeded in crashing it. Truly a shame!

Canada

Although we have seen a photo of this model before, Bruce Thompson of 328 St. Germain Ave., Toronto, Ontario M5M 1W3, Canada, builds such nice models and takes equally good photos, it is hard to resist using what he sends. Photo No. 12 of Bruce's Red Zephyr is an excellent example of what this columnist is talking about. Note the strict adherence to the original color scheme.

Sweden

This is finally the "Last of the Mohicans" as far as the supply of photos on hand received from Stan Persson and Sven-Olov Linden. Stan has sent in Photo No. 13 showing Sune Stark, 1951 Wakefield winner, preparing his model for an official flight. The original 1950 Wakefield is being held by another famous Swedish Wakefield flier from the thirties, Ake Roggentin.

SAM 53

The "Sod Busters" R/C Club, which forms the nucleus for SAM 53, the "Sioux SAMS," is still quite active according to Mark Glammier, Secretary-Treasurer.

Mark writes to complain about a flight problem in his Scientific Flagship as seen in Photo No. 14. Mark says the model flies with a rocking motion of side to side. Mark says he has tried about everything to cure this problem, but to no avail.

This characteristic is noticeable in all the Scientific designs by Ben Shereshaw. In design the Ensign, Flagship, Mercury, Starling, Eaglet, and Commodore are all alike with Ben Shereshaw's propensity for pretty shaped vertical tails. However, by and large, these fins are generally inadequate in area, hence the model ends up with what we call "Dutch rolling." Adding fin area and/or reducing dihedral will help but then, of course, the model is "out of scale" for Old Timers.

THE WRAP-UP

Hard on the heels of the cancellation of the proposed International SAM Champs scheduled for Stead Air Base, Reno, comes the news from SAM President, Jim Adams, that the Champs will be held at a large dry lake near the California-Nevada border. Accommodations will be at the border casinos at very reasonable rates. The meet dates have been moved from June to early October to avoid the high desert temperatures. The casinos on the border are located 43 miles from Las Vegas, so make your plans accordingly. •

R/C Soar. . . . . *Continued from page 37*

is that possible, you ask? It is made possible by more evenly distributing the plastic, which used to be concentrated in the nose section. The result is a much tougher, more indestructible (huh??), prettier fuselage that will outlast many a disposable foam core wing and stab.

These new fuselages are available now in a rainbow of six striking colors: black, red, orange, yellow, blue, and white, for a price of $20.95 plus $3.00 shipping (and California tax of 6.5% if applicable).

Call or write to Robert Pettyjohn at Cheetah Models, 14725 Bessemer Street Unit B, Van Nuys, California 91411, (818)781-4544, and ask for a product flyer and price sheet. Fly a Cheetah and stop worrying about crash damage!

Cliff Hanger Models

Marty Silberstein and Steve Peacock have themselves a gold mine of exciting little power scale slope flyers! Currently available scale subjects for aerobatic slope fun are the F-20 Tigershark, the F-5E Tiger II, the P-40 Warhawk, the KAI-100 (improved Zero), the P-51D Mustang, and the F4U-1A Corsair. These models range in span from 38 to 50 inches, with most averaging about 44 inches. They are available in two forms: Basic and Complete. Basic kits include wing cores, fiberglass fuselage, plans, and complete instructions. Complete kits include all the Basic parts, plus all wood parts, fiberglass cloth, and linkages for an additional $30. Basic kits are each $59.95 with one exception: the Corsair is $69.95. Shipping and handling add $5.00 each kit.

For more information, contact Cliff Hanger Models at P.O. Box 9081, Torrance, California 90508, (213)320-4530.

DCU

DCU has three new slope gliders in its lineup: the Dragon Fly, the Super Dragon Fly, and the Stryker. Each kit features lightweight epoxy fiberglass fuselage with canopy, foam wing cores, machine cut balsa and ply parts, and extensive hardware.

The Dragon Fly is a 50 inch span minisloper that is quite aerobatic. It has a wing area of 257 square inches, a length of 30.5 inches, a flying weight of between 17 and 20 ounces, and requires a two-channel radio.

The Super Dragon Fly is an aerobatic model of 70 inch span, 42 inch length, 560 square inch area, and 38 to 42 ounce flying weight. It too requires a two-channel radio.

The Stryker is a very stealthy-looking blackbird-type model. I don't know if it is supposed to be a scale model of anything, but you sure could pass it off as a "something."

Its wingspan is 48 inches, its lifting area is 410 square inches, its length is 37 inches, and its flying weight is 37 inches. It features a one-piece fuselage, clear canopy, foam core wings, machine sanded balsa and ply parts, and extensive hardware.

Contact Mark Hambelton at DCU for more information: 1556 S. Anaheim Blvd., Suite C, Anaheim, California 92805, (714)535-6969.

Hobby Lobby

Dave Martin at Hobby Lobby showed me the relatively new Graupner Elektro-UHU (pronounced "oo-hoo"). This really high performance 6- or 7-cell electric motor-glider has astounding climb performance and wind penetration. It will thermal with the best sailplanes, yet its thin airfoil gives the UHU excellent ground covering ability.

The UHU is a Graupner Quickie kit which comes complete with preformed fuselage, two-piece rib and spar construction wing, and precision cut balsa parts. The motor and prop drive unit (which is optional) comes with a 104 watt, 18,000 rpm, Speed 600 motor, Scimitar shaped small folding prop, connectors, wire, and assembly tools. Together, these kit items come to about $119.

Also noted in the Hobby Lobby booth, pictured on the outside of a colorful box label, was a sleek new electric powered scale version of the ASW-22B. This is a three-meter, aerobatic capable, T-tail thermal soarer with performance claimed to rival Unlimited Class FAI F3E competition models.

If you are interested in model sailplanes and you don't have a Hobby Lobby catalog, I suggest that you call them at (615)373-1444

and get one delivered to your door. It contains scores of kits and accessories for gliders and electric motorgliders that you will want to be aware of. Order it today while it's fresh on your mind!

Hobby Shack

Hobby Shack and its import/distributor company, Global Hobby Distributors, had three models from its recently acquired Sailplanes International kit line on display. They were the Mini-Racer, Osprey 100, and Sitar Special 100. Many of you already are familiar with Sailplanes International because it has been imported to the U.S. and Canada before. However, this is the first time a major distributor has carried the line.

The Osprey 100 is a 100-inch span thermal or light-air slope model. It has rudder and elevator control with optional spoilers. It is a conventional wood kit that assembles rapidly and accurately. The airfoil is a relatively thin, high-penetration section which looks much like a Goettingen 795, but is in reality a modified Eppler 176. Competition-minded sailplane fliers should consider this as a great polyhedral model suitable for a wide range of conditions.

The Mini-Racer is a cute, 60 inch, aerobatic sport sloper that makes an excellent transition model from rudder/elevator models to more advanced aileron models. The foam core wings come factory presheeted with obechi wood veneer. The fuselage is a molded fiberglass job with a tinted blue canopy.

The Sitar Special 100 is a very high performance FAI F3B type slope racer or multi-task thermal soarer. It has 100 inch span, epoxy reinforced, obechi veneered, foam core wings. These wings feature a the popular Eppler 193 airfoil at the root transitioning to an E180 airfoil at the tip for drag reduction and light lift performance. The Sitar Special 100 features a fiberglass fuselage, blue tinted canopy, precision cut wood parts, and complete hardware.

If you wish to receive more detailed information regarding the Sailplanes International line, write to Global Hobby Distributors, 10725 Ellis, Fountain Valley, California 92728-8610.

JADE

The JADE booth was crowded with unique slope designs. Owner Richard Jarel is a graphics designer by profession and his innovative slope models show it.

JADE's Telos canard has appeared in these pages before. It is an aerobatic, light to heavy air sloper that, because it is a canard, is very easy to fly. It is immune to stalls. It rolls rapidly, holds inverted flight easily, performs effortless outside loops, and yet can land at a virtual crawling speed.

The Telos is a deluxe kit featuring a molded Kevlar/carbon/fiberglass composite fuselage with integral fin, blue foam wing and canard cores, balsa wing sheeting, spruce leading edges, carbon fiber spar material, molded clear canopy, precision wood parts, complete hardware, full-size drawings, 19-page illustrated instruction booklet, and a special 22-page illustrated composites guide.

Specs for the Telos are: 52 inch main wingspan, 24 inch canard span, 37 inch fuselage, 351 sq. in. main wing area, 90 sq. in. canard area, 28 oz. weight, and a two-channel radio is required.

Telos was just one of the interesting designs shown in JADE's booth. There was also the prototype Equis electric powered canard which looked much like a canard BD-5. There was a swept-forward wing ultra-miniature canard of "limited commercial interest" (due to size) called the Toucan. There was a gas powered version of the Telos. There was the Crossbow canard slope racer which Richard personally flies in slope races. And there was a prototype .40 powered canard called the Viper.

Finally, the hottest looking sloper I've seen in a while was JADE's Shogun ATF (advanced tactical fighter). This is the sharp little flying wing that looks like it was designed by a NASA research team. Richard claims its performance is similar to a Scorpion or Obelisk, which is to say, very maneuverable and aerobatic. It was only a prototype, but it is likely to feature a molded fuselage and foam core wings for simple, quick assembly.

I'm sorry to say that I was just too worn out by the show to try and get more information from Richard on his models, especially the Shogun ATF. Those who are interested should contact Richard Jarel at Jarel Aircraft Design and Engineering (JADE), 11367 Culver Blvd., Los Angeles, California 90066, (213) 390-1348. Please tell him that you saw his models in *Model Builder*!

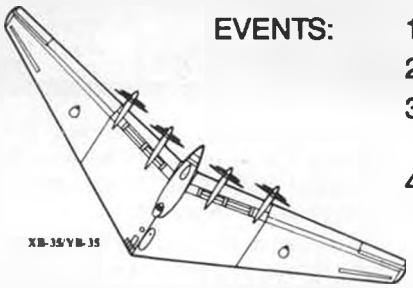
23RD ANNUAL NORTHROP FLYING WING CONTEST

F/F ONLY

SUNDAY, MAY 28, 1989
8:30 A.M. TO 4:00 P.M.

- Sponsored By: *MODEL BUILDER* Magagine
  Bill Northrop, Publisher
- AMA Sanction #382 — AMA License reqd.
- Site: Condor Field, Taft, CA
- Time: 8:00 a.m. to 1:00 p.m.
- Jr., Sr., & Open combined in all events
- Entry Fee: $3.00 each event

1st TIME AT THE U.S. F/F CHAMPS!



EVENTS:

1. Rubber Power
2. Glider (164 ft. towline)
3. Scale — any power
   (20 sec. official)
4. Gas — 25 sec. eng. run, or
   Electric — 35 sec. motor run

• combined event •

In case of controversy, opinion of Contest Director and Judge will be final.

Chief CD
Carl Hatrak
3825 W. 144 St.
Hawthorne, CA 90250

Scale & Flight Judge
Bill Stroman

● *NOTE:* Proxy entries encouraged. Send models to flier of your choice, *NOT* to *Model Builder* or CD's.

John Pond Plans

Although not in the kitting business, John Pond is most certainly the world's leading authority on antique models and maintains the largest single library of old time plans. His plans service can provide you with a wealth of nostalgic model glider plans dating back many years.

Hanging prominently from the middle of John's booth was his own Frank Zaic Floater R/C assist Old Timer glider. R/C O.T. gliders are catching on as a new competition class, and it all looks very relaxing and FUN! Other O.T. glider designs would include the famous Thermic 100 model that Midway Model Co. is cutting partial kits for.

If any of these plans or others like them interest you, give John a ring at (408)292-3382 on Tuesdays or Fridays, and he can help you with these or similar plans.

Robbe Model Sport

John Gill of Robbe had on display one very new motorglider based on a previously well accepted and successful glider design called the RC-Uno; appropriately, it is called the RC-Uno-E (for electric). It is your basic three-channel, 80-inch, rudder/elevator controlled ARF trainer that does not need a winch, high-start, or cliff to get airborne.

The RC-Uno-E can easily be assembled in one day and flown the next. It has a molded Plura fuselage, factory molded Siros veneered foam core wings, and precision cut balsa parts. It is a very complete kit which includes such things as an adjustable (0.4 seconds to 4.0 minutes) electronic motor timer for two-channel R/C operation, motor, prop, spinner, all hardware, even paint! The RC-Uno-E can be flown with a 6-cell pack. Its high-lift airfoil and slim profile give it the edge in climb and glide performance. Beginners will appreciate its inherent stability and slow landing speed. The selling price of this system is $229.95; the glider version is $159.95.

The Robbe Vampir flying wing also made its western debut at the IMS. There is a full-blown product review coming on this one, so I won't go into many details here, but for now I will say that it is a big one at 125-inch (swept) span, 991 sq. in. of wing area, 60 oz. flying weight, and 3-channel R/C. It is definitely unique!

Robbe can be contacted at 180 Township Line Road, Mead, New Jersey 08502, (201)359-2115, for additional information.

Sig Models

In the Sig booth was a prototype slope glider kit called the Ninja. Designed by Mike Pratt (who also designed the Sig Riser 100), this nifty all-wood sloper should prove to be a winner with slope fliers all over the U.S., should the kit be produced. It was primarily at the IMS to draw consumer reaction. I have no other information on this model at this time, and shall await future shows for additional info.

Slope Soaring News

Charlie Morey has a good thing well started in his labor of love that is about to pay dividends. Slope Soaring News is now on issue No. 4 and cookin'! It's picking up advertisers, product reviews, feature articles, photos, technical illustrations, maps to good soaring sites in California, tips on how to fly aerobatic maneuvers, and lots more! It is typically running 16 pages, and is being published monthly for a cover price of $1.50. All back issues have sold out.

If you want to subscribe, drop Charlie a check for $15.95 for one year to: Slope Soaring News, 2601 E. 19th St. #29, Signal Hill, California 90804. I think this is a worthwhile investment for the slope soaring enthusiast who really wants to stay on top of current affairs over the slopes of the nation.

Scale Model Research

Bob Banka can give sailplane modelers a great deal of invaluable, priceless help when it comes to documenting their next scale subject. SMR has research agents in Germany, Japan, Australia, Italy, and England who have helped build up a formidable library of color Foto-Paaks and three-views of thousands of scale subjects. When you can't go there yourself, let SMR go there for you and get your photos! There are now 110 sailplane Foto-Paaks available! Powered sailplanes, vintage sailplanes, "glass slipper" sailplanes, you name it, Bob probably has it. Contact him at 2334 Ticonderoga Way, Costa Mesa, California 92626, (714)979-8058. His $3.00 catalog of Foto-Paaks of over 2,200 subjects is waiting for you!

Sun Fair Aircraft Designs

Sun Fair has been around for more than a couple of years now and has built up quite a nice little kit line. Added to the Slope

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Whether you're just considering helicopters or have already logged a thousand flights, the Kyosho Concept 30s combine the design, technology and support that adds up to what R/C pilots want most – Quality Airtime. So get some Quality Airtime of your own. See the new Kyosho Concepts at your nearest hobby retailer.

Master flying wing and Slope Dart aerobatic stunt model is/are the Split-Image model(s).

Actually a two-fer-one kit, the Split-Image offers the beginner a single model with two wings and personalities. He or she can learn the basics of model building and flying with the conventional structure, polyhedral winged rudder/elevator trainer. Then when he has mastered that, he reaches into his kit box and pulls out his second wing which is a foam-core aileron job. Both sets of wings are basically flat-bottom airfoils with Phillips entry. This gives you all the advantages of slow flying speeds when it's time to land, but a fair amount of penetration in the wind when it's time to move out.

The specs on the Split-Image are: 60 inch wingspan, 464 sq. in. wing area, 26 ounce flying weight (add a minimum of 10 ounces for electric power), and the radio requirement is two or three channels. The kit comes with all parts needed to make both wing sets and the fuselage and tail group. Full-size plans and complete instructions showing both wings are included also. The Split-Image is expected to list for $89.95.

For more information, telephone Steve Grochowski at (619)434-4492.

U.S. FAI F3B Soaring Team

The 1989 U.S. Soaring Team has been selected and is seeking support from fellow soaring aficionados. This year's biannual World Soaring Championship will be held outside Paris, France, August 11-20. People contributing financially will be entered into a prize drawing for many fine hobby products including radio systems, aircraft kits, building supplies, and accessories. These are goods which have been donated free of charge to the team by industry supporters.

Donations of $5 will receive the official U.S. Team patch or lapel pin. Donations of $2 will receive a team decal. Ten dollar donations will receive all three. The official team logo is by far the prettiest yet designed. Be proud to be American and support your team. Not only are they a great bunch of fliers and hard workers, but they are already a team of like-minded and spirited fliers who will do us proud! They are truly the best team we've yet fielded, and they will have the best equipment, too! Seth Dawson, Larry Jolly, and Rich Spicer are the three team fliers. Don Edberg and Richard Tiltman round off the team as manager and assistant respectively.

Make team support checks payable to: U.S. Soaring Team, P.O. Box 19608-489, Irvine, California 92713. Tim Renaud will be in charge of all fund raising.

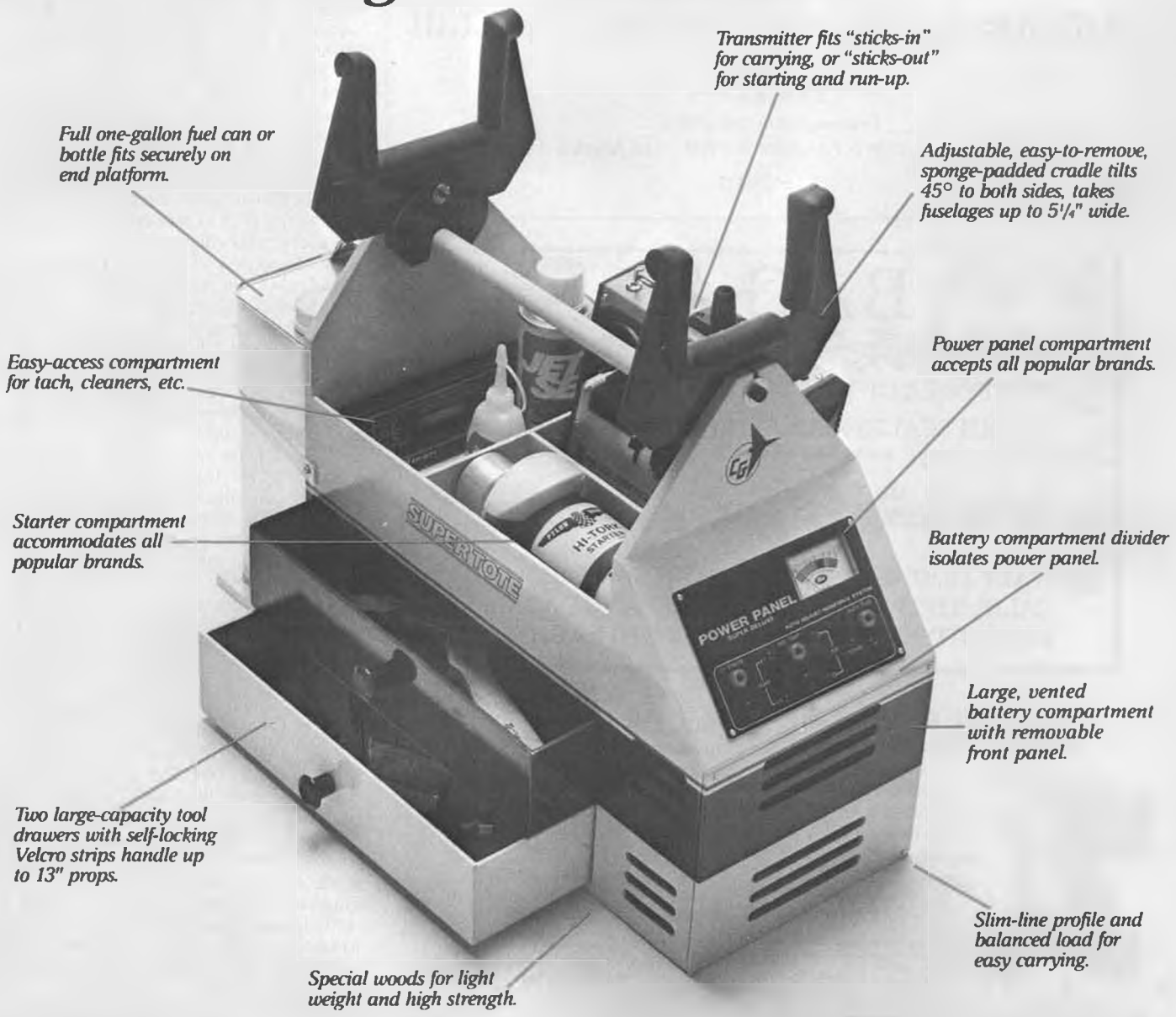
A $12 fee earmarked "F3B/USA" will provide you with a year's subscription to the *F3B/USA* newsletter edited by Randy Reynolds. This will keep you up to date on all that's happening with the team. This newsletter is not funded by AMA. Send checks to the address above. •

Choppers. . . . *Continued from page 27*

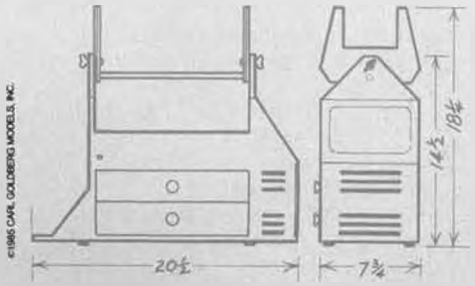
with the fore/aft cyclic control. Modern full-size helicopters such as the Sikorsky S-60 Black Hawk and Apache AH-64 employ this feature to improve performance. I will tell you more in my review of the GMP Legend, the Airtronics Quantum, and the new Airtronics ball bearing SG-1 gyro in an upcoming column.

The Vision is Airtronics' answer to the JR PCM-10 and Futaba 1024. Since there are more helicopter fliers in the U.S. than any country in the world, it is logical that Airtronics decided to produce a "designed in the USA" radio. The Vision incorporates a 16-bit microprocessor and the fastest scan rate of any of the PCM radios on the market. (For readers who are not familiar with this jargon, the brain of the IBM minicomputer is a 16-bit microprocessor. Higher bit means information can be processed at a faster rate; 16 bit means the Vision is quite a smart radio system.) All of Airtronics' helicopter radios come with five high-quality servos, but only a 700 mAh receiver battery. I would like a 1000 or 1200 mAh receiver battery pack because I always put in at least five flights during every practice session. For people who have replaced the standard 500 mAh pack with a 1200 mAh pack, make sure you buy a new 120 mAh rate receiver battery charger! The stock chargers from all the manufacturers are only 50 mAh rate, which can fully charge the stock 500 mAh receiver battery in ten hours. But it would take a lot longer to charge a 1200 mAh pack!

Only an experienced kit designer could bring you a field box that's engineered this well.



The Super Tote.™ From Carl Goldberg Models.



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See the C.G. Super Tote at your favorite RC dealers, or order one now.

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Futaba has the longest history with helicopter radios in the U.S. I have used Futaba radios in my airplanes since 1974. I have crashed umpteen times, but the radios were never damaged due to the crash. I always wrap my receiver and battery in many layers of foam. I don't recommend using double-sided tape to tape the receiver and battery to the helicopter cabin. That might look neat, but you'll pay for it when you crash. Futaba has discontinued the gold color FG7Hi and the dual stick 512 PCM. For 1989 Futaba offers six different helicopter radios to meet the vast spectrum of helicopter pilot capabilities. They are all listed in Table 2. Futaba has also decided to include five servos and a 1000 mAh receiver battery pack on its top three helicopter radios. Bravo! I think all manufacturers should do this on all their helicopter radios.

The PCM 1024 is the *creme de la creme* of Futaba heli radios. It has more than enough features to keep you playing with it for a long time. The book-like instruction manual is very clear. At first I worried that these ultra-sophisticated radios might require a lot of studying to learn how to use them, but after seeing and playing with a JR Galaxy and the Futaba 1024, I think the programming is well planned by the manufacturers. These sophisticated radios are not intimidating. For example, the Futaba 1024 manual clearly illustrates with figures how you can set up the collective pitch in five different ways. One of the choices is it can have all three servos move at the same time to move the collective up and down. The modeler can also program which toggle switch will operate what. For instance, John Doe might program the top left switch to be the elevator dual rate switch, and the top right switch to be the rudder switch. Of course, the gimbal tension can be adjusted. I like the smooth and soft feel of the sticks because they help avoid PIO (pilot induced oscillation. PIO occurs when the model is too sensitive, or when the stick is too tight, leading the pilot to over-correct and cause the aircraft to oscillate).

What was new in R/C helicopters at the IMS? Great Planes proudly showed off their new Kyosho Concept 30 DX and SE helicopters. I have logged over a hundred flights on my Concept. I think it is one of the best and most stable mini-helicopters that I have ever flown. Regardless of its size, this is one of my favorite helicopters of all time. This helicopter is more revolutionary than evolutionary. For instance, take Miniature Aircraft's X-Cell. The X-Cell flies great, but it is a very conventionally layed out helicopter. The X-Cell borrowed the best features from the best helicopters in the world and improved upon them. Borrowing great designs and refining them is certainly a very smart way of designing a new helicopter. The refinements that went into the X-Cell made it an extremely successful and respectable machine. I think its contest record speaks for itself. However, Mr. Taya, the former F3C World Champ and designer of the Concept, took the adventurous route. He designed the machine from the ground up rather than scrounge other designers' ideas. There are three major reasons why the Concept is so stable: 1) The main rotor blades are torsionally soft and have a very forward chordwise CG to create lagged-rate feedback to help stabilize the vehicle's longitudinal and lateral motion; 2) It has a softly loaded offset flap hinged main rotor to take advantage of the smoothness of the articulated rotor design, and yet the offset gives controllability; 3) It has a unique sliding Bell-Hiller mixing unit that gives almost 95% Bell-Hiller mixing ratio, which is the highest I have seen on a collective pitch helicopter. The Hirobe DDF head has about 80%, Kalt Blackhead about 70%, and the GMP Prohead has about 50%. The Concept has many innovative design features which I will go over in a future review article.

As usual, GMP had the largest helicopter booth at the show. It was manned by the many times National Champion, Robert Gorham. He was busy explaining the features on GMP's new .60 sized Legend. The modelers can purchase the Legend with a flybar or a flybarless Delta-3 head. Of course, they were showing a video of Robert doing some smooth and wild aerobatics with the Legend. GMP also displayed the world's only tandem rotor R/C helicop-

ter kit (about $1500). Then, there were the perennially popular GMP Cobra, King Cobra, Cricket, Shuttle and the beautifully prefinished fiberglass fuselages for the Shuttle and the new pint-size Bell 222 fuselage.

My friend Vince Canzanese flew in from New Jersey to take charge at the Robbe/Schluter booth. He was displaying the 1989 improved Champion, .60 size Scout, and the .50 size Junior. Sorry, Vince, I don't have a picture of you!

(As a point of interest, a friend of mine just back from Germany reports seeing a brand new Robbe/Schluter machine called the "Magic," a fully aerobatic helicopter said to be as good as or possibly even better than the Champion. Stay tuned to this column for more details.)

Kalt helicopters were showcased at the Hobby Dynamics booth. The superb $1200 Kalt Jet Stream Jet Ranger helicopter was the slickest helicopter at the show. It has one of the smoothest tail rotor pitch control and main rotor gear transmission systems. Frank Dyke says the 62-inch diameter Jet Stream cruises at about 65 mph. A friend of mine saw Dan Melnik's Jet Stream fly at the Tangerine contest, and he vouches that it's fast and smooth. For the sport fliers, Kalt offers the very economical Cyclone for less than $300. I think this is the best bargain in town for a 50/60 size collective pitch sports helicopter. The Cyclone, Baron 28, and Baron MX are the only helicopters sold in the U.S. with a hingeless main rotor. I am a strong advocate of the hingeless rotor design because there is no slop and it's simple. Beginners can obtain docile characteristics by using a soft spring steel plate, and experts can obtain great controllability by using a stiff plate. Full-size helicopter industries are all moving toward a hingeless main rotor design to reduce mechanical simplicity and cost, and increase life span and controllability.

Miniature Aircraft was the only major helicopter company that didn't come to the show. I guess it would be pretty costly for them to come from Florida. I was looking forward to seeing some of their new fiberglass blades. As some of you readers may know, my real job is doing research on full-size helicopter rotors and blades; naturally, I am interested in new blade designs for R/C helicopters. The main rotor system and blades account for 80% of the flight dynamic characteristics of any helicopter.

One of the more fun and interesting products that I have seen is the R/C Chopper Flight Simulator by Ambrosia Microcomputer Products. I spent 15 minutes doing hover, nose-in, stall turns and loops on the simulator. It is pretty darn realistic. It captures 80 to 90% of the feel of flying a real

R/C helicopter. The package comes with software and hardware and a modified Futaba two-stick transmitter ready for use on any Atari computer. Besides helicopters, it does R/C airplane simulation, too. (I thought only real R/C vehicles can be underpowered, but these computer simulator helicopters and fixed-wing aircraft seem to be underpowered too. Without sufficient forward speed, the simulator helicopter can actually stall at the top of a loop.) I forgot to ask if this helicopter simulator has an invert switch for practicing inverted flight. Dave Brown has a similar flight simulator for IBM PC's.

Hobby Lobby was at the show displaying the British MFA 500 fixed-pitch beginner's helicopter. Fixed-pitch helicopters can be an inexpensive way to get started in R/C helicopters. I learned on the vintage Schluter Heli-Baby and American Revolution 1 in 1976. I have also enjoyed flying my little GMP Cricket in front of my garage. And, they were all very manageable without a yaw rate gyro or a specialized heli radio. Maybe the simple fixed-pitch helicopters will be popular among the beginners again.

Next month I will go into some heavy stuff and explain the theory of two- bladed rotor systems. I will also periodically brief you on the the status of our project to improve the top speed and maneuverability of our R/C World Speed Record attempt helicopter. Since I am not in the model manufacturing business, I would like to trickle down the results of our research to the public so everyone can benefit.

In December 1988, my test pilot Mike Johnson and our work team went to the California desert to prepare for a speed trial. Due to an unknown failure, he managed to center punch the only two-foot-square concrete spot in the Mojave desert. Needless to say, the Champion was demolished. The receiver and servos were like shrapnel, exploded into pieces. Even the engine crankcase on the O.S. .60 Long Stroke exploded. We had the video camera rolling throughout the flight test; when we decided to stop rolling the video, it crashed. By the way, the existing speed record is 86 mph. We clocked a stock, Magna Pipe equipped X-Cell through our timing gate at only 57 mph. So, if you are thinking of conquering the speed record, brute horsepower will not do it. You need to improve aerodynamic efficiency. Stay tuned for more details. •

Jake. . . . . *Continued from page 7*

that's an area where I can really help.

Jake

* * *

Dear Jake:

Help! I don't know how to use tissue paper. Bill Warner of the "Hey Kid" series says to apply it with the smooth side up and Phil Hartman of Blue Ridge Models says apply it with the rough side up. What side do you use?

John of Conifer, Colorado

Dear John:

Well, I use Charmin and I always wad it into a ball, so I imagine that some of both the rough side and the smooth side are applied.

Jake

* * *

Dear Jake:

The instructions for my new Enya 35 R/C say that I should be sure to use a glow plug with an idle bar. What's an idle bar?

Jeff in Gladwin, Michigan

Dear Jeff:

An idle bar is a tavern for the unemployed.

Jake

* * *

Dear Jake:

Do you agree that in order to foster the American economy, we should boycott Japanese model products?

Conservative in Concord, NH

Dear Conservative:

No, but I firmly believe that we shouldn't buy any Japanese lettuce or grapes.

Jake

* * *

Dear Jake:

Do you know what an aximoron is? It's when two totally incompatible words are combined to form a common phrase. The phrase makes sense, but the two individual words taken together are ridiculous. "Jumbo shrimp" is a good example. Everybody knows what a jumbo shrimp is, but

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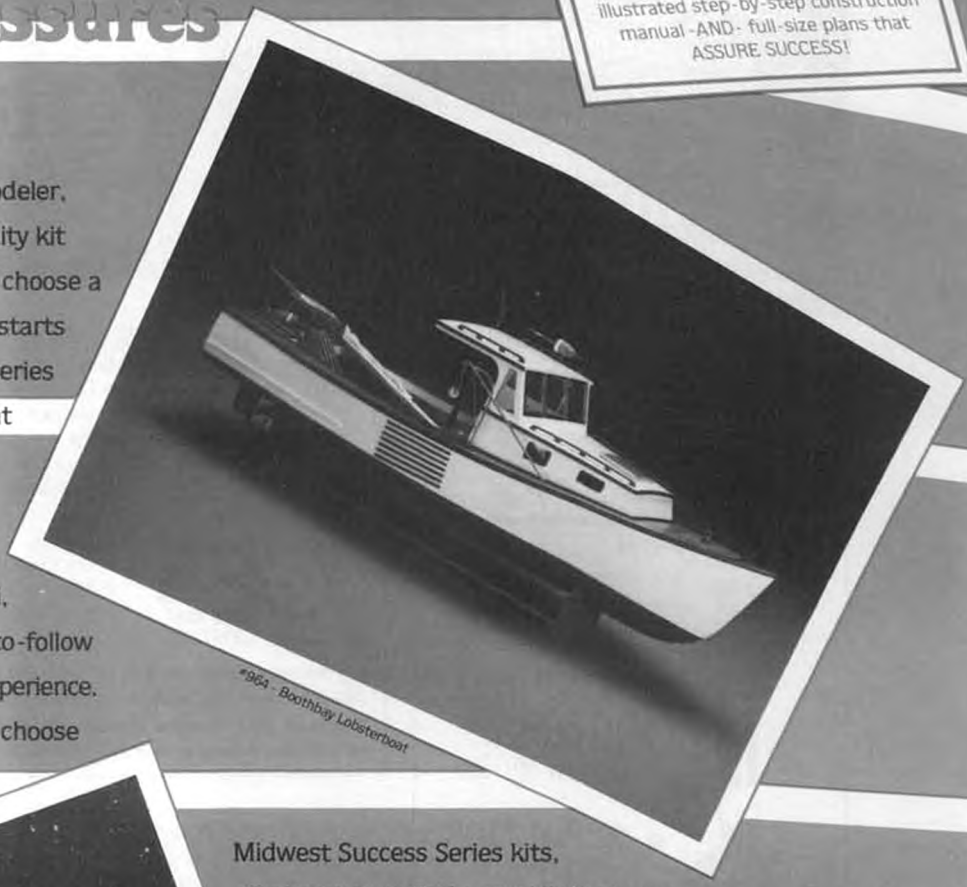

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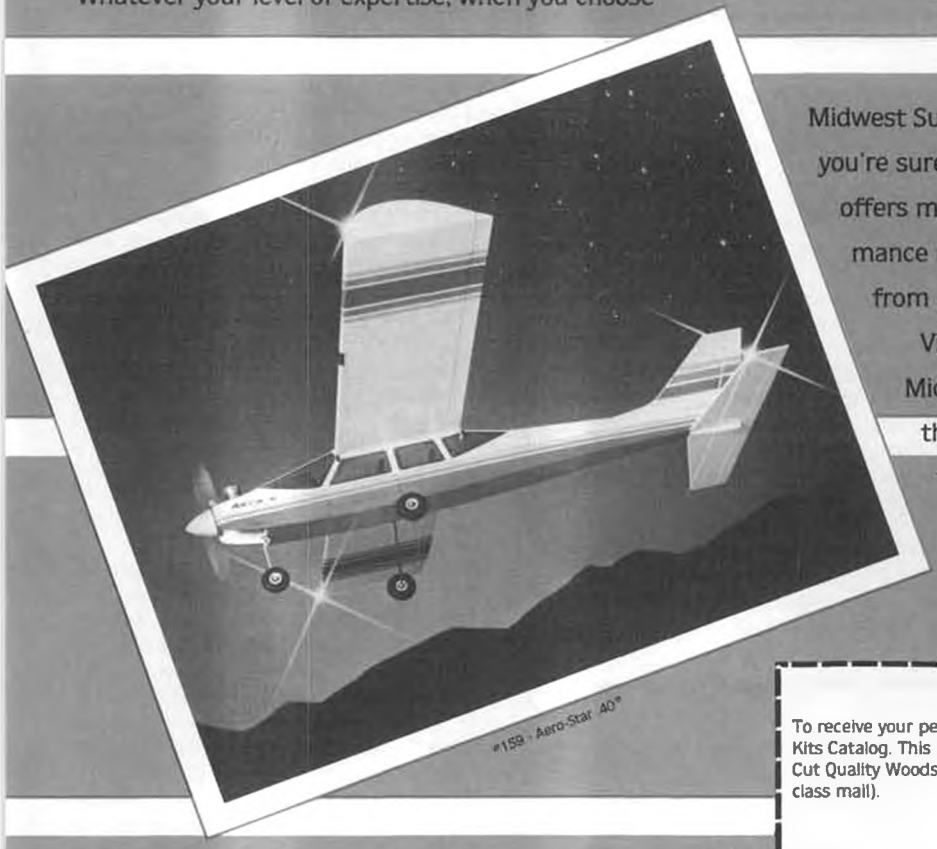

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how can it be both at the same time? "Military intelligence" is another classic example of something that can't be. "Honest politician" must be included as well.

I would like to suggest to you that "Dear Jake" is an aximoron. In my experience, no one has ever used "dear" as a descriptor for you. Therefore, since "dear" and "Jake" are totally inappropriately combined in the phrase "Dear Jake," it must be an aximoron. A minor revision to something like "Damn Jake" would eliminate the incompatibility and solve the problem.

By the way, aximorons are not always limited to just two words. "Sound advice from Jake" would be an excellent example of a longer one.

Grammarian in Great Neck

Dear Grammarian:

Thank you. Hey, how about that?! There's another pair of words that don't go together, at least not in this case.

Jake •

Sage Hen. . . . . *Continued from page 19*

ment. Use four #2x1/2-inch screws to secure the hatch in place.

20) Fabricate the landing gear (aluminum or fiberglass landing gear blanks can also be used) and install. Use four landing gear straps and eight #4x3/4-inch screws for securing the landing gear in place.

21) Install the servos. Hardwood rails glued in between the fuselage sides work well as a servo tray, or cut a tray out of 1/8 or 3/16 ply.

22) Insert the inner parts of the Gold-N-Rods and hook up the controls to the servos and their respective control surfaces. A "Z" bend is a simple and positive way to hook up to the servos, and a metal clevis, large nylon snap clevis or a ball link can be used at the control horn.

23) Install the engine, fuel tank, battery pack, receiver and switch harness (mount this on the side opposite the exhaust) and connect the servos and all other wiring. Be sure to mount the fuel tank, receiver and battery in at least 1/2 inch of foam rubber. A ball link is especially helpful to insure a friction-free hookup when connecting the throttle control to the engine carburetor arm.

24) Install the tailwheel bracket and 1/16-inch wire tailwheel assembly using brass tubing, then glue the balsa tailpost block over the tubing.

Note: The upper part of the tailwheel tiller rides freely in the small piece of brass tubing glued to a concave area in the lower rear of the rudder, so that rudder movement also provides tailwheel steering. This area should be free of covering to insure a good glue joint.

25) Install the two forward hardwood wing mounting blocks in F-5 and the rear mounting block in F-7. Don't drill the holes for the wing hold-down bolts yet.

26) Fuelproof the engine and tank compartments with epoxy or polyester resin (dope doesn't do a good job). Epoxy costs more but polyester stinks and tends to be somewhat brittle.

FINAL ASSEMBLY

1) Although we normally prefer something stronger like dacron, ceconite or a polyester for covering a BIG Bird, a plastic iron-on would be suitable in this case because it is lighter and faster.

Cover the Hen with contrasting colors, particularly on top of the wing and the horizontal stab. Remember, if you have trouble seeing your bird and telling what it's doing, then you're gonna have trouble controlling it. (Betcha didn't know that red-and-white airplanes fly better.)

2) Glue the tail section in place on the 1/8-inch balsa stab seat at the rear of the fuselage, being careful to align the fin with the center of the fuselage.

3) Place the wing on the fuselage cabin top over formers F-4 to F-7. Square up the wing so it's in alignment with the horizontal stab and the fuselage.

4) Hold the wing in place and mark the hole locations on the hardwood mounting blocks where the screws will go. An easy way to do this is to rub soft lead (a #2 pencil) on the bottom of the 1/4-inch nylon bolts. When shoved through the holes in the wing and rotated while being pressed down against the mounting blocks, the bolts will leave an accurate mark for drilling.

5) Remove the wing from the fuselage. Drill three holes where marked on the hold-down blocks with #7 bit. Use a drill press if possible to keep the holes vertical.

6) Tap the holes with a 1/4-20 tap. Then apply thin Hot Stuff or other CA to the holes. When dry, retap. This will greatly strengthen the threads in the holes and allow a more secure mounting.

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Atlanta

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7) Install tail bracing. It takes eight bracing wires, four on top and four on the bottom. Two different types of bracing were used successfully: Jomar's Aramid Cable with DuBro #201 rigging couplers and 2-56 threaded clevises, and turnbuckles (DuBro, Proctor or Hobby Lobby) with Berkley Steelon (20-30 pound test) leader material. Don't forget to safety wire the turnbuckles. Nylon wire ties make fine lightweight brackets when cut into one-inch strips. The braces should be just taut enough to keep tension on the tail pieces, but not so tight that the stab or rudder get warped.

HOMEWORK

1) The wing tip panels should have washout, which means that the wing tips are angled or twisted so that the tip trailing edge is higher than the tip leading edge. This keeps the outer part of the wing flying after the inner section has stalled; it allows for tighter turns and lower flight speeds, and makes the Hen a veritable pussycat.

Here's the way to do it. In a seated position, hold the wing vertically so one wing tip is resting on the floor while the wing is locked solidly between your legs/knees. Then twist the upper wing tip until its trailing edge is higher than its leading edge (1/8 to 3/16-inch) and use your heat gun on both sides of that wing tip area. Hold that twist until the iron-on plastic covering cools and the washout remains. It's very important that the amount of washout be the same at both wing tips. Double check that you have not twisted either wing tip the wrong way.

2) The Sage Hen can be safely balanced anywhere between 4 to 5 inches back from the wing's leading edge (she's much more receptive to thermals, but still not tricky, when balanced close to the 5-inch mark). This is done with the bird completely assembled, ready-to-go, but with the fuel tank empty. Proper balancing is *vital* and must be done in your shop, not at the field where wind and peer pressure will guarantee that you'll do a lousy job and most probably end up with a poor flying, if not unsafe, aircraft.

Here's a simple, effective way to balance. Install two 1/4-inch #4 sheet metal screws into the bottom sheeting of the wing center section. Locate these screws so that one is 3-1/2 inches out from the center of the wing toward the left tip and the other is 3-1/2 inches out from the center to the right tip. Make sure that both screws are the same distance (somewhere between 4 to 5

4"x8" vacuum former with self-contained heat source. Easily constructed from local materials. Plans $12.00. Complete unit $42.00 postpaid. GRACO MODELS, Box 18358 Kearns, Utah 84118.

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WANTED: Magazines, 1952 Air Progress. December 1954 and August 1955 Flying Models John Hannah, 3141 East 54th Avenue, Vancouver, British Columbia, Canada, V5S 1Y9.

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inches) back from the leading edge. Then, place the tips of your forefingers under each of the screw heads and gently lift the bird off the bench. Ideally she should hang slightly nose down.

Try to bring her into balance by moving the battery or receiver. If shifting equipment around still doesn't help, consider going to a heavier (1200 mAh) battery pack. Add dead weight (like lead) only as a last resort. In fact, an extra coat or two of fuelproofing resin would make more sense than screwing and/or gluing in pieces of lead. All three prototypes came in between 7-1/2 and 8 pounds.

3) With a Robart incidence meter check that the wing incidence is between zero and one degree more positive (the leading edge is higher than the trailing edge) than the horizontal stab. Shim the wing if necessary. Make very sure that the wing is not negative to the stab.

4) Like most every other sport-type flyer, the Sage Hen flies best with its engine thrust line offset . . . and Ernst has engine mount thrust plates that are perfect for this job. These tapered plates will allow you to set in the needed 3 degrees of both down and right thrust. Use the Robart meter to check these thrust settings.

5) Double check for perfect alignment between the wing and horizontal stab, and between the wing and fuselage. The fin should be vertical to the stab and on the reference line between the tail and the center of the firewall.

6) A little toe-in (2-3 degrees) on the wheels is OK.

7) Rudder throw: no more than 3/4-inch in either direction is necessary. If you have dual rates, set low for 1/2-inch and high for 3/4-inch . . . and use low once you're off the ground and tooling around.

This bird doesn't need much rudder for effective turns and small movements will help to minimize overcontrolling both on the ground and in the air.

8) Elevator throw: you really don't need more than 3/8-inch up and down. If you have dual rates, set low for 1/4-inch and high for 3/8-inch. Unless the bird is balanced severely nose-heavy, you shouldn't have to worry about running out of elevator when flairing for a landing.

9) The engine should have been run for at least an hour or so on a test stand so that you've become familiar with its handling characteristics. Also, this running will give you a good idea where to set the carburetor barrel for approximate best idle when installed in the plane.

10) After the engine meets with your approval on the test stand, reinstall it in the Sage Hen and test run *before* going out to the field. At this point only a small adjustment of the throttle control or throttle servo should be needed to arrive at the optimum idle setting. Also make sure that the throttle servo doesn't bind at either high or idle, and that there is enough throttle trim left to cut the engine off when desired. This is not difficult to do but does take a little extra time to get it right.

11) Make sure that right stick gives right rudder and that back stick gives up elevator. Any wrong movement can be corrected by using the transmitter's reverse switch for that channel. (Older sets won't have reversing switches, so in these cases you'll either have to route the control rod connection to the opposite side of the servo, obtain an opposite rotation servo, or go into the servo and reverse both the motor and pot connections yourself.)

Even experienced pilots sometimes screw up when checking control surface direction, so it's best to stand directly behind your bird when doing this. And don't forget that the throttle should be advanced by pushing that stick forward.

12) Range check your radio according to the instructions that came with it. All radios are not the same. Some are range checked with the first antenna section out, some with the antenna completely collapsed, and some with the antenna removed from the case. Get to know the antenna requirements for your specific set and what the minimum expected range should be. If you don't get the recommended range, and/or your servos are jittery or humming, don't fly until you find out why. Be prudent and don't risk your plane and possible injury to others or damage to property by being impatient and unsafe.

13) If no extra weight is needed for balance, the standard 500 mAh pack that came with your radio would be suitable for use in this slow flying, lightly loaded BIG trainer. However, an 800 or 900 mAh pack would yield almost twice the usable on-time without much additional weight.

14) All three prototypes flew well with Saito 45's, so any 40 to 50 size four-stroker would be an excellent choice. The best prop to start with would be something like a 12x4, 12x5, 13x4 or a 14x4.

These large, low pitch props will insure that your Hen flies *slowly*, that she'll accelerate faster in an emergency and that

your idle will be enhanced due to flywheel effect. Also, at idle a larger prop acts like a solid disc, slowing the bird down and allowing a more positive and controlled descent... and with a large prop on a four-stroker or diesel, you're talkin' real Q-U-I-E-T.

Please don't stick anything bigger or more powerful than a four-stroke 50 on this bird. More power isn't needed and will, in fact, be too much for this gentle and easy-to-fly very basic trainer.

FLYING

You're really gonna fall in love with the Sage Hen. Besides being docile and inherently stable (if you get in trouble just let go of the stick and she'll right herself), she's also a very graceful looking bird in spite of all those square corners.

And don't let her being a taildragger scare you. She handles very well. Just don't rush your takeoffs. In addition to minimum rudder throw and toe-in, coming up slowly to about 25-30% throttle and letting her stabilize at that power setting for a few seconds will allow you to maintain control. Then, as you ease her up to full power, concentrate on steering straight down the runway. Don't skimp on the amount of runway used for takeoff. Let the Hen build up a good head of steam and a slight nudge of back stick will have her climbing out at a safe and realistic attitude. Stay on that takeoff heading until you're at least 100 feet high, and then make your left or right turn out of the traffic area.

You're gonna find that most every turn requires some up elevator in order to keep the nose from dropping. You're also gonna find that this bird is hard to stall...and when she finally does succumb, she won't suddenly fall off on a wing. Instead she'll mush, drop her nose and lose about ten feet of altitude, picking up enough speed to keep on trucking.

Don't get locked into making only left-hand turns while you're learning. Too many guys practice only left turns, so when the inevitable emergency pops up and they must turn right, they're in deep trouble.

Also, get into the habit of setting up a rectangular landing pattern which consists of slow, gentle 90 degree turns onto an initial heading (down the runway), a crosswind leg, a downwind leg, base leg and final approach. Throughout this pattern you should be slowly coming back on the throttle so that your bird has a chance to bleed off excessive speed and you have the time to mentally adjust to the idea of a landing.

Depending on whether the turn onto final approach is left or right at your field, the best way to prepare for a landing is to throttle back to a moderate speed and:

1) Start your landing pattern by flying upwind parallel to the active runway about 150 feet high.

2) When you're just beyond the far end of the runway make a 90 degree turn onto your crosswind heading and start to throttle back.

3) After about five seconds make another 90 degree turn (in the same direction); this is your downwind leg.

4) Wait until the plane is just abeam of the approach end of the runway, then make the 90 degree turn onto your base leg, all the while slowly coming back on the throttle.

5) Start your turn onto final just a few seconds after rolling out on your base leg. The idea here is to ease the bird onto the runway heading. If you wait too long to turn onto final, you'll have to rack the plane over to make major heading changes, and this is bad news when you're low and slow and inexperienced. A very gentle turn onto final will allow you to line up with the runway.

At this point you should be carrying very little power, but don't be afraid to add throttle if it looks as though you're going to be landing short. Come all the way back to idle as you cross over the runway threshold, and when you're just a few feet off the deck start to flair by feeding in a tad of up elevator. If you've landed anywhere on the field and your bird is still right side up, congratulations. With a little practice you'll be landing on the runway most every time.

The Sage Hen has consistently handled 12-13 knot winds with no sweat, and typically, most of her flying has been while loafing along at no more than 15-20% throttle.

One last comment. If at all possible, utilize a buddy-box during your training because this setup eliminates most of the strain and pain usually associated with learning to fly. The Sage Hen teamed up with a buddy-box is a combination that can't be beat.

Soooo...if you've had a rough time learning how to fly, or are just starting, let the Humongous Sage Hen mother you; after all, it is her specialty. •

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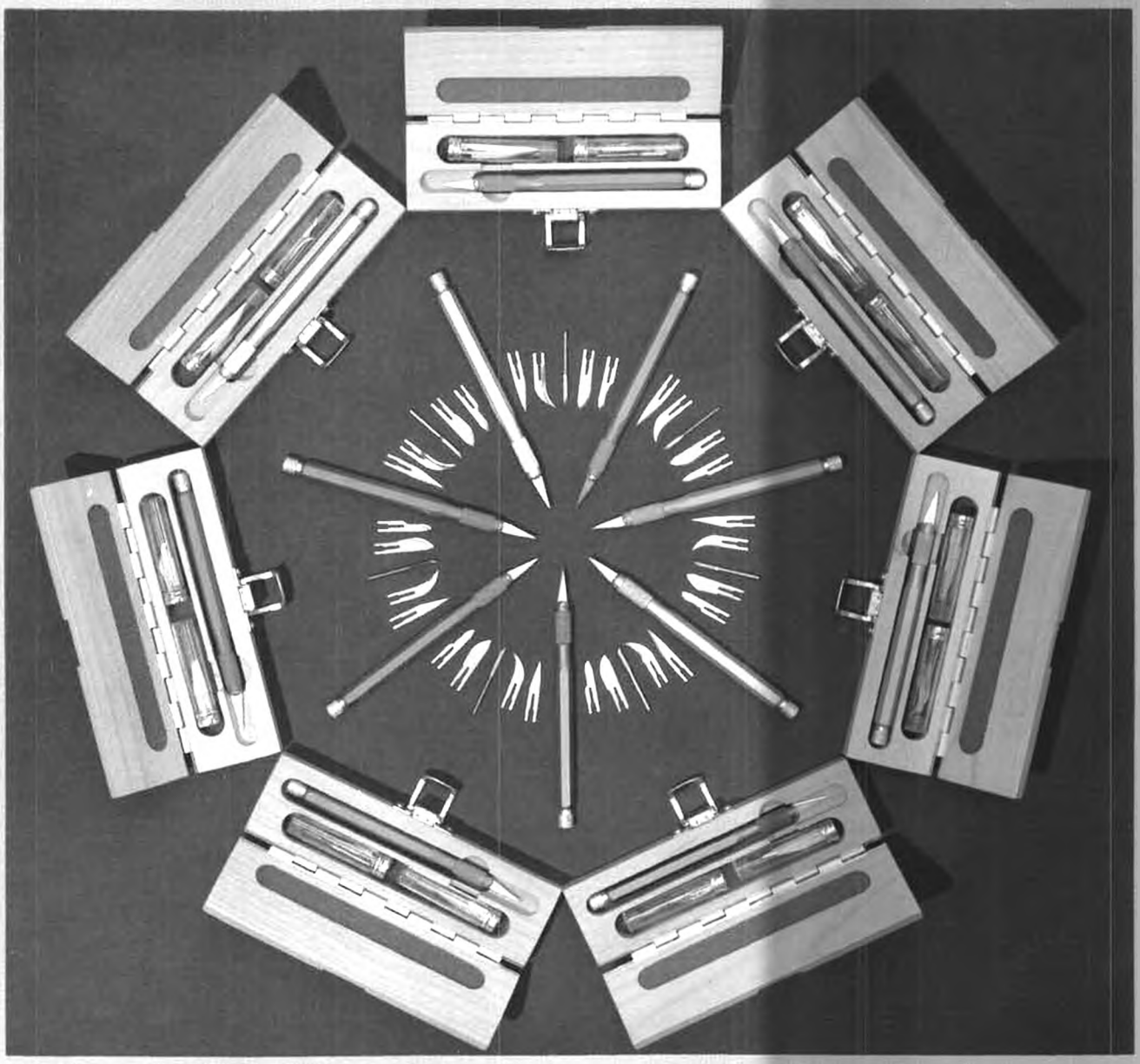

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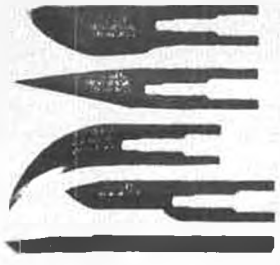

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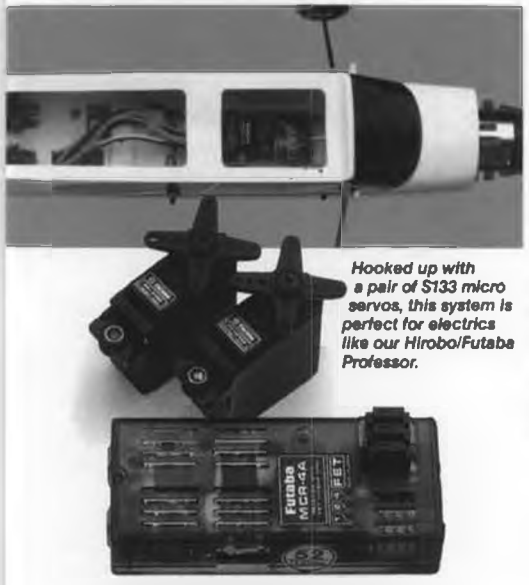

Hooked up with a pair of S133 micro servos, this system is perfect for electrics like our Hirobo/Futaba Professor.

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R114H	S148(3)	Dry Case	72MHz	Aircraft
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(This is no illusion. It's an actual photo of the Clod Buster climbing over 1/10 scale off-road cars. Note the size difference.)