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volume 18, number 196

MODEL AIRCRAFT BUILDER

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AN R/C ELECTRIC B-36

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FORWARD-SWEPT WING DESIGN

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TOTAL ECLIPSE.

Airtronics' Eclipse, our first electric powered sailplane kit, gives you the best of both worlds. Ideally suited for beginning sailplane enthusiasts and advanced sport flyers, the Eclipse offers advanced aerodynamic design and engineering to ensure uncompromising soaring performance.

This new generation in sailplane technology continues Airtronics' quality kit tradition by combining the advantages of electric power and soaring flight. It's quieter and easier to use than gas engines, it's suitable for smaller fields for greater flying site flexibility, and it eliminates cumbersome hi-starts and winches.

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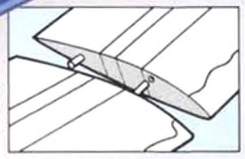

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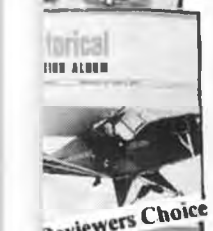

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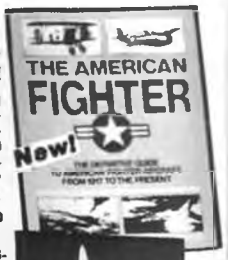

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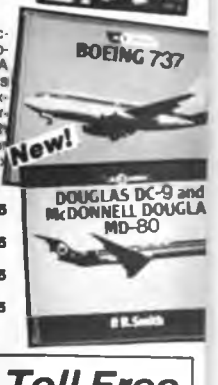

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MAY 1988

volume 18, number 196

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CONTENTS

FEATURES

CONSTRUCTION

COVER: This magnificent B-36 is the product of its designers and builders, Addie Naccarato and her son Tony, of T & A Hobby Lobby, in Burbank, California. This 1/24-scale B-36 Peacemaker has a wingspan of 112 inches and is electric-powered by six Astro Flight 05 cobalt motors linked to a servo-mounted speed control that allows three speeds of flight. Control is from an Airtronics seven-channel FM radio system. In the photo, Addie and Tony kneel with the big bomber, assisted by Marine Sergeants Ed Kostiuk and Louis Castillo. See page 14 for the story and additional photographs of this supreme achievement.

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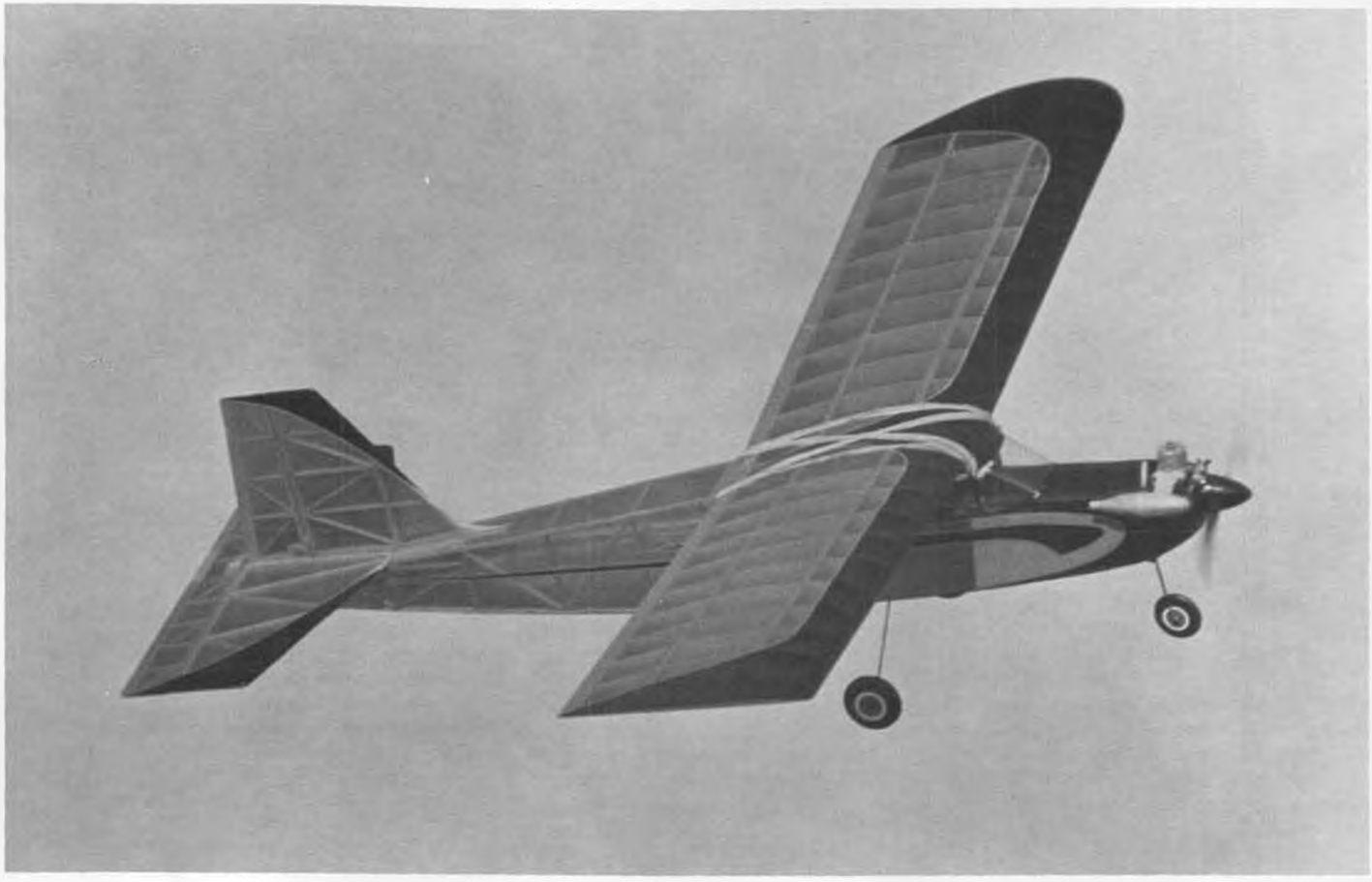

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9801 W Sample PH 753-4228
FRUITLAND PARK
Top Value Hobby
2740 North Hwy 466A
Fruitland Park Plaza
JACKSONVILLE
Orange Park Hobby World
7273 103rd St
MIAMI
Airmodel Corp Hobby Toys
11277 S W 40th St
MIAMI
Crown Hobbies
7439 Coral Way
MIAMI
Orange Blossom Hobbies
1975 N W 36th Street
ORANGE PARK
A & B Hobby House
1476 Park Ave
ORLANDO
Bob s Hobby Center Inc
7333 Lake Underhill Road
ORLANDO
Colonial Photo & Hobby, Inc
634 N Mills Street
PANAMA CITY
Jack's R/C Hobbies
2639 C Lisenby Ave
PENSACOLA
Bobs s Hobby House
5719 North W Street
PLANTATION
Universal Hobbies
141 South State Road 7
PH 305 581 9390
POMPANO BEACH
Trade N Hobbies
2159 S E 9th Pl 943 1997
ST PETERSBURG
Hobby House
6393 9th St N PH 521 4148
SOUTH DAYTONA
Ace Hobbies
2127 So Ridgewood Ave
PH 904-761 9780
TALLAHASSEE
Pam & Allen's Hobbies
1196 A Capital Circle N E
TAMARAC
RC Hobbies
7150 W McNab Road
PH 305 721 5720
TAMPA
Charlie's Discount Hobbies
7530 W. Waters Ave
PH 813-882 4007
TAMPA
Farmers Sundries & Hobbies
4939 E Broadway
PH 813 248-3314
VEROBEACH
Berggren's Hobbies
1505 20th St
GEORGIA
EAST POINT
Total Hobbies
1814 W Washington Ave
ROSWELL
Tommy's Hobbies
1294 Alpharetta St
HAWAII
HONOLULU
Hobbietat
1423 Tenth Avenue
WAHIAWA
DJ's Hobby Stuff
823 California Ave A 20
IDAHO
BOISE
Boise Precision Aeromodeling
3085 N. Cole Suite 103
ILLINOIS
BELLVILLE
West Side Hobby
2629 West Main Street
BLOOMINGTON
Hobbyland Inc
616 N Main St
CHICAGO
Stanton Hobby Shop
4734 N Milwaukee Ave
CRYSTAL LAKE
Frank's Games, Toys & Hobby
111-113 North Main Street
PH 815-459-0247
ELMHURST
Al s Hobby Shop
121 Addison
LOMBARD
G & D Hobbies
716 S Main St
OAKLAWN
Pat's Hobbies & Crafts
5730 W 95th Ph 424-6131
ROCKFORD
Rockford Hobbies Inc
619 So Rockford Avenue
SPRINGFIELD
The Hobby House, Inc
3419 Chatham Road
STREAMWOOD
Swanson's Hobbies
1032 Schaumburg Road
WAUKEGAN
Lake County Hobbies
37632 N Sheridan Road
PH 312-662 4544
INDIANA
FORT WAYNE
Phil's Hobby Shop
1722 Lake Ave Ph 426-5056
RICHMOND
Radio Control Center
1408 So U St Ph 935-5060
IOWA
COUNCIL BLUFFS
Bud's Hobbies & Crafts
133 W Broadway
DES MOINES
Hobby Haven
7872 Hickman Road
HOLSTEIN
Chuck s Lawn & Used Cars
520 East 2nd
LeMARS
Hobby Haven
Airport Entrance Highway 75 So
PH 712-546-5980
MASON CITY
D n B R/C SUPPLY
201 So Vermont
REMBRANDT
Maple Arch Hobbies
R R 1 PH 286-5644
SERGEANT BLUFF
R/C Extras
Rte 1, Box 288 Ph 943-4102
SIOUX CITY
Tri State R/C
3201 Viking Dr Ph 255-8190
SPIRIT LAKE
Spirit Lake HobbsCraft
1621 Hill Ave PH 336-5586
WATERLOO
Bob's R/C Supply
2401 Falls Ave
WAVERLY
R/C Hobby House
916 E Bremer Ave
KANSAS
JUNCTION CITY
R/C Hobbies
115 W 7th St PH 238-1877
KANSAS CITY
R/C HOBBIES
5620 State Ave
LIBERAL
Miller s Bike & Hobby Shop
105 E Seventh
MANHATTAN
Wings & Wheels
463 E Poyntz
Town East Ctr PH 776-6099
WICHITA
Big Frank's Hobby Center
2269 N Amidon Ph 838-3011
Sweetbriar Shopping Center
LOUISIANA
BAKER
Hobby Haven
260 Main St
BATON ROUGE
Hobby Towne
3112 College Drive Suite A
BATON ROUGE
Hobby Towne
6996 Airline Highway
COVINGTON
Performance Hobby
301 N Hwy 190 Suite E8
GRETNA
Boy s World of Hobbies
605 Lapalco Blvd
MANDEVILLE
Mercury Hobbies Inc
Rt 6 Box 734A Ph 892-7204
MONROE
American Classic Hobby Shop
1314 U S 165 North
PH 318 343-5554
SHREVEPORT
Bardwell's Hobby Shoppe
6505 Line Ave #8
MAINE
WATERVILLE
Piper Radio Control
Riva Ridge Vassalboro
MARYLAND
MIDDLETOWN
Larch Lane Hobbies
18 Larch Lane
WALDORF
Doug s Hobby Shop
Waldorf Shopper s World
WESTMINSTER
Bobby's Hobby Lobby
65 E Main St
MASSACHUSETTS
CHICOPEE
J & J Hobbies
133 Frontenac St
Ph 592 1472
EAST FALMOUTH
R/C Hobbies
153 E Falmouth
EAST LONGMEADOW
Bill's Hobby Supplies
600 N Main St Ph 736-7711
FISKDALE
K N Hobbies & Toys
559 Main St
FRAMINGHAM
Fisher R C
17 Salmi Road
GREENFIELD
Chano Hobbies
40 Bank Row PH 773 3300
MERRIMAC
George s Hobby Shop
22 Merrimac Square
REVERE
Tony's Hobby Shop
90 Kimball Ave Ph 284-8756
WALPOLE
B & B Hobbies, Inc
938 East Street
WORCESTER
Ray's R/C Specialties
12 Sherman St PH 757-5883
MICHIGAN
ANN ARBOR
Rider's Hobby Shop
115 W Liberty
BATTLE CREEK
Hobby House
506 Riverside Dr Ph 964 9105
CHARLOTTE
Hussey s Hobbies
222 Lansing St Ph 543-4400
COLDWATER
Hobby Haven
7 So Monroe Ph 278 5894
COLEMAN
Long s Aero & Hobby Shop
5812 W Saginaw Road
DEARBORN
Joe s Hobby Center
7845 Wyoming Ave Ph 933-6567
EAST DETROIT
Joe s Hobby Center
17900 E 10 Mile Ph 733 8294
FARMINGTON
Joe s Hobby Center Inc
35203 Grand River Ave
PH 313 477-6266
GRAND RAPIDS
Rider s Hobby Shop
2055 28th St S E
HOUGHTON LAKE
Craftsman s Cove & Tradingpost
5729 W Houghton Lake Dr
PH 517-422-5714
LANSING
Rider s Hobby Shop
1609 E Michigan Ave
PH 517-485-0700
PONTIAC
RC Hobbies
921 Huron
ROCHESTER
Joe s Hobby Centers, Inc
Campus Corners Shp Ctr
105 S Livernois
SAGINAW
Aerodrome Models Ltd
2623 S Miller Road
PH 517 781 3000
SAGINAW
Roger's Hobby Center
5658 State at Wieneke
Ray's Shopping Center West
PH 517 790-0080
SAGINAW
Tart's Hobby Shop #2
3270 Bay Road
TRAVERSE CITY
Ray's Radio Control Shop
517 So Union PH 947-4949
UTICA
Henderson's Family Hobbies
2441 Auburn
WALLED LAKE
Richie's Hobbies
2604 A Benslam
WARREN
Prop Shop Hobbies
23326 Van Dyke
MINNESOTA
BLOOMINGTON
Jolly's Hobby & Craft Center
Southtown Shopping Center
DETROIT LAKES
Fred's Hobbies
Randolph Road PH 847 3973
LITTLE CANADA (St Paul)
Hub Hobby Center
82 Minnesota Ave
PH 490 1675
MANKATO
Don's Hobby Co
424 S Front St PH 587-1330
MINNEAPOLIS
Jolly's Hobby & Craft Center
Apache Plaza
MINNETONKA
Williams Hobby World
5757 Sanibel Drive
RICHFIELD
Hub Hobby Center
6416 Penn Ave S
ROBBINSDALE
Hub Hobby Center
4114 Lakeland Ave N
ST PAUL
Gullwer's
1526 W Larpenteur
PH 612-646-8249
ST PAUL
Jolly's Hobby & Craft Center
Sunray Shopping Center
2127 Hudson Road
ST PAUL
R/C CITY
961 W 7th St
W ST PAUL
Jolly s Hobby & Craft Center
1891 S Robert
MISSISSIPPI
OXFORD
Creative Sources
1010 Jackson Ave
MISSOURI
GRANDVIEW
Flo Mow Hobbies
700 Blue Ridge Ext
PH 816-761-6471
GREATER KANSAS CITY
Hobby Haven
Metcalf S Shop Ctr,
Independence Center
& 10901 Hickman Mills Dr
MARYLAND HEIGHTS
Flying Models Hobby Center
2723 Creve Coeur Mill Road
ST CHARLES
Mark Twain Hobby & Craft
1201 S 5th St
ST LOUIS
J & J Hobbies
5511 So Lindbergh
MONTANA
VICTOR
Murph's Hobbies
239 West View Drive
NEBRASKA
NORTH PLATTE
Patterson's Hobbies
103 No Jeffers Ph 534-1038
OMAHA
Hobby Cooperative Supply
13225 I Street
NEVADA
LAS VEGAS
J J s Hobby Den
4972 S Maryland Parkway#8
NO LAS VEGAS
Peterson Hobbies & Crafts
3262 B Civic Center Drive
RENO
High Sierra Models
953 W Moana Lane Ph 825 9098
NEW HAMPSHIRE
KEENE
Leisure Time Hobbies
141 Winchester St Ph 352 1518
MANCHESTER
Queen City R/C
760 Hevey St PH 623-6913
NASHUA
Hobby Emporium
Royal Ridge Mall
NORTH CONWAY
C V Machine Co
Kearsarge St
SALEM
Bill s Hobby Barn
326 S. Broadway
PH 603-898-9241
WOODSVILLE
North Country Hobbies
Central St Route 302
PH 603-747 2165
NEW JERSEY
BOUND BROOK
CJ Hobbies
423 W Union Ave Ph 469 8844
CLINTON
Hobbies To Go
310 Hway 31 N. Ridge Plaza
MARLTON
Hi Fly Hobbies
Route 70 & Cropwell Road
Marlton Square Shp Mall
PH 609 983-8060
POMPTON PLAINS
Hobby Hut
567 Rte 23 PH 835-2077
RANDOLPH
Carl s Hobby Center
508 Rte 10 PH 366-4300
RED BANK
Hobbymasters, Inc
62 White Street
RIDGEFIELD
Ridgefield Hobby
508 Broad Ave
RIVERDALE
Zeppelin Hobbies
62 Hamburg Turnpike
WILLINGBORO
Wilting Hobbies
Country Club Plaza
Beverly-Rancocas Road
NEW MEXICO
ALBUQUERQUE
Valley Hobbies
4522 4th St N W Ph 345-9681
CARLSBAD
The Schettlers
1009 N Eighth St
NEW YORK
ALBANY
Competition Hobby Supplies
67 Exchange St
BROOKLYN
Brooklyn's Model Masters
1192 Nack Rd Ph 339 9250
CANANDAIGUA
Finger Lakes Hobby
222 S Main PH 394 7509
CHEEKTOWAGA
Field's Hobby Center
3523 Union Rd Ph 681-6440
ELMSFORD
Andy's Hobby Shop
36 E Main Street
PEEKSKILL
Lenco Hobbies
819 Washington St
ROCHESTER
Dan's Crafts & Things
352 Empire Blvd Ph 654-8388
ROCHESTER
Edmund's Hobby Shop
1521 Mt Hope Ave Ph 442 6430
SYRACUSE
Walt's Hobby & Craft
4300 W Genesee St
UTICA
Hobby & Sport World
2107 Whitesboro Ph 724 4959
NORTH CAROLINA
ASHEVILLE
Carolina Art, Craft & Hobby
128 Swannanoa River Road
BURLINGTON
R/C Hobby Workshop/Raceway
1358 S Church Ph 228 6809
CHARLOTTE
Action Hobbies
2819 S Blvd Ph 527-2596
GOLDSBORO
Hollingsworth R/C Shop
Rte 14, Bx 93 Ph 735-5098
HENDERSONVILLE
The Hobby House
1211 Asheville Hwy Ph 692 6683
HIGH POINT
Bernie's Craft & Hobbies, Inc
2291 English Road
KING
King R/C
Old Hwy 52 PH 983 3969
WINSTON SALEM
The Hobby Corner
136 C Oakwood Dr Ph 723 3589
NORTH DAKOTA
FARGO
Valley Hobby
1543 So 1st Ave
OHIO
AKRON
Miller's Hobby Shop
1018 Kenmore Blvd 848 2264
BALTIMORE
Frank's Service
145 Baltimore-Somerset Rd N W
BERLIN HEIGHTS
Daniel's Hobbies
36 Center Street
CENTERVILLE
A Hobby Shop
13 N Main St Ph 433-7127
CHAGRIN FALLS
Trains, Boats & Planes Co
Stagnorth 100 North Main
CINCINNATI
Carl s Hobbies
1188 W Kemper Road
CLEVELAND/PARMA
National Hobby, Inc
5238 Ridge Rd Ph 749-2450
FINDLAY
Jims Model Supplies
721 Rockwell Ave
JACKSON
Prop Shop
127 Pearl Street
LAKEWOOD
Wings Hobby Shop Inc
17112 Detroit Ave 221 5383
LANCASTER
Slater's Inc
Plaza Shopping Center
1141 N Memorial Drive
MANSFIELD
John's Hobby Shop
15 N Main
MAPLE HEIGHTS
Southeast Hobby
5150 Warrensville Ctr Road
MARION
Lew's Whistle Stop & Hobby
603 Marion Cardington Road W
PH 389 3464
MAUMEE
J & M Trains & Hobbies
2566 Parkway Plaza
PH 419-893 2621
MIDDLEBURG HEIGHTS
American Modeler
7559 Pearl Road
MILFORD
House of Hobbies
204 Main St
NORTH CANTON
North Canton
Aero Tech Hobbies
531 N Main
NORTH CANTON
Modeler's Haven
4255 Portage N W Ph 499-6000
OREGON
Buckeye Hobby Shop
1153 Eastwood Ave
STRONGSVILLE
Hinch's Train & Hobby
8788 Pearl Rd PH 243-6050
TOLEDO
The Hobby Stop West
4558 Monroe Street
UPPER SANDUSKY
Jim & Ken's Hobby Shop
14635 CH 58 R3
PH 419-294-1712
WAPAKONETA
Dad s Toy Shop
123 W Auglaize St
PH 419-738-2007
YOUNGSTOWN
Boardman Hobby Center
6820 Market Street
OKLAHOMA
OKLAHOMA CITY
Campbell's Hobby House
3500 N MacArthur
OKLAHOMA CITY
Hobby Corner
3101 S Robinson
TULSA
Action Hobbies
4423 E 31st St
TULSA
Wings 'N Things
5153 So Peoria PH 745-0034
OREGON
CANBY
Northwest Hobbies
485 S E 1st Ave
CORVALLIS
Trumps Hobbies
1875 N W 9th St
EUGENE
Eugene Toy & Hobby
32 East 11th Ave
PORTLAND
Norm's Hobbies Unlimited
4503 N Interstate Ave
PENNSYLVANIA
ALLISON PARK
Wildwood Hobbies Corp
4678 Rte 8 Ph 487-0706
BATH
Dick Wetzel's Hobbies
514 E Main PH 837 6681
ERIE
Maxwell's Repair Center
5014 Station Road
EVANS CITY
Cranberry Hobby Depot
Cranberry Gardens Plaza
20327 Perry Highway
GROVE CITY
Wagonhill Hobbies
225 S Broad St
HUMMELSTOWN
The Hidden Hangar
149 S. Hoernerstown Road
LANSDALE
Penn Valley Hobby Ctr
837 W Main St
MOSCOW
The Hobby Hut
RD #6 Box 6598 (Elmhurst)
READING
Iron Horse Hobby House
60 South 6th St
READING
Oil's Hobbies
536 N 10th St
WARMINSTER
J.C R/C Hobbies
13 York Road PH 672 5200
YORK
Mel's Hobbies
935 East Market St
YORK
Shelly Sporting Goods
2227 W Market St
SOUTH CAROLINA
HARTSVILLE
Clyde's Hobbies
P O Box 2455
MYRTLE BEACH
Ed's Hobby Shop
702 Main St PH 448-8685
PELZER
Hilley s Hobbies
591 Cooley Bridge Road
ROCK HILL
Rock Hill Hobbies
1204 Mt Gallant Road
SOUTH DAKOTA
ABERDEEN
Klein s
406 S Wilson
RAPID CITY
RCA Hobbies
Rte 6 Bx 1270 Ph 787-6658
WATERTOWN
Holton s Hobbies
Route 2 Box 14
TENNESSEE
KNOXVILLE
M & N Hobbies
1923 Branville Rd Ph 525 7532
KNOXVILLE
Mike s Keys & Hobbies
4011 Chapman Highway
KNOXVILLE
Tennessee Model Hobbies
8909 Oak Ridge Hwy
PH 615-482 2900
NASHVILLE
The Toy Mart
113 Graylynn Dr Ph 883 1648
OAK RIDGE
Ridge Handicrafts Inc
205 Jackson Sq
TEXAS
ARLINGTON
The Hobby Hub
903 A Pioneer Parkway W
AUSTIN
Command Hobbies
6929 Airport Blvd Ste 146
CONROE
J & K Hobbies
1136-B W Dallas St
PH 760-1986
DALHART
Hobby Discount
Box 1249 PH 249-2455
EL PASO
Hal's Hobby Shop
4886 A Hercules Ph 755-1914
FARMERS BRANCH
Bold Hobbies Inc
101 Valwood Village Shp Ctr
PH 214 241 8492
FORT WORTH
Mott's Hobby Shop
7241 Grapevine Highway
PH 817 281 0921
HOUSTON
Larry s Hobbies
156 F 1960 E Ph 443 7373
HURST
Roy s Hobby Shop
1309 Norwood
LONGVIEW
Lewis s Hobby Shop
2726 Gilmer Road
McALLEN
B & B Hobbies
2117 Noland
ODESSA
Odessa TV Video Clinic
805 N Jefferson Ph 332 2831
ODESSA
The Windsock Hobby Center
Winwood Mall PH 333 2317
SAN ANTONIO
Clayton Hobbies
5707 E Mobud
SULPHUR SPRINGS
Hudson s R/C
508 Merrill Drive
WACO
Beverly Hills Model Shop
3421 Memorial Drive
VERMONT
NO FERRISBURG
Yandow s House of R/C
Route No 2
VIRGINIA
RICHMOND
The Hobby Center
1709 Willow Lawn Dr
WASHINGTON
BELLEVUE
R/C Model Shop
14010 N E 21st St
PH 506-747 9914
BELLINGHAM
Hobby Hive
703 W Holly Ph 734 4090
MT VERNON
Performance R/C
1501 Parker Way, Suite 3
PH 206 428-2750
PUYALLUP
All Hobbies
1430 E Main Suite D
SEATTLE
Webster Hobby Shop
1116 N 183rd
SEQUIM
Fred's Hobbies and Guns
349a W Washington
SPOKANE
B & B Hobbies
E 907 Francis Ph 487 2122
SPOKANE
R/C Hobbies of Spokane
W 1104 Wellesley
TACOMA
All Hobbies
Narrows Plaza 2310 Mildred W
TACOMA
Bill s Hobby Town
13923 Pacific Ave Ph 531-8111
TUKWILA
Express Station Hobbies
668 Strander Blvd
WALLA WALLA
Harley s R C
Rte 1, Bx 277A Ph 529-2618
YAKIMA
Model Aircraft Supply Center
505 N 20th PH 453-8238
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W Washington St
WISCONSIN
APPLETON
Galaxy Science & Hobby Center
756 Northland Mall
FOND DU LAC
Focus
75 S Main St
WALDO
Kwindlog Hobbies
104 S Mill
WAUKESHA
ABC R/C Inc
14418 East Main St
WAUSAU
Pope's Hobby Land
640 South 3rd Ave
CANADA
BAWLF ALBERTA
Alberta's Littlest Airport
Box 6 PH 373-3953
CALGARY ALBERTA
Calgary Hobby Supply Ltd
Box 3173 Stn "B"
CALGARY ALBERTA
P M S Hobby Craft
154-495 36th St N E
Northgate Village
ROCKY MTN HOUSE ALBERTA
JB Crafts & Hobbies Ltd
Box 538, 4918 50 Street
PRINCE GEORGE, B C
M S M Enterprises
3980 1st Ave PH 564 5228
VANCOUVER B C
Silvervwing Hobbies
2721 East Hastings
BRANDON MANITOBA
RC Hobbies
24 Weber Dr Ph 728-9868
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 9331
COURTRIGHT ONTARIO
Plane Crazy
428 Talbot Hwy RR1
PH 867 3102
KITCHENER ONTARIO
Flite Craft Model Co
1595 Victoria St N
LONDON ONTARIO
Flite Craft Model Co Inc
1700 Dundas St E
MISSISSAUGA ONTARIO
Hobby Hobby Inc
128 Queen St South
SCARBOROUGH ONTARIO
National Hobby Inc
1875 Lawrence Ave E
PH 416-755-1766
STREETSVILLE ONTARIO
Hobby Hobby
128 Queen St South
PH 416-858-7978
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 368-1655
LAVAL QUEBEC
Carl's Hobby Shop
1500 Labelle Blvd
MONTREAL QUEBEC
Can Ae Hobbies
5850 Gouin Blvd Quest
PH 514 332 3565
ST GEORGES BEAUCE QUE
Place Bureau Enr
12515 lere ave est Ville de
SHERBROOKE QUEBEC
Sher Hobby
1085 12th Ave Nord
VILLE ST LAURENT QUE
Hobbieville
949 Decarie PH 744-8280
NORTH BATTLEFORD SASK
B & C Supply
103 2062 100th St
REGINA SASKATCHAWAN
Aero Specialties
200 Shannon Road
SASKATOON, SASKATCH
Collins Aero-Craft
113 2301 Ave C North
Hascamp Centre PH 652-4775
YORKTON
Radio Control Hobbies
221 Roslyn Ave PH 783-4747
COSTA RICA
SAN JOSE
El Hobby Shop
Box 529 Centro Colon
ENGLAND
NORFOLK NR17 1DG
Pegasus Models Ltd
Caston Attleborough
PUERTO RICO
GUAYAMA
CBS Electronics & Hobbies
Palmer St #6
SWEDEN
S 871 02 HARNOSAND
Modell Produkter AB
Box 2060

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

from Bill Northrop's workbench

• We have just returned from participating in the WRAM's show in New York, February 26, 27, and 28. For the last two years, the show site has been the Yonkers Raceway, just off New York Throughway 87, about 15 miles from 40th St., Manhattan, and about the same distance from White Plains. In 1989, the show will return to its former location, the Westchester County Center in White Plains. The County Center, where New York City area modelers such as Carl Goldberg used to go by train to fly indoor models back in the early to mid-30's, has been closed for renovation and expansion. We haven't seen the enlarged facility, but the vast amount of free parking at the raceway will be sorely missed. For those who stay in local hotels during the show, the use of taxis is highly recommended!

IMS ATLANTA UPDATE

On Monday following the WRAM show, we hopped a plane to Atlanta in order to solidify more details for the IMS show coming there on April 29, 30, and May 1. Judging by our various contacts in the southeast, there aren't too many modelers in that part of the country who haven't already heard about the show, and attendance is expected to be outstanding! They shouldn't go away disappointed, either. At the end of this segment, we'll include a complete list of exhibitors who have signed up as of March 1, with new names coming in every day.

Aircraft modelers will be interested to know that Sig Mfg. is bringing the ultimate in scale documentation for its new one-third scale model of the "Spacewalker" homebuilt . . . one of the two full-size Spacewalkers owned by Hazel and Maxie Hester will be on display next to their booth! Another full-size aircraft to be on display will be the MiniMax ultra-light, by T.E.A.M., Inc., of Bradyville, Tennessee. It will be an uncovered aircraft, so you can see all of the very model-like construction.

One of the main features of the IMS show in Pasadena has been the free flight, control line, and radio control flight demonstrations put on by the Burbank, California "Black Sheep Squadron" model club, under the directorship of Tony and Addie Naccarato. IMS is bringing a skeleton crew from the Black Sheep, including Tony and Addie, to put on the demonstrations in Atlanta. (Sooner or later, we're hoping that some major model manufacturer will realize the tremendous potential of electric powered control line for bringing the younger generation into model aircrafting. An electric powered, almost ready-to-fly control line model, if made available to the uninitiated young public through major department stores, could once again launch a new generation of modelers to replace those who are the dwindling remainder of the 30's and 40's model airplane boom). Part of the skeleton crew will also conduct the Delta Dart building and flying program for youngsters and/or beginners who attend the Atlanta show.

In addition to the live demonstrations by the Black Sheep (with the help of some local free flight and control line modelers), you'll see Tony Avak flying the electric powered R/C blimp he designed and that appeared in *Model Builder* as a construction article, along with several R/C "hot air" (helium) balloons based on the design by George Steiner, which was also published in *Model Builder*. Incidentally, George himself will be there to head up the AMA Transmitter Testing booth. This is a free service offered by AMA and one that every R/Cer in the area should make use of. Bring your transmitter(s) with you to the show, check them in at the AMA test booth, and pick them up as you leave. It's reassuring to know your trannies are behaving properly when turned on!

Not to be outdone by the aircraft, the 32 by 48-foot boat pond will be available to manufacturer/exhibitors as well as local modelers for the purpose of demonstrating their models. Power has to be limited to electric and wind (fans for the sailing yachts). Also, a carpet-surfaced oval racetrack will be installed for R/C cars. The track will be large enough for 1/4-scale gas powered cars to be demonstrated, limited to cars sponsored by the manufacturers in attendance. While these cars will be restricted to scheduled demonstration races and extra silencing mufflers, the electrics will be running almost continuously. Those big 1/4-scale Grand National Stockers should really thrill the spectators!

Following the successful beginning of the inclusion of model railroading at the IMS in Pasadena earlier this year, an area has been set aside for exhibitors, operating layouts, and a "train swap" in Atlanta. Responsibility for this part of the Atlanta show belongs to Ray Brokaw, of nearby Decatur, who also puts on various train, toy, and collectibles shows in the Atlanta area, as well as in Cleveland, Ohio.

Anyway, here's that list of expected exhibitors in Atlanta as of March 1. Obviously there will be many others by show time:

AMA
Airtronics

A.P.B.A.
Avenger/Spider Boat Mfg.
Blue Sky Importing
Boca Bearing Co.
Ace R/C
Ambrosia Microcomputer Products
Auto Engineering
B & L Racing Products
Bob Violett Models
Bolink R/C Cars

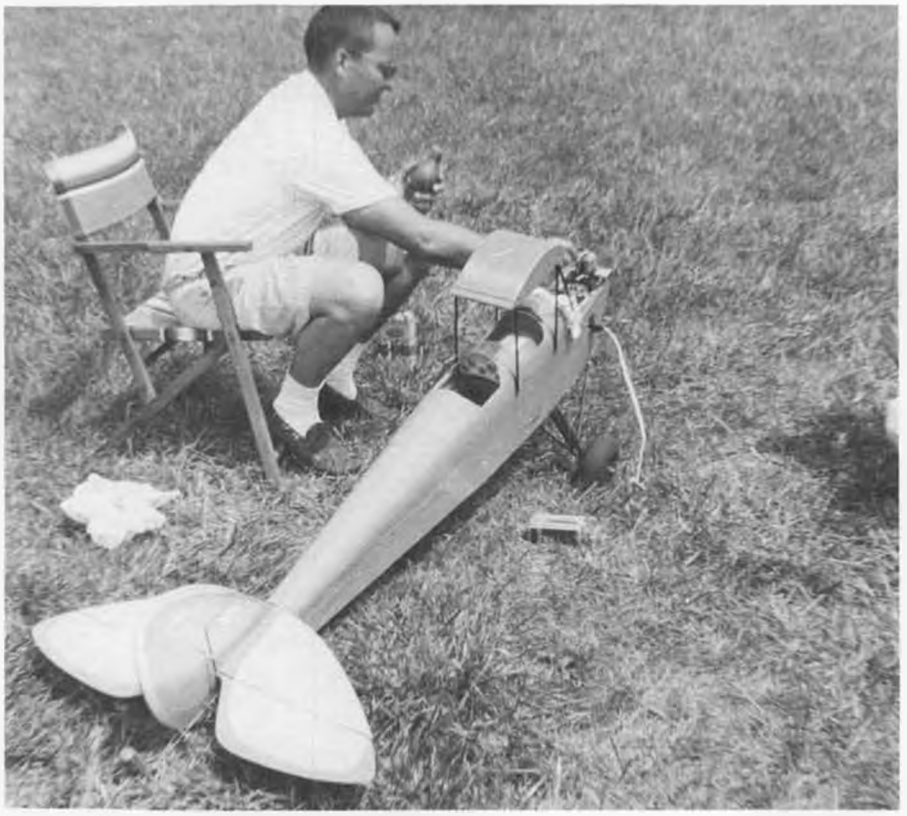

Photo taken at 1961 AMA Nationals, Willow Grove NAS, near Philadelphia, Pennsylvania, by "Duie" Matenkosky, Murrysville, Pennsylvania. MB's editor/publisher breaking in the Forster 99 two-speed ignition engine in his Gipsy Moth. Engine quit just at takeoff during official flight, saving the aircraft for the '65 Nationals, a better radio, a more experienced pilot, and Third Place in Scale plus Best Scale Achievement trophy!

Byron Originals
Cannon R/C Systems
Custom Electronics
Daca Products
Davey Systems
Dumas Products
Easy Built Models Ltd.
Fast Lane Exotics
Fourmost Products
Gorham Model Products
Hobby Hardware
IMAA
Indy R/C Sales
J. C. Model Supplies
Jomar Products
Lanier R/C Division
Max Industries
Micro Model Engineering
Miniature Aircraft USA
Naval Institute Press
NSRCA
Parma Intl.
Phillips Aircraft
Pro-Line Mfg.
R/C Report
Racing Wings
Radio Controlled Models/RAM
RC Video Magazine
RJL Industries
Robart Mfg. Co.
Safety "Plus"
Scale R/C Modelar

Sherline Products
Starflite
TEAM
The Edjer
Tidewater Engineering
Traxxas Corp.
U.S.A. Hobbies
Wolff-Pak
Zimpro Marketing

Campbell's Custom Kits
Charlie's R/C Goodies
Custom Racing Products
Dave Brown Products
Davis Diesel
E. H. Yost & Co.
Electronic Model Systems
Fiberglass Master
Golden Gate Hobbies
High Point Products Co.
Hobby Merchandiser
In Air Hobbies
Innovative Model Products
Ja Lea Co.
Lake Hobbies
M D M Co.
McDaniel R/C
Mid-Am Distributors
Model Shopper
NFFS
Paper Models Intl.
Penn Intl. Chemical
Polk's Hobbies
Product Design
Racing Silks
Raco Modelcraft

Rave's Mfg. USA
RCMB Publications
ROAR
Robbe Model Sport
S.A.M.
Sermos R/C Snap Connectors
Sig Mfg. Co.
Sunshine Products
Technopower II
The Scale Shipyard
Tower Hobbies
Uber Skiver Knives
W.C.M.
World Engines

LET'S FACE IT!

We assume you noticed the sneaky change in our *Model Builder* logo. It's not expected that everyone is going to immediately refer to the magazine by its new moniker, in fact it's highly unlikely that anyone, including ourselves, will ever call it anything other than "MB" or "Model Builder," but we figured we might as well "tell it like it is" (We'll never forget you, Howard). With *Radio Controlled Model Cars* and *U.S. Boat & Ship Modeler* picking up the ball in those areas, it just makes common sense that MB should concentrate entirely on the area in which it has always given most of its editorial space . . . model aircraft. For the record, there once was a magazine called "Model Aircraft Builder," as most old timer modelers may remember. It was published in 1936 by Nat and Irwin Polk, and to the best of our knowledge, only lasted for a few issues. We have three, and unfortunately removed the full-size plans for the neat Wiley Post Trainer biplane from one of them in order to build it. Our model was black and orange and we added floats. It came out so nice, we chickened out and never tried to fly it. Ahh, sweet memories!

THAT ATOM!

We are still receiving material from people who were taken by the Atom engine replica deal. As those involved know, the company took many cash orders for engines, somewhere around seven to eight hundred, at about 80 bucks per, and never delivered an engine or returned the money. The Post Office has so far, in spite of all you hear about their strong intolerance for mail fraud, made all kinds of excuses for doing nothing about the matter, mostly saying there wasn't enough evidence of intentional dishonesty. For this total lack of interest, the P.O. is rewarding itself with a three-cent increase in First Class letter postage!

Las Vegas, Nevada, February 24, 1988: Michael A. Ciolli has been named president of Circus Hobbies, Inc., a subsidiary of Circus Circus Enterprises, Inc. For the last two years, he was president of another large direct mail marketeer and wholesaler of R/C equipment.

We offered to act as a gathering point for evidence from potential buyers who lost their money in this deal, hoping that we can hit the P.O. with a pile of proof they couldn't ignore. We have asked for copies or original transactions, with copies of cancelled checks. A letter telling us that you were "taken" is useless. We gotta have the "ev-i-dence" as Jackie Gleason put it, in "Smokey and the Bandit." We are still receiving material every week.

In the meantime, we have just been informed that one of the principals in the company has been served papers. At this time, it would not be prudent to go into further detail. Just be aware the issue is not dead. We'll keep you posted.

AJAHS

The initials stand for "American Junior Aircraft Historical Society, Inc.," a nonprofit organization, which has been formed with the intention of preserving the history of the American Jr. Aircraft Company and its founders. An immediate goal is to establish a building fund for a museum in which to house and display the many products manufactured by the company. The society also hopes to develop a series of video programs, along with jackets, T-shirts, pins, patches and calenders for sale to the public. The proceeds will be used for the building fund and operational costs. For further information send an S.A.S.E. to: American Jr. Aircraft Historical Society, Inc., P.O. Box 22885, Milwaukie, Oregon 97222.

SORRY, WRONG NUMBER . . .

The proverbial typo gremlin was at it again, this time in the April issue when he (she or it) managed to change the phone number for cover artist Bob Benjamin's art

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ADVICE FOR THE PROPWORN
—By Jake

Dear Jake:

Why do playing cards, envelopes, wing panels that have broken off your airplane in flight, and other flat rectangular objects rotate about their spanwise axis as they fall through the air? Is it the circulation associated with lift that makes these objects spin?

Theorist in Trenton

Dear Theorist:

Yes, lift makes them spin. Winged seeds falling from a tree will do the same thing. As these objects spin, their rotation creates more circulation in the airflow around their surface. This circulation generates even more lift. Lift created by air passing over a rotating body is called the Magnus effect. Even a solid cylinder will create lift if it rotates rapidly and moves forward through the air. In 1937, Chappedelaine designed a biplane with one conventional wing and one powered rotating cylinder. It flew briefly, then succumbed to vibration. In 1984, I designed a model airplane with two Budweiser cans for wings. Each can was mounted to the shaft of a Tee Dee .049 and rotated at 19,000 rpm. During the only test flight, the beer foamed badly, blew out the pop tops, and drowned both engines. Damage was extensive and irreparable, so I

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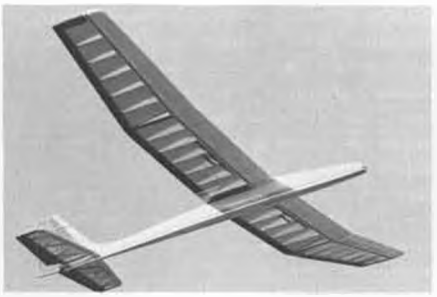
OVER THE COUNTER

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



Sig's Riser 100 R/C sailplane.

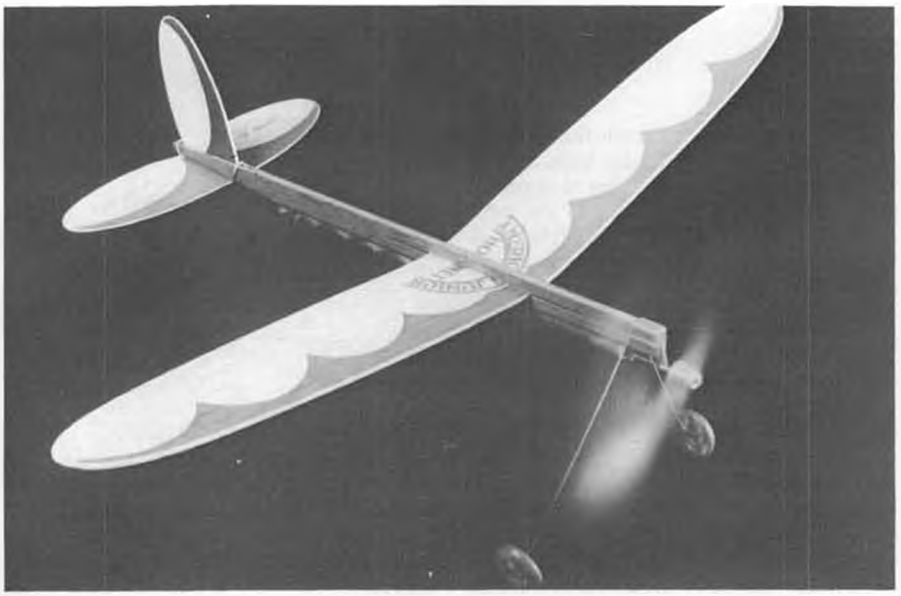
Goldberg Models' Sophisticated Lady.

Davey Systems electric R/C Eindecker.

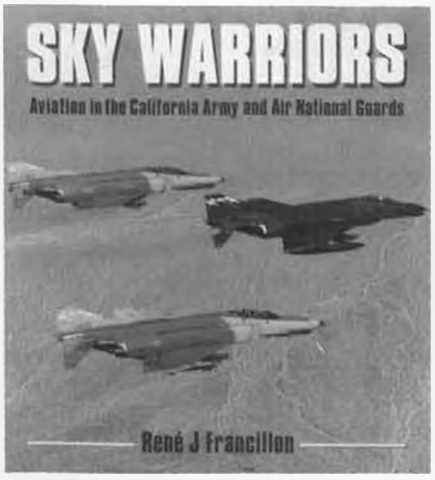
• Building time is nearing an end, according to all those who say you must build in the winter and fly in the spring and summer; out West, it's a little different, because we build in the summer, winter, fall and spring, usually when the sun is down, because most of us spend the daylight hours at the beach ogling the girls! At any rate, the first part of this month's Over the Counter is devoted to some airplane kits for those of you expecting a late snowfall.

Carl Goldberg Models has introduced a variation of their popular Gentle Lady glider, called the Sophisticated Lady. This two-meter sailplane is made of balsa and plywood with a clear plastic canopy section in the nose. Under the canopy is a full cockpit interior with pilot; remove the interior and you'll find easy access to the receiver and battery pack. With a 663 square-inch wing area utilizing a Clark Y airfoil, the Sophisticated Lady has ample lift to stay aloft for a considerable amount of time. The T-tail design means less chance of damage to the tail during landings. Intended for beginners and sport fliers, the Sophisticated

Continued on page 105



American Junior Models' A-J Hornet is back!



Aviation in the National Guard from Zenith.

Combat Helicopters from Zenith Aviation.

The Messerschmitt 109 from Zenith Books.

SCENES FROM THE IMS SHOW, 1988

The Eleventh edition of the West's premier model hobby show proved once again to be an outstanding success, with more exhibitors, more spectators, and more models than ever before. See you next year!

Lighter-than-air balloons are a common sight at the IMS show in Pasadena. Kids are enthralled by the curious craft above.

A mass-launch of Delta Darts by kids who were shown how to build their own flying models at the IMS show. These launches are held periodically through the day as kids finish their planes.

Voyager designer and modeler Burt Rutan was on hand to show his skill as a control line flier with one of the Blacksheep Squadron's electric control line models.

Slow-moving blimps and balloons hover over the crowds during the show. There's always something in the air at the IMS show; balloons, electric R/C, rubber-powered models, gliders, control line models, you'll see it all here!

Blacksheep Squadron members put on daily exhibitions of control line flying with electric-powered model.s, including carrier landings. They'll be on hand at the IMS Atlanta show to demonstrate their flying prowess.

In the R/C car section, Parma had Don Prudhomme's full-size funny car on display, to the delight of drag racing fans. Even more spectacular displays will greet you at the IMS Atlanta show, coming April 30 and May 1, at the Georgia World Congress Center, Atlanta, Georgia. Be there!

U.S. Scale Masters

By FRANK TIANO. . .The desert outside Las Vegas played host to this year's U.S. Scale Masters, and the competition was heavy once again as the winners of the regional contests met to decide the championship.

Ramon Torres' winning Beechcraft King-Air.

• It's difficult to report on a contest, especially one of this caliber, when you've been one of the entrants. What makes it so difficult is that it's necessary for the author not to get his own feelings or opinions involved in his endeavor to bring the reader a true outlook on what took place.

So, with that in mind, let's start off by saying that this past Masters was a real success. Why was it a huge success? Simply because we had 60 of the finest scale fliers in the world, competing with 60 of the finest scale models in the world, all in the same place at the same time. Now I realize that we didn't have the *best* 60 scale people in the world, but we just may have had 60 of the ones who really care enough to further this wonderful sport of ours. For the first time, we even had three guys come all the way from South Africa! One of them went home with more hardware than customs would allow him to bring back into his country!

At this year's Masters there were many, many fine aircraft, but as always, there were a few that really stood out just a tad above the rest. That's not saying that these few were any better than the rest, just a bit different. I mean, how many contests have you been to lately that have had two different versions of the famous Stuka competing for the gold? Well, we had such a contest. And not only did we have a pair of JU-87s, we had a pair of Phantoms, a slew of P-47s, a couple of Messerschmidts, four or five Beechcraft, a Japanese Tony, a Hercules, a spectacular J-3 Cub, a TBF Avenger, and so on, and so on, and so on.

I'm going to let some pictures do most of the talking, but I thought it might interest you to know who finished in the top ten, what some of the latest trends are, and what obstacles the pilots had to overcome.

First, the accommodations in Las Vegas were all quite above average, but I must admit that it was a bit of a hassle getting the airplanes to and from the room each morning and evening. Hopefully, the nightclub atmosphere, great food, and those compassionate slot machines more than made up for any inconvenience. As far as the flying weather was concerned, it could be summed up in three words; excellent, then terrible! Static Day proved to be the best of the four days, with sunny weather and temperatures in the 70s. It all went down hill

Bob Fiorenze took Third with his Jet Model Products F-4 with two Rossi .65s, two Dynamax fans, plus drogue chute.

Charlie Chambers took home the Best Military award for his 81-inch span P-51 from the Platt kit. Power is a Moki 2500 glow engine.

A P-51C from Gene Bartow, Garden Grove, California, with an ST 3000 gained for Gene Thirteenth place in this year's Masters.

Bob Hanft, of Elberta, Alabama was Fourth with his R/T Associates T-34C Beechcraft. Bob is a U.S. FAI Scale teammember.

Bob Francis, Aptos, California, was 23rd with his scratchbuilt Stuka witha Sachs 3.7 gas engine. Model had flaps, dive brakes, dropped bombs, too. Wingspan was 105 inches, weight, 28 pounds.

This Proctor kit Jenny flew on an Enya 80 four-stroke. Model is by Dick Hansen, Portland, Oregon. Spanned 87-1/2 inches.

Skip Mast's scratchbuilt C-130 Hercules, powered by four K&B .21s gained for him Twelfth place. Weighed in at 14 pounds!

Dave Vogland's P-40 was good enough for 39th place. It was built from Holman plans.

This Bleriot X1 by Jeff Troy of Reston, Virginia spanned 108 inches, weighed 13 pounds. Powered by Enya 120R 4-stroke.

Digby Cranke of South Africa flew this Pilot Tiger Moth to Tenth place. Power was an Enya 120 four-stroke. Weight: 16 pounds.

Scratchbuilt Ryan PT-22 by Chuck Fuller took Eighth place. Power was a Zenoah 3.7.

Earl Thompson of Livermore scratchbuilt this Gloster Gladiator with an Enya 240 for power.

Dave Latshar's Sport Shark from Violett models was on display at the Champs.

This modified Platt Spitfire with an ST 3000 was built by Vance Martin of Kansas City.

Bob Heitkamp from Juneau, Alaska scratchbuilt this Ju-87G. Flew on an ST 2500, but unfortunately suffered a crash.

Diego Lopez, of Corona, California, got the dubious honor of coming in last(someone has to!) and got a T-shirt for his efforts.

Frank Tiano's Kawasaki 'Tony' is a 1/5-scale model with an 86-inch wingspan. Took 24th place with Max 1.08 engine.

from there. A cold, rainy front pulled in for the next 2-1/2 days that really put a damper on some of the festivities. But, the pilots took a vote and every single one of us decided to fly anyway. So out came the umbrellas for transmitter protection, and the contest went on as it was supposed to. The front finally broke on Sunday and allowed at least two rounds of pleasant flying weather. We had so much water on the runway at one time that some of the pilots couldn't retract their landing gear because the tires had absorbed so much water that they swelled to the point of not fitting inside the wheel wells! But my hat's off to Craig Hath and Shawn Story, the President and V.P. of the Las Vegas Radio Control Club, for keeping everything moving and really making the best of a lousy situation.

For the first time, I actually heard contestants acknowledging that if it wasn't for Pacer Tech, the manufacturers of Zap adhesives, the Masters may not have come as far as it has. It really does take a few bucks to pull off an extravaganza of this magnitude, and Pacer kicked in with almost $18,000 for the 1987 event. A number of other manufacturers also supported the Masters by purchasing full-page advertising in the Masters' program. These included Goldberg Models, Loctite, Robart Manufacturing, House of Balsa, Futaba, K&B, Dave Platt Models, Hobby Shack, Du-Bro, *Model Airplane News*, and many others. Also, *Model Builder* magazine, *Model Airplane News*, *Flying Models*, and *R.C.M.* all donated full-page ads at no charge throughout the year for announcing the schedule for the various regionals that one must attend in order to qualify for the Masters in the first place. But the real big shove came from Pacer Tech and Jim Munn, its president, who said it was about time that some of the hobby manufacturers returned part of their profits to the modeler, and what better way to do that than to sponsor such a prestigious event as the U.S. Scale Masters? I'm proud to be associated with such a neat company.

There were four rounds flown at the Masters, and for a while it was a real tossup as to who would come out the victor, that is, until Ramon Torres flew his third round! After that, it was just a matter of who would take the next four places. Although everyone tries to make the top ten, it's only the top five finishers who are automatically qualified for next year's competition. So, Ray took first place with the help of his devoted dad and a beautiful Beech King-Air. Dennis Crooks, of Big Rock, Illinois, grabbed second place with his magnificent Grumman Avenger, complete with torpedo drop and folding wings. Third place was taken by Bob Fiorenze, from Brooklyn, New York, and his super-immaculate F-4 Phantom built from a Jet Model Products kit. Tom Cook, the owner of J.M.P., was unfortunately absent from this year's competition, and we all missed him. Fourth place was taken by Bob Hanft. Bob is an ex-Navy jock who, along with Ray Torres, will represent the USA at the world finals in Italy next year. Bob flew an RT Associates T-34 Turbo Beech.

In fifth place, we saw Shalesh Patel just nose out Kent Walters by .12 of a point to automatically qualify for next year! This will be the first time in eight years that "cowboy" will have to attend a regional like the rest of us poor slobs. Although, it's a safe bet that he'll come out on top as usual. Mechanical problems finally bit the old SBD Dauntless, and Kent said that his might be the last year for the airplane. If not, he said that definitely by 1993 it's gonna get hung up!

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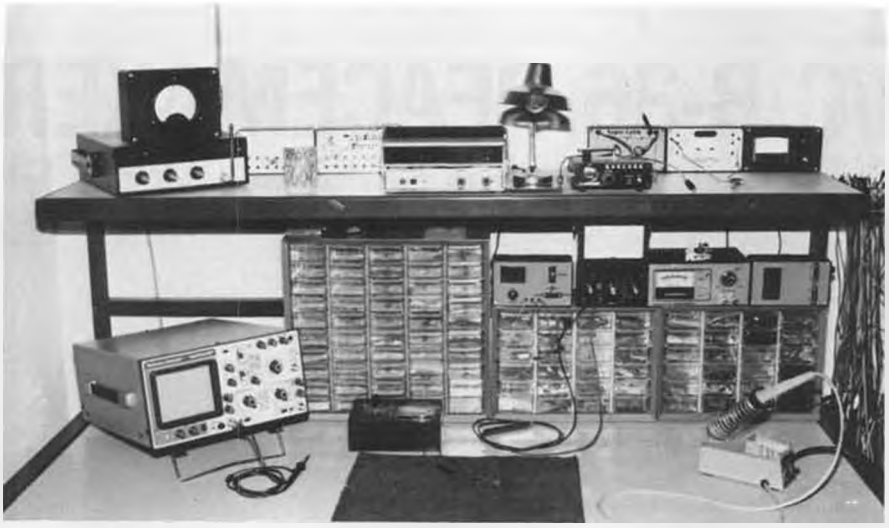


Electronics Corner

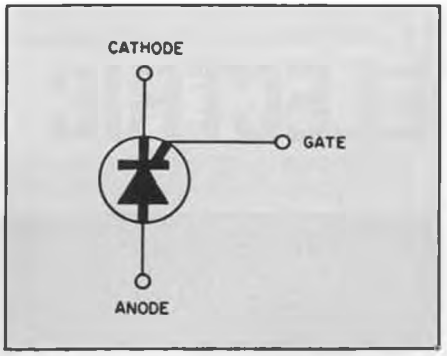
By ELOY MAREZ

• Our servo reverser circuit of December '87, with corrections in January '88 (Blush!), stirred up a lot of interest among our readers. Though more and more of our modern transmitters have built-in servo reversing, they don't all have this useful feature. It really isn't that difficult to reverse the actual servo itself, but apparently many of you prefer the versatility of being able to switch back and forth at will. The on-board, at-the-receiver, servo reverser gives you this option.

Our Order of the Pot—servo, that is, goes to Rich Nevelin, of Oakland, California, who sent in a compendium of servo-reversing information, including a circuit that he has designed and used, and one from another of my favorite sources, the British *RCM&E* magazine. It is all too long to include here, so, as usual, copies are available to those of you who would like to pursue the subject further.

Rich also reminded me that another one of my favorite sources, Ace R/C, actually has a kit for a similar device, it's No. 14K104 kit for $8.50, less connectors. The same, assembled and tested is No. 14K104C, at $13.00. Ace also has the complete line of Deans solder-on connectors, as well as both male and female Airtronics, Futaba, and Kraft connectors. I guess I could save myself time and just say: all the major brands, right?

The same batch of mail that brought Rich's letter also brought a couple from readers who state, "I am a new *MB* subscriber. . . ." and, "I have just discovered your column. . . ." I would like to remind them, and *you*, of something else that Rich Nevelin's letter unintentionally points out, that EC is our monthly meeting place for those subjects that deal with the "R" part of R/C. Really, there is never enough time for me to experience or to try everything that I would like to do—your questions or input is always welcome here, everyone gets equal time!

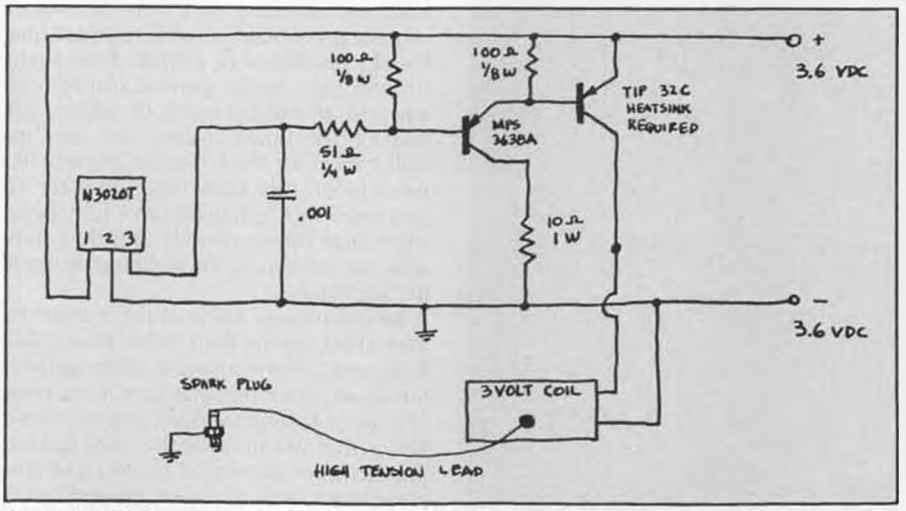


Circuit symbol for a SCR (Silicon Controlled Rectifier), one of many members of the Thyristor family. An input to the gate terminal is applied to control current flow from the anode to the cathode.

Well, almost equal time! Every now and then I come up with something that I can't lay on anyone else, and must take the blame for. For example, this discussion of servo reversers reminds me of something I wrote some years ago, in discussing an R/C system whose transmitter did feature servo reversing, and with which reversed direction operating servos were also furnished.

Which brings up the point then, that if you use a reversed servo in a channel set for normal rotation, it is running in *reverse*; correct? However, if you reverse the channel, the servo then operates normally, but it can't because it is a reversed servo. Therefore, it must be working in *reverse reverse*! Then if you . . . I guess we should drop it; it probably isn't important. Besides, April was last month.

SPARK IGNITION, also a previous subject, seems to be a hot one at the moment and was also addressed by a number of this month's correspondents. First and foremost to be heard from was Duie Matenkosky, Murraysville, Pennsylvania, who, in a very gentlemanly way, pointed out a goof of mine in February. Referring back to Floyd Carter's spark ignition circuit published in November '87, in February we had a mod by Bill Mitch showing how to replace the mechanical distributor (points) with a Hall Effect Switch. This Hall Effect I showed as having its output, lead 3, connected to the junction of the .001 cap and the ohm resistor, a junction that does not exist. The correct connection is at the junction of the .001 and the 51 ohm resistor. To further clarify the matter, Duie even worked up a complete schematic of the two, which is shown here in its entirety. Thanks, Duie!



A marriage of the two circuits previously shown here in EC; Floyd Carter's spark ignition system with William Mitch's add-on Hall Effect switch. Diagram courtesy of Duie Matenkosky.

Next to be heard from is old pen pal Floyd Carter himself, who has a couple or three things further to say:

"The Sprague UGN 3020T Hall IC certainly does work well with the transistorized ignition module which I produce. However, there are a couple of important limitations with this combination.

"The Sprague data sheet says that the normal operating voltage for the Hall IC is 5V,

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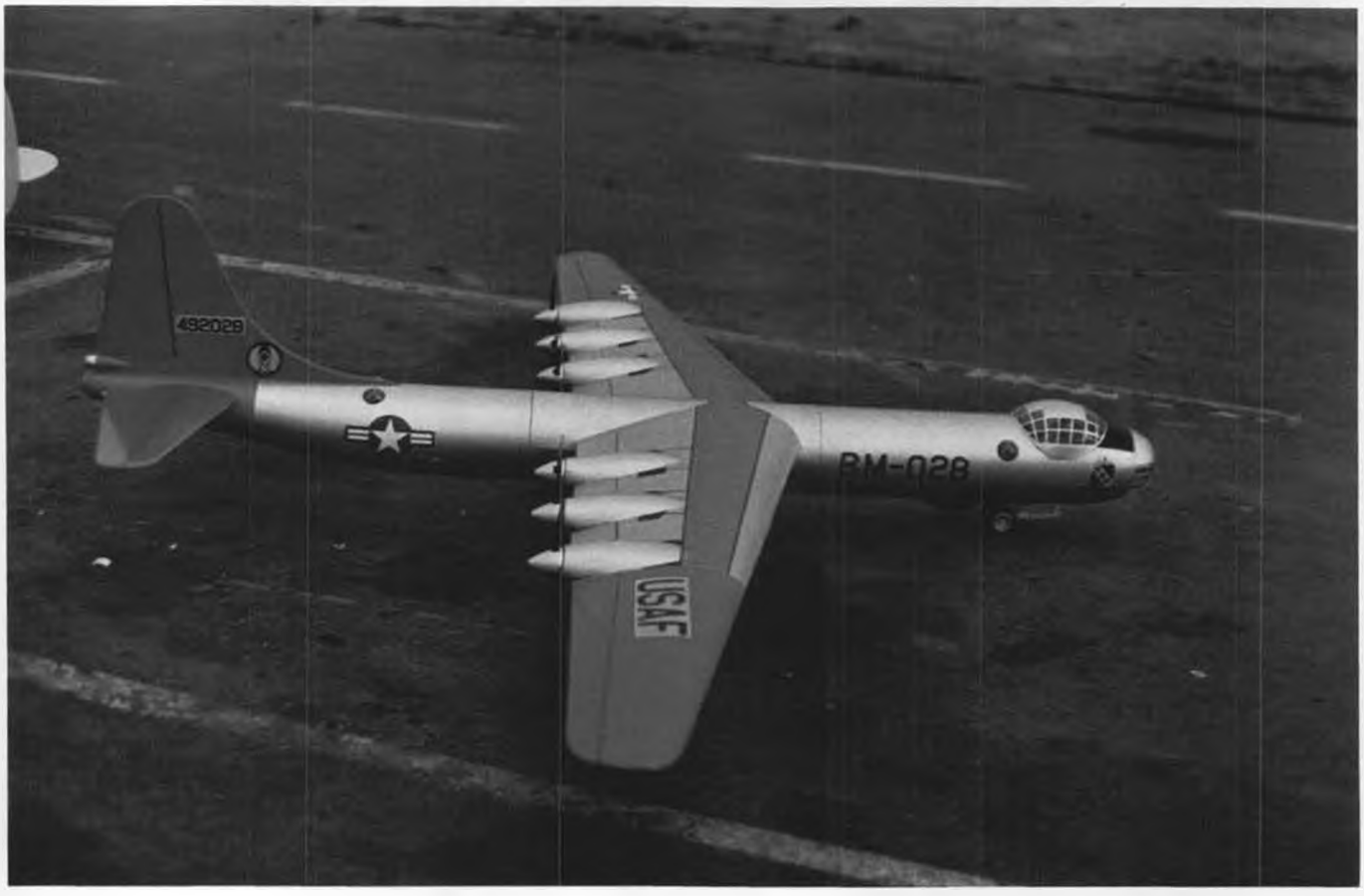
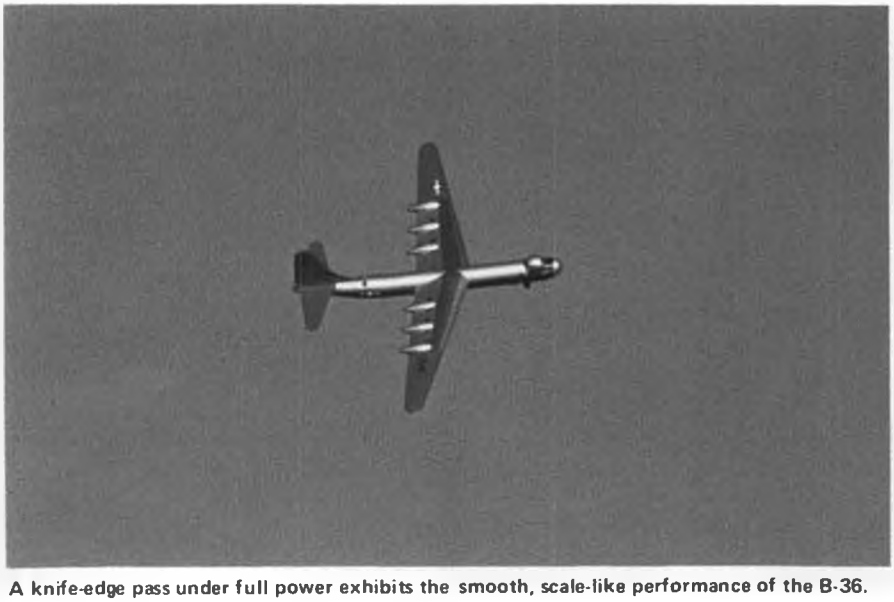
ELECTRIC R/C B-36 PEACEMAKER



By GLEN GELLER... An astounding model, this electric-powered R/C bomber is an impressive sight on the ground, and in the air.

• When it first took to the air in 1946, the Consolidated B-36 Peacemaker was the largest, most powerful airplane in the sky at 162 feet long, with a wingspan of 230 feet, powered by six 3500 hp Pratt & Whitney 28-cylinder radial engines. It was the world's first giant intercontinental bomber, with a range of over 8,000 miles; at the time, the most complex sophisticated piece of machinery ever to fly. For the Giant Scale modeler, the B-36 provides the kind of multi-engine challenge found in few other planes except perhaps the Spruce Goose or Dornier Do-X.



A knife-edge pass under full power exhibits the smooth, scale-like performance of the B-36.

For several years the B-36 had been the giant bee in the bonnets of Addie Naccarato and her son Tony of T & A's Hobby Lobby in Burbank, California. Hanging from the walls and ceiling of their store are over 40 years worth of blue ribbon flying machines, literally hundreds of aircraft: Free Flight, Control Line, Radio Control planes, with any and all combinations of rubber, gas, and electric power. Addie and Tony are well-known for their electric models like the quarter-scale Cub, the third-scale 12-foot span Ritz Ultralight, and C/L speed, stunt, and carrier models. But they were only the beginning, the stepping stones to the Big Plane.

Tony explained some of the reasons for their choosing the B-36, rather than a B-17, B-24, or B-29: the inherent safety factor of the six engines rather than four, in the event of a motor failure; the multi-engine contest bonus that would offset the fixed landing gear (chosen for weight savings and simplicity); the basically good proportions of the airplane; lots of room in the fuselage for the 42 1200 mA Sanyo Ni-Cds, the 6 Astro

Wing and fuselage under construction shows traditional balsa formers, ribs, and stringers. Fuselage center section will be glued to the wing after motors, servos, wiring and sheeting are installed; wing assembly mates to fuselage with nylon bolts for easy access.

Close up shows the custom vacu-formed blisters, canopies, handmade decals and scale cockpit details. Pilots were drafted from Toys-R-Us.

Flight 05 Cobalts in the wings, and the Airtronics 7-channel FM radio system. The cavernous fuselage also provided room for a novel speed control system: a cam mounted on a servo sequentially activates three heavy-duty micro-switches to run the motors in pairs of two, four, or all six. This provides three speeds, giving Tony full power for sure takeoffs, and a choice of economical cruising speeds. (Of course, there are no synchronization problems with the electric motors.) Cooling air for the motors enters through the scale air inlet ducts in the wing leading edge, and exits through holes concealed by the spinner backplates. Due to the location of the motors in the wing nacelles, Addie had to fabricate short extension/adapters which mate the motors to the spinners and props. The B-36 swings Rev-Up 8 x 5 wood props for flight, and also has a set of scale three-blade propellers with spinners for static display.

The size of the plane was determined by the power output of the six motors and is approximately 1/24-scale, with a wing span of 112-1/2 inches. The plane's weight was expected to be 15-1/2 to 18 pounds, and the final product came out to a hair under 18. Once again, the generous dimensions allowed Addie to provide special flight features, and scale six-section flaps were incorporated. These are all linked to two large high-torque servos. Dual servos are also used for aileron control, with one in each wing. One servo each is provided for elevator, throttle and rudder. The rudder is linked to a steerable dual nose gear.

Before any balsa was cut, many hours were spent planning the design and structure of the model. The data used was collected from the Squadron/Signal publication *B-36 in Action*, the Monogram plastic model in 1/48th scale, and the actual Convair drawings. Once the final plans had been assembled, Addie went to work. Construction is of a fairly conventional approach, basically a balsa and light plywood structure with some carbon-fiber in the wing spar, fuselage, and the large battery box. The wings are covered with sheet balsa, but the entire fuselage is double-planked with strips of 1/4 x 3/32 balsa; this provides an extremely strong, stiff assembly with minimum weight penalty. Then everything was covered with silk and dope, "Still the best way to finish an airplane" says Addie. Tony created the scale flight deck, with stations and crew members recreated in painstaking detail. The cockpit canopy, bombardier's nose window, remote gunner's blisters and various radomes, bumps and bubbles were all vac-u-formed from hand-carved plugs. The final product of Addie and Tony's efforts is a B-36-B of the 8th Air Force, chosen for its clean configuration (no jets) and striking color scheme of red, silver, and black. Construction began in early August 1987 and completed October 20, 1987. This itself may be a speed record for giant scratchbuilt model airplanes!

The first flight of the Peacemaker was made on Friday, October 25, 1987, from the rain-dampened desert floor of El Dorado Dry Lake bed. The event was the 11th Annual Q.S.A.A. Fun-Fly, in Las Vegas, Nevada, the Who's Who for Giant Scale R/C. While Addie carefully tended to charging and making final adjustments on the big

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Final approach at Sepulveda Basin in Van Nuys, California. Touchdowns are smooth and steady. Note flaps in down position.

Tony and Addie pre-flight the Peacemaker at Sepulveda. Plane is clean and gunk-free despite having flown several times earlier this day.

SWEPT-WING CONFIGURATIONS
Theories and Comments

By JOHN RAPILLO. . .In the final part of his two-part series on forward-swept wings, the author explains the concept of forward-swept vs. aft-swept wings, and examines the Grumman X-29A .

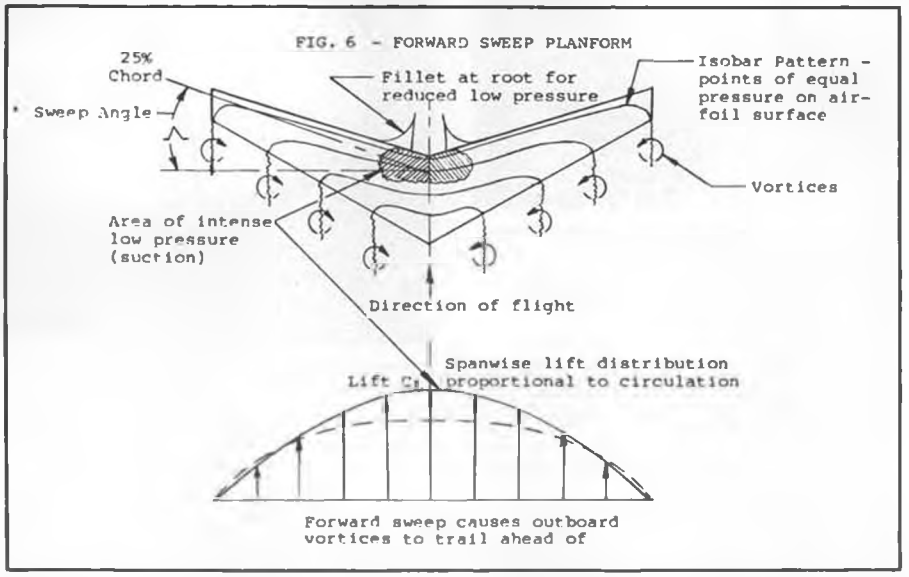
• Theories, studies, and experiments in modeling tailless glider designs through the years has progressed to the present with more than just cut and try methods (refer to Fig. 2). In discussing the forward-swept wing, model designers and builders provide instructive examples and design parameters of their findings and suggestions. Among some reports of tailless and all-wing glider (soaring types included) models, wing designs with aspect ratios from 1:6 to 1:9 are considered as most advantageous, and a wing taper ratio (from root to tip chord) of 2:1. Forward sweep angles from 15 to 20 degrees and dihedral set at approximately 8 to 10 percent of the wing span. Airfoil sections of symmetrical shape and 12-percent thickness prove adequate with a wing washin of approximately 3 degrees at the inboard section and the greater washin angle of incidence at the tip extremities.

The most promising results, with regard to designing and building an R/C forward-swept wing model, lie within the scope and applied efforts exercised by the builder. Here then, is a workable baseline that can be used for a starter project which allows latitude for experimenting and modification with some reservations in keeping with known design rules and boundaries. Begin by using the above parameters for your initial layouts, and expand on your designing, building, and flying progressively.

Forward-swept wings work somewhat opposite for aft-swept wing in that it functions to assist low speed control. The forward-swept wing avoids premature tip stall because the root section stalls first and ailerons tend to remain effective well into the stall mode, however, pitch up still occurs. Because the swept-forward wings stall near their center sections first, the characteristic is desirable from control considerations as the outboard sections are free from separation and the lateral controls remain effective. It follows then, that lateral stability and control can be retained with forward-swept wing planforms. Conversely, forward sweep has an adverse effect on directional stability and, as such, a larger fin area is required for this configured wing design.

In considering the usable operating lift coefficient (C_l) of a swept-wing, tip stalling is generally the major factor as this leads to the unstable pitch-up moment. The combination of aspect ratio and sweep angle influence the stall and thus the moment (see Fig. 6).

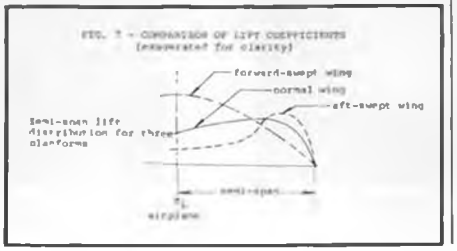
On full-scale aircraft, forward-swept wings, while aerodynamically advantageous, is considered structurally objectionable in some planform designs. This is because wing deflections produce increased angle of attack, which increases lift and further increases deflections (structural divergence). This combination is classed as being aero-elastically unstable beyond some critical speed (high Mach numbers), and the critical speed (M_{crit}) may be restricted to a lower speed envelope unless the wing is exceptionally rigid. The aerodynamic natures of the forward-swept wing renders it prone to structural divergence because as dynamic pressures increase, forces tend to deflect the leading edge upward. If a divergent speed were reached, a cycle of leading edge bending, increased angle of attack, and increased wing loading progresses to cause and result in structural failure. Thus, it can be asserted that wing design requires a high margin of structural integrity and rigidity to prevent and overcome divergence.



Reverting to the R/C model with a forward-swept planform, structural integrity should be a prime consideration during wing construction, and the wing twist faction should be incorporated during the construction stage. Obviously, a model of three- to four-foot span does not incur strong aerodynamic wing loads or extreme performance speeds, so wing structure need be only reasonably conventional. However, designing for an eight-foot or longer wing span will require a more rigid structure to avoid the inevitable torsional (twist moments) loads which become magnified with intensity as speed is increased.

There is a significant advantage offered by the forward-swept wing arrangement when considering the design of the wing structure. The wing root area with its deep chord section provides for a very rigid construction, and also allows the root juncture assembly to be located further aft, behind the center of gravity (CG). It may also be possible to derive a lighter spar structure as a result of this planform arrangement, but this presumption may have different consequences depending on the builder's ability to construct "with lightness in mind" as a prime concern.

Continuing with baseline principles, a key element is the selection of a suitable wing airfoil section. As mentioned earlier, an appropriate wing section to start with would be a semi-symmetrical airfoil of 12-percent chord thickness, and this includes the modern NACA five- and six-digit series of laminar flow airfoils. These particular sections were developed to achieve natural flow in flight and produce significant drag reduction. These sections are: NACA 63_1-012; NACA 63_1-212; NACA 63_1-412; NACA 64_1-212; NACA 64_1-A212; NACA 65_1-212; and NACA 65_1-412. Noted sections have maximum lift coefficients ($C_{l_{max}}$) in the order of 1.6 for a plain airfoil, and approximately 2.5 with flaps. These coefficients are measured at a Reynolds number of 6 million.



In using this type of airfoil during wing construction and final assembly, particular attention towards maintaining a constant airfoil shape throughout is critical to the efficiency and performance characteristics of the laminar flow airfoil section. Consider that, when striving to lower the section drag, the closer must be the attention to maintaining both profile and surface finish.

Why a forward-swept wing and what advantage does it offer over the normal or the aft-swept wing? Substantiations favoring the forward-swept wing are:

1. The wing tips are relieved of static stress on the wing structure because lift generation is higher at the center section (see Fig. 7). This produces the same effect as washout on a normal straight wing.

2. The effects of a forward-swept planform produce very favorable spiral (diving) and lateral (yawing) characteristics.

3. Wing washout is not required and thus is eliminated by the use of this planform.

4. Because the forward-swept wing retains lateral stability and control, adding washin to the tip regions will generate an optimum overall lift effect.

5. Longitudinal stability is increased by both forward- and aft-swept wing planforms in that, the angular difference between wing and stabilizer incidence (also referred to as, "decalage," and/or longitudinal dihedral) is smaller. In essence, the overall wing lift produced at various angles of attack is somewhat levelled out.

6. As a result of less sensitive angle of attack changes, stabilizer areas can be reduced, or alternatively, a reduced length tail moment arm can be implemented.

7. Wing sweep also transposes spanwise lift distribution.

As shown in Fig. 7, note the manner in which taper causes section lift coefficients to peak towards an early stall. Reduced Reynolds number towards the tip would worsen the condition. Washout towards the tip on the aft-swept wing planform would reduce the incidence and lift coefficient beneficially. (Refer to Figure 1.)

BACKGROUND—FORWARD-SWEPT WING (FSW) CONCEPT

The forward-swept wing (FSW) concept is not new, as the aerodynamic advantages of forward-swept wings were recognized and developed during WWII. The JU-287 German bomber was in its development stages when Germany collapsed, but was further improved and placed into production by the Soviet Union later on. Another German project was the Blohm and Voss BVP 209 fighter with a 26.5-foot span which employed a pronounced forward-swept wing planform. However, this project never proceeded beyond the design stage. There were a number of German designed and developed high-performance sailplanes which included the FSW concept. Another design which incorporated the FSW planform was the American experimental ultrasonic Convair XB-53 aircraft. This particular project incorporated a pronounced sweep forward, short span, and stubby wings to attain ultrasonic speeds.

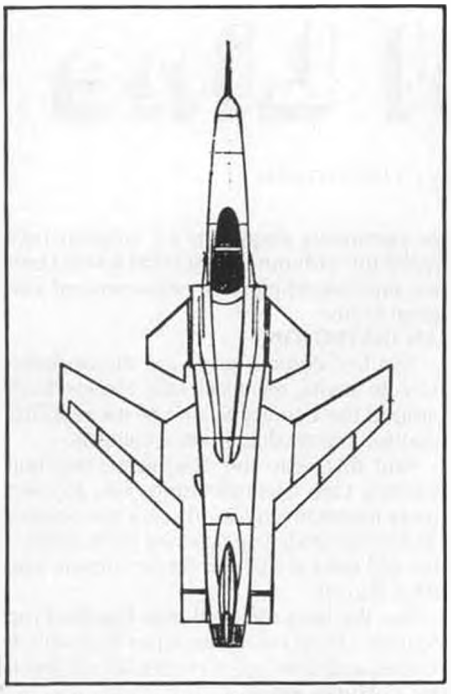


Fig. 8--Planform of the Grumman X-29A.

Since then, FSW research and development has progressed to the present state of the art, and the improvements in design concepts, techniques, and government program funding collectively have brought about the newest derivative of experimental projects, the Grumman X-29A Forward-Swept Wing demonstrator (see Fig. 8).

FSW design offers the promise of a new generation of tactical aircraft that will be lighter in weight, smaller in size, more cost effective, and more efficient than contemporary fighters. The advantages include improved maneuverability with virtually spin-proof characteristics, better low-speed handling, and reduced stalling speeds. Additionally, such designed aircraft have the advantage of lower drag across the entire operational envelope, particularly at speeds approaching Mach 1. Effectively, this permits the use of a less-powerful engine.

In the roll of a hi-tech prototype article and test-bed for Air Force and Navy advanced tactical fighter aircraft (ATF and ATA) programs, the X-29 represents combined aerodynamic features which include close-coupled canards, variable camber wing trailing edges, rear strake flaps, and digital fly-by-wire control system with an analog back-up computer to update positions of the control surfaces.

A significant design goal of the X-29 is to provide a 20-percent drag improvement over aft-swept wing aircraft. To date, the X-29 has been flown to Mach 1.4 speed, reached 5.3_g, and flown up to 20-degree angle of attach. A second angle of attack program is planned this year using a No. 2 X-29A aircraft.

General dimensions for the X-29A full-scale aircraft are presented for those whose interests lie with scale ducted fan R/C projects

WINGS

Airfoil: Supercritical wing section.

Thickness/Chord Ratio: Root—6.2 percent; Tip—4.9 percent.

No dihedral.

Incidence: -6 degrees at wing station 20 to +0.8 degrees at wing station 163.22.

Forward Sweep at 25-percent quarter chord: 33 degrees-44 feet.

Span: 27 feet, 2.5 inches.

Chord: Root—9 feet, 8.5 inches; Tip—3 feet, 11 inches.

Area: 188.84 sq. ft.

Aspect Ratio: 4.

FOREPLANES

All-moving canard surfaces.

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FIG. 9 - STABILITY - FSW PLANFORM

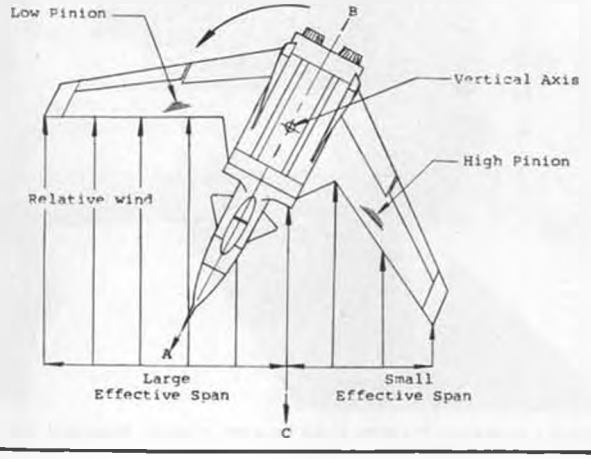
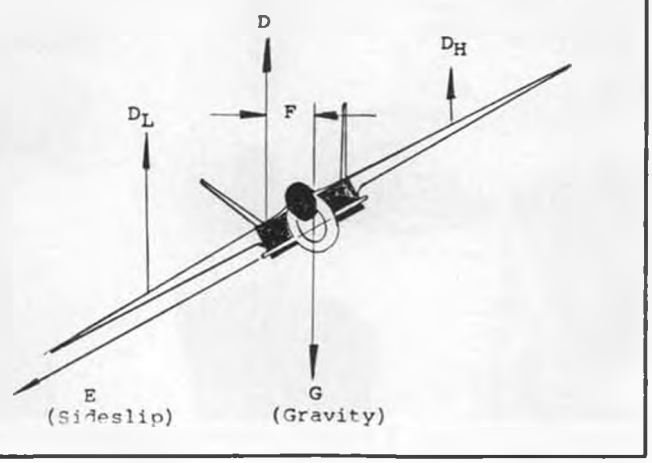


FIG. 10 - STABILITY - RIGHTING FORCES



Control Line

BY JOHN THOMPSON PHOTOS BY THE AUTHOR

• A new name appears atop the column this month, as Mike Hazel passes the handle over to me, John Thompson. It should not, however, signal a drastic change of direction or philosophy for the column because the two of us have been known for some years as the Nitroholics Racing Team and have traveled the contest circuit in the Pacific Northwest and some national events—not to mention countless hours of sport flying together.

A brief introduction of your new columnist is in order.

I am 37 years old, a newspaper copy editor by profession, and a dedicated control line flier by avocation.

I began in my model aviation at approximately 10 years of age but drifted away, as many do, during my teen years. I returned to sport flying in 1976 and began in competition in 1977. Since then I have been involved to some small or large degree in nearly every type of CL model aviation. By a gradual process of evolution, I selected AMA fast combat as my main competition event but continue to compete regularly in several racing classes and some other combat events, and I have dabbled in precision aerobatics, speed, carrier, and even scale at various times over the years.

I, along with Mike Hazel, was co-founder and first editor of *Flying Lines* CL newsletter and co-founder and first coordinator of the Northwest Sport Race Drizzle Circuit winter racing series, now in its tenth year. I'm a member or supporter (and newsletter reader) of all the CL interest groups, a member of the Control Line Contest Board, and a contest director.

As your columnist, I claim no particular advantage in expertise over any other experienced modeler; like most modelers, I'm still learning my hobby. This column presents an opportunity for us to explore together whatever topics seem timely. I invite and urge anyone interested to send me photos, drawings, technical tips, questions, or comments about any CL subject. Let's make this column a joint effort toward better understanding and enjoyment of our great hobby.

AN INVITATION

The first column gives me the opportunity to invite my modeling friends from around the country to one of the real *BIG* control line model airplane contests.

And this year, the Northwest Regional Control Line Championships has an even more interesting twist—it's on a new, bigger and better field! It's just across the road from the old field at Mahlon Sweet Airport, and it's a doozy!

Yes, the long-rumored new Eugene Prop Spinners Field is a reality. It has four asphalt circles and three grass circles, all enclosed by a security fence.

There are parking and pit areas, covered benches, night lighting, *and* all the amenities that went with the old field. That means the airport terminal, restrooms, restaurant, rental car outlets, RV parking areas, and all the other things that made the Regionals special. As usual, there will be the hobby shop on the field.

Airplanes hang from leadouts in author's shop.

Also as usual, the Prop Spinners and other Northwest clubs will make the Regionals what has come to be regarded as the largest CL contest in the country outside of the Nats, in terms of number of events offered. There are 33 separate competition classes. Look at this lineup:

Aerobatics: Beginner, intermediate, advanced, expert, and Old Time Stunt.

Balloon Bust.

Carrier: Profile, Class I, Class II.

Combat: AMA, slow, FAI, and 1/2A.

Racing: Rat, slow rat, Goodyear, Mouse I, Mouse II, Northwest Sport Race, Northwest Super Sport Race.

Scale: Profile, precision.

Speed: 1/A, A, B, D, Jet, FAI, Formula 40.

Junior Events: Class I Mouse Race, Northwest Sport Race, Balloon Bust.

The Regionals offers trophies and merchandise through third place in all events and also gives away three beautiful grand championship trophies. A traditional part of the contest is a big pizza bash on Saturday night, which usually draws 75-100 people.

The schedule will be slightly different this year, so traditional contestants may want to take note.

Saturday: Carrier, Combat (slow, FAI), Racing (Mouse I, Mouse II, Goodyear, NWSR), Old Time Stunt, Profile Scale, Speed.

Sunday: Balloon Bust, Combat (1/2A, AMA), Precision Scale, Precision Aerobatics, Racing (NWSS, Slow Rat, Rat), Speed.

The Northwest Regionals is one of those contests that anyone within striking distance doesn't want to miss. It traditionally draws competitors from all over the West, and occasionally from much farther away.

For the best in CL competition, come to Mahlon Sweet Airport at Eugene, Oregon, on May 28-29, 1988!

HANGAR TALK

Nobody goes flying CL model airplanes without starting out in the workshop. And what a variety of shops one encounters in

Balsa box, shelves, chests of drawers in author's well-appointed workshop. Do you have photos of your shop? Send them in!

Author's workshop features three benches, shelves, pegboard, electrical junction boxes.

visits to other modelers.

Shops I've visited range from a simple kitchen table to elaborate basement machine shop to, in one extreme case, an entire two-story house that appeared to be just about all workshop.

The one conclusion that appears to emerge is that one can build model airplanes in just about any environment if one wants to badly enough—we've all heard the stories of planes built on laps in cars and hotel rooms as big contests draw near!

But some aspects are common to all workshops. Let's take a look at a few essentials, with the idea of giving some tips to the potential CL modeler who is just getting ready to set up his first work space and possibly with the hope of passing on some new ideas to the experienced modeler as well.

First of all, where do we set up our work area?

Obviously, this is a function of your particular living arrangement. Some ideas I've seen used successfully include a spare bedroom in a small house or apartment, a corner of a big bedroom (a common experi-

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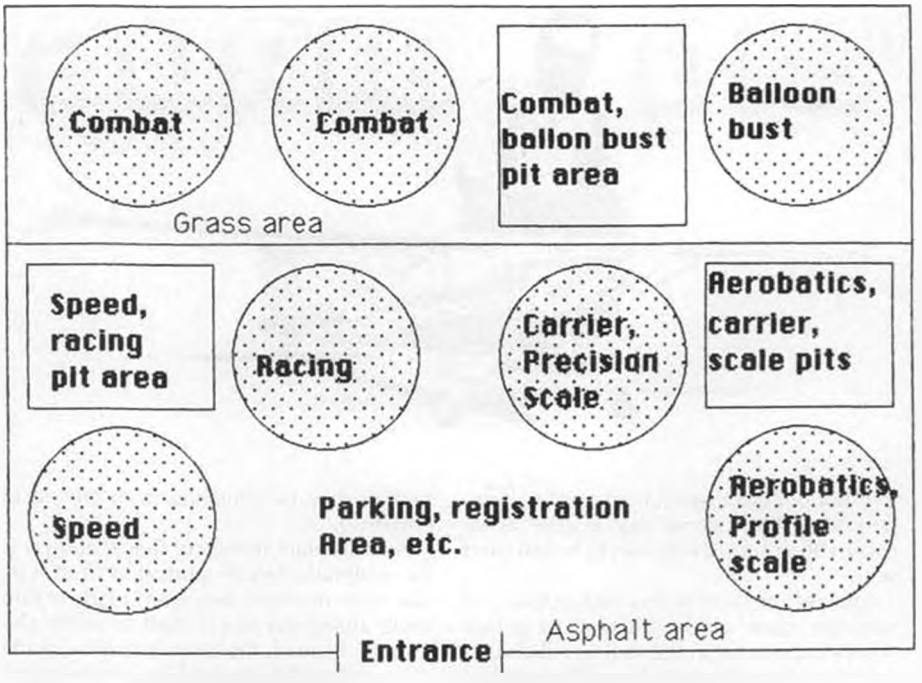
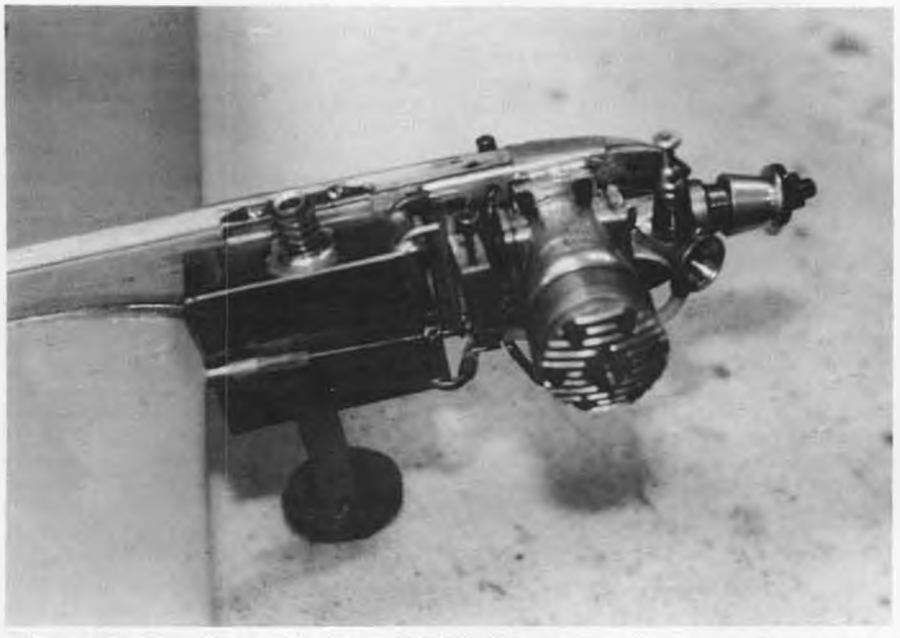


Map of the new Northwest Regionals Control line Championships site. More info in text.



Business end of Dave Green's Minotaur, a championship NW Super Sport race design. K&B .35 power. Photo: Donna Green.

Dave Green, of Astoria, Oregon, king of the Northwest Sport Race Drizzle circuit. Dave holds the Minotaur.

Many top racing planes have come from Dave's well-equipped workshop.

Organizers and cubbyholes in Dave's shop help prevent bench clutter.

BIG BIRDS

By AL ALMAN

• Can't believe there are any AMA members who don't know that engine noise causes beau coup flying sites to be lost each year.

And yet, in spite of this well-publicized carnage, many clubs still tend to ignore what's happening in the real world and allow their members to fly with reworked and/or bored-out mufflers that were barely effective even before they were "modified." These pieces of junk are instruments of the devil and to keep on using them is like playing Russian Roulette—with all the chambers loaded.

What to do about it? Well, probably the smartest move would be to invest in a Soundmaster muffler. Why? Because these new mufflers imported from Germany by Bob Davis (Davis Diesel Development, P. O. Box 141, Milford, Connecticut 06460; 203/877-1670) are amazingly effective; they do muffle.

Not only do they meet the very stringent European standard of 82 dBA at seven meters, but Soundmasters will boost top end power by at least 200 rpm over factory-equipped mufflers. There are sixteen models for two-cycle engines and two models for four-strokers, and more are coming. And, through the use of adapters, a muffler may be switched from engine to engine.

An important feature of these mufflers is the materials they're fabricated from. Unlike other mufflers, they aren't made of thin sheet aluminum nor diecast of brittle aluminum. Instead, the Soundmaster is made of seamless alloy steel tubing, silver-brazed together into a very strong and rugged unit. Front sections and outlets on many models are machined from solid aluminum bar stock with pressure taps installed on all units, and they're finished in black heat-resistant paint with polished aluminum ends.

But beauty is only skin deep, and the best part of the Soundmaster is inside. Multiple internal chambers are partitioned by swirl acoustic baffles linked with sound-trapping tube couplers (whew, how's that for a mouthful?). And if that's not enough, there's the "GM Super Silent" Soundmaster with more chambers that'll placate even the toughest neighbors.

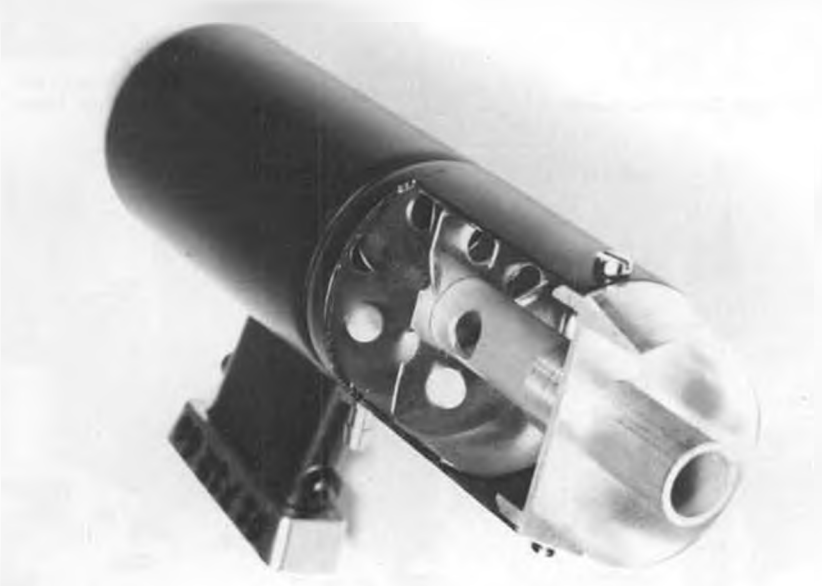
All mufflers except the four-stroke and the F series require an adapter to suit your particular engine, and DDD does have adapters to fit many of the popular engines.

You can use a 90/1.08-size muffler on a .60 for a further boost in power and additional reduction in sound. Add an 18-inch length of tubing to two-stroke units and get an even greater boost with further sound reduction. The same is true for a .40 using a .60 muffler.

Also, mufflers are available for Quadra-type engines, and, by the time you read this, Davis should have mufflers to fit the BIG Super Tigre 2000/2500/3000 series of engines.

I really can't explain why this muffler design works so well, but I suspect that it operates much like the silencer on a gun. The point is that these Soundmasters do work as advertised; they make engine noise far less noticeable. So, if people aren't annoyed by your engine, they certainly can't bitch about it. Yeah, these do cost more than the hollow junk mufflers we're used to, but they work so much better that there's no comparison.

Guys, we can't allow engine noise to send our hobby down the tubes. Up to now the only thing harder than finding a flying site has been keeping one, but mufflers as effective as the Soundmaster should change all that.



Here's what the inside of a Davis Soundmaster muffler looks like, and the reason it's so effective.

TWO MORE ENGINES

We've been blessed with a w-i-d-e variety of engines for our BIG Birds.

O.S., Saito, and Enya make a line of single-cylinder four-strokers up to the 1.2 size. And O.S. also manufactures a number of twins, a flat-opposed four, and a five-cylinder radial, while Saito has their 270 twin and a five-cylinder radial available at the same time.

Of course, if you don't like four-strokers, you can choose one of the many BIG glow or gas burners that are also on the market.

Hard to believe that not too many years ago we had so few choices when it came to engines. We really have come a long way since then.

And now we can add two more options to our engine list: a dieselized Maloney 100 and A&M Aircraft Supply's custom-made 43cc short-stroker.

First, here's the poop on the Maloney 100 conversion straight from DDD's Bob Davis:

"After having a conversation with the late, great John Maloney at the 1986 WRAMS Show, World Engines sent me a Maloney 100 stripped of its magneto and flywheel. The essence of the diesel conversion was to reduce the weight without loosing any power, or better yet, to gain some power in the process.

"I've just successfully concluded the conversion and can honestly say, an animal it ain't, but an overgrown weakling it ain't anymore, either.

"Anyway, here are the specs: a 16 x 8 Top Flite at a tad over 6,000 rpm with the idle at a solid 2,200. Sound measured 88dBA at three meters using the standard muffler with only one outlet. The Walbro pump carburetor was removed and replaced with an adapter block and a Super Tigre .60 carburetor, ala Tartan. Weight with the prop was a little over 2-1/2 pounds. Not bad for a diet! (Also removed most of the rear shaft with my trusty Dremel tool.)

"The conversion kit or a complete dieselized 100 will be available from World Engines. Next project is the Maloney 125.

A J.B. Special built by Richard Gamble, of Youngstown, Ohio. A Kioritz 2.4 powers this 78-inch, 25-pound biplane.

Tom Hayden with his 18-pound Week's Special. This 72-inch bird is powered by a Zenoah G-38 and flies well.

"The reason for working so closely with WE is that DDD has turned over the marketing of its conversion kits, accessories, and fuel to World with the kickoff starting at the 1988 WRAMS Show. Hobby stores will now be able to gain access more easily to conversion kits and, most importantly, the fuel. So don't let them tell you that they can't get any diesel fuel." It's no secret that the standard Maloney 100 is not exactly a powerhouse of an engine, but as a diesel it's very much lighter in addition to having more torque and the ability to swing a bigger prop, so the engine now has a reasonable power-to-weight ratio.

Even though I haven't seen this particular diesel conversion run, experience with six of my own engines (from an O.S. .10 all the way up to a Super Tigre 3000) has proven that when converted to diesel any engine will have a better top end and a lower and more reliable idle.

Okay, now here's all the info I have on Al Willaert's (A&M Aircraft Supply, 1801 South Crest, Carrollton, Texas 75006; 214/242-0984) new 43cc hummer.

Y'see, Al's taken the piston, cylinder, and shaft of a 2.6 cid Sachs engine and added his own case, mount, hub, and carburetor. The engine can be had for either gas or alky, but here's something unusual: both versions turn a 20 x 6-10 at 7,000, which ain't a bad banana.

This ball-bearing "Sachs 40" is light; only 3-1/2 pounds because there's no magneto. Instead of the heavy mag wheel, it's set up with a Hall Effect and mechanical spark advance for use with the C.H. Electronics and other ignition systems that use a Deans plug. Also, because this engine's such a short-stroker, it'll fit quite easily into a lot of cowls.

It's gonna be on the market around March/April and will be available with or without an ignition system. I'll have tach readings and other data for you next month.

YELLOW AIRCRAFT, REVISITED

When I mentioned this new kit manufacturer a few months ago, all I had to go on was some advance advertising hype. Well, things are different now because I've been able to fondle and eyeball two of their prototypes; the CAP 10B and the Corby Starlet.

These are quality kits! The fiberglass work is as good as Byron's, and the ply parts are beautiful; nice and smooth with no fuzz or rough edges. And the wings, tail, and control surfaces come with 1/16-inch balsa sheeting already epoxy-laminated to the foam cores. If the "Hong Kong Connection" can maintain this impressive level of quality control, Dr. Jack Tse won't be able to produce kits fast enough.

And just to get you to lickin' your lips in anticipation, let me tell you what the good doctor has in mind for the future.

Come June he'll be releasing an F-16 and an F-4E, both 67 inches long.

Then in the fall you may be seeing an F-14, an F-18, and an F-15 in addition to an 88-inch Spitfire and a 96-inch OV-10 Bronco.

And, maybe, in 1989, an F7F Tigercat!

For more info and pricing, contact Yellow Aircraft & Hobby Supplies Ltd., Suite 201, 3040 Palstan Road, Mississauga, Ontario, Canada L4Y 2Z6; (416)273-6757.

BIG BIRD SOCIAL CALENDAR

June 11-12: The Converse Cadets (IMAA Chapter #48), will be hosting their 7th Annual Giant Scale Fly-In at Converse Air Field, Converse, Indiana.

IMAA's most successful Fly-In Festival was held at their 52-acre concrete strip last summer, so you know that these Chapter #48 folks really do have their act together and

Continued on page 70

That's Mel Santemyers standing in back of someone else's fine Fly-Baby biplane.

The Air Tech bunch: Bob Brown, Wendell Roberts and John Westbrook, with one of their Air Tech Eagle models.

CHOPPER CHATTER

BY DICK GROSSMAN

• When Hirobo came out with the BBC (Best Basic) Stork, about two years ago as best I can remember, it was unique in many respects. It had many plastic parts, among them the seesaw and blade holders. The cooling fan was situated right against the head, and turned by a belt off of the crankshaft. To make room for the fan, the carburetor housing was rotated 180 degrees. The helicopter was sold with an O.S. .46 rear exhaust engine. It had a tricycle landing gear instead of skids. It was different.

Most of this chopper is pure Stork, but many things have been changed. Landing skids, .60-size engine mounts, cone starting, GMP sideframes, engine head facing rearward for easy glo-plug access, and a sleek vacu-formed canopy are GMP's contribution to the helicopter.

What has been retained is the Dual-Damped Flapping head, the belt-driven tail rotor, and the lightweight reinforced plastic construction that makes this chopper almost overpowered with a .60-.61 engine.

Most of the original Stork parts are placed on a cardboard sheet with a blister pack over each compartment. Each compartment is labeled with a description of the part or screw size. Those parts that aren't needed for the Stork SE have been removed, and conversely those extra parts needed for the Special Edition are included in a separate bag.

This is the easiest helicopter to build for the absolute beginner that I have ever seen. The instructions are simple to follow, consisting mainly of diagrams with the required screw, bolt, washer, size and shape indicated right on the plans. Keep a little metric ruler handy right in front of you on your table or workbench. There are quite a few different size and types of hardware; and the faster you can identify and find them, the faster your building will go.

Sleek lines of the new Storke SE, imported by Gorham Models.

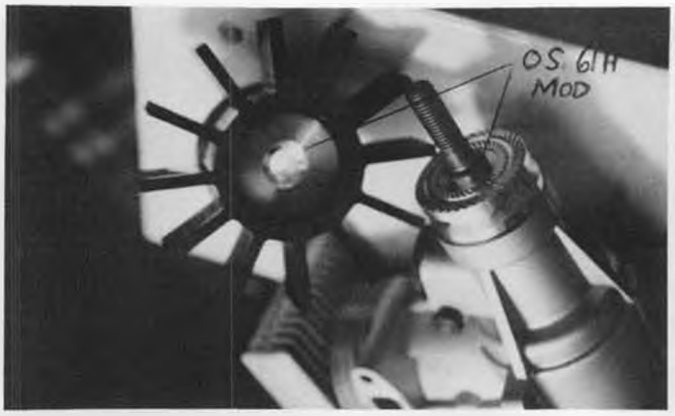
I didn't follow the building sequence in exactly the order shown in the instructions. I assembled the clutch, fan, and start shaft first. The O.S. .61 H Long Stroke has a raised part on the shaft that extends past the thrust washer. *If you use this engine, you must ream out a portion of the flywheel so that it sits flush against the thrust washer and not against the little "bump" on the crankshaft. The flywheel slides over the thrust washer, and you can't actually see the two making contact, so be careful that you have it right.*

The flywheel, clutch, fan, and start shaft lined up perfectly, with no runout whatsoever. This left me with about three hours to kill, since that's how much time I had allocated to aligning those parts.

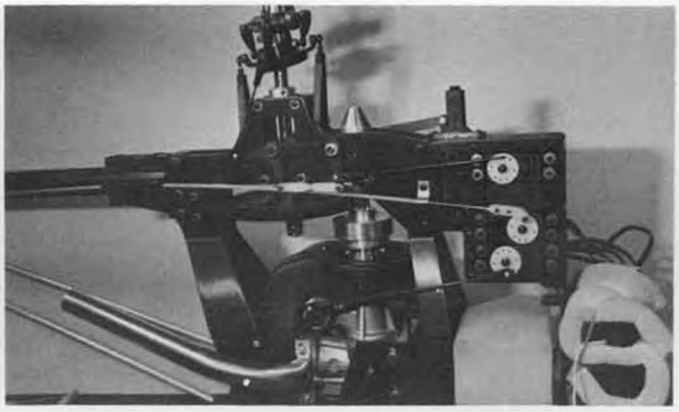
John Gorham points out differences between BBC Stork and his special edition version to Chopper Chatter columnist Dick Grossman.

Next was simply assembly of all the components, starting with rotor head and the seesaw, which is plastic and comes in two halves. The bearings supporting the flybar and the flybar control arms are encapsulated between those halves which are then joined with #2 self-tapping screws. This compact and sturdy assembly does introduce one problem: you have to take it apart to replace the flybar if it gets bent. Based on the quantity of flybars that are sold, it's apparent that too many people are *replacing* them at the slightest provocation. *They can be straightened.* With just a little time and patience, you can get that flybar almost perfect. It's somewhat of an art, which I'll talk about it in a future article. It one of the few things I do well—from experience, unfortunately.

The rotor head and blade holders are already joined, leaving only the job of installing the rubber dampers and attaching the blade control arms—nothing very complicated. It was at this point that I encountered my only real problem in the assembly. There are two millimeter pan head screws that are threaded into the plastic seesaw arms and washout control arms to hold the



Relieve hole in flywheel for O.S. .61 H. See text for details.



Note Mac header slants upward.

ball-links. These screws are too soft, and in screwing them into the plastic, you run the risk of either rounding out the head or snapping them off altogether. Two of these broke off flush with the plastic, and all I could do was to replace the entire part. I replaced the rest of these screws with the Du-Bro socket head screws and never had the problem again.

There are some lessons to be learned about working with plastic, and we had better learn them because *every* new chopper on the market has a large percentage of plastic parts. One lesson is that the deeper you screw something in, the harder it gets to turn because the plastic hole is often the full length of the thread. Another lesson is that you can't tighten things very hard or you'll strip out the plastic. Just twist enough to seat the head and then leave it. You can't torque as hard as you would with a nut and bolt, but *you don't have to.* It won't come loose. Also you can't screw and unscrew too many times because the plastic *will* strip out. I had to take apart the seesaw assembly on the Stork, and when I tried to replace two of the screws, I found the threads had partly stripped out in the holes. This isn't as serious a problem as you might think. Rebuilding Shuttles taught me that a little thick CA will hold a stripped screw very well, because most of the thread is still left.

Nothing bad happens if you don't follow the building sequence shown in the instructions. I jumped around from one assembly to another just for the fun of it. It's hard to put this helicopter together *incorrectly* if you just pay *some* attention to the instructions.

The tail rotor gearbox isn't really a gearbox. The Stork has a toothed belt tail drive very similar to the Shuttle. The tail shaft pulley is supported by two ball bearings held between the plastic tail box halves. Outside the plastic housing is the tail rotor axle and the pitch control mechanism. The bladeholders are standard two-piece plastic bladeholders held together by 2mm screws that tap into the plastic. The pitch control mechanism is the Heim-type (for lack of a better description). It is a nice slop-free mechanism that helps the Stork hover like an Army drill team. I did notice a little play in the pivot bolt for the pitch control arm, which I had to correct by putting in a larger screw. The pitch control mechanism is held together with six 2mm screws tapped into plastic. You can't tighten them too much or the mechanism won't operate freely. The tail rotor assembly slides onto an octagon-shaped tail boom. That unusual shape eliminates the possibility of the tail assembly rotating in the tail boom. A two-piece plastic tail boom holder assembly screws together and fits nicely between the sideframes.

The gearbox that takes off the main gear is supported by two ball bearings and goes together in a few seconds.

The whole kit almost falls together by itself. Everything fits together nicely; holes are where they're supposed to be, not a few millimeters off, if you know what I mean.

There are some things I would have liked to see a little different. I think with some planning they could have eliminated many of the different screw sizes, particularly the hard-to-find ones. I didn't mind the extensive use of plastic bearings, because they contribute greatly to keeping down both the weight and the cost of the helicopter. Even expensive ball bearings can rust or break, in which case they're worse than no bearings at all. However, even as we speak, ball bearing replacement sets are being sold for the Stork. If you're at the stage where you can keep your helicopter together and flying for a whole season, you might consider the ball bearing mod. However, if the word "crash" is used frequently in describing your flying, leave the plastic bearings.

I felt I wouldn't be pushing it by adding 25 grams of lead to the end of each rotor blades. This will help autorotations, keep the blades in track, and bring the blade CG up to where it should be. However, I won't know this for sure for a couple months because I doubt I'll be flying for a while; the wind chill index was *minus 32* today.

I did fly an SE Stork last summer, so I'll give the flying end of this review based on someone else's chopper, until I can fly my on. Nice, stable, smooth, and the DDF head helps keep it steady in the wind. The light and *fast* tail gives a quick tail response that keeps this chopper locked in to where you point it. For the beginner, the stability of the Stork should be a big factor in learning to hover and fly without smashing into the ground every five minutes. For the "hot-dogger," a .60 engine in a 9-pound machine gives some speed and climbing ability that can only be described as *awesome*. Now,

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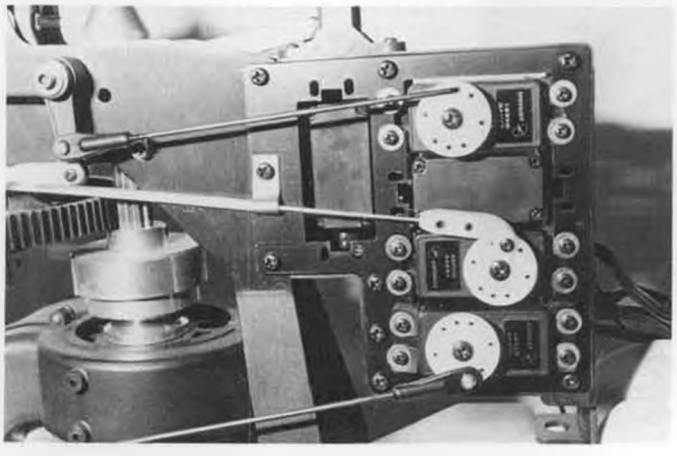
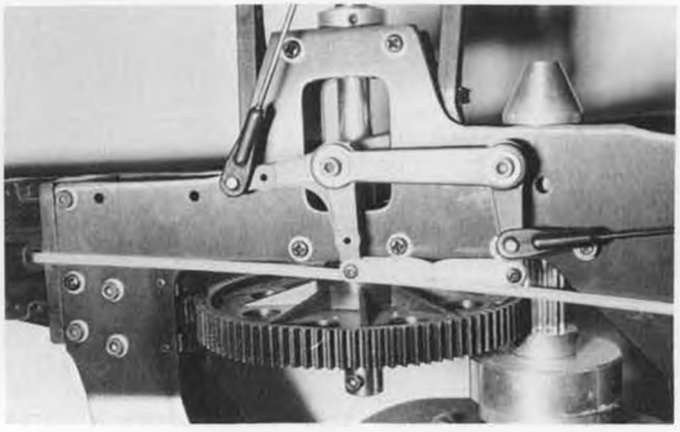
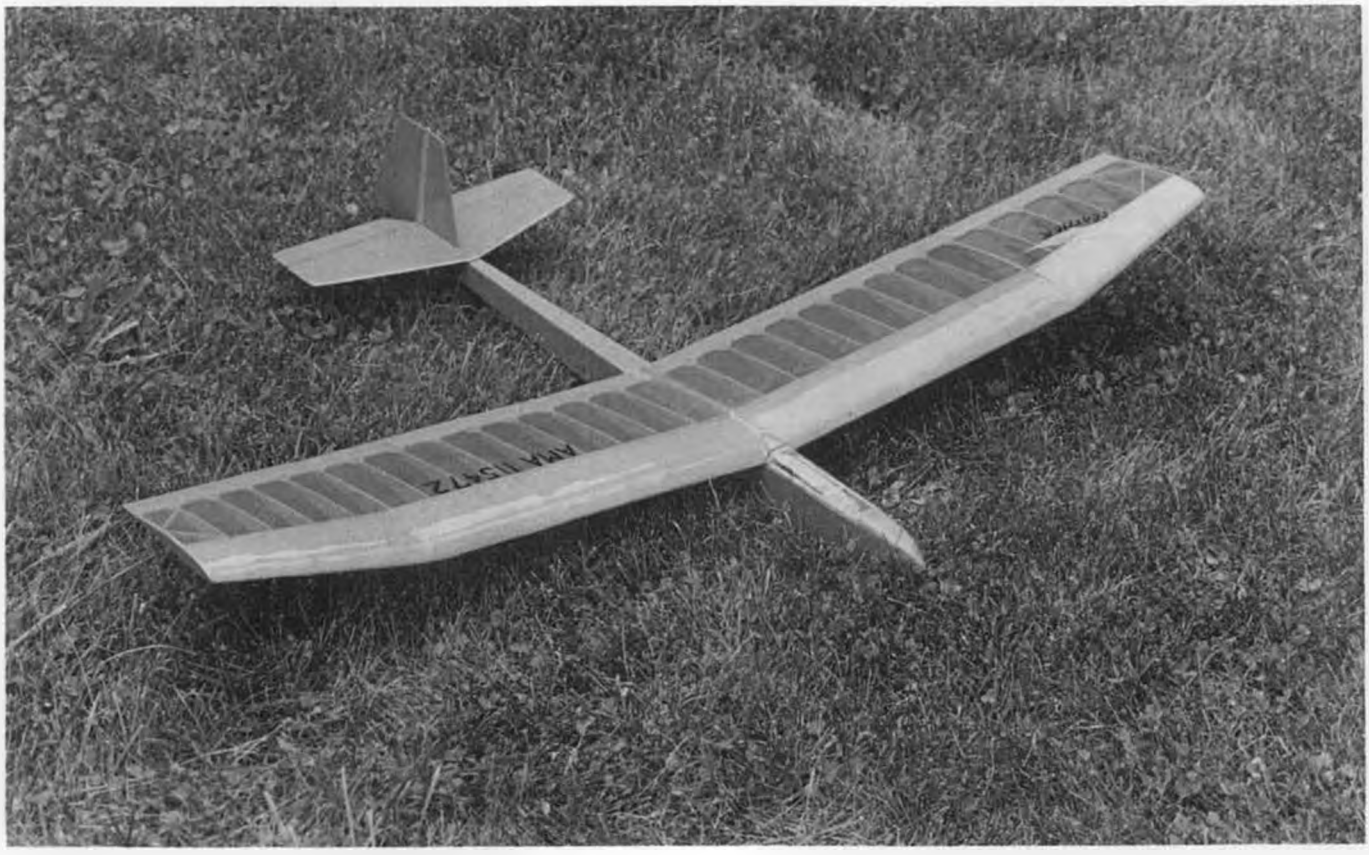


Efficient servo arrangement. All parts are included.



Double lever system eliminates cross-controlling between collective and cyclic.



Feather

By NOBLE KIRKPATRICK, design by FRANK GREEN. . .Here's a small, lightweight high-performance hand-launch sailplane with a 43-inch wingspan. Construction is simple, flying is exceptional.

• As a result of experience, there were several features that I thought would be very desirable in a hand-launch sailplane. Having crashed a lot in the past, I thought a strong crash-resistant design would be a good place to start—then things began to fall together. Strong, to me, meant small. Small meant greater potential launch height. Small meant cheap. I also thought small would have its own special appeal. All of the above have proven true. Let me tell you about crash resistance first.

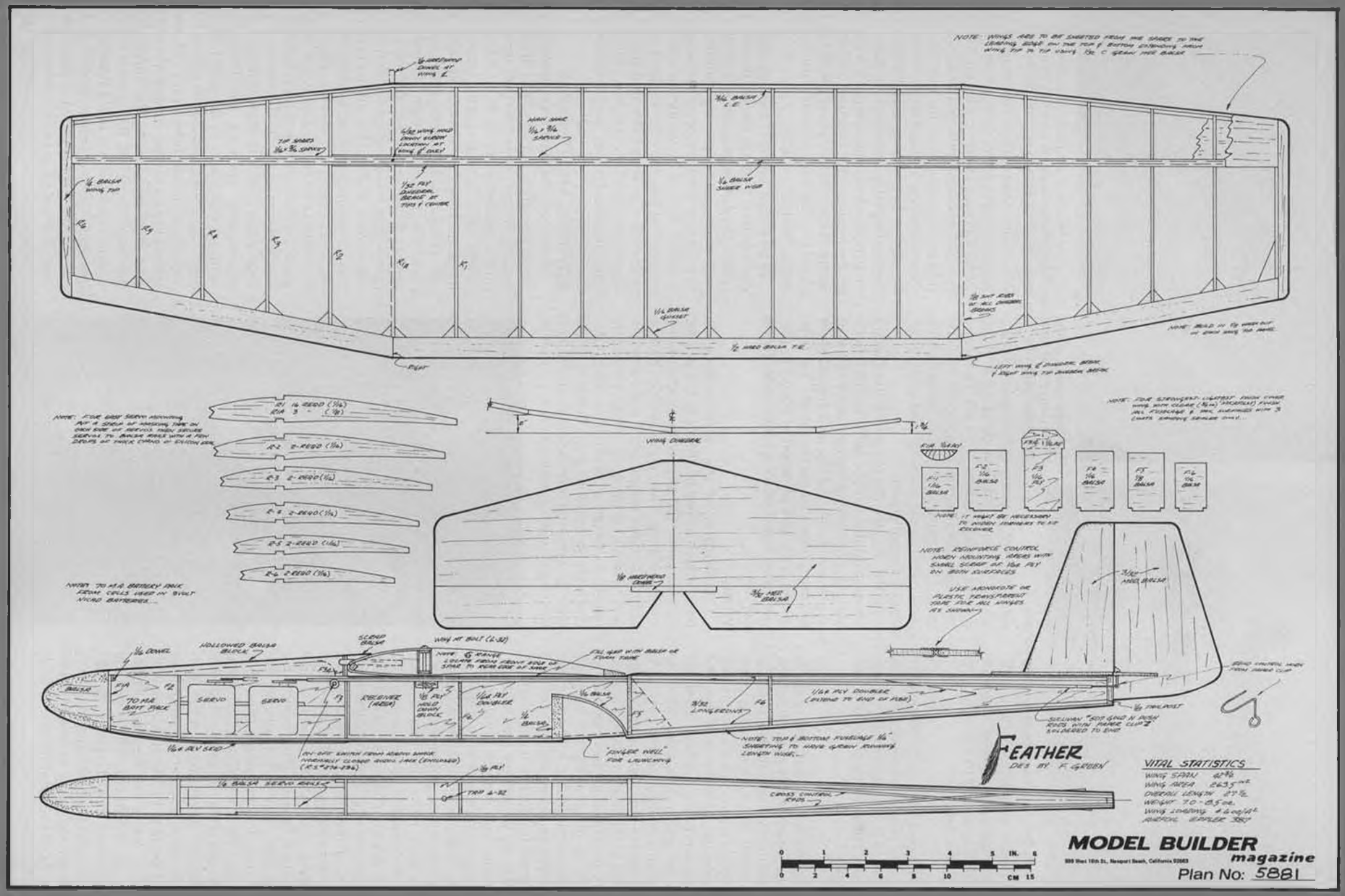
One of the weakest areas on most radio control HLGs is the wing hold-down screw at the trailing edge. The Zephyr is a good example; drag a wing tip and there go the fuselage sides. However, by anchoring the wing at the leading edge and holding it down at the spar with a screw into a good strong block, well-supported in the fuselage, a trailing edge of the wing will move while the wing absorbs the shock and no damage will result. Many craft have been lost on a downwind turn because of insufficient rudder travel and the inability to pick up that low wing. The Feather has an outrageous rudder with a great deal of travel; like brakes on a car, it is there if you need it. Yes, it will absolutely destroy light thermal flight if used excessively; but adequate control throw is a joy when working in close for a hand catch. Another point to remember: with adequate control throw, good thermal flight could be accomplished on trim alone. The bottom line is: don't bitch about a sensitive airplane—learn to fly it.

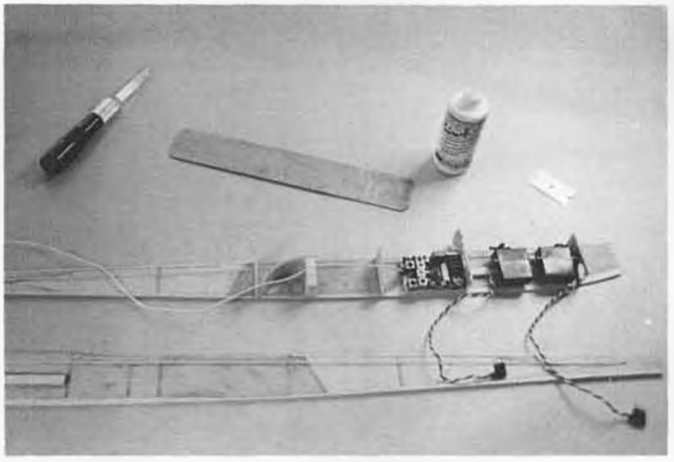
Designer of the Feather, Frank Green, gives it a heave. It's a great park flyer.

As for construction, 1/64 plywood is used extensively in the fuselage. The servos actually serve as bulkheads. Good hard balsa servo rails and the application of 1/64 plywood create a fuselage that is exceptionally strong. Please build it that way. You can even glass the nose with .6-ounce cloth with a minor weight penalty. The first Feather weighed exactly 7-1/4 ounces ready-to-fly and required *no* additional weight for balance at the CG. The flight pack weighed just under three ounces with a 100 mA battery pack (no case), Vanguard (Royal) four-channel kit receiver (no case), two World S22 mini servos, and hard wiring (no connectors). With *no* wind and good lift, the first Feather flew reasonably well, but I soon found that additional weight was required for really good performance—8-1/4 ounces seems ideal and 10 ounces maximum for really bad wind. Don't try to build light—I didn't on the second Feather, and it came out at 8-1/4 ounces with about 1/4 ounce of weight in the nose for balance. Penetration is excellent, and light thermal capability is also excellent (unless flown too slow). If you insist on building light (under 7-1/2 ounces), then I would suggest you reduce the wing span by two bays for slightly under 38 inches.

CONSTRUCTION

The construction of this small wonder is, for the most part, fairly standard; and the ex-


FEATHER
DES BY F. GREEN
VITAL STATISTICS
WING SPAN 41"
WING AREA 263 SQ. IN.
OVERALL LENGTH 27½"
WEIGHT 7.0 - 8.5 OZ.
WING LOADING 4 OZ/SQ.FT.
AIRFOIL EPPLER 387
MODEL BUILDER magazine
Plan No: 5881



Fuselage construction, showing location of radio gear.

The bare bones of the Feather before final assembly and covering. There aren't more construction photos because construction is so darn easy! Anyone with some building experience can do the job.

perienced builder should have little difficulty putting it together. However, there are a few things that you need to know in order to smooth out the process:

GENERAL

I think it's a good idea to Xerox patterns for the wing ribs, fuselage formers, etc. and then cut out all of the parts so that once you start the actual construction, nothing will slow you down.

FUSELAGE

Once the parts are cut out and ready to go, you can begin assembly of the fuselage. My entire plane was constructed with CA glues, and I highly recommend using them, whatever brand you use. Just make sure that when you glue the stiffeners and the 1/64 plywood doublers to the fuselage sides that you make a left and a right side. After you add the 1/64 ply doublers using slow CA, you can add the 1/4-inch servo rails. Slot the fuselage sides at the rear to allow the control cables to pass through and glue the cable sheathing in place along the fuselage sides. CA the pushrod tubes to the fuselage sides to prevent buckling under load and cross them at the fuselage rear exit points in order to allow for smoothest possible mechanical action; i.e., prevent kinking. Before gluing fuselage formers 1 through 5 in place on one of the sides, you should make sure that the formers are wide enough to accommodate your radio receiver, and remember to consider the space taken up by the control cables as they pass all the way through the radio compartment to the servo area forward of the wing. When you are sure that your radio gear will fit the small areas provided, you can join the fuselage sides at the front formers. But, before you do, make certain that all formers are set square and true. When joining the sides, check that the two sides align exactly, and be careful to avoid the dastardly "banana-shape syndrome" when you join the fuselage at the rear post. When it is time to sheet the top and bottom of the fuselage with 1/16-inch balsa, notice that the plan calls for the grain to run lengthwise. This is not the common practice, but it seems to add greatly to the strength of the fuselage, preventing it from snapping in unreinforced areas during those rough whiplash landings that occur from time to time.

TAIL SURFACES

After the fuselage is finished, you can round the edges to the tail pieces and put a 45-degree bevel on the side of each of the control surface edges—this allows for the tape-type continuous hinges that will be used. The lightweight control horns that are shown on the plans are formed easily from small paper clip wire.

NOTE: You should not attach the control horns until the control surfaces have been hinged. The control horns can be fastened in place with CA, but the area around them on the control surfaces should be reinforced with 1/64 plywood or epoxy to prevent them from breaking loose under flying stresses.

WING

Construction of the wing surfaces is pretty much as you might expect, if you are familiar with "D" tube-type structures and shear webbing. The center sections can be built flat on the board, but it will be necessary to block up the trailing edges of the tip panels to create a 1/8-inch of washout. I don't advise trying to warp in the washout after the covering is on because this wing is very rigid when construction is complete.

Designer Frank Green with the Feather HLG.

When the layout of the basic wing structure has been completed, form the tip dihedral joints followed by the center joint and add the 1/32 plywood dihedral braces to each side of all joints. This is the time to add the shear webbing to the interior wing panels because it becomes a might tedious after the leading edge sheeting is in place. Use a nice medium-weight, straight-grained balsa for the leading edge sheeting; and do not attempt to sand this sheeting after it has been glued in place because you'll just produce a weak, "riffled" surface.

A less hard piece of trailing edge stock can be used to make the tip panels, if you prefer. Do not be tempted to omit the 1/16-inch wing gussets, as they contribute considerably to the strength of the wing.

NOTE: Ribs R-1A are identical to Rib R-1 except that they must be installed on either side of the plywood dihedral braces and, therefore, must be cut in two and installed after the dihedral has been installed in the wing joints.

COVERING AND FINISHING

I don't own stock in the company that produces Micafilm, but I do insist that this material is the only sensible covering for these little hand-thrown birds. In the first place, it is light, light, light! And in the second place, it is almost puncture-proof compared to the other heat-shrink covering I have used. The clear (3/4-ounce) Micafilm is ideal for this project. It goes on easiest of all the Micafilm colors, and it looks great when it has been shrunk into place. (Like silkspan with beau coup coats of clear dope flawlessly brushed on, old timers.) Of course, you have to brush Balsarite on the framework wherever you want the covering to stick; but this is no big problem because it brushes on like clear dope and dries immediately. I do not recommend covering anything but the wing on this plane. In the past I have covered these little hand-launch gliders all over with heat-shrink films, only to end up spending a lot of time cursing when I had to peel them off to repair the minor damage that hand-launched R/C gliders inevitably suffer in the course of being flown in vacant lots and stubbled fields. Instead, revert to the proven practices of yesteryear and use several coats of sanding sealer on all the wooden surfaces of the fuselage and the tail

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ALL ABOUT ARFS

By ART STEINBERG

Author poses confidently beside his Headmaster-40 ARF. Both pilot and plane are relaxing in anticipation of a smooth initial test flight.

• Some years ago, after I had taught a dozen or so students how to fly R/C, I began to do a lot of thinking about the perfect trainer. Of course, there is probably no such thing, but it is certainly possible to outline some parameters for a suitable basic trainer, a model which could serve a rank novice and take him right up to the intermediate stage of learning. Much of this thinking was brought about by the types of "trainers" I was forced to deal with. Some of the problems I encountered were caused by the potential student having purchased too small an airplane, either by being poorly advised by a friend or hobby dealer, or by having made an unsatisfactory choice himself. Let me say here that it has been my experience that most dealers correctly advise newcomers to the hobby on the choice of a trainer, but some dealers have fallen prey to misleading advertising and inadvertently goof when helping in the choice of a basic trainer. The point is that little airplanes are not suited as basic trainers. They are skittish, unstable, tend to be too fast, and they are too difficult to see if allowed to get a bit too far away. Nevertheless, there is a mistaken belief amongst beginners that it is best to learn to fly on a small airplane. Therefore, let us take a few moments to list the qualities and features of a suitable basic trainer:

1) Minimum wingspan of 60 inches and/or a minimum wing area of 700 square inches. By selecting a model of this size, we have a more stable platform which can be made to be less sensitive to control inputs. Furthermore, such a model is more visible at greater distances, thereby reducing the risk of disorientation. Larger planes are also more capable of coping with wind, and this will result in more air time in the long run, as smaller planes are often grounded due to wind conditions.

2) Tricycle landing gear. This provides much easier and safer ground handling for the beginner. The basic training phase is definitely not the time to learn the fine points of mastering tail dragger takeoffs. Moreover, a good sturdy nosewheel is a lot easier on props when learning to land.

3) Sufficient wing dihedral to afford stability and the ability to turn when using rudder only. This allows the option of learning to fly without hooking up the ailerons, then activating them later, when a higher level of skill is attained. Dihedral also helps the trainer to have a self-righting ability when controls are permitted to neutralize.

4) High wing location. This also adds to stability.

5) Fuel tank accessibility by means of a fuel tank hatch. This is important because fuel feeding problems are apt to occur quite often during the learning stages, and repairs and adjustments are more easily and quickly made when the fuel system is right at hand.

6) Wood construction with shrink film covering. This is probably the most easily repairable type of construction, except for a solid foam plane. Holes in shrink film can be patched in only minutes, and wood framework is amenable to repair using a great variety of different adhesives.

7) A name-brand, quality two-stroke .40-size engine. Dependability is absolutely mandatory in a beginner's first engine, and the .40-size engine is just the right size for our large basic trainer. The range of .40 two-strokes are probably the most reliable of the engines available to us today. Four-stroke engines have their place, but they do tend to be balky and require some tinkering. Therefore, I want the beginner to be relieved of engine problems, and I feel the best way to do this is to use a tried and true .40 two-stroke engine which has stood the test of time. Later on, the .40 engine will be useful in more advanced models. It also costs less than a four-stroke.

8) A bright, contrasting color scheme utilizing at least two colors. Colors such as white or yellow as a basic color scheme, and trim colors such as black, red, or dark blue will provide the best visibility of the model at greater distances. This will be also helpful in avoiding disorientation.

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With the rolling Southern California hills as an eye-pleasing background, the Headmaster makes a rock-steady approach, about to conclude her perfect first flight.

Simply Scale

By CLIFF TACIE

• Even though we try very hard to fully document our facts, it's not uncommon when writing a column on a regular basis to every so often make an error in reporting. When I do, I feel a responsibility to set the record straight.

It seems that in my November column on the 1987 Nats, I made a statement to the effect that Dick Byron was the only person to complete a flight during the high winds. This drew a short note from former U.S. Scale Team member Julie Abel reminding me that there certainly was a little blue and white Clipped-Wing Cub going around in circles many times on that very same day. Sorry Julie, you're right.

To let you know just how seriously Julie takes the subject of aircraft, she is currently studying Aviation Maintenance at Embry Riddle Aeronautical University in Daytona Beach, Florida. To some people, aviation is a hobby, to others, it can become their life. Good luck with your studies, Julie, and again, my apologies for my reporting inaccuracies.

MORE ON CUBS

Not too long ago, I wrote about the varieties of "Cub Yellow" that were out on the market and how the modeler must be careful to match the model with the prototype. One of our *Model Builder* readers, Ralph Dodsworth of Saskatoon, Saskatchewan, quickly wrote to enlighten me to the fact that modelers aren't the only aviation enthusiasts who have had problems with "Cub Yellow." It seems that even full-scale Cub enthusiasts have difficulty authenticating the shade of "Cub Yellow" they use on their restorations. An avid Cub fan, Ralph advised me of an organization called the "Cub Club" which distributes a bimonthly newsletter to its over 2100 members. The Cub Club is billed as "An international organization to preserve and promote the restoration, maintenance and use of Cubs." Ralph sent me copies of a couple of articles concerning Cub Yellow found in the Cub Club newsletter, *Cub Clues*. With the permission of *Cub Clues'* editor, John Bergeson, I give you the pertinent excerpts which I think you'll find fascinating, as I did:

Cub Clues, #12, Feb./Mar. '86 - From the Cub's Den (Clyde Smith Jr.) "Cub Yellow':

"Anyone about to restore a postwar Cub or any of the other models built after the war which used what has been called 'Lock Haven Yellow,' please take note of the following observance. During a recent visit to Univair, I returned with a sample of fabric that I removed from a surplus original tail surface which still had the covering on it. When I got it home I compared the yellow color to a J-3 that I happened to be doing in my shop right now. It is painted with what Randolph calls Piper Cub J-3 yellow, code F-6285. After polishing up the sample of the 38-year-old fabric, I compared it to the freshly painted Cub and found the colors are a near perfect match. Randolph is currently producing two yellows: 'Lock Haven Yellow' code M-9521, which resembles the prewar shade of Cub Yellow; and 'Piper Cub J-3 Yellow' code F-6285, which resembles the brighter shade of the postwar Cub Yellow. I would prefer to see this latter color called 'Lock Haven Yellow (postwar)' instead of it's present name because it is misleading. That particular color was also used for the PA-11, PA-15/17, PA-18, and a few of the early PA-20s.

"The whole story goes back to the fact that originally all dope was nitrate. Butyrate didn't come along until the early to mid-forties. Butyrate wasn't as flammable, it had better resistance to cold weather cracking, and had better color retention than nitrate. About the only disadvantage was that it wouldn't stick to metal surfaces, so nitrate had to still be used for fabric attachment and when the aircraft was painted, enamel had to used on the metal parts unless the metal was sprayed first with nitrate. Piper used enamel for the metal surfaces on the postwar aircraft. Now we see the reason for the two shades of yellow; one to match the prewar nitrate yellow, and the other to match the brighter butyrate yellow used after the war. They both probably looked the same just after they were sprayed, but as they dried, the change of shade took place.

"In summary, if you are doing a plane manufactured after the end of the WWII and you want to be authentic, use Randolph F-6285 Yellow and don't let the name "J-3 Yellow" lead you to believe that it was only used on the J-3 models." *Cub Clues*, # 15, Aug./Sept. '86 - From the Cub's Den (Clyde Smith Jr.), "More about the Lock Haven Yellow vs. J-3 Cub Yellow Controversy":

"I have finally obtained the final bit of information that I have been seeking to put this subject to rest once and for all. While at Sun-N-Fun I had several lengthy discussions with Neal Carlson, a past Piper employee and now retired vice-president of Randolph Products. It is official, the darker, more orange shade of the 'trademark' yellow known as Lock Haven Yellow was originally nitrate dope. Production of butyrate dope didn't start until the end of WWII or a little after. Of course, there was a lot of nitrate to be used up also. When the supply of nitrate dope was dwindling, bids went out from Piper for a paint manufacturer to come up with a pigmented yellow in butyrate that would as closely match the nitrate shade as possible.

None of the companies could match the Lock Haven Yellow exactly (*Makes you wonder how we, as modelers, think we can be successful in matching colors! cjt*), but Randolph was the closest and thus was awarded the contract. This butyrate yellow was a little bit brighter and more of a pure yellow, and though Piper continued to refer to it as Lock Haven Yellow, Randolph dubbed it 'Piper Cub J-3 Yellow' because those airplanes were the intended recipients, thus the name change. (It was also referred to by some as 'Sport Yellow.')

"However, about this same time, the J-3 was going out of production in Lock Haven, the last one coming off the line November 8, 1946. Whether any of the Lock Haven J-3s were painted with this, I still don't know. J-

Seen at a past Radio Control Club of Detroit Big Bird Balsa Bash was this Gee Bee Model Y Sportster. Built by Bob Kuczynski and flown by Mike Petrilli, the 20-pound model is from Harry Haffke plans and is powered by a ST 2500 engine.

Looking like a real C-123, Ron Sear's model is control line scale. It's powered by two Wankel engines, this beauty features throttle, flaps, and retracts operated by radio control, the signals traveling through the flight lines.

Wacos are always a beauty to behold, and this quarter-scale model UPF-7 by Steve King is no exception. Seen at a Converse Fly-In, it's scratchbuilt from Behrens plans and weighs 33 pounds.

Yet another example of models seen at Converse is this ultimate in scale Clipped-Wing Taylorcraft by World Champion Bob Nelitz. From this angle, it's difficult to believe it is only a model!

Typical of large scale models to be seen at the IMAA Fly-In is this A5M4 'Claude' scratchbuilt by Dave Ballard of Indianapolis. At quarter scale, Dave says it flies like a pattern ship on a Sachs 3.1.

3s were produced in Ponca City, Oklahoma, from August 1946 to March 4, 1947. I believe all these aircraft had the 'new' yellow. These would have been serial number 219991 to 23180. One way to tell is if the black lightening bolt is painted entirely on the fabric; i.e., it starts aft of the boot cowl, then the aircraft was done in butyrate and enamel was used on the metal boot cowl instead of nitrate dope. (*The lightning bolt controversy and how many different shapes it can take is yet another topic for discussion. How about this: the style of trim clues you in to the type of finish! cjt*)

"All PA-11, 15, 17, 18, and PA-20/22 aircraft were finished with the light butyrate yellow. Again, the prewar nitrate Lock Haven yellow is Randolph Products M-9521 and the postwar butyrate yellow (Piper Cub Yellow) is Randolph F-6285. I am now totally satisfied with this explanation and I hope that answers the questions of all concerned.

"The last thing that I forgot to mention in the article the appeared in the last issue of *Cub Clues* is the little trick of painting either one of these yellow colors over a single coat of white. Instead of going directly from the silver coat of dope to the yellow pigmented final color coats, spray one full cover coat of white and then the three coats of yellow. I guarantee you will be amazed at the difference it makes when all is done. The yellow is still the same shade, but it is much brighter and it will hold that beauty much longer. I highly suggest that white be used as a base coat under most all the colors except maybe black or gray. (*A tip most of us modelers should pick up on. cjt*) Yellow is probably one of the hardest colors to cover with, so the white acts as a reflective base coat and it does make a difference." My thanks to Ralph for sending this very enlightening information. I hope you have found it as interesting as I have.

For anyone interested in the Cub Club, the annual dues are only $10. For more information, write the Cub Club, P.O. Box 2002, Mt. Pleasant, Michigan 48804-2002, or call (517)561-2393.

John Bergeson also edits the newsletter for the "Luscombe Association," an organization 1100 strong. For information on this organization, write Luscombe Assoc., 6438 W. Millbrook, Remus, Michigan 49340, or again, call (517)561-2393.

Tell them you read about it in *Model Builder*!

Incidentally, if you'd like more information concerning Randolph dopes, the contact is: Randolph Products Company, Carlstadt, New Jersey 07072; phone New Jersey (201)438-3700 or New York (212)279-3254.

NASA

In recent issues of the various model aircraft magazines, you've probably noticed reference to NASA, the National Association of Scale Aeromodeling, in the scale columns. The primary reason for this is the common belief of most serious scale modelers, columnists included, for the necessity for, and preservation of, a special interest group for scale aeromodeling within the AMA.

The groundwork for NASA was originally established some years ago, primarily by our current Technical Director at AMA, Mr. Bob Underwood. Since its inception and recognition as the special interest group for scale, it has had its highs and lows, as any group does. Overall, however, it has served the scale modeler well, even though he may not have even been aware of its existence.

NASA, under the direction of current President John Guenther, actively participates in providing input on scale rules proposals, hosting Scale Team Selections, and helping to run the scale events at the AMA Nationals. In addition, it has voiced support of the Scale Masters program and offers sanction of local scale events around the country.

NASA is currently enjoying a resurgence of interest and participation. I believe the main reason for this new interest has been the appointment of Stan Alexander of Nashville, Tennessee, as the newsletter editor. Over the past few years, *Replica*, the official newsletter of NASA, has not been published as frequently as needed to maintain the communications and sense of "togetherness" that is required to keep a large organization going. As of early 1987, this is no longer the case. Stan has done an excellent job of ensuring NASA members receive a copy of *Replica* at least bimonthly, and re-

Continued on page 73

PLUG SPARKS

By JOHN POND

• As has been noted in this column many times, it is a fact of life if you want to really fly free flight old timers, then you must live in California, Nevada, or Arizona. These western states can boast of sites the size of cities back East.

Of course, the most highly publicized field in California is Taft, thanks to many Southern California publications. However, Northern California has an excellent area in the form of Waegell Field located east of Sacramento. This field has been the home of the Northern California Free Flight Council for the last thirty years or better.

But when it comes to large fields conveniently located near a large city, the areas of Las Vegas and Reno in Nevada are hard to beat. The El Dorado Dry Lake is located 26 miles from the heart of the Las Vegas strip while Steadt Air Base (home of the Reno Pylon Racing Assn.) is only nine miles from central Reno.

The best part about the Nevada locations is that a modeler can take his wife and/or family to the mecca of entertainment and be fully assured the better half will be fully occupied while you, the modeler, are out enjoying the flying of old timer models.

Like all good things, the main drawback is the distance involved to attend these meets in Nevada. From a Northern California standpoint, Reno is 244 miles away while Las Vegas is 540 miles (distances considered from the San Francisco Bay Area).

Both cities are synonymous with gambling, but there are so many other things to do. One could spend a whole week viewing the shows, theatres, museums (the fabulous Harrah Auto Museum is a day's trip in itself), dude ranches, rodeos, and numerous other attractions. The major one is, of course, the National Air Races, staged annually.

We have done it in the past, but we are going to talk about the Las Vegas VAMPS O/T F/F Annual held every year on the last weekend of October (this year, the 24th and 25th) at the El Dorado Dry Lake. This site is a minimum of sixteen miles long and at least five to ten miles wide.

The best possible shot of the field is seen in Photo No. 1 showing Bill Hamner of Boulder City with his 1/2A Texaco Lanzo Record Breaker. As can be seen, the horizon disappears in the mist of the hills. Only the ten-mile flat area is seen with another eight miles of up-slope to Hwy. 395. Long way off!

Photo No. 2 shows the gang surrounding the registration area. Bud McNorgan (back to photographer) waits for C.D. Bill Holt to gas up his Anderson Pylon for the Texaco Event. This is a great place to turn the models loose for a five-minute motor run (or more) and then chase across the dry lake bed. One can get his fill of flying this way!

Naturally, we have to run a photo of Bill Holt (No. 3) who was the Contest Director. He can be reached at 4808 Martinelli Court, Las Vegas, Nevada 89130. Bill is seen with his version of Frank Ehling's Phoenix.

Weatherwise, the contest was rained out on Saturday. Everyone made a mad dash to get off the field as the thin layer of dust turns to a slick slurry when water hits it. Traction is difficult and steering must be done with extreme care. Those not familiar with the vagaries of Nevada weather, such as the quarter-scale contestants flying in a nearby area, went home. Truly a shame for such a large R/C flying scale meet as this.

The more hardy free flighters showed up the next morning. The desert had acted like a sponge, and the ground was again bone dry with clouds of dust trailing the incoming cars. It turned out to be a lovely day!

Ever have trouble trying to see a Texaco

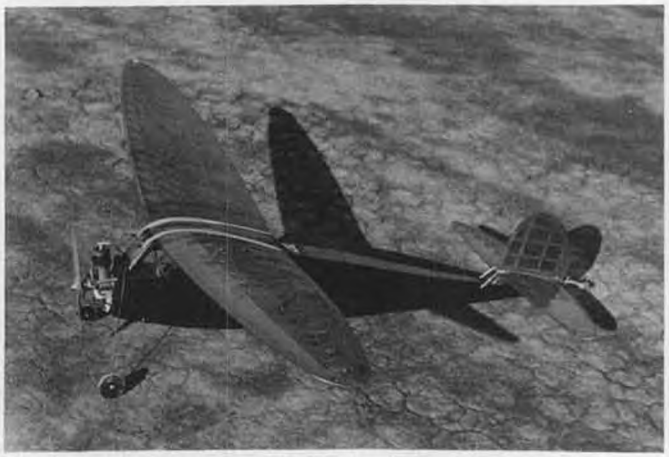
2. Bud McNorgan at the registration desk to have his Anderson Pylon gassed up for a third-place finish in the Texaco Event at the VAMPS OT annual meet in the Nevada desert.

1. Bill Hamner from Boulder City seen with 1/2A Texaco version of the Lanzo Record Breaker.

3. Contest Director Bill Holt holds his Phoenix that he didn't have time to fly.

5. A Pacer C by Larry Schwartz. Smooth flying design by Sal Taibi.

4. A chrome Monokote-covered 1/2A Texaco Powerhouse by Wes Weathers. How's that for visibility!



6. An Orwick .64-powered Comet Clipper by Don Weitz who uses plenty of downthrust to keep the nose down!

7. Nice father-son combo, Bud McNorgan with Spacer and son, Kit, and Dixielander, compete in Class C/D Nostalgia Event.

model at 2,000 feet? Wes Weathers thinks he has the answer as seen in Photo No. 4 of his 1/2A Texaco Powerhouse completely covered with chrome Monokote. I'll bet that had a shine in the sky! Must have helped somewhat as he placed third in 1/2A Texaco.

Instead of running the rather voluminous results (there were 15 events in one day!), we would prefer to run a few more photos such as Larry Schwartz's lovely Pacer seen in Photo No. 5. Although he didn't place, this design is a very smooth flyer.

Like 'em hot? Well, Don Weitz does, and, to prove it, take a gander at Photo No. 6 showing a red hot Orwick .64 in the nose. This columnist doesn't know how he keeps the wing from folding (Clippers were notorious for this under any sort of high power), as the model has a spectacular acceleration and corresponding shallow climb that eventually puts the model well up in the blue. Won the Texaco Event of all events!

One more shot, Photo No. 7 illustrates how old the old timers are getting. Seen in the pic is Bud McNorgan (1) with his McCoy-powered Spacer and his son, Kit McNorgan, with a Torpedo-powered Dixielander. Dad got beat that day in Class C-D Nostalgia Event by less than a minute.

SAM 56 3rd ANNUAL WHAM BAM

In case you are into acronyms, WHAM stands for Wichita Historical Airplane Modelers (BAM; Big Autumn Meet). We are indebted to Ernie Linn for sending in the latest *SAM 56 Sez* newsletter along with a series of photos from which we have culled the best.

Ernie also sent some photos which included a gorgeous trophy for the SAM 56 Perpetual Texaco Event. This was given by President, Bill Schmidt. Photo was too small with poor background. We'll try again!

Linn reports the WHAM-BAM meet took place on Dr. Alley's pasture, three miles east of Andover. This excellent 80-acre pasture has been obtained by Dan Smith through some good negotiating. (Also helps when he is a neighbor.)

10. The Polish Retrieval System demonstrated by Jim O'Reilly with Phelps power.

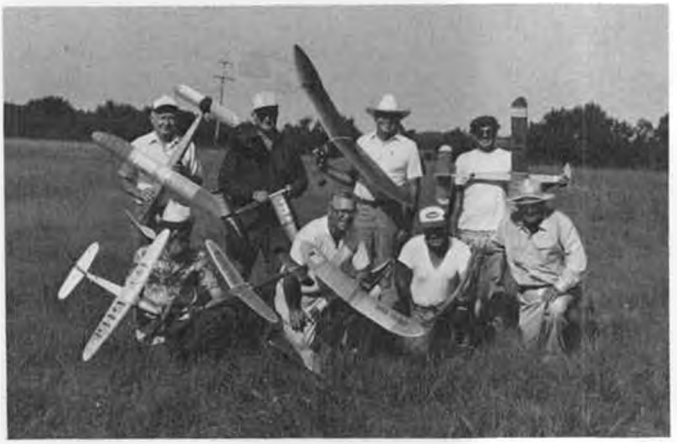
Photo No. 8 shows the active members on this field. Front row: Ben Strausz, Jack Phelps, Don Abbott, and Ernie Linn. Back row: Dan Smith, Lamoine Shrock, Jim O'Reilly, and Les Dewitt.

Speaking of the last-mentioned name, if memory serves me correctly, Les was the designer of a postwar pylon design known as the "Boilermaker." This kit was available, at that time in 1946, from Solar Models of Kansas City, Missouri. Les is into O/T rubber models, and his O/T Wakefields fly as good as his modern Wakefield designs.

Les has an unusual dethermalizer setup where the wing is popped loose and held to the fuselage with a string. This does bring the model down in a hurry with the wing trailing the downward path of the fuselage. Biggest problem here appears to be damage to the model as it comes in vertically.

The next pic, Photo No. 9, is of Bill Schmidt, the real sparkplug of WHAM. Bill is forever prodding the boys about competing and helps many a newcomer over the rough spots. Bill is seen with his 1/2A Texaco version of LaTorre's Alert. Smooth flyer!

Also noted at this contest is the performance of Jim O'Reilly in the O/T events despite his dedication to modern Wakefield models. Ernie Linn sends in



8. The SAM 56 WHAM group. Heavy on rubber competition. See text for names.

9. Bill Schmidt, SAM 56 WHAM prexy, with his latest, a 1/2A Texaco Alert.

Photo No. 10 showing what he calls the "Polish Retrieval System." As can be seen, Jim is using a Phelps power to run the cycle. Later on, it was found to be out of gas. So was Phelps; haw-w!

This meet enjoyed 40 entries (getting bigger every year) with contestants from Oklahoma and Missouri. A look at the R/C O/T gas events reveal Bill Schmidt with three firsts and a fourth, completely dominating the gas events. Jim O'Reilly spread-eagled the field in the rubber events with three firsts and a third. These guys are tough to beat!

27th ANNUAL STOCKTON OLD TIMER

This is the granddaddy of them all! The original O/T meet was first held back in 1960 at Waegell Field, Sacramento, California. SAM 32 under the auspices of Jim Persson deserve a lot of credit for keeping this old meet going all these years after the Stockton club dropped the annual after seven or eight years.

This is one of those meets that fell on the same day as the John Pond Commemorative at Taft. This columnist attended the Taft meet on Saturday, then drove 280 miles on Sunday to get to Madera by 9 a.m. to fly in the Original O/T meet. After breaking several rubber motors, a decision was made to simply take photos.

In that same line, Photo No. 11 shows what the boys and Russ James are doing; i.e., production of old timer rubber kits. Seen in Photo No. 11 is a Scientific All American, a simply gorgeous red, white, and blue combination. They are going to kill me, but I am not sure if Marion Crowder is the name of the builder. In any respect, kits can be obtained from A-J F/F Specialties, 4840 E. Leisure St., Fresno, California 93727. Better yet, get the catalog!

Getting back to the annual, Jerry Rocha was the Overall Champ taking home first and two thirds in the gas events. However, the big winner was Jim Persson, C.D., who won the "Phantom Flash World Champs" again for the second straight time!

ENGINE OF THE MONTH

Again, we are pleased to acknowledge the generosity of Bob McClelland, Secty-Treas. of M.E.C.A., for the use of this month's engine, the Circle 30.

This engine, manufactured by the Laskin Manufacturing Co., of Baltimore, Maryland, was designed by Gene Laskin, an NCAA research and development power plant engineer. The Circle 30 engine was exceptionally light at six ounces having a bore of .750 and a stroke of .678 giving a cubic displacement of .299. Rated horsepower was 1/5.

Featuring twin intake and exhaust ports this rotary-type crankshaft intake type ran quite well on ignition or glow because of its high 9.5 to 1 compression ratio. (The gas

11. Beautiful red, white, and blue Scientific All American being marketed by A-J F/F Specialties. Holder is unidentified.

12. Don Lefferts, Connecticut, sends in this shot of his nicely decorated Wahoo, a Garami designed model.

mixture was a standard three parts of gas to one of oil.)

We are fortunate to have received an article by Brayton B. Paul published in the *SEKS Talks* newsletter so ably edited by Jim Walston. We have excerpted Paul's comments about the Circle 30 engine.

In 1945, Paul got out of the Army and was employed as a draftsman in the engineering department of Glenn L. Martin Co. It was during this time he became acquainted with Fred Kunze and was introduced to control line flying. Living in Baltimore and the fact there was a good engine was being made was an inducement to use the Laskin in Class B control line speed.

Paul would visit the Laskin Mfg. Co. to talk to Gene about control line speed and found Laskin was quite interested in that event himself, going so far as to build an all-metal aircraft powered by one of the Circle 30 engines. This model, although heavier than balsa construction, actually hit speeds of better than 90 mph.

Brayton goes on to say when the glow plug was discovered, this made for quite light Class B racers. Although the model would accelerate very quickly to top speed in a half lap, the model never did exceed 100 mph. Paul attributes this to the fact that the Laskin engine was not a high-rpm engine, running between 10,000 and 11,000 rpm regardless of propeller size.

Brayton Paul feels the engine failed because of a weak crankcase flange attachment to the cylinder. With its high compression which was okay for ignition, with more powerful nitro fuel under glow power, this flange would rupture.

In reporting the problem to Gene Laskin, he found that Laskin was getting many returns because of this fault. Since the parts were die cast, it was too late to change the crankcase flange design without a major infusion of money to make new dies. This was the death knell for the well-built engine even though it had advanced ideas such as chrome-plated parts incorporated in its design.

Leaving the Martin Co., Paul lost contact with Laskin in 1949 and dropped his interest in control line in favor of radio control. Later on, Paul returned to the Martin Co. in the 1953-59 period and at one time worked with Laskin on the design of a smoke system for the Martin Matador. Needless to say, the Laskin engine project had long folded.

For those where the name of Paul strikes a familiar chord, Brayton has been involved in the design of a Cam-Axial engine for the last ten years. He has produced a .60 size and 1.6 cu. in. design in four-stroke versions with a two-stroke glow. Hopefully, production will start in the near future.

Getting back to the technical aspects of the Laskin Circle 30 engine, its lightness was derived from die-cast aluminum alloy cylinder, crankcase, connecting rod, crankcase, rear cover plate, and propeller thrust washer. A mehanite cylinder liner with six milled ports was shrunk into the cylinder, then micro-honed for an extremely smooth finish. To that, an alloy steel piston, chrome-plated, was machined and lapped to an excellent surface finish.

The bearings were phosphorus bronze

13. Max Bowman seen with Class C Zipper at the N.W. OT Annual. A Forster .301 does the job.

press-fitted in the aluminum connecting rod, micro-honed to fit a hardened and ground alloy steel wrist pin which in turn was held by two retaining pins. The crankshaft bearings were also of the same material fitted to a hardened and ground chrome high-strength alloy steel crankshaft.

The fully enclosed timer used two springs of different lengths to eliminate high-speed point flutter. A novel spring-loaded connector (called the "spring connect timer") was used at the stationary point making it practically impossible to change the point settings when tightening the ignition lug attachments.

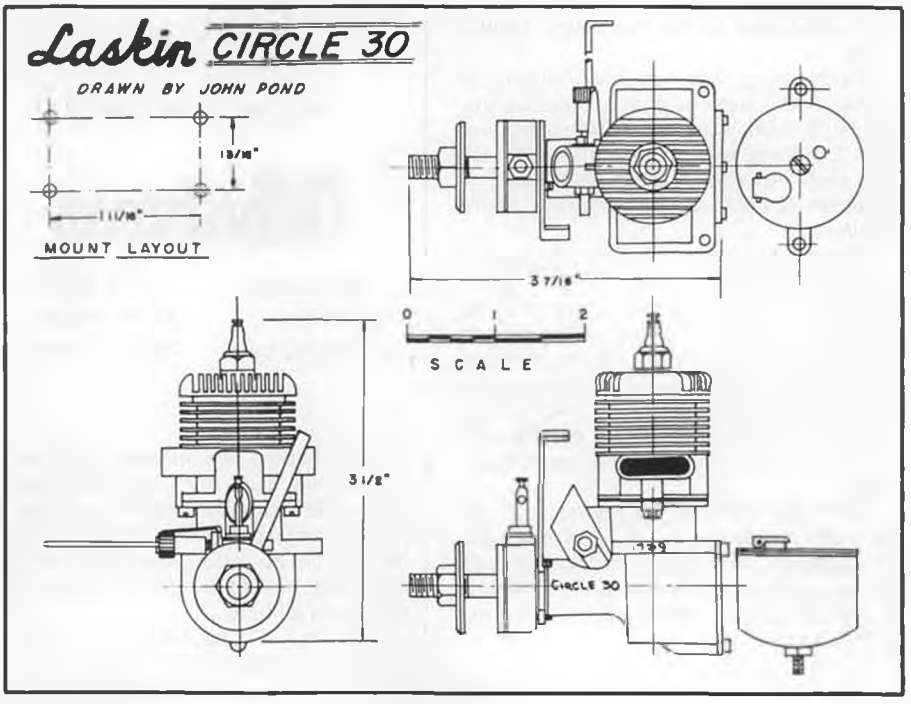
Air Trails Engine Test Committee ran a series of tests on their Strobatic Test unit and found the engine turned 10,700 rpm on an 11-inch Flo-Torque prop. Using 9-8 and 8-10 Rite-Pitch props, 10,400 and 10,600 rpm readings were obtained. Paul was right!

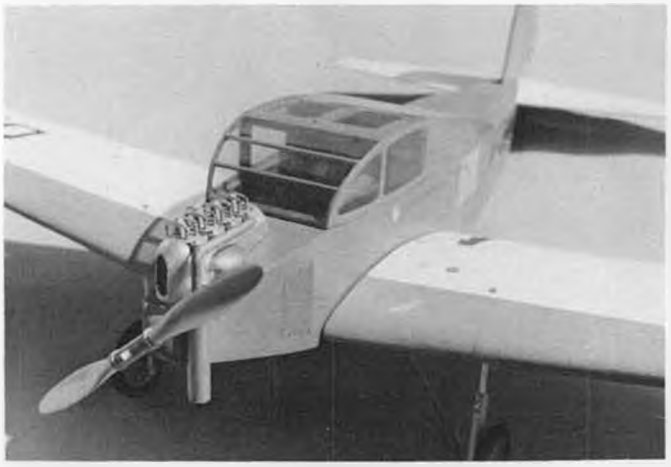
50 YEARS AGO, I WAS. . .

Received the most interesting letter from SAM 21 member, Al Ward, 405 Rancho Arroyo, #262, Fremont, California 94536, who writes to describe what he calls his "Aeromodeling in Chicago 1932-50." Let's hear what Al has to say:

"In 1932, I received a Comet Dipper kit for my eighth birthday. This was followed by numerous Comet and Megow ten-cent kits of sixteen-inch wingspan, not to mention a few solid scales in between.

"Early in 1938, a red letter day! I graduated to the big ones starting with a Thracy Petrides Flying Midget out of *Model Air-*





14. A faithful replica of Joe Weathers' model of the Guillemin J.G. by Maurice Whitta of Australia. Photo: Alaback.

16. An elegant Peerless Blackhawk built by Bob Oslan. It's a Harold Coovert design. Pretty!

plane News and powered it with a rock (what are you going to do with darn little money and expensive engines?). It did glide well.

"However, things took a turn for the better in June 1938. I acquired my first gas engine, a used GHQ for two bucks (my grade school graduation present). At Christmas time I was able to purchase a Megow Flying Quaker from the owner of the local hobby shop operating under Pilot Paint Co. The fuselage sides had been built, but in giving up, I got the whole thing for $3.

"Spring of 1939 found me completing the Quaker with the non-running GHQ. By this time, I had joined the Penguin Aero Club, meeting at Samuel Gompers Park on the north side of Chicago.

"Harry Gunther, a member, needed a plane for a contest in a hurry. So he bought the Quaker and installed a Brown Jr. In turn, Harry sold me a Gwinn Aero (that ran!) and gave me much-needed advice on my first gas model. This looked like a Cleveland Viking. I named it 'Miss Take' but regardless, it flew fine! Eventually I sold the whole setup and with Dad's assistance bought a used Dennymite engine from Bill Englehart, proprietor of the Northwest Hobby Shop.

"By this time, I was in high school with an active model airplane club at Lane Technical High. MRL was across the street, and Carl Goldberg was an official adviser for our club. Another speaker was Raoul J. Hoffman (author, *Model Airplanes Made Painless*).

"The main source of my wood was Aircraft, Inc., marketer of the Buzzard Bombshell kit. For 25 cents, one could get a large grocery-size bag of scrap balsa. Hawk Models, marketing solid scale kits was another source. Best of all, they would cut the ribs and furnish the spars for a six-foot wing for $1. My first Dennymite-powered models were constructed this way (original designs, natch!).

"One day, I heard an engine running, promptly tracked it down, and met Jack Procunier this way. He had a good-running GHQ in an original six-foot model. We flew it at the local park and wonder of wonders, it flew good!

Continued on page 102

15. Bill Krescek launches his Focke-Wulf Stosser at the Dallas Nationals, 1951.

Old Timer of the Month

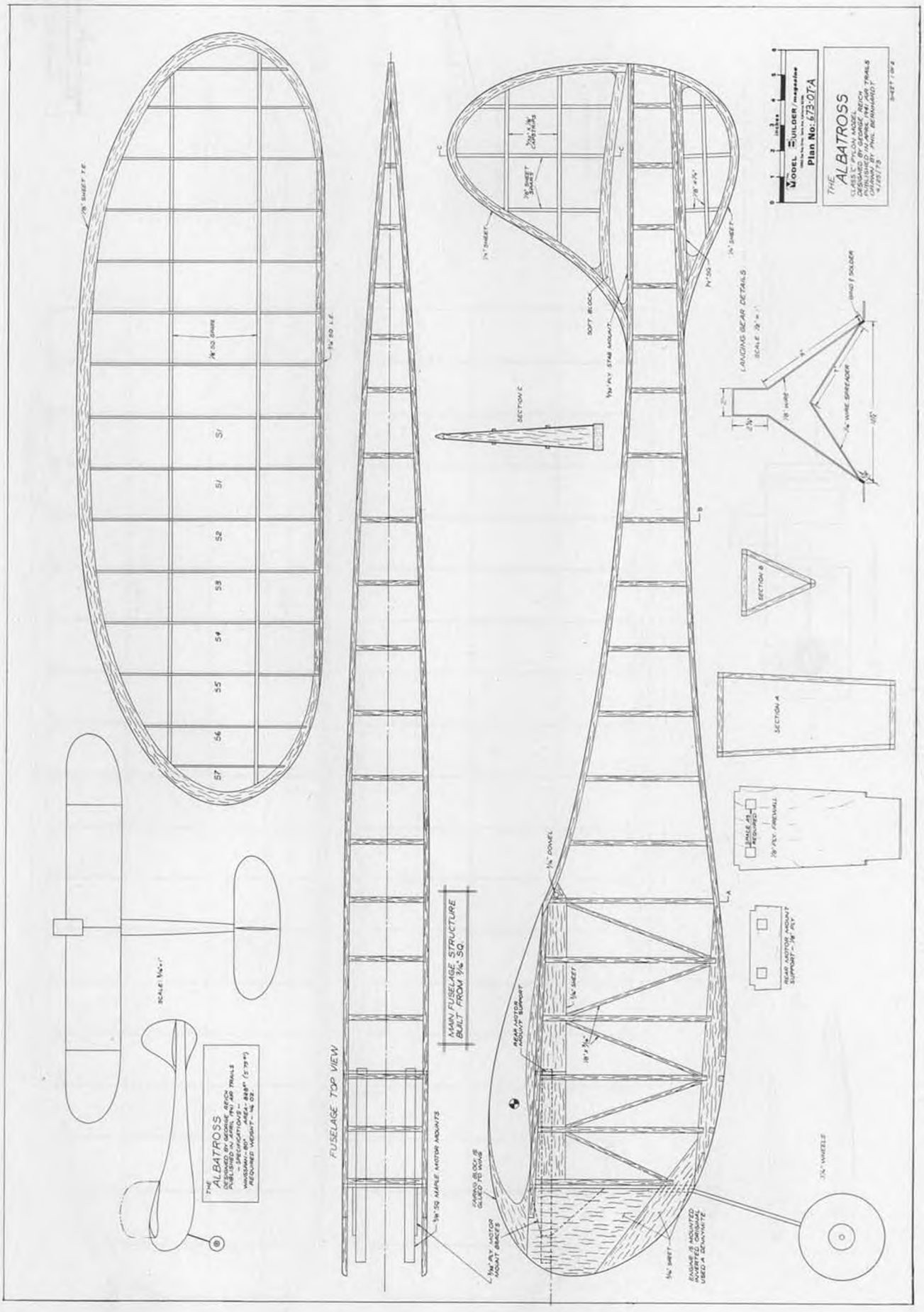
Albatross

Designed by: George Reich
Text by: Bill Northrop
Drawing by: Phil Bernhardt

The Albatross was originally published in *Air Trails* magazine, April 1941 issue. George Reich may be better known for his designs and accomplishments in Wakefield, but in our estimation, this is one of the most beautifully proportioned gas models of all time.

The original Albatross used a Dennymite engine (ignition, of course). However, it was suggested by the designer that the lifting stab thickness be increased to about 13/16" if a more powerful engine, such as an Ohlsson 60, is used. (George felt that a lifting tail of proper thickness would eliminate the need for downthrust.)

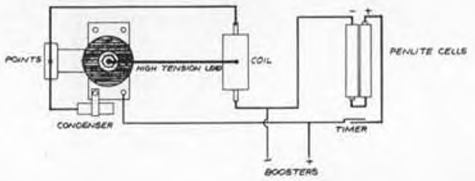
This plan is reprinted from the June 1973 issue of *Model Builder*, plan number 673OT.

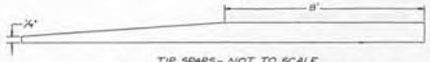


FULL–SIZE PLAN AVAILABLE–SEE PAGE 106

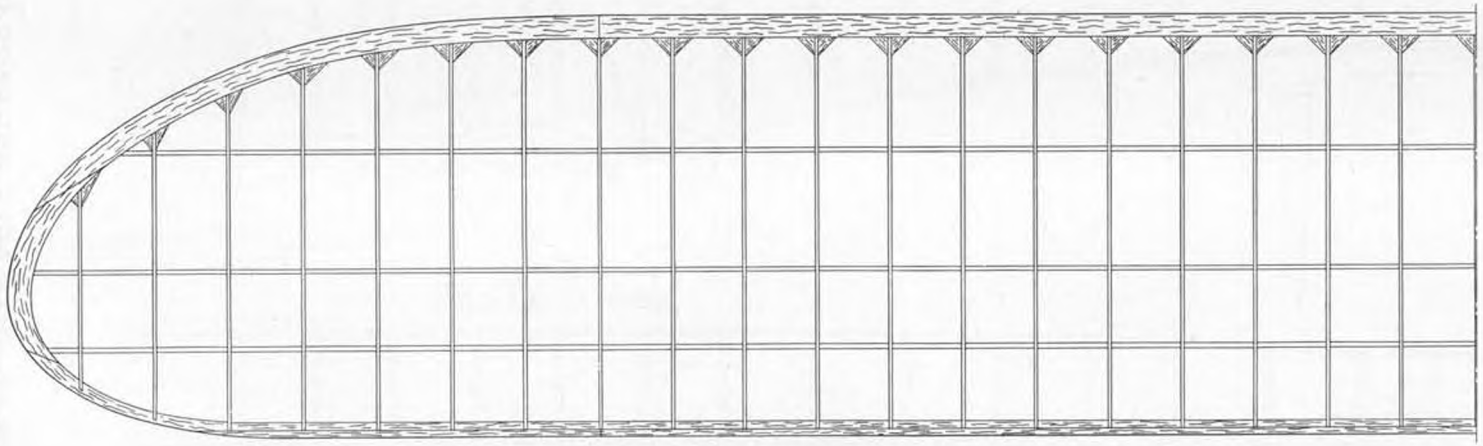
STABILIZER RIBS – 1/16" SHEET

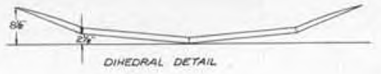
IGNITION WIRING DIAGRAM





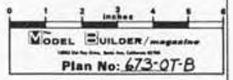
TIP SPARS – NOT TO SCALE
TIP SPARS ARE STRAIGHT FOR 8", THEN TAPER TO 1/4" AT TIPS





DIHEDRAL DETAIL

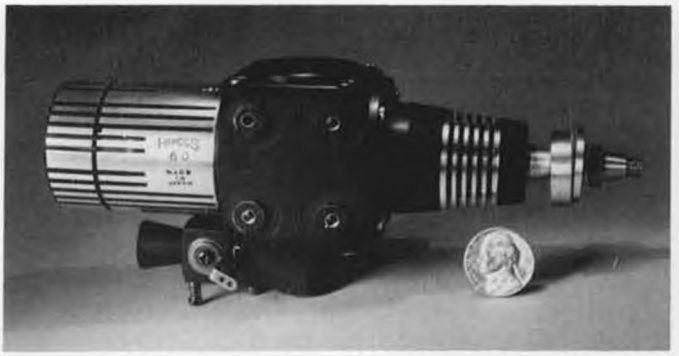
WING RIBS – 3/32" SHEET



ALBATROSS
SHEET 2 OF 2

ENGINES OF THE WORLD
...by Stu Richmond

Hiness Arrow .60



The Hiness Arrow .60 has its piston/cylinder to the left with dual glow plugs. Bevel gears run in central crankcase to turn crankshaft.

VITAL STATISTICS: 7-1/8 inches long to the face of the prop driver, 1-15/16 inches across the central crankcase, 2-15/16 inches deep. Weighs a hefty 27-1/2 ounces. Uses four ball bearings and made in 1975 in Japan.
UNIQUE FEATURE: Engine is a beautiful copy of a relatively ugly but very rare Soviet low-profile inline glow engine.

• I own one of the world's rarest model airplane engines. As I type this, the engine is in the Soviet Union, and Igor and his friends are trying to find a willing tourist who will risk bringing it out past border guards! I own a Kratsnorutskij 10cc (.60) inline variable-speed glow engine. It is thought fewer than 20 have been made. They were designed to power the Soviet Team's twin-engined Antonov military transport scale model that won at the World Championships (U-Control) in England in 1972. The same design with similar engines was again flown by the Soviet team at the 1974 Aerolympics at Lakehurst, New Jersey, and Nat Polk managed to gain ownership of one of these Soviet rarity engines. Nat took the engine to Japan to Hiness in Tokyo and said, "make 'em just like this one. . . only make them pretty!" Hiness did, and what resulted is today called the Hiness Arrow .60.

Polk's was to have an exclusive on the Arrow .60, but Hiness ended up selling them to anybody anywhere and total production figures are now unknown. Nat told me that they bought fewer than 1,000 engines and most went straight to collectors in the USA and the world.

Eventually I'll get my Russian original into the USA. Frank Kramer in Pennsylvania already has his; luckeeee! But this month we're looking at the *counterfeit/imitation* that's owned by friend Bob Valyou.

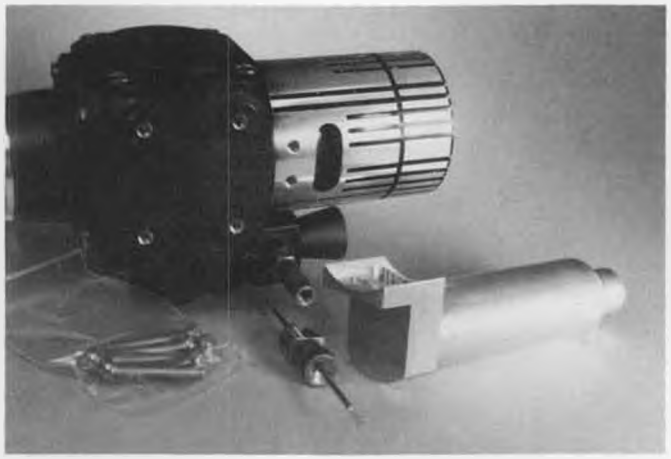
There's always much interest in low-profile power units for scale models. Kratsnorutskij reportedly worked as a machinist in the Red Air Force aircraft maintenance shops and has been the designer of successful 2.5cc (.15) team race engines. One of his designs used a rotary drum rear intake with great success and was put into planned economic production in their system and was known as the 2.5 RITM. Production quality of the engine I have is quite poor. Now, 10 years later, the same factory is making a similar team race diesel named, "MARS." It looks better.

Arrow .60 is a beautiful counterfeit of the rare Soviet Kratsnorutskij 10cc which Stu owns, but doesn't have. See text for details.

But back to Kratsnorutskij's inline low-profile design. We featured the Aero .35 inline in July '86 *MB* which used a complex wobbling "L"-shaped connecting rod which allowed the piston/cylinder to lay parallel to and *under* the crankshaft. This month's design puts the piston/cylinder *behind* and in line with the crankshaft's axis by clever use of twin bevel gears in the central crankcase area. One bevel gear attaches to the rear of the crankshaft. It's matching bevel gear connects to the piston. Unlike the Aero .35, this system yields "zero" lost motion, although it does bring with it the question of properly cooling a rear-facing cylinder head. But the Russians won using these engines, so the cooling question is dead.

When Nat Polk went to Hiness they were already making an extensive line of all-barstock (no cast parts) engines including a twin opposed with .60-size jugs, a twin opposed with .40-size jugs in handsome black anodizing; a silver twin opposed with .44 jugs; a three-cylinder radial was made as well as a four-cylinder made from a *pair* of geared twin opposed engines. So you can see it was no big job for them to duplicate the Kratsnorutskij inline .60. With fuel/air mix flowing through the lubricating the central crankcase with the bevel gears it was dreamed the gear teeth would act like a

Continued on page 72



Fewer than 1,000 Hiness Arrow .60 engines were made. Fewer than 20 of the Soviet originals exist.

Low profile model engines are perfect for scale models of turbine-powered full-scale aircraft. Hiness Arrow .60 on left for size comparison with Aero .35.

R/C SOARING

By BILL FORREY

• I think you are really going to enjoy this month's "R/C Soaring." I'm excited about it mainly because of all the great support *Model Builder* readers continue to give this column. Thanks to your technical and literary contributions, the monthly topics within this column can be diverse, fresh, and alive, rather than a stale rehash of one person's opinions and limited knowledge.

I have received many letters, photos, and drawings in the past few months which are all very worthy of publishing, and for which I am grateful. My job as a contributing editor is a tough one. As much as I dislike it, I have to pass judgement on all the submitted material, selecting what I feel is most profitable to all readers. Then, I must boil it all down to fit as much of it as possible within the generous, but limited, space provided for the subject of R/C soaring by this full-spectrum model magazine. Invariably, the available space is smaller than the ideas on hand to fill it.

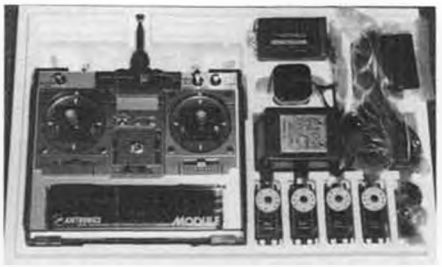
Thank you for your contributions one and all, and hang in there if you have passed along an idea which hasn't appeared in these pages; it may run yet!

EXPERIMENTS WITH THE SELIG 3021 AND LOW ASPECT RATIO WING

DESIGN

Harry Weitz of San Diego, California, has provided some valuable information for us which he has gained from his experiments with the Selig 3021 (the "Improved Eppler 205," see Dec. '86 *MB*) and lightly loaded, low aspect ratio wing, glider design. Harry received his formal aeronautical education at the Brooklyn Polytechnical Institute where he had access to a small wind tunnel capable of achieving usable data at Reynolds numbers as low as 150,000. Currently, Harry flies with the North County Clouds in San Marcos.

The first design he produced using the S3021 is the "Slik" two-meter. The specifications for this model are: 78-inch span, 692-square inch area, 8.87-inch constant chord wing for an 8.8:1 aspect ratio, conventional tail, and 36-ounce flying weight. The wing loading is a light 7.5 ounces per square foot. The Slik's two wing halves plug into the fuselage on a .221-inch steel drill rod main pin rated 58 Rc on the Rockwell scale and a 3/32-inch music wire locator pin in the rear. The two center panels have no dihedral angle, as they plug in at 90 degrees to the fuselage sides. The flat center section of the wing from tip panel to tip panel is 34 inches in span. Each tip panel is 22 inches long. The outer tips are propped up 6-3/8 inches for dihedral, and then the trailing edge is raised (twisted) 1/4 inch for washout. The wing is mounted on the fuselage at a 4-1/2-degree angle of incidence. The horizontal stabilizer is 12 percent of the wing area, and the vertical stab is 6 percent. No specs were given on the fuselage other than the nose moment is long enough that no nose weight is required to balance the model.



Airtronics' MD75P is a little-understood radio system. This month's column sheds some light on its many functions.

With the written description of the model behind us, this is what Harry says about the performance of the model:

"This is a very clean two-meter glider for two-channel R/C. It uses the Selig 3021 airfoil, coordinates for which appeared in *Model Builder.* It is very stable, it will turn with rudder only, and it will not tip stall. The wing loading is light at 7.5 ounces per square foot, yet the Slik will fly without ballast in winds up to 15 mph. Power launching in a slight wind with a rear tow hook location gives almost straight up perfor-

Harry Weitz's Slik 2-meter glider. Harry says the design flies very well using the 12-86 Airfoil of the Month, the S-3021.

Harry's Big Slik 110-inch low aspect ratio glider. Also uses S-3021 and flies well. See text.

The Bumble Bee is a 2-meter, modified Selig 3021 glider. Slab fuselage, faster than the regular 3021. Extremely strong wings.

MFA of England's High Sierra, available from Hobby Lobby This 2-meter has hardwood-covered foam wings, 'glass wings.

mance. The glide is extremely flat and slow, and hooking on to thermals is really easy. With three clicks of down trim, this airplane really moves across the sky.

"This glider is so successful that I am building a 110-inch version using the Selig 3021. The new model's wing will have spoilers and will be mounted at 5-1/2 degrees incidence.

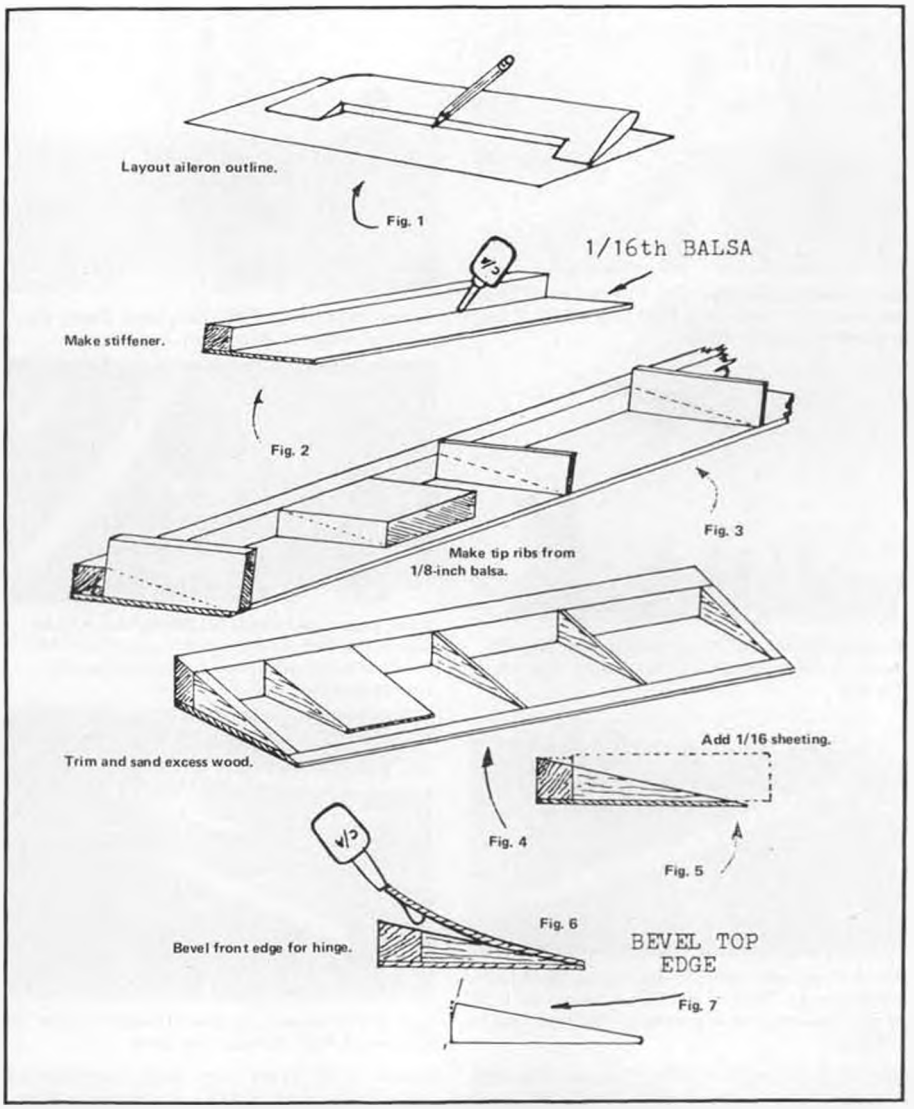
". . .Thanks for the info you have given me over the phone. Good flying, Harry Weitz." A few days after I received Harry's letter, I called him to ask for a more usable photo of the Slik. It was then that I found out that the 110-incher was built and had been test flown. Harry reported exceptional all-around performance, but in particular, very good low speed performance, "It's so slow you could walk under it and write your name on it." Quoting from his second letter: "Enclosed are better photos of the 'Slik' and 'Big Slik.' Since the last time I wrote, I have completed and flown the glider which I have dubbed 'Big Slik.'" The statistics and design details are as follows:

"This glider at 110 inches is a scaled-up version of the two-meter Slik which is an exceptional flyer. From theory, practice, and my experience, larger (chordwise) airfoils perform better than smaller ones. Big Slik represents this theory. The chord is 12.5 inches, Selig 3021 profile, 110-inch span for 1375 square inches. The all up weight is 70.0 ounces. The tail is standard; 12-percent horizontal, 6-percent vertical. The wing inner panels are each 24 inches long, and the outers are each 31 inches long. The dihedral of the inner panel is 1.5 inches, and the outer panel is 9.0 inches from the horizontal. Wing rod is .312-inch diameter (5/16) high carbon steel, hardness measuring 52-56 Rc. The rear rods is 3/32 music wire. Angle of incidence is 5-1/2 degrees. Each spoiler is one percent of the wing area.

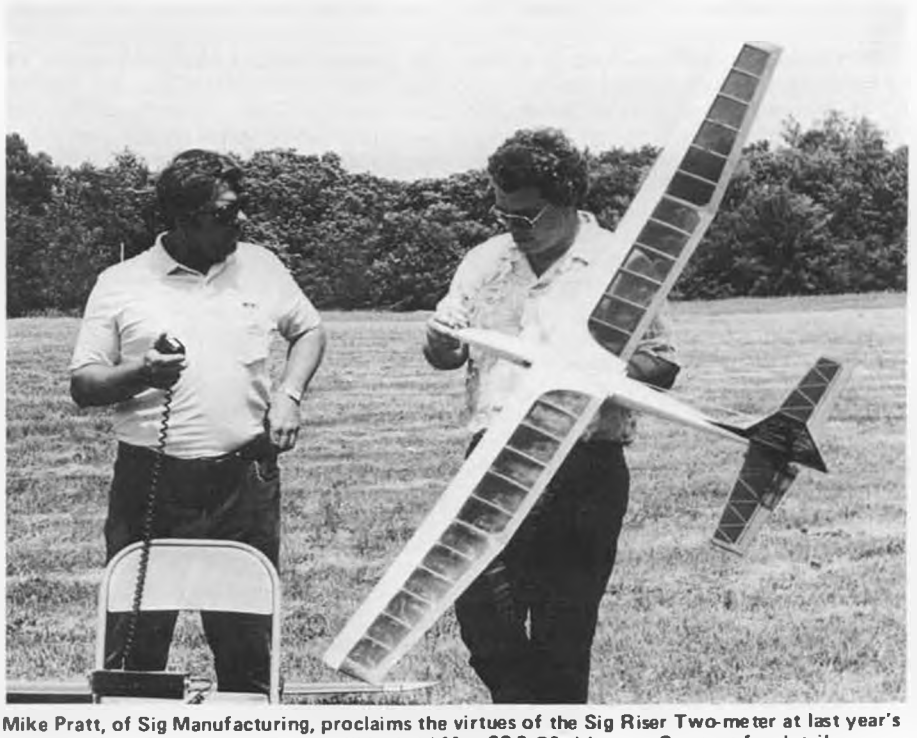
"The wing is constructed using two main spars, 1/4 X 3/8, while the rear spar is 3/16 X 1/4. Bass wood for the inner panels; hard balsa for the outer. The bottom of the bottom main spar and the bottom of the top main spar in the inner panels are reinforced with .007 X 1/4 carbon fiber laminate strips. The ribs are 3/32 balsa. The top and bottom of the inner panels from LE to main spars is 1/16 balsa sheet. Overall results with Super Monokote covering is a wing with an extremely high torsional gradient and very high bending resistance. Each wing half finished weighs 17.75 ounces.

"The fuselage is 54 inches overall with a 13-inch nose to lessen the need for excessive balance weight. It is light ply and balsa construction with a long hatch to give access to the three servos and other system components. The fuselage, although rectangular, is very clean, and is conventional in structure."

"I had decided not to test glide the Big Slik, but rather to winch launch on its first flight. I was confident of its balance and alignment. My flight buddy, Bud Moore, sent it off on the winch while I was controlling. It took off, not unexpectedly, at a steep angle due to the rear mounted hook position. The 70-ounce weight did not allow for any pedal modulation; it needed all the out-



Mike Reed, of Corona, California, is responsible for this Tech Tip for those who want to build in aileron or flap control surfaces on a new glider, or add them to an existing glider.



Mike Pratt, of Sig Manufacturing, proclaims the virtues of the Sig Riser Two-meter at last year's National Skills Symposium. Event will be held May 28 & 29 this year. See text for details.

Casey Geller, Number One finisher and CD at the first F3F slope race held in the U.S. Casey is holding Mueller Comet.

Action at the first F3F slope race. Casey signals via buzzer, "clean turn."

Roger Mara's Mk. 7 and Mk. 8 slope racers. He has a style all his own with fast slopers.

Combat Models' F-16 in action. Not enough wind to fly successfully, but a neat ship nonetheless.

John Lupperger holds his Modelbau Krause Carrumba and Aviomodelli Super Rieti. He flew both but preferred Carrumba for the conditions that day.

Young Tony Martin's original design model made of composites. Tony has advanced in building and flying beyond his years.

Steve Chan and the Rowing Impuls(an $800-$900 plane). Two of the Germans on the F3B team that went to Australia in '85 flew Impuls models.

Two V-tail Snipes. An electric version won the first 7-cell F3E Champs last year.

John Veale's O.D. racer is hard to beat. Fuselage is just big enough for the radio. Glass over foam wing construction.

put of the 12-volt winch. At about 150 feet, the much-used line broke. It caught me by surprise, but I quickly recovered and set the glider on an even keel. I also dialed in two clicks of trim for the best flying attitude. The glide was extremely slow and reflected the 7.33-ounce wing loading. I landed in zero wind conditions with spoilers down.

"The second launch was no better. The aged line broke again.

"The third launch destroyed the parachute launch ring. The huge amount of lift was too much for my rig.

"My next time out with a refurbished rig produced a flight time in light lift of 11:15. Spoilers are very effective, and this airplane shows great promise from all preliminary indications. It is a real crowd pleaser.

"P.S. Some other glider photos enclosed." Harry enclosed a photo of a third model which looks an awful lot like the other two. He calls it the "Bumble Bee" apparently from its yellow and black covering job. This model uses a "modified" S-3021 section which he claims is faster than the true 3021. Even though it is only a two-meter glider, he claims it acts and flies more like a 100-incher. No, coordinates are not available even though Harry claims he can reproduce the wings, which incidentally are "extremely strong." I don't doubt it.

The fourth photo was one of a MFA "High Sierra" imported by Hobby Lobby from England. This model is an ARF two-meter that comes with foam core wings presheeted with hardwood veneer, precolored fiberglass fuselage, precut rudder pieces and tail plane halves, and formed canopy, among other features. It is designed for slope or thermal contest work and two-channel radio systems. In the Hobby Lobby catalog for Fall/Winter 1986/1987, this model was on sale at $69.00! This is the best price I've ever seen for this type of model, but even at full list ($95.00) it should be a great value. Harry hasn't flown it yet, but he says it's a real beauty!

MORE FEEDBACK ON THE S3021

There seems to be a lot of experimenting going on with the S-3021 airfoil lately, and so far all of it has been very positive. Dick Edmonds of Edmonds Model Products, England, has kitted a 2.5-meter version of the world famous Sean Bannister design called the Algebra using this section. In a recent article entitled "Practical Experience with the Selig 3021-095-84," published in the English mini-magazine/newsletter called *The White Sheet* (Sean Walbank, editor), Dick Edmonds very definitely praised the section. Excerpts follow:

". . .What attracted me to this section was its similarity to the E205, and the claim that it was superior to the E205 at high angles of attack while the performance at low angles was equally good and the drag produced being of a low order. Being semi-flat-bottomed it would also be easy to produce. The first test flights (*of the Algebra 2.5*) were very encouraging, and it reacted in a very positive way when encountering lift and gained height in even the weakest bubble. Several more wing sets were then made up and given to experienced fliers to check the performance independently. It was agreed that Michael Selig had got this particular section right. It was good in light lift, low wind, and outstanding in strong winds. It could be flown in high winds with little or no ballast, far better than most of the popular sections now being used.

". . .Like all sections, it has its own operating characteristics, it is better when flown fairly fast, it reacts to lift in a very positive way at the faster speeds, it can also be trimmed back to minimum sink which is surprisingly low and the speed slow for this type of section. The speed differential between minimum sink and best glide angle is the greatest I have ever experienced.

". . .The S3021 really comes into its own on the slope—by its very nature slope soaring is performed in a wind which is converted into slope lift mixed in with thermal lift. The S3021 has the most positive reaction to lift of any section I have ever tried—the rate of climb in lift is very high. Good lift can also be converted into high speed and on entering good lift the model can be seen to accelerate very rapidly. This should make it an ideal choice for slope cross-country." Thank you Dick Edmonds and Sean Wal-

AIRFOIL OF THE MONTH—S3021

bank. By the way, anyone interested in subscribing to *The White Sheet* may write to Sean at: 29, The Gardens, Acreman Street, Sherborne, Dorset, England DT9 3PD. The annual rate is $30.00 (U.S.) for six issues delivered airmail to your address. Well worth the five bucks per issue if you want to keep informed in the world of R/C soaring.

I am frequently asked to recommend airfoil sections for different purposes. This one would seem to be an excellent choice for all types of soaring; thermal, slope, or cross country. One might even give it a shot in R/C hand launch because of its ability to go very fast at low drag (the toss), yet thermal very well while reacting to light lift. If you need the theoretical profile polars for the S3021, you will have to dig back to the December 1986 *Model Builder* and turn to page 37. If all you need are the coordinates and a drawing of the section, you will find those elsewhere in this column.

THINGS TO DO IN MAY

If you will recall my December 1987 column, I announced a very unique event for scale sailplanes—be they scale models of sailplanes or sailplane models of powered aircraft—to be held in the Richland, Washington, area on May 27 to 29. This event is to be a fun-fly and as such will have no rules to abide by other than safety and courtesy (no hogging the frequency pin!). The number of fliers registered is likely to be around 40 with probably well over 100 gliders checked in to fly. There are two flying sites for the event, a primary site which has been the site of three major slope races in the Northwest since 1978 and is 1,100 feet high by 20 miles long, and a secondary site which is 600 feet high with 150 acres of grass at the top for landing. Both sites are world-class slope sites and should rival the best Europe has to offer. A banquet will be held, speakers will speak, and a giant raffle will be drawn with many expensive radios and kits in the pot.

Since time is short for planning your trip to the Northwest, I suggest you contact CD Wil Byers at: 632 Meadows Drive, Richland, Washington 99352; (509)627-5224, and request all the particulars as soon as possible.

Way down in Texas, Pancho Morris and Don Chancey have announced this year's annual Texas National Tournament to be co-hosted by the Southwest Soaring League and the Eastfield Boomers on May 14-15. The site will be off Campbell Road on the campus of the University of Texas at Dallas. There will be two classes of sailplanes flown, Two Meter and Unlimited, and two classes of pilots, Sportsman and Expert, with trophies to third place in all classes plus one overall winner of the perpetual trophy. The events to be flown are, Saturday: 15-minute add-em-up, and 7-minute international duration with FAI landing tape used in both; and Sunday will be a Triathlon with scale runway. The entry fee is $10 per class in advance, or at the field add $5 for late entry. Contact Pancho Morris, 2715 Eastbrook Dr., Mesquite, Texas 75150; (214)681-1098 for more info.

AIRFOIL FILE NAME: — S3021

Line #	Stn. %	Upper coord	Stn. %	Lower coord
1	0.01	0.099	0.19	-0.427
2	0.37	0.799	0.98	-0.852
3	1.16	1.615	2.32	-1.232
4	2.36	2.472	4.18	-1.547
5	3.97	3.329	6.54	-1.789
6	5.98	4.157	9.39	-1.957
7	8.39	4.930	12.71	-2.053
8	11.18	5.631	16.46	-2.085
9	14.33	6.243	20.61	-2.059
10	17.82	6.753	25.12	-1.986
11	21.61	7.151	29.93	-1.876
12	25.68	7.433	34.99	-1.742
13	30.00	7.596	40.24	-1.592
14	34.51	7.632	45.61	-1.433
15	39.19	7.537	51.05	-1.273
16	44.00	7.312	56.47	-1.115
17	48.89	6.964	61.83	-0.963
18	53.84	6.505	67.06	-0.821
19	58.80	5.955	72.08	-0.690
20	63.73	5.342	76.84	-0.571
21	68.57	4.695	81.28	-0.462
22	73.27	4.039	85.35	-0.365
23	77.75	3.394	89.00	-0.278
24	81.96	2.776	92.19	-0.193
25	85.84	2.199	94.88	-0.107
26	89.34	1.670	97.05	-0.035
27	95.00	0.769	98.66	0.003
28	98.68	0.172	99.66	0.006
29	100.00	0.000	100.00	0.000

Max. Thickness..... 9.2% at 30% chord
Maximum Camber..... 3.1% at 39% chord

Plot and data from Cygnetics Software.

News of a National Soaring Skills Symposium for sailplanes and electrics has reached this editor in time for a quick announcement. In a very detailed two-page information sheet, event sponsor Jim Porter outlined the program for the two-day gathering which last year drew 150 participants. If you are looking for something fun and interesting to do on May 28 and 29, then travel up to the National Antique Airfield in Blakesburg, Iowa, eight miles southwest of Ottumwa on County Road H41.

To give you an idea of the concept behind the NSSS, I quote from a part of Jim's letter: "There will be flying seminars and displays on subjects of interest that relate to flying sailplanes and electrics. There will not be time set aside for formal demonstrations as it is intended that experienced instructors will be available all day for questions and demonstrations. There will be a centrally located sign listing (and directing people

Continued on page 106

ELECTRIC POWER

By MITCH POLING

• From time to time I have mentioned that I thought the Leisure stock 05 motor is one of the best deals around for power and quality for the dollar. Well, time goes on, and even the best can get better. Since this motor came out, the stock 05 motors have continued to improve, and the latest generation of stock 05 motors is very impressive indeed. They all represent real bargains, since their price is limited to $28 or less (usually less, especially if discounted). The big jump since the stock motors came out is timing. All the stock motors now are timed for more power, usually about four to six degrees advance (the end plate is rotated that many degrees opposite to the direction of rotation). This draws more current, but it also gives more rpm. Another improvement is that the gap between the armature and the magnets has been decreased, which improves efficiency and lowers current draw. This helps to cancel some of the increased current draw of the advanced timing. Attention to detail is everything in a motor, and the result is a remarkably potent new class of stock motors. I ran a set of tests on these motors, using no wiring harness except for the ammeter in series, and the Norcal Accutach. Here are the results:

Cox Gray 6x4 Prop/Six-cell Sanyo 1200 mAh Pack

Motor	Rpm	Current
Original (1986) Leisure Stock	11,650	13 A
Original (1986) Associated Stock	11,600	13 A
1987 Trinity Stock	12,200	15 A
1988 Associated Stock	12,500	17 A
Astro Cobalt 035	12,340	22 A

Note that the new Associated stock 05 is performing in the cobalt motor range! The Trinity is close too. I ran further tests with the same battery pack and a Cox 6 x 3 prop, those results are:

Cox Gray 6x3 Prop/Six-cell Sanyo 1200 mAh Pack

Motor	Rpm	Current
1986 Leisure Stock	13,320	10 A
1986 Associated Stock	13,230	10 A
1988 Associated Stock	14,700	13 A
1987 Twister Stock	14,300	12 A
Astro 035 Cobalt	15.050	15 A

Again, these new 05 stock motors are almost in the cobalt range. I was curious about how much of the increased rpm was due to timing. I took the original 1986 Leisure motor and advanced it six degrees. I got 14,400 rpm, an increase of over a thousand rpm! Timing makes quite a difference! As you can also see, it draws three or four more amps. This is no big deal for sub C cells, though it might be for smaller cells. I do not have the latest generation of the Leisure stock motor, I am sure it is right in there with the latest Twister and Associated motors. The bottom line is great performance for a very reasonable price, so it all gets better and better! These motors are very happy at high rpm, so they are ideally suited for gear drive or fast-flying direct drive. Try one in place of your older 05 in a gear drive for increased performance.

Speaking of gear drives, Astro now has a gear drive for the 035 cobalt and the 05 ferrite motors that is outstanding. It is part number 4046, price $34.95. It is set up to fit any 05 motor with the standard 1/8-inch armature shaft. It is very compact; the drive only adds 5/16 inch to the height of the motor. This is so compact that the motor plus drive can be installed in most planes set up for direct drive. The gear drive is mounted using the same holes in the front of the motor that are used for mounting the motor on a firewall. This means that if you want to mount the motor plug gear drive behind a firewall, you must use longer bolts (1-inch 4-

Continued on page 99

Dick Fleming's fine Taylorcraft just taking off from the grass. Dick scratchbuilt the model, with a wing area of 550 sq. inches. Weight is 55 ounces, and it is powered by an Astro cobalt 05 geared on 7 1200 mAh Sanyo cells, with Jomar throttle.

John Mountjoy's Heron, kitted by DSC, designed by Bill Winter. It is a great 10-minute flyer on a cool day, with stable flat glide, and nice transition from power to glide.

Dick Fleming also sent a shot of his '41 Fairchild UC-86, a scratch-built electric with a Hobby Lobby RX-15 motor with belt reduction, using 7 800 to 1200 mAh Sanyo cells. Covering is Micafilm.

Author's Seagull, docile and easy to fly model which accepts many different kinds of motors. It will ROW on as few as five cells, although Mitch usually flies it on six cells. Details in text this month.

P·FLIGHT FIESTA

Top-notch flier Carol Bartick displays Sig hat and Bill Barr's Mini-Hogan, a Denny Davis original. Model came from Bill's Lexington, Kentucky workshop, promptly went OOS on first flight!

STORY & PHOTOS BY JOHN OLDENKAMP. . .San Diego's innovative Orbiteers club joined with our Dave 'VTO' Linstrum for a fun Pee Wee 30 contest that included proxy flying and lots of intense competition.

• Sounding very much like any of the current crop of PGA golf tournaments, the P-Flight Fiesta was Dave (*MB*'s Mr. Inside, alias VTO) Linstrum's notion, by letter and by design. His October query to the Orbiteers and *Model Builder* Publisher Bill Northrop received quick okays from all, and the contest was on, or nearly so. First came the logo artwork, then the entry blanks and adverts in *MB*, next the T-shirt order to commemorate the effort, then a short pause while the entries made their way to us via UPS and USPS. The latter, through no fault of their own, delivered at least three partial "kits," mere shreds of their former splendor, meaning total rebuilds from scratch (author's shop did the delicate task), two bottles of Hot Stuff and a yard or so of tissue/dope. Moral of the story: Try not to put a 30-inch airplane in a 30-inch box for shipping! Rather, use a three-foot container and scads of those nasty little foam "peanuts," or things will go poorly on the receiving end.

A happy Don Bartick and his Moonshot Pee Wee 30. Trophy was for Don's high time in 1987 for the Orbiteer's PW30 Challenge meet.

Orbiteer President Bob Beecroft, with MB's Bob Stalick's Pee Wee 30 Spacer, which he proxy-flew.

Beecroft discovers new joy in ROG try with Stalick's ship. Next attempt, successful, came after realigning slightly left of wind!

Eventual Power winner Bob Beecroft craftily pre-times engine run on his all-sheet Lucky Lindy(from Zaic Yearbook) replica. Great climb on KK Cox .020 Pee Wee.

Properly dressed for the day in which conditions didn't lend themselves to good flying, Walt Mooney and Meredith Musicks get the Border Airliner ready for a game attempt. Vicious winds caused wing flap, necessitating gobs of CA to repair. Photo: Greg Weissenberger.

But when VTO speaks, people listen (read), and as the appointed day approached, my photo studio looked more a hobby shop/haberdashery than not, with T-shirts and models all over the joint. Ah, the smell of nitrate as it seeps through the darkroom vents! Fun was in the air, too, however. And light rain, as VTO himself arrived a day before the meet to serve as VIP at our annual club banquet, held at a place named the 94th Aero Squadron, local watering/gustatory hole filled with vintage aero memorabilia and a stone's throw from the Goodyear Blimp anchorage, said airbag coincidentally in town for pre-Super Bowl festivities.

The weather at dawn Sunday, the appointed date, was unkind, to say the least. Saturday's tentative raindrops presaged a monster frog strangler of a storm that eventually dropped several inches of wet on us, plus carried winds that bettered 70 miles an hour. Horrors! Nevertheless, approximately 30 enthusiasts showed up at Otay Mesa, hard by the Mexican border, to have Dave's "Fiesta." No way! Mike Meyers and Walt Mooney threw up a couple of test hops and got back pieces and trash in the awful wind. By 9:30 a blowout/rainout was declared by CD Linstrum, and all retired to Brown Field Airport for warming and snacks. The meet was rescheduled for the next week at Perris (near Riverside). Dave Linstrum was vastly disappointed, of course, as were some of the other visitors, who had commitments elsewhere and could not make the reset.

Professor Walt Mooney's latest, the Border Airlines PW30 has terrific visual appeal, and also flies well. Could be an upcoming MB construction feature.

So Perris it was, a week later, but under very sunny skies, albeit with some indecent wind midmoring. The concept, of course, was to highlight both Orbiteer innovations, P-30 Rubber (now ten years old) and the brand new, ever burgeoning Pee Wee 30 classes. By the 09:00 start time, 36 entries were recorded, outstanding for a delayed and winter season contest.

Competition was as it should be: hot and heavy with capricious thermal activity, high jollies content. and a laid back atmosphere

Foo 2 U Too in Pee Wee 30 form as entered by R.Q. 'Speedy' Diaz, who specializes in OT and Nostalgia subjects in .020 PW30 class.

Seattle's Mark Sexton sent this P-30, perhaps an O'Donnell design from England. Highest placing proxy was flown by Meredith Musick, shown here waiting for lift.

Greg Weissenberger's hybrid Sneeker PW30 of mixed ancestry. Greg, aka the Unknown Modeler, is from Orange County.

Master wing-flinger Barnaby Wainfan checks CG on Linstrum's P-30 knockoff of Wainfan's latest, the Swallow, a MB plan (No. 6872).

in between. As background, San Jacinto loomed quite strikingly in a new snow mantle. Besides our busy little 30 inchers, the air was populated with skydivers, paraplanes, soarers, and ultralights operating from the nearby Perris Airsport runways. Some Sunday shooters in the neighborhood, too, made things interesting. Two sheep brayed upwind, and a new house on the field perimeter, the owner of which immediately announced that he would not return any of our stuff that wandered into *his* turf made things interesting. Oh, well!

We went from 09:00 until 14:30, thereby allowing everyone, pilots and proxies, a fair hit at prevailing conditions. Those who flew too early risked marginal times, the middle

Continued on page 72

P-30

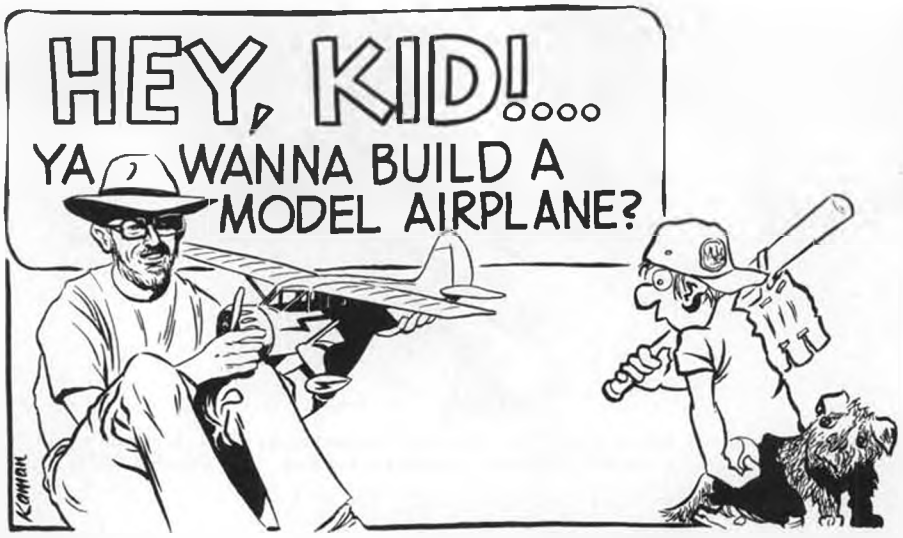
Place, Entrant/Pilot	Time (Seconds)
1. Lynn Martin/Jim Martin	347
2. Hattie Sisk	322
3. Mark Sexton/Meredith Musick	315
4. Don McHugh	314
5. Carol Bartick	312
6. Charlie Yost	307
7. Marc Sisk	296
8. Dennis Weatherly/Meredith Musick	292
9. Hank Sperzel/Mike McKeever	290
10. Bill Burt	269
11. Don Bartick	265
12. Bill Vanderbeek/Bill Booth	258
13. William Barr/Bob Langdon	246
14. John Hutchison	177
15. Dave Linstrum/Don Bartick	272
16. Eric Anderson/Don McHugh	168
17. Dave Linstrum/Barnaby Wainfan	165
18. Don DeLoach/Guy Kirkwood	Crash
19. Alan DeCook/Guy Kirkwood	Crash
20. Meredith Musick	000

PEE WEE 30

Place, Entrant/Pilot	Points
1. Bob Beecroft	1886
2. Don Bartick	1866
3. Barnaby Wainfan	1864
4. Bob Bicknell	1859
5. Carol Bartick	1796
6. Bob Stalick/Bob Beecroft	1786
7. Greg Weissenberger	1719
8. Walt Mooney	1671
9. Mike McKeever/Greg Weissenberger	1567
10. Speedy Diaz	1496
11. Greg Weissenberger	1373
12. Charlie Yost	1328
13. Bill Vanderbeek/Bill Booth	979
14. William Barr/Carol Bartick	600
15. Dave Linstrum/Gary Anderson	Crash
16. Meredith Musick	000

Bob Bicknell's fifteen-year-old Japanese design, the Gifu, now reincarnated as a PW30. It carries Williams Bros. vintage wheels, as seen on most entries.

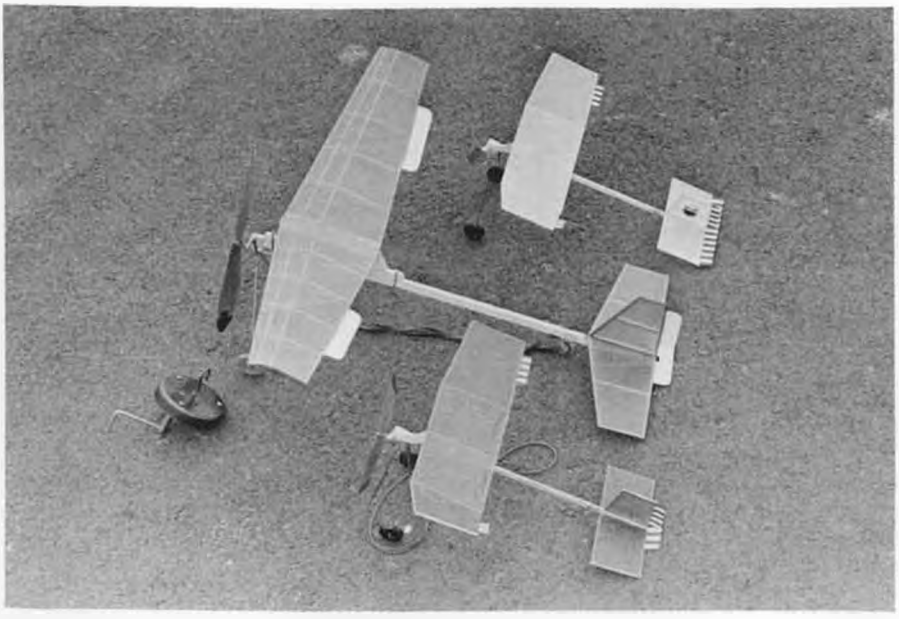
Don Bartick does the acrobatics required on VTO's P-30 entry. Wild color scheme of black, yellow, red, and flourescent green!



By BILL WARNER

Illustrations by JIM KAMAN

Flight-trimmed Sky Bunny off on a hop to the clouds.



Sky Bunny flanked by two Peck ROGs, ready for the air.

Ed Arteaga, a student in the author's Aeronautics Education class shows the right angle in which to launch the Sky Bunny successfully.

• One of the hardest things about making model aircraft is making the bends in the music wire prop shafts and landing gear. Music wire is a special steel often called "piano wire" because it is used in pianos to produce the sounds. It is hardened, and that makes it hard to bend. One good way to practice bending is to get some soft wire such as used by mechanics and try that first. Most bends can be done with slip-joint or needle-nosed pliers, but often a bending jig made from a piece of wood and a couple of nails or screws can be helpful. They are cheap and quickly made. We'll use two, one for the landing gear and one for the prop shaft. The cutoff nails on the prop-shaft jig are just close enough together to let the wire slip between them. The landing gear jig has the bending posts about a half-inch apart. When the wire is going to bend all the way around the post to form a prop hook or to come back in the same direction as it started, the bending post can be made the same size of the dimension needed. A 3/16-inch diameter hook can be bent around a 3/16-inch diameter screw, etc. Cutting the heads off makes the bent parts easier to remove.

BENDING THE LANDING GEAR

When we started making the Sky Bunny with an after-school group of junior high kids with some model building experience, we had no idea of the exact problems that would arise. The biggest one was bending the wire. I had chosen .046-inch diameter music wire to help make the design bullet-proof. This heavy wire would take up a lot of the shock of bad landings. The only problem was that the kids couldn't bend it with pliers! Putting the twisting force sideways on a pair of pliers just would not do the job! Hence the bending jig.

The first thing to do is mark off where the bends are supposed to be. I usually just grab the wire at the place I am going to bend it (holding it over the pattern on the plan), grasp it with the pliers right up against my fingers which "marked" the spot and bend away, holding it back over the plan to see if it was right, and making the necessary adjustments. The kids had a hard

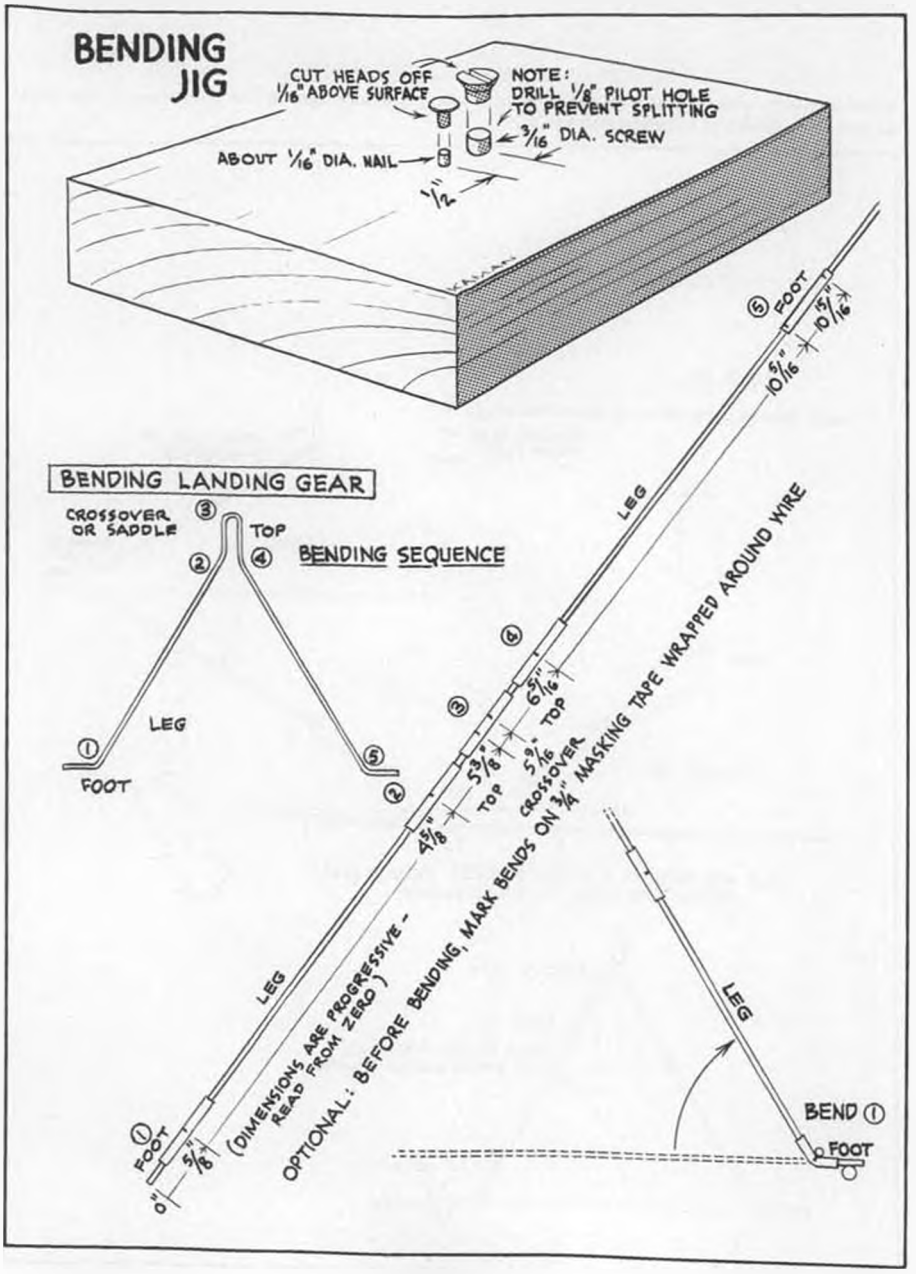
time getting it anywhere close, and the bends were definitely not all in the same plane.

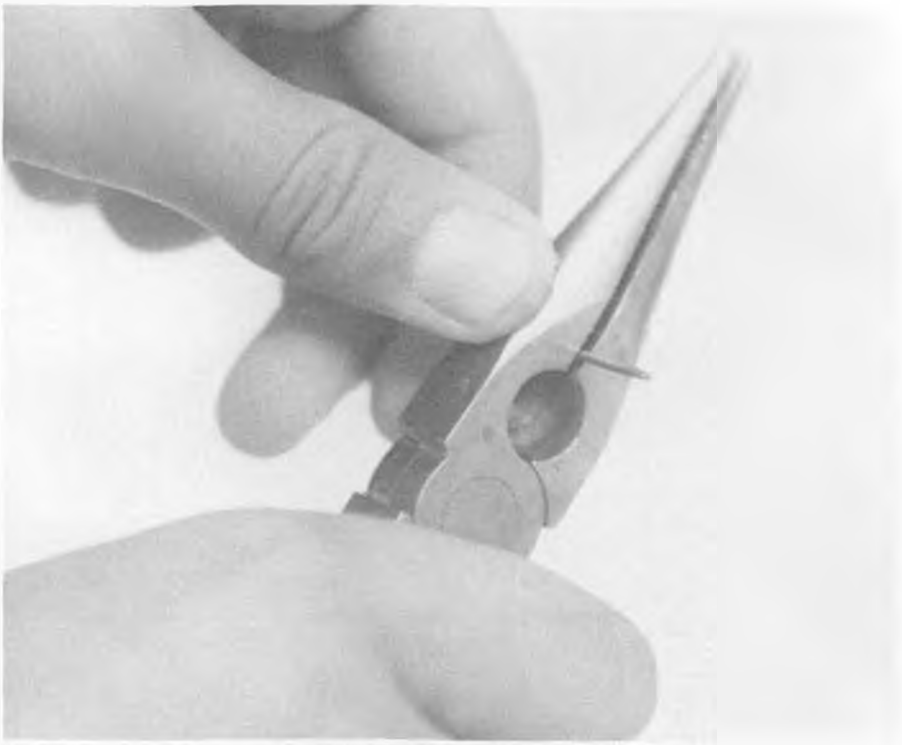
The dictionary defines "plane" as "without elevations or depressions; even; level; flat." That means that when you have finished bending up your landing gear wire, and you lay it on the table, all parts of it should touch at the same time. Sound easy? I have seen grown men cry trying to get a bent-up part to come out with all surfaces in the same plane. The jig method can help here, for the *surface* of the board you are using is a flat plane!

Knowing exactly where the bend should be will be easier if you mark the bend locations on the wire and check by holding it over the plan after you bend each bend (just a little) before you commit it to a full-scale heavy bend. You can take little "test" bends out, but once you bend it very far, you may have it snap off from metal fatigue. Marks do not show up too well on wire. I suppose you could paint them on. Masking tape works okay, with only a couple of wraps around at each location to mark on. Look at the diagram. You will notice that I have given names to the parts of the landing gear to make them easier to discuss. The place the wheel fits, or "axle," I have called the "foot." The long strut that goes from there up to the fuselage I call the "leg." The part that goes up, over, and back down on the fuselage fit is the "saddle" or "crossover." You should note that all the dimensions I have laid out in the diagram are measured *to the same place*, the *end* of the wire. Measuring from one bend to the next is not too good, as if you make a tiny error at each place, you can be quite a ways off by the time you get to the other end!

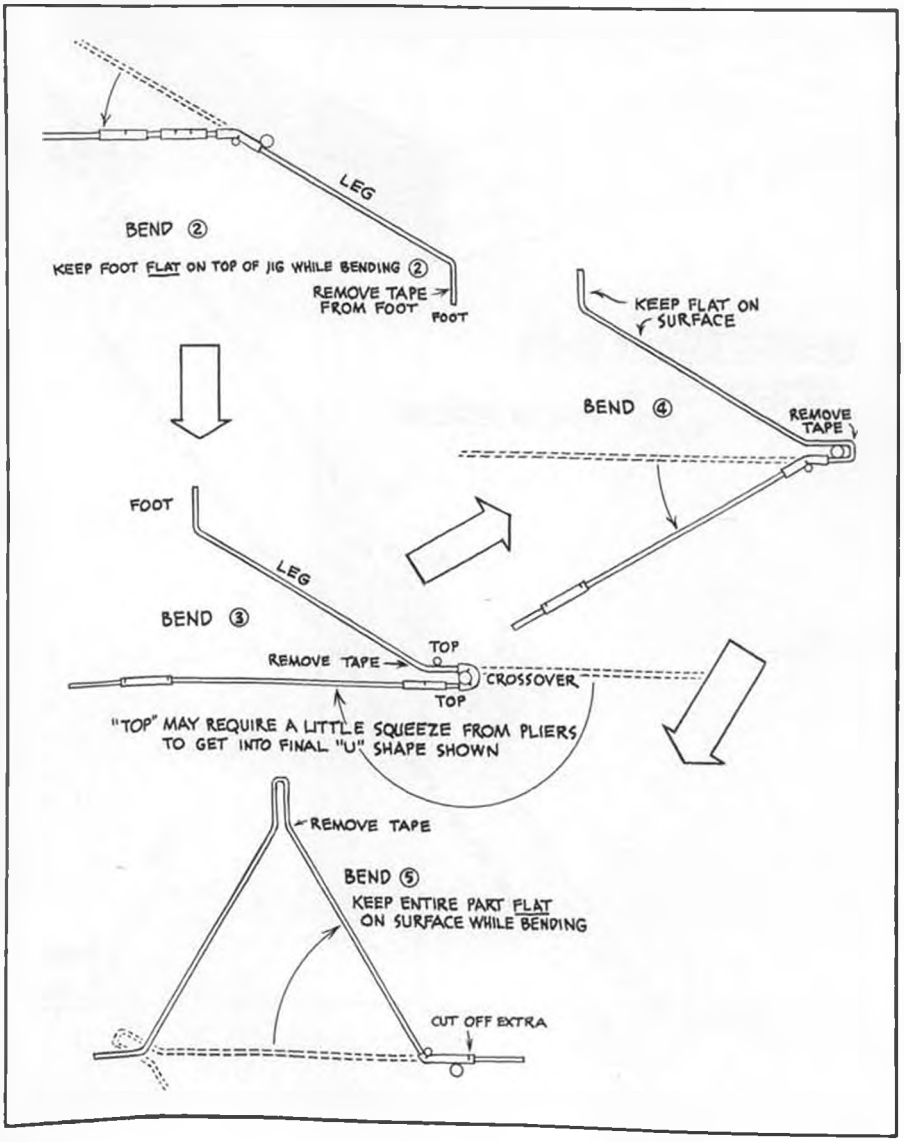
Bend No. 1 (see diagram) will be the easiest, because it does not have to line up with anything! Check the bend to see if it is the correct angle by holding it over the plan. Use your pliers to make minor changes. When you make bend No. 2, you have to be sure that the "foot" you just formed is *lying in the same plane*, that is, flat against the top surface of the bending jig. Have someone hold it down flat on the board if you need both hands. Take the marking tape off after each bend if you wish. Bend No. 3 will round the crossover, but it will still work OK. You could do this bend with needle-nose pliers if the wire wasn't so hard. Sometimes heating the wire over the stove until it is red hot will make it easy to bend, but is dangerous to handle when red hot and may become brittle when it cools. Again, take special pains to make sure the parts you have already bent lie *flat* while you are bending. When you have finished all bends, cut off the excess wire. This can be fun, as the hardened wire will ruin the cutting edges of cheap pliers. Making a nick with the corner of a file and then bend it back and forth with pliers at that spot to produce a break. Then you can clean up any sharp edges with the file. Really hard wire can ruin a good file, so be careful! The way I do it is to use a *Dremel Moto-Tool* with a No. 409 Cut-Off wheel. This is one of the handiest little things in any workshop, but should be used only with glasses or a face shield. Grinding anything, or even cutting

Bending the landing gear wire without a jig. Note the use of the thumb to apply back pressure to get a sharp bend.





When bending wire with pliers, use thumb to apply pressure against the wire close to the jaws as you twist pliers in opposite direction.



off the ends of wire with pliers can endanger your eyes. When you cut off wire with pliers, the end can fly several feet! The cutoff wheel breaks often and bits can go in your eye. Just be careful; OK? One last note, if you really *can't* bend the .046-inch diameter wire, try it with .031-inch (1/32 inch). It won't be as strong, but will be better than nothing. Oh, yes, you can fly the Bunny without landing gear, but then it won't be a Rise-Off-Ground; will it?

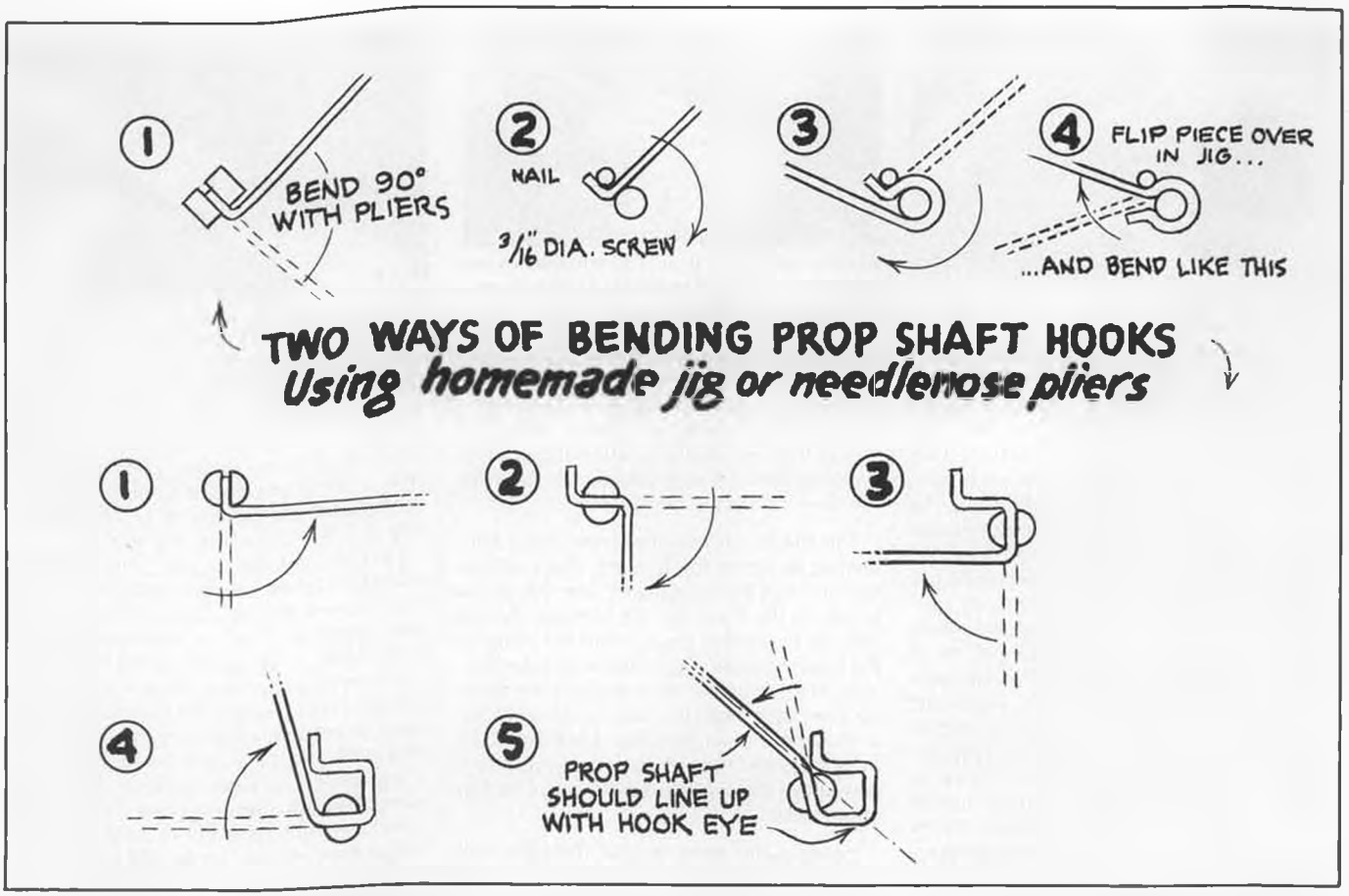
The prop shaft can be bent with needle-nose pliers in a "diamond" shape, with the ends squared off. The trick is to make sure the part where the rubber will hook on is *directly opposite* the shaft. If it is not, you are going to be in for a lot of *shaking* as the off-center rubber hook whips around! Spin the finished shaft between your finger to make sure it is going to run true. Also, the hook should lie in the same plane as the shaft. Try it on a flat surface to check this. While you are at it, make a few extra shafts. Use the best one, and save the rest in case you bend one while flying. A classy way to finish off the business end of your prop hook is to shove a bit of wire insulation plastic or fuel tubing over it to help protect the rubber from being cut by the wire. A little saliva helps the tubing slide on. Heat-shrink tubing is easy to put on.

Making a "jig-bent" shaft is about the same. The "bend-back" on the last bend is necessary to get the hook in line with the shaft. Check it the same way you did to get your diamond hook centered. If your wheels will not fit the size wire you have used, either drill the holes bigger (a red-hot wire can be used in an emergency but can burn you if you're not careful). If the hole is too big, you can "bush" it by drilling oversize to fit a piece of aluminum tubing the right size in. A rolled-paper bushing, or a bit of hardwood drilled the right size can be glued in the wheel. Hold the wheel on with a drop of cellulose glue on the end of the axle. A better way is to file a nick near the end of the axle and then wind some thread around until you have a little ball locked onto the notch. Use glue on the thread while you're winding. Sometimes wheels with large holes can work themselves around the first bend and find themselves on the leg. If this happens, you may want to do the "thread-ball" number in the inside of the axle to stop the wheel.

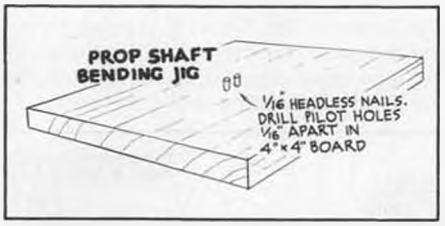
COVERING

First, I suggest you review the covering information from the March '88 *MB*. The only difference is that this time you are covering *both* sides of the wing. The tail parts are the same. They *can* be covered on both sides to prevent warps, but it will add a little weight to the tail. One ounce of weight in the tail means adding five on the nose to balance it. On this model, the wing can be slid back a little to compensate, but as the tail moment (distance from the wing to the tail) gets shorter, the plane gets more unstable and less forgiving.

If you haven't glued the wings together at the roots yet, make sure they are well sanded, with no bits of glue of balsa part mismatches standing "proud" from the surface. Did you remember to round the L.E. and T.E. to blend in with the airfoil shape of



the ribs? Use a separate sheet of tissue for the top of each wing and for the bottom of each wing. Don't try to "wrap it around." Attach the tissue with thinned white glue (60/40), pulling out the wrinkles with your thumbs. Again, keep your thumbs wiped off so they won't stick to the tissue! Cover the top first and let it dry. Then trim with a sharp razor blade or use your sanding block. Then do the same with the bottom. The L.E. and T.E., which show plain balsa color, can be color-doped or colored with a felt pen. (Yellow is the easiest color to make blend in.) For the more adventurous of you, cover the bottom first, trim when dry, and then do the top. Do not trim the top even, but use scissors to cut all around the wing staying about 1/8 inch out. This part can then be glued over the exposed L.E. and T.E. to just overlap the bottom. You will need to make little cuts at the corners so it will overlap without wrinkling. You will not have to use pre-shrunk tissue for this wing, as it is a lot stronger than the *Peck R.O.G.* The tissue can be shrunk right on the wing using a light



water spray or a cotton swab soaked in rubbing alcohol. It is still a good idea to pre-shrink the tissue for the tail parts.

Note: If you already have the wing all glued together before covering, you will find that you will need to prepare two special sheets to do the top. Tissue will not bend to fit the dihedral and still fit the curved shape of the top of the wing. Where the two halves meet at the root, cutting the edge of the sheet to a slight curvature inward will help it fit. Start with a longer sheet than needed and do some "cut-and-try."

DOPE

There are several types of "dope" or special liquid plastic used to treat the tissue. The purpose of using dope is to make the tissue waterproof, airtight, and often to tighten it. There is clear dope, and there is colored dope. Colored dope has coloring material added and is therefore heavier. I suggest using colored tissue and clear dope for the lightest structure. I have seen kids use colored dope and put several coats on to make it cover. Put enough of this on and you can forget about flying!

In the past, there used to be nitrate dope, made of the same stuff as old movie film (celluloid). It was, and still is, used on full-size planes to tighten and seal the fabric. It does tighten, but then it stops, and you know where you are. It goes on beautifully. It's main problem was tightening too much sometimes, a problem which was usually solved by adding "plasticiser." This could be any substance from oil of wintergreen to castor oil. "TCP," tricresyl phosphate is still very popular for this. To make nitrate dope usable, you first mixed it half and half with dope thinner so it would flow on nicely and not add too much weight. To each fluid

Using 60% white glue, 40% water mixture, cover top of wing in two pieces. Attach with thinned white glue, then pull out the wrinkles with your thumbs.

Optional reinforcement made from card stock added before covering at the wing root.

Joel Wagner uses razor blade to trim tissue. He is cutting away from his fingers.

Dip brush in dope thinned 50-50 and wipe off one side of brush on lip of container.

Brush dope from L.E. to T.E. and overlap the strokes. Use light reflected off surface to see places you missed. One coat of 50/50(1/2 dope, 1/2 thinner) should do fine.

Uncolored balsa can be made to match colored tissue covering with help of a felt marking pen.

ounce of dope, you'd add about ten drops or so of plasticiser. You could control how much the dope tightened up your tissue by controlling how much you added. The other main type of dope was called "Hot Fuel-Proof" or Butyrate. Because many people used engines with wonderful things in them like nitromethane, nitrate dopes did not hold up. Even though butyrate dope did not go on as nicely as nitrate, it soon began to replace nitrate in hobby shops as gas-engine use increased. Today, even buying something that says "Nitrate Dope" on it may not be the good old stuff. Paint makers have gone nuts in the last few years and keep putting in plasticisers, acrylics, and all sorts of things which give unpredictable results. Sig's "Lite-Cote" plasticised dope is probably the best bet for you right now. It won't shrink your tissue too much. Don't use over one or two coats of 50-50 mixture, however.

APPLYING THE DOPE

An old baby food bottle is good for mixing your dope with thinner. You *can* apply dope as you buy it, right out of the bottle, but it will be thick and will not cover evenly. After you mix up some thinned clear dope, put down some newspaper so as not to make a mess, and get about a 1/2-inch soft-bristle brush. Cheap brushes will leave bristles as they go, and you will need to keep dabbing them off with your brush and wiping them off on the newspaper.

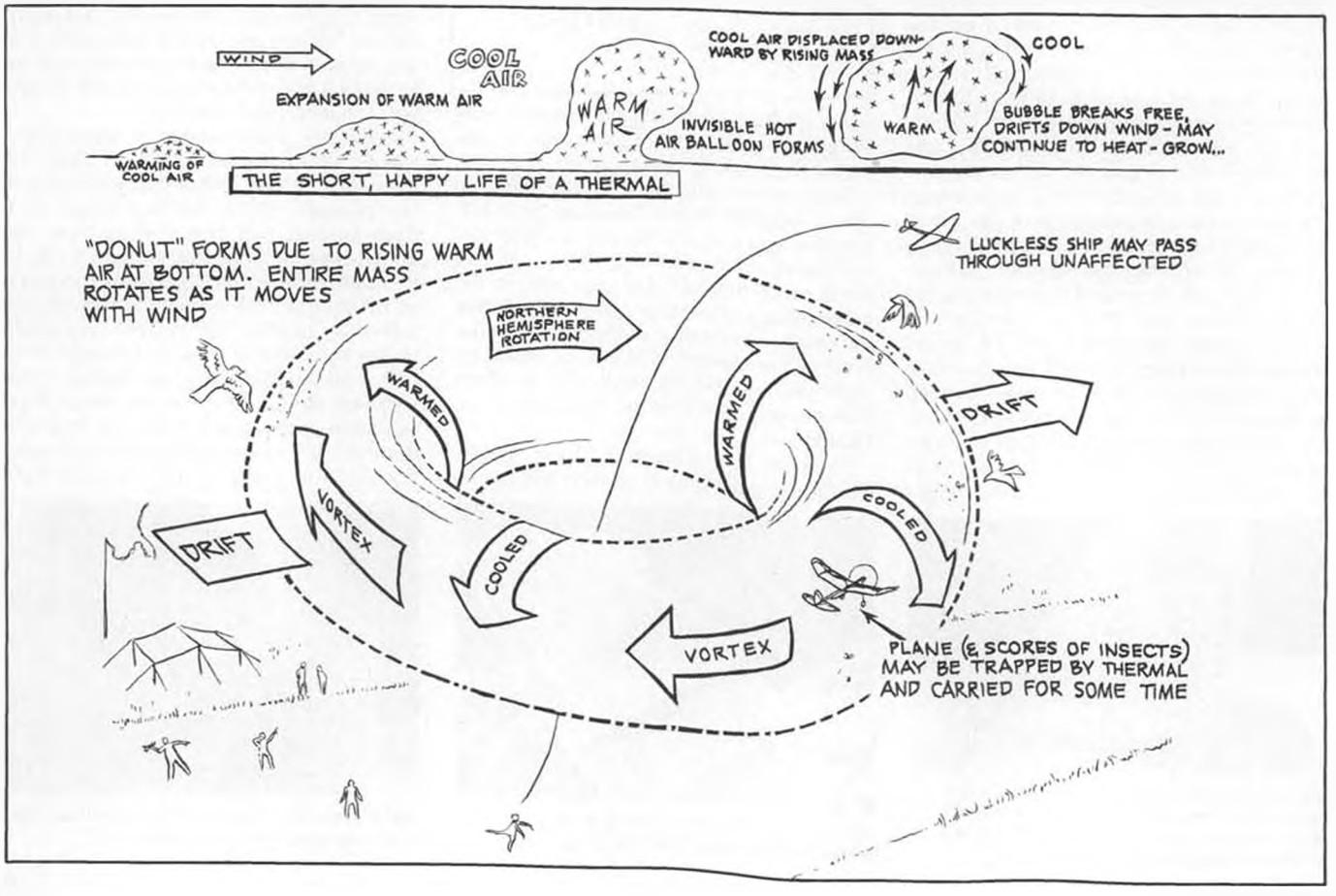
Dip the brush into the dope about halfway or so up on the bristles. Then, as you take it out of the jar, wipe off one side of the brush on the lip of the jar, keeping the full side up to prevent drips. Hold the wing so the long dimension is in line with your forearm. Start at the center and apply the dope by a twisting motion of your wrist and forearm. Do not push the brush back and forth away from and towards your body, you have no control that way, plus it is tiring. Overlap your strokes.

Holding the wing so that the light will shine off its surface to help you see if you are covering well or leaving dry places. If you begin to see it leaving dry spaces, get more dope on the brush. Keeping the brush full and advancing out to the tip from the root with overlapping strokes between L.E. and T.E. should do the trick. Never just keep going over the same area with a "dry" brush trying to spread out the dope. Flow it on. If you see it beginning to "run" from too much dope on the surface, pick up the extra with a dry brush. Never do just the top or the bottom. Do them both at the same sitting as they will pull up equally.

Finally, if you do use regular nitrate dope, realize that there are two kinds: "tautening" and "non-tautening." You can't tell by looking sometimes. The last time I used Sig's nitrate dope, I was surprised to find that it *loosened* the covering! That is nice to know ahead of time. For the Sky Bunny, you might want to try a small surface like the rudder first and look at it after it dries well to see if it tightened up, went slack, or stayed the same! You can always re-cover it if it warped from over tightening. Plasticise your dope if that is the problem. Loosening won't hurt it too much. Just makes it look sloppy.

CLEANING UP

Wiping off the threads of the bottle and applying a little vaseline will pay off when you try to open the bottle next time. If you forget to do this, set the bottle upside down



and flow a little thinner in between the bottle and the cap and let it sit for a few minutes to loosen it.

If you forget to wash your brush in thinner, you will know it next time you want to use it; rock hard. The best way to clean it is to wipe off the excess dope and then slosh it around in thinner. Then you can wash it carefully under the tap with soap and cool water, smoothing the bristles into their original shape to let them dry.

FLYING

Consult the preflight instructions and flying instructions in the December '87 *MB* and January '88 *MB* articles. Steam out any warps in the wings. A tiny bit of washout, about .030 inch, is fine and will actually help your model fly better! A little less angle of attack at the tips means that the center section of the wing will stall first if it comes to that, meaning that your plane will have less tendency to fall off on a wing tip. Some builders put washout in all their models! You will have adjustment tabs to help you fly also.

Try about an 18-inch loop of 3/16-inch flat rubber to start your test flights. Slowly build up the number of winds on each successive test flight, making whatever adjustments are necessary. The model can be hand-launched or R.O.G.'ed. Don't throw it. Take the troubleshooting chart printed this month.

Gradually increase the number of turns until the Sky Bunny is boring a hole in the sky. Experiment with different sizes and lengths of rubber until you get the type of flight you want. A smaller prop will give a faster spin and a zippier climb. A longer rubber motor will mean a long, slow cruise.

The Sky Bunny seems to be happy with a wide right climbing turn. The pylon and the right thrust contribute to this tendency. I use left rudder to control the diameter of the circle. If the model turns too much to the right, bend in a little more left rudder, and vice-versa.

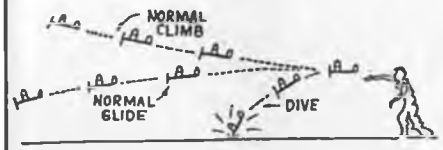
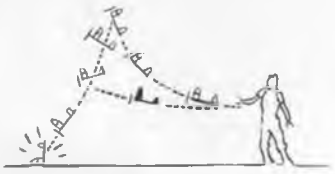
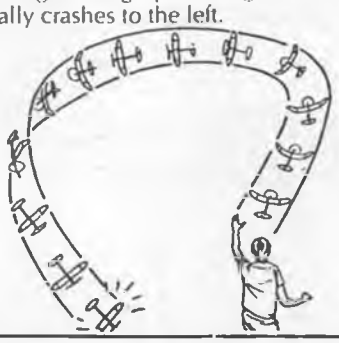
Another feature of the sliding pylon is that you can slip a shim (small thickness of balsa or anything else) under the front or the back of the slider and change the angle of attack of the wing. If you need more lift, slipping a bit of 1/16-inch or 1/32-inch sheet between the front of the slider and the fuselage will increase your alpha and give more lift. A stall might be cured by shimming the rear of the pylon assembly, thereby decreasing the alpha and reducing lift.

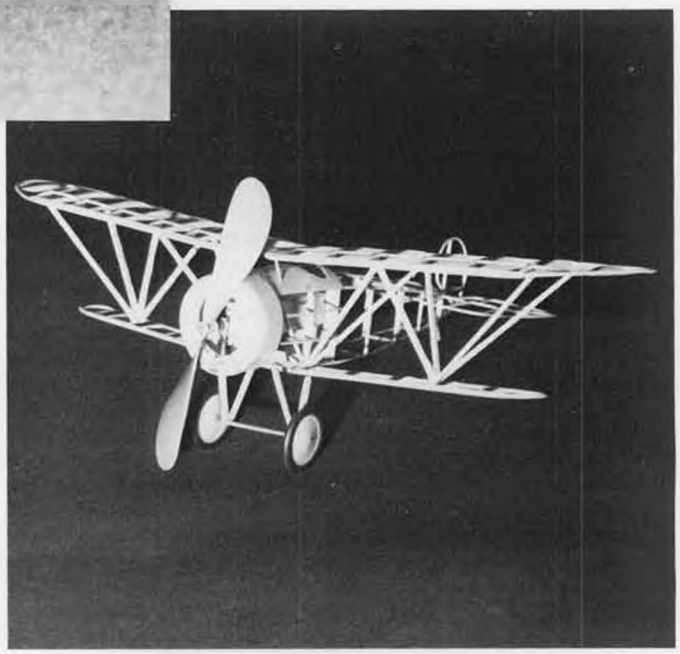
Have fun with your Sky Bunny, and if it breaks, tear off part of the tissue, fix it, and re-cover it. Don't just throw it away when it looks broken up. Wrecks are never as bad as they seem!

Next month we will start the famous *Flying Aces Moth*! As with all the projects in this series, you can get the kit of supplies from: Peck-Polymers/Beginners, P. O. Box 2498, La Mesa, California 92044. We're going to start with the Moth right from the Peck kit and then are going to show you a couple of modifications to jazz it up. Send Pecks a SASE for their free sheet of materials for our series, or get their whole catalog for $2.

Keep 'em flying! •

TROUBLE SHOOTING CHART—NO WIND BLOWING, MODEL LAUNCH NORMAL

THE PROBLEM	WHAT MIGHT FIX IT
1. Model dives straight in. 	1. Bend the trailing edge of the stab or the elevator tab up .030 inches. 2. Add a bit of modeling clay about the size of 1/2 a pea to the tail. 3. As a last resort, reglue the wing 1/2 inch farther forward.
2. Model stalls. (Nose first goes up, hesitates slightly, then drops to a dive. Roller-coaster.) 	1. Bend the trailing edge of the stab or the elevator down .030 inches. 2. If the model wasn't turning, bend the rear of the rudder or the rudder tab about .030 inches left (as seen from rear). 3. Try a bit of modeling clay about the size of a pea on the nose as far forward as it will go.
3. Spiral dive to the right. (Model raises its left wing—pilot's left—and finally crashes to the right.) 	1. Hold model at arms length. Close one eye and see if wings are warped. The right wing should be untwisted, but the left should have about .070 inches wash-in. If too much wash-in, breathe on it and twist in opposite direction. Recheck. 2. Bend rear of rudder or tab about .030 inches to the *left*. 3. Bend the trailing edge of the stab *up* about .050 inches (or a tab). 4. Add about a 1/2 a pea of clay to the tail. 5. Bend right aileron tab down .050 inches and left tab up .070 inches.
4. Spiral dive to the left. (Model raises its right wing—pilot's right—and finally crashes to the left. 	1. Hold model at arm's length. Close one eye and see if the wings are warped. The left wing should have about .070 inches wash-in. If not enough wash-in, breathe on it and twist leading edge higher. 2. Bend rear of rudder or tab about .050 inches to the *right*. 3. Bend the trailing edge of the stab or elevator up about .050 inches. 4. Add about 1/2 a pea of modeling clay to the tail. 5. Bend left aileron tab down .050 inches and right tab up .070 inches.
5. Model refuses to fly left, even though you try everything.	1. Go with the flow. Fly right. Why fight it? You may have built it as a RH model without knowing it.
6. The model flies great until it runs out of power, then it dives, stalls, or goes straight.	1. Remember that the rubber spinning the prop makes the plane roll left. When the motor runs down, this force is missing. Try adjusting the model so that it glides well, and then play with the prop shaft part of the nose bearing. Twisting it a little right will open up a too-tight left turn, a little left will turn a straight climb into a left circle, etc.



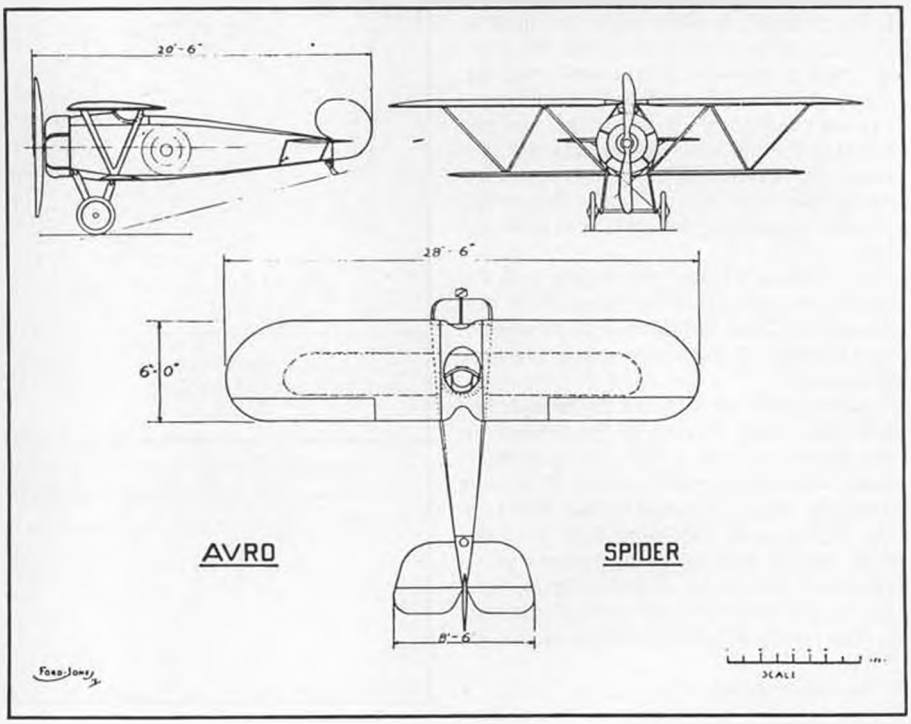
Avro Spider

By WALT MOONEY. . .Professor Peanut comes through again, this time with a delight from the 1919 issue of Jane's All the World's Aircraft. It's CO_2-powered, and a snap to build.

• The three-view for this interesting World War I biplane was published in the 1919 issue of *Jane's All the World's Aircraft*. Several features make it somewhat different from most of the other biplanes of the period. It has a large low aspect ratio top wing and a small high aspect ratio lower wing. As a consequence, the insignia carried on the wings is carried on the top and bottom of the top wing. It also has no interplane wire bracing because it uses a "Warren" truss "V" strut arrangement between the wings. Finally, the top wing was set very close to the top of the fuselage so that the pilot's eyes were in line with the wing, theoretically giving the pilot a better field of view than the more conventional biplanes.

Of course, the pilot's head is no longer protected in the case of a noseover on landing, and the wing's aerodynamic efficiency was somewhat decreased by the hole in the center of the top wing. Still, it makes into an interesting Peanut Scale of a little modeled WWI airplane.

Love these new copy machines, they'll take a three-and-a-half-inch span three-view and blow it up to thirteen-inch Peanut size. That's what was done here, which ac-



counts for the roughness on some of the outlines. But it gives a true enlargement which was then cut apart and rearranged into a more normal Peanut format and the model structure drawn in place. Note that the horizontal tail size has been increased. It looks awfully small on the three-view.

The basic model structure is very conventional, so it will not be allowed to take up much space in this article. The model was designed to be built as either rubber or CO_2-powered and the removable CO_2 powerplant installation will be covered as well as an innovative way of decorating and covering the model. Finally, the wing assembly was done a little differently than usual, and that will also be discussed in detail.

All the main structure is balsa and, except for the fuselage box itself, can be built directly over the plans. The lower wing plan is shown dotted, under the top wing, so to speak. Its leading and trailing edges are continuous right across the fuselage. That is, the whole lower wing is a single unit. The top wing, tail surfaces, and fuselage sides are totally conventional.

Once you have all the parts made, sanded smooth, and ready for covering, assemble the uncovered model.

The model in the photographs is covered with pre-decorated condenser paper and has not been doped at all.

Staedtler Lumocolor 357 permanent felt pens were used to decorate the condenser paper. Permanent pens are used so that the condenser paper can be water shrunk after the model is covered without the color smearing. Condenser paper is totally airtight and does not need dope for sealing. As a result, the felt pen ink does not run along the fibers as it will with regular tissue.

Tape a piece of condenser paper down over the wing plan and using a circle guide draw in the roundels using a red pen for the center and a blue one for the outer ring. Then use a brown pen to color the entire rest of the top wing covering leaving a one-sixteenth wide blank outline around the outside of the blue. Make sure the brown is smoothly done as possible and extends at least a quarter inch beyond the outline of the wing. Now using the decorated paper locate it very carefully over the top wing structure and glue it in place using thinned out white glue.

Now, carefully cut the top wing loose from the assembled skeleton. The strut system, being a nice set of triangular trusses, will remain in place on the lower wing. Decorate a piece of condenser paper to cover the bottom of the top wing. It has roundels but is not colored brown. Cover the bottom of the top wing, and, when the glue is dry, watershrink the top wing. When shrunk, dry cement the wing back in place on the struts.

Now remove the bottom wing from the struts and remove the fuselage from the top wing. The struts which have been cemented to the top wing should remain nicely in place.

The top half of the wing struts should be colored with the brown felt pen while the

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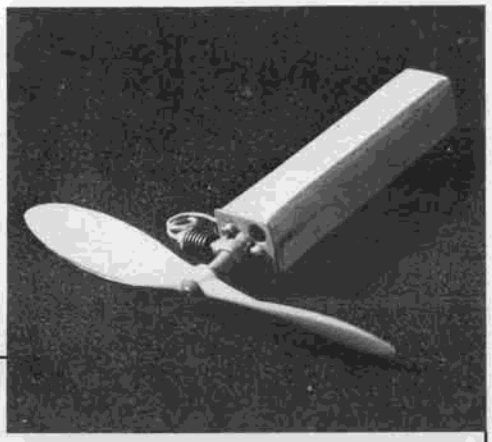
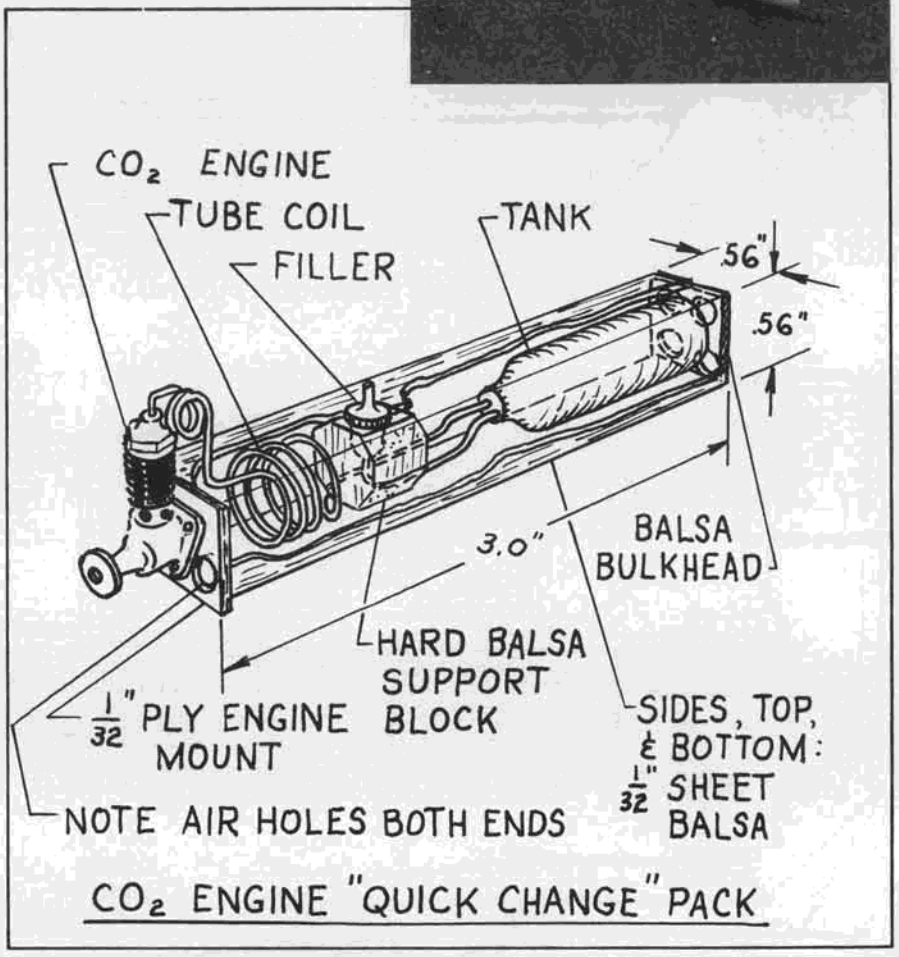


The removable CO_2 package requires a bit of modification during initial construction of the fuselage, but effort is worth the extra trouble. You can remove unit, and put it in another model. This allows you to use only one CO_2 motor for multiple models, and lets you hide the CO_2 filler inside, rather than have it protrude from the fuselage.



The Spider with its CO_2 unit removed for display. Note the placement of the filler tube.

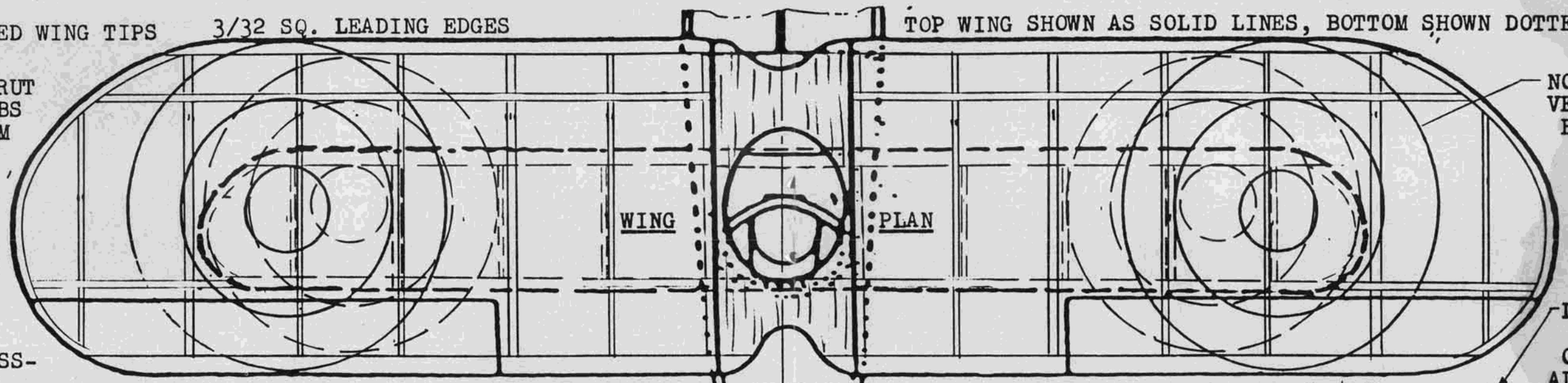
LAMINATED WING TIPS

3/32 SQ. LEADING EDGES

TOP WING SHOWN AS SOLID LINES, BOTTOM SHOWN DOTTED

ROOT AND STRUT LOCATION RIBS ARE CUT FROM 1/16 SHEET, ALL OTHERS FROM 1/32 SHEET

MAKE STRUTS FROM 1/64 PLYWOOD OR THIN MODEL RAILROAD BASSWOOD.



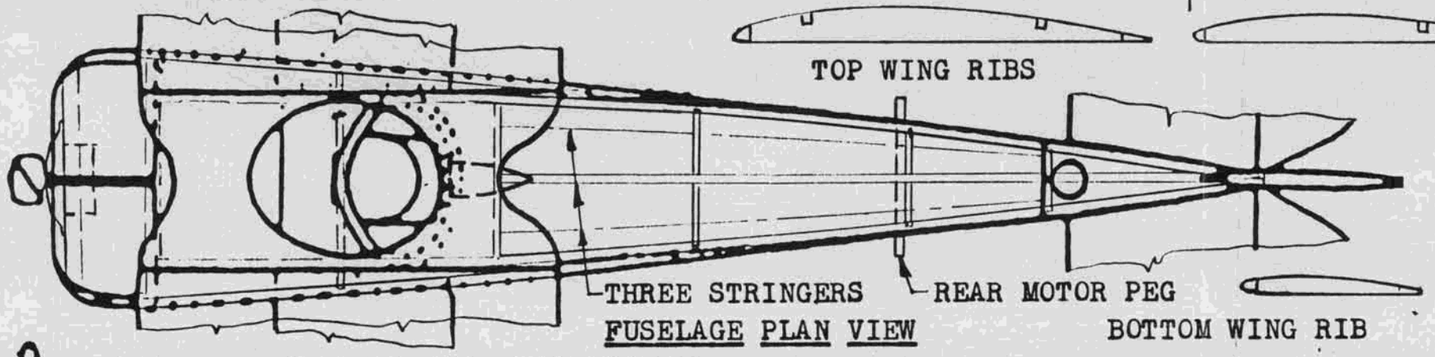
WING PLAN

NOTE THE VERY LARGE BRITISH ROUNDALS ON THE TOP WING.

WING TRAILING EDGES 1/16 BY 1/8.

TOP WING CENTERSECTION IS MADE FROM 3/32 SHEET.

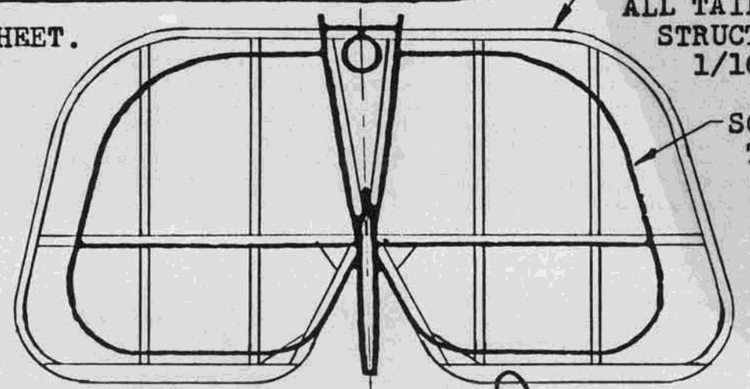
TOP WING RIBS



THREE STRINGERS FUSELAGE PLAN VIEW

REAR MOTOR PEG

BOTTOM WING RIB

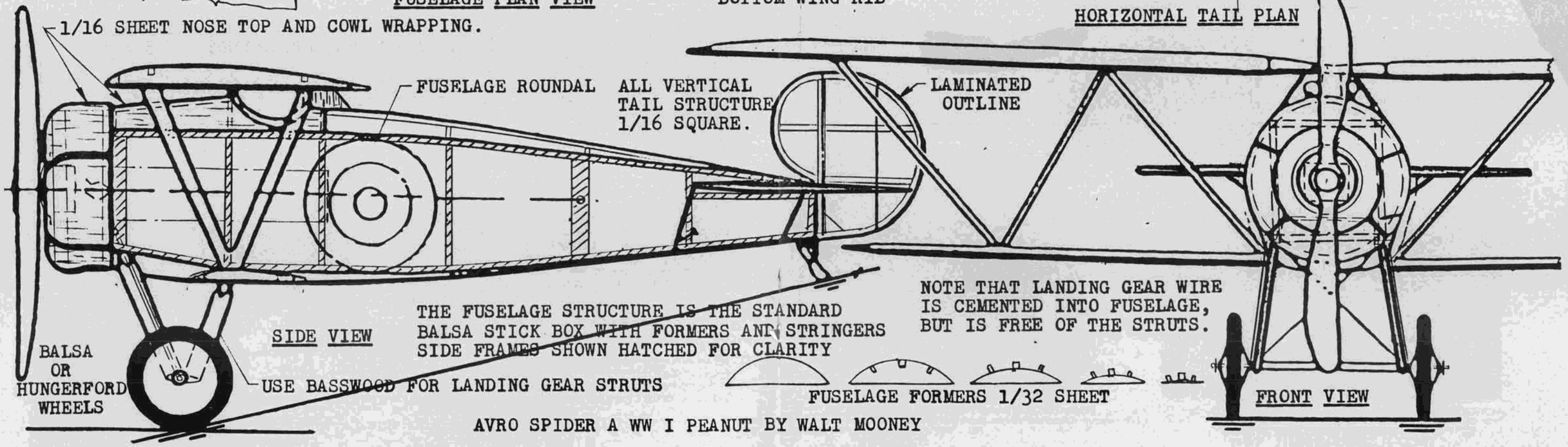


LAMINATED TAIL OUTLINES ALL TAIL STRUCTURE 1/16 SQ.

SCALE TAIL

HORIZONTAL TAIL PLAN

1/16 SHEET NOSE TOP AND COWL WRAPPING.



FUSELAGE ROUNDAL

ALL VERTICAL TAIL STRUCTURE 1/16 SQUARE.

LAMINATED OUTLINE

BALSA OR HUNGERFORD WHEELS

SIDE VIEW

THE FUSELAGE STRUCTURE IS THE STANDARD BALSA STICK BOX WITH FORMERS AND STRINGERS SIDE FRAMES SHOWN HATCHED FOR CLARITY

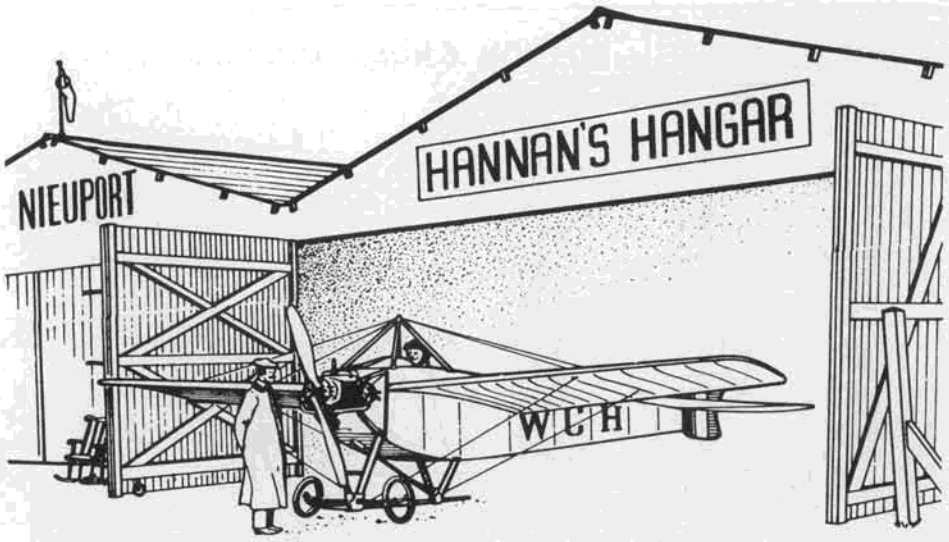
NOTE THAT LANDING GEAR WIRE IS CEMENTED INTO FUSELAGE, BUT IS FREE OF THE STRUTS.

USE BASSWOOD FOR LANDING GEAR STRUTS

FUSELAGE FORMERS 1/32 SHEET

FRONT VIEW

AVRO SPIDER A WW I PEANUT BY WALT MOONEY



"The happiest people are those who are too busy to notice whether they are or not."

• Our anonymous lead-in line this month was found in *Sportsman Aviation Booster*, edited by A. Lee Spencer, of Kansas. Certainly model builders are unusually busy?

HOW ABOUT THAT

We casually mentioned to Walt Mooney that when he drew the little three-view of the Romanian R.M. 12 canard for the December *Model Builder*, he had, among other changes, pointed it the opposite way from the research drawings we had sent him. "Of course," said Walt, "all accepted three-views have the fuselage drawing pointed to the left." Frankly, we had never thought about this, and immediately commenced a search through our archives. Sure enough, regardless or origin, the vast majority of three-views pointed to the left. Apart from a few of our own, we had about given up finding any exceptions, when lo and behold, in a German publication, we found one, a three-view of the Dornier X, pointed to the right.

SPEAKING OF THE "X"

A confirmed rumor has it that a well-known builder will soon have a model Dornier X ready for flight, powered by 12 electric motors and (presumably) a zillion batteries!

ERRATA

The gremlins are active again! In our February *MB* "CO_2 and Wee R/C in Czechoslovakia" article, Stefan Gasparin's miniature engine was erroneously captioned as displacing "100 cubic centimeters." Columnist Bill Warner spotted this incredible boo-boo immediately and wrote in to ask: "Where can I get one of those 100cc CO_2 motors? I would like to try it in my motorcycle. Will I have to use a special CO_2 storage tank the size of the Goodyear blimp to get enough range to go anyplace? Is that a giant coin by the engine for size comparison or is it a garbage-can lid?" Tsk, tsk.

A smiling John Rapillo with his beautiful free flight Curtiss Robin at Mile Square Park.

HANGAR HAPPENING

Frank Scott, of Dayton, Ohio favored us with a brief report about a one-time only model flying session in the new bay of the U.S. Air Force Museum. This model fliers' dream covers 2 acres and has an 80-foot ceiling height. Although a few full-size aircraft were on the floor (a B-58, F-105, F-101, F-94, F-104, C-46, and a C-47), they merely added to the total aviation atmosphere. The air, however, was shared by everything from Sleek Streeks to microfilm models. As Frank put it, even though the opportunity to fly models in the fabulous building may never occur again, "It was fun while it lasted."

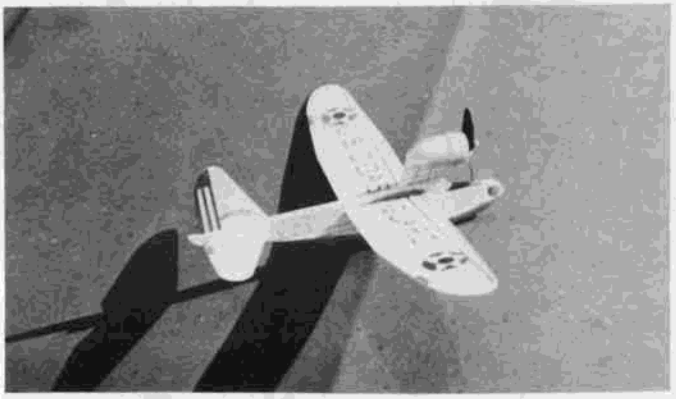
SPEAKING OF INDOOR FLYING SITES

Dr. Martin's *The Hangar Pilot* newsletter informs us that Florida's Charles Slater discovered a long-overlooked place to fly models, New York City's Grand Central Station! It seems that this massive railroad facility closes at about 1:30 a.m. when the last train departs. Apparently New York modelers had never thought about his, but Charles did! Noticing how empty the place was, he wound up his Penny Plane and, with the night crew, the police, and a few spectators cheering him on, soon had his model circling near the roof!

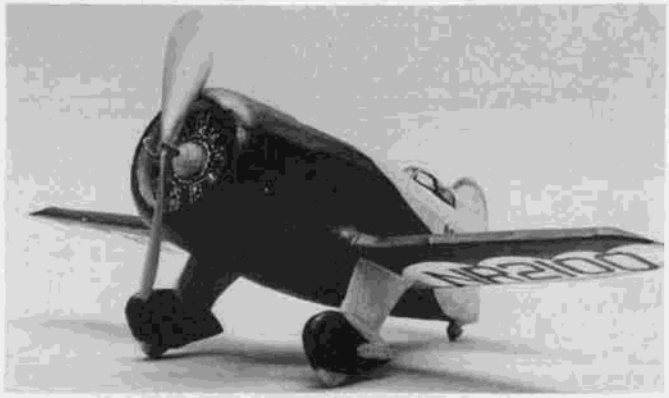
The message to be gained here, according to Doc Martin, is that we may be overlooking some great flying in places not being used for anything else during the wee small hours. Examples might include shopping malls, hotel rotundas, college atriums, bus terminals, hangars, warehouses, auditoriums, etc. Why not, asks Doc, take a nap after supper, get up at midnight, and go out for an all-night flying session?

NEW YORK CONTEST REPORT

One reason Charles Slater happened to be in Grand Central Station is because he was a participant in the New York Columbia Indoor Model Airplane Society December contest. Announced (perhaps tongue-in-cheek) as for "heavy models," rather than the usual gossamer indoor types, classes included Peanut Scale, Bostonian, and a new event called ISL-30, which required the following parameters: maximum span, 30 inches; maximum weight, 20 grams; single or double-covered flying surfaces allowed;



Jake Larson's reproduction American Junior Fairchild Amphibian took him back to the days of his youth. More in text.



Free flight Gee Bee R-1 constructed from a Gene DuBois kit by Dr. Laird Jackson, who is more often identified with control line models.

Bob Bender holds his BFW-30, winner of the first ISL-30 indoor event. See text.

Quarter-scale Spirit of St. Louis by Karl Erik Olsryd, of Sweden. Photo: Ebbe Jensen.

built-up (no profiles) fuselage; and hand-launch only. Unlimited official flights were allowed and scale judging was via the Walt Mooney system of ranking.

Peanut Scale (17 entries)

1. Bob Bender	Santos-Dumont 14-Bis Canard
2. Bill Passarelli	P.A.M.A.
3. Sal Alu	Waco SRE

Bostonian (15 entries)

1. Bill Passarelli	Fat Cat
2. Frank Haynes	Pilatus Porter
3. Vic Gagliano	Boston Beanie

ISL-30 (9 entries)

1. Bob Bender	BFW-30
2. Dave Acton	Found Centennial
3. Charles Slater	A-W Ape

Conclusions: Although we have not listed judging points and duration times, owing to space limitations, the following comments were made: The Charisma bonus factor in the Bostonian class had no affect upon the final placings. Judge Ed Whitten feels it should be increased from the present 30- to 50-percent, to encourage more scale-like models. The Mooney judging system was *not* well received in New York. The new ISL-30 class may be continued with some rules modifications. In general, the consensus was that the New Yorkers favored the more ghostly style models rather than the "heavyweights."

MEANWHILE IN CONNECTICUT

Mark Fineman describes another new competition event for the indoor flier. The rules specify reduced-size models of "Old-timer" gas models, complete with dummy ignition engines, to be flown with rubber power. The most unusual aspect of the regulations is that the model clocking will not begin until the entry has reached its maximum altitude, rather than from launch. The objective is to discourage lightweight "ghost" models, almost the opposite goal from the New York modelers! Well, whatever turns you on.

PROXY PEANUTS & PISTACHIOS PLANNED

Both Doc Martin of Florida's M.I.A.M.A. club and F.L. Van Hauwaert of Belgium's Club de Petite Aviation have announced proxy contests. The Florida Pistachio Inter-Gnats event is scheduled for May 21 and 22, while the Belgian affair will be conducted in August. Both have attracted true international participation in the past. Why not try your luck/skill? For Florida information, send a stamped, pre-addressed return envelope to Doc Martin, 2180 Tigertail Ave., Miami, Florida 33133. For the European event, send three International Reply Coupons (available from most Post Offices at low cost) to: F.L. Van Hauwaert, Grand Place, 1 Box 52, B-4110, Flemalle, Belgium.

PEANUT BUTTER ANYONE?

In thumbing through Gleason Enterprises' Gold Book of Model Plans, we were amused to encounter a page labeled "Peanut Butter & Miscellaneous." It turns out this refers to a series of three-views and plans which have been resized to 13-inch span, thus simplifying conversion to Peanut models. Prices are quite reasonable (many are less than 50 cents per sheet), and the variety is comprehensive. The remainder of the Gold Book features hundreds of model plan listings. A copy of the catalog may be obtained by sending $2 to: Gleason Enterprises, 1106-10th Drive S.E., Austin, Minnesota 55912.

MORE PLANS

Don Mace has added plans for a 24-inch span Caudron Type N to his range of kits

Continued on page 78

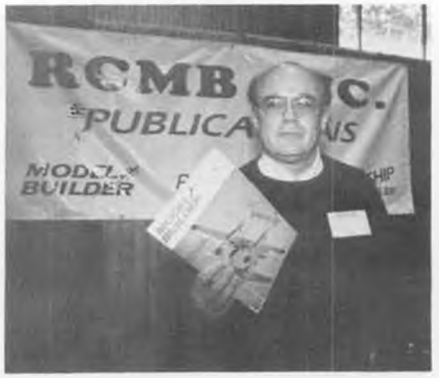
Frank Curzon's huge R/C Farman Mosquito is admired by Mrs. Ian Byers, in Australia.

Stan Fink with his Jodel Bebe Peanut, unusual in that it was scaled up from a Don Mace Pistachio plan!

the INSIDERS

INDOOR FLYING REPORT

By DAVE "VTO" LINSTRUM



VTO in captivity at IMS show in Pasadena, hawking magazines for MB. "Hey, read alla bout it. . . ."

• We promised you an interview with the newcomer on the USA Indoor Team, and by good fortune we were able to conduct that in person while in the beautiful town of Loma Linda, California, last January. USA Team Manager Bob Randolph invited us to his home there, and who should appear but Steve Brown of nearby Glendora, the new boy on the team. Hardly a boy at age 34, he is still the youngest team member and was characterized as a "protege" of Randolph's in the *Indoor News and Views* that announced the team of Cezar Banks, Bud Romak, and Brown. He does admit that he has learned a lot from Randolph and Banks, both former team members who have flown with him at the Santa Ana hangars.

Steve Brown says he is more of an "upstart" than "protege," as he began modeling in 1983, switching from R/C soaring to indoor in 1984 when good soaring sites were lost. His first indoor model was an EZB from Ron Williams' famous book, which also interested him in FAI Class F1D Microfilm models as an eventual goal. He used the smaller, less complex EZB and Pennyplane types as learning tools before building his first F1D microfilm ship in July 1984. This was his own design, with a relatively conservative 8-inch chord wing and 30-inch long body (wings in F1D are limited to 65cm span, about 27 inches) and no gadgets. While he practiced with this, he did not participate in the 1986 Team finals which selected Banks, Randolph, and Calliau to go to Cardington, England.

Brown enjoys the challenge of design, particularly in the development of devices that allow higher flight times than would ordinarily be expected in a given site. An example is the clever variable pitch prop shown in the photo. We were not able to get a close-up of the hub, but suffice to say that it is based on proven concepts from the seventies by Mark Drela and a hub used by Ron Higgs of Canada to set a Category One Record. Cezar Banks, who saw the Higgs hub in action at Cardington, built one before Brown tried it. Both work very well. The launch pitch is 52 inches, but it backs off rapidly to 42 inches as torque actuates the hub through a free rotating shaft. Springs keep the blades at equal pitch. This mechanism allows launch turns/torque that might be used in Cardington to be used to advantage in lower sites, such as the USA Mini-Dome in Johnson City.

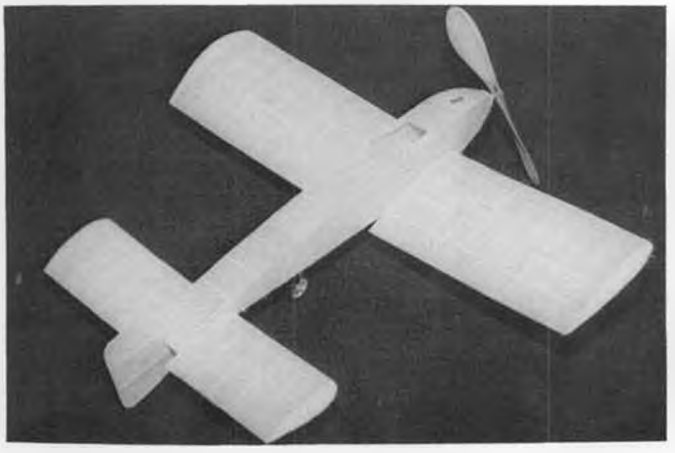
U.S. Indoor Team's new boy, Steve Brown, from California, with F1D prop, held at variable-pitch hub.

While Brown will practice fly with the team at Santa Ana (south of Los Angeles) and San Francisco's Cow Palace (courtesy of Romak) he is studying various ways to maximize turns and minimize altitude so he can ceiling scrub at the 116-foot Mini-Dome during the three-day 1988 World Champs. He believes that this is the key to winning times, when competing with the world's best fliers. Among these is defending World Champion Jim Richmond, whose "soft" props have high flare at launch. This allows max launch torque without gadgets. However, Richmond won his World Champ laurels at a low ceiling site in Japan with a variable diameter prop that allowed climb to roof, descent, and then another climb to cruise altitude. It is likely he may try this at the Mini-Dome.

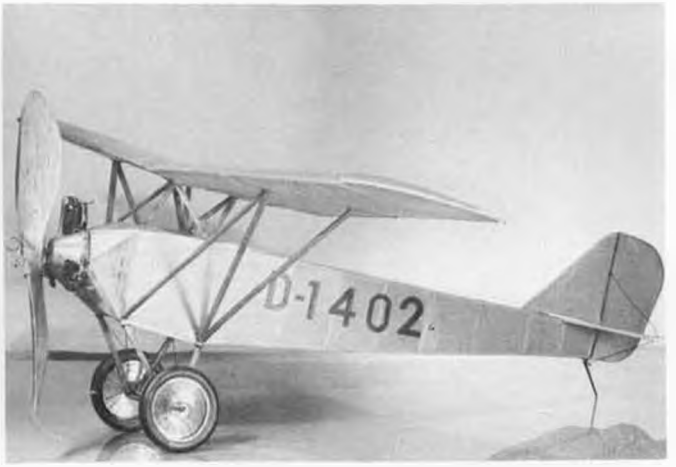
When asked what he liked best about F1D microfilm indoor flying, Brown replied that "it builds tolerance to frustration." We hope that tolerance is an asset to the USA Team this May 28 through 31 in Tennessee. We wish them all, new boy and old timers alike along with the reigning Champ, the best of good luck. Look for a report on this meet, a part of Indoor Week '88, in a future *Model Builder.*

VAN GORDER WINS NFFS AWARD

Tony Italiano of NFFS has announced the



Peanut Bleriot IV by Brent Saulsburg of Amarillo, Texas is from a Benno Sabel plan. Ship is covered with pre-shrunk Peck-Polymer's tissue. No dope. Weight is 5 grams, with Hungerford spoke wheels.



A 1926 Albatros L-66A, a German 35 hp single-seat sportplane by Ed Heyn. Span is 24 inches, making it a Walnut Scale model.

National Free Flight Society Ten Models of the Year Awards, selected by a committee chaired by Jon Zeisloft. You will have to check Stalick's *MB*FF column for outdoor winners, but we can tell you (the envelope, please) that Walt Van Gorder of Cincinnati was recognized for his Manhattan design "Manhattan Pieces." It got that name from the many sources of design for the components. Walt has set many National AMA Records with this straightforward but capable model. He deserves our applause.

Besides this good news, Italiano had some very bad news for indoor fliers recently. As many of you know Pirelli rubber strand has not been available since the late seventies. Fliers who have any are miserly with it, hoarding the stuff like vintage wine. At Cardington in 1986, some teams were reduced to using old broken Pirelli motors from Wakefield flying, stripped to indoor width.

Italiano had our hopes up that Pirelli might again be produced by industrial chemists in Italy using the original formula. However, based on what he learned in a recent trip there, it was but a pipe dream. Environmentalists and health regulatory agencies are adamant about safety in any industrial process. Making Pirelli would require use of acids producing noxious fumes. The safeguards to vent these harmlessly make the process, in small batches required for modeling use, economically prohibitive.

So the bad news is that you can kiss Pirelli goodbye, and concentrate on trying to get the best out of Champion and FAI Supply "made in USA" rubber. If you know of anyone who has a stash of Pirelli, Italiano will make you an offer you can't refuse. With his Italian roots, he simply loves the stuff.

NFFS SYMPO PUBLICATIONS

Out in Silicon Valley, Fred Terzian's house is overflowing with some of the best free flight publications available. His list is far too lengthy to mention them all here, but it includes such items as the Twentieth Anniversary Edition of the *NFFS Symposium Report* and many of the issues leading up to that 1987 annual. The cover is a composite of all 20 of the Sympo Reports, and NFFS Executive Director Hardy Brodersen recounts the two decades in an intro that is heavy with nostalgia.

Fred has foreign pubs as well, including a pair by Vic Smeed of England that belong in your library. *Fifty Years of Aeromodeller* and the *1987 Model Flying—The First Fifty Years* are superb compilations of aeromodelling lore. Many reprints from early magazines circa 1903-1913 are truly hilarious; yet they are the roots of modern, hi-tech modeling.

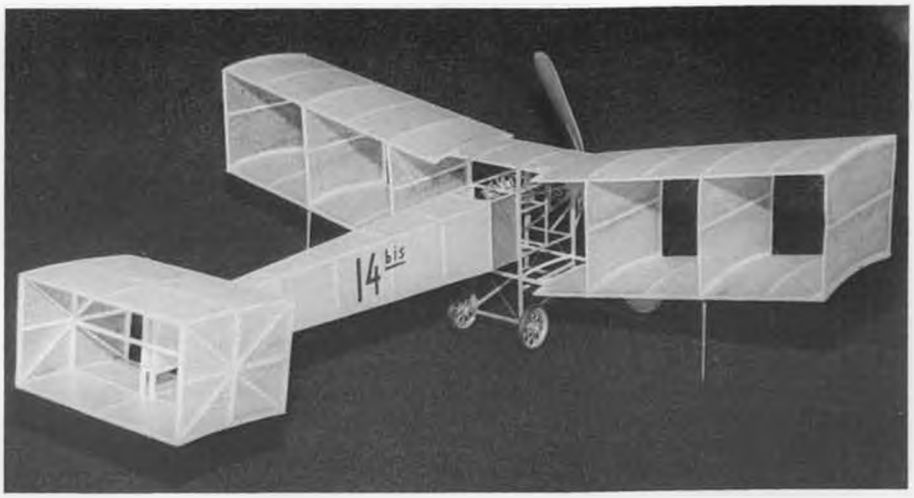
To get a price list of these amazing paperbacks, send a SASE to: Fred Terzian NFFS, 4858 Moorpark Ave., San Jose, California 95129. Foreign readers should enclose two International Reply Coupons instead of a SASE. The NFFS library is the best you can find anywhere.

'EMPIRE OF THE SUN'

Speaking of the best, the National Board of Review has picked this movie as "Best Picture." We could not agree more—it is a super effort by Steven Spielberg which includes magnificent scenes of models and model flying, not to mention some of the best full-scale WWII flying we have seen. The story is set in occupied China, and the youthful star is an aeromodeller. His room is full of rubber scale ships, and he "flies" an Old Timer R/C electric outdoors. While this is historically inaccurate (no Astro motors existed in 1941), the rest is surprisingly authentic. The models are truly realistic.

This should not be a surprise, however. Spielberg went to England's David Baker to authenticate the models used. Society of Antique Modeler member Baker (SAM 35 UK) had to discard about half of them, substituting models from his collection and that of friends. The result was superb, and Spielberg donated 500 Pounds Sterling to the SAM 35 treasury.

What can we say about "Empire of the Sun" without becoming a movie critic? Simply put: SEE IT TODAY. If you have seen it, go again and take a closer look at the models in the bedroom and the "glider" as it soars by with the electric motor spinning the prop for an impressive free flight of fantasy. Spielberg, in that moment, captures the magic of free flight for all of us.



Peanut Santos Dumont 14 bis by Larry Kruse is based on a larger version designed by the master of the canard, Don Srull. Model si covered with Micro-X Early Bird tissue, with one thin coat of Micro Coat to seal surfaces. Model weighs 7 grams; rigging is 1-pound monofilament fishing line. It flies left and does over a minute consistently.

OBSCURE AIRCRAFT

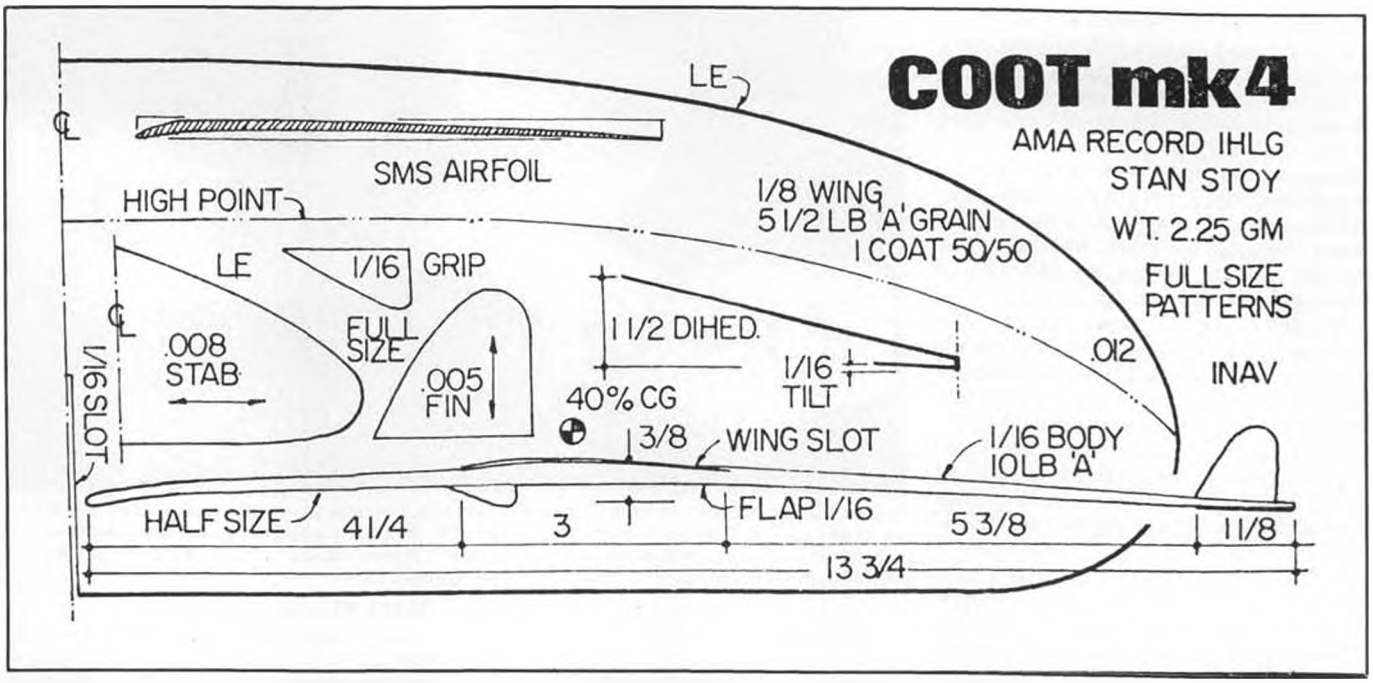
Larry Kruse and Ed Heyn are the only ones to reply so far to our plea for subjects that are obscure but flyable. We have photos this month (the models, not the guys) to tempt you to try them. Heyn has probably built more obscure types than anyone but Walt Mooney. From his shop in Norwood, Massachusetts, come some real oddities. Next month we will list them for you. Meanwhile, send in your own selections for this feature.

HINT OF THE MONTH

We mentioned Pirelli (and Champion/FAI) rubber earlier. If you have some, where do you keep it? Purists store it in the refrigerator or in a cool cellar. Frank Zaic used to bury his in the backyard in subterranean trash cans. Whatever, it keeps better cool, just like fine wines.

Which brings us to our HOTM. Since you can't very well bring your backyard or kitchen to contests, we have stored our stripped working rubber supply in a wooden wine box. This is the type often seen at Christmas, holding three bottles of the fruit of the vine. Buy the box to store

Eight years ago, Indoor W/C produced these stickers seen here on Doc Martin's decrepit, well-traveled foam core model box. It has been around a bit!



rubber, and the wine is free—or vice versa if you are a teetotaler. The thick wood provides good insulation in transit (avoid exposure to sun by putting under towels in summer), and the box is big enough to hold many sizes of stripped rubber. The rope handle makes it easy to carry into the flying site with other gear. The final plus—you can drink the wine (ours was Cella) while designing a new variable pitch hub to beat Jim Richmond!

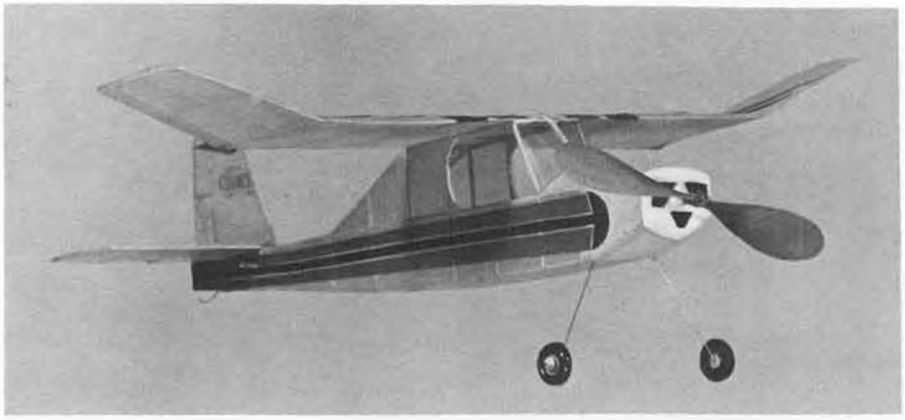
INSIDERS ERRATA

From Larry "Eagle Eye" Kruse comes this caption correction. Whoops!

Re: January '88 "Insiders" column, page 58.

Butch Hadland appears to be holding a model of a Cranwell C.L.A. 3 which was one of the entrants of the 1925 Lympne Trials and is of British origin. The August 1980 issue of *Aeroplane Monthly* has the three-view plus photos, and Richard Ridings new book *British Ultralights* features the C.L.A. on pages 125 to 128.

The plane should be an excellent flier for Butch. It appears to be Peanut Scale. I'm currently building an 18-inch version of the C.L.A. for '88 indoor competition. •



Peck-Polymers' 16-inch span rubber powered Bostonian Pup. The model features controls for easy flight adjustments. Qualifies for Bostonian Contest; needs to be built light for indoor.

INAV editor Rich Doig inspects his FAI F1D microfilm model. Note plexiglass model box side.

Indoor week, last held in West Baden in '83, moves to Johnson City, Tennessee May 28.

1988 USA team member Cezar Banks of San Diego fiddles with thrust bearing on his original Novice Pennyplane.

RAMBLIN' AROUND AUSTRALIA

By STU RICHMOND. . .Continuing his Aussie trek, Stu drops in on Gordon Burford, engine maker.

• The great model engine makers of the world are the Brodbecks (K&B) and Fox in the USA; Irvine, Tidey (Laser), and Oliver in England; Burford in Australia; Pfeffer, Sladky (MVVS), Garcic, Davidovich, and Patrman in Czechoslovakia; Garafoli (ST) and the Rossi Brothers in Italy; Gen Saito, the Enya Brothers, and Shigeo Ogawa (OS) in Japan; Aling Lai (Magnum & others) in Taiwan; and there are more.

In advance of my ramble to Australia, I wrote to Gordon Burford in Oz and said I'd welcome a chance to meet him. He answered that he'd have John Pond with him and they'd be attending the Australian SAM champs and then traveling on to their 40th Nationals to compete and have fun, and if I didn't get to either of those places, I'd be welcome to visit him at home! Gordon Burford is truly one of the world's "greats." In late 1986, in Madrid, Spain, Gordon was honored with a special award by the General Assembly of the FAI for his aeromodeling contributions in the southern hemisphere and the world. But more important, Gordon is an active model builder and flier *today, still*! He's one of us! Although he competed in vintage rubber, Hangar Rat, and an FAI event at this Nats, we actually met over an Australian twenty-dollar bill!

Can you imagine an American postage stamp honoring model builders? Poland *does* have one. Or how about an American twenty-dollar bill honoring Charlie Grant who was truly one of America's *greats* and invented flaps, slats, retractable landing gears, and manufactured model airplane kits by the thousands? Well, Australia has a similar aviation pioneer named Lawrence Hargrave, and he *is* on Oz's twenty-dollar bill! When I asked who could tell me more about Hargrave, it was Gordon Burford who came forward and recorded the following for transcription, which led to a very interesting engine interview that's also included:

MB: Who can tell me about the twenty-dollar bill and these models?

GB: The Australian $20 bill is issued to commemorate the life of our Lawrence Hargrave, a pioneer aviation person who was a model builder. He never made a full-size aircraft. In his modeling career, he made 42 engines (includes inventing the rotary engine of WWI) and upwards of 50 models of orinthopters, box kites (was used by Santo-Dumont and Voison in full-scale early flight). This is the 100th year since his aviation successes. This $20 bill commemorates his progress and aviation contributions as Australia's first aviation engineer.

MB: How about the back side of the bill?

GB: This is Kingsford-Smith. He became a pioneer many years later of long-distance full-scale aviation flying with his "Southern Cross" Fokker airplane. He disappeared later flying a Lockheed "Altair" to England from Australia. He was lost near Malaysia.

Australian engine maker Gordon Burford is probably best known in the U.S. for his Taipan model engines that were imported about 15 years ago.

MB: Do any of Hargrave's models exist today?

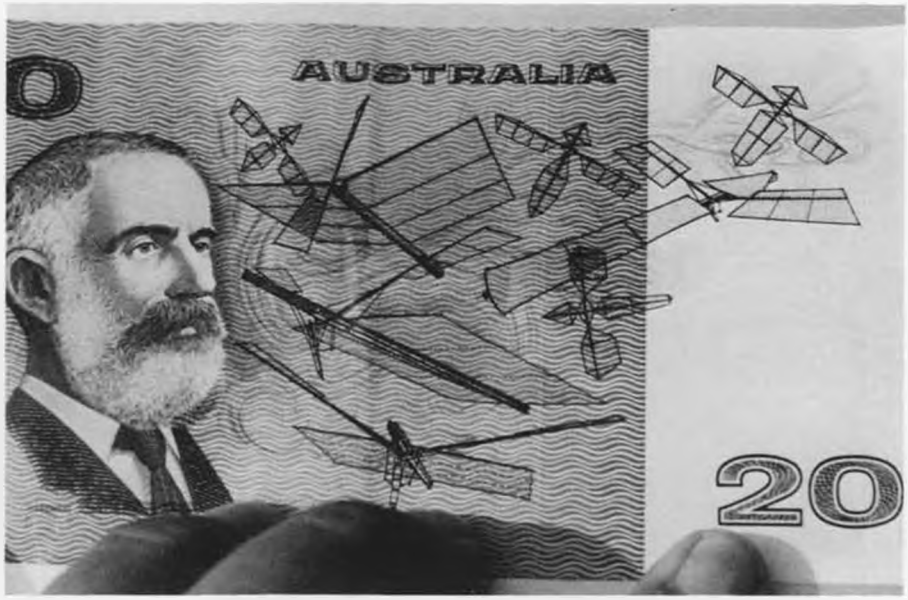
GB: No. A replica of the Hargrave three-cylinder engine exists in the Sydney Technical Museum. All his other engines and models were bought and gathered by the German government before WWII, but they were destroyed during the allied bombing of Germany.

Stu was given this modeler's paperweight by Gordon. Crankcases are cast three at a time, in bunches.

MB: Why did the Germans want Hargrave's models?

GB: The German government was the only one interested in collecting those treasures. Hargrave first offered them to the Australian government. They showed remarkable lack of enthusiasm. He went to the English, but they had their own aviation pioneers. The Germans took the entire collection; a great shame for Australia.

MB: Can we talk about your model engines?



Australian twenty-dollar bill honors their pioneer model builder. See text for details.

Free Flight

By BOB STALICK

• It's May again! Here I sit listening to all of the hype surrounding the 1988 Super Bowl while attempting to put intelligent free flight-oriented comments on the page. Thinking about the warm zephyrs of May is difficult at best at this time of the year. But it seems incredible to me that so much can be said about so little relative to a professional football game, and yet whenever someone asks what my hobby is and I tell them that I build and fly model airplanes, the standard response is something on the order of, "Oh, radio control?" My response tends to be, "No, free flight!" And then I follow this up with my brief 60-second description of just what constitutes free flight. Often, the glaze on the eyes of the person tells me that the brief description has either zipped over his head, or that his interest level has just been exceeded by at least 15 seconds. Occasionally, I find a spark of curiosity. These are the openings that are pursued with a more detailed description. Sometimes the response is similar to, "I used to fly those, and I often wondered whether anyone still did." Or "I know someone who did that when I was a kid." The interested responses can be cultivated, and a number of retired free flighters can be brought back into the fold in this fashion. Every now and then, the person who responds with, "I used to do that, and I still have most of my ships stored in my mom and dad's home," really piques my interest. If the guy is interested in becoming active again, it's easy to move on to the next offer. "Why don't you come to a club meeting or contest and bring some of your old ships. You'd be surprised of the activity in Old Timers or Nostalgia-era ships." If he isn't interested, then he becomes a target for the collector in me. "I'd like to see those ships—how old are they?" Well, you know how it goes. The point of this little discussion, however, is not to promote a return to the hobby but to compare the status of free flight with the status of professional sports. While literally millions of people know what a field goal is, very few have ever kicked one. Thousands of people know what a dethermalizer is and thousands have personally experienced one of their models being dethermalized. The difference is that we have hidden our free flight hobby/sport in the backlots of the country, while football has broadcast itself inexorably into our homes. Are football stadiums more easily found than free flight fields? Do they cost more? Do more people play a football game than "play" a free flight contest?

Now, free flighters really don't want spectators hanging around when they fly. Football players thrive on the public (or at least their owners do). It all boils down to this: football is a sport that spectators want to see not because they are retired professional athletes, but because the game has been packaged for them. The free flight game has not been packaged for the spectator—nor do free flighters even want it so packaged. Free Flighters want to be left alone in their backlots with their fellow free flighters and other travelers. So be it!

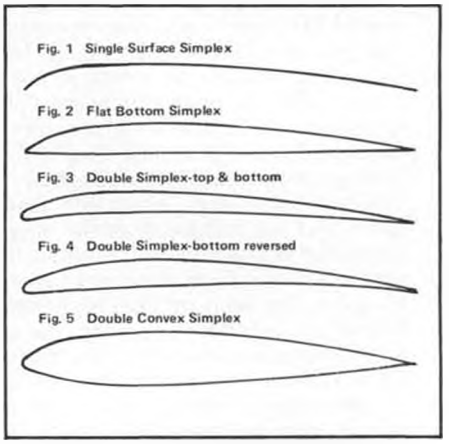
Consequently, the decline of participation in free fight is predictable. No public image, no public participation, and no public visibility are the keystones of the decline. Besides, if you are a first-time observer, after you have seen a few rapid climbing, screaming power models; a few graceful gliders in a thermal; and a few nicely crafted free flight scale models, the contest scene becomes pretty routine and quite boring.

So, now what? Well, the task belongs to the free flighters. It means that if we want to expand our numbers and our influence, we must promote our hobby/sport through increasing the opportunity for participation. In my mind, however, in contrast to recent articles by such luminaries as John Worth and Ron St. Jean, the issue is not an "either-or" scenario. The solution rests with the development of small field events that can be flown at those football stadiums or in the local parks or schoolyards. These are the places where people frequent and can have their curiosities aroused. Once interested, the potential free flighter can count on some regular free flight events that are held in these locations. He (or she) knows that if he builds a small field free flight model, someone will be at the same small field site on the next regularly scheduled date and time to help, to encourage, and to admire his handiwork. Soon, the neophyte's interest and skills in small field flying can be expanded by an invitation to attend the next free flight meet that is scheduled for one of those remote backlots where we hold the "real" events. If this interest grows, then we may have a potential "real" free flighter. If not, we start again.

The missing link is the starting line. Some serious thought to developing a comprehensive small field program that precedes our "real" free flight events needs to be encouraged. Who should encourage it? The answer is really simple, and Pogo said it best: "We have met the enemy, and they is us!"

MYSTERY MODEL FOR MAY

This is a ship that intrigues me. I got a set



Airfoils details--see text for more info.

Owen Moore waits to launch the FAI glider for his son Stephen at the Pacific Free Flight Championships.

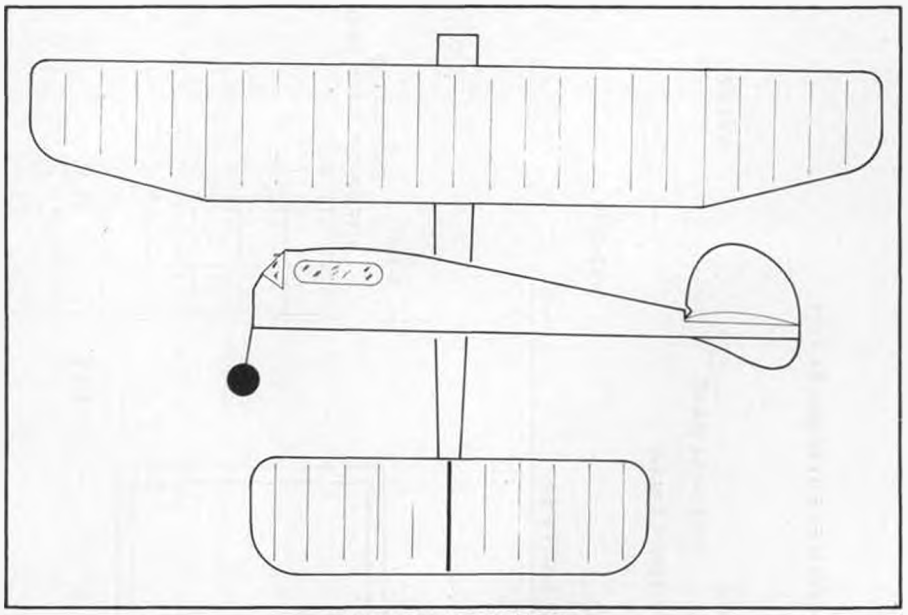
Richard Blackam from Melbourne, Australia flew this Wakefield in the Pacific Free Flight Champs.

Hardy Broderson from the Detroit Balsa Bugs with Weatherbird, a F1C, showing his distinctive banded fuselage. Hardy waits for another chance to max. He was top scorer at the 1987 Pacific Free Flight Champs, held in New Zealand. The event will be back again this year. All photos by Rod Lewis.

of the full-sized plans from John Pond last summer, even though I knew very little about it. It is a Nostalgia Cabin-eligible model and features ROW floats. Meant to be powered by an Arden glo engine, it is simple to construct, as we have come to expect from this outstanding designer. Undercamber in the wing section is featured. So, now you think you know what the name of it is? How about the designer? Do you know both? Great! Now, here is what you do—you write the name of the design and the designer on a sheet of paper and place in an envelope addressed to Bill Northrop, c/o *Model Builder* magazine. Race down to the post office and drop the letter into the slot. If you are correct and the first one in *Model Builder's* office with the answer, you get a free, one-year subscription to *Model Builder*. Simple, eh what?

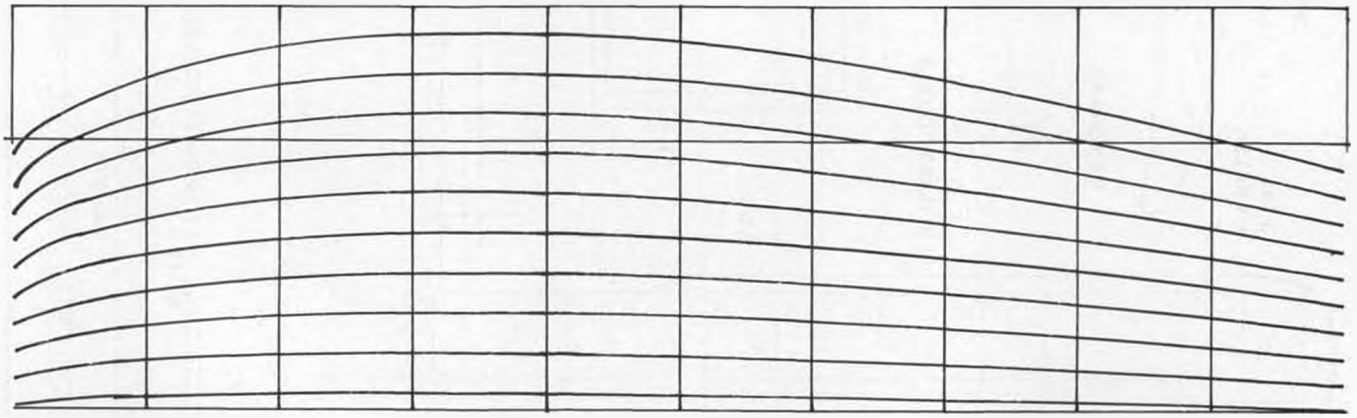
MAY THREE-VIEW, LE NOMADE MULVIHILL by John Lenderman

First off, you should know that this ship has been selected by the National Free Flight Society as one of its Top Ten Models of the Year for 1988. It will appear in the *1988 Free Flight Symposium Report* with a more detailed write-up than you will see in this column. Secondly, John Lenderman is one of this country's outstanding rubber model fliers. John has been a several times member of the USA FAI team both as a Wakefield flier and as team manager. In the NW, John is regularly first in line for the trophies given in all of the rubber-powered categories. So, we are not talking about an average model this month. Le Nomade has the qualities that most Mulvihill fliers dream about—it climbs fast and steady throughout the entire power run, and it glides like a Nordic. The additional quality of the ship that helps set it apart from the rest is that it seems to "thermal-hunt." No nearby thermal seems safe from having Le Nomade occupy its space. I have seen the model perform in all kinds of conditions, and it is a winner!



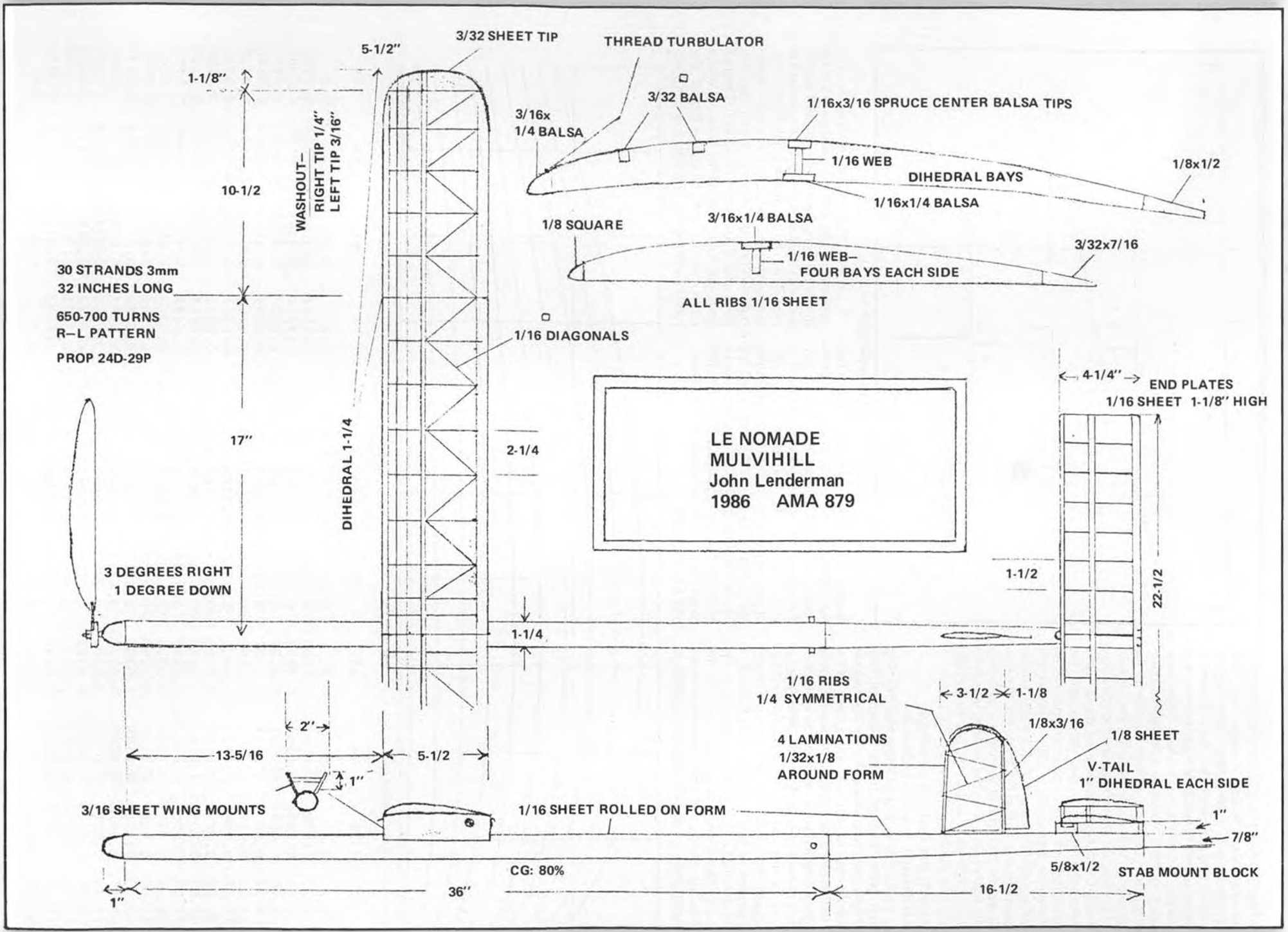
MAY MYSTERY MODEL

I believe that the three-view is self-explanatory and that full-sized plans can be drawn up from them. One tip that I would suggest is that after you have completed the model, you fly it right/left as John does. This means that you build in the washin-washout and the thrust offsets as shown. You may need a bit of left rudder tab as well. Then all you need to do is wind the heck out of the rubber motor and launch. One of the rumors around the Northwest is that John

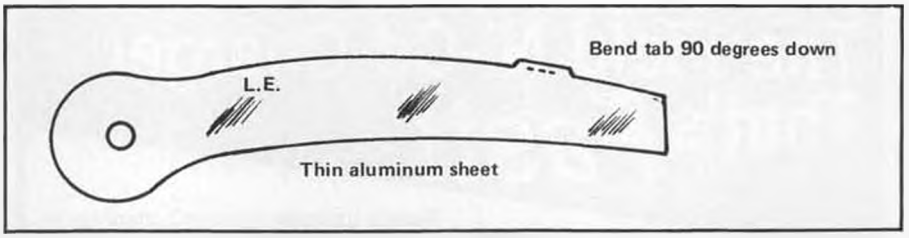


Simplex Airfoil Coordinates

Coord.	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1.25	0.0021	0.0041	0.0062	0.0082	0.0103	0.0124	0.0144	0.0165	0.0185	0.0206
2.50	0.0031	0.0062	0.0092	0.0123	0.0154	0.0185	0.0216	0.0246	0.0277	0.0308
5.00	0.0046	0.0091	0.0137	0.0183	0.0228	0.0274	0.0320	0.0366	0.0411	0.0457
7.50	0.0057	0.0114	0.0171	0.0228	0.0285	0.0342	0.0399	0.0456	0.0513	0.0570
10.00	0.0066	0.0132	0.0198	0.0264	0.0330	0.0396	0.0462	0.0528	0.0594	0.0660
15.00	0.0080	0.0159	0.0239	0.0318	0.0398	0.0478	0.0557	0.0637	0.0716	0.0796
20.00	0.0089	0.0178	0.0267	0.0356	0.0444	0.0533	0.0622	0.0711	0.0800	0.0889
25.00	0.0095	0.0190	0.0285	0.0380	0.0474	0.0569	0.0664	0.0759	0.0854	0.0949
30.00	0.0098	0.0197	0.0295	0.0394	0.0492	0.0591	0.0689	0.0788	0.0886	0.0985
36.30	0.0100	0.0200	0.0300	0.0400	0.0500	0.0600	0.0700	0.0800	0.0900	0.1000
40.00	0.0099	0.0199	0.0298	0.0398	0.0497	0.0597	0.0696	0.0796	0.0895	0.0995
50.00	0.0094	0.0188	0.0282	0.0376	0.0470	0.0564	0.0658	0.0752	0.0846	0.0940
60.00	0.0083	0.0167	0.0250	0.0333	0.0416	0.0500	0.0583	0.0666	0.0750	0.0833
70.00	0.0063	0.0136	0.0204	0.0272	0.0340	0.0408	0.0476	0.0544	0.0612	0.0680
80.00	0.0049	0.0098	0.0146	0.0195	0.0244	0.0293	0.0342	0.0390	0.0439	0.0488
90.00	0.0026	0.0052	0.0078	0.0104	0.0129	0.0155	0.0181	0.0207	0.0233	0.0259
95.00	0.0013	0.0027	0.0040	0.0053	0.0066	0.0080	0.0093	0.0106	0.0120	0.0133
00.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0


3/32 SHEET TIP
5-1/2"
THREAD TURBULATOR
1-1/8"
3/32 BALSA
3/16x
1/4 BALSA
1/16x3/16 SPRUCE CENTER BALSA TIPS
1/16 WEB
1/8x1/2
DIHEDRAL BAYS
1/16x1/4 BALSA
10-1/2
WASHOUT–
RIGHT TIP 1/4"
LEFT TIP 3/16"
1/8 SQUARE
3/16x1/4 BALSA
3/32x7/16
1/16 WEB–
FOUR BAYS EACH SIDE
ALL RIBS 1/16 SHEET
30 STRANDS 3mm
32 INCHES LONG
650-700 TURNS
R–L PATTERN
PROP 24D-29P
1/16 DIAGONALS
4-1/4"
END PLATES
1/16 SHEET 1-1/8" HIGH
17"
DIHEDRAL 1-1/4
2-1/4
LE NOMADE
MULVIHILL
John Lenderman
1986 AMA 879
3 DEGREES RIGHT
1 DEGREE DOWN
1-1/2
22-1/2
1-1/4
1/16 RIBS
1/4 SYMMETRICAL
3-1/2
1-1/8
1/8x3/16
1/8 SHEET
4 LAMINATIONS
1/32x1/8
AROUND FORM
V-TAIL
1" DIHEDRAL EACH SIDE
2"
13-5/16
5-1/2
1"
3/16 SHEET WING MOUNTS
1/16 SHEET ROLLED ON FORM
1"
7/8"
CG: 80%
5/8x1/2
STAB MOUNT BLOCK
1"
36"
16-1/2

John Lenderman launches Le Nomade, the 3-view this month(opposite). The Mulvihill model was moving, so it's a bit blurry.



Here's another good tip from Joe Claussen. This will help you get a few more rpm from that .049 or .051. I've seen it in action, and it does work. See text for more details.

gets more thrust from the knots in his rubber than most of the rest of us get from our pure rubber strip, so wind 'em tight. And if you want to increase your competitive edge in Mulvihill, this is the ship for you.

DARNED GOOD AIRFOILS—EQUIANGULAR SECTIONS

The following article is a condensation of the original presentation done for the National Free Flight Society by Charlie Sotich in the July/August 1977 issue of the *Free Flight Digest*:

"These zip-zap-type airfoils are also known as Simplex airfoils because they can be used in any number of combinations to construct just the exact kind of section that you are seeking. The general notion is that these curves have a very useful characteristic. If you cut off a section from the end of the curve, the remaining curve is geometrically similar to the initial curve, meaning that if you use the six-percent template to cut out ribs for a tapered wing, cutting off the excess length from the trailing edge, all the ribs will be six-percent high with the high point at 46-percent. One template made long enough therefore serves many applications!

"In addition to using these curves of single surface airfoils, they can also be made into double surface airfoils as shown in the sketch. This is done by combining straight lines or other simplex curves with the original upper surface curve. Sketch (Fig. 3) shows a double-surface airfoil whose maximum mean camber always hits at 36-percent—the upper and lower curves both have their maximum height at this point.

"The curve shown in Fig. 4 is generated by reversing the bottom, so that its 'leading edge' is at the trailing edge of the upper surface. This type of airfoil will have its maximum mean camber move back, as more undercamber is used. (Note that this makes for a rather 'droopy' trailing edge.)

"The origin of the simplex curves, for you mathematics types, is the equiangular or logarithmic spiral. It is expressed in this form: $r = ae^{m\theta}$. Two constants (a) and (m) must be determined and 0 is an angle in radians. The base of the natural logs is noted as (e) 2.718, and (r) is a radius vector. Charlie has worked with the equation for a number of years and was able to come up with the table of coordinates that accompany the airfoil sketches.

"In my opinion, one of the best ways of using these Simplex sections is to take a copy of the page from this issue of *Model Builder* and enlarge the curves with a photocopier to give you the maximum chord length you are apt to use. Then, I would glue or trace these curves onto a piece of 1/32-inch or 1/16-inch plywood. Finally, I would cut out the plywood curves and sand the edges smooth. Mark each plywood template with the percent of the section. This way, you can pull them out of the workbench anytime you need an appropriate airfoil, and you are ready to go.

"Hope you enjoyed this little article and find these zip sections useful."

USEFUL THOUGHT

From Tom Winter by way of the Okie Flyer, "I get done what I get done by not doing what I don't do!"

LEARNED OR REMEMBERED

by Ed Lidgard by way of *The Thumb Print*

"A Monokote iron is a good device for: 1. tightening tissue before and after doping, 2. removing wrinkles (from tissue), and 3. adding or removing warps.

"Set the iron at 210 degrees. Use for tissue or silk, as the heat affects the covering when dry and after doping since dope is thermoplastic. Use the iron tip for wrinkles and the whole face for warps. Clamp the iron in place for undercamber and move the surface over the iron slowly three or four times. Do not over-twist! For the upper camber, shim to the desired warp and use your favor-

Doug Galbreath(USA) and Rex Bain(NZ) discuss Doug's F1C power model at the Pacific Free Flight Champs. The black carbon fiber fuselage was distorting in the sun, so Doug painted it white.

John Templeman, NZ F1C team, waits to launch for Ian Weston. Winds came up and caused a bit of a wait for the competitors.

Martin Williams flew F1A for the Australian team at the Pacific Champs. He placed 4th. The glider is called Boris Plasticmac.

ite hold-down device. Pass the iron over the surface three or four times slowly. Do not move until cool.

"The above procedure is safer than gas or electric stove heat and is not subject to over- or under-twisting.

"Another tip: The best way to keep from losing a model is to look where it lands, tell yourself what the sighting point looks like, and repeat yourself. Also look where you are standing when the sighting is made. Carrying a monocular or binocular also helps. A sighting compass is invaluable in the woods, tall weeds, and a must in the fog. So who looks for models in the fog? Me, when I lose one at dusk and go out in the a.m. to find it when it's foggy—that's who!

"Test flying. Test flying without knowing the angular difference, CG, and thrust offset is ridiculous since there is no basis for intelligent trim changes unless these facts are known.

"Weight of silk. Silk is equal in weight to tissue and may be a tad lighter if doped correctly. The method is to dope onto a piece of toilet tissue about 1-1/4-inch wide. Saturate the full width of the tissue for the first one-inch, and draw the tissue over the covering. Keep adding dope when the soaked area gets down to 3/8 inch. If you make a puddle by dropping too much on the covering, just pass the tissue over it. The tissue will suck the dope up so it doesn't make a blob on the inside.

"If you wonder whether silk is worth the trouble, just make a test panel, dope it, and tear it off."

COX GREY PROP MODIFICATIONS
by Joe Clawson

From the pages of the *Brainbuster Newsletter*, Newport News, Virginia, comes the following tip for anyone interested in increasing the performance of his 1/2A Cox Grey Props. See full-sized template elsewhere in this free flight column.

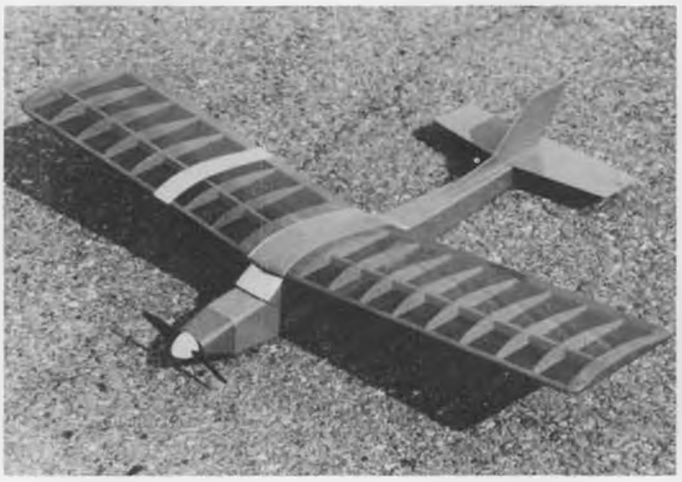
"The template will fit any Cox grey prop from 5-1/4 inches through 6 inches in diameter. Cut template from thin aluminum sheet. Place on back of the prop with pin in the shaft hole and bend tab along the leading edge. Press template against the back of the prop and scribe along trailing edge of template. Remove material with knife or file and shape remaining blade to airfoil shape. Balance it!

"This modification will compare to the Top Flite series which are no longer made. Our 5-1/4-inch Cox grey turns 21-23 K and pulls stronger than the Top Flite on our spring scale. Once set up, props can be refinished in about 30 minutes."

PRESS RELEASE FROM THE NATIONAL FREE FLIGHT SOCIETY

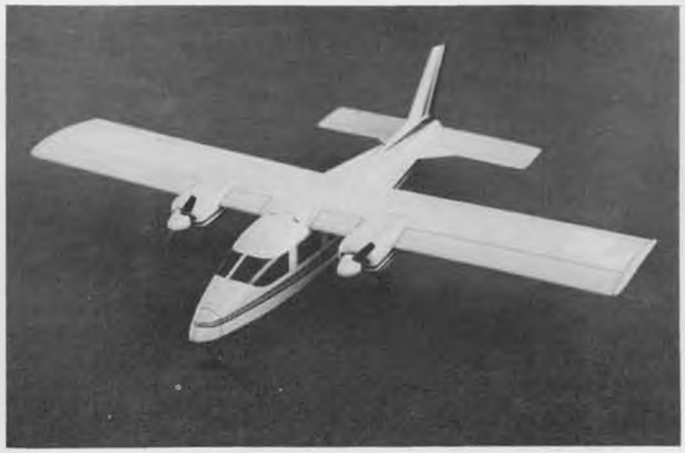
For the past five years, Don Hughes has been serving as the membership chairman of the NFFS. Since he originally agreed to a two-year term, he has decided to retire. Taking Don's place will be Phoenix Free Flight sparkplug, Sal Fruciano. From this point forward, any membership business should be conducted with Sal at 6146 Cactus Wren Rd., Scottsdale, Arizona 85253; phone, (602)948-5798. NFFS dues remain the same at $15 per year. My appreciation goes to Don for his years of unselfish service. I wish Sal well.

ELECTRIC POWERED AIRPLANE KITS



THE ASTRO SPORT

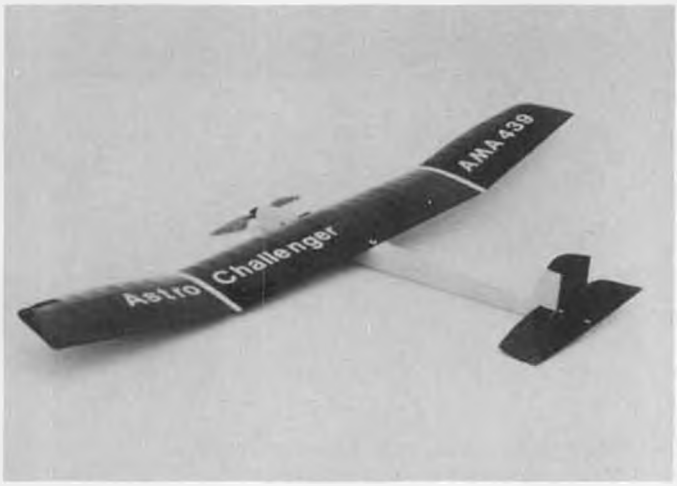
The Astro Sport is a cute little high wing sport trainer that is specially designed for schoolyard fun. Install the Astro Cobalt 020 Motor and you have a gentle and forgiving trainer that is very easy to fly. Install the more powerful Astro Cobalt 035 and it becomes a real schoolyard show-off doing snappy 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**



PARTENAVIA P-68 VICTOR TWIN

Our popular PARTENAVIA P-68 kit has been comnpletely redesigned for the Astro Cobalt 05 Motor. The airfoil section has been changed to the Eppler-195 for improved aerobatic performance. The P-68 has always been a popular model at our electric contests, and in fact an Astro Cobalt 05 powered P-68 won first place in aerobatics at the 87 EAA Electric Championships. The deluxe kit features all machine cut and sanded balsa parts. Wing Span 50 inches, Wing Area 400 Sq.In., Flying weight 4.5 lbs.

Kit # 1013.....$89.95



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

ASTRO FLIGHT INC.

13311 BEACH AVE. • MARINA DEL REY, CA 90292 • PHONE (213) 821-6242

A FEW BUILDING TIPS FROM *THE SATELLITE NEWSLETTER*

One of the nice features that Ralph Prey, editor of the San Valeers newsletter, *The Satellite*, includes in each issue is a building tip or two. This newsletter is one that regularly provides a comprehensive view of the So Cal Free Flight scene. Anyhow here are a couple of the latest:

"1. Stick Glue sold in any stationery and most grocery stores can be used to glue tissue to the frame of models. Rub the stick onto the frame and lay the tissue over it. Press into place. Some brand names to look for: Dennison's Stick Glue, UHU Stick, and Pritt Glue Stick.

"2. Dope bottles can be cleaned for reuse when they are empty by letting them stand open for 24 to 48 hours. Fill the bottle with very hot water and let stand for five minutes. The thin cover of dope inside can be removed. The hot water expands the glass but not the dope, and so the bottle pulls away from the dope."

COTTAGE INDUSTRIES TO ADD TO YOUR LIST

Been wondering where to get those superlight T.D. 1/2A radial mounts? Try K.K. Fags, 236 Thayer St., River Vale, New Jersey 07675. This unit threads into the backplate of the T.D. 049-051 engines. It weighs only three grams, one gram more than the bare backplate by itself. Cost is $4. Fags also sells the Taibi Tank Mount for 1/2A for $8.00, a hand-held balsa stripper for $7.50, a hand-held spring winder for $18.50, and a universal angle sanding jig in two sizes; 12-inch for $22.00 and 16-inch at $28.00. Postage is 75 cents per item except the sanding jigs which cost an added $2.50 each.

New Circle Towhook. Jim Bradley has just entered the cottage industry business with his circle towhook. This towhook has been specifically designed for F1A gliders. It has functions and adjustments for straight tow, circle tow, zoom, and glide turn. Provisions for automatic timer start are also included. Also included with the towhook

IMS COMES TO

Atlanta

April 30, May 1, 1988

Trade-Only Day, Friday, April 29

By popular demand, the International Modeler Show, well known for producing the best model hobby show in the West, is coming to ATLANTA in May 1988 to present the same great model hobby show in the Southeast! More than a hundred major model manufacturers from all over the US have already registered to exhibit at this premier annual extravaganza!

See the latest products and visit with major manufacturers and distributors of:

- ***Model Aircraft • Model Boats • Model Cars***
- ***Radio Control Systems • Model Railroads***
- ***Modeling Accessories***

★ GIANT RAFFLE ★ SWAP SHOP

★ BOAT POND ★ CAR TRACK

★ LIVE INDOOR MODEL DEMONSTRATIONS

STATIC DISPLAY COMPETITION IN MANY CATEGORIES

GEORGIA WORLD CONGRESS CENTER
285 International Blvd., NW, Atlanta, GA

SATURDAY, APRIL 30, 1988, 10 a.m. - 6 p.m.
SUNDAY, MAY 1, 1988, 10 a.m. - 5 a.m.

ADMISSION: Adults $5.00, Juniors (12 and under) $3.00.
Children under six, free when accompanied by an adult.

INTERNATIONAL IMS MODELER SHOW

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and baseplate are autorudder line material, clevis and turnbuckle, all the hardware to mount the towhook and baseplate, plus instructions on installation and adjustments. Weight of the entire unit is 23 grams. Price is $37.50. Jim also markets a d.t. timer specifically for F1A. Electronic gizmo that weighs 17 grams ready to hook up to the 9-volt battery. Send $47.50 for yours. Jim Bradley can be reached at 1337 Pine Sap Ct., Orlando, Florida 32825.

TIME TO CLOSE

I was looking through some old publications the other day, you know, *Air Trails*, pre-war *Model Airplane News*, *Aeromodellers* from the 1950s, and the like. I do that when I get myself ready for the spring building season. I found that ship that will fit the new Ignition Nostalgia event—Oldershaw's Glory Bee B Class streamliner. I also ran across the following bit of flying field whimsy, so I'll leave you with it to end this month.

PROCEDURE FOR STARTING ENGINE AT THE FIELD

1. Fill the tank with go-juice.
2. Connect power source to glo-plug unless it's a diesel, then don't bother.
3. Flip propeller smartly or dumbly.
4. If engine makes noise, check to see if propeller is turning.
5. If propeller is turning, disconnect power source and make frantic motions to let everyone know you're going to launch the model.
6. After launch, have a cold brew to control shakes.

Thermals to all until next month! •

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

know how to run a fly-in. The guy to contact for flyers is: Bill Hammock, 2609 Catalina Drive, Anderson, Indiana 46012; (317)644-7307.

July 23-24: C'mon over and help the Puget Sound Rocs (IMAA Chapter #108) make their 6th Annual BIG Bird Bash the best ever. As usual this shindig will be held at the Rocs Roost in Yelm, Washington.

Flyers are available from me or Bash Boss Bruce Gale, 811-9th Avenue, S.W., Puyallup, Washington 98371; (206)845-0705.

THOUGHT OF THE MONTH

All your stick twiddling is in vain if an angel pees in your tranny.

Al Alman, 16501-4th Avenue Court East, Spanaway, Washington 98387; (206)535-1549. Don't put that brand new plane in jeopardy. If you've been hibernating and haven't flown since last year, get the cobwebs out by flying your old standby first.

And don't forget to keep those cards, letters, and photos coming; your input is needed, and appreciated. **THINK SAFETY!**•

B-36. . . . . . *Continued from page 15*

bomber, Tony scrutinized the runway area for rocks, debris, and uneven surfaces—the relatively small nose gear could be damaged from an impact with such a hazard. Satisfied that all was right with both aircraft and runway, the on-board radio and motor safety switches were activated. This was the moment of truth. Addie called out a final "All clear!" and Tony applied full power. The only sound was the muffled hum of the cobalts and the whoosh of six propellers as the B-36 quickly gained speed. Tony kept her on the ground for about 200 feet, then rolled another 30 feet with the nose wheels a few inches high, and at last he pulled up into the sky with a powerful, sweeping turn to join the other aircraft flying nearby. "Just like Jimmy Stewart in *Strategic Air Command*," said Tony, who watched the film three dozen times just to get it perfect. For five minutes it was 1949 again. The B-36 soaring through the sky, making phantom bombing runs, indistinguishable from its long-gone ancestors. The model performed flawlessly on two, four, and six motors, easily keeping pace with the gas-powered jobs, but with no mess, no smoke, just an elegant turbine-like whine. As Tony felt the power just starting to drop off (no sudden cutting out), he guided the big ship home for a picture-perfect three-point landing, rolling to a stop in front of the applauding crowd. Several more textbook flights were made that weekend, and when Addie, Tony, and their crew returned to Burbank, they brought home the trophy for Best Electric Aircraft.

A few weeks later at the annual Marine Corps "Toys for Tots" Fun-Fly at Sepulveda Basin, California, the mighty B-36 took to the air once again. This was the first time

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the flaps were tried, and fully extended, they allowed Tony to make slow, stable landings with very short rolls. On the third flight of the day, a motor power connector came loose and the plane took off with only four motors running, but there was enough power to safely make a couple of low passes and come home again. That problem was quickly remedied, and the fourth and final flight of the day was without incident. On every occasion that it has flown, the big B-36 has been the hit of the day.

Addie and Tony Naccarato set out to prove that giant electric flight is not a future possibility, but a reality of today. Very large electric planes are a practical, realistic, and exciting alternative to combustion power. Addie and Tony have proven that clean, quiet, efficient electric propulsion can be the most responsible power source available for flying model airplanes. If nothing else, they have proven with their B-36 Peacemaker, it can be a whole lot of fun. And that's what flying models is all about! •

Engines. . . . . . *Continued from page 37*

pump. So the engine was advertised as follows: "HINESS ARROW .60 SCHNUERIE—ALL HAND MADE—INTERNAL SUPPER CHARGER;" the spelling errors are theirs, and they likened the gear/pump action to super charging! The Arrow .60 is an absolute beauty compared to the Soviet engine, and when, in 1975, Polk's marketed it under their Aristo-Craft Distinctive Miniatures name it retailed at a very modest $175, and it came packed in a handmade box wrapped with two shades of green fabric. The labeling/markings were cut from printed cardboard and carefully glued to the box. The instruction sheet called for break in with fuel containing *castor* oil and the muffler left off for maximum heat scavenging; smart with *any* new engine. 30-percent nitro fuel supposedly gives 14,000 rpm with an 11-7-1/2 and 12,500 without nitro.

If you find a new Hiness Arrow .60 today, it's worth two to three times the 1975 retail. And, if you're going to the Soviet Union on vacation and want to do me a *big favor* (like bringing out my original Kratsnorutskij 10cc past the machine guns) please write me care of our favorite magazine, *Model Builder*! •

P-30 Fiesta. . . . *Continued from page 45*

part meant dealing with excessive drift, and the last two hours or so were delightful, almost like a nice day at Taft! Some of us had come 80 miles or so to participate, so it was a long day. But at the end, nearly everyone was smiling as the awards and merchandise (very generous industry support) were handed down. A look at the results shows just how excellently things went. Notice, please also, that five of the first ten places went to our women aeromodelers! That's what Pee Wee 30 and P-30 are all about:

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Two things can be said: P-30 is firmly established as one of the most interesting and challenging events in recent F/F history. *No one* has really got a lock on it, otherwise, the models would be much more alike than they are. Two, Pee Wee 30 has matured rapidly and allows competitive flying with virtually any design from any era, whether OT, Nostalgia, or Modern. The modifying (and fun) quotient appears to be the very even performance potential of the .020 Cox Reed Valve power unit, the ROG phase, weight rule, *and* engine run/scoring procedure. This is heady, promising stuff for all of us. And it is safe, quick, and cheap. Can an all-30 Proxy/Championship be far behind? Format: P-30, Pee Wee 30, Electric 30, CO_2 30, Towline 30, OT Pee Wee 30, Texaco OT 30, R/C 30, Rocket 30, Nostalgia 30, Hand-launch 30, Catapult 30, etc.! Sponsors: *Model Builder*, VTO, San Diego Orbiteers, the Industry. Site: Taft. See you on the dirt!•

Simply Scale. . *Continued from page 29*

cent issues have been extremely informative as to what is happening within the scale fraternity, where scale has been, and where it is going in the future.

The purpose of NASA is stated as being to "encourage, promote, and advance all phases of scale aeromodeling." To this end, I would encourage you as a scale modeler to look into joining NASA. The dues are minimal, only $6 per year. And with your new subscription will come an attractive NASA stick-on decal, a copy of the NASA Scale Data Source List, and a subscription to *Replica*, distributed on a bimonthly basis.

To join, send $6 (Make checks payable to National Association of Scale Modelers) to the Secretary-Treasurer, Bert Dugan, 11090 Phyllis Dr., Clio, Michigan 48420. Please include information on your full address, phone if possible, AMA number, club name, and your main areas of interest in scale modeling; i.e., FF Scale, CL Scale, RC Scale, Giant Scale, Scale Sailplanes, etc.

CONVERSE '88

A reminder to those scale fliers out there who enjoy the big birds. IMAA Central Indiana Chapter 48 will be hosting their 7th annual Giant Scale Fly-In at the Converse Air Field in Converse, Indiana, on June 11 and 12. This is the same club that did such a

great job last year hosting the IMAA Festival at this site.

I really enjoy this fly-in, and I'm sure you would too. If you'd like more information, contact Bill Hammock, 2609 Catalina Dr., Anderson, Indiana 46012; (317)644-7307. Hope to see you there!

RCCD BIG BIRD BASH

Speaking of Giant Scale Fly-In's (I'm really not trying to steal Al Alman's job!), a local one coming up for us here in the Detroit area also on June 12 is the Big Bird Balsa Bash hosted by the Radio Control Club of Detroit. Held at the 27 Mile Rd field, it's always a good time for those of you in the Detroit area. For information, call Ed Kowalski at (313)548-8062.

Until next time, Keep It Scale and Simple! Cliff Tacie, 49404 Michelle Ann Dr., Mt Clemens, Michigan 48045 •

Choppers. . . . *Continued from page 23*

whether or not the Stork can do successive 10-foot loops, I don't know or care.

There's something important to keep in mind here. The Stork is now Hirobo's primary helicopter design. They've made the commitment to it in tooling, design, and marketing. There are other models like the Hawk and the Eagle that are variations of this design and use many of the same parts. There are many scale fuselages that Hirobo is making to fit this model. You're not going to get stuck with an orphan. Parts, supplies, etc. are always going to be available for your Stork SE. And in the US no company has established a network of dealers and hobby shops as well as GMP.

I guess what this says is that I like it. •

Avro Spider. . . *Continued from page 53*

top wing is off, and the bottom half of the struts should be colored when the bottom wing has been removed. It is best not to color the struts prior to the initial skeleton assembly because the model cement used can make the color run onto the wing ribs, and it might show through on the uncolored lower surface coloring.

Decorate the fuselage side covering in a similar manner to the wing and cover the fuselage. The top and sides of the fuselage, the top of the lower wing, and the top of the horizontal tail are brown. The vertical tail can be covered with uncolored paper and the stripes put on after covering. The front stripe is blue, the middle is white (uncolored), and the aft is red.

When all the parts have been covered, check to see that all the places that need to be colored are colored. It's tough to try to get a felt pen in between the struts after everything is assembled. Add the rest of the details, such as, the hinge lines, using a thin black felt pen, wheels, tailskid, and tail struts.

If your model is to be powered by a rubber band, a half-inch Williams Bros. thrust bearing is used and fits into a square hole in the bulkhead at the front of the cowl. Install a plastic propeller and rear motor peg in the time-honored fashion.

For the CO_2 installation, a little modifica-

tion is required at the beginning of the fuselage assembly, and a removable CO_2 engine package needs to be constructed. This is a little extra effort but has the nice feature that you can use the engine in other models and its easy to load and the loading valve is hidden instead of on an unsightly stem of tubing sticking out of an otherwise beautiful model as has been published from time to time.

If your model is to be powered by a CO_2 motor, make up the motor package first because some of the modifications to the model are internal and must be made to fit your particular "quick change" engine package.

Basically, the idea is to make a small neat package that can be pushed into the front of a fuselage to be held in place by friction or a single pin, with the engine neatly inside the cowl, and still have the cylinder and the lines and tank exposed to plenty of air. Also, with the package outside of the airplane, engine adjustments and filling must be easily accomplished. The "quick change" package in the photographs has been used in three different airplanes and has been trouble-free. The filler installation is easily supported and very strong, and vibration of the tubing has been pretty well eliminated so tube cracking should not be the problem that it is sure to be with the filler at the end of a long, free stem.

The holes in the engine mount plate and in the bulkhead at the opposite end of the package are absolutely essential to allow free passage of air past the tubing coil and past the tank. This air flow is required to gasify the CO_2 and therefore there must also be an air escape hole from the fuselage itself. In the case of the Avro Spider, the cockpit itself is enough. The tubing coil should just touch all sides of the box, so that it is not free to vibrate. Do not use cement or sealer to immobilize the coil because that will act as insulation and prevent the heat transfer we need from the air flow to the CO_2 gas.

The engine shown is the Brown A-23 and has been a real little jewel.

Have fun with your Avro Spider. •

Feather. . . . . *Continued from page 26*

surfaces. The results will be lighter and much easier to repair and maintain. If you insist on color, you can tint some clear dope with some kind of coloring agent and/or use decorations cut from MonoKote Trim sheets or colored tape.

CONTROL SURFACES

After the tail surfaces have been finished with dope and sanded, the control surfaces can be hinged. The neatest and simplest way to join the control surfaces to the flying surfaces is to use a MonoKote-type hinge as shown on the plans. The only difference is that I use a good quality plastic tape to form a continuous strip on each side of the control surfaces. This method is strong and safe, and the continuous strip reduces turbulence. The control horns are easily bent from small paper clips and should be glued in place after the control surfaces have been hinged, but before the tail pieces are aligned and glued on the fuselage.

RADIO INSTALLATION

The small size of this airplane demands the smallest and lightest radio installation that you can achieve (3 to 3.5 ounces maximum). Radio weight can be minimized by utilizing some or all of the following methods:

1. Use micro servos (not over .65 or .75 ounces each).

2. Remove receiver from plastic case and wedge in place in fuselage cavity with packing foam.

3. Don't use the standard switch arrangement provided with your radio. Instead, ac-

quire a three-conductor audio jack of the Radio Shack #274-296 normally closed variety, and wire your battery pack to one side and your receiver to the other. This unit will act as both charging jack and on-off switch when used with a subminiature phone plug. If you glue a piece of ribbon several inches long to the rear of the phone plug, you will never launch your bird with its receiver off!

4. Wherever possible, remove heavy radio connectors and wire units directly together, avoiding the unnecessary extra weight penalty.

5. Mount servos using servo tape or glue in place with silicon adhesive. Even simpler, servos can be glued in place using CA. If a strip of masking tape is applied to the side of the servo which is to be mounted, CA can be applied; and when the servo is later removed, the masking tape can be peeled off without any marring of the servo case.

6. Be sure that you check the rotation of your servos making sure that the movement of the control surfaces corresponds to the appropriate movement of the transmitter sticks, unless you have a transmitter that features reversible servos.

FLYING

The Feather should balance somewhere between the front edge of the wing spar and 1/8-inch behind the spar. Start with the forward position and move back gradually because this little bird is very responsive. Check for warps and test-fly on a windless day over a grassy surface.

When you have a flat, straight glide, you're ready to give the Feather a hefty toss. Trim in a small amount of down-trim on your transmitter elevator control (to prevent "zooming" into high-angle overhead stalls). Throw the Feather at a 45-degree angle straight away into whatever breeze there might be. It should climb in a straight path until just before it runs out of speed. As you gain skill, you will be able to zero the elevator trim at just the right point to get the plane to transition to level flight without a loss of altitude or flying speed. Once you notice that you have stumbled onto lift conditions, the Feather can be made to circle quickly and flatly into the bubble. The feather is smoothly responsive, and the only caution is that you must fly it fast enough to maintain its flight stability. As with most other high-performance soaring craft, it does not take kindly to being stalled in a tight turn. You will lose several feet of altitude if you do stall, and close to the ground this could be disastrous. So, keep your speed up in low-altitude downwind turns! The joy of this small soarer is that it will respond to very light-lift situations, allowing a skilled flier to float the Feather through the air like magic. Also, the small size and light weight means that you don't need to hire Arnold Schwartzenegger to do your throwing for you—the average, out-of-shape, middle-aged modeler can throw all

afternoon without breaking his body!

A hint on charging these tiny (70 to 100 mA) battery packs: If you will slow-charge them at the 10-percent rate between flying sessions, you can get an hour or more of flying time on a single charge. I have flown for an hour and 15 minutes and still had about 25 percent of my charge left, according to my ESV. You can fast-charge from your car battery, but be careful—these are small cells. A fast charge seems to give about 40 to 45 minutes maximum. Another solution is to carry an extra slow-charged battery in your flight box. Well, that's about all I can think of—the Feather builds quick, so get building! Happy soaring. •

Hannan. . . . . . *Continued from page 57*

and accessories. This drawing, based upon a fine scale three-view by Harry Robinson, of England, is unusually complete, even to featuring directions for making your own spoked wheels. Also available are other plans, rubber and publications for model builders. You can receive a complete price list by sending a stamped, pre-addressed return envelope to: Mace Model Aircraft, 359 South 119th East Ave., Tulsa, Oklahoma 74128. Please tell 'em *Model Builder* sent you!

GONE WEST

Another famous aircraft designer has passed away. Vernon William Payne, best-known for his Knight Twister series of compact biplanes, was 88 years of age. A resident of Escondido, California, Vern had an avid interest in aviation in all forms, including models, and at the time of his passing was planning to market small die-cast metal Knight Twisters. Our condolences to his family and many friends.

MICROWAVE MODEL FLIES

The remotely-beamed-energy-powered model mentioned in an earlier Hangar column has been successfully demonstrated in Canada, according to a report from Ed Whitten. The 14-1/2-foot span craft received its "fuel" via microwaves transmitted from the ground and converted by "rectennas" mounted on its undersurfaces. In theory, such a machine could be kept aloft as long as desired, suggesting that it might perform tasks presently accomplished by space satellites.

OH YEAH?

Vic Nippert ran across this definition in *Jane's Historic Aircraft 1902-1916* (1972 reprint): "HELICOPTER. Any proposed flying machine in which the lifting force is designed to be given by horizontally revolving air-screws intended to lift it vertically from the ground. (An object in which experimenters have as yet failed, and which it seems unlikely that any useful purpose will be served if they ever succeed.)"

ED TONER, INNOVATOR

Captain Ed Toner, now retired from airline piloting, remains one of the most creative and enthusiastic model designers in our audience. His most recent project? A Jet-X powered biplane, Stringless Wonder!

FAC NATS

The Flying Aces Nationals, probably the world's largest gathering of flying scale models, is scheduled for July 8, 9, and 10, according to information from Tom Schmitt. To be held at the National Warplane Museum in Geneseo, New York, the contest is expected to attract entrants from many parts of the country. Featured will be events for nearly every type of Free Flight Scale models, including Peanuts, FAC Rubber, Power Scale, Jumbos, plus the sport-class Embryo Endurance aircraft.

Mass-launch categories will include WWI (multi-wing only), Golden Age, Thompson Trophy, Greve Trophy, and WWII. Prizes to be presented are: Nats Grand Champion, individual class engraved plaques through fifth place, the Earl Stahl Trophy, three special trophies for

models of U.S. Navy aircraft, and, if warranted, a Special Achievement Award. The real bonus, of course, is the chance to meet and share fun with fellow enthusiasts under low-pressure conditions in the best Flying Aces Club spirit.

Reasonable-cost housing and meals will be available. For additional details contact the Contest Director: Allan Schanzle, 20008 Spur Hill Dr., Gaithersburg, Maryland 20879. Please enclose a stamped, pre-addressed return envelope.

HAPPY BIRTHDAY, TOM!

Sir Thomas Octave Murdoch Sopwith has turned 100. Here is a man who was a pioneer balloonist, conducted business with the Wright brothers, gained his pilot's license in 1910, manufactured thousands of aircraft, including Sopwith Camels and Triplanes during World War I, competed in America's Cup yachting events in the 1930s, developed the Hawker Hurricane, so vital in the Battle of Britain, and as Chairman of Hawker-Siddely contributed to the development of the Harrier vertical take-off and landing planes. Truly a remarkable career spanning nearly the entire history of aviation.

AJ AMPHIBIAN

Also submitted by Jake Larson was the photo of the American Junior Fairchild Amphibian model shown in one of our photos. Larson had fondly remembered this model from his youth and contacted the present operator of American Junior Aircraft Co., Frank Macey, for more details. Not only did Frank recall the model, he sent Jake a ready-formed wing for one, and the remainder was painstakingly reproduced complete with every panel line, rivet, and marking. Although the original had incorporated a stamped aluminum engine nacelle, Jake made a close simulation from a model rocket nosecone. Having laboriously completed the nostalgic little craft, Jake could hardly wait to fly it, and as he reported; "Oh, boy! What emotions! The plane flew beautifully, and as with *all* my American Junior planes, headed for the nearest tree. I felt six years old all over again—really! Same anxiety, same thrill, and same panic over trees. I got a lot of razzing from the guys at the hobby shop where I work part-time. I guess I did get pretty excited at that, but, then, it is not often a guy gets the chance to drop back and be a six-year-old again." For reactions to this and other incidents relating to trees, tune in to next month's Hangar column.

MERRILL HAMBURG

Robert A. Lockwood suggests a tribute to Merrill Hamburg is long overdue. During the 1920s, Mr. Hamburg was instrumental in introducing thousands of youngsters to model building through his series of arti-

cles in *The American Boy* magazine. Among them was Robert Lockwood who recalls: "His first article gave instructions for building a Baby R.O.G. It sent every kid absolutely "bonkers" in the town where I was raised. Mr. Wise at the local hardware store provided the Ambroid glue (we always checked before leaving the store that it was still liquid, rather than a solid mass at the bottom of the can). Nobody in our town had ever heard of balsa wood or Japanese tissue, so we had to find substitutes. Mr. Wise also sold us a bamboo fishing pole which we cut into useable lengths, providing us with a lifetime supply of bamboo.

"All of the supply problems we encountered were solved by a kit that Mr. Hamburg offered through the American Model League of America for $1 (as I recall). A dollar was a lot of money in those days; however, a 1928 book Hamburg wrote reported that 75,000 kits were sold in an eight-month period. And don't forget that the kit included *everything* needed to finish and fly the model.

"Would you believe that our school opened the gymnasium an hour before school each morning so that the kids could fly their Baby R.O.G.s? I can't think of anything that had a greater impact on the children of that era. Certainly Merrill Hamburg deserves more recognition than he has received."

Naturally, we refer to the amazing half-size Mosquito featured in one of our photos. Builder Frank Curzon, of Australia, has been flying this remarkable model for some years, and also has a one-third size Bleriot, so he does "think big." He admits that his wife grew tired of finding one of these productions on the bed, and suggested an alternative storage place. In Frank's words, "How selfish can you be? To think of that lovely Bleriot in a cold, damp garage is totally out of the question! However, being British and supposedly therefore a master of the compromise, I'm having the bed moved into the garage."

SIGN-OFF

As can easily be seen, our readers supply the majority of the material for this column, making assembly of it a real pleasure. I'm made constantly aware of a little quotation found in William Strunk's book *The Elements of Style*: "Writing is an act of faith, not a trick of grammar." •

ARFs..... *Continued from page 27*

We have listed the main points desired in a "perfect" trainer, but there are many more minor points which we will not take up at this time. However, the point of all this discussion about basic trainers is that I recently came upon what appeared to be a virtually perfect basic trainer, and, of course, it most definitely was in the category of Almost Ready to Fly!

THE HEADMASTER 40 A.R.F.

Top Flite Models, Inc. has recently introduced a new version of Ken Willard's venerable Headmaster trainer, heralding this new ARF as a "supertrainer." This writer was able to gain possession of one of these promising models, and, to say the least, on opening the rather large box even these jaded old eyes did a double-take! Inside the box was what appeared to be a completely hand-built Headmaster trainer, not made of plastic, or foam, or an exotic combination of space-age materials, but of good old balsa, plywood, and heat-shrink covering. Were it not for the beautiful and classy red, white, and blue color scheme incorporated in the tough film covering, I would have without doubt assumed that this model was lovingly built by a talented modeler right on his building board. Suffice it to say that structurally the model left nothing to be desired from the standpoint of strength and light weight.

The Headmaster in its original kit form has been around for years, and it has always been one of the few basic trainers which met my exacting standards for the novice pilot. However, being made available in ARF form was the answer to my prayers. After all, here is a way we can get our student into the air with just a minimum amount of assembly work, rather than the weeks of agony and effort he would need to expend in assembling a standard kit. No sanding, no mess, no marital spats because of absence from the family circle evening after evening for weeks on end. And with minimum effort the end result should be straight, strong, and supremely airworthy. No more warped wings and two pounds of lead in the nose because of poor building practices.

Anyway, I headed for the workshop and commenced to find out if this ARF was as good as it looked in the box. The first thing that impressed me was the complete sixteen-page assembly guide. While this manual is very comprehensive and is packed with clear photographs and drawings covering the assembly thoroughly, the beginner is "urged to seek and use experienced assistance in the assembly and flying of this airplane." After all, beginners with no modeling experience should receive some guidance from the flying instructor during the assembly phase of his first R/C airplane.

To say this model is built up of balsa and ply is quite an understatement. As a high-class touch, the horizontal stabilizer is of framed-up construction, rather than just a slab of balsa. This is an example of the lack of shortcuts in the manufacture of this ARF. The light stabilizer helps battle the beginner's (and many expert's) bugaboo; tail heaviness. The wing is of conventional rib and spar construction, with a wide balsa-planked center section, making for great strength and lightness, the two best allies a pilot can have in his airplane. There is an absolutely complete set of hardware, and everything falls into place perfectly. No sloppy mismeasurements here, every single pre-drilled hole is right on. Another example of the thought and care that went into this model: as I reached for my hand grinder to put a flat on the nosegear strut so the collar would lock into place, I found that the flat had already been ground for me.

The fuel tank supplied appeared to be of very high quality, but seemed to be about eight ounces in size. If you want a longer engine run, there is room in the fuel compartment for at least a twelve-ounce tank, so you have leeway if you want to increase the length of your engine run. Speaking of the fuel compartment, this one has a nifty cover that comes off by simply removing a few screws. The fuselage is built with enough ply to make it extremely strong, and another bit of forethought is the incorporation of large lightening holes aft of the cabin area. The main landing gear is of the torsion bar type, and the wheels furnished are of soft sponge material, which are intended to be low bounce for gentler landings. Push rods are prefabricated and ready to use, and the nose wheel and throttle rods have "Z" bends preformed. The latter two rods fit into pre-drilled holes in the firewall and forward bulkhead precisely, and no additional fitting is required. I completed the airframe assembly, installed my Airtronics Championship Series radio, mounting three servos on the ready-made plywood servo tray, and a fourth servo on the aileron servo tray. My brand new O.S. .40 FSR ABC two-stroke engine was mounted on the sturdy fiber-filled motor mount, followed by application of a few pressure-sensitive decals which completed the assembly.

At this point I stood back and admired the finished Headmaster 40 ARF. I would hardly believe that it went together in only about four hours. Surely any beginner would be able to complete it in no more than a couple of evenings. The completeness of this model is really wondrous. Even some additional covering material is provided should any repairs be required! (Note: this is very low-heat material, so be careful when applying an iron.)

Now for some measurements, so out came the tape measure and kitchen scales. Top Flite specifies the wing span as 59-1/2 inches, but my wing measured exactly 60 inches (all the better). Top Flite also lists the wing area as 714 square inches, but my measurements came out at 731 square inches! The ready-to-fly weight is supposed to be between 5-1/4 and 6 pounds, and my Head Master 40 tipped the scales at 5 pounds, 14 ounces. The CG is marked directly on the fuselage, and no corrections were necessary, as the balance was right on. It was uncanny the way this model more than met my demanding requirements for the "perfect" basic trainer! Is there sufficient wingspan and wing area? Yes. Enough dihedral? Yes. Tricycle landing gear? Yes. Fuel tank hatch? Yes. High wing location? Yes. Wood construction with shrink-film covering? Yes. Dazzlingly bright color scheme? You bet! Only one thing left to do, find out how it flies!

FLIGHT TESTING

THE HEADMASTER 40 ARF

Arriving at the field on a clear, sunny, and windless morning, the Headmaster 40 was

prepared for flight. Until it was announced that this was a state-of-the-art ARF, all fliers present assumed it was a beautifully built conventional model! The O.S. .40 FSR was primed, hand-flipped four times, and, just as expected, it came to life ready for the business at hand. The take-off run was almost boringly uneventful, and the wheels gently lifted off the paved runway. I prepared to correct any out-of-trim tendencies. Absolutely no trim changes were needed, as the Headmaster 40 flew straight and level "right out of the box." The engine, being brand new, was running on a rich needle valve setting, purring contentedly on its five-percent nitro fuel, and the model climbed gently with no turning tendencies. Aileron turns were quite docile, and turns using rudder-only were every bit as stable, confirming my belief that a good primary trainer will fly well without ailerons. Loops were excellent, both inside and outside types, inverted flight was effortless, requiring a minimum of down elevator. Rolls were a bit slipshod, as is to be expected in a model of this configuration, but keep in mind that ailerons were set at minimum throw. Stall turns were outstanding, but snap rolls were non-existent, again due to mild control throws. Spins were rendered only as gentle spirals. A number of stalls were attempted, but all that happened was a lowering of the nose until flying speed was regained, with no disconcerting dropping of a wingtip. After trying every maneuver I could think of, I throttled back and set up for a landing. Steady as a rock, the Headmaster 40 floated in on an ideal glide path. Just before touch down, a hint of up elevator held the wheels off the ground until when the actual landing occurred, and it greased in without the slightest bounce. A short taxi back to the pits, down-trim on the throttle, and the engine quit, right on cue.

Subsequent flights were limited to trainer-style flying; doing an oval racetrack pattern around the field at various altitudes and speeds, executing numerous touch and goes, and generally trying to find faults in performance. I found none and was highly impressed. As ARF trainers go at this time, the Headmaster 40 ARF is absolutely in a class by itself. I have no reservations whatsoever in recommending this trainer to the novice who is seeking a stable, easy-to-fly first airplane which can be assembled in only a few hours. For that matter, even the advanced pilot can get many relaxing and enjoyable flights from one of these models. There's nothing flimsy about it, and with any care it could last long enough to train a whole squadron of beginners. If you're looking for a practically ready-to-fly trainer, you need look no further. •

Control Line. . *Continued from page 19*

ence for teen-agers still at home), or even in a big closet. An outbuilding with a wood stove was my shop for several years. A garage is a natural if you have a way to heat it. The best of all worlds, of course, is a nice basement.

Just about any space can be made to work with some careful planning and organization. And these are key words. Just as *practice* is the key word to success in competition, *planning* and *organization* are the keys to success in building models in confined or less than ideal spaces. I'll add a couple of other key words; *cleanliness* and *safety.*

The shop needs to be planned to make sure that you can find and get to everything you need while you're building. The smaller the shop, the better you need to be organized. Careful use of pegboards, drawers, shelves, and bench organizers (those little boxes of tiny drawers available in hardware stores) will help make the building job enjoyable.

Cleanliness is not just a matter of keeping things looking nice. Some methods of dust control is a must for making finishes turn out right, for example. Glues won't cure properly on dirty, oily, or damp surfaces. Trying to work in a messy shop where tools hide under and behind piles of junk is a nightmare. Always putting away tools after their use, or at least after each building session, makes the next session a lot easier.

The reason for safety in a work space is almost self-evident. No shop should be without a fire extinguisher and some first-aid equipment. Electrical connections should be examined for safety, and the load of any simultaneously used power tools should be spread out among circuits. Knives should be stored carefully out of elbow-bumping reach, and power tools should be out of

reach of children and properly mounted and located for safe use.

Assuming you've met all the above criteria in picking out and setting up your first, or new, shop, what should it have in it?

At the very basic level, you need to have the tools and supplies needed to put modern model airplanes together. For the youngster or novice, remember: *It can be done without huge expense.* We'll list some things here that should be considered basic necessities and then follow with those desirable tools that can make the job easier.

CUTTING TOOLS

In the old days of our modeling, the basic cutting tool was a simple razor knife. There simply wasn't much else for the youngster with a tight budget. Even today, most model airplanes could, if they had to, be built with the use of just this one cutting tool—though the choices of brands and types are now much broader. In addition to your knife, you'll want a drill, scissors, wire cutter, and a small razor plane. A variety of grades of sandpaper from 80-grit to 400-grit will be needed, and sanding blocks are cheap and important for good finish work (you can make one out of a block of wood if necessary).

As your experience grows, you will want to add basic power tools. The most basic and most useful tool for an intermediate modeler is a Dremel Moto Tool or similar grinding tool, which comes with a variety of bits. This is one of those "I don't know how I lived without it" tools. A Dremel Moto Saw or Moto Shop will add the ability to saw single and multiple wood parts and thin aluminum. Again, this will see a lot of use in any modeler's shop. An electric drill is standard equipment in most workshops, model or not. Beyond that, most cutting tools are in the "luxury" class for most hobby modelers—band and table saws, lathes, machine tools, etc. all make model work easier but are not essential.

If you plan to use the modern plastic coverings, you want to acquire an inexpensive modeling iron and heat gun; look in any hobby shop or mail-order house ad for choices, but a household iron will due in a pinch.

MISCELLANEOUS TOOLS

A fairly standard array of normal workshop tools is desirable—pliers, screwdrivers (many CL modelers prefer Allen-head bolts and would use hex wrenches), and so forth can be gathered up fairly inexpensively. Obviously, the miniature variety is the best type for model building.

ADHESIVES

Once again, the old days were different. A tube of Ambroid seemed to be all one needed to build perfectly good model airplanes. Once again, we still probably could build with just one tube of glue but would prefer to use the variety of adhesives now available for a variety of specialized jobs.

I once found myself using seven or eight different kinds of glue in a single airplane; however, I'm down to two or three nowadays. These are what I consider to be the essential adhesives of a modern CL modeler's shop:

Cyanoacrylate: Hot Stuff, Zap, Jet, etc. These are the instant glues that make model

building such a quick affair compared to the old days. They are very lightweight and good for any place where you have tight joints and moderate stress. I always keep on hand a regular thin instant glue, a thicker, gap-filling variety, and a bottle of kicker to make "instant" even quicker. If you're working with foam airplanes, a bottle of foam primer for repair work is helpful.

White glue: Tite Bond, Elmer's Carpenter's Glue, or Pica Products Glu-It. These are very strong, medium-weight glues that are good for such jobs as gluing foam to wood (impossible with cyanoacrylates due to their corrosive effect on foam), wood to wood where weight is not critical, etc. These (particularly Glu-It) are sandable. They should be used in applications where air can reach them to aid drying and where some shrinkage would not be a problem.

Epoxy: Both five-minute and slow-cure epoxies are advisable. The slow-curing variety is best for the most critical joints and those involving hardwood, such as motor mounts. The five-minute variety works everywhere else. Several other gradations are available, but these are the only two essentials. Epoxy (two-part glues) should be used in all high-stress locations such as motor mounts, wing joints, bellcrank mounts, etc. These are the heaviest glues and should be used sparingly and only where their strength is absolutely necessary.

BUILDING MATERIALS

For the modeler working in a confined space or setting up a first shop and trying to save money, wood, covering materials, and finishes (paints, dopes, etc.) are best purchased as needed, though bulk prices on mail-order balsa often are a good alternative for stocking up. People who build mostly from kits will find a large inventory unnecessary. Over time, modelers tend to build up quite an array of these supplies. Don't overlook the need for metal; music wire, tubing, and brass sheet in various sizes.

BUILDING FACILITIES

At the very least, you need a straight, stiff building board. This can be part of or on top of a fancy custom-made work bench or a simple board that can be stored in a broom closet and placed on the kitchen table. But it must be straight, and it should have a soft surface that pins can be put into, such as the Firtex wallbaord available in building supply stores. Jigs, guides, etc. can be added as needed. A good metal straightedge is essential, as are a square and a triangle for checking alignment.

SUPPORT FACILITIES

A vacuum cleaner helps for dust control and a sink nearby also is helpful. A good trash can is eminently preferable to letting scraps drop on the floor. If you're a music lover, a pair of cheap speakers, and a wire to your living room stereo is a divine way to combine your favorite tunes with your favorite hobby.

STORAGE

You'll need to be creative in the use of

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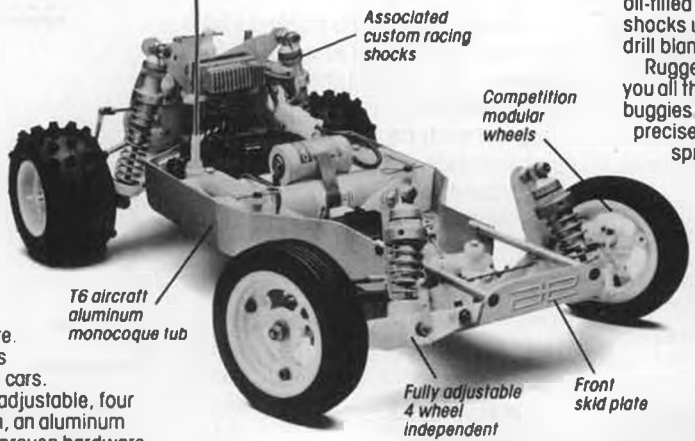
The new RC10 features fully adjustable, four wheel independent suspension, an aluminum alloy monocoque tub and race-proven hardware throughout.



oil-filled racing shocks. These custom shocks use machined alloy cylinders and drill blank shafts for silky smooth action.

Rugged, yet light, the suspension gives you all the adjustability of full size, full race buggies. The A-arm/Ball joint design allows precise camber, caster, ride height and spring rate tuning. Even anti-roll bars and a VariLok dif are included.

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Silverwood, Idaho Welcomes The U.S. Scale Masters To The Northwest Scale Internats

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The Northwest Scale Internats.

June 17th, 18th, and 19th. This year held at Silverwood, Idaho (formerly Henley Aerodrome), and the Farragut State Park.

Sponsored by the Farragut Flyers, the Coeur d'Alene Aeromodelers, and Silverwood, Idaho.

U.S. Scale Masters

For those who take their scale aircraft modeling seriously. And also for those who just enjoy seeing expert enthusiasts displaying their proudest achievements in the beautiful setting of one of North Idaho's most unique communities, Silverwood, Idaho.

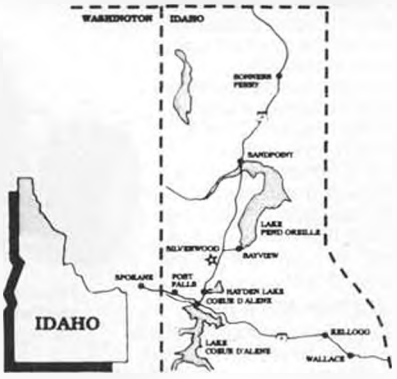
Nestled amidst the rugged Idaho Rockies, Silverwood showcases the grandeur of a perfectly reconstructed turn-of-the-century mining town—complete with its saloon, fine eating establishment, and shops that are guaranteed to bring back memories of a bygone era.

There will be more than twenty antique aircraft on display, and rides in everthing from vintage airplanes to Silverwood's very own stagecoach and narrow gauge railroad.

So plan to attend, whether you compete or not. Static judging will be held on June 17th from 10:00 to 4:00 at Silverwood, and the flying competition is scheduled for June 18th and 19th at nearby Farragut State Park.

A special banquet will be held in honor of the competition Saturday, June 18th at Silverwood, and overnight camping is available at Farragut for self-contained vehicles.

Silverwood, Idaho



Silverwood, Idaho and the Northwest Scale Internats. Without question, the premier scale event of the season. We'll see you there.

For more information or entry materials, contact Paul W. Parks, Contest Director, 4200 Woodland Drive, Sandpoint, Idaho 83864, or telephone (208) 263-2045.

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World-class .20-size racers depend on O.S. for winning power on- or off-road. The rear-exhaust **.21 VF-BR** is the perfect powerplant for sophisticated buggies like the Kyosho Vanning and the **.21 SE-R** and **.21 VF-R** produce the top-end speed that takes the checkered flag home in 1/8 scale flat track racing. The competition will know who rules the land when you race with O.S. – the leader in model car engines.

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your own particular space to find ways of storing airplanes and works in progress, along with your growing collection of general model miscellany. In my previous outbuilding shop, I hung coathangers (cut and bent to provide a double-hook) to hang airplanes by their tails. In my current basement shop, which has a low ceiling, I made a wire of several strands of old control lines and hang the airplanes by their leadouts. Combat expert Gene Pape, who works in a spare bedroom, has his combat planes hung by their leadouts in a coat closet. Mike Hazel strings two wires across the ceiling and rests the wings on them. A separate cabinet for engines, preferable one that could be locked, is a good idea.

LIBRARY

An essential for any shop is a place to organize and store model magazines, books, catalogs, brochures, etc. Shelving and drawers are good for this purpose. Make sure things are organized in a fashion that allows you to find what you're looking for at the moment you need it.

LIGHTING AND ELECTRICAL

It's difficult to work in a dimly lit shop; it's hard on the eyes and the lack of light hides many little flaws that will show up unflatteringly in the sunlight of the flying field. Wherever you work, take special pains to arrange for bright lighting in all areas of the shop.

I also find it very helpful to provide multiple electrical outlets. Inexpensive junction boxes can be obtained from hardware stores, providing a place to plug in your var-

Dreamgirl.

With her stunning looks and sparkling performance, who could blame you for guessing that the Sophisticated Lady might be a bit of a snob?

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She's a high-flying beauty with a personality that couldn't be more down-to-earth.

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All the tricks are in the engineering—not in the skills you'll need to build her. The Lady's designed to go together straight and true, with the help of plans and instructions that may be the most complete you've ever seen. There's even a section on techniques for the various forms of soaring.

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The C.G. Electric Power Pod (No. 678), is perfect for the Sophisticated Lady, the Gentle Lady and lots of other 2-meter gliders.

In more active conditions, add a bit of ballast and the Lady's slim airfoil and slender contours let her knife through turbulence and handle booming lift with ease.

And while she's built to shrug off the rigors of standard 2-meter high-starts and lift-grabbing tight turns, she won't be insulted if you prefer the more relaxed fun of powered climbs with the C.G. Electric Power Pod.

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As you might expect, the Lady's kit is complete in every detail. The wood is select, the cutting is precise, the hardware is like fine jewelry, and there are nice touches—like her formed canopy and cockpit detail—just to sweeten the deal.

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ious power tools. An overhead rack to hang the tools on allows you to keep them plugged in. You can turn everything off when you quit work by using the junction box switch. *Be careful not to use too many electrical devices at once when they are plugged into the same box.* I have three such junction boxes in my basement shop.

MISCELLANY

Pegboards, old chests of drawers, organizers, shelves, etc., creatively arrayed, provide homes for all the little gizmos that collect in a shop. Again, a pre-planned storage system is a timesaver.

Watch for sales at hobby shops moving or going out of business. In addition to being a way of picking up bargains on bulk items like balsa wood, it also is a way to pick up racks for various kinds of materials. I have a large balsa wood rack obtained in just such a sale, which I once filled with balsa picked up at a fraction of its retail value from a shop that was closing down.

Another little luxury is a bulletin board for pinning up pictures of your favorite airplanes, flying sessions, magazine clippings, or contest flyers.

These are just a few ideas about workshops, to which readers could add their own experiences.

I've enclosed a few workshop pictures as examples. How about you sending a shot of your workshop for publication in a future issue? Point out the special tricks you've learned for making modeling enjoyable on those rainy, windy days when flying is out of the question.

As mentioned earlier, your comments, questions, photos, and information are invited. I'm looking forward to hearing from you. John Thompson, 1505 Ash Ave., Cottage Grove, Oregon 97424. •

Forward-Swept. *Continued from page 17*

Span: 13 feet, 7.5 inches.
Area: 35.96 sq. ft.

FUSELAGE

Overall length, including nose probe: 53 feet, 11.25 inches.
Height: 14 feet, 3.5 inches.

(*) Note: It has been reported that a German modeler who produces, among other scale R/C jets, an impressive model of the X-29 FSW with a wing span of 51 inches, fuselage length of 90 inches, and a flying weight of 12 pounds. The modeler, Mr. Herbert Koudelka, can be contacted by writing to his address: 18 Stauffenbergstrasse, 6050 Offenbach/Main, Federal Republic of Germany.

Referring to Fig. 6 and the general comments relating to lateral stability necessitates some explanation to describe the effects of lateral stability on forward-swept planforms. Using a hypothetical futuristic FSW concept for our model, let's review some factors and examples (see Fig. 9).

As shown in Fig. 10, the airplane sideslips (E) due to the gravity force (G), but also moves forward because of thrust power (propeller or ducted fan unit). As a result of this combination of motion, the airplane actually moves in the direction indicated by arrow (C). The volume of air (relative wind) striking the low pinion is proportional to the "large effective span" area. Conversely, the air stream width striking the high pinion is a lesser volume, as indicated by the "small effective span" area. Accordingly, air action on the low pinion causes much greater lift than on the high pinion.

As lift on the lowered wing increases and contrarily decreases on the higher wing, the airplane rotates about its longitudinal axis (AB) back to the normal position. The resultant lift (D) of both pinions acts upward on the lower pinion (whose lift action is identified as DMIS

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MIE*) because this pinion has more lift.

Correspondingly, the two forces, D and G, team up to from a "righting" couple (F), rotating the airplane back to flight position; reason being, that the forces D and G are opposites in their action, and as such, do not act at the same point. The farther apart these two forces are, the more powerful is the righting tendency.

In conjunction with the above, it can be added that forward-swept wings embody satisfactory directional stability and consequently produces sufficient turning and circling flight characteristics. For R/C models, forward-swept wings provide effective turnability, and it may be that the FSW planform does have significant influence in the "righting" and stabilizing effects of the model during takeoff and landing modes while flying in stronger winds and gusting conditions.

To summarize, the above information is basic in nature and provides only a general substance for the familiarization with swept-wing design as reflected by full-scale aircraft. Many illustrations and the technical explanations presented here are condensed outlines of sections taken from references noted below.

For models, appropriate design parameters, at best, are usually experimental approaches bordering success, but realistically, a great deal of study, evaluation, preliminary design, and comparison reviews of existing model concepts are required principles to resolve a workable and satisfactory project. When beginning a design, it is important not to become content with early three-view sketches and layouts; make numerous sketches and brainstorm all the ideas you can muster. You'll know when the final design can be "frozen" and preparations for cutting wood are at hand.

In the final analysis, your completed design will have consumed an exorbitant amount of your time and best efforts in producing the ultimate flying machine, so your achievement is most worthy of your pride and strong sense of accomplishment—after all, you created it.

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Electronics. . . . *Continued from page 13*

and that 4V is a minimum. I tested several units and found that it will respond to a magnetic field down to a supply voltage of about 2V. However, at supply voltages less than 3.2V, the Schmitt trigger part of the IC (negative resistance at the threshold) stops working. In other words, one can adjust the magnetic field such that the output of the IC is only partly 'on' (linear mode). Spark coils depend on a sharp break in the primary current flow in order to generate the high voltage pulse to the spark plug. So the Hall cell must have this hysteresis (snap action). Now, this shouldn't concern anyone using 3.6V (3 Ni-Cd), but 2 Ni-Cd or 2 alkaline cells will not permit the Hall IC to operate satisfactorily, especially when starting the engine when the angular rate of magnet travel past the Hall IC is slow. Those who do not use 3 Ni-Cd cells for their sparker are certainly not listening to what I have been preaching. On my bench test, I can jump a spark 1/2 inch using 3 Ni-Cd and a Modelelectric coil. This equates to a high tension of 46,000 V. Certainly adequate; don't you think?

"The second limitation is that the Hall IC must be 'turned on' by the magnetic field for approximately 45 degrees of crankshaft rotation in order to provide enough dwell time (current flowing through the coil primary). This means that a magnet 3/8-inch diameter must be mounted with the

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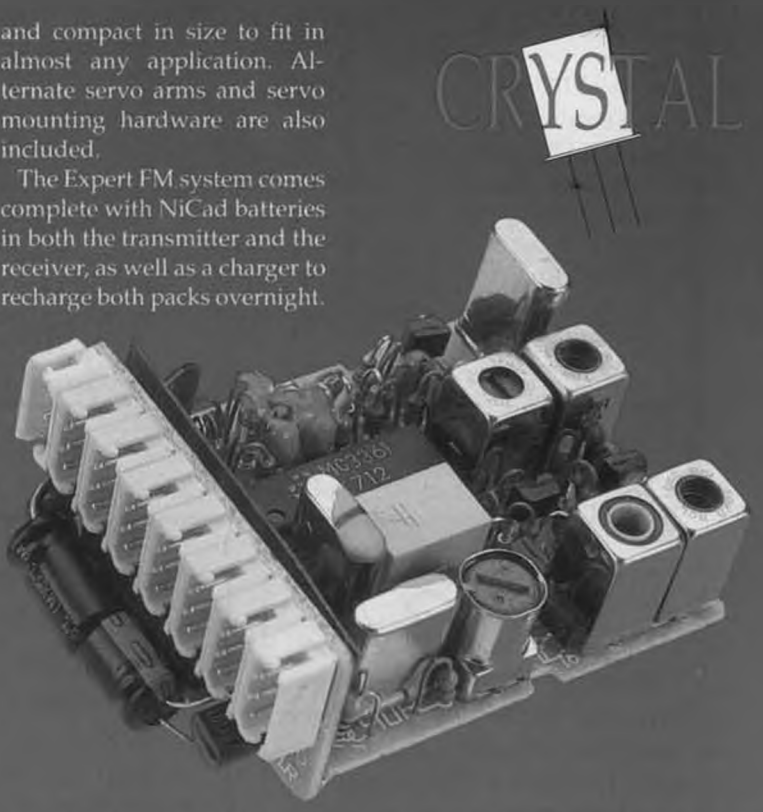

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pole face about 5/8-inch from the center of crankshaft rotation. This dimension takes into account some fringing of the magnetic field which causes an apparent increase in dwell time. If the dwell is not long enough, the spark voltage will decrease at high speed, possibly to the point of causing engine 'missing.' If the dwell time is too long, the average battery current will be higher than necessary, but the spark voltage will stay up. So it is best to fudge towards a longer dwell time.

"I have a good supply of UGN 3020T Hall Effect IC and ALNICO 8 magnets. The magnets are 3/8 x 1/4-inch long. I can provide the IC or magnet at $1.50 each, postpaid.

"Anyone using Hall Effect should know that the SAM rules (Sect. 2, Para. 1) requires spark ignition engines to use 'cam-operated points.' Hall pickups are not SAM-legal." Well, as usual, Floyd seems to have been doing his homework. That is all very interesting information, some of which I don't remember ever running across before. I especially appreciate his making available those 3020s and magnets, as such things can be a real headache for us tinkerers; they are readily available to manufacturers in almost any quantity, but trying to buy one or two can be darn near impossible.

I really don't have anything to add to Mr. C's clear explanations, though I do have a couple of comments on related subjects, but first, back to supplies for spark ignition systems. Another source of such, including those hard-to-find spark plugs, the Model-electric coil that Floyd mentions, and other SAM supplies, is: Kustom Kraftsmanship, P.O. Box 2699, Laguna Hills, California 92653; (714)830-5162. A buck will get you a catalog, which also lists custom Cox engines and parts, Rev-Up props, Orwick engines (well, replicas anyway!), and all manner of interesting and useful goodies.

Now back to spark ignition systems—and one fallacy that must be addressed: adding such a system to an engine does not automatically make it a gasoline burner! It will run on it, naturally, but you will immediately notice two important differences. The engine will run hotter, considerably more so, which is drastically going to change its lubrication requirements. And, in most cases, the carburetor will be extremely difficult to adjust, too often so difficult that one click will make the difference between too rich and too lean. And if that isn't enough, there have been reports of plastic carburetor bodies being melted by gasoline.

What to do? Well, for the first problem, there are Band-Aid-type solutions such as heat sinks for the heads, as are used on helicopter engines. Even so, we all know what excessive overheating can do to an engine—throw in one lean run on a hot summer day, and it's *Auf Weidersehen* for sure. Bill Carpenter, of C.H. Electronics, makers of the popular spark ignition system of that name, use a mixture of methanol, 15- to 25-percent gasoline, and 8- to 10-percent Klotz KL100. There are so many possibilities, dictated by engine size and design, you might write Bill for information on the best fuel for your particular engine. Don't forget to enclose a SASE.

Now for the errant carburetor. Not much precise help there either, I'm afraid, except to tell you that the cure in all cases is a different taper on the needle, long and thin. No guidelines, just file and try. It is critical—I've talked to a couple of gasoline addicts who admitted to having one needle valve that works perfectly, but not being able to duplicate another one. Not with the equipment that most of us have anyway, maybe if you own a CNC lathe. . . .

LET US NOW TALK ABOUT THYRISTORS! We've strayed a bit, with all that busi-

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ness about gasoline and needle valves, but we are now back to the main subject, electrons; though we are still on the subject of spark ignition. My reason for bringing up the subject is that it has been vaguely mentioned in ads and articles, I'm sure leaving some erroneous ideas and confusion.

First of all, the thyristor (THYRatron transISTOR) is another one of countless solid-state devices available to us, a distant relative of the more common transistor and diode. Actually, thyristors, all of which are intended for use as power control devices, comprise a family all by themselves. The best known ones, due to their more common usage, are the ASR (Asymmetrical Silicon Rectifier), SBS (Silicon Bilateral Switch), SCR (Silicon-Controlled Rectifier), and the Triac. There are even different types within those basic nomenclatures; they are all thyristors! There are others, but as I've already said, they are not often encountered in production equipment. Yet!

One or more of the above is why we have lamp dimmers in our homes, infinitely variable speed-controlled motor-driven appliances in our kitchens, and similar products in our workshops. They are used to turn things on and off, either instantly or gradually, a chore which they do upon receiving a specific type of electronic signal.

They are *not* why we have spark ignition systems, nor does their use in one by itself guarantee a better system. They are not a part of the Hall Effect Switch or system, nor another substitute for the cam-operated mechanical points. If you've been reading some of the same material I have, you might have gotten all or some of those impressions. Starting back at the start again, the purpose of the points, or Hall Effect Switch, is to *time* the spark—to cause it to occur at the proper time according to the position of the piston in the cylinder. Something else actually fires the circuitry to create the spark. In Floyd's circuit, this is done by the small transistor (MPS 3638A) which in turn triggers the large one (TIP32C) which is capable of handling the large current passing through the coil.

That is where a thyristor could be used! Different circuitry, but same effect: spaaark! No magic, and not even necessarily an improvement, simply another way of reaching an electronic goal!

ONE MORE OLD SUBJECT! Seems that is all that was covered this month, but fear not, the well has not run dry by a long shot. It just happens that these subjects are rather timely at this moment. Anyway:

ELECTRONIC SPEED CONTROLS. We've covered them last year, also with great reader interest and input. My research has turned up one more such circuit, this one using one chip, five transistors, and whose current carrying capacity you can adjust by the number of drive transistors installed. It also has reverse.

However, I feel that it is a subject more suitable for *Radio Control Model Cars* magazine, rather than for you airplane jockeys, and as such I will present it there. I just want to mention it here so that if you are interested in the subject, you can look for the May issue of *RCMC*.

Next month, new subjects. I promise. •

Ramblin' . . . . . *Continued from page 61*

GB: Sure, I started about 1946.
MB: What got you started?
GB: I became first involved in model aircraft about 1929. When WWII came I got into engineering and, later on, instrumentation for aircraft. Then, like everyone else in manufacturing, we thought what to do when hostilities cease. Being always interested in model airplanes and recognizing no one was making model engines in Australia, I ordered my first lathe, an engine lathe rather than a production lathe, there's a vast deal of difference. Then I bought from *Aeromodeler* the book called *Model Diesels*, and in it was Sparey's 5cc diesel with a square sandcast crankcase. I've always been interested in casting, but no sandcasting that gives a rough finish. My interests lay in gravity diecasting, or as the Americans say, permanent mold casting which gives reasonably precise dimensions plus a good outside finish. With the Sparey 5cc diesel I converted the sand cast case to my idea of a gravity die cast case. I made a great number of *free* engines.
MB: Did they run?
GB: They ran extremely well, but there was a great disappointment too. I used one in a free flight model, then I removed it and entered the engine in an exhibition at our Royal Show amongst other internal combustion engines. I received a commendation for the effort. The judges took me aside and said that why I did not win first prize was that mine was an *unfinished* engine. *It had no ignition or spark plug.* Nobody in Australia then realized what a compression ignition engine was and *that* was an intense disappointment to me.
MB: Gordon, you've made model engines for over 30 years (Gordon is newly retired), what would you change if you did it all over?
GB: I would change many things in design and construction of the engines, but as far as making a living in model engines, NO! It's been a *great* career in model engines, and I've really enjoyed it.
MB: How many engines would you guess you've produced?
GB: Something in the order of 100,000 engines.
MB: I know you're still making a few engines in your home workshop. What's the future for your engines?
GB: I feel the interest to not compete with today's hi-tech engines, but I'm interested in making replicas of engines of yesteryear. I feel the interest would be very great. The required skills would be diverse. Rather than making sheer volume, you'd make runs of 1,000 to 2,000 pieces and then change to another design. This means a great need for investment casting where you get precise outlines, precise internal shapes without

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huge investments being necessary. There could be a very viable industry for about 20 people using other than hi-tech machinery, and this could also give very good training to the youth of the country.

MB: What is your opinion of today's four-cycle engines?

GB: They are a *work of art!* But I do question the need for their complexity. My feeling is that as costs increase, we should concentrate on the simpler devices; there's always such a need. I believe very much in simplification. Having been in manufacturing and in selling, I've found that in anything connected with model aircraft, the owners are inveterate "tinkerers" and they like to take things apart. But often they can't get things back together. That's why I like simplicity.

MB: I know you don't have all your own history. Have you kept examples of your engines?

GB: The "GB," the "Glo Chief," the "Sabres," the "Taipans," maybe I still have two to three total engines. I'm tenderhearted, and over the years I guess I've given everything away.

MB: Do you ever use someone else's engines in your models?

GB: Yes, the main engine I've used of others is the K&B .09 and .15 Greenheads, which I'm sure makes Johnny Brodbeck very pleased.

MB: Have you seen the new line of K&B Sportsters?

GB: Yes, I have a new K&B Sportster, and, from an engineering view, I feel this is a great step forward. I would compliment Bill Wisniewski on it. Now, I don't mean the following to be derogatory, but when I first saw the engine I immediately said, "This is a 1987 *slag* engine *properly built*."

MB: That's priceless; that's great! Gordon, you're heavily involved in very successful model engines that are now coming into the USA and being sold all around the free world in substantial volume by the Thunder Tiger Model Company in Taiwan. Please tell us about it.

GB: Regarding Thunder Tiger, I could tell you *many* stories. Some should not be printed; some you can. Originally, on my way back from the Tokyo Trade Show I used to stop in at Taichung in Taiwan which is a manufacturing center 130km from Tai Pai. Taiwan is broken up into sections. When you want to buy various articles you go to a *specific town*. Taichung is metal machinery; Tai Nan is electronics machinery; Kow Ching is woodworking machinery. So I gravitated to Taichung and Thunder Tiger. The original Thunder Tiger people made sewing machines but had excess capacity, hence model engines began production in the mid-60s.

MB: Boy, they've come a long way.

GB: Well, not really until fairly recently. The original Thunder Tiger engine was a copy of the Enya. They somehow got their directions mixed up. They had tight fits at the *bottom* of the stroke and *loose* fits at the top of the stroke! You've met me; you understand that I tend to call a spade a spade. I mentioned this wrong inverse taper to the owner of Thunder Tiger. He immediately took umbrage and escorted me to the factory's front door and shut it, with *me* on the outside! There I was, the door was shut, and I was just standing there on the main street. He just took hold of me and, poof, I was outside. So relations with *this* Thunder Tiger factory and myself ceased. Their engines were very inferior; wrong steel for the crankshaft, fits were very poor, and their oriental people who were responsible for facing the western customers had an extremely hard job in explaining these problems. But later a small group from this factory broke off from the old company and started a new company named Thunder Tiger Model Company. They asked me to come over and advise them on the way to go regarding the metrology or measuring equipment. The mechanical equipment such as lathes, mills, grinders, whatever; the process of fits, correct materials. The Chinese people are very proud. They insisted the name "Thunder Tiger" would still remain, and, like Phoenix, would rise from the ashes! I was rather dubious at first, but I could not change their minds. Later on they invited me over to prepare drawings, to discuss with the various die-making people the way to make pressure die castings, and *away we went!* They did *not* skimp on equipment. They bought top-class CNC and other machinery, and a few mistakes were naturally made at first. But now they're making a whole range of top-class engines.

MB: They listened to you; didn't they?

GB: Yes, they listened. My name with them is "the professor." They're very kind, and they learned very quickly.

MB: Do you think Thunder Tiger will make a four-stroke-cycle engine?

GB: Thunder Tiger *will* make a four-stroke

MB: Do you think Thunder Tiger will make a four-stroke-cycle engine?

GB: Thunder Tiger *will* make a four-stroke engine. Their equipment is very good, their international marketing is very good, and the feeling generally is that they will become the Switzerland of the East.

MB: Gordon, we all thank you for talking with *Model Builder*'s readers.

Since the interview I've learned that Gordon has been invited to spend a year at the Thunder Tiger factory working with development. But he's quietly enjoying building and flying model planes, attending the vari-

ous SAM Champs around the world, and if you think engines grow in bunches like bananas, you're partly correct. Gordon Burford is busily casting crankcases for the ol' English Elfin 1.46 (.09) diesel engine of long ago. He's gearing up to produce maybe as many as 200 of them, just for the fun of it, he says. He also makes replicas of the Deezil .12 engine sold by Gotham Hobbies in NYC many years ago. Gordon's engines are wonderful runners!

At the Australian Nats there was a very successful auction held one evening by Ivor F, and I had money in my pocket again. So the guys from Oz decided it wasn't time for me to go home yet. They planned about a week of ramblin' around their city of Sydney to see fuel made, go flying, visit hobby shops, go to a club meeting, and spend evenings at different model builder's homes. I accepted. We road the outback for hundreds of miles to get to Sydney. I never saw such a big continuous flying field in my life. And tucked in my pocket was an invitation to come to New Zealand to visit modelers too, while ramblin' down under. Lotsa fun coming up. •

Electric. . . . . . *Continued from page 42*

40) or 4-40 rod (available in hobby stores), or use small straps under the bolt heads to provide new mounting holes.

Now for the very important part, the output shaft. It is 1/4-inch diameter! This shaft will not break in a noseover, crash, or whatever. This output shaft is twice the diameter of any gear drive now available; they all use 1/8-inch output shafts. The most frequently asked question that I get in letters is, "How do I fix the output shaft on my gear drive." This is a universal question, *every* brand of gear drive other than Astro has the problem with the 1/8-inch output shaft snapping easily. My answer to the question is to make a shaft out of 1/8-inch music wire, but often the repair has alignment problems. OK, the Astro gear drive is the answer to your snapped output shaft problems! I wish the other gear drives had a shaft like this one.

The big output shaft is supported by two huge ball bearings, 5/8 inch diameter. This unit is built strong, but it is light too, only 1-1/2 ounces! The big bearings mean that there is not much room for the pinion, so it is a press-on pinion, not a set screw type. I much prefer a set screw, but there is now an excellent gear puller just for 05 motors on the market. It is the BL 6014 gear puller by BoLink, 420 Hosea Road, Lawrenceville, Georgia 30245. It is $7 and well worth it. It works great, I use and like mine. The gear puller removes my objection to press-on pinions since it is now easy to remove the pinion whenever I want to. Hobby stores that carry offroad car parts should have this puller.

The reduction ratio is 2.38 to one, for most planes this will allow the use of a 9x5 or 10x4 prop at 6500 to 7000 rpm. This is a very good size for the old timer type of plane, or use a folding prop for sailplanes. Enjoy!

Last month I wrote about the AP-29 motor available from Tower Hobbies. It is an excellent replacement for the now defunct Astro ferrite 035 and is more powerful than the old ferrite 035. It is excellent on six cells and a 6x3 prop. Anyhow, Don Hughes wrote about a new AP-29 he got from a friend in Japan. This one has sealed ball bearings at each end, adjustable timing, and clips internally to hold the magnets apart (I had had a problem with one AP-29, the magnets came loose due to no clips). It has 28 turns instead of 30 so it will be even hotter than the regular AP-29. Tower does not stock it yet, but write them and maybe they will get the idea!

Don replaces the broken shafts on his Kyosho gear units with 5/32-inch drill blanks. These are so tough that the only thing that will cut it is the Dremel cut-off wheels. Since you can't drill the shaft for a pin, the Kyosho output gear has to be drilled and tapped for a set screw, then grind a flat on the shaft for it. If the set screw distorts the plastic on the gear when it is tightened, you have to do one more thing, make a metal bushing that fits over the gear boss and drill and tap that for the set screw.

Don says that sometimes even this type of repair does not work out, especially if the output gear got damaged. I know, I have repaired these drives too, and often alignment is off and the drive is never the same. The shaft and the output gear are not available separately; you can purchase them as one unit from Tower, and that will do the repair, but the shaft is still the same old fragile one. Don has an answer for this too, Boston Gear has some very satisfactory gears that will do the job. The 38-tooth Kyosho gear can be replaced by the 30-tooth Boston gear, part YPB-3230 at $5.76. The Boston YBP-3212 ($4.52) twelve-tooth pinion works just right, at 2.5:1 ratio. These gears are good-quality Delrin with brass hubs and 3/16-inch thick gears. The output gear hole is 3/16-inch, so use a piece of 3/16-inch brass tubing to shim it down to the 5/32-inch hole used in the gear drive. Best of all, these gears come with set screws so you can easily change or replace them on your nice new piano wire or drill blank super tough shafts. Definitely the way to put new life into a busted Kyosho drive! Don did not have an address for Boston Gear, but they have a toll-free number, (800)343-3353, and can tell you who the local supplier in your area is. Don, as many of you know, is an expert at electric F/F, and he says he is willing to share his expertise with those who would like to get into electric F/F. Contact Don at 8383 Zancanaro Ct., Citrus Heights, California 95610. Don really knows his stuff, as those of you know who follow this column, and he'll get you started right! Thanks, Don!

Now for photos! First, my Seagull, which has provided many hours of flying fun at the local park lake. It is a docile and easy-to-fly plane and accepts a wide range of motors. It will ROW with as few as five cells, though I usually fly it on six. I usually fly with an offroad stock 05, though sometimes I use a cobalt 05. Flying weight with six sub C cells is 44 ounces, and with six 900 mAh cells it is 40 ounces. It has a 42-inch span, 315 square inches. With the sub C cells it is 20 ounces per sq. ft., and with the 900 cells it is 18 ounces per sq. ft. These loadings seem a little on the high side, but the plane does not fly heavy at all, it flies "light." Perhaps the floats add to the lift? I think they do, my float experience tells me that the floats add as much lift as they weigh; i.e., a net of zero. If so, the plane "really" weighs about 36 ounces aerodynamically. The floats are 22 inches long, this seems about right. The floats I published in *Flying Models* are 21 inches long, and will handle a plane this size, but look slightly too small. I am thinking about scaling the plane down to about 37 inches for the 21-inch floats, using five sub C cells and the offroad stock 05 motors. This combination should weigh about 36 ounces and will be really ideal for that "grab and go" spontaneous type of flying that electrics are so good at. The throttle, of course, is the Jomar SC-5, absolutely perfect for this type of plane. I am using the Tower micro airborne pack, it is very light and reliable.

Dick Fleming sent some photos of his lovely planes; the Taylorcraft is just taking off from grass. It sure looks like the real thing! I have quite a few hours in the full-scale Taylorcraft, and it is my favorite plane to fly. Dick's model is scratchbuilt (I think from Dick's own plans); wing area 550 sq. in., weight 55 ounces. It is powered by an

Astro cobalt 05 geared on seven 1200 mAh Sanyo cells turning a reworked Rev Up or Top Flight prop. The throttle is Jomar; the radio is the Futaba mini, three-channel. The covering is Micafilm. Dick says the plane flies slow, stable, and very realistic in the air. It has a great glide and will fly all by itself very well. So does the real one, Dick, I liked to trim it, then just use occasional rudder to keep course, and just watch the scenery! Dick says not to lift off too soon, though, or it will stall promptly. The tail surfaces are enlarged from scale.

Dick's 1941 Fairchild UC-86 is also scratchbuilt; wing area 500 sq. in., weight 50 ounces. The motor is a Hobby Lobby RX-15 with belt reduction, using seven 800 to 1200 mAh Sanyo cells. The prop is a reworked 10-1/2x7 Rev Up. The radio is a Futaba mini, three-channel, Jomar throttle. The covering is Micafilm. It flies slowly, reasonably stable, and very realistic in the air. It is not a trainer but is easy to fly, and will fly all by itself. Tail surfaces are enlarged. The landing gear shocks really work!

Dick's project under construction is a PBY-5A; wing area 642 sq. in., weight 80-90 ounces. It will use two Astro cobalt 05s with 14 sub C cells. It will be direct drive, Jomar throttle, four-channel. I think it will fly very well. I remember the PBY very well—when I was a kid in Juneau, Alaska, Alaska Coastal Airlines used one to carry bush traffic. The PBY flew so slowly that is almost seemed to hover. It was very graceful in the air, and it was neat to watch it take off. Thanks, Dick, for the photos!

John Mountjoy sent a photo of his Heron, which is kitted by DSC and designed by Bill Winter. John says they have a winner, it is a great 10- to 12-minute flyer in cool air with no thermals and does everything an electric should do! It has a stable flat glide, and very little change from full power to glide. It looks good in the air. John does recommend two changes, if you use a large prop, lengthen the landing gear. If you use a throttle, provide for a brake, as the large prop freewheels a lot. Thanks, John, I have heard a lot of good reports about the Heron.

There are a couple of new electric clubs, and, if you are in their area, they would like to hear from you. The EMF of Chicago has a nice little newsletter, contact Steve Moskal, 30 S. Kensington Ave., LaGrange, Illinois 60525; (312)354-2803. They will be having a fun-fly this year, and they are actively working with the Parks Department for flying sites for electrics and gliders. I know this works out well; we have a park locally that has a shared use between gliders, electrics, and polo. It works very well indeed.

The Westmoreland Electric Soaring Society would like to hear from interested fliers. Contact Neil Rossi, 3947 Murray Highlands Circle, Murrysville, Pennsylvania 15668. They are planning a fun-fly later this year, and it will have something for everyone. The members have the full spectrum of planes, including sailplanes, old timers, sport, and semi-scale. Again, they are actively looking into park flying.

The Salinas Area Modelers are planning a fun-fly on the weekend of May 14 and 15 and would like anyone who is interested to come and have fun. Dan Earl is the man to contact at (408)978-5610. Salinas, by the way, is near San Francisco. SAM has a flying site nine miles south of Salinas; this is where the fun-fly will be. Dan, by the way, writes the electric column for *RC Report*, a newsmagazine that specializes in product reports. Well, for now, fly high with the electrics! •

Scale Masters. . *Continued from page 12*

Kent's good friend, Bob Frey, also from Arizona, took seventh place with a Republic Thunderbolt built from Holman plans. Only .37 points behind Bob was Chuck Fuller and his pretty Ryan PT-22. Chuck scratchbuilds everything he flies, and even put on a demonstration with his new 120-inch P-38 for all the crowd to see during tabulation. Right behind Chuck, in ninth place, we had David Pape from Canada. Dave not only built the most gorgeous Kinner Sportster we've ever seen, he even handmade the five-cylinder radial engine that powered it! Heading up the rear, in tenth place, we had Mr. Digby Cranke, a really funny sort of chap from South Africa, and his Tiger Moth. It's interesting to note that Digby's total score for tenth place was 184.50, and that Charlie Chambers, who took nineteenth place with his fantastic Platt P-51, had a final score of 183.50! Think the competition was a little rough? This was one contest where if you didn't have a static score of at least 93 and a flight score average of at least 92, you were in a lot of trouble!

Even though the competition was a bit tense at times, the Las Vegas surroundings offered more than enough distraction for the majority of the pilots. We had a good time at the special banquet put on by Mr. Harris Lee and the Scale Masters steering committee. After the banquet, some special awards were given out, and these included the Pilot's Choice award, which went to Glen Roberts from South Africa; Best Civilian, also to Mr. Roberts; Best Military to Charlie Chambers; and High Static to Ray Torres. After the banquet broke up, we all hit the casino for a couple of hours for some relaxation! Amid the hollering of Al Casey's

wife Kathy, I went to bed. Seems she hit the slots for a couple of thousand!

Thank goodness the weather cleared for Sunday's flying. It made taking pictures a whole lot easier, and it was nice that the awards could be presented without the aid of 57 umbrellas. Even though we all had a great time, I think that most of us were kinda glad it was finally over. Some guys started out immediately for home, others stayed the night for a fresh start in the morning. Do you believe that a few of the pilots actually drove 2800 miles to compete? That's dedication!

Well, I could go on and on about the Masters. It's one subject that I never tire thinking or writing about. There are so many details that I haven't explained. You really had to be there. But you can have a chance for next year's Masters. Simply attend a regional, of which there are about 18, finish in the top 5, and you're invited! You can fly giant or regular scale, but remember that this competition is supposed to be for real masters, the cream of the crop. So, get out there and practice. Get out and compete. Go and qualify and join Pacer Tech and all of us for the 1988 version of the U.S. Scale Masters. You'll have the time of your life, we guarantee it! •

Plug Sparks. . . *Continued from page 34*

"Jack was older (16) and had graduated from high school. Finding work under 18 years of age was difficult in those days, so he and his dad decided to produce gas engine propellers. Thousands of props were made by the American Model Propeller Co. involving all sizes, even left-handed for the Cleveland 'Air Car.' Props cost 10 cents base wood and 25 cents for the lacquered jewels.

"Harry Gunther's uncle also made props. He produced hand-carved wide-blade types with the trade name 'Hop Props,' taken from his name, Hopper. Gunther was sweet on Maria Konefes. It was only recently I learned from Ed Konefes they were married many years ago.

"Several members of the Penguin Club, Harry Gunther and Barney McShane were flying Dennymite-powered pylon models they called 'The Pipe.' This was in the early 1940 era. They looked and flew like Zippers, climbing vertically for the entire motor run. Hard to say who was first in Chicago with these hot flying designs.

"The flying field for contests was the 79th and Cicero area on Chicago's south side. This ideal field had empty fields in all directions. As directed by Bernard Schwartz, the Chicago Park District sponsored contests in this popular site. Harry Gunther was impressed and joined the Chicago Buzzards, meeting the Konefes clan; Joe, Ed, and Maria. The club model was the Buzzard Bombshell that everyone built, all being painted orange and black with slightly different patterns.

"The 1941 Nationals were held at this site. Jack Procunier flew his own design powered with a Super cyclone while I used my scratchbuilt Bantam-powered job in Class A to place third. By this time, the Penguins had changed their name to the Chicago Gas Lions with a surrealistic Lion decal used to identify the club members.

"At this same time, Jack Procunier went to work for the telephone company (Ma Bell). I was taking an airplane mechanics trade course in high school. Jack bought a six-inch lathe, and together we made a .29 engine with aluminum case and steel crankshaft. The engine ran and flew the model fine. He still has it!

"December 7, 1941, put everything in modeling to a screeching halt. I finished high school and went to work for United Air Lines at the Chicago Municipal Airport. Jack joined the Army Air Corps and ended up in Morocco.

"Enjoying ideal flying conditions, Jack simply had to build a model. With the help of Mrs. Goldberg, we sent enough material to scratchbuild an Atom-powered model. He scrounged heavy oil and gasoline from the Air Corps, and free flighted among the Bedouins in North Africa! This couldn't last, as Jack was transferred to a nonflying area. All the stuff was shipped back to Chicago. Everything arrived intact, as a matter of fact, I still have the wing and tail!

"During this time, I was fixing airplanes in the U.S. Navy. However, I got a real break being stationed near home. I was able to build some models albeit control line types. Sure beat no flying!

"Tiring of control line, I built a free flight for my Bantam, but didn't get to fly it until V-J day. Jack got out of the service first and started to build another engine, a .60-size this time. It fell upon me to scrounge up the aluminum bar stock from the scrap pile. Then, we went at it. I was the best file and hacksaw man you ever saw, while Jack did the 'precision work.'

"This engine was fitted with a ringed piston. This ran and sounded like a McCoy 60. Jack still has the engine and strangely enough, has never used it.

"Girls and postwar adjustments slowed model work to a crawl. The next activity was in 1949 at Glenview NAS featuring the Plymouth Internationals. This was old home week for me having been stationed there for two years. I managed a third place with my Bantam-powered model in Class A. At that time, there was no 'max' type flights, the total time of three flights being cumulative. I blew it on my third flight when I let the engine go too lean. I still have the model, completely rebuilt and ready to fly.

"I also flew a Forster .301 (Class C) powered model but failed to score. The eventual arrival of four fine sons slowed activities, but every so often I would fly my .051 jobs in the farm field near the house.

"So, here I am, 63 years old, retired from United Air Lines after 40 years, still trying to learn how to build and fly model airplanes. I figure I'll be called to my reward by a cardiac arrest resulting from the excitement of three 'max' flights in a row by my GHQ-powered Quaker!"

(Ed. Note: Al Ward is very active with the SAM 21 Chapter and flies O/T radio-controlled gas models. His latest interest is

Electric O/T R/C. Al will welcome all letters from old buddies and friends.)

READERS WRITE

Don Lefferts, who runs Vintage Auto Restoration, Inc., P. O. Box 83, Ridgefield, Connecticut 06877, sends in Photo No. 12 showing his latest, a Garami design, "Wahoo" as marketed by Polk Bros. back in 1940.

Don says he uses a red hot .049 engine and is amply rewarded for performance (original model was designed for an Atom 09). The color scheme is taken from Vic Stanzel's Tiger Shark. This made a big impression on Don at age 11.

Bob Stalick took quite a few photos at the Northwest Old Timer Annual held at Parker Field, Oregon. Seen in Photo No. 13 is Max Bowman of Rosburg, Oregon, with his Class C version of a Goldberg Zipper. He finds the Forster .301 provides all the power needed.

MORE DAFFYNITIONS

As taken from the S.F. Vultures newsletter and complied by Jim Hanratty and Jeff Raskin, we are presenting the latest update on word meanings:

Aircraft Flight Report: A loud noise accompanying the termination of a rapidly descending flight path.

Air Foil: A very light fencing sword.

Air Frame: A frame constructed around a body of air, or a body surrounding something.

Zoom: The latest kind of lens.

Ballast: Loud explosion.

Barrel Roll: An athletic contest usually held at company picnics.

Bomb Bay: City in India.

Buffeting: Eating dinner standing up.

Bulkhead: Person of questionable intelligence.

Butt Joint: A place to buy cigarettes.

Shear Web: What spiders construct.

Spoiler: Anybody who does better than you at a contest.

Wing Flap: Pointless argument about airfoils.

Gliding Distance: (Technical) One half the horizontal distance from a sail plane to the intended landing point.

SAM 41

Ever since Jim Alaback took over as newsletter editor for the San Diego Aeroneers, SAM 41, the quality of reporting has taken a quantum leap. Of particular note is Jim's dedication to the designs of Elbert "Joe" Weathers that are to be placed in the San Diego Aerospace Museum, the History of Model Aviation Section.

Jim reports that Maurice Whitta of Melbourne, Australia, has been corresponding with Joe Weathers in early eighties and decided to surprise him with a model (matter of fact, Weathers first design in Feb. 1936 *Flying Aces*) of his Guillemin J.G. 10 as can be seen in Photo No. 14.

Maurice rushed the model to meet the January 1985 deadline imposed by the San Diego Aeroneers Annual Banquet where presentation of the model would take place. The model was in transit to USA when Maurice learned that Joe Weathers had died suddenly on December 6, 1984.

Weathers' family decided to donate the model to the Aerospace Museum. Minor repairs were effected by Bill Noonan, and SAM 41 Historian, George Wagner, made the presentation.

MAIL BAG

While at the International Model Show in Pasadena, Pond met many of his good friends at the Pond O/T Plan Service Booth. Right next door was the SAM booth chaired by Sal Taibi and Jim Adams. Naturally, between the two booths, many a good gab session developed.

As usual, Bill Krecek dropped by to show a couple of good photos taken at the Dallas Naval Air Station 1951-52 Nationals. Seen in Photo No. 15 is Bill in his younger days about to launch his Focke-Wulf Stosser in the Flying Scale Event. Despite everything looking great, that particular flight turned out to be a bummer. Careful examination will reveal that the engine cowl is coming loose just before launch. This effectively fouled up the flight with the cowl sliding back even farther.

These were the good old days when the US Navy sponsored the AMA Nationals. This shot was taken at the Grand Prairie N.A.S. and shows somewhat the excellent facilities that were available for a Nationals.

In addition while at the booth, Bob Oslan, SCAMPS member, brought in some ex-

CLASSIFIED ADS

IMPORTANT INSTRUCTIONS: Non-commercial (personal items) rate is 25 cents per word, with a minimum of $3.00. Commercial rate is 40 cents per word, with a minimum of $5.00. No advertising agency discounts allowed. Name and address free, phone number counts as two words, abbreviations count as whole words and will be spelled out. All ads are payable with order, and may be for any consecutive insertion period specified. Send ad payment to: MODEL BUILDER, Classified Ads, 898 W. 16th, Newport Beach, CA 92663.

WANTED: Berkeley and Cleveland kits or related items: parts, plans, boxes, brochures, books, ads, radio equipment, accessories, etc. Gordon Blume, 4649-191st Ave. S.E., Issaquah, Washington 98027.

THE GOON IS COMING! Soon. LSASE to Vern's Plans, 308 Palo Alto Dr., Caldwell, Idaho 83605. If catalog desired also, include $2.00.

RANDOLPH DOPE, NITRATE AND BUTYRATE. 1/2 pint to gallons. Send SASE for color chart and prices. ABC Hobby Supplies, P. O. Box 2391, Clarksville, Indiana 47131.

BRASS RODS, TUBING, SHEETS. X-Acto tools. Stainless steel and brass, screws and bolts. Small quantities, free catalog. Elwick, Dept. 681-T, 230 Woods Lane, Somerdale, New Jersey 08083.

PRECISION ROUTER, machines "Lapp" joints. Use when joining sheets together for wing skins. Joints won't warp, gap, separate, or pucker after finishing. 50% stronger. Other uses. Uses your Dremel, or moto-tool. $29.95. Free brochure. Shape-Up Inc., P. O. Box 12895, Wichita, Kansas 67277.

THORPE BROS. JET PLANS. F-20, F-18, F-4, F-104. $35.00 each. US Agent for Taylor, Elite, and the British magazines. Three catalogs for $9.00. Bob Holman Plans, P. O. Box 741 MB, San Bernardino, California 92402.

NEW! VOLUME 3, PEANUTS & PISTACHIOS! Truly international, with plans, photos, pointers and whimsy from near and far, $5. Still available, VOLUME 2 at $4.95. NEW! VOYAGER, the complete story of Jeana and Dick's epic round-the-world flight. Hardbound, $19.95. Add $1.50 postage and handling. California orders, please add applicable sales tax. Hannan's Runway, Box A, Escondido, California 92025.

BUILD A BEER CAN BIPLANE from 15 cans. Kit contains step-by-step instructions, photographs, cut-out patterns. No special tools required. Plane is 9 inches long, with 14-inch wings, cockpit, struts, etc. Propeller spins, wheels turn; $9.95. Kit Can Kit Nine, Box 72104, Marietta, Georgia 30007.

ANTIQUE MODEL IGNITION PARTS, O.K., GHQ, Forsters, Delong, others. Excellent timers, Needle Valves, Tanks, Point Sets, Cylinders, Instructions, Kits, 1988 Catalog, 800 Parts, $4 plus $1 Shipping. Chris Rossbach, R.D. 1, Queensboro Manor, Box 390, Gloversville, New York, 12078.

FREE FLIGHT PLANS. Scale, sport, competition. Rubber, CO2, Electric, Gas, Unusual subjects, including BV-141. Send $1 for illustrated catalog. A.A. Lidberg, model plan service, 614 E. Fordham, Tempe, Arizona 85283.

SEMI-KITS fabricated from your plans. Parts cut from balsa, bass, pine, maple, and plywood. Custom wood sizes and shapes cut from your specs. Send SASE for quotes. Model Wood Specialties, 4209-24th St., Kenosha, Wisconsin 53142.

WANTED: RTF u/c planes from Aurora/K&B, Comet, Cox, Gilbert, Sterling, Testors, Wenmac, etc. Compete or pieces, buy or trade. John Fietze, P. O. Box 593, Lynbrook, New York 11563.

PLANS ENLARGED, Model Drafting Software, Nicad Monitoring Software. Free catalog. Concept Technology, P. O. Box 669D, Poway, California 92064 (619)486-2464.

SCALE DOCUMENTATION: PLAN ENLARGING. Photo packs, three views, drawings for 1600 aircraft. Super Scale R/C plans for Giant, Sport. 60-page catalog $3.00. Scale Plans and Photo Service, 3209 Madison Ave., Greensboro, North Carolina 27403; (919)292-5239.

DRONE ENGINE RIGHTER Model 0451 1941YR. Like new, make offer. 300 model magazines all 1982 or older. Sell all $50. I need a G.H.Q. engine or parts or old gas engine for my G.H.Q. Sportster. Archiel Yarger, 808 S. Washington St., Angola, IN 46703.

NEW ILLUSTRATED PLANS CATALOG: Rubber, Jetex, Scale, Sport, Old Timers, $3.00 refundable. Allen Hunt, Box 726B, Dunbar, WV 25064.

WANTED: Ignition model engines and race cars, 30s and 40s vintage. Don Blackburn, P.O. Box 15143, Amarillo, TX 79109; 806-622-1657.

SPECIALIZING IN MAJOR DECALS. for fast service and good prices, send for free catalog to: Clark's Aircrafters Supplies, 501 Raintree, Malvern, Pennsylvania 19355.

MAGAZINES/BOOKS: Aviation, Model (1929/1980) Lists $1.75 & LSASE. V. Clements, 308 Palo Alto Dr., Caldwell, Idaho 83605.

Semi-kits fabricated from your plans. Parts cut from balsa, basswood, pine, maple, and plywood. Custom wood sizes and shapes cut from your specs. Send SASE for quotes: Model Wood Specialties, 4209-24th St., Kenosha, Wisconsin 53142.

BEAT HIGH PRICES on every model you buy. Static or RC Up to 50%. Send LSSAE for details to: Second Childhood Hobbies, 14052 Hume, Armona, California 93202-8327.

ECKSTEIN, SID, TAMBE CLUB, BROOKLYN, 1930s, or anyone knowing whereabouts, please contact Jesse Sklarin, 4 Phaeton Lane, Marlboro, New Jersey 07746.

CLEARING OUT OLD MAG ACCUMULATION. M.A.N., A.T. Flying Models, and others. Send self-addressed, stamped envelope for list to: Fruciano, 6146 E. Cactus Wren Road, Scottsdale, Arizona 85253.

FREE VIDEO TAPE CATALOG! Over 100 videos oriented to modeling. Airplanes, trains, cars, how to, also books. Kennykraft, 5665 Peninsula Rd. MB, Florence, Oregon 97439.

RACE CAR PLANS from 1930s, old model airplane kits, out-of-print model books, ignition engine instructions. $1.00 for two brochures, two lists to Vintage Classix, P. O. Box 87, Elgin, Minnesota 55932.

ANYONE FOR PEANUTS ON THE MALL? New federal triangle employee seeks downtown D.C. lunch time model conversation once in a while. I speak FF, CL, R/C. Call Raymond at (202)566-6201.

BUILDING BOARDS: Flat. Warp Resistant. 3/8" Pinnable Surface, 16" Wide x 48" Long. Free Brochure. Limestone Enterprises, Box 586-MB, Athens, Alabama 35611.

WANTED: Ignition model airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063; (918) 245-3649.

STRIPPED GLOW PLUG THREADS REPAIRED with stainless steel Heli-coils. 2-stroke heads $7.50. 4-stroke heads $10.00 postpaid. Send head only. C.F. Lee Mfg. Co., 7215 Foothill Blvd., Tujunga, California 91042.

RUBBER POWER KITS AND SUPPLIES our specialty, also FF Gas and Electric. Send $1 to Airmen's Supply Co., P. O. Box 1593, Norfolk, Nebraska 68701.

"LEARNING TO FLY R/C With Or Without An Instructor," $2.95 plus .56 postage. Jim Waterman, 3818 Deerfield Dr., San Antonio, Texas 78218.

IGNITION AND GLOW ENGINES. Collectors, runners, used, new. Sell, trade, buy. SASE for large list. R.L. Eierman, 504 Las Posas, Ridgecrest, California 93555; (619)375-5537.

FIELD BOXES: Ready to go, not a kit. Different sizes and designs, 1/2-inch birch. Send SASE for info to: Boxes, 91112 Worldway Postal Center, Los Angeles, California 90009.

cellent photos of his Peerless Black Hawk as designed by Harold Coovert. Seen in Photo No. 16 is a gorgeous rendition of this model painted in red with black contrast and yellow pin striping.

Bob always had a love affair with this design and often tried to have this model certified as an Antique hoping to fly it in the Texaco Event. The best this writer has been able to do is to pinpoint the advertising in the middle of 1939. Rats!

Disappointed, Bob converted the model to R/C, put in an O.S. 40 four-cycle and had himself a ball with a fine flying model. As can be seen, the elegant lines are unmistakable as Harold Coovert was always a competitor for the Berryloid Best Finish and Beauty Award in the late thirties at the Nationals.

This photo was taken at Taft, Condor Field. As can be seen the field is surrounded by sagebrush which must be periodically dragged.

THE WRAP UP

Received a letter from Sam Morgan, 1004 Colbert Ave., Pensacola, Florida 32507, that reflects the general tenor of feelings about old timers. Sam sez:

"I have been around model aviation since the IGMAA, was AMA #68, so that should tell you something about my background. Yes, I am as old as you are, but your name is legendary to me. Am now retired and have a hankering to build a couple of old birds. In my early day, I built and flew the old "King Burd" as marketed by the Burd Model Co. The Kramer Bros. (Burd) I knew well as I did George Austerman, their designer. Also knew Steve Kowalik, the Ideal "Air Chief" designer as well as the Stinson

Senior and a few others. In fact, the SR-7 in the picture was built by me. Just some trivia that may interest the readers." (*Ed. Note: If we can gather enough trivia like this, we will get an excellent picture of who and what produced the old designs. As Lawrence Welk used to say, "Keep those cards and letters coming." The* next *guy may enjoy your comments.*) •

**Counter. . . . . ** *Continued from page 8*

Lady comes with full-size plans and a complate, fully illustrated instruction book that moves the modeler from identifying the pieces through all stages of construction to finishing and flying. Available at most hobby shops for $54.99, the Sophisticated Lady is well worth your inspection.

* * *

From Sig Manufacturing comes a new sailplane, the Riser 100, with a 100-inch wingspan, and 1000 square inches of wing area. Flying weight for this glider is 45 ounces, and requires a 2- or 3-channel radio. A modified Eppler-205 airfoil lets the 100 get excellent penetration into the wind, and it can be launched to more than adequate altitude from a standard high-start. The kit contains precision die-cut balsa parts, a die-cut lite-ply fuselage, a two-piece wing, with spoiler option, and complete hardware. Instructions are detailed with a photo-illustrated instruction book accompanying the full-size plans. Construction is easy, and the instruction book enables a beginner to go from the workbench to the flying field with no glitches along the way. See the Rider 100 at Sig dealers everywhere, or write: Sig Manufacturing, Montezuma, Iowa 50171. Tell 'em you read all about it in *Model Builder*!

* * *

Davey Systems Corporation, 675 Tower Lane, West Chester, Pennsylvania 19380, is offering the Eindecker, an inexpensive electric-powered stand-way-off-scale version of the famous WWI fighter. The Eindecker is designed to accept the Davey Systems' 075 motor and 8/4 propeller. The wingspan on this fun model is 40 inches, with 275 square inches of area. The kit comes with die- and machine-cut balsa and plywood, all necessary hardware, and rolled full-size plans and complete instructions. Included in the kit price is the DSC Hyperthrust motor with fused switch harness and Tamiya connector, plus prop adapter and an 8/4 propeller. For more information, contact Davey Systems or check your local hobby dealer.

* * *

For all you grown-up kids here's one that will surely get your pulses racing: the A-J Hornet is back in production! Yes, this venerable rubber-powered classic has returned, the same model that launched a thousand modeling love affairs. This Hornet is the version manufactured in the 50s, with a one-piece, 18-inch wing with formed camber and dihedral. It's band-powered by a 3/16-inch contest rubber band, driving an efficient 7-inch plastic prop. The balsa used, as in all A-J models, is of superior quality, and printed with the same graphics that we remember from the original. The new A-J Hornet comes ready to fly, and sells for $6.95 each, plus $3.00 shipping. Current supplies are scarce, due to overwhelming demand, but a few hobby shops should have some in stock. For a direct order, write to American Junior Aircraft Co., Box 68132, Portland, Oregon 97268. If you are just writing for more information, please include a SASE.

* * *

Here are some new offerings from the bookshelf that should be of interest to you: *The Augsburg Eagle: The Messerschmitt Bf 109* by William Green is a detailed history of the development of the squadrons and battle theaters of this formidable fighter. Those wishing to obtain accurate documentation for modeling purposes will find this book invaluable; the author has included color charts depicting markings and

NOTICE: New Full Size Plan prices are now in effect. Send a long, self-addressed, stamped envelope for your list of revised plan prices.

MODEL BUILDER

All Full-Size plans purchased from *MODEL BUILDER* Magazine include a reprint of the construction article, if building instructions were part of the article.

SEND TO: MODEL BUILDER PLANS SERVICE
898 W. 16th St., Newport Beach, CA 92663

Minimum order: $10.00

No. 5881 FEATHER **$10.00**
A very easy-building hand-launched R/C glider with a four-foot span. Frank Green.

No. 673-OT ALBATROSS **$10.00**
Class C gas ship designed by George Reich. Redrawn by Phil Bernhardt.

NEW ORDERING INSTRUCTIONS

U.S. orders, including APO and FPO, add 20% of total order for shipping and handling. Overseas orders (includes Canada and Mexico) add 50% of total order. Remit payment by International Money Order or U.S. funds, drawn on U.S. bank. Please, no cash or C.O.D.'s. Mastercard or Visa include card number, expiration date, and signature. Add 5% to credit card orders. California residents add 6% sales tax.

camouflage from different squadrons along with more than 200 wartime photos of the 109. It's available for $24.95 from Zenith Aviation Books, as is *Sky Warriors,* another in the Osprey Color Series of aviation books. *Sky Warriors* details the California Army and Air National Guard's use of various forms of aircraft, from jet fighters to helicopters with stunning color photos throughout. This book's 128 pages are loaded with color photos of Guard operations in the air and on the tarmac. A fascinating study of a contemporary homefront fighting force.

The last book this month is *Advanced Combat Helicopters,* by The International Defense Images. This hardbound book covers most of the operational 'choppers in service today, including the Apache, Mongoose, Cobra, and Panther. Photography is all in color, with a well-researched text accompanying the photos. It too is available from Zenith Aviation Books, Box 1MB, Osceola, Wisconsin 54020. •

Jake. . . . . . *Continued from page 7*

never tried it again. The Magnus effect is a sound principle, however, and I'm sure it would have worked if I'd used a noncarbonated beverage like iced tea or Hawaiian Punch.

Jake

* * *

To Model Builder Plan Service:
(Forwarded to Dear Jake)

Tell your editors that if they would cease giving space to the vacuous humor (?) of "Dear Jake" they would be able to print (construction) articles in complete form.

William H. Wainwright
Sculptors Workshop
Somerville, Massachusetts

Dear Mr. Wainwright:

Thank you for your comment. I've always felt that if there was less sculpture in art museums, there would be more room for paintings. The point is that everybody likes something different. There are even some people who like "Dear Jake." (Three, at last report.)

Jake

* * *

Dear Jake:

Our club recently admitted some new members. One of them is a health nut. Now, our club has served coffee and doughnuts at our meetings for over thirty years. This guy Brad comes along and starts telling everybody that coffee and doughnuts are bad for you. Coffee's full of caffeine and tar, and doughnuts are fattening and chocked full of processed sugar and collagens. He's been harping on it so much that we finally gave in and told him we'd get rid of one but not the other. My question is what's worse, coffee or doughnuts, and which one should we get rid of?

Club V.P.

Dear Club V.P.:

What's worse is having a health nut in your club, and Brad's the one you should get rid of.

Jake

R/C Soar. . . . . *Continued from page 41*

to share knowledge that can make soaring more enjoyable for all." Some of the special features of the NSSS will be: seminars and demos of all forms of glider flying, open flying to licensed AMA members, manufacturer reps, door prizes, bull sessions, Saturday evening barbecue, on field breakfast and lunch, on field camping (hot showers and restrooms available), a swap shop for buying and selling, and more. Contact Jim Porter at 100 Bonnie Blvd., Hudson, Iowa 50643; (319)988-4477 for more information.

AILERON OR FLAP BUILDING TIPS

Mike Reed of Corona, California, submitted the following "Tech Tip" for the benefit of those scratchbuilders or kit modifiers who want to either build-in aileron or flap control surfaces as they go, or simply add them to a previously built glider.

As you read the text you may want to refer back to the drawings at the opening of this article which correspond to the various steps, so get a book marker or keep a finger there for easy reference.

"Let me share with you my method for constructing lightweight control surfaces. This technique is especially suited for large ailerons or flaps, but may work well on rudders and elevators too.

"Just recently I completed work on a flying wing sailplane. The elevons are two inches wide and 7/16 thick at the front edge. Making these from solid balsa would require hours of sanding (not my favorite task), not to mention a large, heavy chunk of balsa wood. I built the elevons from 1/16 balsa sheet as described below.

"1. Decide the outline of the aileron to be constructed. Draw this on a sheet of light cardboard or stiff paper. Use this template to make the cut out in the wing and for making the main panels of the aileron from 1/16 balsa sheet. The actual opening can be cut and then traced directly to the balsa to avoid making this template if you prefer. See Figure 1.

"2. Measure the thickness of the wing where the ailerons will mount. Subtract 1/8 inch from this measurement and you will have the height of the front stiffener. Make the stiffener from 1/4 balsa. Position the stiffener on the forward edge of the 1/16 balsa aileron sheeting and glue with CA adhesive. See Figure 2.

"3. Make the tip ribs from 1/8-inch balsa. The ribs don't have to be shaped yet, a rectangular chunk of balsa will do fine. The ribs will be shaped by sanding later on. Follow the same idea for the 1/16 ribs in the middle. I like to place a rib every four inches. A piece of 1/4-inch balsa may be installed where the control horn is going to mount. See Figure 3.

"4. After all the ribs have been glued, trim off excess wood as indicated by the dotted lines in Figure 3. With a long sanding block, sand the entire top surface of the aileron until it is sloped from the trailing edge straight up to the front edge of the stiffener. See Figures 4 and 5.

"5. Cut and position the top 1/16 sheeting over the aileron surface. Align the trailing edge and glue with CA adhesive. Flip the whole assembly around and lift the front edge of the top sheeting about 1/4 inch. Let a drop of CA glue run down the top sheeting directly over one rib. See Figure 6. As soon as the glue starts to run, press down firmly on the top sheeting. Do this to all ribs. Glue the remaining front edge.

"6. Bevel the front edge of the aileron to accommodate the appropriate method of

hinging or surface deflection. See Figure 7." Thank you for the contribution, Mike. I would only like to add that a better way of gluing on the top sheeting might be to use a slow curing, thick CA adhesive bead along the top of every rib before pressing the sheeting in place. This way you can avoid the possibility of building in a warp.

AIRTRONICS MODULE SERIES MD7SP RADIO

There is a radio system offered by Airtronics which has not received the recognition it deserves in the modeling press. This radio was specially designed with the needs of sailplane fliers in mind, and as such is the only one of its kind imported into the US. (Yes, there are specialty radios offered by European manufacturers which have been designed for glider flying such as the Becker radio and Multiplex Expert with F3B Soft Module, but these are much more expensive and less readily available.)

Anyway, the MD7SP radio is a sophisticated, affordable glider radio that can do a lot of things no other radio can do. When it first came on the market about two years ago, I asked Airtronics for information about all of its mixing functions and other features. Apparently even Airtronics wasn't prepared to fully explain all that the MD7SP could do because it took three requests in a two-year period to finally get my answers, and then when the answers came they were written by users of the system, not Airtronics!

If you own a MD7SP and are not sure how to get it to do certain things, I recommend that you send to Airtronics for the Harley Michaelis letter. It is a "how to" type letter, and it is directed toward the MD7SP owner, not prospective buyer.

If you are looking for a new glider radio and are looking for something more than just four channels, servo reversing, and trim tabs, then read on. I might just sell you on an MD7SP!

The following information was written by John Wyss of the Rocky Mountain (Denver area) Soaring Association. John has been very active in F3B and is an accomplished builder and flier.

"The Airtronics Module Series radio system (SP) is designed for the sophisticated requirements of state-of-the-art sailplanes. This radio system was used by several competitors at the last F3B finals including the number one team member, Steve Work.

"To maximize the features of the radio there is a basic requirement: each control surface must have its own servo. A typical setup would be six servos: one for each aileron, one for each flap, one for rudder, and one for elevator (a flaperon ship would use four servos). The wing servos are typically mounted in the wing at each control surface. (No cables or bellcranks, please!) These are some of the features:

"AILERON RUDDER COUPLING: This allows the rudder to move when the ailerons are used to give a better turn quality, especially at slow speeds. (*This is often called coordinated turning. wrf*) The rudder can be used independently of the ailerons, which is desirable on tow or on final approach. The amount of rudder coupling is adjustable on the transmitter.

"AILERON DIFFERENTIAL: By turning a trim pot on the transmitter, the amount of aileron differential is infinitely adjustable. Adverse yaw can be minimized by the proper use of aileron differential. Steve Work is a proponent of proper aileron differential as a very necessary part of fast speed runs.

"FLAP PRESETS: A three position switch allows the flaps to be positioned as a fixed setting (dialed in on the transmitter), infinitely adjustable with an auxiliary slide switch, or coupled to the elevator (flaps move when the elevator moves). It is not uncommon to use five distinct flap settings; speed, distance, thermal, launch, and landing. These presets also work with flaperons.

"FLAP ELEVATOR MIXING: This allows the elevator to move when the flaps are moved to compensate for the pitch changes caused by the flaps. It couples in two directions. When flaperons are lowered, it adds up elevator (*e.g., for speed turns. wrf*). When flaps are lowered, down elevator is added (*e.g., pitch compensation. wrf*).

"ELEVATOR PRESET: A three-position switch allows for three different elevator neutral settings. For example: speed, launch, and thermal.

"SPOILERONS: In the spoileron mode, the throttle stick moves both ailerons up. This has the effect of killing lift and creating drag; very effective glide path control for landing. When used with down flaps, this system makes conventional spoilers obsolete in high performance sailplanes. There were only one or two F3B team finalists who used conventional spoilers.

"FLAPERONS: Flaperons are typically full-span control surfaces that work independently as ailerons, or using an auxiliary slide switch, deflected as flaps. . . . Flaperons are often found on slope racers for camber changing ability, helping the glider stay up in weak lift (more camber) or penetrate high winds (less camber). The flap elevator mixing above also helps the glider make sharper, faster turns which are helpful in racing.

"FREQUENCY MODULE: The frequency module plugs into the back of the transmitter. To change frequencies, the module is removed and replaced with the desired frequency module. This process takes all of about 15 seconds.

"TRANSMITTER BATTERY MODULE: The modular transmitter battery pack plugs into the back of the transmitter without having to take the transmitter case apart.

"STOP WATCH: Easy to use for practice.

"NECK STRAP: The transmitter balances at the neck strap attachment point making the neck strap a useful addition to the transmitter.

"USUAL BELLS AND WHISTLES: Adjustable dual rates, servo reversing, end point adjustment, adjustable sticks, contest gimbals, etc. are all features of this system.

"In the recent past, there has not been a radio available in this country that had features necessary to maximize the performance of state-of-the-art sailplanes; Airtronics has solved this problem!" I might

add that those who heard rumors about crashes involving MD7SP radios brought on by interference problems can disregard them. The new, narrow band, eight-channel Airtronics receiver is as good as they get; it is very solid. If the kind of mixing offered by the MD7SP interests you, you can buy one at your local hobby shop or favorite mail order company.

F3F SLOPE RACING

I would wager that most readers out there have little (if any) experience with this form of international soaring. Historically, F3F has received virtually no press here in the US. One never hears about an F3F slope race either before or after the fact unless it appears in a British or German magazine.

Casey Goeller, who is an avid slope racer, multi-task soaring enthusiast, and active CD wanted to change all of that by CD'ing what he claims was the very first F3F race in the United States. (Boy, I can feel the mail coming after that statement.) On January 16, 1988, the event was held very successfully, having a decent turnout of 25 fliers and cooperative weather. The site was the often-mentioned "Hughes Hill" in Westchester, California, located on the property of Loyola Marymount College.

The event is brute simple. There is a measured course length (in this case the relatively short, standard course layout for this slope of about 120 yards), there is a given amount of working time in which the pilot can fly the model up to a nice height prior to the start, and there is a specified number of laps the pilot has to fly. Only one glider is on the course racing, so the possibility of midair collisions is eliminated. The guy who finishes the course in the shortest time wins the heat and is given 1,000 points. At the end of three heats the guy with the most points wins. Simple!

Well, I've included a few snapshots of some of the competitors to give you an idea what was flown. The winners flew F3B-type ships followed closely by specialized, smaller slope racers.

IN CLOSING

That is going to have to do it for this month. I will try to continue next month with the contributions I have received from you readers out there because the mail bag is not empty yet. Until then, thermals! Bill Forrey, *c/o Model Builder* magazine. •

Workbench . . . *Continued from page 7*

enterprise. For all of you who tried to call and buy the exquisite April acrylic cover painting of the Laird Super Solution, here's the *right* number: (206)352-2602.

THINGS TO DO

The Indoor World Championships (F-ID) will take place in Johnson City, TN, at the Mini-Dome of East Tennessee State University. Dates are May 28 through June 1, 1988.

* * *

The World Championships for Electric Powered Aircraft (F-3E) will be held at Parks Air College, St. Louis, MO, from August 14 through 19, 1988. Information on both of the above events can be obtained by calling Geoffrey Styles, AMA at (703) 435-0750.

* * *

The Bay of Quinte Aeromodelers Club will be holding its annual Fan Jet Rally at Mountain View Airport on June 4 and 5. For further information, contact Peter Sant, Quinte 88 Steering Committee, 1631 Colonial Road, Belleville, Ontario, Canada K8R 1B9, or call (613) 966-5160.

* * *

The 1988 FAC (Flying Aces Club) Nats will take place on July 9 and 10 at the National Warplane Museum, Geneseo, New York. For more information, contact Allan Schanzle, 20008 Spur Hill Dr., Gaithersburg, MD 20879, or call (301) 840-5884. If you want to witness or participate in free flight scale, don't miss this one. It's the best!

* * *

Set aside September 15 through 18 for the 25th annual National Championship Air Races in Reno, Nevada. It's the longest continually running event of its kind in the world, and if you're any kind of an aircraft nut and haven't attended this one, put it on your "Do it once before it's too late" list! Besides four classes of aircraft racing (Formula 1, Biplane, T-6, and Unlimiteds), you'll see the U.S. Army Golden Knights, the U.S. Air Force Thunderbirds, the Eagles Aerobatic Flight Team (Hillard, Soucy, and Poberenzy), Bob Hoover, Lefty Gardner, Joann Osterud, Brigitte de Saint Phalle, wing walker team of Jim Franklin and Johnny Kazian, Suzanne Ashbury-Oliver, and many more. Contact the Reno Air Racing Association at P.O. Box 1429, Reno, Nevada 89505, also BASS Ticket Centers or Ticketron outlets.

R/C F/F RECOVERY

We must apologize for not continuing our discussion on the matter of using R/C for recovering free flight models in official competition in this issue (PLEASE NOTE: We said for *recovery* only, not at any time during the official flight!). Other magazine deadlines, plus travelling to New York and Atlanta during February, have prevented us from getting to it. We have a stack of mail on the subject, and happily, whether the writers agree or disagree with the concept, their comments have been thoughtful, serious, and not the least over-reactive or threatening. One fact stands out. No one who is a serious and dedicated free flight modeler wants any radio control of a free flight model during its official flying time, from power launch to first use of the radio for recovery, and we totally agree. Free flight should remain as it has always been, free flight, without radio assistance. The only thing that has changed over the years is the space in which to fly the models. The fliers who are most against the idea of radio recovery are usually those who are fortunate enough to be living near one of those almost nonexistent flying sites. The majority of free flighters are fast becoming dormant, as the sites disappear. R/C recovery is undoubtedly the only way in which they can resume the hobby they have enjoyed so much in the past.

The key words in the controversy are "assist" and "recovery." *Assist* has created the big trouble spots in old timer "free flight." Radio has provided the control over the killer engines that are flying old timers in a way they were never capable of in their day. Perhaps the designers back then would have liked to have that additional power, but if they did, the models undoubtedly would have been entirely different in design and flight characteristics. Had *recovery* been the ruling word in old timer R/C, the models might be able to handle some additional power, but not the amount they are being flown with now. The lesson for modern free flight is obvious; allow the radio for recovery only, whether it is after the max or whether the flight is cut short to save the model. Come on free flighters, do we have to be so masochistic that a flier must crash or lose his model in order to remain "pure?" Hell, let's rule out ear plugs so we can all resort to hearing aids by the time we're fifty, rule out electric starters and "chicken sticks," and rule out winding tubes. What are we, a bunch of wimps? •

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And all Conquest Systems include servo reversing, computer-built PC boards and Futaba NiCd power packs.

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(Far left) 6NLK/FM 6 channels of Conquest performance with dual rates, S148 servos and FM. 6NLK/AM also available.

5NLP/PCM brings contest features like Pulse Code Modulation and dual rates to sport flyers.

4NL/AM Aircraft system can be specified with S33 micro servos and R4H micro receiver for sailplane use.

Midnight PUMPKIN

The 1953 Ford Pick-up that combines 50's style with the latest technology from Tamiya.

Tamiya takes you back to the 50's with an awesome combination of classic beauty and brute strength. The full size pick-up was called the "Pumpkin" for its round contoured body style, bulging hood and fenders. Tamiya's 1/12 kit is a beauty, guaranteed to turn heads for miles around. The classic body sits high atop monster tires ready to eat up the turf.

THE BEAUTY OF THE FORD F100

From the chrome-plated bumper in the front to the chrome-plated bumper bringing up the rear, this truck was designed to be hot and nasty! Look at its chrome grille...the blue flames racing across the fenders...the chrome flood lights high atop the roll bar.

It's a blast from the past!

But making it beautiful is never enough at Tamiya. They also made it tough. So the body features injection-molded plastic for detailing and super resiliency.

THE TOUGHNESS OF TAMIYA

We made the F100 tough, inside and out. Inside, we started with an engineering resin plastic chassis/frame..Then we installed a sealed gear box, which incorporates precision differential gearing for better cornering. A powerful 540 motor. And three-step speed controller.

THE APPEAL OF ITS ENGINEERING

Outside, the first thing you'll notice are the 5" high tires that'll clear all but the biggest obstacles. To keep it down to earth and under control, we also installed independent swing arms in the front and a rigid swing axle suspension in the rear, and smoothed it with heavy-duty coil shock dampers for smooth sailing over the toughest terrains.

The result? A customized pickup with classic 50's good looks and powerful 80's technology that'll take you where you want to go. The Midnight Pumpkin from MRC/Tamiya. It's a blast from the past built for R/C's future.

MRC™ TAMIYA

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