MODEL BUILDER

MARCH 1982

$2.50

volume 12, number 122

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THE DYNAMIC DUO

There's no better winning combination than a Kalt Baron 50 helicopter and JR Unlimited helicopter radio. This Dynamic Duo of engineering excellence was flown to victory by Mike J. Mas in his recent win in the expert division at the 1981 Nationals.

Becoming a champion is a selective process. Each step a decision. Thats why Mike chose a Kalt Baron 50, similar to the one shown and a JR radio. The kit is quick and easy to assemble, there are no wooden parts to cut out and fit. The main rotor blades are completely finished and balanced. The collective pitch rotor head is factory assembled and fully ball bearing supported. The aluminum engine mount is machined, drilled and tapped to fit most of the popular .60 size engines. Vacuformed body and canopy are shock mounted on rubber grommets for longer life. Each kit comes complete with all the necessary hardware and accessories including: fuel tank, universal servo tray, and linkages to complete the assembly of this outstanding helicopter. All you need is an engine and radio system to be ready to fly. Best of all, we'll keep you flying longer because we have a complete selection of factory parts in stock.

So, when you're ready to put the Dynamic Duo to work for you, we'll give you a choice of 10 Kalt helicopters and a wide variety of multi-channel JR radios. For more information call or write Circus Hobbies.

National Champion Mike J. Mas

Kalt, JR, Webra, and **IM** are imported exclusively by Circus Hobbies.

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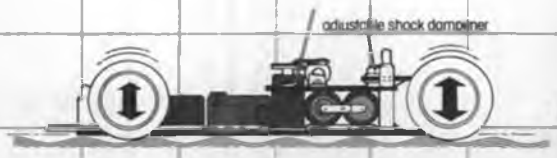
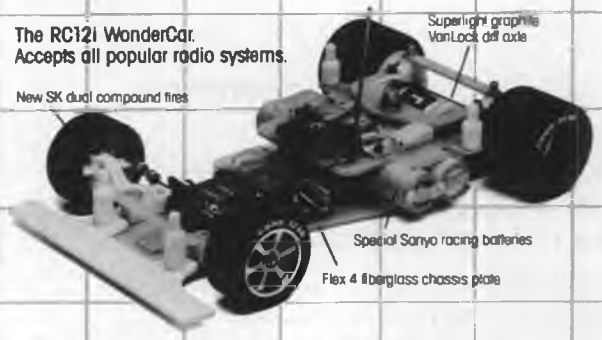


While the tires of the amazing RC12i follow the contours of the track, the central chassis, radio equipment and batteries remain stable for phenomenal cornering power.

Nobody knows more about building winners than the Team. In just four years our RC12E won an astounding 10 National Championships, winning in every class of competition indoors and out.

Now there's a brand new winner from Associated, the RC12i. We call the RC12i the WonderCar, because it has handling and road hugging characteristics second to none.

The RC12i grips the track with our unique Flex 4 chassis, a totally new design featuring shock-dampened front and rear roll rates and a trailing link controlled beam axle. That gives the RC12i a suspension without springs, to isolate the radio and batteries from excessive vibration for maximum traction on every track surface.



FLASH! NEW ASSOCIATED RC12i FLAT OUT CORNERS THE COMPETITION

And the RC12i isn't all that's new from the Team. Special "SK" dual compound front tires, graphite VariLock diff axles, Reedy Indoor rewinds, plus McRae Can-Am, Brabham F1 and Lola T600 bodies are just a few of our latest speed secrets.

Keep up with all the action with your free subscription to Racing with the Team. Call or write today.

The IMSA Champion Lola T600 GTP, our newest 1:12 scale body shell. New McRae and Conquest Can-Am bodies also available.

Associated Electrics 1928 East Edinger/Santa Ana, CA 92705/(714) 547-4986

1981 ROAR Nationals! Boston—Mike Lavacot/Team Associated wins Indoor Modified. Reedy motors win All modified classes for 4th year in a row.

MODEL BUILDER

MARCH

1982

volume 12, number 122

621 West Nineteenth St., Box 335, Costa Mesa, CA 92627-0132 Phone: (714) 645-8830

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Cover: A modeler's model, the Great Lakes has appeared in a multitude of scale sizes, probably beginning with the famous Cleveland Model & Supply line of many years ago. In fact, it was kit No. SF-1 in the long, long list of Cleveland 3¾-inc scale models. The aircraft on the cover, in one-fourth scale, was designed, built, and has been flown successfully many times, by Frank Comyns, one of Southern California's leading R/C scale modelers. Frank isn't that competition minded, but his models look and fly well enough to place high in Precision Scale. Construction article begins on page 13.

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Changing track conditions can send RC cars scurrying into the pits for a linkage adjustment that could take laps to complete.

The driver with Futaba's 3FG doesn't panic though, because he has Total Control on his side.

A flick of a lever and the adjustable dual rate takes over.

Increase or decrease steering servo throw while maintaining full lock-to-lock control. The 3FG gives you a choice, on the track.

An oversteering, sliding car instantly responds to the pre-set steering ratio and is dialed-in again.

The 3FG system was developed by and for serious racers. In addition to rate control, you'll also find servo reverse switching, electronic trim, mixing and throttle fine tune in the handsome brushed alloy case.

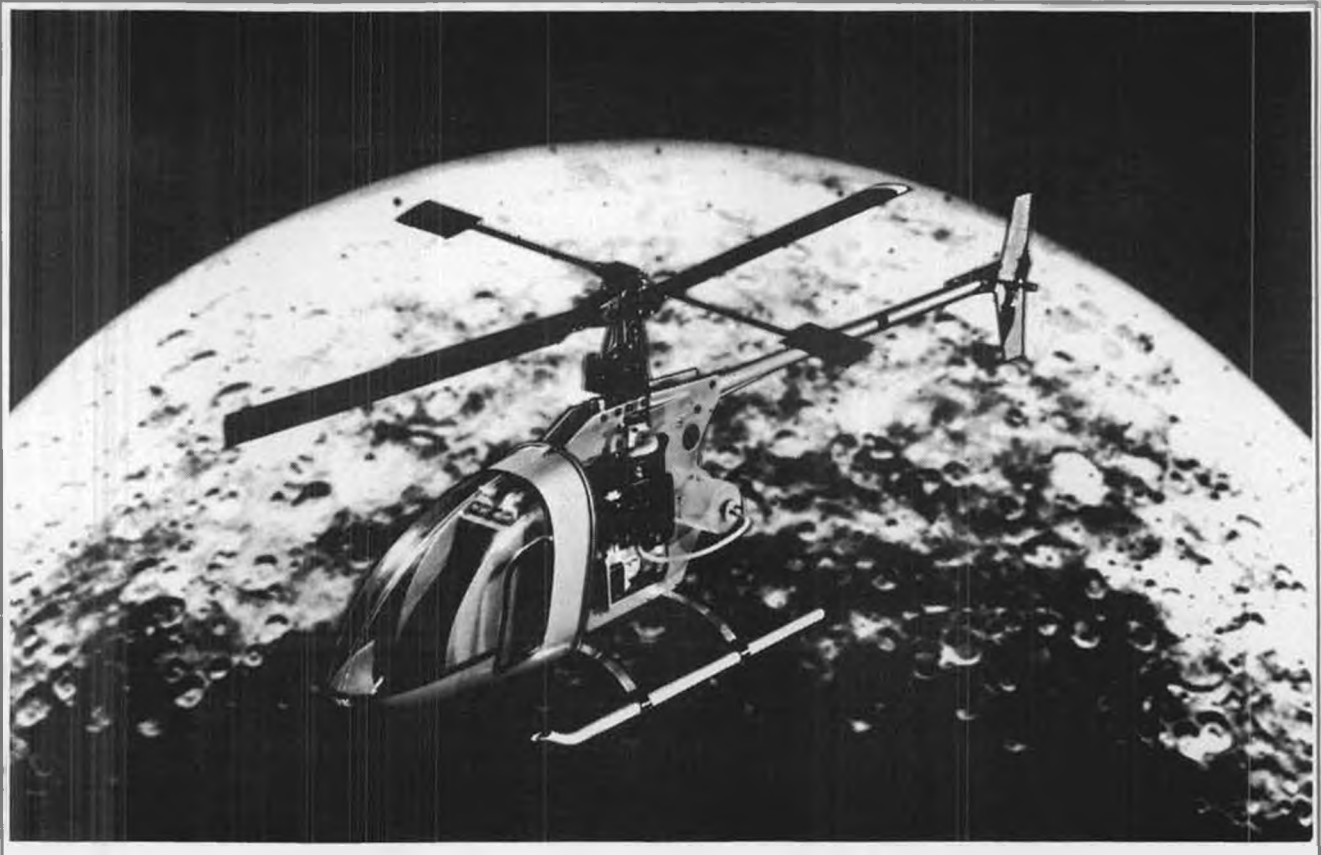
The 3-channel 3FG system is available with a wide range of servo options, too. Ultra mini S20 servos are perfect for 1:12 scale electrics, while boat and gas car racers favor the watertight, heavy-duty S27's.

Gentlemen, choose your servos.

And for total performance, the 3FG can be ordered with high-torque, coreless motor S24's and rechargeable NiCad batteries.

Futaba

Track tune your racer from the driver's stand with the new Futaba 3FG.



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. . . been flying your Revolution I for five years. I know the quality of your products and have been delighted to recommend your machines to my flying friends. Thanks for another fine product that we can all afford!

RUSS RHUE, Age 46 - California

I was surprised at how easy it is to assemble!

PAUL MASTERS, Age 15 - Ohio

. . . wanted one for years. I am truly amazed by the stability of flight I get from my Mantis. Prior to buying my Mantis I had flown only gliders, yet within 3 days I was making coordinated turns, safe landings and nice long flights. I think the Mantis is truly a great helicopter kit!

GUY ROY, Age 17 - California

The Mantis has a major acceptance here in Rio, because of the high quality materials employed associated with an exceptional low price. That's Great!

ANTONIO CLAUDIO JAMEL, Age 19 - Brazil

I have long been desiring an R/C helicopter. At this cost, yours is a dream come true!!!

CECIL R. PARRISH, Age 33 - Illinois

Instructions are very clear. I'm glad to own a Mantis!

DAVID GUERRA, Age 16 - Texas

For a beginner in R/C Flying I feel you have come up with a real big winner - both construction and flying . . . keep up the good work.

STANLEY A. LEWIS, Age 27 - Florida

This kit is the most complete and comprehensive I have ever had. Assembly is a breeze with your fine instruction booklet and photographs.

WELDON I. HALTOM, Age 32 - Texas

I'm quite pleased with the way the kit was packed and packaged - it appears to be the best kit I've ever purchased.

THOMAS C. HENRY, Age 35 - Canada

It flys great, hovers very well. . .I love it very much. Can't wait until I get the new Super Mantis. I am sending you a picture of my new Mantis. I hope you like it. P.S. - Keep up the good work. Happy to fly the "American R/C Way".

FRANK R. CASPER, Age 28 - New Jersey

"OUTSTANDING!!! Exceeds all expectations, we use O/S Max .40 . . . plenty of power! (after) 4 years flying full size aircraft, fixed wing, this model put the thrill back into R/C. Look for more orders . . . my friends want one too! All claims of ruggedness gladly confirmed!

CARL P. DEAL Jr., Age 39 - Florida

This is the finest kit I have ever purchased. I have been a modeler for 50 years — I am a tool maker and I know quality. This is the best! You may use this recommendation for advertising.

H.H. MOORE, Age 62 - Texas

MANTIS

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American R/C Helicopters, Inc.

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STICKS - 36" Lengths

B 001	1/16 x 1/16	10
B 002	1/16 x 1/8	12
B 003	1/16 x 3/16	15
B 004	1/16 x 1/4	20
B 005	1/16 x 3/8	24
B 006	1/16 x 1/2	27
B 007	1/16 x 3/4	37
B 008	1/16 x 1	46
B 009	3/32 x 3/32	12
B 010	3/32 x 1/8	14
B 011	3/32 x 3/16	16
B 012	3/32 x 1/4	20
B 013	3/32 x 3/8	26
B 014	3/32 x 1/2	32
B 015	3/32 x 3/4	43
B 016	3/32 x 1	53
B 017	1/8 x 1/8	14
B 018	1/8 x 3/16	20
B 019	1/8 x 1/4	24
B 020	1/8 x 5/16	27
B 021	1/8 x 3/8	31
B 022	1/8 x 1/2	35
B 023	1/8 x 3/4	48
B 024	1/8 x 1	58
B 025	3/16 x 3/16	24
B 026	3/16 x 1/4	30
B 027	3/16 x 3/8	33
B 028	3/16 x 1/2	43
B 029	3/16 x 3/4	53
B 030	3/16 x 1	65
B 031	1/4 x 1/4	35
B 032	1/4 x 3/8	41
B 033	1/4 x 1/2	48
B 034	1/4 x 3/4	68
B 035	1/4 x 1	81
B 036	5/16 x 5/16	44
B 037	5/16 x 3/8	55
B 038	5/16 x 1/2	65
B 039	5/16 x 5/8	79
B 040	5/16 x 1	91
B 041	3/8 x 3/8	61
B 042	3/8 x 1/2	71
B 043	3/8 x 3/4	85
B 044	3/8 x 1	1 03
B 045	1/2 x 1/2	82
B 046	1/2 x 3/4	1 10
B 047	1/2 x 1	1 36
B 048	5/8 x 5/8	96
B 049	5/8 x 1	1 42
B 050	3/4 x 3/4	1 33
B 051	3/4 x 1	1 57

TRIANGULAR CUT BALSA 36"

B 416	1/4 x 1/4	43
B 417	3/8 x 3/8	52
B 418	1/2 x 1/2	66
B 419	3/4 x 3/4	83
B 420	1 x 1	1 10

STICKS - 48" Lengths

B 061	1/8 x 1/8	20
B 062	1/8 x 1/4	28
B 063	1/8 x 1/2	45
B 064	3/16 x 3/16	32
B 065	3/16 x 1/2	53
B 066	3/16 x 3/4	70
B 067	1/4 x 1/4	46
B 068	1/4 x 1/2	62
B 069	1/4 x 3/4	88
B 070	5/16 x 5/16	57
B 071	3/8 x 3/8	77
B 072	3/8 x 1/2	92
B 073	3/8 x 3/4	1 09
B 074	1/2 x 1/2	1 06
B 075	1/2 x 3/4	1 43

48" AAA SHEETS

B 388	1/32 x 3	1 08
B 389	1/16 x 3	1 21
B 390	3/32 x 3	1 41
B 391	1/8 x 3	1 64
B 392	3/16 x 3	2 02
B 393	1/4 x 3	2 33
B 394	3/8 x 3	3 07
B 395	1/16 x 4	1 76
B 396	3/32 x 4	2 00
B 397	1/8 x 4	2 26
B 398	3/16 x 4	2 84
B 399	1/4 x 4	3 30
B 400	3/8 x 4	4 68
B 401	1/16 x 6	3 14
B 402	3/32 x 6	3 58
B 403	1/8 x 6	3 96
B 404	3/16 x 6	4 57
B 405	1/4 x 6	5 16
B 406	3/8 x 6	6 55

MODEL BUILDER'S ASSORTMENT

B 600	Balsa Wood Assort	10 20

LAPPED EDGE BALSA SHEETS

B 610	1/16 x 3 1/4 x 36	1 06
B 611	3/32 x 3 1/4 x 36	1 25

BULK BALSA 3" x 36"

Not Stamped or Sorted

B 508	1/32 x 3	62
B 509	1/16 x 3	69
B 510	3/32 x 3	81
B 511	1/8 x 3	97
B 512	3/16 x 3	1 17
B 513	1/4 x 3	1 32
B 514	3/8 x 3	1 75

ODDS & ENDS PACKAGE OF BALSA

B 534	Packages	2 15

SHEETS - 18" Lengths

B 173	1/32 x 2	28
B 174	1/16 x 2	31
B 175	3/32 x 2	37
B 176	1/8 x 2	43
B 177	3/16 x 2	54
B 178	1/4 x 2	68
B 179	3/8 x 2	76
B 180	1/32 x 3	41
B 181	1/20 x 3	43
B 182	1/16 x 3	45
B 183	3/32 x 3	53
B 184	1/8 x 3	62
B 185	5/32 x 3	67
B 186	3/16 x 3	76
B 187	1/4 x 3	88
B 188	5/16 x 3	1 05
B 189	3/8 x 3	1 17
B 190	1/32 x 4	59
B 191	1/16 x 4	70
B 192	3/32 x 4	76
B 193	1/8 x 4	87
B 194	3/16 x 4	1 07
B 195	1/4 x 4	1 32
B 196	3/8 x 4	1 64

SHEETS - 36" Lengths

B 134	1/32 x 2	56
B 135	1/16 x 2	61
B 136	3/32 x 2	74
B 137	1/8 x 2	84
B 138	3/16 x 2	1 07
B 139	1/4 x 2	1 36
B 140	3/8 x 2	1 50
B 141	1/32 x 3	83
B 142	1/20 x 3	87
B 143	1/16 x 3	91
B 144	3/32 x 3	1 06
B 145	1/8 x 3	1 25
B 146	5/32 x 3	1 35
B 147	3/16 x 3	1 52
B 148	1/4 x 3	1 75
B 149	5/16 x 3	2 08
B 150	3/8 x 3	2 33
B 151	1/32 x 4	1 19
B 152	1/16 x 4	1 42
B 153	3/32 x 4	1 52
B 154	1/8 x 4	1 75
B 155	3/16 x 4	2 15
B 156	1/4 x 4	2 66
B 157	3/8 x 4	3 29
B 158	1/16 x 6	2 42
B 159	3/32 x 6	2 70
B 160	1/8 x 6	3 02
B 161	3/16 x 6	3 47
B 162	1/4 x 6	3 90
B 163	3/8 x 6	5 00

BLOCKS - 3" Lengths

B 251	1 x 1	15
B 252	1 x 2	29
B 253	2 x 2	39
B 254	1 x 3	39
B 255	2 x 3	53
B 256	3 x 3	83

BLOCKS - 6" Lengths

B 266	1 x 1	30
B 267	1/2 x 2	40
B 268	3/4 x 2	46
B 269	1 x 2	55
B 270	1 1/2 x 2	66
B 271	2 x 2	76
B 272	1/2 x 3	50
B 273	3/4 x 3	61
B 274	1 x 3	76
B 275	1 1/2 x 3	91
B 276	2 x 3	1 05
B 277	3 x 3	1 65
B 278	1/2 x 4	76
B 279	3/4 x 4	85
B 280	1 x 4	94
B 281	1 1/2 x 4	1 20
B 282	2 x 4	1 45
B 283	3 x 4	2 30
B 284	1/2 x 6	1 08
B 285	3/4 x 6	1 28
B 286	1 x 6	1 50
B 287	1 1/2 x 6	2 07
B 288	2 x 6	2 29
B 289	3 x 6	3 21

BLOCKS - 12" Lengths

B 299	1 x 1	57
B 300	1/2 x 2	76
B 301	3/4 x 2	90
B 302	1 x 2	1 10
B 303	1 1/2 x 2	1 32
B 304	2 x 2	1 51
B 305	1/2 x 3	97
B 306	3/4 x 3	1 20
B 307	1 x 3	1 51
B 308	1 1/2 x 3	1 81
B 309	2 x 3	2 18
B 310	3 x 3	3 30
B 311	1/2 x 4	1 51
B 312	3/4 x 4	1 69
B 313	1 x 4	1 87
B 314	1 1/2 x 4	2 39
B 315	2 x 4	2 90
B 316	3 x 4	4 59
B 317	1/2 x 6	2 11
B 318	3/4 x 6	2 55
B 319	1 x 6	2 99
B 320	1 1/2 x 6	4 13
B 321	2 x 6	4 57
B 322	3 x 6	6 42

BLOCKS - 18" Lengths

B 333	1 x 1	85
B 334	1 x 2	1 65
B 335	2 x 2	2 25
B 336	1 x 3	2 25
B 337	2 x 3	3 30
B 338	3 x 3	4 95
B 339	1 x 4	2 80
B 340	2 x 4	4 35
B 341	3 x 4	6 90
B 342	1 x 6	4 50
B 343	2 x 6	6 90
B 344	3 x 6	9 60

BLOCKS - 24" Lengths

B 354	1 x 1	1 15
B 355	1 x 2	2 20
B 356	2 x 2	3 00
B 357	1/2 x 3	1 90
B 358	1 x 3	3 00
B 359	2 x 3	4 40
B 360	3 x 3	6 60
B 361	1 x 4	3 75
B 362	2 x 4	5 75
B 363	3 x 4	9 20
B 364	1 x 6	6 00
B 365	2 x 6	9 15
B 366	3 x 6	12 80

TAPERED CUT SHEETS - 36"

B 430	1/4 x 3	1 70
B 431	1/4 x 4	2 53

LEADING EDGE - 36" Lengths

B 085	1/2 x 3/8	69
B 086	3/4 x 5/8	1 20
B 087	1 x 3/4	1 56

36" ROUNDED EDGE AILERON & ELEVATOR STOCK

B 441	1/4 x 1	92
B 442	3/8 x 1	1 08
B 443	1/4 x 2	1 45
B 444	3/8 x 2	1 64

AIRFOILED SHAPED SHEETS

B 111	3/16 x 3 x 36	1 64
B 112	1/4 x 3 x 36	1 87
B 113	1/4 x 4 x 36	2 78

TAPERED TRAILING EDGE 36" Lengths

B 097	1/8 x 1/2	41
B 098	3/16 x 3/4	53
B 099	1/4 x 1	67
B 100	5/16 x 1 1/4	81
B 101	3/8 x 1 1/2	95

BAGS OF BALSA

B 524	Bags of Balsa	3 10

PLANKS - 36" Lengths

B 206	1 x 1	1 69
B 207	1/2 x 2	2 25
B 208	3/4 x 2	2 65
B 209	1 x 2	3 30
B 210	1 1/2 x 2	3 95
B 211	2 x 2	4 50
B 212	1/2 x 3	2 90
B 213	3/4 x 3	3 60
B 214	1 x 3	4 50
B 215	1 1/2 x 3	5 45
B 216	2 x 3	6 55
B 217	3 x 3	9 90
B 218	1/2 x 4	4 50
B 219	3/4 x 4	5 05
B 220	1 x 4	5 60
B 221	1 1/2 x 4	7 15
B 222	2 x 4	8 70
B 223	3 x 4	13 75
B 224	1/2 x 6	6 30
B 225	3/4 x 6	7 65
B 226	1 x 6	8 95
B 227	1 1/2 x 6	12 40
B 228	2 x 6	13 70
B 229	3 x 6	19 25

36" C-GRAIN AAA 8 - 12 LBS

B 470	1/32 x 2	62
B 471	1/16 x 2	66
B 472	3/32 x 2	79
B 473	1/8 x 2	89
B 474	3/16 x 2	1 12
B 475	1/4 x 2	1 44
B 476	3/8 x 2	1 55
B 477	1/32 x 3	89
B 478	1/16 x 3	97
B 479	3/32 x 3	1 11
B 480	1/8 x 3	1 31
B 481	3/16 x 3	1 57
B 482	1/4 x 3	1 80
B 483	3/8 x 3	2 38

VH - VERY HARD

B 493	1/16 x 3	97
B 494	3/32 x 3	1 11
B 495	1/8 x 3	1 31
B 496	3/16 x 3	1 57
B 497	1/4 x 3	1 80
B 498	3/8 x 3	2 39

CONTEST BALSA - 36"

Very Light 4 - 6 Lb Stock

B 454	1/32 x 3	92
B 455	1/16 x 3	1 00
B 456	3/32 x 3	1 14
B 457	1/8 x 3	1 34
B 458	3/16 x 3	1 61
B 459	1/4 x 3	1 84
B 460	3/8 x 3	2 42

Get with it! JOIN THE SIG CROWD . . .

SIG JACKETS

AD 002 SB	Small Blue	13 00
AD 002 MB	Medium Blue	13 00
AD 002 LB	Large Blue	13 00
AD 002 XLB	X-Large Blue	13 00
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AD 002 MY	Medium Yellow	13 00
AD 002 LY	Large Yellow	13 00
AD 002 XLY	X-Large Yellow	13 00

SIG WING PINS

The international fad of collecting and trading model theme pins has spread to the U.S.! Here's our version, in a choice of gold or silver background. "SIG" is red enamel and the wings are blue. The clasp has a lock that prevents it from becoming accidently unpinned.

AD 010G	Sig Pin w/Gold Background	2 00
AD 010S	Sig Pin w/Silver Background	2 00

SIG CAPS

AD-001	Sig Cap (Blue - All Cloth)	3 75
AD 004	Sig Stocking Cap (Blue)	3 75
AD-005 B	Men's Mesh/Cloth Cap Blue and White	3 75
AD 005 Y	Men's Mesh/Cloth Cap All Yellow	3 75
AD 006	Child's Mesh/Cloth Cap Blue and White	3 75
AD 008 B	Ladies' Mesh Cap Blue and White	3 75
AD-008 Y	Ladies' Mesh Cap Yellow and White	3 75

SIG KAN KOOLER

At a hot competition a flier needs to stay cool! This handy red, white and blue foam sup with a plastic "can hutcher" top is designed to keep that cola, lemonade or other beverage at a drinkable temperature. Top is removable so the sup can be used as a drinking glass if desired.

AD 009 Sig Kan Kooler (6 per pkg) 2 50

SIG FIELD BOXES

BX-001 Sig Field Boxes 1 00

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

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SIG MANUFACTURING CO., Inc. . . . . Montezuma, Ia. 50171

from Bill Northrop's workbench

We used this photo in the same spot 10 years ago, but it seemed so appropriate for this time of year (Dec. 23) that we thought you wouldn't mind a repeat performance. Scene was about 5 miles outside of Troy, N.Y., in March 1947. Your editor was attending Rensselaer Polytech Institute, and on this weekend, went free flight slope soaring with JASCO 50 and 72 Thermic

FOUR DAYS

Beginning in 1982, **Model Builder** Magazine's business office in Costa Mesa, California, will be closed on Fridays. Actually, it would be closed the first two Fridays, anyway. New Year's Day is on Friday, and Friday, the 8th of January, 1982, is set-up day for exhibitors at the IMS Trade Show in Pasadena, and all of the **MB** staff will be there.

A telephone answering system will be set into operation on Fridays. If you have called long distance, your nickel will not be wasted. You will be able to leave your name, message, and/or phone number. Business calls will be returned on the following Monday, and personal calls will be returned at the disgression of the person being called.

Business hours on Monday through Thursday will remain the same: 8 a.m. to approximately 5:30 p.m. (you may catch a straggler after 5 p.m., but don't count on it!).

LATE APOLOGY

Wow! What a response to my plea for the loan of a set of Gallopin' John plans, as published in the August '65 issue of *M.A.N.* Letters and plans have been pouring in from all over the place. I've returned all but two sets of plans (which the senders didn't want back) and answered all letters offering plans if needed. Some of our readers figured we'd be deluged and said, "Don't bother to answer unless you need the plans." To all of these, thanks for your kind offer, but please, *don't send plans!*

The other evening I sat down and studied the plans in-depth (while thinking about 4-channel conversion) and was shocked at the lack of information. If no one ever built the plane, I can understand why! Suddenly realized I had never really checked the plans when they first came out. Important cross-sections were left out, wood and wire sizes were missing completely, and some pieces wouldn't fit if cut to the size shown. Several models were built by others, using copies of my original plans, so I know the originals were complete. I apologize to anyone who finally managed to guess their way through the construction, or gave up in frustration.

Because this ship was such an excellent flier, I plan to rework these plans into a modern version, which we'll call "Mini-John". It'll have ailerons, less dihedral, but flying weight will be kept down to where a modern .15 or mild .19 will be plenty of power. Actually, it flew so well without ailerons, we'll probably show that option too.

The ship brings back one funny and exciting memory. I was flying it at one of the great DC RC Symposiums in the late '60s, with Min-X single channel "Galloping Ghost" equipment. (Once and for all, pulse rudder was *not* Galloping Ghost! G.G. was a pulse system with a wild looking crank linkage on the back end that made both the rudder *and* elevator pulse. Changing the pulse width from 50-50, on or off, to 80-20, 70-30, or what have you, caused the rudder to pulse more on one side of neutral than the other, thus proportional control . . . way back in the '50s and '60s! Changing the pulse rate made the elevator pulse more down than up or more up than down . . . fast for down, slow for up. In spite of all the wiggling at the back end, the aircraft normally flew in a smooth path, all the wiggling canceling itself out . . . except on full up, when the elevator and rudder pulse was real slow. At this point, the rear end of the plane would show signs of the control deflections, and the plane would "gallop" somewhat, thus the name. By various means, such as speeding up the neutral pulse rate, it was sometimes possible to almost completely get rid of the gallop. Wow! That is really digressing!) The Min-X equipment was nice because the control stick was built right into the hand-held transmitter, not common in those days. It was also one of the first super-hets.

Anyway, I was flying up a storm, when all of a sudden the control stick in my right hand and the transmitter in my left hand parted company! The stick had come out of its socket! I tried watching the plane while blindly trying to find the socket with the stick end. Each time I contacted the socket, I'd move it, and the ship would respond. It was all over the sky. Finally, in desperation, I took my eyes off the plane and focused them on the socket and stick and got things back together. Luckily, the plane was still in the air when I regained control and flew out the remainder of the fuel. (Throttle? Not with *good* Galloping Ghost control. It limited the overall control range of the equipment), with a great deal of pressure on the stick!

"WE" VS. "I"

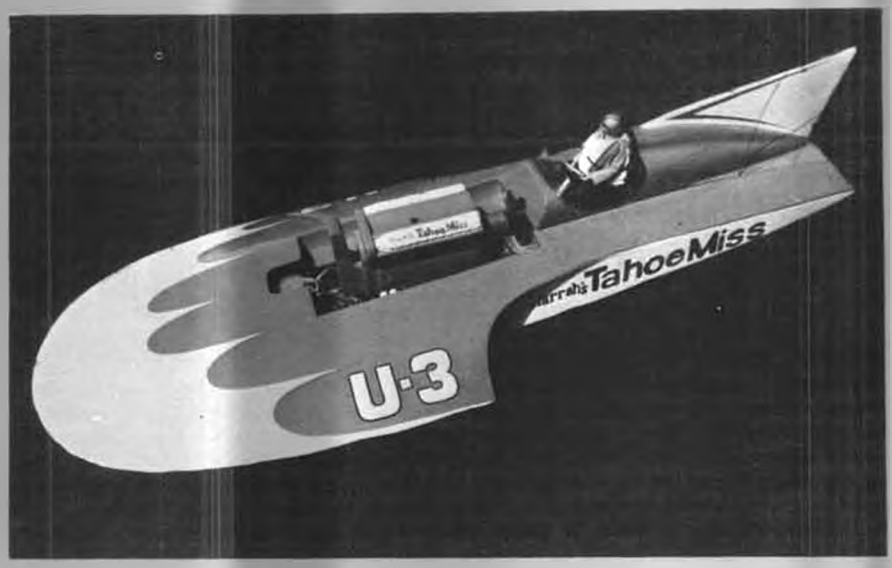
Note that in the above dissertation, we. . . er. . . I used the first person pronoun for the first time since the magazine began, back in 1971.

It all came about because of com-

Continued on page 102

OVER THE COUNTER

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



First of new 1/8-scale series of yesteryear Unlimited Hydroplanes by Steve Muck.

● HOT STUFF! The modelers choice... Satellite City has *ADDED* a spout applicator to its original tubing and says to the modeling world;

ANY WAY **YOU** LIKE!

DISPENSE **THREE** WAYS!

DO NOT REMOVE SAFETY-LOCK INSERT

Spouts are now supplied with each container of Hot Stuff and Super 'T' in addition to its tubing at *NO* increase in price.

Built with Satellite City "HOT STUFF" WORLD FAMOUS ADHESIVE

TWO beautiful red, white, and blue, fuel-proof, self-adhering mylar decals are also included with each 1/2 oz. and economy 2-oz containers of Hot Stuff and Super 'T'. Larger versions at 4-3/8 × 1-3/4 inches are also available at no cost. Simply send a self-addressed, stamped envelop to; SATELLITE CITY, P.O. Box 836, Simi Valley, Ca. 93062-0836.

• • •

Indoor Model Supply, purveyors of fine modeling supplies for builders of rubber and CO_2, indoor and outdoor models, has released its new catalog, #1982. One dollar will get you this 16-page catalog, chock full of modeling goodies, plans, kits, special balsa, rubber strip, and other needed items.

TWO YARD BIRDS, a pair of schoolyard flyers, are a top performing pair of rubber powered models for the Novice! A free-wheeling plastic prop, contest rubber, full size plans, satin-smooth balsa, and full size plans provide easy building and smooth flights. With a 12-inch wing-span, 150-foot high flights are not uncommon. Two for $4.95, add 10% for postage, California residents add 6% tax. Indoor Model Supply, Box 'C', Garberville, Ca. 95440.

• • •

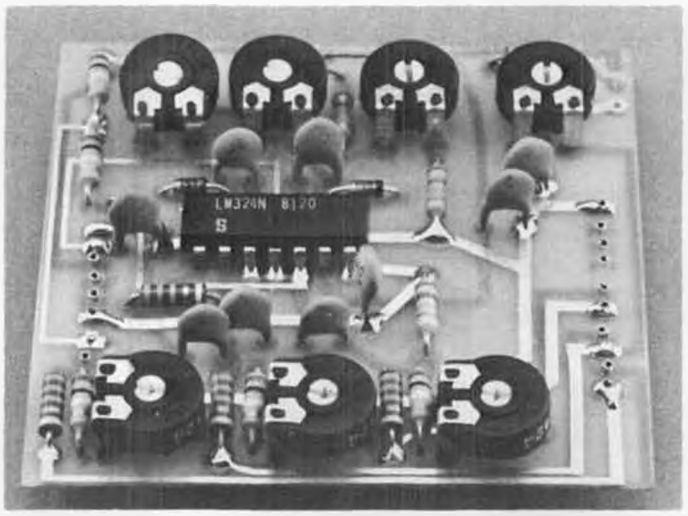
The good news from the people at Sig, is, that Sig will have available again, colored Esaki silk! It's available in eight brilliant colors, including Red, Orange, Royal Blue, Silver, Light Yellow, Dark Yellow, Rose Pink, and of course, White. A new manufacturing process has enabled colored silk to be produced again.

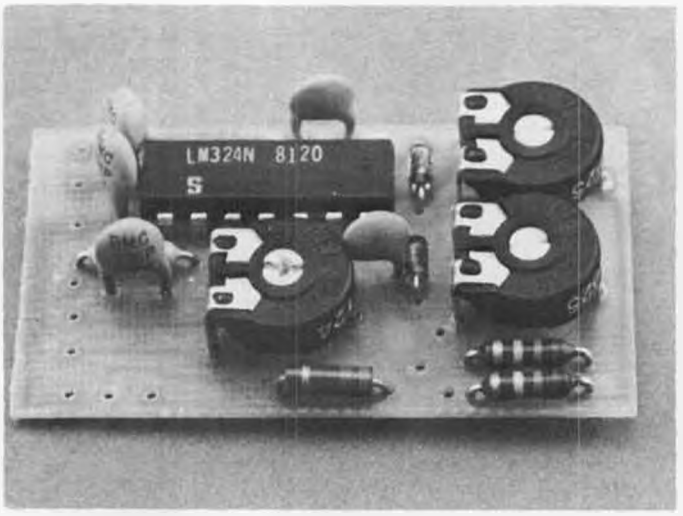
Claude McCullough has been developing a smaller version of Sig's famous Kougar, to be called the KOBRA. Designed around popular sized .25 engines, it will be available later this winter.

Also in the works at Sig is a new, two-meter glider to be called the RISER. Strong, simple to build, it will, undoubtedly become the "Kadet" of the glider field. With lots of room for radio installation, it utilizes Sig's popular printed fuselage style

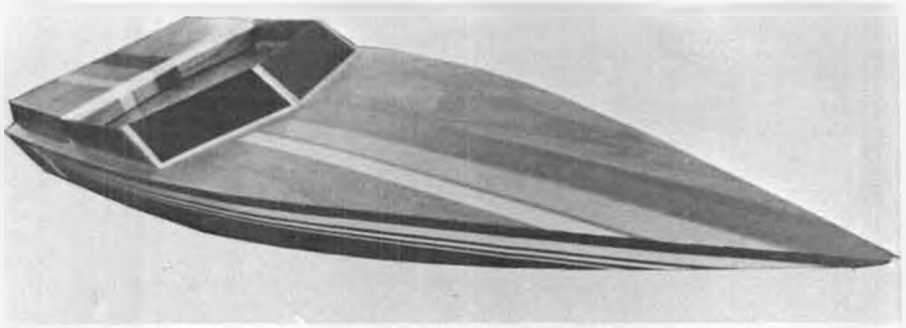
The Yard Bird, from Indoor Model Supply.

MRC's Sand Rover, electric powered off-road vehicle.





Two new options for the Ace R/C Silver Seven transmitter CAR + DIF. AIL/EPA OPTION (left) and CAR + DIF. AIL. ADD–ON (right).



J-5 Enterprises' Hurricane, for Quadra power.

of construction. Coming soon. Sig Manufacturing Company, Inc., 401 S. Front St., Montezuma, Iowa 50171.

* * *

Byron Originals has just recently announced that it is now offering the complete P-51 power system separate from its 1/5 scale P-51 kit. This unique four-bladed power unit, originally offered only with the deluxe kit, is the only system capable of effectively swinging a full, 24-inch four-bladed prop. With nearly a thousand P-51's currently out in the field, this well-engineered reduction unit has proven itself a dependable method of powering large scale aircraft. Standard items include; four rugged nylon prop blades (including all hardware for securing props and spinner to prop hub), 5-1/2 inch spinner, Quadra engine, complete reduction system, tensiometer, muffler, glass-filled nylon mounting brackets, and all necessary bolts and fasteners, one 5/32 and one 9/64 ball driver, and Loctite. Static thrust is 20 pounds @ 3000 RPM with a total weight of only 8 pounds. Price complete with Quadra engine is $314.50, or $229.50 without Quadra. Add $4.25 shipping for either package. For more information, contact Byron Originals, P.O. Box 279, Ida Grove, Iowa 51445, or call (712) 364-3165.

* * *

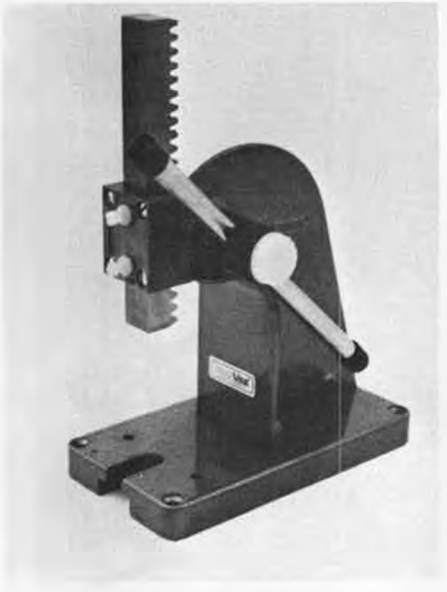
Top Flite Models, Inc., manufacturers and distributors of kits, coverings, and accessories for the Radio-Control and U-Control model airplane industry, recently announced two executive promotions. Robert T. Nickels has assumed the position of President, and G. Scott Christensen the office of Vice-President for the Chicago based firm.

Nickels, who had been Vice-President since 1976, will serve as the chief administrator for all Top Flite operations. In addition, he will direct all sales and marketing programs for new and existing products.

Christensen, Top Flite's Vice-President of manufacturing since June, 1980, will assume total coordination and direction of the firm's manufacturing facilities. He will

G. Scott Christensen, Top Flite's new Vice President.

Top Flite's President, Robert T. Nickels.



The Panapress, by Panavise Products, Inc.

Bellanca Aircruiser on floats, from Pas-M-Co plans.

Pennzoil Chapparal 2-K Indy body from BoLink.

also continue to provide creative service to Top Flite's product development program. Nickles and Christensen state they are committed to continuing the company's growth, while upholding the tradition of excellence and dedication to the hobby that was established by the late Sid Axelrod and Mike Schlesinger. Axelrod, who created a place for himself in modeling history by virtue of his inventive and engineering genius, died in August, 1981.

* * *

MRC-Tamiya has added the SAND ROVER to its line of off-road electric vehicles. The SAND ROVER features semi-pneumatic knobby rear tires for the best handling either on or off the road, plus treaded pneumatic front tires for superlative steering. The rugged ABS chassis features coil springs on the front trailing arms and an FRP stabilizer spring on the rear axles for full 4-wheel independent suspension; brass universal joints; and tough front and rear bumpers to handle those inevitable hard knocks. The speed of the long-running RS-380 Mabuchi electric motor is controlled by a variable resistor speed control featuring forward and reverse speeds, plus dynamic braking. Extra parts and a gear set are included for the optional RS-540 motor, for greater hill-climbing ability. A roll bar, detailed instrument panel, steering wheel, driver figure, and clear windshield add to the realistic appearance. Join the MRC-Tamiya Off-Road Revolution in R/C cars now! See your dealer or contact; Model Rectifier Corporation, 2500 Woodbridge Ave., Edison, New Jersey 08817.

* * *

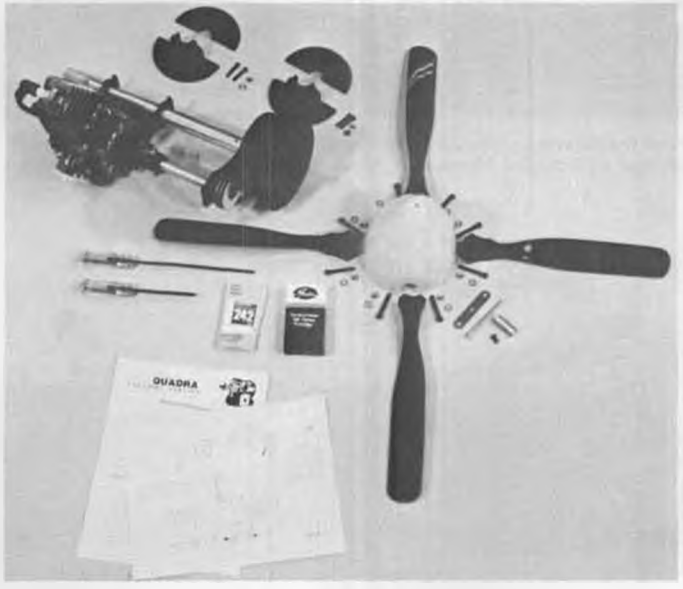
Coverite, the home of the Black Baron, reminds us that, although the Gee Bee Sportster kit has already been out for one year, Mr. Henry Haffke, the designer, has joined the staff of Coverite and the kit is now being produced under his personal supervision. The Gee Bee epitomizes the excitement of Golden Era airplanes of the thirties with its racy lines, but what has pleased modelers the most is the Gee Bee's surprisingly stable flying characteristics. It has been called "the tail dragger trainer," because it is ideal for learning how to fly scale planes. The Gee Bee weighs in at 5 to 6 pounds, has a 56-inch wingspan, and zips around on a .40 size engine. Covering and finishing in traditional scale colors are easily accomplished without a paint brush by using Permagloss iron-on coverings which are available in the correct Gee Bee Sportster colors; light blue and new cream. The kit's decals, in full color, make the completed project an eye popper on any flight line. For more information on the extensive line of finishing products from the house of the BLACK BARON, contact Coverite, 420 Babylon Road, Horsham, Pa. 19044, or call (215) 672-6720.

* * *

Astro Flight announces its newest and best Ni-Cd battery charger, the "AC/DC Auto Charger," #4005 AC/DC. This new charger is claimed to be far superior to all other chargers on the market today. The unit is rugged and designed for years of trouble-free use. UL rated at 4-1/2 amps continuous duty, the charger has been tested for 12 hours continuous charging at 4-1/2 amps with no signs of overheating.

The AC/DC Auto Charger features a continuously adjustable charge current from zero to 6 amps, and will reliably charge any pack with a rating of 100 mah to 1800 mah and containing 4, 5, 6, 7, or 8 cells. A 5-foot long charge cord is supplied (with alligator clips) for charging in the field from your 12-volt automobile battery. An equalizer circuit, with pilot light, trickle charges between runs or overnight to break memory build up. Built-in voltmeter jacks allow you safe, positive monitoring of Ni-Cd battery voltage with any analog

Continued on page 81



Byron Originals' P-51 power unit now available separately.

Astro Flight's "AC/DC Auto Charger" is latest and most advanced.

Winners at the D.U.S.T. one-design contest (l to r): Bob Carr 1st, Don Nigg 2nd, Rex Powell (C.D.) 3rd, Peter Neuer (co-sponsor), Mike Armstrong 4th, and J.P. Neuer 5th. Read more about it in the text.

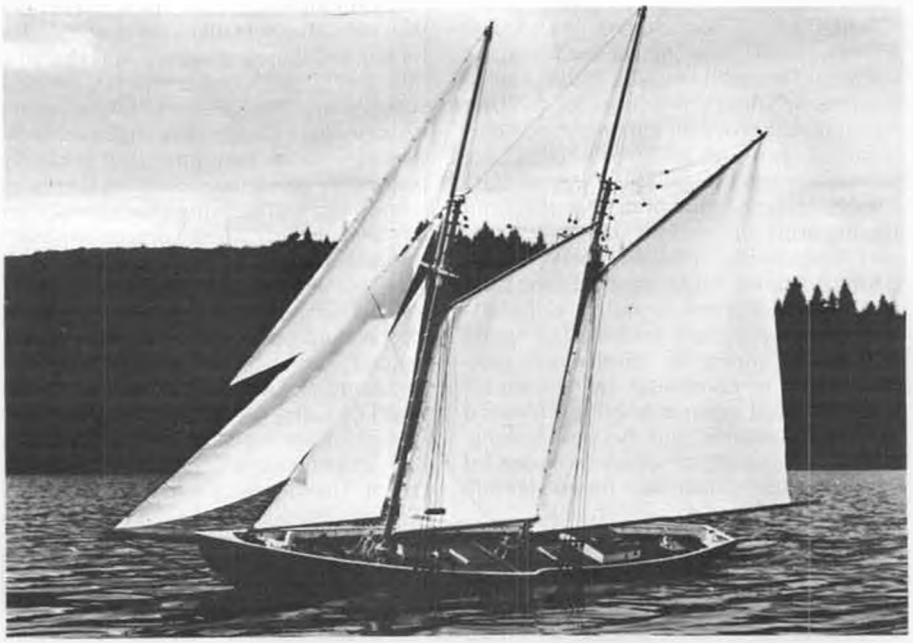
R/C WORLD

Text and Photos by JOHN ELLIOT

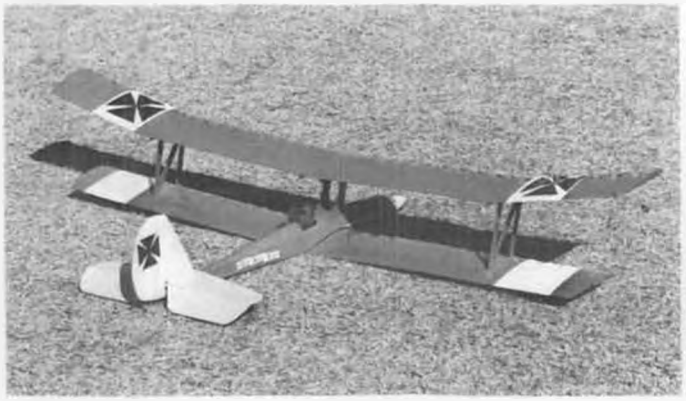
• Humble Pie is a great delicacy, especially when one serves oneself a nice slice . . . I'm referring to the LOMCEVAK contest in the January issue of **MB**. Seems that one should have *all* the facts gathered before preceding onward . . . Various aviation sources have identified *both* Jeri Blaha and Ladislav Bezak as having originated the Lomcevak. Also, other definitions of the Lomcevak were quoted, too!

Bruce Steingraber submits from an article in the December, 1970 issue of *Air Progress* on how the maneuvers is performed; quotes that the word 'Lomcevak' come from a Czechoslovakian idiom that means "Hangover", literally, "A block of wood in the head," or a "Block in the head." Jim 'Doc' Edwards, noted pattern flier, chief judge at many national level contests, and the T.O.C. and, unknown to many, a highly qualified judge of full-scale aerobatics, mentions that 'Laddie' (notice the first-name basis relationship) describes it thusly: "It is the motion the top limbs of a tree go through when you attempt to shake the apples off. Every which way, or every way but loose, if you can imagine." Thanks, Doc! (Have you ever been in the top on an apple tree with some one shaking it?)

Good friend, Howard Crispin, Jr., in his response, also submitted some interesting info on what sounds like excellent reading for anyone flying and/or judging aerobatics, full-size or R/C. Howard



Radio controlled model of the American/Canadian fishing schooner "Blue Nose" is 83 inches long. Built and photographed by Douglass Henderson. More in text.



Kinda wild biplane glider by Jim Crisman, not legal for competition (no fair, no fair! wcn).

"Reckon you can put another five pounds of lead in the nose?" Actually, they're draining tail pipe of JP-4 after a no-start.

suggests *AEROBATICS* by Neil Williams (in which *five* different types of Lomcevaks are described, the fifth being very similar to my description, and said to have caused several Zlinn's to lose their props while doing the maneuver. Probably why the maneuver was outlawed), very well written and illustrated, published by St. Martins Press, Inc., 175 5th Ave., New York, NY 10010. Price is, or was, $13.95. Many thanks, Howard. Interesting what we can learn about our hobby/sport from a simple contest, it helps us to enjoy it even more . . . Thanks, troops.

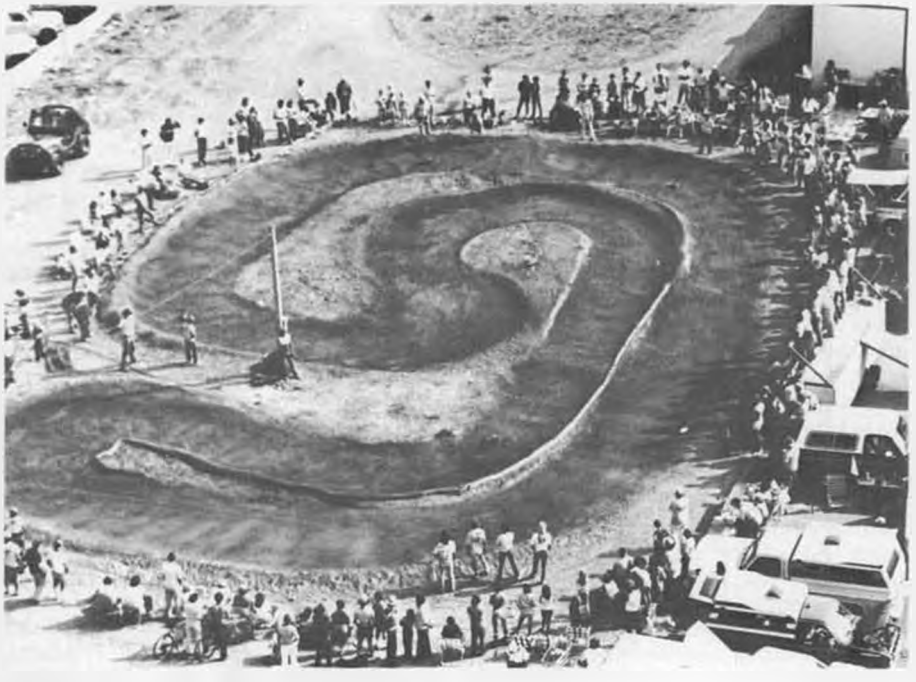
One last side note, as this is being written (mid-December) the score for Blaha and Bezak is *dead even*, with several votes for Mira Slovak. Ah, the power of the press! By the way, Frank Lee, from New Jersey, was firstist . . . Congrats.

★ ★ ★

From time to time, many clubs become involved in worthwhile projects and someone should blow their horn. Bill Semler, a very active (some would say hyperactive) CD and member of the BIRDS, was involved with the 'Trans America Rally' (Easter Seals) in conjunction with the BIRDS, and the following is excerpted from the *BIRDS EYE VIEWS* newsletter.

"For once, the Sunday flyer member of AMA was allowed to participate in a worthwhile endeavor! To advance the sport of flying R.C. . . . and while doing it, to help raise money for a very worthy cause . . . namely Easter Seals. When the rally was first announced, the Board of Directors gave its blessing on having a team from the BIRDS. TWENTY-TWO people applied for the job, and by the simple expedient of drawing names out of a hat, the team was chosen. Then came the idea of having things donated, and then to sell tickets on the three aircraft to raise money for Easter Seals. In another article, we thank the members of the modeling industry for making this possible. (K&B for fuel and engines, Futuba for radios, Zinger for props, Robart, Prather Products, Jet Hangar Hobbies, Jenesco, Walteria Toy and Hobby). And to THANK YOU, the members of this club, who sold tickets and helped raise the money. Our leg of the Trans Am was from Phoenix, Arizona, to the Riverside Speedway. We flew in two, stages, from Phoenix to Blyth (California), to Riverside. Pilots flew from seats securely fastened to the pickup truck. You were given an average road speed for the day's flying, from point A to the finish at point B. Then you figured out your fuel stops, your speed and your mandatory stops to get you to your destination at exactly the right time. You were allowed two aircraft, one for backup. Most teams used both aircraft because of failure; either pilots, conditions, or aircraft. The BIRDS team, happy to report, had no penalty points, no repair time, and flew the same aircraft both days, without ever taking the backup off the shelf! A tribute to the radios, engines, fuel, props, and above all, the pilots.

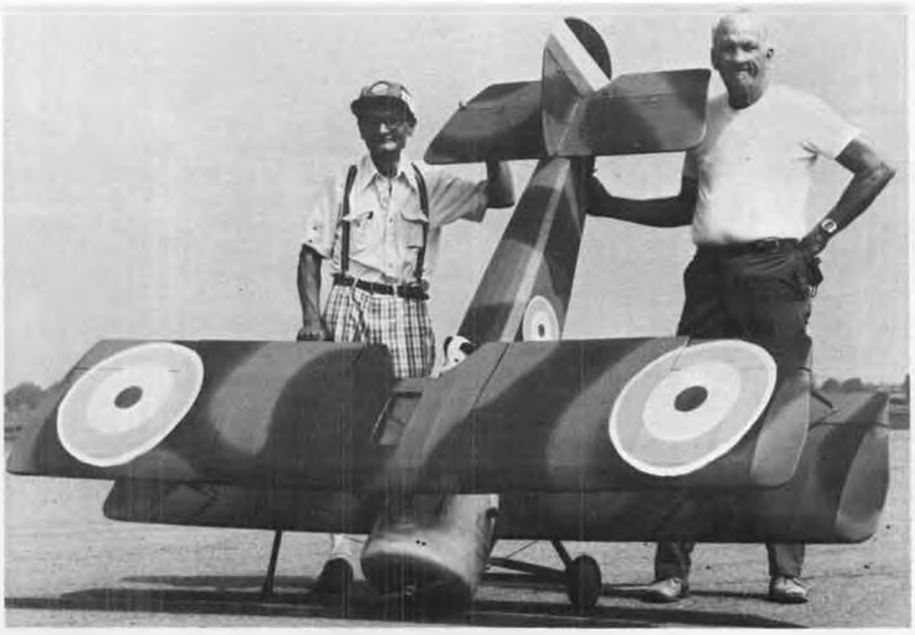
Sunburned, tired, happy bunch of drivers with their "gold" after Western R/C Off-Road Championships in Costa Mesa, California. More information in text. Photo by Jim Duffield.



Elevated view of axle-bending track, treated to minimize dust. Layout is only about 100 yards from Model Builder's office. Photo by Jim Duffield.

"It is too bad, that after deciding at the executive level of the AMA, in favor of the race, that the house organ for the AMA could not see fit to support its own effort. If they had poured on the coal in the AMA magazine, they could have really wound up with a greater donation to Easter Seals, which was the main idea of the whole thing. When you stop to realize that as many people or more were involved in the Trans Am as in the Nationals, it gives you some idea of the scope and appeal this rally had for the general membership. This is another case of a decision by the council being overridden by management, and the subsequent ignoring of the complete rally in its own house organ! Management now says the race was dangerous . . . so is Formula 1. And precision pattern, with its 130 mph guided missiles presents some lovely aspects of danger also! I had the privilege of being a CD, as well as a Team Manager on the Rally,

Just to clarify . . . original "Snow White" was designed by Bill Effinger and built by Joe Raspante. Many have thought it was Joe's design.



Leo Hopper (left), former hobby shop owner, built this Balsa USA 1/3-scale Sopwith Pup for Bill Porter (right). Power is a 3.2 Kawasaki. Photo by Jerry Lafavor.

and granted, there was the element of safety consideration but to no greater degree than a race; Formula 1, or Quickie 500; or Pattern, or, I believe, no greater danger than a Sunday's fun flying at the average field! The people involved in the race felt extremely disappointed that after giving their time, effort, and money to support an AMA sponsored function, that the AMA magazine could not find the space to openly promote, publicize, and make the Rally the huge fund-raising drive it COULD HAVE BEEN!! The only ones to suffer are the would-be recipients of the funds raised for EASTER SEALS. Personally, I am proud that our Club participated . . . and proud of the knowledge that our favorite sport was allowed to help in such a worthwhile community project, as FLYING FOR EASTER SEALS! Bill Semler."

We have learned that on March 29, 1982, between 11:00 a.m. and 1:00 p.m. P.S.T. during the nationwide Telethon for the Easter Seals fund raising drive, the BIRDS will present a check for $3000 to the Easter Seals program.

★ ★ ★

Where, but in Palm Springs, California, would you find a glider or sailplane group that calls themselves "D.U.S.T."? Perhaps the club was formed in the summer months when thr winds and *dust* does blow in the area. In any case. D.U.S.T., or the Desert Union of Sailplane Thermalists, presented a one-of-a-kind contests in early December, 'one-of-a-kind' being the sailplane design allowed for entry.

Rex Powell, the DUSTY CD, and Peter Neuer, of Precision Model Products, and the designer of the "Challenger" two-meter sailplane, concocted the idea and said, "Why not!" The planes had to be 'box stock' with only a few minor mods allowed. Three rounds were flown with a toss-out round. Weather was a perfect 70 to 72 degrees and winds of zero to 3-4 mph roared through with some thermal activity. The contest was conducted on an easy-going, low-key basis, which served several of the contestants quite well, this being their first contest ever! A unique and challenging approach to the spot landing area was the use of a 'gate' or approach zone that had to be flown through before making for the long, narrow, spot landing area. Helped to minimize the 'stick the nose in the ground' spot landing (?) concept.

Trophies were awarded for the best looking models to Don Nigg, Rex Powell, and Greg Ritter. After the 'dust' had settled, the final finishing order was as follows: 1st, Bob Carr, 2nd, Don Nigg, 3rd, Rex Powell (should CD's be allowed to fly?), 4th, Mike Armstrong, and 5th was J.P. Neuer. Trophies and merchandise were awarded through 12th place . . . After the contest, the word was, "Let's do it again." Drop a note to P.M.P., 21489 Cold Springs Rd., Diamond Bar, CA 91765, for the date of the next 'One Design Contest.'

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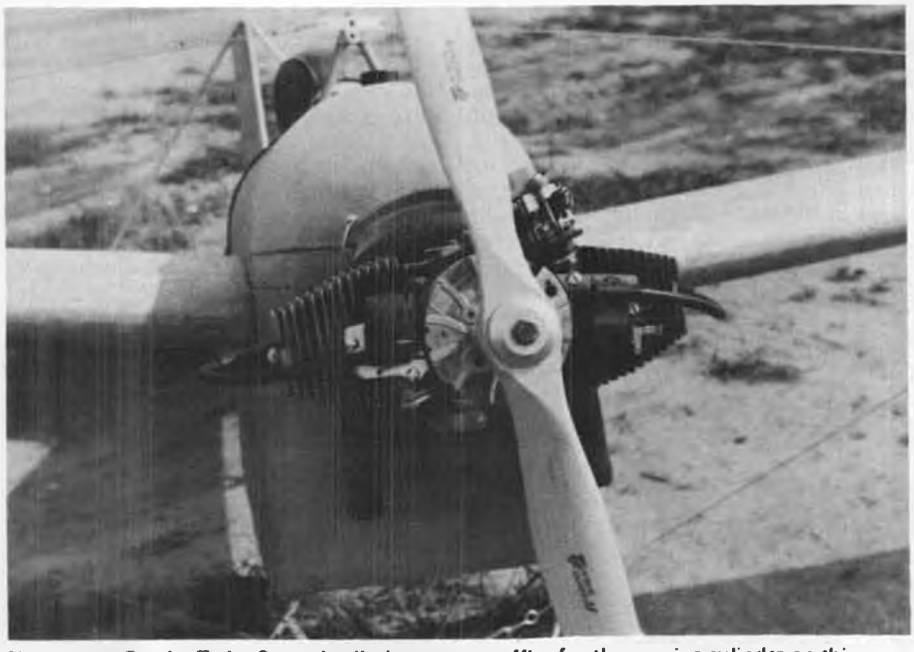
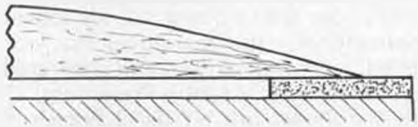


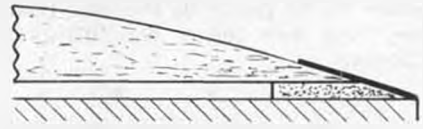
Nope, not a Quadra Twin. Second cylinder acts as muffler for the running cylinder on this Eastbourne Monoplane, built mostly of cardboard(!) by Art Schmalz, who took photo.

Trailing edge construction method developed by Woody Blanchard from a technique used by Paul Wedeking. Strong and straight!

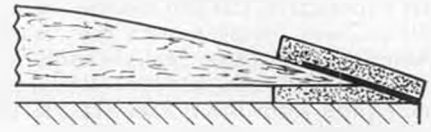


1. Bond ribs to lower trailing edge. Use Super T or equivalent.

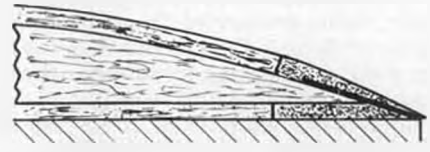
2. With sanding block, bevel lower trailing edge. Build it along edge of work board!



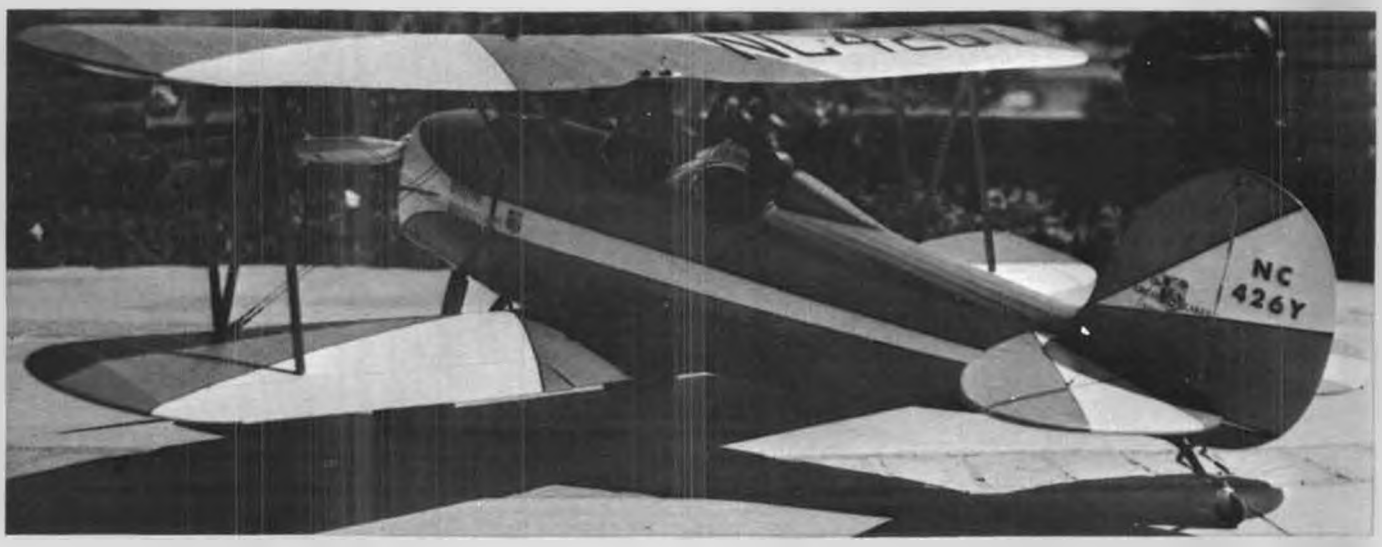
3. Bond full-span strip of 2-ounce K&B (or equiv.) fiberglass cloth, using regular "Hot Stuff" or equivalent. Sand lightly to remove bumps.



4. Bond upper trailing edge sheet to all contact area, using "Super-T" or equivalent.



5. Add cap strips, sheeting, fillers between ribs to stiffen front of trailing edge, etc. and sand edge to thickness desired.



GREAT LAKES 2T-1E one fourth scale

By FRANK COMYNS . . . Probably the most famous and well-liked sport biplane of all time, the Great Lakes has been a favorite of modelers since it first appeared in 1929. This is the stock 2T-1E version.

• Mention the Great Lakes around an air enthusiast or pilot with gray hair (if any) and see his eyes light up. Many of them will probably say it was one of their favorite planes.

The Great Lakes was first introduced to the public at the Detroit Air Show of 1929, and was an immediate hit.

The first four planes off the production line had straight wings and were found to be tail heavy. It was impractical to move the wings further back, so after some serious calculating it was decided to sweep the top wing back 9.2 degrees to bring the center of gravity in line with the center of lift.

The swept-back wing and short coupled fuselage made an average sport plane look like a small pursuit plane of that time. Orders came in faster than the aircraft could be built.

The Cleveland aircraft plant was doing very well financially, when the big depression of 1929 hit, and as orders dwindled, managed to stay in business until 1933, but like many other aircraft companies of the '30s, finally had to close its doors.

The Great Lakes has been a collector's classic since the end of World War II, and when available, can bring a price 10 times or more than the original 1931 tag of $2,985. Now, after many years, a new one, powered with an opposed Lycoming engine, can be purchased today.

Ask that old airplane enthusiast if he remembers "Tex" Rankin. No doubt he will, as "Tex" was one of the outstanding fliers of the 1930s, with many light plane cross-country records and the world record of 19 "outside loops", all in a Great Lakes.

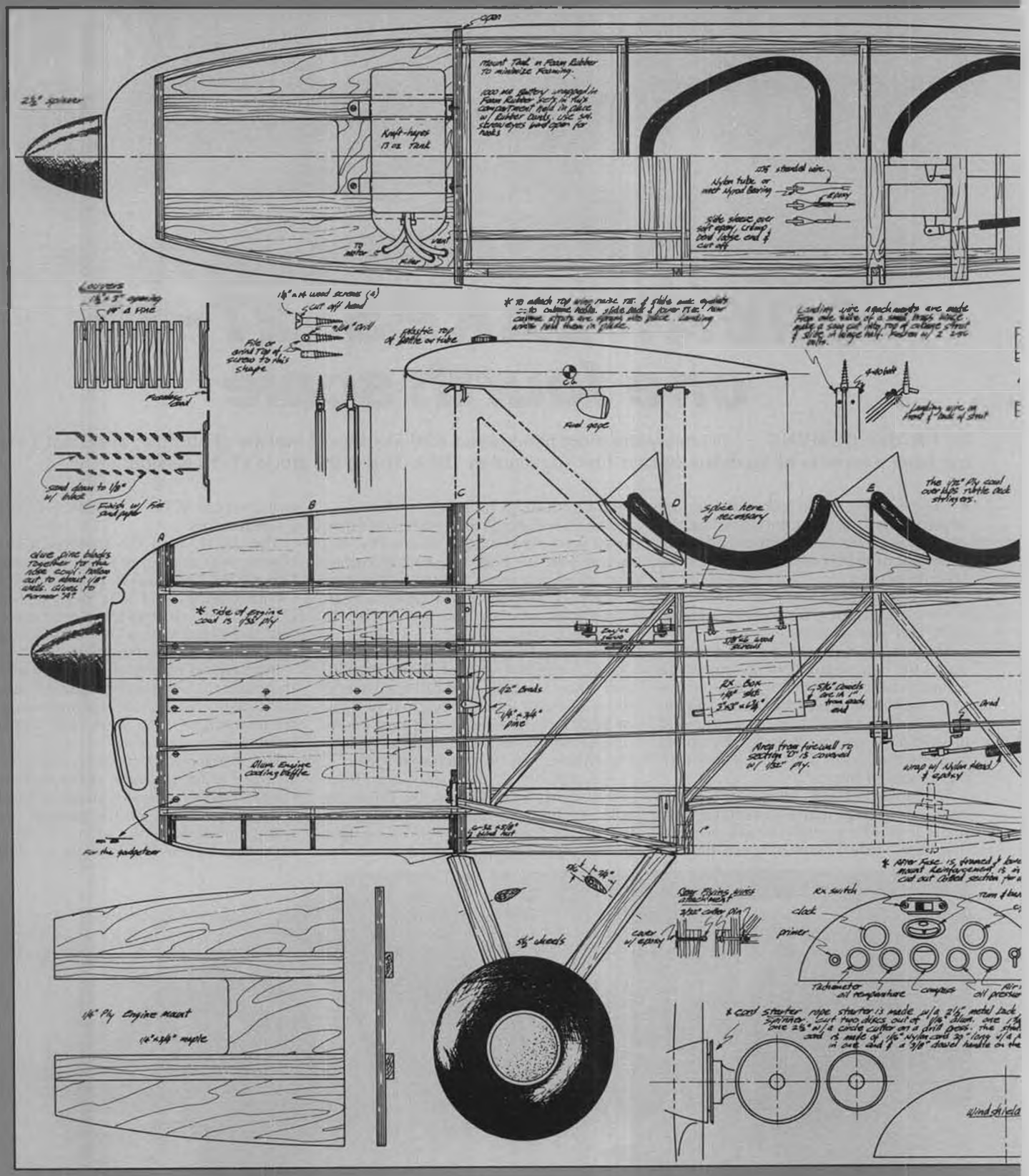
The 2T-1E, with the inverted Cirrus engine, was the last production model. The earlier Great Lakes had an upright Cirrus engine, and was designated a 2T-1A. The same cowl was used either way and could, with a little redesigning, be changed on the model.

Instruments for the front cockpit were an option to the customer. Some had no instruments at all, some had just enough for instruction. Few were fully instrumented front and rear.

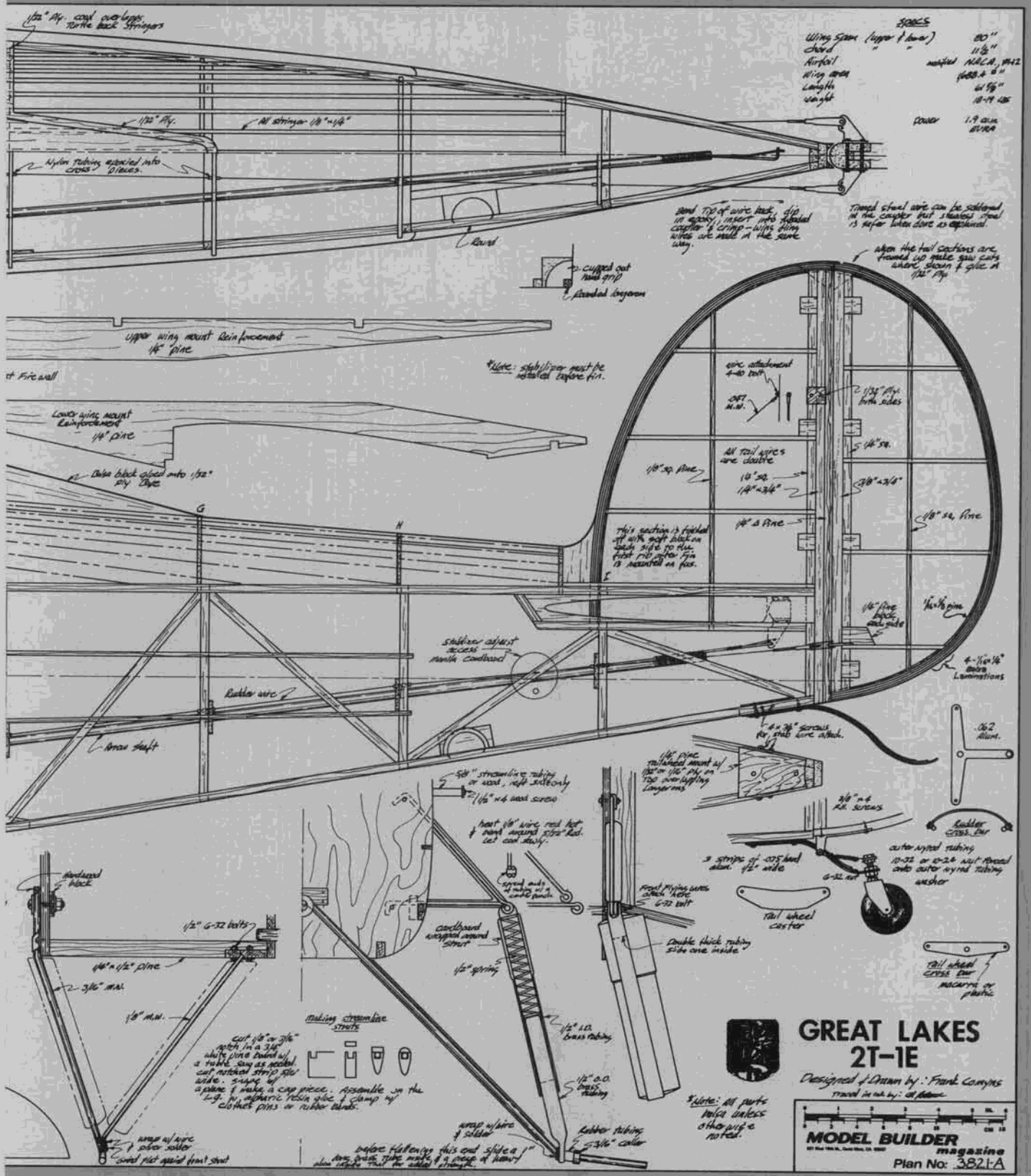
The quarter-scale model is as much a pleasure to fly, I'm sure, as the real one must have been. It is very stable in the air and handles nicely on the ground. The average modeler who can maneuver an advanced trainer would have no diffi-

Frank shows how he safely turns the prop for pull-starting the Evra engine, from aside and behind.

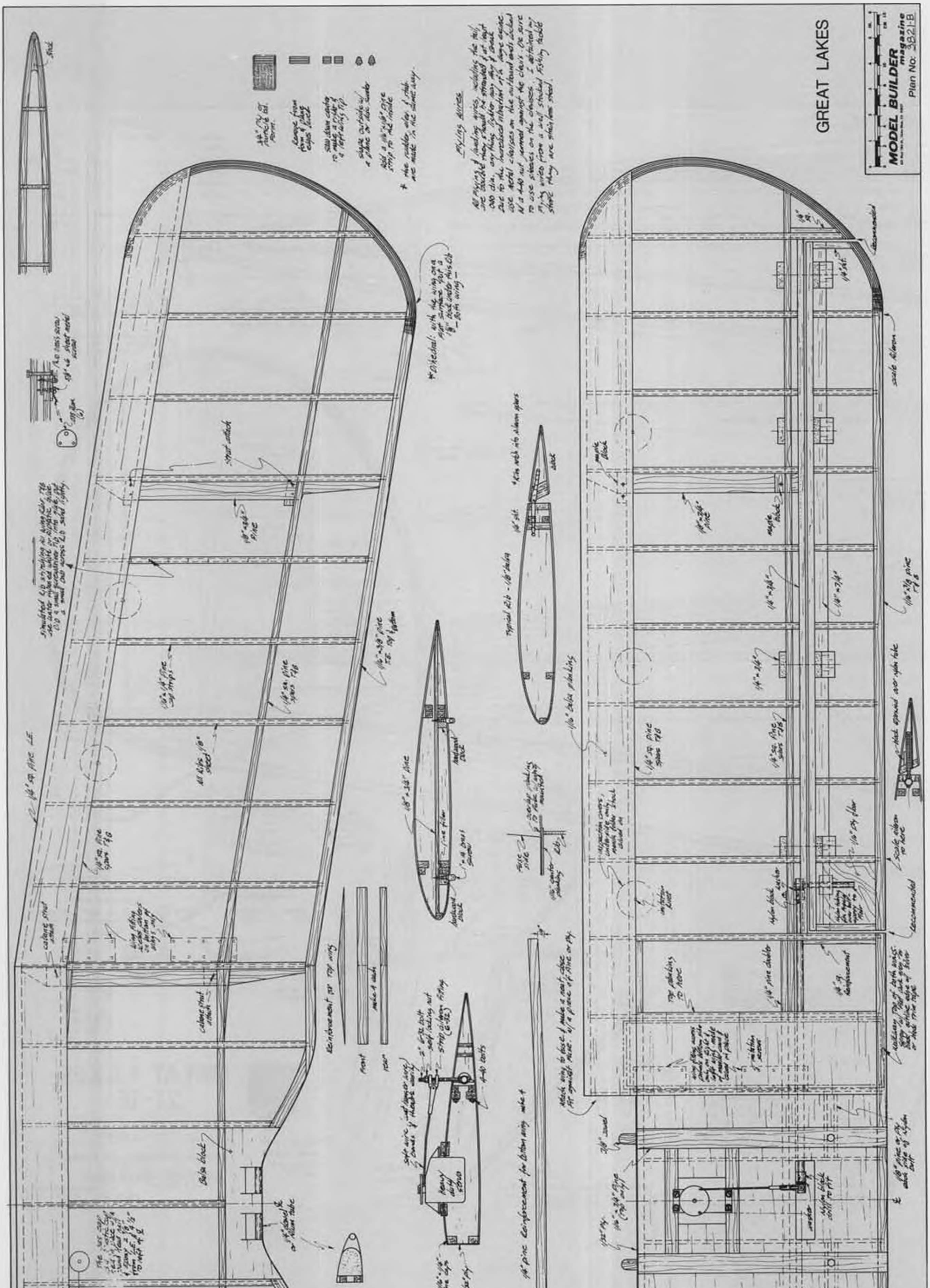
Not many, but enough! Instrument panel in G.L.T. was sparse but adequate. Note on-off switch that caused radio problems.



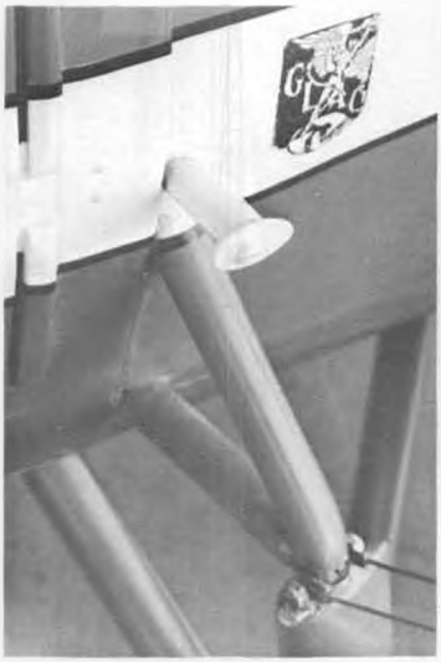
2½" spinner
Mount Tank in Foam Rubber to minimize Foaming.
Kraft-hayes 13 oz Tank
Nylon tube or meet Nyrod Bearing
Epoxy
Side sleeve over soft epoxy, crimp bend large end & cut off
Louvers
Fuselage Cord
Sand down to 1/8" w/ block
Finish w/ fine sand paper
Plastic top of battle or tube
Fuel gage
Landing wire attachments are made from one side of a small brass wire. make a saw cut into top of cabane strut & slide in large half. Fasten w/ 2 2-56 bolts.
Landing wire on front & back of strut
Splice here if necessary
The 1/2" Ply cowl overlaps turtle deck stringers.
Glue pine blocks together for the nose cowl. Hollow out to about 1/8" wells. Glues to Former "A"
* Side of Engine cowl is 1/32" ply
Engine servo
1/2" Brads
1/4" x 3/4" pine
Alum Engine cooling baffle
For the gadgeteer
Area from firewall to section "D" is covered w/ 1/32" ply.
Wrap w/ Nylon Head & epoxy
Rear Flying wires attachment
3/32" cotter pin
cover w/ epoxy
5½" wheels
1/4" Ply Engine mount
1/4" x 3/4" maple
Rx switch
clock
primer
Tachometer
oil temperature
compass
oil pressure
Wind shield



FULL SIZE PLANS AVAILABLE—SEE PAGE 100


GREAT LAKES
MODEL BUILDER
magazine
Plan No: 3821-B

Cooling baffles force air close to engine. Upright installation used same cowling.



Close-up of landing gear, step, flying wire attachment, and cooling louvres.

Steerable tail wheel is legal modification. Steering arms linked to rudder with springs.

culty flying the Great Lakes.

The ailerons are a bit slow, but adequate for sport flying. The real Great Lakes must have been similar, as some pilots added ailerons to the top wing for aerobatic show work. So adding extra ailerons to the top wing of the model will be authentic.

Although most of the wood used can be purchased in hobby shops, access to a table saw will make construction easier and considerably cheaper.

You will notice that I use a lot of pine (white pine) for construction. I have found that white pine works nicely, being flexible and with little tendency to split. Go to a good lumber yard that handles different kinds of wood and pick out a board with straight, close grain on all four sides and light in weight. Weight can vary considerably from board to board. Although not always true, I have found that generally speaking, the whiter colored pine is best for our needs. A 1 x 6-inch piece, 6 feet long will be more than enough for this model. Spruce should be just as good, but a little harder to find, depending on your geographic location.

For the upper and lower wing mount reinforcement, look in the molding section of the lumber yard for 1/4-inch lattice. It comes in various widths of white pine and is handy for building large models.

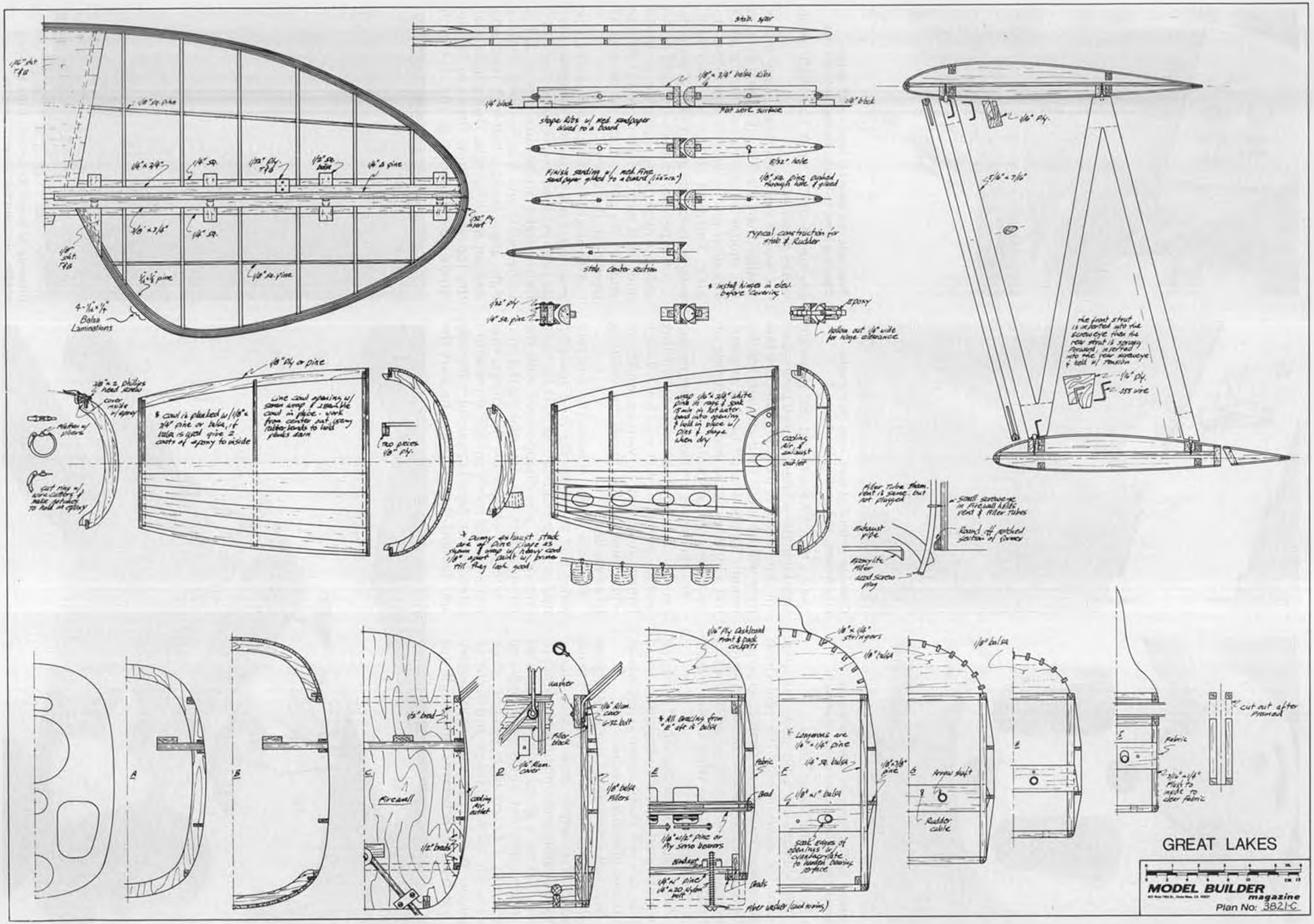
The Evra motor is powerful and reliable, but the transitorized ignition makes it very difficult to start by hand cranking. I was disappointed with the motor at first, but after making the cord starter, as shown on the plans, that problem was nicely solved, along with a safety bonus. Now I can stand to the side and behind the propeller to start the engine. A 18x10 or 8 Top Flight prop works good.

I would not recommend any motor smaller than the 1.9 cubic inch Evra, as this model is made sturdy for the extra vibration and power of a gasoline engine. Finished all up, without fuel, weight should be about 19 or 20 pounds.

An experienced builder could probably use more balsa and lighter plywood and fly it with a belt-drive or .90 size engine. Weight should not be over 15 pounds in this case.

Although cooling baffles for the engine are not absolutely necessary they do help to make it run cooler. I used two lightweight aluminum pieces 2-1/2 inches wide and 3 inches long. Make a right angle bend a half-inch from one end on the long side. Drill a hole near the top and bottom. They can be fastened to the front of the 1/4-inch

Close-up of hood latch made from key-ring holder, also another view of louvres.



FULL SIZE PLANS AVAILABLE—SEE PAGE 100

plywood "A" former with small screws. The screws are installed through the two large openings in the front cowl.

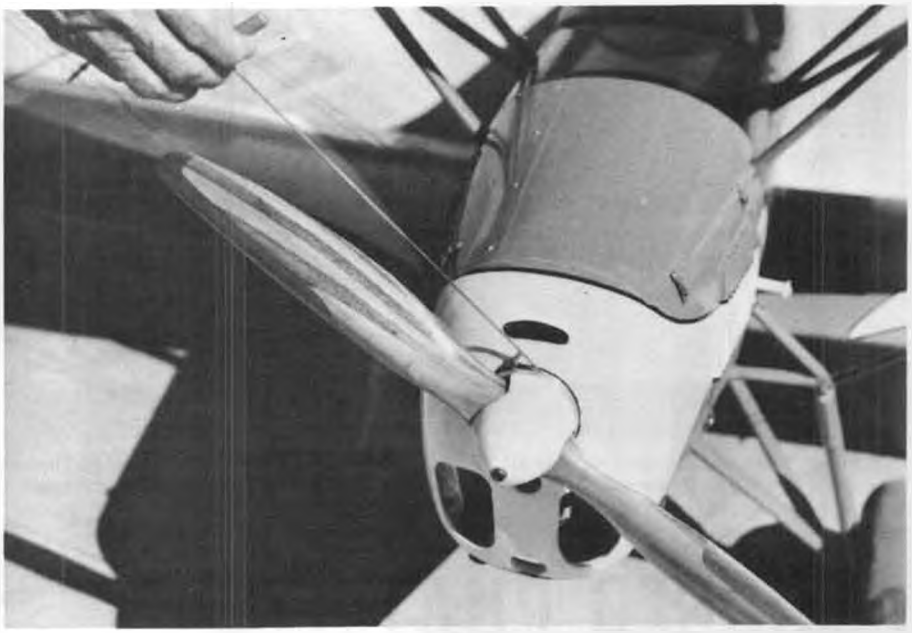
Bend the baffles around the cylinder but keep them at least a 1/2-inch from the engine. If they should touch while running, it could cause radio problems.

When I finished my Great Lakes, I ran a wire from the ground tab on the magneto to a switch in the rear cockpit and back to a ground on the motor. This was my engine ignition switch cut off. I almost lost the ship a few times until I discovered this switch rig was interferring with my receiver. So don't make the same mistake.

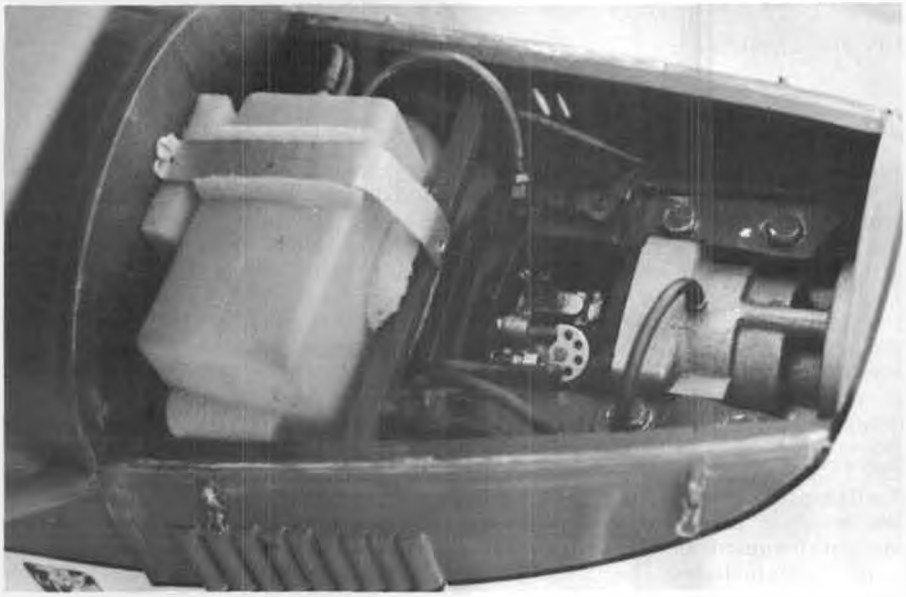
Now I have a homemade choke that runs back to the cockpit. It is a must, and can be used to stop the engine in an emergency.

FUSELAGE

Start on a piece of particle board or similar material by nailing a straight 1x2 board across the top, over the plans. Cover plans with wax paper. Line the 1x2 with the top of the fuselage frame. Assemble the two sides, one on top of the other, against the 1x2. The dotted sections in the lower wing cutout and stabilizer mount are built in and cut out later.



Close-up of cord starter, ready to spin prop. A 30-inch cord with knot in end is just right for the job. Note fingers are clear of prop blades.



Engine compartment, showing throttle hookup, tank, and choke. Extra plumbing is for smoke system. Busy but neat.

To frame up the two sides install the firewall. Use 1/2-inch brads and glue. The brads will make a stronger joint. I have a small hammer for this job, but they can often be pushed in with a nail set or sometimes forced in smoothly with large pliers.

Place the fuselage on a table, upside down, with the firewall top over and against the edge, and add the cross bracing.

Brad and glue the plywood motor mount to the firewall and assemble the engine section.

Now glue and brad the upper and lower wing reinforcement pieces to the inside top and bottom fuselage, then cut out the lower longerons for the bottom wing, also the stabilizer mount. The rest is more or less standard construction, as per plans.

Continued on page 94

Not the normal looking model airplane kit box, but everything's in there.

The completed Kobe-Kiko Hughes 300 helicopter, assembled by columnist Ray Hostetler. Yes, his dad is Wendell, the giant scale plan man.

CHOPPER CHATTER

By RAY HOSTETLER PHOTOS BY THE AUTHOR

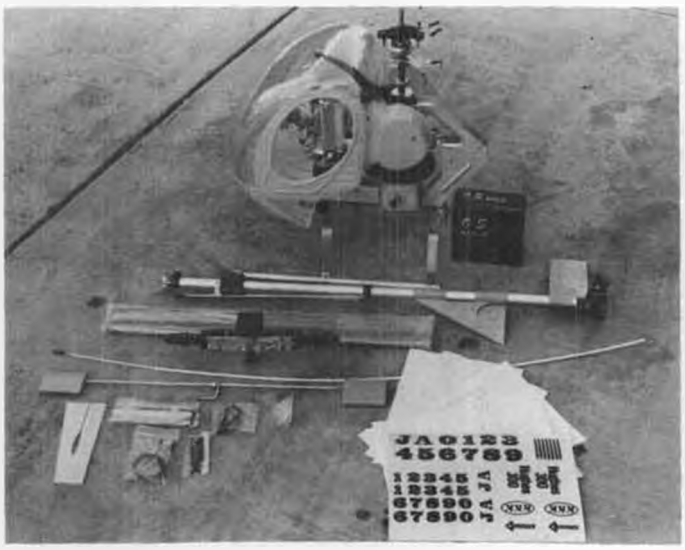
• For the next two months I'll be reviewing a new helicopter that has just been released by Orange Coast Hobbies, Westminster, California.

The Hughes 300, manufactured in Japan by the Kobe-Kiko Co., is the first imported product of this line to enter the country. Kobe-Kiko also offers a number of other scale/semi-scale helicopters, some of which may be distributed by Orange Coast at a later date. So much for the introduction, let's open the box and examine the product.

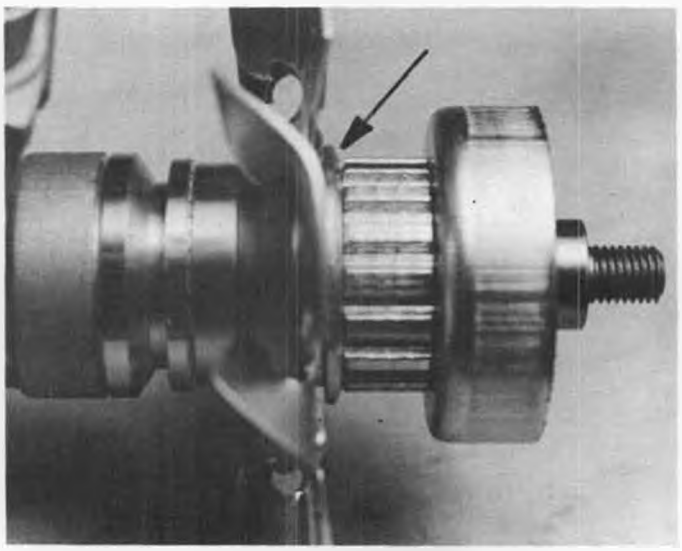
This Hughes 300 is a metal framed helicopter by design, with plastic tail fins and a moulded canopy/gas tank, which gives it a nice full-bodied appearance. While it is not a true "scale" ship, there is no doubt that it is a Hughes 300 you're looking at. It comes in a "semi-knock down" configuration, which means that the major construction is done for you. You must stick on the tail boom, add the gas tank, radio, cover the blades, balance the head, etc., before you can fly it. "Major construction" includes the main frames, landing gear, rotor head, and various push rods.

At this point I should add that the kit is available with or without an engine. Mine included the engine, an O.S. Max .50 FSH-R, specifically designed for helicopter operations. It comes mounted in place for you, with the original engine box and operating instructions included. The manual states that either a .45 or a .50 engine may be used. I would recommend a .50 size, and the O.S. that comes with the helicopter serves very well. If you don't have a healthy .50 handy, by all means obtain the engine with the kit, it will save you from the "unreliable" and "weak" powerplant syndrome later on.

Due to my personal philosophy, I elected to tear the whole ship down and start from square one. This was done for several reasons. I don't believe in running the engine in a helicopter without a thorough break in, and I hate to wipe off an aluminum helicopter after a flying session and get all the black residue from the aluminum chafing on aluminum. The paint makes everything look better, and it is more pleasureable to clean up after a flight. Plus I wanted to do a detailed inspection of all the little



All of the components, as they come out of the box. A lot of the work has been done.



Arrow points to spacer which Ray recommends beveling, as shown. Eight-bladed fan provides cooling for engine.

pieces, and look for any weak spots that could become potential problem areas. The easiest way to cover the 300's major systems is to start at the front and work back.

POWERPLANT AND CLUTCH

The engine is mounted vertically, pointing down. I believe that vertical is the best way to mount helicopter engines, as the engine torque affects the yaw axis, and can easily be corrected by tail rotor, right along with main rotor torque. (Horizontally mounted engines affect the roll axis in addition to main rotor torque changing the yaw axis.) The engine fan is mounted against the thrust washer, and the clutch is screwed on after the fan. The fan has 8 vanes, each deflected slightly to blow air over the engine. There is no shroud to duct the air over the engine head directly as there is in a Heli-Boy. I have not had any heating problems in average conditions, but there is the possibility of this system being marginally effective in hot and humid weather. A simple shroud could be added with little difficulty, and this would surely help getting the forced air directly over the head. In short, running a "weak" engine and trying to get every last ounce of power from it would not be adviseable here, or anywhere else for that matter.

The clutch is of Heli-Boy design; a one-piece assembly that engages by centrifugal force, flexing the shoes against the clutch liner. This system is nice and simple, and quite trouble free. A sprague clutch is an optional extra which will allow you to do autorotations, or have a shot at saving the copter should an engine fail in forward flight.

The engine is started by a neat arrangement on the bottom front of the side frames. When the starter is applied, this assembly pushes up to the engine, engages through friction, then falls back down by gravity, disengaging once the engine has started. No more trying to get a long starter shaft aligned a la Heli-Boy. (Schluter has modified this on the SX-81, by the way.)

The tank is mounted under the main shaft, so there is no center of gravity change with fuel burnoff. However, the tank is low and quite a way from the engine, and muffler pressure is mandatory. Given muffler pressure, the engine run is fairly constant. Maybe a touch of leaning from the last of the tank. The O.S. must have pretty good fuel draw, because I thought that it would be touch-and-go even with muffler pressure. If you happen to run into fuel draw problems it is not too difficult to reposition the tank higher and closer to the carburetor.

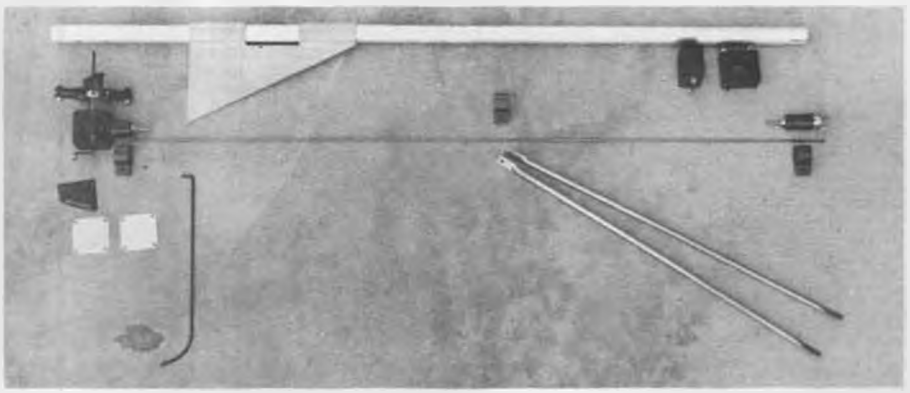
DRIVE TRAIN

The engine is geared to the main rotor via belt reducing ratios: from engine to intermediate gear, 2:1, from intermediate gear to main rotor, 4.5:1, and from main rotor to tail rotor, 1:4. This gives an engine: main rotor: tail rotor: gear ratios of 9:1:4. Assuming the engine turns 12,000 r.p.m., the corresponding blade speed would be 1333, and tail rotor speed, 5333 r.p.m. If you've followed the past articles we commented on proper gear ratios, and the 300 turns just where it should. Whoever designed the gear ratios knew what they were doing. You can set the ship up with the supplied pitch gauge, and it will be perfectly happy at that r.p.m. This turns out to be one of the Hughes' strongest points: We'll cover this more in Part 2 next month.

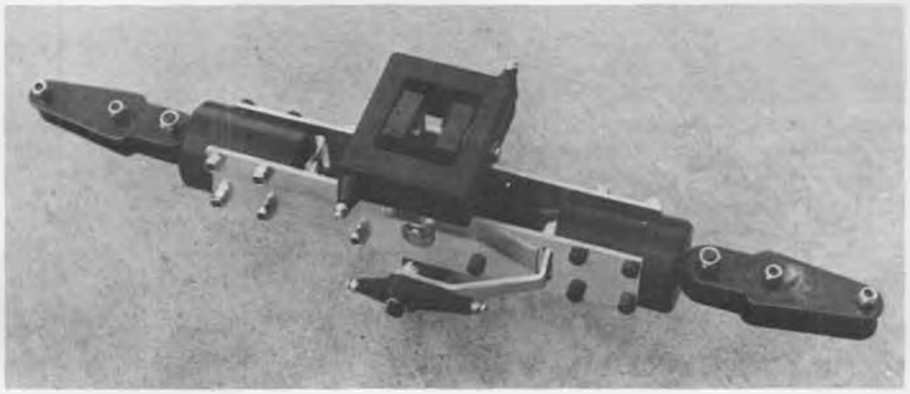
The intermediate gears are mounted on the intermediate shaft, with bearings on the top and bottom of the gear assembly. The shaft itself is "E-ringed" securely in the upper and lower mounting blocks, which are held to the frame with two bolts at each position. This intermediate shaft also gives vertical rigidity to the "U" shaped frame. (See photos.) In the event of a hard landing or crash, the "U" portion of the frame is supported, and will not compress or deform vertically, as it appears that it would. The bolt holes on the frame are elongated to allow fore-aft adjustment of the entire intermediate assembly, allowing the proper belt tension to be set.

It is important to set the belt tension from the intermediate gear to the main shaft *first*, then adjust the engine shims to tension the belt between the engine and the intermediate gear. Out of the

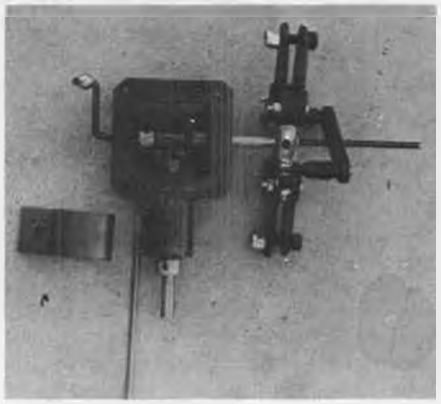
Continued on page 74



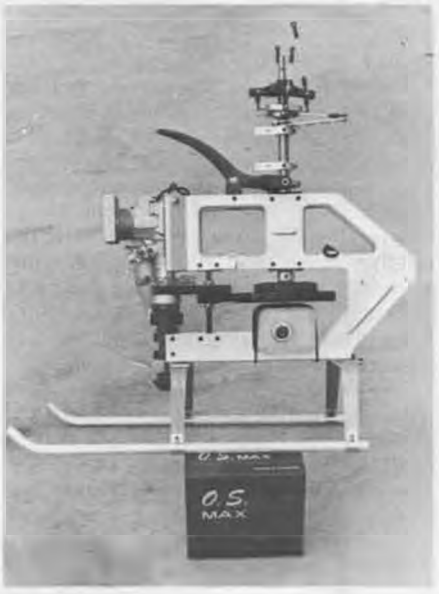
Exploded view of tail boom and drive system.



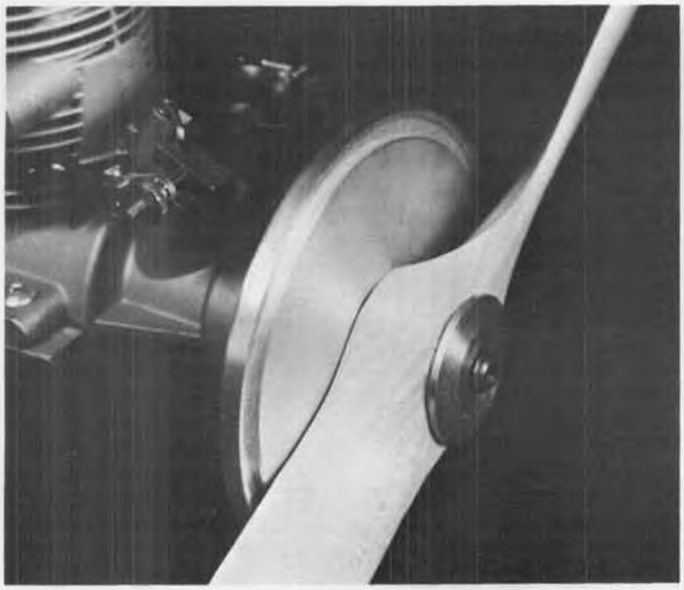
Detail of main rotor head, without fly bar installed.



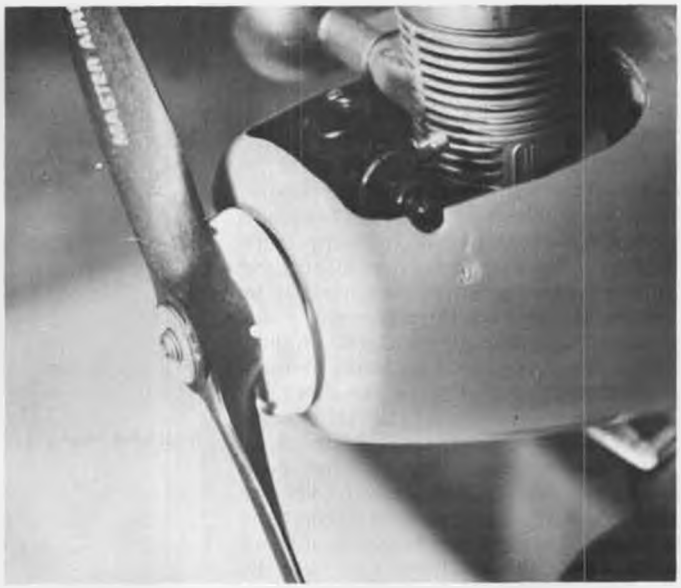
Close-up of tail rotor gear box and drive shaft.



View of metal framed construction, showing overall mechanical layout of drive train.



Webra .91 with CB spinner backplate, Top Flite 12x8 prop, and washer. Not enough shaft remains on which to thread the prop nut.



An HB .25 with Goldberg spinner backplate, Master Airscrew prop, and washer. Again, nothing left for the prop nut.

HOW TO DEAL WITH A.....

SHORT SHAFT

By ELOY MAREZ . . . Some engines don't have enough prop shaft to accommodate a spinner backplate, a prop, a washer, and still take all the threads of the prop nut. For safety sake, avoid being short shafted!

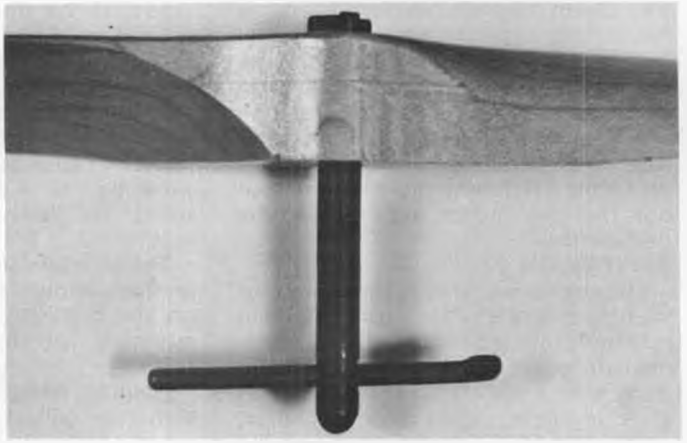
• There are some things which I just don't understand: Boolean Algebra, Scotch drinkers, Einstein's Theory of Relativity, Girls, Ugly Stik Flyers, and engine manufacturers who put too short a prop shaft on their products. I even wrote the importer of one of these engines some time ago, and after some exchange of correspondence, he came back with the further startling news that the European maker felt that the shaft was too long.

Too long? You put a spinner back plate, prop, and washer on the shaft, all standard stock items, and there was no shaft left on which to even start the nut! Too long? I wonder if these people ever look around in an attempt to determine why the unpopularity of their engines?

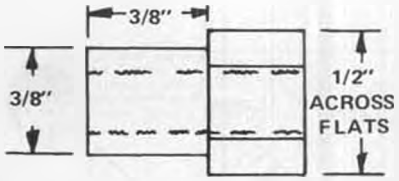
I can't believe the makers of these short shaft engines make them so in an attempt to save the miniscule amount of material and labor involved, or because the advertised weight of the engine can be a silly milli gram less. I can only assume that such decisions are made by someone whose middle name might well be Schneurle, and who might be the greatest metalurgist in the world, but who have never actually put a prop on an engine which he himself was going to fly.

I love the prop shaft arrangement on K&B's .40 series engines, on which the threaded portion of the prop shaft is separate from the crankshaft and threads into it. This gives you complete control of the amount of threaded portion that protrudes past the prop blade for whatever type of nut or spinner adapter you chose. In addition, there is another benefit, though I don't remember ever seeing it referred to in K&B's literature. The removeable part of the prop shaft is not heat treated, and therefore not as hard as the crankshaft itself. Therefore, in the event of a nose-first crash, it should absorb some of the shock and will probably bend without any distortion occurring to the shaft. I don't know the exact price of either of these replace-

Hobby Products "REAM'R" described in text. Available in three sizes, and extremely easy to use in an accurate manner.



"REAM'R" in use, shown here as it enlarges the hole in prop for the .91. You must carefully control hole depth.



Nut for use with a spinner that does not require a holding screw. For 1/4 x 28 threads, bore hole with a No. 3 drill bit.

ment parts, but I am sure that the cost of a one-inch 1/4-20 threaded un-treated iron rod is no where near that of a machined, heat-treated and honed crankshaft. It seems like such a good idea that I don't see why it wasn't borrowed by some of the other engine makers a long time ago.

Anyway, like it or not, or understand it or not, there are some short shaft engines around, which definitely pose a problem when it comes to sticking that fan on the front, and more so if that fan is to be covered with a spinner in the center. *(And remember, AMA rules call for a spinner or spinner-nut on the front of every engine! wcn)* The easiest and most often seen cure is simply to whittle away some of the prop at the hub, and while this works, it does have some drawbacks that must be considered.

If this thinning of the hub section is not done by machine in one of various ways possible, it is extremely doubtful if the hub will be of an equal thickness all around it's perimeter. When placed on the prop shaft, and especially if the hole is even slightly oversize, and secured with a washer and nut, uneven stresses will be placed on the prop which will result in enough misalignment to bring up another problem which must be avoided whenever possible, vibration.

Another even more scary possibility is that when you thin the hub, naturally you are removing some of the strength from the center section of the prop. Now, I have no way of knowing just how thick a piece of maple has to be to safely withstand my Webra 91 whirling it around at 13,000 times per, but I am willing to take Top Flite's word that at least 11/16 inches are required; which is the thickness of it's 12-8 prop. Maybe less will do the job, but I don't care to find out that it won't when I am setting the needle, even from behind, which I have formed the habit of doing. Even if the possible failure doesn't occur until you are in the air, a thrown blade at full throttle will cause a lot of damage to your airplane in just the second or two that it takes you to throttle back or the engine to die of it's own accord.

Incidentally, those RPM and prop-size figures are right out of the Webra catalog, as optimum power revs and recommended prop for them.

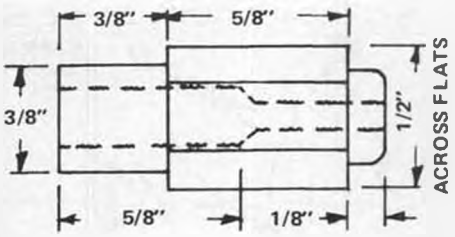
So carving off some of the wood at the hub is not the best possible solution, and we can't extend the shaft, what then? Well, we have to make a special nut, that's what.

Now, there was a time when I would not have recommended as a solution to the average modeler's problem anything that required special or hard-to-obtain materials, or machines, but too many things have changed in the past few years. One of them is the availability of a number of excellent though reasonably priced hobbyist lathes. Even though a professional machinist or tool maker might turn up his oil-splattered nose at even the best of them, they are accurate enough for our purposes. I do believe we have to be practical . . . most of us modelers don't require production type of accuracy and reliability in a tool that we use only occasionally. Then too, most of us who don't have a lathe or access to one, usually have at least one friend who does, and who doesn't mind whacking out a small job like a prop nut for us.

What it all amounts to is that you will bore out the front of the prop hole, about half it's thickness, and machine a prop nut that will be long enough and of the proper diameter to mate down into the recess, at the same time engaging a sufficient number of threads on the prop shaft to insure its safe and proper attachment. The other end of our new nut is hex shaped, for obvious reasons, and long enough so that the spinner screw that it accepts also has a sufficient length of threaded surface to secure itself.

The dimensions given are simply guides, as other engine, backplate, prop, and washer combinations will require slightly different dimensions. But you will get the idea, which is to provide as much threaded surface as possible both between the nut and prop shaft and spinner screw as possible. Too much is certainly better than too little.

Now, that business of reaming out a prop has always been a pain in the old



Nut for spinners using center holding screw. For Webra .91, drill 17/64 hole and tap with a 13 x 1.25mm tap. Other end is drilled to No. 29, tapped with 8-32. Dimensions may vary for other engines.

basic flight instrument . . . unless you have the right tool. And in this case, the right tool is called a "REAM'R", which is made by Hobby Products. It is available through normal hobby outlets; by mail from Ace R/C. This is the only reamer that I know of with which it is impossible to go wrong, no matter how hard you try. It is made in three sizes, .276, 5/16, and 3/8 inches. For our purpose, we need the latter size, I mention the others merely as a matter of information.

The "REAM'R" is a two-piece device; the 1/4 inch shank is inserted through the original prop hole, which assures a perpendicular cut by the cutting end of the reamer. A cross piece is inserted through a hole in the non-cutting end, which then becomes a handle by which the reamer is turned. Be careful, it goes through faster then you would expect.

In the case of the 12-8 prop for the .91, we opted for a 3/8 bore, 5/16 inch deep into the hub, so our "REAM'R" has a mark scribed on its shaft at that point . . .when the mark shows through the prop, it's time to quit. We recommend that you mark yours also for whatever depth of cut you design for.

One more point that I feel worth mentioning before we get down to cutting metal is that while you are making or having made this special nut,

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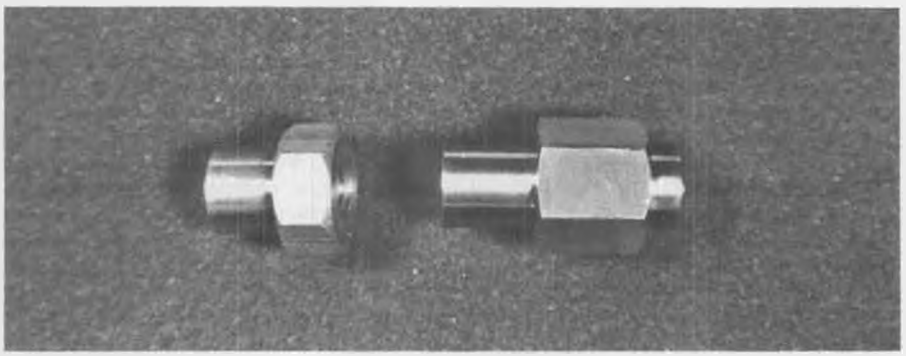

Inset prop nuts as described in text. The one on left is for spinners not requiring use of a center holding screw. Good new product idea for someone!

Smaller prop nut on two-piece spinner. Increased thread area assures safe, secure prop.

S.G.(SCALE GUY) BY R.C. SWEITZER

1 TO 1 SCALE

By BOB UNDERWOOD PHOTOS BY AUTHOR

• I've said it before! As the last week of the month approaches I begin casting about for some outstanding, earth-shaking item to include in "One to One". Those of you who read this column regularly probably are thinking right now how often such revelations escape me and the article reads just as well upside down. This month's offerings came about as a result of three phone calls within a two-day period. Several fellow modelers called about various and sundry things, however, one item appeared in each conversation.

Ron called and expressed some frustration about his modeling career. As a relative newcomer to the hobby/sport, he has passed the early "shakey flying stages" but now has reached that point where a lack of modeling or aerodynamics background has raised questions in his mind. Terms such as washout and incidence rear their ugly heads. The plotting of airfoils, C.G., etc., are beyond his expertise in evidence at this point.

The second call, from Steve, spoke to the problem of scratch building. While what he was suggesting he wanted to do (building from a set of commercially available plans), is not my definition of true "scratch building", I know the frustrations. There are many new skills necessary to achieve the goal.

The third call was from Don Allen, a St. Louis modeling friend who is not timid about tackling new or challenging projects. He also happens to be one heck of a good builder and if he ever *really* learns to fly, well . . . look out (He'll kill me for that statement!). The ability to translate the nicities of an aircraft of the big variety into the beauty of our size is a skill Don has developed in a relatively short amount of time.

After talking with Don about his latest project and his outlook for its success, I decided that perhaps there are many modelers out there who are thwarting their own modeling future by being overly concerned about the designing aspects of producing a model. Certainly in this age of complex technology, we have the capability of producing the necessary items to very scientifically develop a modeling project. We've seen many highly technical articles in recent years which require a considerable amount of scientific understanding both in terms of aeronautical engineering and math. I personally cannot handle these articles. More importantly, at this stage in my modeling career, I have no particular interest in reading them.

I'm certain that this represents a narrow minded attitude on my part. As a teacher, I encourage children to expand their horizons and to continually learn. How then, can I personally justify ignoring self development in important areas of design and aerodynamic function? Basically I feel I have spent, in the last decade, considerable energy in trying to upgrade my skills in building and flying. Time and energy has precluded expanding into other areas.

I personally would encourage others to learn only the simplest necessary items to effectively enjoy the hobby/sport in the very beginning. There are fundamental concepts which can be kept in simple, general terms. Airfoil types, center of gravity, effects of thrust and incidence, etc. are examples to consider.

Perhaps it's luck, but let me illustrate some samples which were *not* approached from a very scientific viewpoint. When I sought an airfoil to use for a sport scale Russian fighter a decade ago, I settled on borrowing one from a successful model I had previously built. The only problem was that it wasn't long enough to duplicate the chord on the prospective model. I determined the necessary chord length, laid the sample down on the paper and drew a new airfoil around it (I *know* that there are processes for plotting curves and points, but I don't know *how* to do it). Later, after I produced a model that flys very nicely, I was informed by a knowledgeable engineer that what I had done would not work (at least not very well). That model won or placed in scores of contests over a 10 year period.

When I first produced a Wittman D-12 "Bonzo" many years ago, there were many persons who suggested that I should enlarge the horizontal tail area. Other helpful people provided scientific evidence that because of Reynold's numbers and this and that, that the darn model probably wouldn't even begin to fly. One friend looked at the wing, clutched his heart and almost died on the spot. I had simply drawn the scale airfoil from the three-view. I was naive enough to believe (A) that if the real one flew that way, why not the model, and (B) the person who did the three-view knew what he was doing and knew the airfoil. The model wing has a 16-3/4 inch chord, is only 1-1/16 inch thick at its thickest point, and the high point is about 40 to 45% of the chord. The tail surface is *very* small. It flys beautifully.

The DeHavilland DH-88 with its fantastically thin pointed wingtips contains airfoils, both in their shape and thickness, that were arrived at by the eyeball school of engineering. While it had handling problems on the ground, it was a great flying machine.

Please do not misunderstand and believe that I am suggesting that we throw out all the research and science involved in developing model projects. This is a most helpful and productive field that can make our own efforts really worthwhile. What I *am* suggesting is that you should not let a lack of knowledge in these areas prevent you from enjoying the hobby/sport. Certainly knowledge is valuable, and I would encourage you to learn and stretch your mind. Don't just say it's hopeless and turn away from projects you are interested in.

I recall reading some time ago, somewhere, something about that if it looks right it will work. In my research for the Wittman D-12 "Bonzo" I discovered that Steve Wittman was not exactly an aerodynamic expert. He told me basically what he did was to take the surplus engine and figure out the smallest practical airframe possible. The result was something less than beautiful. There were no wind tunnel tests. When it didn't go fast enough with a 21 foot wing

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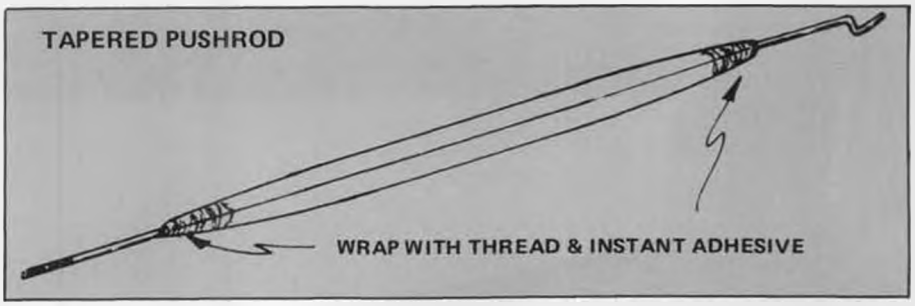
Pattern Flying

By DICK HANSON . . . Doing any maneuver properly, whether in competition or not, requires a "straight" aircraft. Here's how to check yours.



• Every now and then we create a plane which just simply refuses to trim satisfactorily. Most of us know how to measure well enough to eliminate obvious warps, but finding the subtle differences can be a problem. The following suggestions may help.

The first thing to do is list all the problems you tried to correct; some may be interrelated. The next thing to do is list any *corrective* trim adjustments you have made, such as 1/6-inch left aileron trim, 1/8-inch right rudder trim, etc., etc. Finally, list all the annoying flight characteristics which persist even through the trim adjustments *seemed* necessary.

I know this sounds like the classic gag, "How to make a million dollars and not pay taxes." (Answer . . . first, make a million dollars, and second . . . don't pay the taxes.) Just bear with me.

Let's go through a checklist:

1. Is the model built according to the designer's recommendations?
2. Is the model over design weight specs? (This can change things dramatically.)
3. Does the model fly at design speed?
4. Does the model pass the following tests?

WING:

1. Each half the same size *and* thickness (ailerons too).
2. Each aileron has the same stiffness.
3. Each aileron has the same freedom of movement and travel.
4. Is each aileron aligned in the same manner to its wing panel (high-low, wavy, etc.)?
5. Does each landing gear fit and align the same?
6. Using a non-staining fine marking pen, develop a new center line on leading edge and tips. Cut/heat or reshape until panels are equal . . . don't fret over slight deviations such as small dents, but make certain thickness curves are the same.
7. Balance the wing independence of the fuselage.
8. Sight the wing using technique shown, and look for variations.

Repeat technique described for wing . . . the alignments here are *more* critical than the wing because of the leverage.

Example: If the plan is a conventional design (not a canard), the stab and elevator provide a down force to keep the plane aligned in pitch (up and down). Also, they act like the feathers on an arrow and keep the flight path aligned with the C/L of the fuselage. *If* one stab provides more force than the other, the resultant drag will cause the model to skid or roll slightly, or, if the plane flies in a slightly crabbed attitude, the first reaction will be to correct with aileron (for roll) or rudder (for skid). Always remember, *warped stabs are probably the least understood and the most elusive of any trim problems.*

FUSELAND AND VERTICAL STAB/RUDDER

Using a long and perfectly straight scale, draw a large grid on the workbench and center the fuselage on it. Note the intersecting points relative to the fuselage which would indicate a curved or distorted portion, especially aft of the wing.

If the vertical stab is sunken on one side or twisted, remove the rudder and cut and insert styrofoam ribs to correct the shape. Remember, equal is more important than any other factor.

ENGINE ALIGNMENT

If the airframe is designed correctly, this is not too critical . . . usually making certain that there is some right and down thrust is sufficient. We use down and right thrust on almost everything, except on extremely light and fast designs.

The larger the prop and the slower the design, the more critical this becomes. If the model has bad pitch change characteristics, it's probably due to a thrust line position which is effectively too low.

CONTROL LINKAGE

I believe the hook-up should be as "tight as possible", mainly to keep vibration from hammering the servo to pieces. The best set-up is the one with the lowest mass possible.

If you are using pushrods, a tapered spruce stick is the best I've found (see sketch). The elevator pushrod should run directly down the fuselage center for the most predictable results. This is most important for split elevators. The rudder pushrod should also be extremely stiff, with as few wire bends as possible. I run the pushrod from the exit on one side to the servo on the opposite side.

Aileron hookups should be stiff, with as little wind-up or springiness as possible. Separate servos located near the ailerons is a good idea, provided you are using a radio system which has extremely well matched servos.

We mentioned earlier that minor variations in the stab and elevator can cause problems. Here are some examples.

As an experiment, we built a small model with a flat-bottom, no-dihedral wing. The tail feathers were sorta like an F-4 Phantom . . . severe anhedral stabilizer and a vertical fin on top. The only movable control surfaces were the two stab halves. These were controlled by a mixer fed by two servos. As impossible as

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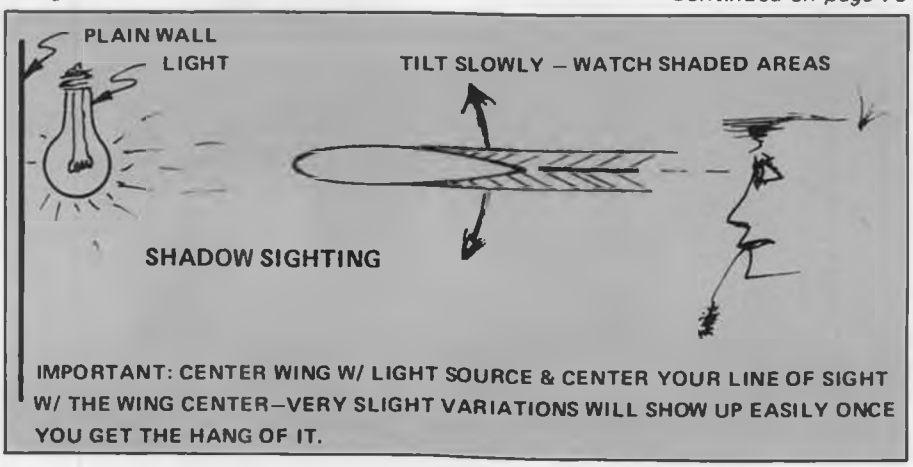
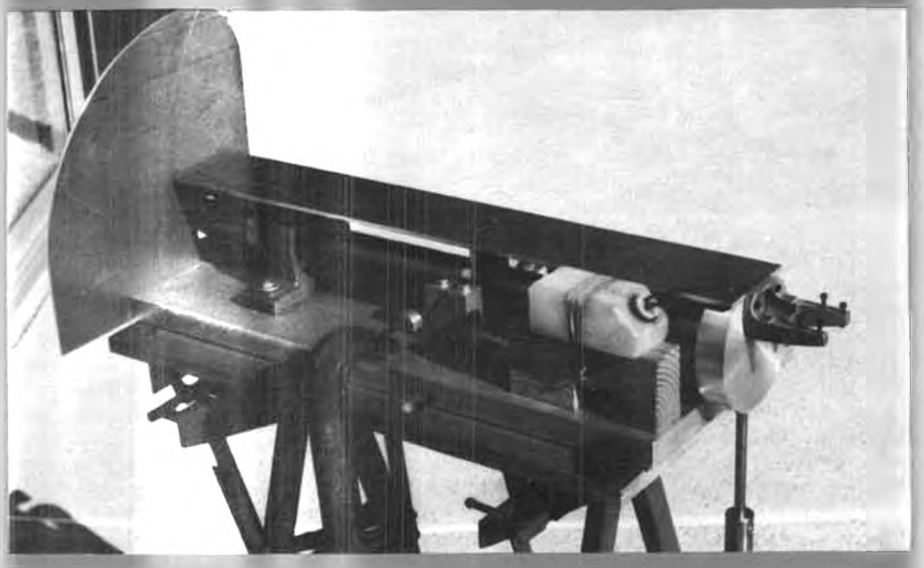


FUEL LINES

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

PHOTOS BY AUTHOR



1. The author's dynamometer firmly clamped to a Black and Decker Work Mate stand. Construction is explained in text.

• Hi guys! Last month's column contained some general information about dynomometers, brake horsepower (BHP), and why we might need such things. Also, a promise was tacked on about describing, and explaining how a dynomometer works, and then doing an illustrative engine test. This month, it'll be descriptions. Next time around, there will be a walk-through of an engine test.

Take a look at the first photograph. It may not impress you. Actually, it's kind of an ugly looking contraption, but, honestly, it is a dynomometer.

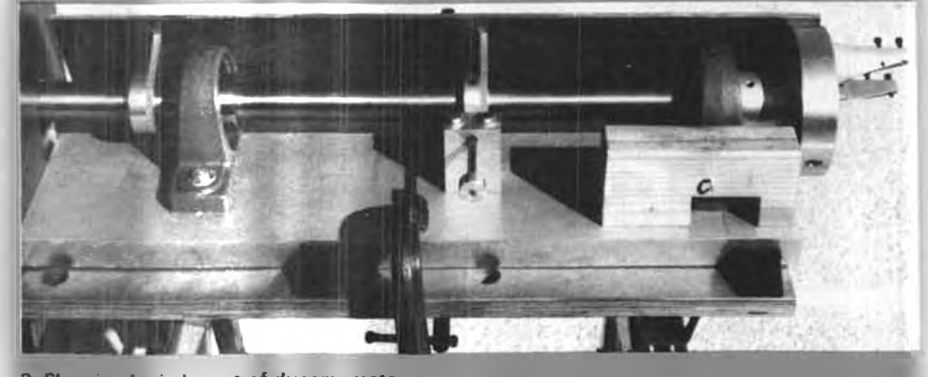
As you'll recall, a dynomometer is meant to measure BHP. To do so, it must provide rpm and torque measurements. Plugging these two figures into the following formula will give us a BHP reading:

$$BHP = \frac{\text{(Torque in ounce-inches) (RPM)}}{\text{(1008400)}}$$

However, since accurate light-reflective tachometers are readily available, the physical capabilities of our dyno need only include torque measurement. That's in keeping with KK's (my nickname) philosophy, namely, KISS: Keep It Simple Stupid! That was the goal in the design of this dynomometer.

Torque it is. But what's torque? Torque is work. The only technical difference between it and work is that the latter is scientifically expressed as inch-ounces, and the term for the former is ounce-inches. We all frequently juxtapose *(Is this the way it's gonna be in 1982, Joe? wcn)* these words, and I guess that's a scientific boo-boo, but it really doesn't matter. The end result of the information equation is still BHP.

OK, how about taking a second look at that first photograph? The upper part is the dyno . . . the lower is a Black and Decker Work Mate. It's a sturdy base, and with the addition of a couple of "C" clamps, the dyno won't become airborne.

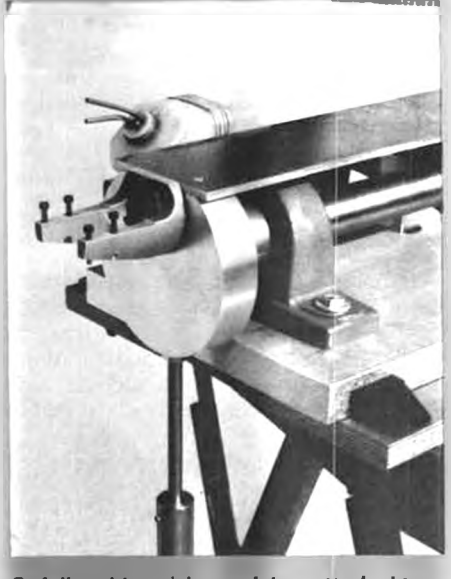


2. Showing basic layout of dynamometer.

Photo two is next, and it is the basic key to understanding the torque principle of the dyno. Obviously there's a shaft mounted on two pillow block ball bearings, together with a face-plate/engine-mount on one end. The shaft and mount rotate quite freely and are restrained against engine torque by a load . . . an adjustable-weight pendulum attached to the face plate. This is shown in both the first and third photographs. In the third, you can see the weights for adjusting the torque load. Further, this photo is a good one for some comments on engine mounting. As you can see, the beam engine mount is located off-center. Will this affect measurements of engine torque? Not in the least. Not only that, but no complex vector computations are necessary. Simply stated, if the engine crankshaft is parallel to the dyno shaft, then torque readings on the dyno shaft will always be the same for a given engine/prop load no matter where the engine mount is located on the face plate. The sum of the vectors, for all locations on the plate, is always equal as long as the shafts are parallel.

By now, you have a good understanding of the concept of KK's dyno . . . engine torque transferred and working against a pendulum load. Fine, now let's measure it. On the other end of the shaft (behind that rather large plate) is a pointer. It's shown in the fourth photo.

Tying it all together, an engine will torque against a pendulum load, and this will be indicated by the pointer. But how much does it indicate? Again, to keep things simple and avoid constant, time-consuming calibration of a complex system, KK just marks where the pointer settles under a given load, reads rpm on a tach, stops the engine, attaches an accurate torque meter to the pointer nut, and then measures the torque by rotating the pointer to the mark. The fifth photo shows a couple of accurate



3. Adjustable weight pendulum attached to face plate.

4. Measuring pointer on aft end of dynamometer, with oil dampner to prevent surging of pointer.

5. A couple of accurate torque gauges (plus or minus 1%).

(±1%) torque gauges. In the next picture (number six) you can see the torque gauge being used to work against the pendulum load until the pointer matches the mark for that load.

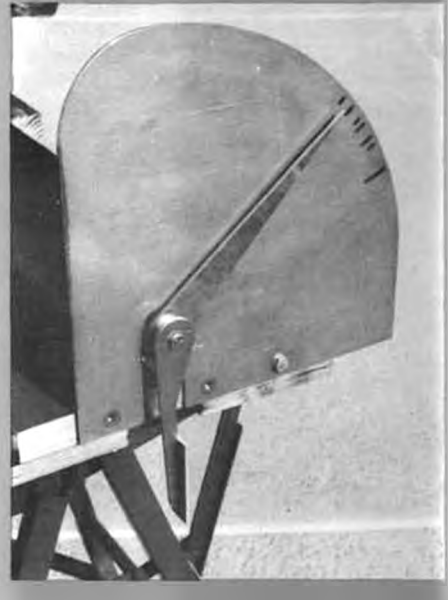
As you can see, it's a very simple dyno, but it works very well, and it will provide accurate readings for BHP computation. Now, if that sounds like a declaration of a flat out successful design, let me assure you that it wasn't perfect off the drawing board. Why? Well, because the thing was so sensitive that even 100 rpm variations would cause the pointer to surge back and forth. It usually was only a quarter of an inch or so, but that meant interpelating where to mark the pointer. To solve this problem, an oil dampner was attached to the rear of the shaft, underneath the pointer. It's that pie-shaped container you see in the fourth photo. Inside the container, a paddle (photo seven) moves through oil which dampens the oscillations without affecting the load. That's all that was needed.

A brilliant design? Not really. KK didn't invent a darn thing. All that was involved was the application of long-established principles of physics. Further, there are many, other excellent dyno designs. Each has its own merits, but they all use the same basic principles, and they measure BHP either directly, or indirectly by providing figures for mathematical BHP computations.

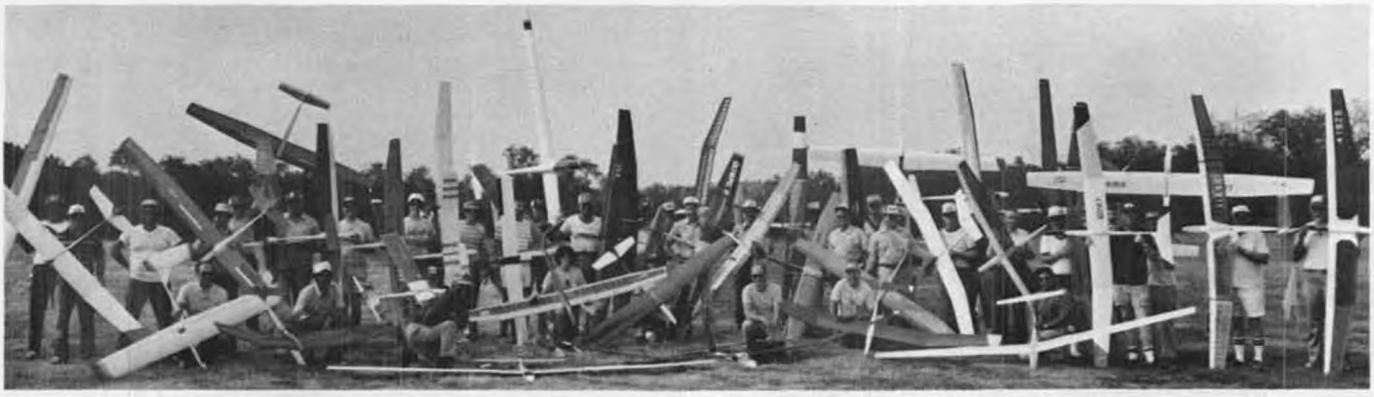
One or two other comments. The platform above the shaft is used for mounting tuned pipes. The reason that such a long shaft and mount is used is to provide the capability of testing the long pipes associated with .90 and larger engines. The one-inch thick aluminum base plate is 10 inches wide and 24 inches long. The shaft is one and a quarter inch steel. The dyno, less the Work Mate stand, weighs 46 pounds. If, by chance, anyone would like more specific construction details or supply-source information, just send me a letter. I'll be glad to provide any data you ask for, as long as you include a large, stamped, self-addressed envelope.

Next month: an illustrative engine test on the dynomometer. Happy modeling.●

6. Torque gauge being used to take measurement of work against pendulum load.



7. Paddle on vertical arm moves through oil to dampen sensitive movement of pointer.



A whole gaggle of R/C sailplaners at the Fourth Annual Empire State R/C Soaring Classic.

R/C SOARING

by Dr. LARRY FOGEL.

● What's the future of R/C soaring? What will happen by when... and, how could this affect you? Obviously, looking into the future is difficult. There's no way to be certain about coming events, and yet there are trends in the technology that will continue to affect R/C soaring design, construction, and flight performance. Perhaps the good way to begin is with a glance at the past.

R/C soaring was born in the late thirties and early forties... a coupling of free flight and amateur radio. A few pioneers first proved that it could be done... you really can carry that much size and weight in a model sail-plane. Hey, remember those inverted bottles they called vacuum tubes? R/C soaring began in earnest when free flight gliders were expanded to 100-inch span and beyond.

Early in the game, vibrating reeds were used to separate the binary control signals. Then you could have a single channel proportional control in the form of a pulse rudder... or maybe even "Galloping Ghost," which was a pulsing of both rudder *and* elevator from a single channel. Talk about aerodynamic efficiency?

The sixties and seventies gave us digital proportional sets with channels for rudder, elevator, flaps, spoilers, and whatever else you might think of. Two-channel bricks became common. Here the receiver and two servos were embedded in a single container for easy compact installation... bought at a cost in terms of lay-out flexibility. The four-wire servo systems were replaced by three-wire systems that provide greater protection against catastrophic failure of a single battery cell. Finally, we could depend on really reliable rechargeable digital proportional radio equipment... except on the frequencies affected by the growing misuse of C.B. You could even add a thermal sensor to indicate rate of climb by the frequency of the audio modulation radioed down from your sailplane.

And our hobby grew in the number of participants, the diversity of their planes, and the events they flew. Larger planes allow higher altitude, longer duration, cross country flight. Smaller planes are suitable for aerobatics in restricted lift... and there's the convenience of that size aircraft. The "floaters" were generally replaced by sailplanes capable of greater speed range. Scale ships fascinated those willing to put in that amount of time and effort.

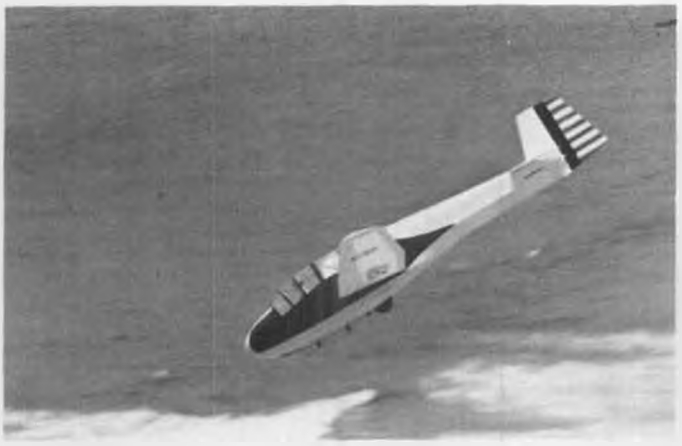
Nowadays, the traditional balsa/plywood framework structure is still common, and you don't have to look far to see a fiberglass fuselage and foam core wings. Kevlar and carbon fiber reinforcement is used to cope with lightweight high-strength requirements. (By the way, D.L. Dahm suggests that Kevlar "fuzz" is easily burned off with a hot microflame torch... "like singeing a plucked chicken." But he warns you to be fast and careful.)

Now you can buy AM or FM transmitters that allow individual servo reversal to facilitate installation, dual rates by channel, change in the range of servo throw and even the manner in which they follow the stick displacement. You can have linear or non-linear sensitivity of each control stick and mix the control signals in the transmitter to take care of ailerons, V-tail, or elevator as a function of flap or spoiler position. Some transmitters provide a battery/transmitted power meter and even incorporate an electronic clock to monitor your accumulated flight time.

The currently available microservos encourage rocket-boost radio control gliders and those of us who simply get their kicks out of micromechanisms that really work. You can use alkaline cells for long duration or perhaps turn to lithium cells for such special single-shot events. You can install

Ron Leon (left) and Bill Slining hold their "militarized" Spitefuls.

"Murph" Misewicz and his big Schweizer TG-3 military trainer.



Murph's Schweizer TG-3 dives to gain speed over the cliff at Torrey Pines.

Ron Leon's Spiteful in flight. Markings add some realism.

solar cells in your wings to recharge your battery while you fly. You can now purchase a no-moving-parts stability augmentation device from Watson Industries, Inc., Eau Claire, Wisconsin. It's about the size of a conventional receiver, weighs less than three ounces, uses less than 1/8 watt... and costs a bit. You might place a strobe light under your fuselage that pulses at a rate proportional to the rate of climb. This removes the need for a down-link, and helps keep your plane in view while at high altitude.

Some trainer planes have been made of expanded bead foam. Soon self-skinning foam will be used as a basis for inexpensive sailplanes made of molded replaceable parts. Here the strength depends on the thickness of the skin, which in turn depends on the temperature of the molding process. The thicker the skin, the greater the strength and weight. Proper design requires varying the skin thickness over the surface of the aircraft in proportion to the need. Here's a real engineering challenge. In the 1990's, certain new materials will become available, making wings and fuselage an order of magnitude stronger than today's graphite fiber designs... and this *without* greater weight.

A few years ago, Westport International, Inc., introduced a new mode of radio frequency operation to provide clearer signals at the same average power output and a protection against interference. You see, the conventional set-up operates a continuous carrier interrupted to mark the pulses that translate into channel and control surface position. The Westport system operates in reverse... sending only the pulse of the carrier that indicates the channels and control position by channel. You send much greater energy during each pulse and still have the average power within legal limits. The receiver damps out unwanted signals, and will generally disregard transmissions by any conventional system operating on the same frequency. That's surely a big step in the right direction.

The Skyhawk really moves, in flight here at Torrey Pines.

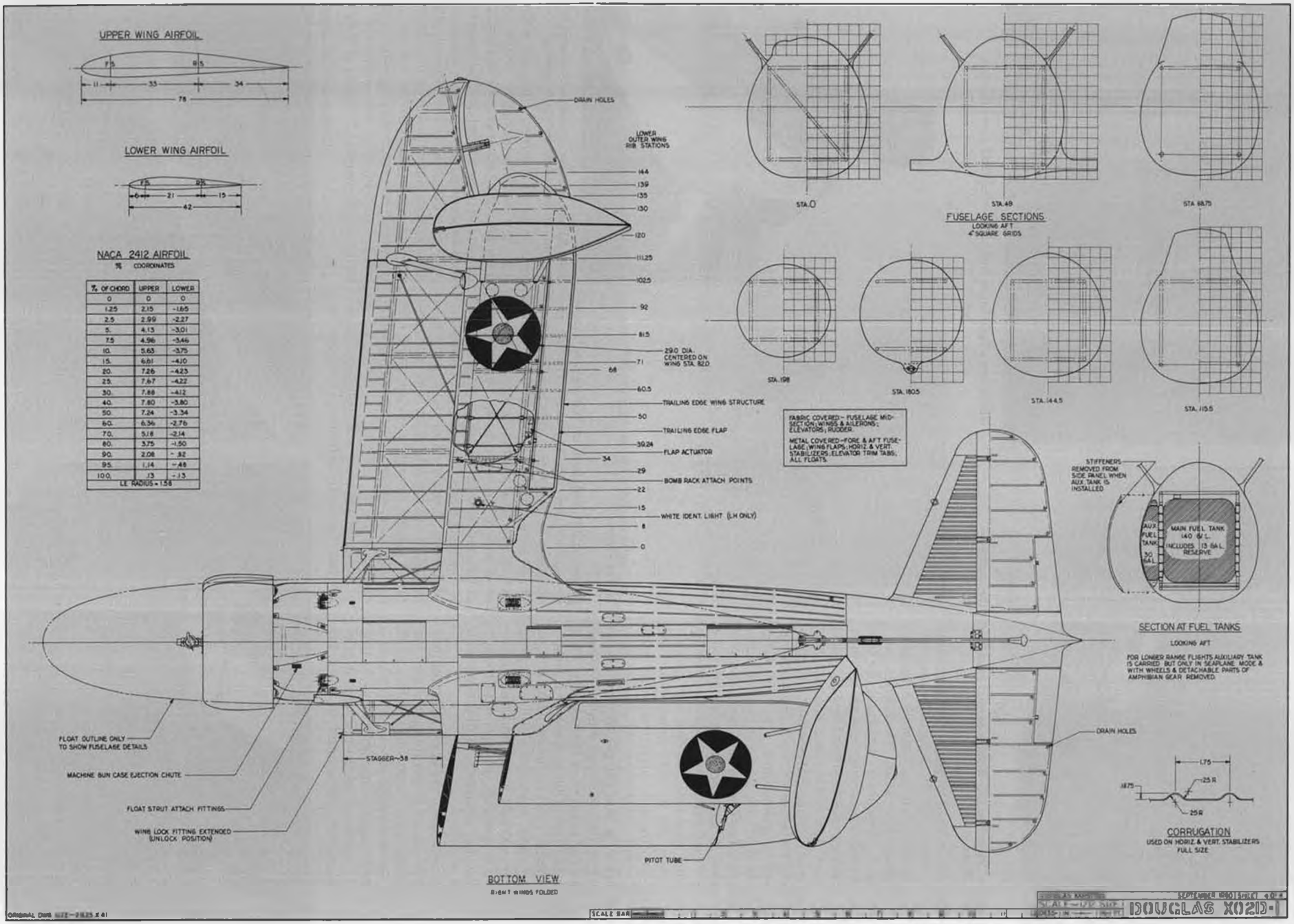
The radio spectrum is already too crowded, but the cry for additional frequencies may cease when timesharing and encryption are widely available. Here, you transmit your personal code before each command pulse sequence. The decoder in your airborne pack recognizes and accepts only your commands, even though others may be transmitting pulses on the same frequency. Your transmitter sends these command sequences at varying intervals, or even aperiodically, to minimize interference between r.f. signals sent by the

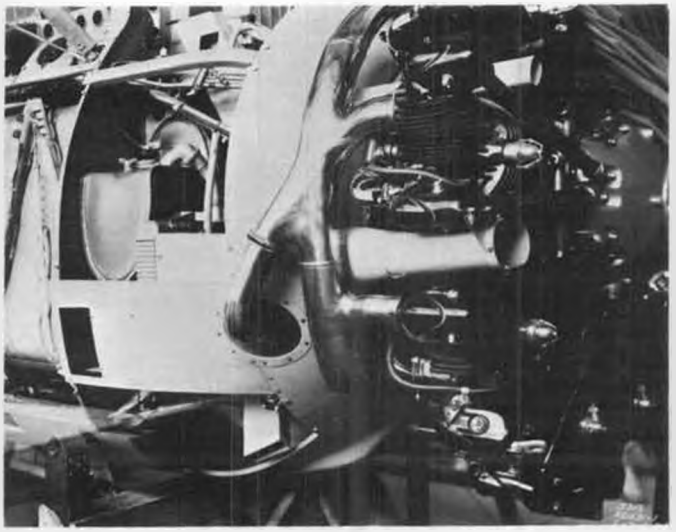
Continued on page 83

John Schwinghamer converted Midwest A-4D ducted fan Skyhawk for slope soaring.

World Champ Dwight Holley rares back to launch his FAI "Turkey".

John Lewis even went so far as to "militarize" his Marks Models Wanderer.


UPPER WING AIRFOIL
LOWER WING AIRFOIL
NACA 2412 AIRFOIL
% COORDINATES
% OF CHORD | UPPER | LOWER
0 | 0 | 0
1.25 | 2.15 | -1.65
2.5 | 2.99 | -2.27
5. | 4.13 | -3.01
7.5 | 4.96 | -3.46
10. | 5.63 | -3.75
15. | 6.81 | -4.10
20. | 7.26 | -4.23
25. | 7.67 | -4.22
30. | 7.88 | -4.12
40. | 7.80 | -3.80
50. | 7.24 | -3.34
60. | 6.36 | -2.76
70. | 5.18 | -2.14
80. | 3.75 | -1.50
90. | 2.08 | -.82
95. | 1.14 | -.48
100. | .13 | -.13
LE RADIUS = 1.58
DRAIN HOLES
LOWER OUTER WING RIB STATIONS
144
139
135
130
120
111.25
102.5
92
81.5
71
68
60.5
50
34
29
22
15
8
0
29.0 DIA. CENTERED ON WING STA. 82.0
TRAILING EDGE WING STRUCTURE
TRAILING EDGE FLAP
FLAP ACTUATOR
BOMB RACK ATTACH POINTS
WHITE IDENT. LIGHT (LH ONLY)
STA. 0
STA. 49
STA. 68.75
FUSELAGE SECTIONS
LOOKING AFT
4" SQUARE GRIDS
STA. 198
STA. 180.5
STA. 144.5
STA. 115.5
FABRIC COVERED - FUSELAGE MID-SECTION, WINGS & AILERONS; ELEVATORS; RUDDER.
METAL COVERED - FORE & AFT FUSELAGE, WING FLAPS, HORIZ. & VERT. STABILIZERS, ELEVATOR TRIM TABS, ALL FLOATS.
STIFFENERS REMOVED FROM SIDE PANEL WHEN AUX. TANK IS INSTALLED
AUX. FUEL TANK 90 GAL.
MAIN FUEL TANK 140 GAL. INCLUDES 13 GAL. RESERVE
SECTION AT FUEL TANKS
LOOKING AFT
FOR LONGER RANGE FLIGHTS AUXILIARY TANK IS CARRIED BUT ONLY IN SEAPLANE MODE & WITH WHEELS & DETACHABLE PARTS OF AMPHIBIAN GEAR REMOVED.
DRAIN HOLES
1.75
.1875
.25 R
.25 R
CORRUGATION
USED ON HORIZ. & VERT. STABILIZERS
FULL SIZE
FLOAT OUTLINE ONLY TO SHOW FUSELAGE DETAILS
MACHINE GUN CASE EJECTION CHUTE
FLOAT STRUT ATTACH FITTINGS
WING LOCK FITTING EXTENDED (UNLOCK POSITION)
STAGGER-3.8
PITOT TUBE
BOTTOM VIEW
RIGHT WINGS FOLDED
SCALE BAR
DOUGLAS XO2D-1

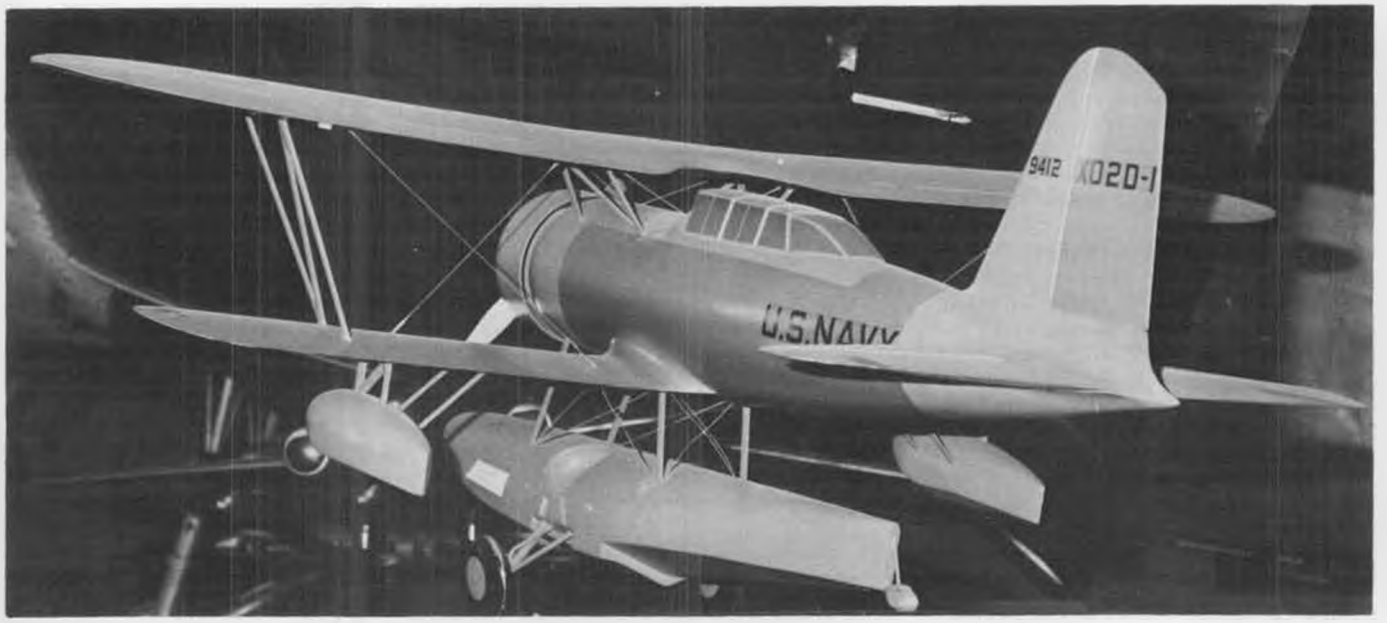


Right front engine section. Blast tubes carry cooling air to oil cooler and other engine accessories. Oil and fuel tanks visible.

Pilot's instrument panel. Mark II aircraft protractor and plotting board stowed by pushing forward in support channels.

DOUGLAS XO2D-1

By NICK KARSTENS



XO2D-1 wind tunnel model is 1/6 size with a wingspan of 72 inches. Note early position of wing floats. Model may be seen at the Donald W. Douglas Museum and Library in Santa Monica. Photo by Karstens.

Vought XO5U-1 was third competitor, mounted float on central pylons as used on later Kingfisher series. Note "park bench" ailerons.

Curtis XO3C-1 with land gear. This aircraft won the competition and was produced as the SOC Seagull series.

the Electronics Corner

By ELOY MAREZ

Many-featured servo tester, briefly described in text. Further info available if enough interest exists.

REQUIRED READING

● It seems that January was the month to reconsider whether or not we are flying the right mode! In January MB, I gave you the benefits of my Mode One flying experiences and observations, and in the same month, in Flying Models magazine, Bob Aberle, W2QPP tells us we are all wrong, we should be flying Single Stick. No, he really doesn't put it quite that strongly, but he does tell both sides of the Dual Stick vs Single Stick story quite well. Bob is a prolific builder and flyer, who has gained his experience where it counts, out in the field, so his opinions have merit. You should read the article if you haven't already done so.

About Mode One, he says, "It clearly separates the elevator control from the ailerons," which I pointed out as being the main advantage.

73 Bob, de W1DBN, W1DBN/V02, W1DBN/AM, DL4LE, KC4USA, ZC4AM, YS1XEE, HU1P, etc.

WORLD'S BEST SERVO TESTER?

Well, I think so, since it is my idea! After years of getting by with a servo tester that was adequate but definitely temporary "until I get some time," I finally got it all together. The photo shows the results, a servo tester with variable pulse center and length, measured on it's built-in digital pulse meter. It works for both positive and negative servos, through both metered and un-metered outputs; the latter to eliminate the voltage drop caused by the meter and shunt. It also features a built-in automatic cylcer for time testing and burn-in, has it's own Ni-Cd supply, switchable from the normal four-cell pack to five and six cells for R/C car servo testing.

Personally, I think something like this is beyond the needs of the average flyer, being more a technician's and tinkerer's instrument. Maybe I am wrong, which is why I am showing it here; if there is enough interest I'll cover it in greater detail in a future issue, possibly even a complete construction article.

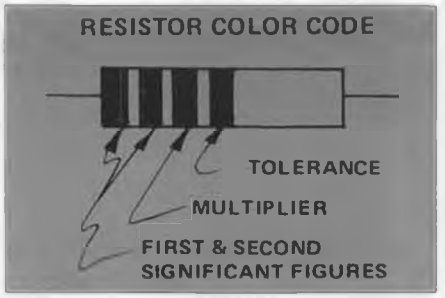
COLOR CODES

Bad Boys Rape Our Young Girls But Violet Gives Willingly...

Don't bother to write for Violet's phone number... the above is merely a rhyme taught newcomers to electronics to help them remember the component color code as used on resistors, and some capacitor and diode markings. Their color bands, or dots translate into numbers, as follows:

Black—0	Green—5
Brown—1	Blue—6
Red—2	Violet—7
Orange—3	Gray—8
Yellow—4	White—9

If you will notice, the first letters of each color correspond to the Bad Boys, etc., rhyme. In practice, the components are marked with three significant colors, which indicate the first and second digits, followed by a given numnber of zeros as indicated by the third color. For example, a resistor marked with yellow, violet, and orange bands would have a value in ohms of 4 (yellow), 7 (violet), plus three zeros, or 47,000.



The fourth color band normally seen indicates tolerance: silver is 10%, while gold is 5%. Lower tolerance resistors (in the 1% range) are usually different shaped, and have their value and tolerance printed right on them in plain numbers, with the exception that "R" is used in place of a decimal point, "K" is used to indicate 1000, and "M" indicates 1,000,000. Thus 27R4K means 27,400; while a resistor marked 10M is one with a value of 10,000,000 (10 Megohms) ohms.

Our present frequency flag system started off following that color sequence, with the lowest frequency, 72.080 being assigned White/Brown, second up the ladder 72.240 being Red/White, etc. However, the later introduction of 72.160 (White/Blue) and 72.320 (White/Violet) threw the system out of sequence. At present, our 53 MHz frequency spots are still in step, with 53.1, the lowest, being assigned Black/Brown, and on up the frequency ladder in .1 MHz increments.

Incidentally, if you like to be 100% correct, the frequency flag colors indicate band

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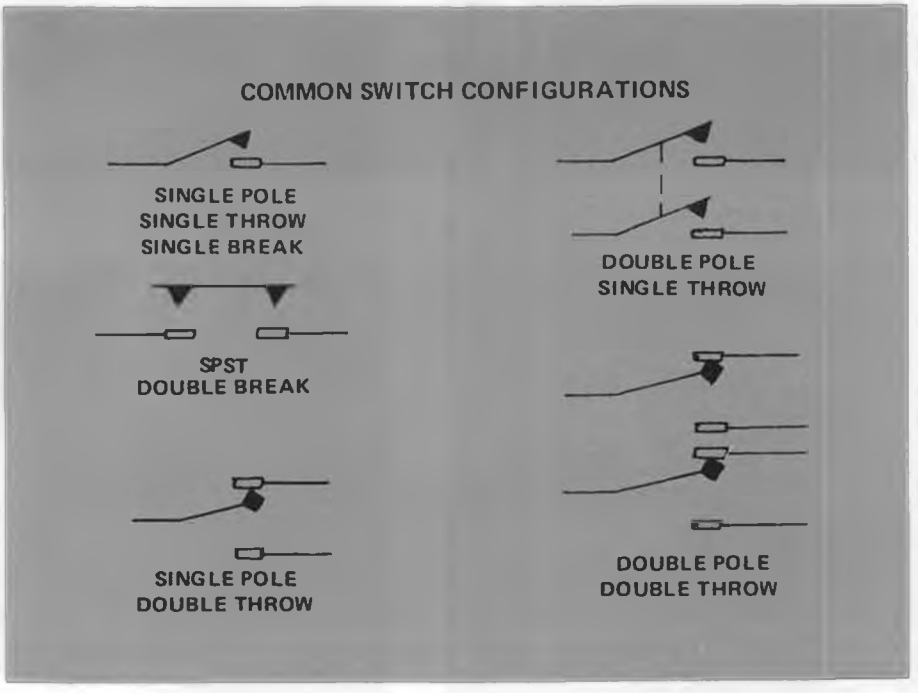


Two Dumas models of a Coast Guard 41 foot Utility Boat, one 15 inches long, the other is 31 inches. Gas or electric power.

Custom Cavalier scaled down to 36-inch wingspan for .020 power, by Midway Model Company.

Sport SCENE

By LARRY RENGER

THE END OF THE TRAIL

Hero of the People's Republic of Modeling, namely Jim Jones, has finally ended his quest for decent razor blades! Our fearless tracker of the elusive Carbon Steel Double Edge, battler with the corporate giant, and general man about town, successfully glommed onto a supply of good old-fashioned breakable, super-sharp blades.

Jim had been attempting to obtain the blades from Gillette, and did, indeed receive some lovely samples of just the ideal blades from them. A follow-up batch, however, proved to be the same great-for-shaving, lousy-for-modeling stainless-steel type you can buy in any drug store. It seems that Gillette didn't realize the importance of carbon steel blades for modeling.

However, in the meantime, Jim had sent an order to Wilkinson Sword in South Africa, but that shipment of blades seemed to have gotten lost in transit, kissing off some significant number of American dollars. Happily, however, the order had accidentally been shipped surface mail, not air as originally advised, and the blades showed up! Joy and Celebration! Happiness throughout the kingdom of modeling, you can now order good blades from Jim again!

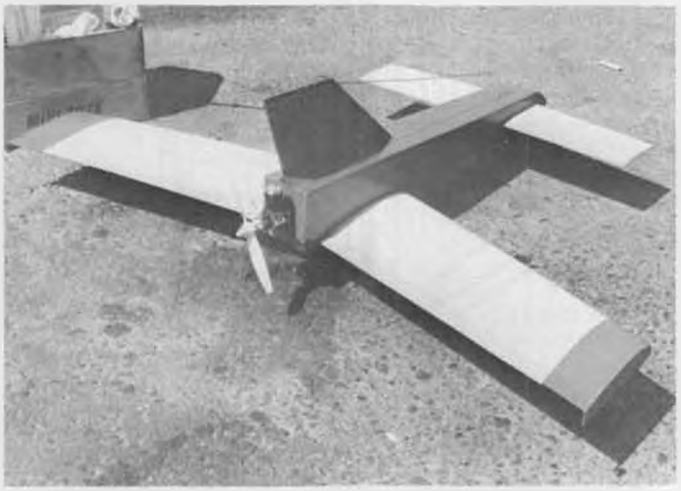
Jim will sell the blades for $7.51/100 or $14/200. Anyone wanting a free sample blade send a SASE to ABS, c/o Jim Jones, 36631 Ledgestone Dr., Mt. Clemens, MI 48043, USA. Jim says that if anyone orders a batch of blades and is not satisfied he will make a full (prorated to the returned blades, I suppose) refund after receipt of the returned blades. Also, anyone caught shaving with these blades will never receive another shipment from Jim!!!

A few columns ago, I mentioned the balsa strippers made by Master Airscrew and also by Ray Harlan. I neglected to mention that there is also a very nice one made by Jim Jones. In fact, the name ABS comes from Adjustable Balsa Stripper. Jim's stripper falls in between the other two, I think, in accuracy and size of balsa stripped.

Anyhow, to you readers who sent helpful suggestions and clues toward finding the blades, let me extend the thanks of those who will buy them. And to Jim, who had to do a lot of phoning, writing and actually putting money on

Continued on page 74

Roger Newbold, engineer in toy division at Mattel, with his TD .051 powered original, using Ace foam wings. Pressure fuel feed.



Interesting pusher-canard seen flying very smoothly at Mile Square Park. K. Phumirat used Ace foam wings, TD .051, pusher prop.

Ron Lowe and his TD .051 powered Warlock has flown in night time (!) 1/2A pylon races, using LED's on wings to track models.

"I hate to build, but I love to cut out ribs."

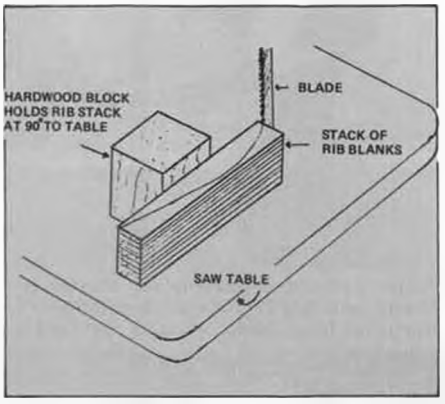
THORNBURG AT LARGE

By DAVE THORNBURG . . . How to cut ribs for scratch-built models. Read this and you may be inspired to tackle that Fokker Triplane . . . . . .

● Wing ribs. Let us be honest about them at once: *very few people with I.Q.'s above 68 enjoy making wing ribs.* Every model has too many of them. They all have to be too much alike. They're invariably full of little notches, and the little notches invariably split out when you're cutting them.

No wonder people buy kits instead of scratch building. No wonder most of the magazine plans sold are never built. No wonder styrofoam models get more popular every year. No wonder everybody builds their fuselage first.

Wing ribs. Is there anything good to be said for them? Just this: once you have them behind you, the rest of your model will be a joy and a pleasure. For this reason alone, I always start a new model by cutting out all of the wing ribs.



Bandsaw method of cutting a stack of ribs all at once. Straight wings only!

On the workbench this evening is a Pond Plan for the Brigadier, a 56 inch old timer free flight. Steve Work just built one for three-channel RC. Buzz Averill promised me the use of an ignition K&B 29 if I'd build a "Brigidier" (that's how it's spelled on the plan) and fly it at the Southwestern Regionals this year. Should I confess that I've never run an ignition engine before? Hell no... just brazen it out, Thornburg. After all, the plan has a wiring diagram on it.

And so I begin with the Brigadier's wing ribs. Now as I see it, there are only three basic ways to make wing ribs: You can cut them *en masse* on a bandsaw or jigsaw; you can make an aluminum template and cut each rib from the template, using a razor blade or knife; or you can make a simple balsa template and draw around it multiple times, forming your own printwood sheets of ribs. Each method has its virtues and its vices, so let's look at them one at a time.

BANDSAW METHOD

The big drawback here is that you must own, or have access to, a good bandsaw or jigsaw. A surprising number of modelers own one of these devices. Bandsaws are large, noisy, filthy, loveable machines. Once you learn to use a bandsaw, you'll be spoiled forever. You can cut out perfect 1/8-inch plywood firewalls in under two minutes. You can stack-cut thirty wing ribs in a quarter of an hour, including set-up time. Cutting multiple parts is so easy you'll be tempted to "kit up" a couple of extras of whatever design you happen to be building. Once you learn to use a bandsaw.

But don't try to learn by cutting wing ribs. Rib cutting is strictly for experienced "sawyers." To bandsaw a stack of ribs with any degree of accuracy the cutting blade must be EXACTLY 90° to the saw table, both side-to-side and fore-and-aft. The ribs must be stacked and held EXACTLY 90° to the table during the cut.

If I were planning to bandsaw the ribs for the Brigadier, I'd grab five pieces of 3/32 x 1 x 36 balsa, cut 'em into 20 pieces 8 inches long, and stack these against the side of a perfectly square block of balsa or hardwood about the size of a Rubikube, which would serve as a guide while sliding the ribs through the saw. Then I'd draw the rib outline on the top piece in the stack and have at it. The important thing is to keep the rib stack perfectly vertical during the cutting. And to keep your fingers out of the saw.

If you don't have ready access to a bandsaw, consider taking your stack of rib blanks to a cabinet shop. Arrive with the blanks stacked neatly and accurately, perhaps pinned together with long straightpins, and

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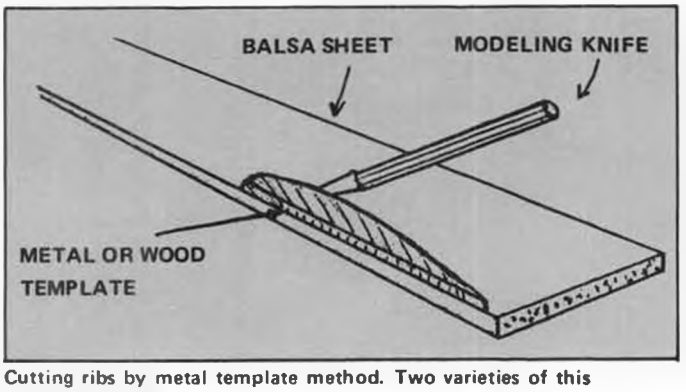
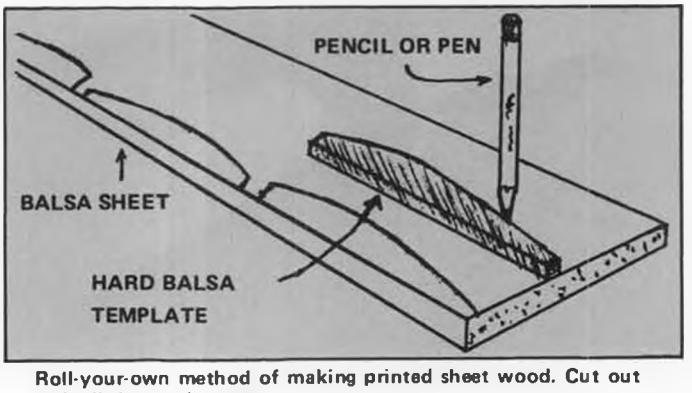


Cutting ribs by metal template method. Two varieties of this described in text.



Roll-your-own method of making printed sheet wood. Cut out each rib in usual manner.

1. There are certain drawbacks about fencing your own private field! Al Staben, SAM 30, found out the hard way.

2. SAM 30 President Nick Nicholau doubles as C.D. for most SAM 30 meets. Alten, Anderson line up, Solenberger tries to scrounge frequency pin.

PLUG SPARKS

By JOHN POND

In the northern portion of California, SAM 30 stages an annual meet in the Fall known as the "Team Challenge" This has turned out to be extremely popular, as the head-to-head confrontation so often found in "hot dog" competition is absent In its place is a team effort comprised of three members, each attempting to help the other make a good flight

When the meet was first started, SAM 30 did it with the idea that the superiority the ignition and four-cycle motors were enjoying would be eliminated, and any engine, particularly a glow engine, would be competitive

To start with, rules were quite simple. Each club was to be represented by at least one three-man team, with each member contributing ten dollars The idea of the jackpot was that possibly some of the "poorer" clubs would win; hence, their treasury could be easily augmented

Each contestant is allowed only one flight with a two minute motor run, the idea being to stay up as long as possible, a la the Texaco event. As it turned out, the motor run (which actually started at three minutes) was reduced in two years to one minute, as the boys and the motors were getting too good.

The last rule was that all models were to be Antique vintage; i.e., designs falling before Dec. 31, 1938. This, of course, would eliminate hot models like Playboys, Zippers, etc. Actually, in looking over competition results, for long flights, the limited engine run types find themselves at a disadvantage to the big soarers About the only thing that beats a Dallaire Sportster these days is another Dallaire Sportster, the Lanzo, and Powerhouses, etc., having fallen by the wayside

With only one flight required of each contestant, this allows SAM 30 to run a regular O/T R/C contest in conjunction with the team challenge One cannot say he does not get enough flying in for a day.

Incidentally, the field that SAM 30 enjoys is a completely fenced in area with cultivated grass, parking, barbeque stand, and in general, a neat place to fly But! Anytime you get an enclosed space someone will always try to do it the hard

3. Tom Vincent terrorized the boys with this excellent flying Boehle Giant. Never failed to place!

4. Speed Hughes hand holds his Morton M-5 while it runs. Smooth and reliable.

6. Carl Carlson, of Chicago, with his Wall powered original. Note Pathe or Vitaphone News camera in the background.

7. Vernon Grey's Wakefield entry proxy flown by Bert Pond. Bruce Lester photo.

way. Photo No. 1 shows Al Staben in an unsuccessful attempt to strain his model through a four-strand barbed wire fence. Al got off real lucky, as only one bad hole in the leading edge was the result of this unfortunate encounter. SAM 30 is extremely fortunate in getting this field for only $100 a year. What a bargain!!

The columnist simply had to run a picture of Nich Nicholau, the spark plug of SAM 30, as he runs contests, has the meetings at his place, and in many cases has built about 50% of the models being flown by SAM 30 members. Talk about dedication to the old timers!

Photo No. 2 shows Nick giving directions to the girls (Miriam Schmidt and Neva Nicholau, back to camera) on the method of registration. This photo was taken at Brown Valley, a site owned by Speed Hughes, also a serious member of SAM 30. Jack Allen is shown peeling off his entry fee money.

Interestingly, the caps worn by the various competitors are different colors, which help identify the various SAM Chapter members. Right now, SAM 30 uses red and white caps, SAM 21 has blue and white, while SAM 27 is yellow and white. Other California clubs are gradually picking up on this idea also.

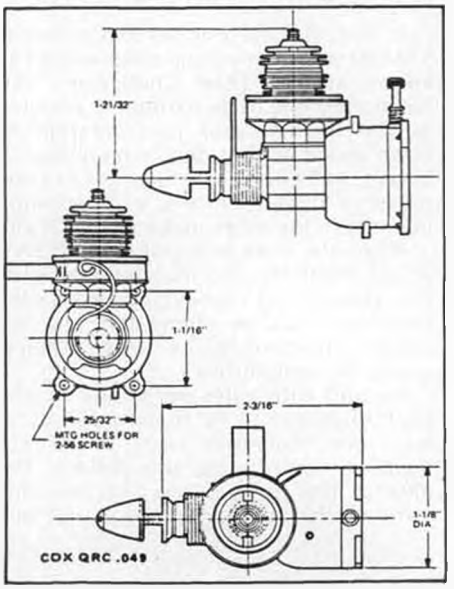
Contestwise, what can you say when the competition is so good that if you don't "max" on the first three flights of the Limited Engine Events or the Antique Event, you are out! Boy, did this columnist get a shock when he maxed five out of six times and didn't win! SAM 21 President Jack Alten had even more reason to complain, as he made six max flights and failed to place!!

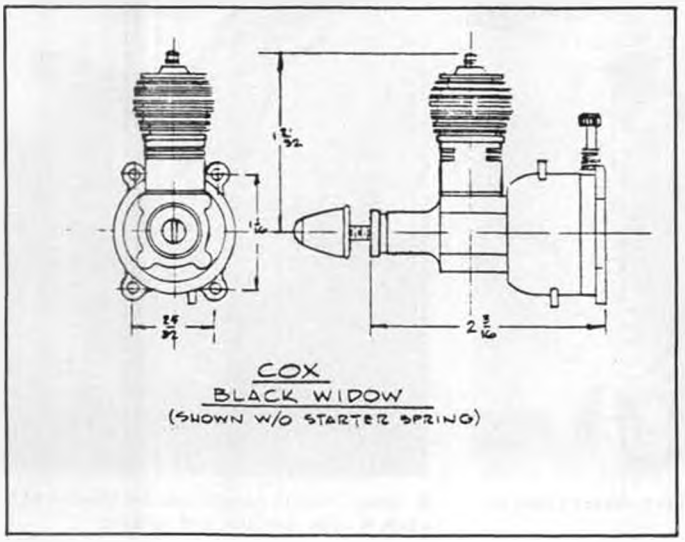
One of the tough competitors who has evolved over the last year is Tom Vincent, seen in Photo No. 3 with a Boehle Giant (built by Nicholau, hatch!). Tom flies this huge model like a soaring glider and is truly a threat to win any event he enters, whether it be Texaco, Antique, and even limited engine run!

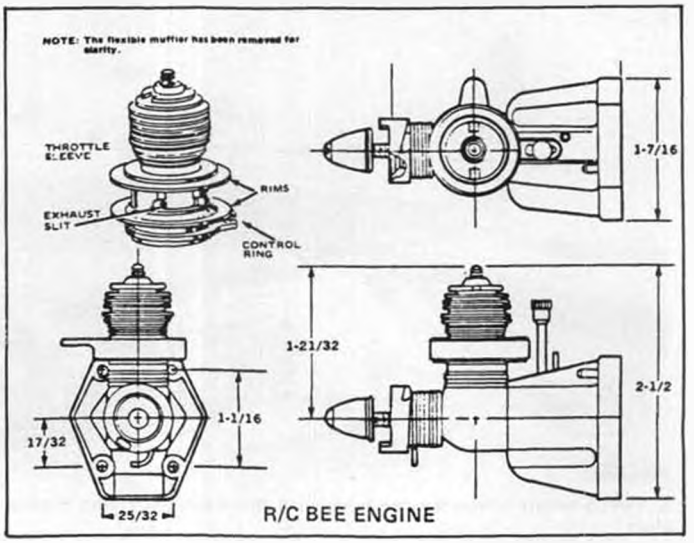
It is really a pleasure to watch Tom milk every second he can out of his flights, some of them less than 200 feet high! Needless to say, the Boehle is a superlative glider.

Regardless of the hot competition, some fellows, like Speed Hughes, found time to thoroughly enjoy themselves. As can be seen in Photo No. 4, Speed took particular delight in running his Morton M-5, neatly mounted on a combination display and run stand. Not many modelers have actually seen a Morton five-cylinder engine in action, hence, Speed was busy all day running the engine upon request. Maybe the Morton wasn't the greatest engine for power, but it's realism, with all the valves working, was simply great. In case the reader cannot see, the engine is actually running while being held, attesting to its smooth operation.

Photo No. 5 shows the columnist with a scaled Playboy Jr., as developed by Barnett Kernoff, the owner of Tyro Models, which has produced many successful old timer kits. One of the main reasons for running this shot is to show what can be done with scaling old timers (permissable only under R/C regulations). Many of the die-hards may regard this as







5. John Pond applies the electric twister to the K&B 19 while Bob Allen holds on to the scaled Playboy Jr. Timer Mike Bernhardt watches operation.

heresy, but how many times have you had a motor that was a little too big or too small for the particular design you are interested in building? More than once, I'll bet!

To top off the fun at this meet, on Saturday and Sunday, a hot dog-hamburger type barbeque was offered as lunch for the contestant at the paltry price of $1.50. With all the salads, potato chips, dips, desserts, etc., you got the best bargain of the day!! No wonder flying stopped promptly at twelve!

Well, we could talk about the meet and its innovations for many pages, but let's take a look at the results to see what is winning these days:

CLASS AB

1. Don Bekins (Playboy)	20:17
2. John Pond (Playboy)	20:07
3. Loren Schmidt (Dallaire)	4:11*
4. Rich Kultti (Bombshell)	3:42*
5. Al Staben (Dallaire)	3:22*

*Crashed

CLASS C

1. Ed Solenberger (Playboy Jr.)	31:40*
2. Jack Alten (Playboy Jr.)	25:03*
3. Don Bekins (Playboy)	24:38*
4. John Pond (Playboy)	21:21*
5. Speed Hughes (Dallaire)	19:00

*Including fly-off time

ANTIQUE

1. Tom Vincent (Dallaire)	40:11*
2. Don Bekins (Gas Bird)	38:12*
3. Jack Alten (Dallaire)	37:56*
4. Jim Kyncy (Dallaire)	37:10*
5. Loren Schmidt (Yates)	28:40

*Including fly-off time

TEXACO

1. Don Bekins (Gas Bird)	30:00*
2. Don Carll (Dallaire)	30:00*
3. Jim Kyncy (Gas Bird)	30:00*
4. Jack Alten (Dallaire)	25:21
5. John Pond (Dallaire)	18:41

*A second flight determined winner

1/2A TEXACO

1. Eut Tileston (Westerner)	30:00
2. Tom Vincent (Dallaire)	29:40
3. Ed Solenberger (Anderson)	28:59
4. Jack Alten (Playboy Jr.)	27:56
5. Jim Kyncy (Playboy Jr.)	27:51

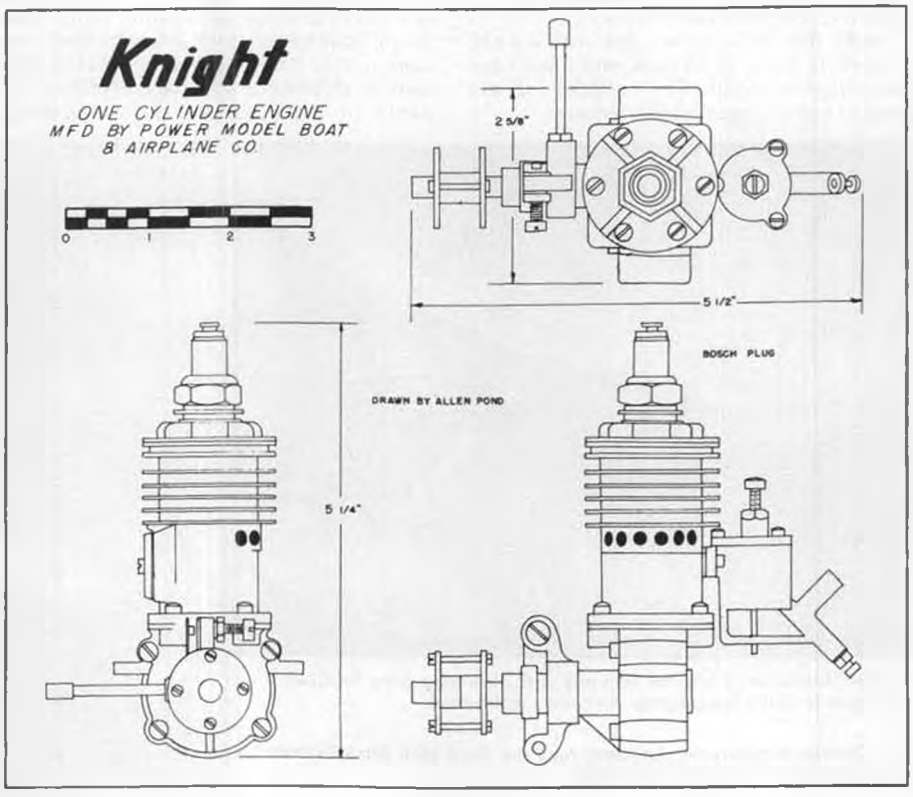
1/2A TEXACO REVISITED

At the recent SAM 30 contest, a protest was registered in the 1/2A Texaco Event over the use of an engine not readily identifiable as one of the engines permitted under the rules. As it turned out, the contestant claimed to have assembled parts from eligible engines and had been permitted to fly by the Contest Director. This, of course, did not set too well with the rest of the contestants.

8. Jerry Persh built this Struck Flying Cloud. Kitted by Berkeley.

This has prompted Jack Alten, President of SAM 21, to restate the original SAM 21 goals in establishing the Provisional 1/2A Texaco Rules and to further describe the basic Cox. .049 reed valve engine configurations and visible differences. Here is what Jack has to say:

"When I first heard of the 1/2A Texaco Event as defined by the Southern California SAM Chapter 49, I thought this would be a great way to introduce the newcomers to our sport. First of all, the event should be simple, with no complicated rules or loopholes that the 'sharpies' could take advantage of. To this end I made hundreds of engine runs to check various engine combinations and modifications. In addition, I tested every commercial glow fuel available and also every conceivable 'witches brew' I could concock for economy. Based on the engine modifications I could make to improve performance and the special fuels that gave amazingly long motor runs, to eliminate the foregoing, the rules for ENGINE REQUIREMENTS in the SAM 21



9. Bob Lane at one of the SAM 21 club meets with a Modelcraft Miss Tiny powered with .049 Black Widow.

1/2A rules is again reiterated.

"Any Cox, Baby Bee, Golden Bee, QRC, or Black Widow rear valve .049 cu. in. engine with a stunt tank is eligible. Fuel tank capacity must not exceed 8 c.c. Engine modifications or substitution of non-standard parts that would alter the engine performance are not allowed.

Exceptions:

(1) Moving fuel pickup from middle to bottom of tank.

(2) Addition of mufflers.

(3) Needle valve extensions for cowled motors.

On the addition of throttles, even though we did not specifically prohibit their use, we thought we had written the rules in a simple fashion which would PREVENT their use. First, the Golden Bee was offered in the past with a rotating exhaust (not muffler!) throttle sleeve. This sleeve won't fit the O.D. of any (other) Cox .049 cylinder without grinding the outside surface of the cylinder. (This is an illegal modification in all but the Golden Bee cylinder). Secondly, the R/C Bee muffler rotates and throttles the exhaust and WILL FIT any Cox .049 cylinder.

ENGINE CONFIGURATION

Baby Bee: This engine came with a 4 c.c. non-stunt tank. Both tank and crankcase are silver in color. The cylinder (all are black) has a single intake bypass.

10. Cliff Silva, with colorful Corben Ace, is an inspiration for every handicapped person. Photo by Johnson.

Golden Bee: Same engine as the Baby Bee but has a 8 c.c. stunt tank. Both tank and crankcase are gold anodized. Cylinder also has a single intake bypass.

Black Widow: Figure 1 shows this engine with a different cylinder easily identified by two narrow exhaust slits on each side of the cylinder. The cylinder has two intake bypasses. Tank is an 8 c.c. stunt tank. Both tank and cylinder are black anodized.

QRC: Figure 2 reveals this engine is identical to the Black Widow except the crankcase is silver and the 8 c.c. tank is anodized red. A muffler (non-throttleable) has also been added. The muffler has a black band that rotates to allow priming into the exhaust port.

R/C Bee: This engine is quite different, as can be seen in Figure 3. The crankcase is a silver colored die casting rather than being machined from an extrusion. The tank is a 12 c.c. moulded red plastic item and is difference in shape. Neither the tanks or crankcase are interchangeable with any of the legal engines. The muffler is round (rotates for throttling) with a grey rubber ring which is removable for priming.

ENGINE PERFORMANCE

Most 1/2A Texaco models weigh between 16 and 20 ounces. A 20 oz. model with a Black Widow engine and 8x4 Rev-Up propeller will turn 6-7000 rpm and get an inflight motor run of five to six minutes using K&B 100 Glow Fuel. When motor run times exceed these times by any appreciable margin, the following conditions are present:

1. The tank is more than 8 c.c. capacity.

2. Gasoline or other ingredients have been added to the fuel.

3. Engine was throttled back during flight.

4. Someone has figured out a new way to cheat that we haven't discovered.

CONCLUSIONS

This columnist wishes to thank Jack Alten for his conscientious efforts in

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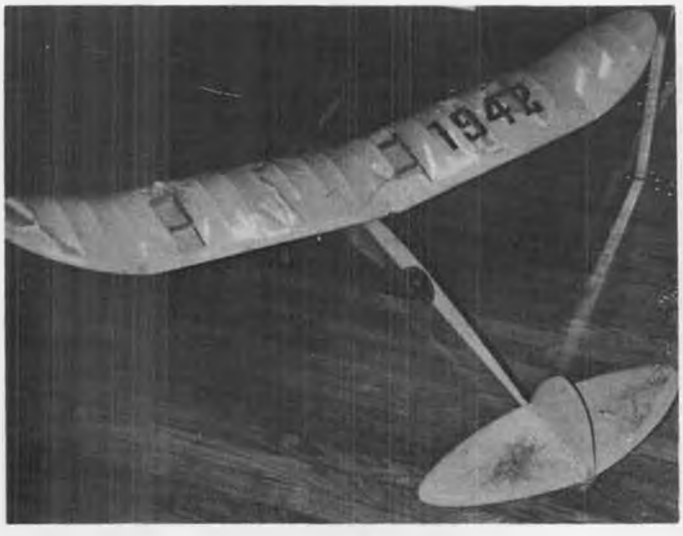
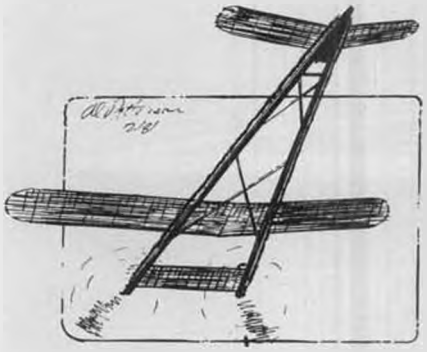


11. Bill Englehart's original So Long with extended wing for Class B. It's been in Bill's hobby shop ever since retirement.

12. George Stephenson, England, says the Reid Hull Stick Winner is best flying kit model ever made.



TWIN PUSHER

OLD TIMER Model of the Month

Designed by: Ralph Kummer
Drawn by: Al Patterson
Text by: Bill Northrop

• On June 16, 1934, this twin pusher was launched on its third flight at a contest in St. Louis, Missouri, and managed to stay within sight of timing officials for 20 minutes, 54 seconds, setting a new N.A.A. record that stood for more than a year. The modeler was Ralph Kummer, and the design was published in the August, 1936 issue of *Model Aircraft Builder*, one Irwin S. Polk, editor. Incidentally, we have no doubt that this magazine's name was subconsciously on our mind when we were picking a name for our own magazine, 35 years later.

The article about the twin pusher, entitled "Championship Twin Pusher and Contest Hints", indicated both Ralph W. Kummer and David B. Hecht as authors, so we're not absolutely sure which one designed the model. Our suspicion is that it's Kummer's design, and that David Hecht drew the plans, as his initials are on two of the three plates . . . the way it was originally presented. And the article also makes reference to Ralph, by name, in several instances, suggesting to us that he, Ralph, did not write it. Oh well, if either of them is still around to straighten us out, we'll be glad to give proper credit in a subsequent issue.

The "twin-pusher era" was about coming to its end in 1936, but it dominated contests for quite a few years before "single tractors" gradually took over. For those of us who were not active competition modelers in the early '30s, the twin pusher is often looked back upon as sort of an awkward aircraft . . . with its "A" frame stick fuselage, tail-first flight attitude, and the thought that winding up two rubber motors at the same time . . . in opposite directions . . . could involve as many as four people! However, those who "were there", and

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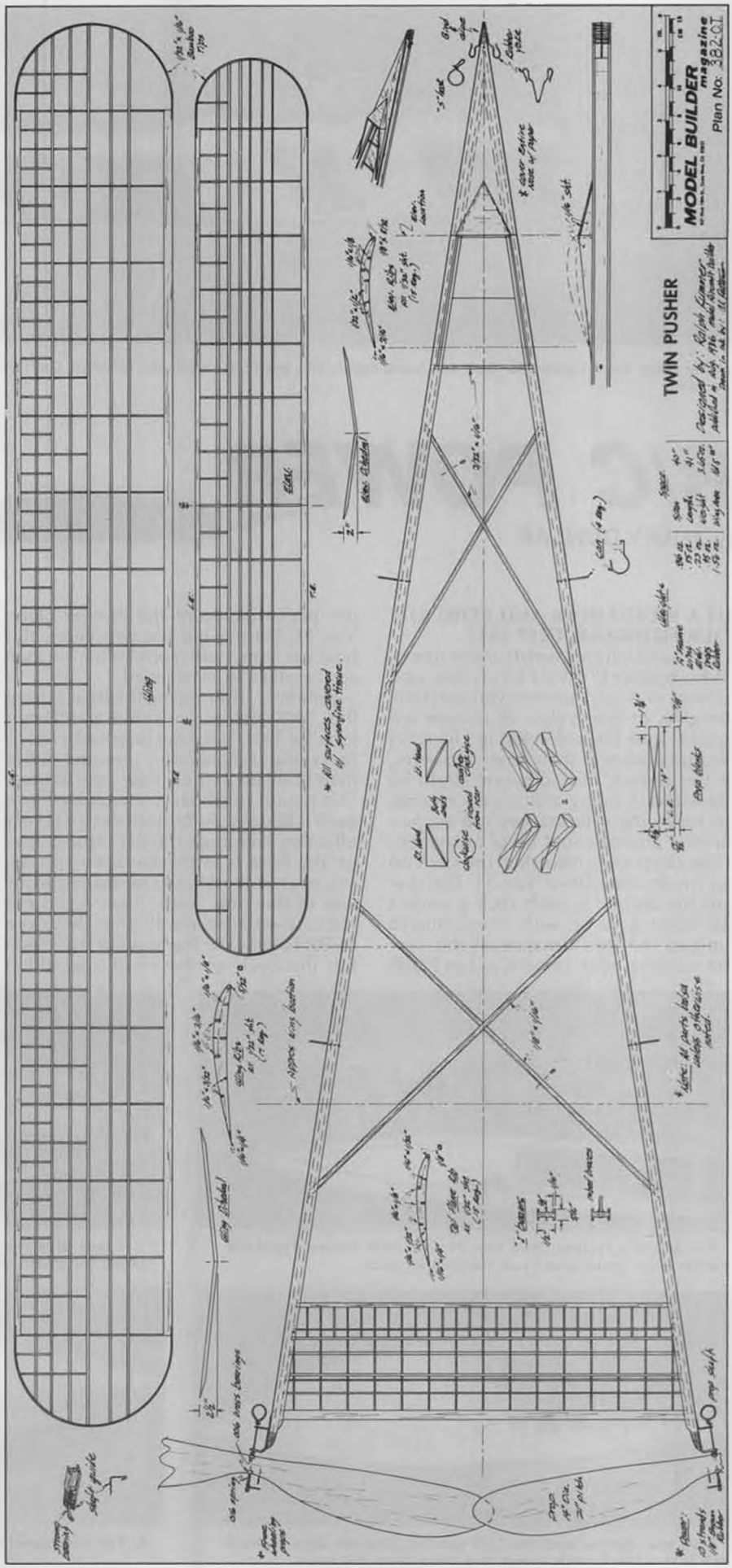


Prather Deep Vee 31 with new deck and hatch cover. This particular boat won NAMBA Dist. 8 Offshore and .21 Monoplane Classes for last two years.

R/C POWER BOATS

By JERRY DUNLAP

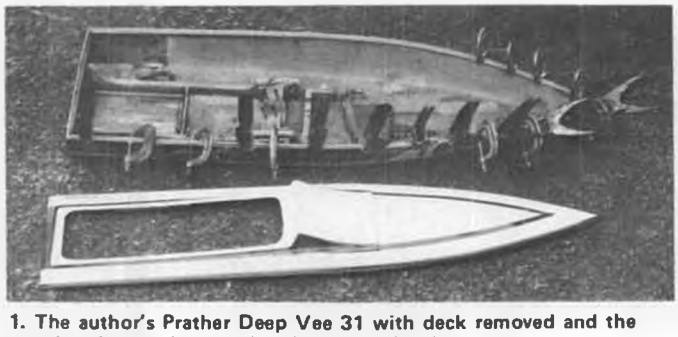
PUT A WOOD DECK AND COWL ON YOUR FIBERGLASS DEEP VEE?

The question that needs answering is, "Why bother?" Most likely the vast majority of model boaters who purchase fiberglass or epoxyglass deep vees are not the least bit interested in changing the appearance of their boats. However, on the chance that someone might be interested in doing a little customizing, the following information and accompanying photos could be of assistance.

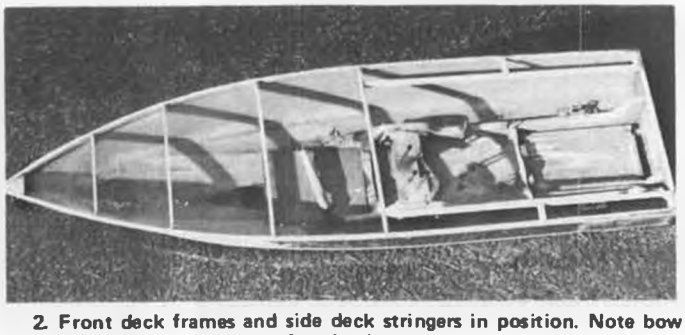
The deep vee I reworked the deck on was my Prather Deep Vee 31. The reasons for bothering with such a project had nothing to do with attempting to improve the performance of this very fine running boat. In no way can I fault the performance of the Prather Deep Vee 31. During the last two years, this boat has won more trophies for me than any model I've ever raced.

However, after racing the boat during the 1980 season, I wanted a different look for 1981. Since the boat had been so successful, I decided to remodel rather than build an entirely new type of boat. The reason this boat works as well as it does is because its bottom design is very effective. Although the deck that comes on the boat is somewhat scale appearing, it left something to be desired to my way of thinking. Such, however, is not the case with the new Prather Deep Vee 65-90. I really like the looks of that deck. But the deck on the small boat didn't turn me on at all.

Removing a deck on a glass boat really isn't all that difficult if you have a tool like the Dremel hand grinder and a circular saw bit. To assist in removing the deck, run masking tape along the seam line between the deck and hull. This will give you a reference line to follow while cutting off the deck. It does help to have a steady hand when cutting off the deck with the hand grinder. Once the deck is removed, use a barrel sanding bit in your grinder to clean the inside of the hull for about a half inch down the side of the hull. To attach the wood deck to the glass hull, it is necessary to glue a wood strip along the top of the hull. Spruce stringers 1/8 x 1/4 inch can be epoxied

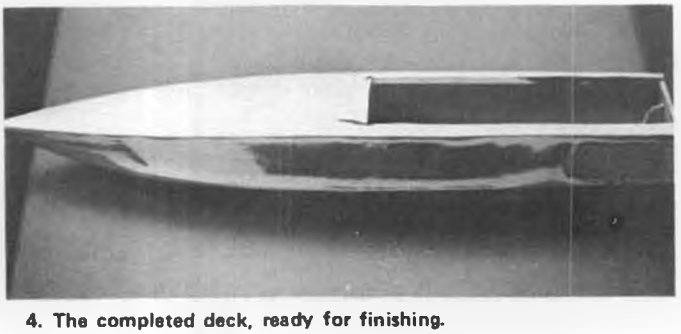


1. The author's Prather Deep Vee 31 with deck removed and the wooden sheer strips glued and clamped in place.



2. Front deck frames and side deck stringers in position. Note bow block for added gluing surface in that area.

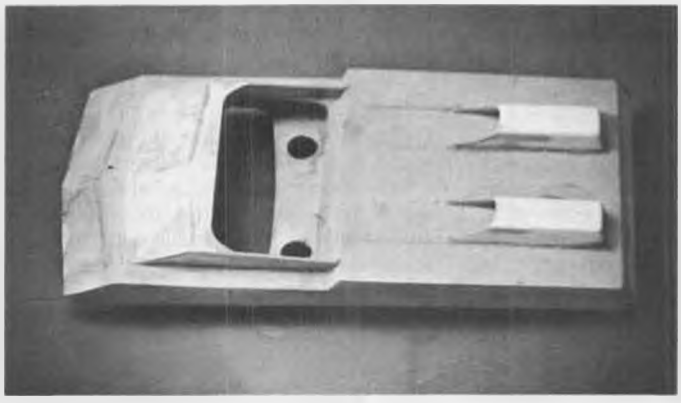
3. Tape and clamps hold the 1/16 aircraft plywood deck in place. Deck is one piece, with engine and radio areas cut away.



4. The completed deck, ready for finishing.

Hatch cover framework in place on the new wooden deck.

Hatch cover framework beside the Prather Deep Vee 31.



Hatch cover completed prior to painting.

Completed hatch cover with Mego figures in the driver's cockpit.

along the top inside edge of the hull. It will be necessary to use plenty of clamps to hold the stringers in place against the hull while the epoxy sets (note photo #1).

With the wooden top sheer strips in place, the cross deck frames can be attached. The stringers for the engine/radio compartment are now glued in place (note photo #2). I brought the front deck back halfway on my boat. The deck frames have a slight amount of crown rather than being flat. I personally feel a deck with a slight amount of crown is more pleasing than a flat deck. As can be seen in photo #2, there is a piece of wood in the bow to provide more gluing surface in that area.

With the completion of the deck framing, the sheeting can now be attached. I recommend using a one piece deck to avoid cracks along seam lines after the boat has been run. Aircraft grade 1/16 plywood can be used for the deck sheeting and attached to the deck framework with epoxy glue. As can be seen in photo #3, lots of clamps and masking tape are used to keep the deck sheeting in position while the epoxy sets. Once the glue has cured, the plywood can be trimmed along the outside of the hull and along the engine and radio compartment edges. Photo #4 shows the deck trimmed and ready for finishing.

The configuration of the hatch cover can be suited to the taste of the modeler. The hatch cover design I developed is a composite of ideas seen on decks of full size offshore racing boats. One of the satisfactions of taking on a project like this is the creating of something different. As can be seen when viewing the photos taken of the steps in building the hatch cover, the construction techniques are very basic. I used the framework concept and covered the top with 1/16 plywood.

The deck and hatch cover were finished using K&B Super Poxy undercoat and Super Poxy paint. Since the entire

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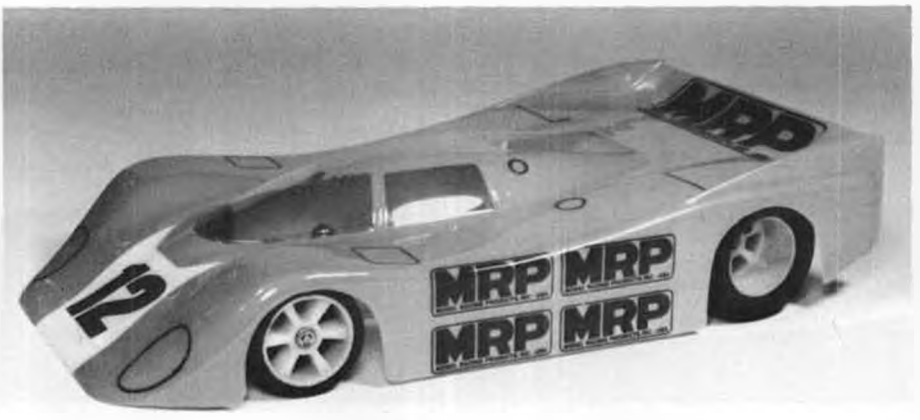
Dumas U-76 by Kelly Wilson, Andrews, Tex. Won Sport 40 Class at 1981 NAMBA Nationals in Amarillo. K&B 7.5, Steve Muck exhaust throttle, drive line, wedge rudder. Octura 1455 prop.

Roger Newton, NAMBA's R/C Unlimited National Chairman, has a message for all model boaters. See text for Roger's request.

R/C AUTO NEWS

By DAN RUTHERFORD

PHOTOS BY AUTHOR



Ford C-100 body from MRP has extremely clean lines and will mount very low on most 1/12 cars.

● Most of the letters I get as a result of this column ask a question or two of some kind. But they rarely question me on what I am writing about. One of those rare letters is here on the desk and as it brings a few interesting points, why don't we get right into it?

Dan,

I have read your car column since it first appeared in ***Model Builder****, and while I generally enjoy it, I do have a few questions for you.*

After reading about a year's worth of your opinions and view on cars, I had the feeling that possibly you were too slanted toward Delta products, as they get a lot of space in your column. I have been reading Gene Husting's ***Pit Stop*** *column in* ***RCM*** *for some time and from that column I had the impression that Delta didn't do a lot in cars, as they have been mentioned only infrequently. The other day a friend happened to lend me a copy of a Deltagram and it listed you as the editor. I think I now understand, you actually work for Delta!!!*

This doesn't seem like a very good situation. The other manufacturers are getting a raw deal.

Another bad situation looks to be coming in car racing and that is the purposeful ramming of other driver's cars. I heard there was a lot of that at the World Championship race and now read in RCM where it also happened in 1/12 scale at the '81 ROAR Nationals, robbing Associated of a win. Any comment on that?

I did like your series of columns on basic car set up, in which you used an RC12E. Any chance of doing the same thing with an MRP 1/12 car, or how about set up of a 1/8 car?

Thanks,
Dale Tester

Fellow racer Dale has a bad case of incomplete facts and wild conclusions based on same. Yes, I do the Deltagram, a factory newsletter from Delta. This typer is for hire and the guys at Delta asked me to do it for them in exchange for all the cars, parts, tires and fuel I can eat. If I didn't race cars they would get a bill for each issue, or if I preferred to race a different brand of 1/8 car, they would also be billed. To really understand the situation, you have to realize that I first decided, three years or so ago, that the Delta Super J was the best 1/8 car for me to race and I was buying my parts, tires and stuff from them, just like any other Delta racer, and have the invoices to prove it.

Delta decided to do a newsletter and Larry Flatt did several issues until running out of spare time. Out of the blue, Bill Campbell called up, made an offer that I accepted on a trial basis, at least at first, and so it has been since. Interestingly enough, another manufacturer also asked me to do a newsletter for them at about the same time and they knew that I didn't even race their cars... or want to. For-hire typers know no loyalty, at least not this one.

I have also done instructions for MRP, ghost-written at least a couple of articles for Don McKay at JoMac, as well as some other stuff I'm not going to tell you about. Except to say that none of these articles or deals has influenced what goes into the MB car column.

However, and that is a big *HOWEVER*, Delta does get its share, and maybe then some, of coverage here in these pages. The reason should be obvious, when a guy sits down to write, he has to write about something that he is familiar with or at least is on his mind. With Delta, they are always sending me the new stuff to play with, as that is part of the deal, and besides, I need to take pictures for the Deltagram. This is in sharp contrast to the situation with Associated, for instance, where I have to call, on my nickel, to find out what is going on. The easy way out is to save my nickels and write about whatever is at hand.

The JoMac and MRP plants are just down the road about three miles, so I see both of them frequently, but even with in-person visits they will forget to tell me what they have that is new or coming soon. It comes down to the fact that no matter what you do, it is absolutely impossible to satisfy all of the manufacturers involved in selling race cars, something I knew before writing my first article on RC cars back some four or five years. So I have never even tried to get tight with any manufacturer and don't plan to.

As for the column in RCM, you should probably be advised that Gene Husting is none other than the boss at Associated. He and Roger Curtis started Associated together. What current financial arrangements there are, I don't know and

For off-roading, the Dodge Heavy Metal step-side pickup is hot and in 1/10 scale.

Also in 1/10 scale is this Pinto Modified from MRP, probably the nastiest looking off-road body now available.

don't care, but Gene pretty much calls the shots at Associated and of course has a deep interest in seeing his company prosper. I think you can figure things out from there, if not, a review of a year's worth of Pit Stop columns ought to make things pretty clear. And I am willing to go on record as saying that I do not like the RCM policy of hiring a large advertiser to write for them, but then I don't care for most everything they do anyway, finding the mag one huge bore.

The deal about somebody getting rammed, I think it was in 6-cell Modified, and, yes, it was an Associated car that got rammed, or at least the last direct hit was scored on an Associated car. It will be an interesting situation to watch develop, as either everybody starts in with team driving tactics or an agreement will be struck to not do it anymore. What is significant here is that this is *not* a new thing, it has been going on for several years. What is new is that this time the designated hitter readily admitted to doing it and freely told one and all why he did it. I have talked to a number of people who were actually at the race and feel very confident in saying that Don McKay (partners with John Congdon in JoMac and, team leader for its racing activities) was not interested in having one of his racers do a number on somebody else, *unless* a racer from another team, in this case Associated, pulled the trigger first. They did. Team JoMac simply retaliated. Having been to three ROAR Nationals and knowing what has been going on all the time anyway, I tend to side with JoMac and their you-hit-me, I-hit-you attitude and would have probably done the same, if placed in McKay's position.

These "take-'em-out" tactics, as mentioned, are not new, but in the past have been much more subtle. For instance, the best way to beat another racer in the A Main is to keep him out of the high main in the first place. So a lot of this bumper-car driving has taken place in heat races where it is much less likely to be noticed. Even if noticed, the usual excuse of having radio interference, a bent chassis, or something equally believable, serves well to get the punch-artist off the hook, although certainly not ridding him of suspicion.

For open-wheel racing, the new Chapparal from BoLink gets the job done.

To put a finer point on it, team tactics require a large number of sponsored racers and Associated commonly has in excess of 20 racers at National events, where the other teams are much smaller and Associated has, over the years, picked up the nickname of Team Gang-Bang.

If this isn't enough for you, at the '78 ROAR Nationals, I was standing at the end of the straightaway of the Indoor track during the running of an Expert main event and was taking pictures, as well as taping the announcer's descriptions of the action. Gary Kyes was driving the only MRP car in this main, and was also winning, a big tip to watch what was happening on the track. I was, and towards the end of the race, when it was obvious Kyes wasn't going to beat himself with a mistake and that nobody could catch him, one of the back-markers slowed up on the straight and as Kyes passed this car on the outside in the right hand corner at the end of the straight, this other car turned left, right into him. It was obvious enough to draw boo's, although Kyes was lucky and lost only a couple of seconds at the most. If I get any serious flak about this part of the column, I'll tell you who the other driver was and you might be very surprised... The excuse was radio interference, by the way, heard the mumbled words myself...

Dale's letter really got me going, didn't it? But I have long had this problem with sponsored racers competing at the Nationals, and this whole racing-for-money scene, which is what the manufacturers are doing, as Nationals wins sell cars, and that's a fact. For me, it has resulted in the Nationals, and who wins what, being pretty pointless. The racers who are good enough to be sponsored are also good enough to win with just about any car, and most certainly can blow the doors off any local club racer just out to have some fun with his toy car. And before I forget, I have to mention that to pick your race car based on what wins it has to it's credit is crazy. You are buying a race car for yourself, not an ace, and your needs in a good, solid club-racer car are a long ways from those of the aces. Spare parts, for instance, are extremely important to you, where the sponsored racer gets the stuff in boxes and for free. He doesn't need easy, local access to parts, the factory is only a phone call away.

That is another reason this column tends to deal with things that are more oriented toward club racing; both because I am a club racer and nothing more, not near good enough to be sponsored even if I wanted to be (and I don't), and because club racing is really where it's happening in car racing. At this level, you can just go

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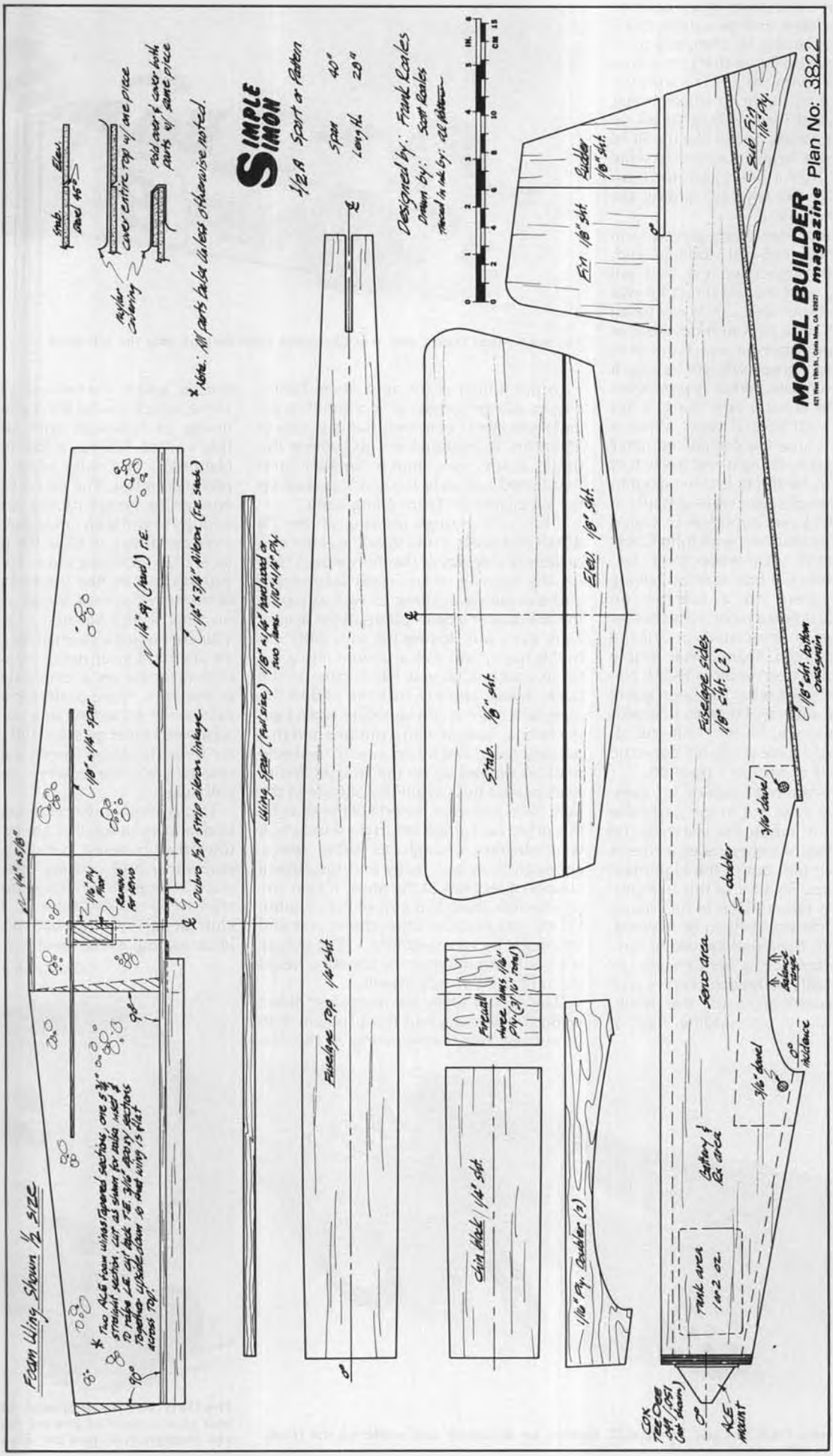
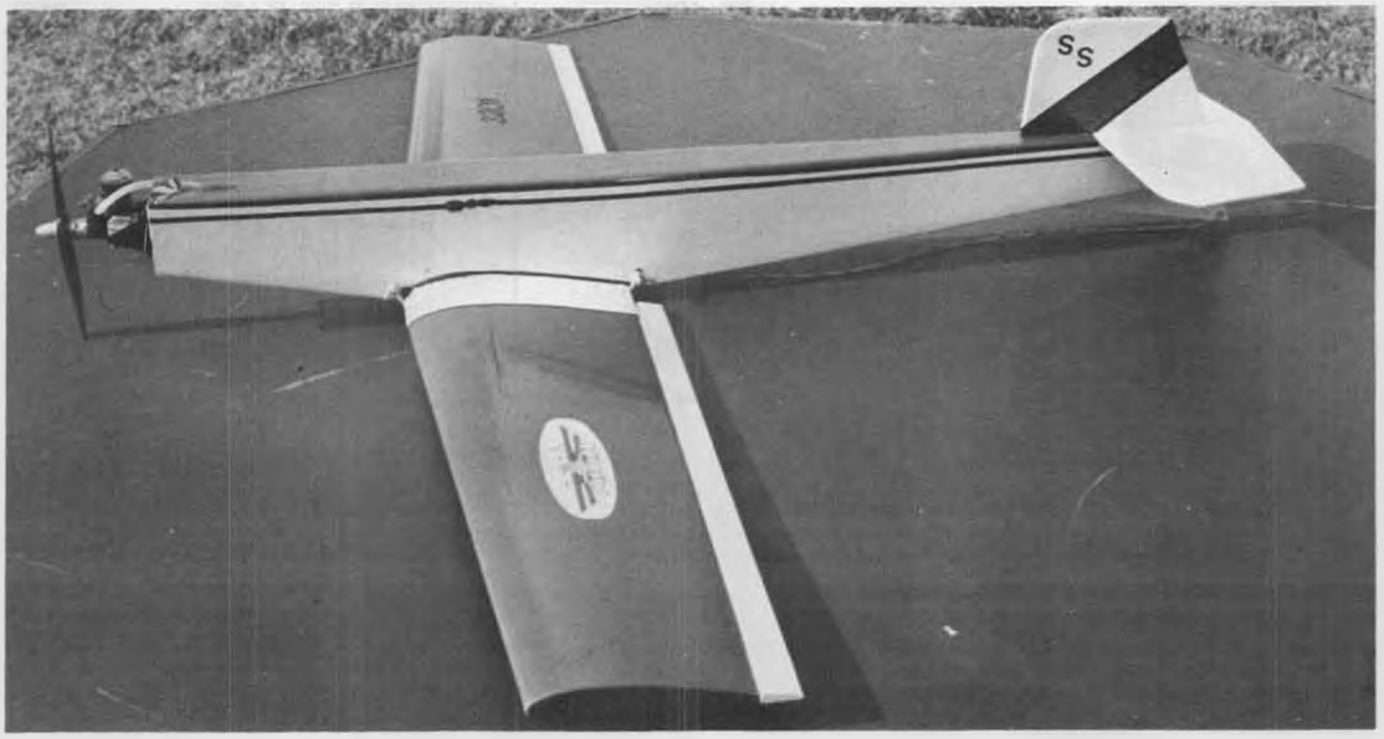
New Can-Am body from BoLink. The C.A.C. Holbert car is smooth and works on the track.

The Dirty Halloween Special, somewhat beat after a night of chasing rug-rats. And you thought your race car was a pumpkin!


SIMPLE SIMON
1/2 A Sport or Pattern
Span 40"
Length 20"
Designed by: Frank Roales
Drawn by: Scott Roales
Foam Wing Shown 1/2 SIZE
Wing Spar (Full size) 1/8" x 1/4" hardwood or two lams. 1/16" x 1/4" Ply.
Fuselage Top 1/4" sht.
Stab. 1/8" sht.
Elev. 1/8" sht.
Fin 1/8" sht.
Rudder 1/8" sht.
Sub Fin 1/16" Ply.
Fuselage sides 1/8" sht. (2)
Servo area
Battery & Rx area
Tank area 1 or 2 oz.
Chin block 1/4" sht.
Firewall three lams 1/16" Ply. (3/16" total)
1/16" Ply. Doubler (2)
Dubro 1/2 A strip aileron linkage
1/4" x 3/4" Aileron (T.E. stock)
1/4" sq. (hard) T.E.
1/8" x 1/4" spar
Remove for servo
Mylar covering
Cover entire top w/ one piece
Fold over & cover both parts w/ same piece
* Note: All parts balsa unless otherwise noted.
MODEL BUILDER magazine Plan No: 3822



SIMPLE SIMON

By FRANK ROALES . . . Here's a quick and easy R/C model for .049-.051 glow or 05 electric power. Ace foam wings make the construction part even simpler. Practice the "biggy" maneuvers economically.

• Line it up for a fast low pass with a big loop. Rack it around and come back with an in-line axial roll, pull the nose up, climb out, roll it over and split-S out. On the way back roll it over and make a low inverted pass. Grab some altitude and when the engine quits enjoy a long flat glide home.

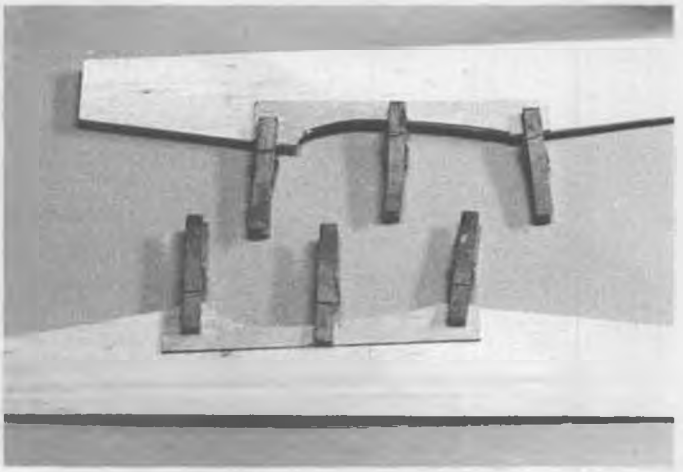
Fun??? You bet, and that's not all. This performance and the good manners that go with it comes in a very economical package. A couple of ounces of fuel, a Tee Dee, along with your favorite small radio, and your off and flying.

It has all the performance one could want from just two functions, with absolutely no bad habits . . . a very flat glide, and no tendency what so ever to snap when really slowed down during landing. In fact, to illustrate this point, let me tell you of an incident that happened during the early testing of "Simon."

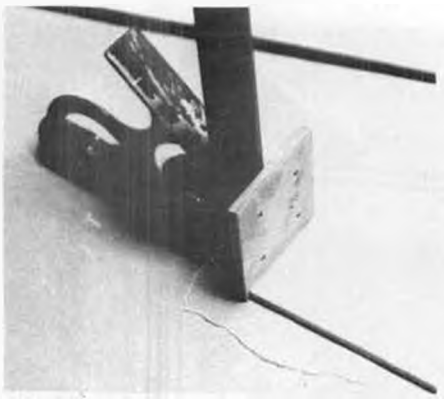
The early version of Simon had a 36 inch straight ACE foam wing with 4 inches of dihedral. One day while out flying, I took just one too many flights on my 100 ma pack and "lost it." The elevator was full up and the aileron's were in a very slight right turn. I set the transmitter on the ground and watched Simon loop its way up to a tiny dot in the sky before the engine quit, then it set into a big right glide circle just like a free flight. After a short chase on motorcycle, we watched it make a perfect landing about a ½-mile down the airport. Not even the prop was broken! Later I learned that total "free flight" time was about 12 minutes. So if you want a super-stable trainer type, just substitute a 36 inch straight foam wing with 4 inches of total dihedral for the one shown. All else should remain the same.

Simple Simon has yet another feature which may well be better than those already mentioned, hard as that is to believe. It is as its name implies, simple.

Get the dirty work over with first; cut out all the parts and make yourself a kit. Now the fun starts!



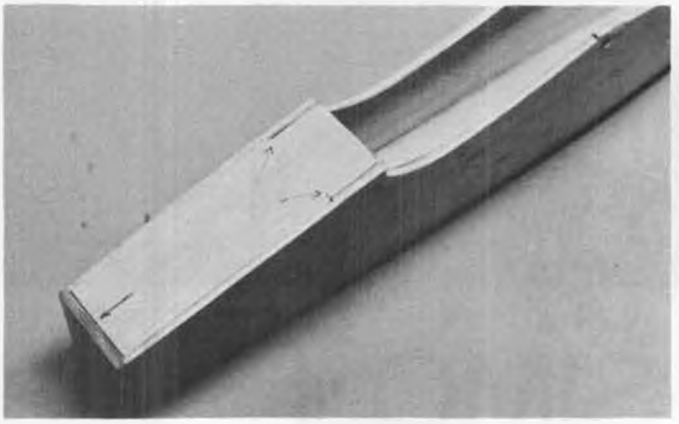
Plywood wing cut-out doublers are clamped in place for gluing by one of a modeler's most handy tools . . . clothespins.



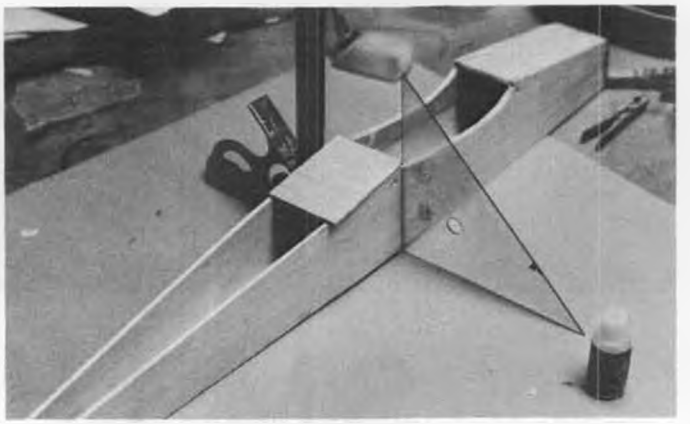
Squaring up and gluing firewall to top of fuselage.

Square up fuselage sides as you glue them to the top of fuselage.

Cyanoacrylate glue makes fast work of the assembly. No pinning required.



Chin block is notched out to clear ply doublers and then glued in place. Again, square up sides as you go.



Bottom sheeting aft of wing opening is applied with grain going across rather than parallel to centerline.

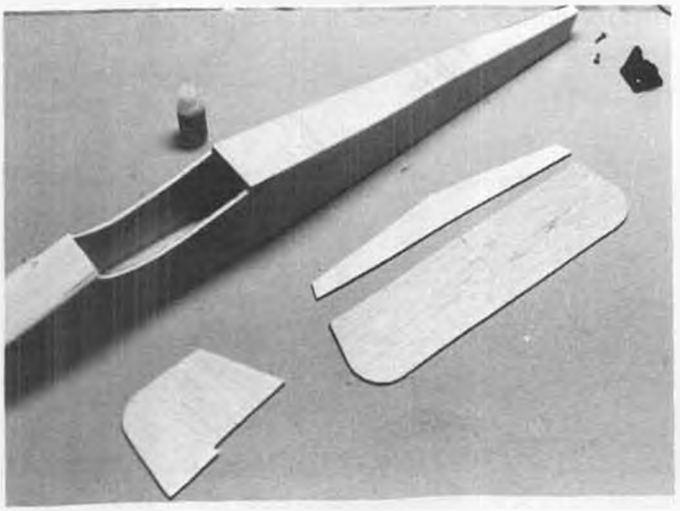
How simple? Well a foam wing and sheet tail together with a fuselage that has no formers, not even one, make for quick, simple building. Also, the whole thing can be built with just three sheets of balsa and a little 1/16 ply, plus a foam wing. Also, as all gluing is with cyanocrylate and 5-minute epoxy, the construction goes very quickly and the same goes for finishing, because of the exclusive use of mylar covering.

So, if after reading all of this you are interested, let's "have at it."

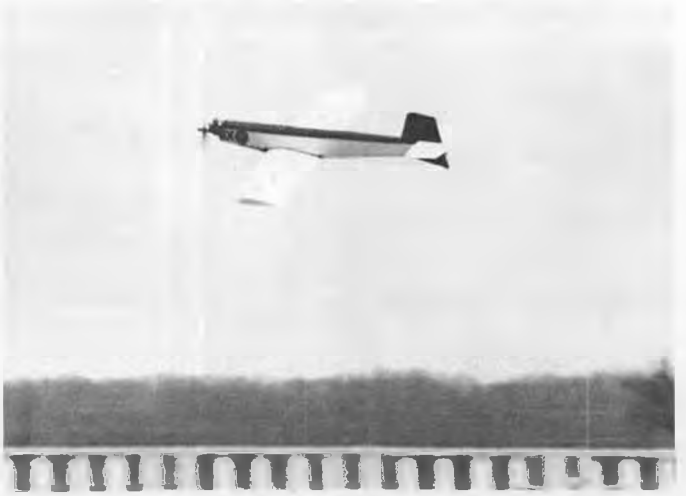
WING

As I hate to build wings, I always get it out of the way first. This one is foam and very easy to build. You will need either a ACE "Pacer" foam wing kit, or if you prefer to do it the hard way, a set of ACE tapered 1/2A wing cores and a 5-3/4 inch section of straight core. If you have decided to use the ACE Pacer wing kit, just assemble according to the instructions and change the fuselage wing cutout to fit. If doing it from scratch, start by using a square on the trailing edge of the tapered cores to make cuts of 90 degrees. This will gain the swept leading edge we are looking for. Next, trim 3/16 off the trailing edge of all parts and 1/4 inch off the leading edge of the center section. Epoxy the 1/4x1/2x5-3/4 inch hard balsa leading edge on the center section, remember to always use epoxy sparingly, because it's very heavy. Next, epoxy together all wing panels, keeping them straight and even.

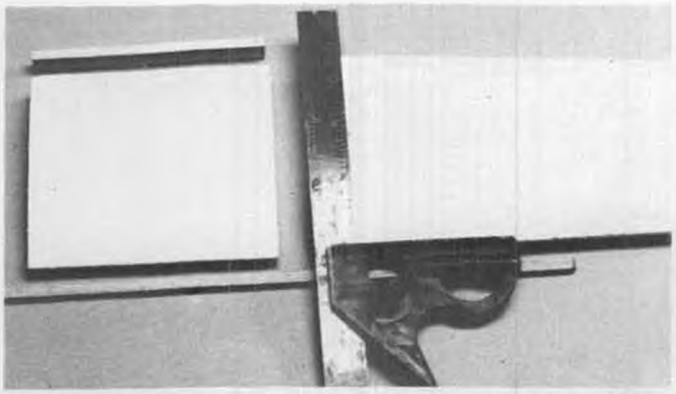
After the wing drys, a groove is cut in the top for a spar. A metal straightedge can be taped to the top of the wing with the front edge approximately 3-3/4 inches forward of the trailing edge. Now, with your soldering gun, make an 18 inch groove along this, centered on the wing center line, 1/4 inch deep for the spar. Practice this on some scrap foam and you'll get the hang of just how fast to move the gun for the size hole you need. It's not hard, just a bit "different." The spar can be made by laminating two 1/16x1/4x18 ply parts, or



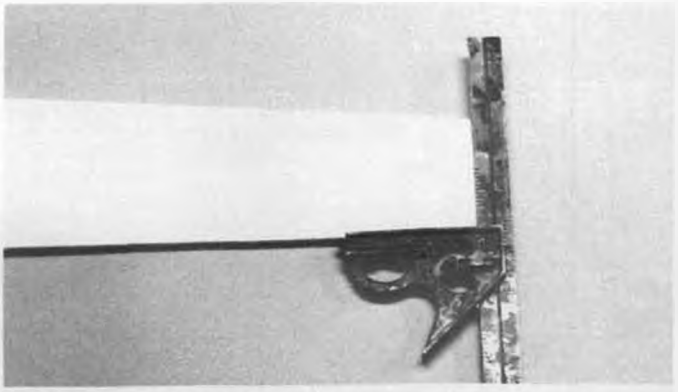
Fuselage and tail feathers ready for covering. None on the areas to be glued, please!



Maybe the name should be "Smooth Simple Simon", as that's the way it flies, smooth and easy.

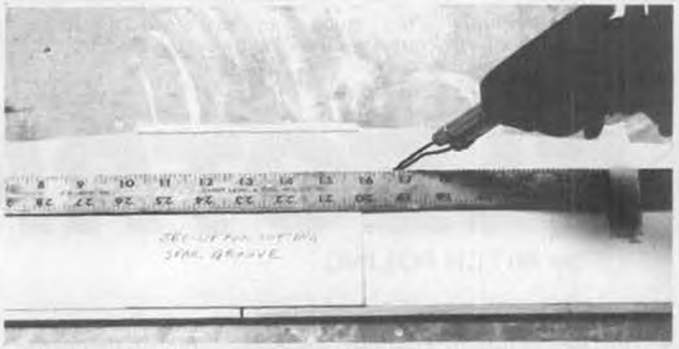


There's that square again! This time it's used to cut the wing root square to the trailing edge, giving sweep-back to the L.E.



Also square off tip, cutting it at 90 degrees to the trailing edge.

Notes in the photo tell you what else needs to be trimmed from the stock Ace foam wing parts.



Metal straight-edge serves as a guide for cutting a spar groove in bottom of wing.

using 1/8x1/4x18 spruce. Your choice. I have used both and see no difference. Glue the spar into the wing using "white" glue.

Next, epoxy on the 1/4 sq. hard balsa trailing edge. Mark the spot for the aileron servo and cut this out by cutting all the way through the wing just behind the spar. Glue the 1/16 ply plate on the underside of the wing to hold the servo and lightly sand the wing smooth. Ailerons are made from 1/4x1 trailing edge stock cut down to 3/4 inch. Make sure it's hard balsa and you re-taper it. Each aileron is 18-1/2 inches long, but if you want to save a bit and get by with just one 36-inch piece of trailing edge, they could be 18 inches with no ill effects. Hinge ailerons using a "living" type hinge. Also, I used Du-Bros 1/2A strip-aileron linkage and used a strip or two of mylar wrapped over the epoxied tubes of the aileron linkage, well up onto the wing. The final step in the making of the wing is to cover the whole thing with your favorite low-temp mylar. But be sure to keep it straight and true. If you use the ACE Pacer wing kit, you will have to modify the center section trailing edge and ailerons . . . also leave off the tips.

TAIL SURFACES

The tail surfaces are cut from 1/8 balsa as shown on the plans. All edges are sanded round except those to be joined, and the stab-elevator hinge. I used what is referred to as a "Monokote hinge" on Simple Simon and it has worked very well, along with being very simple and light. For those of you who haven't tried it, see the diagram on the plans. Also, I used a different way of attaching the horn on the elevator. This could be called a "Hot Stuff rivet". Remove the covering from the spot where the small horn is to be and place the horn on the spot. Micro balloons are then worked into the bolt holes on the horn, with some left on top to form the head of the rivet. Drop Hot Stuff on the micro balloons to form a rock-like rivet through the horn to the balsa. A bit of Hot Stuff around the base of the horn and you are all done. My Simple Simon has over 150 flights and a number of dorks on it and this method is still holding up.

FUSELAGE

Start by making yourself a "kit" of the fuselage by cutting out all parts needed according to the plans. Make the firewall by laminating three pieces of 1/16 ply. Start construction by gluing ply wing saddles to fuselage sides, being sure to make one right and one left side. Next step is to drill the firewall for the ACE

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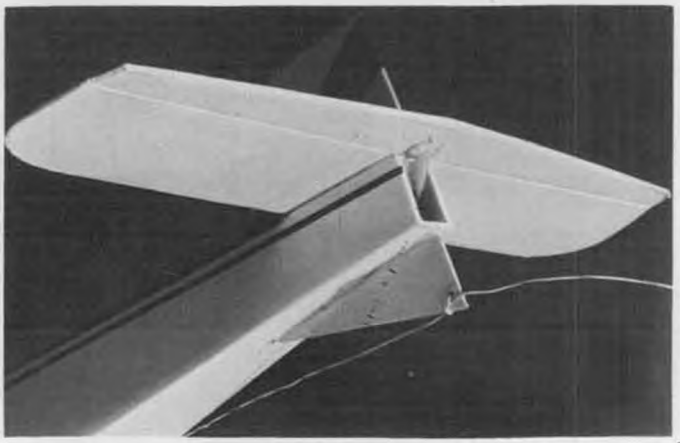
Radio installation is also in line with the model's name, simple. Ace Commander.



Appropriately, the last photo shows the tail end. Elevator horn is dead center in fuselage opening.

PHOTO BY JOHN HICKEY.

Ellis Grumer, Phillipsburg, N.J., holds on to Astro Super Monterey against strong wind. His Porterfield was "Best Looking Model."

PHOTO BY BRUCE FENSTERMACHER.

Aerial view of meet. Lots of wind (note billowing tents) and 36 electric powered models. KRC Club, Hatfield, PA.

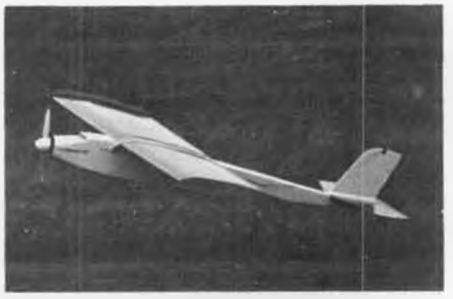
ELECTRIC POWER

By MITCH POLING

• The KRC club in Hatfield, Pennsylvania, had its annual Electric Fly last September, despite the wind, which had gusts over 20 mph. I know the feeling, the annual Electric Championships at Mile Square two years ago was like that, and at first, no one was willing to fly. I threw an 05 stunt ship into the air, and showed that it could be done, and it all went well after that. Bob Kopski did the same at Hatfield; he threw his 05 Jackrabbit into the air, and flew well, and the rest followed! My personal impression is that electrics do better in wind than gas, possibly because they have a heavier wing loading, but also because they fly more smoothly and handle gusts better. Anyhow, let's let Bob Kopski give his account of the KRC second annual Fun Fly.

"The KRC Electric Fly was a fun day. Despite persistant high winds, everyone had a terrific time, and there was quite a bit of flying for the conditions. There were 36 electrics on the field, and several more in the cars out of the wind. Planes ranged from scale to glider, to sport planes and aerobatic types. The best performers were two KRC Jackrabbits (a John Sczary design-MP). These readily sliced through the wind and impressed the spectators. Wind near the ground was turbulent and tricky, and a good on-field landing drew applause from the crowd every time! The crowd of 200 to 300 during the day was mostly modelers, as there was no publicity given out to the general public.

"The two main attractions of the day were the Electric Fly Clinic and the Electric Fly Raffle. Heinz Koerner managed the Clinic all day, and only took time for two or three flights. There was no rest for Heinz, the Clinic was constantly crowded with people getting information and help on electrics. The raffle offered a combination Astro Sport and 05 system provided by KRC and an ARF "Kitty" provided by Irwin Polk. Irwin packed in extra batteries and a charger to go with it! The Kitty is a nice looking glider (about 50") with a motor on a pod. Two lucky people left with all



Bob Kopski's Jack Rabbit, designed by John Szary. Astro 05XL, 6-4 Cox grey, 31 oz., elev., ail., on/off, and prop stop. Wing spill plates improved performance. Fenstermacher pic.

Charles Hampton, Englewood, N.J. flew this Hummingbird design. MRC/Mabuchi motor. Second in "Most Aerobatic". Fenstermacher.

Dave Burt, Indiana, PA, with 05 powered Electra Fly and 075 powered Gentle Lady. Overall hi-point winner. Fenstermacher.

T-Birdy (modified Soar Birdy), by Bruce Fenstermacher, KRC Treasurer. Astro 075 power. Photo by Fenstermacher.

Ellis Grumer's Porterfield on approach. Handles well in wind. Astro 15 with belt drive. High, low, off motor control. Fenstermacher.

the makings to get ready for next year's Electric Fly! Speaking of next year . . . plans are already underway, more details later."

Bob also included a detailed sketch of his latest version of the prop stop, which is really ingenious. The ante keeps going up; last time I talked about a prop stop I just bent the shaft on a stock Astro 05. Well, last weekend I bent the shaft on a nice expensive Leisure 05! At $50 a motor, I guess a prop stop gets sort of necessary, to keep the thing horizontal when you land. Either that, or put a landing gear on your gliders! Bob has really thought out all the details on his prop stop, including dynamic braking, an adjustable on-off trigger, and a soft spring action for the stop.

Heinz Koerner sent some additional comments on the fun fly, which were especially interesting since he ran the clinic. Here are Heinz's words.

"At nine o'clock, the wind really started blowing, and nobody wanted to fly. Bob started flying his Jackrabbit with the Astro 05XL, and it handled very well in the strong wind. John Hickey's twin 02 Jackrabbit did well too, and Bob's 15 powered glider. After that, more people started to fly. Don Srull tried to fly the Kraft Cardinal with a Leisure 05, but the wind was too much for it. I made one flight with my twin 075 Windrifter, but most of the time it was flying backwards! Later on, against common sense, I took my Quad 020 plane and heaved it into the air . . . to my surprise, it handled very well in the wind, and was much more solid in the air compared to the other planes. I am wondering if that has something to do with the gyro effect of four motors. It has both rudder and ailerons, which helped a lot in the crosswind landing.

"A lot of people showed up at the Fly Clinic. Most of the people who brought planes got their problems straightened out. The problems that came up were: short running times due to undercharged batteries, undercharged batteries due to use of chargers without ammeters, propellor missmatch, geared prop drive on planes designed for high speed (Estes), and underpowered airplanes due to manufacturers overstating power output.

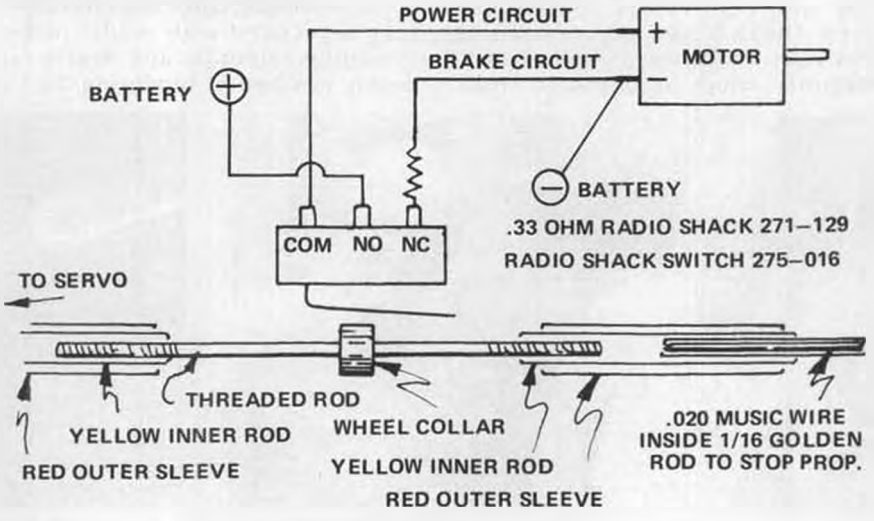
Heinz Koerner, who ran Electric Fly Clinic, shows prop collection. Complete electric workshop on wheels: multiple radio chargers, voltage booster, cooling fans, metering, etc.

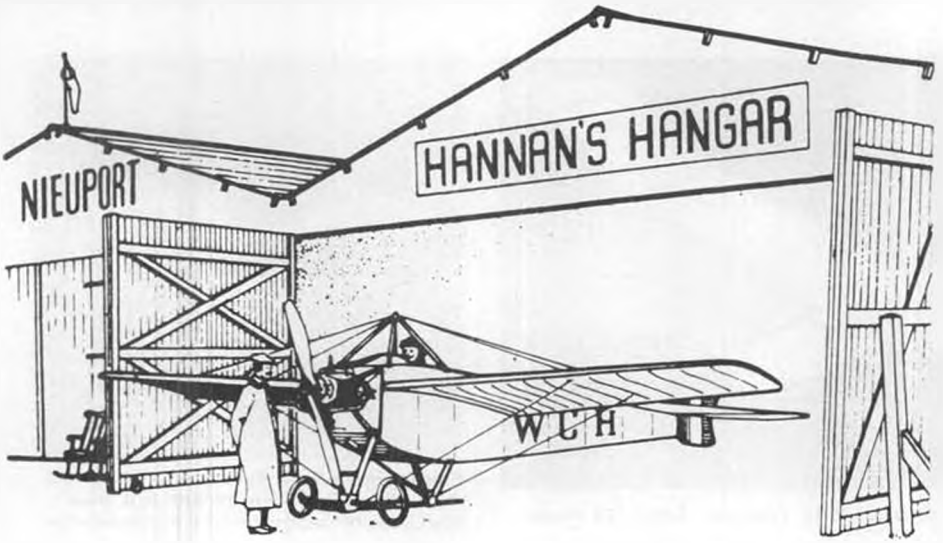
"The majority of people asked how to get started. This included questions on kits, motors, and installation. Some modelers broke their wings by using balsa spars instead of spruce, and some were discouraged after buying some of the cheapy units on the market. Some did not believe the power claims of the Astro systems or Leisure systems. Despite all this, I think there were a good number of future Electric fliers at that field. I hope they all bring their planes to the field next year. It is a lot easier to locate a problem when we can tach the rpm, weigh the plane, measure the wing area, and check the voltage and charge current, instead of just guessing what might be wrong. We may have a two-day event next year. We found out that there was just not enough time to talk to all the modelers present. We will try to organize the Fly Clinic a little bit

Continued on page 90

Bob Trockles, originated all-electric contest idea, former KRCer. Soar Birdy, Astro 075, 8-4 nylon prop. Battery is one of six on flight line courtesy of KRC. Good idea!

BOB KOPSKI'S PROP SAVER





"The most efficient engineering solution is always also the most aesthetic."

Dean McGinnes and friend with wide variety of models, conducting building demonstration in Florida shopping mall. Redding photo.

• Our lead-in line this month is by Aeronautics Professor Eugene Larrabee, of MIT, as quoted in the *Christian Science Monitor*. Larrabee is a long-time model builder, also well remembered for his contributions to human-powered aircraft technology. He has most recently designed a special CO_2 engine propeller for a British firm, employing computer techniques.

ALONG SIMILAR LINES

Other quotes relate nicely to Larrabee's thinking, such as these from *The Philosophy of Style*, published way back during 1852: ". . .in a mechanical apparatus, the more simple and the better arranged its parts, the greater will be the effect produced." And: "Whatever force is absorbed by the machine is deducted from the result." Some things never change!

SPREADING THE WORD

Dean McGinnes, of Lakeland, Florida, is shown in one of our photos helping to publicize model building in his area. He reports that the Central Florida Miniature Aircraft Society is actively promoting interest in rubber-powered flying scale with both indoor and outdoor events. The club uses the popular Flying Aces rules, including the mass-launch categories, which according to Dean, "add a whole new dimension to free flight scale modeling."

SUCCESS FORMULA?

This bit of home-spun commentary is from Georges Chaulet: "Plenty of trimming is the way to get good flights. I've always heard the proverb, 'Flights are 10 percent construction and 90 percent trimming.' Naturally, the layout has to be somewhat valuable at the beginning. If you try to fly a brick, even with plenty of trimming, it will not take off. "Mosquitos and flies seem to have less problems than ostriches getting into the air!"

THE TOY STIGMA

Plenty of print in model magazines is devoted to the "still playing with toys" image of our hobby. Well, at least we are not alone. Military miniaturists have been fighting the "toy soldiers" label for centuries. And now, builders and collectors of miniature furniture are complaining in their publications about having a "doll-house" stigma in the eyes of the general public. But unlike model aircraft builders, they are not a minority group. In fact, they claim to be second only to stamp-collectors in popularity.

Interestingly, some manufacturers long associated with model planes, including Scientific and X-acto, are deeply involved in producing the tiny furniture kits.

Perhaps all of us are wasting our time and energy in trying to defend our hobbies. Why not just relax and enjoy? Perhaps those who scoff at adults being interested in "toys" have simply forgotten the fun of play?

THOSE NEW POSTAGE RATES

Twenty cents may seem a steep price to send an ounce of domestic mail, but considering the high cost of almost everything these days, perhaps it is still quite a bargain. Fulton Hungerford, maker of those beautiful lightweight spoked wheels, figures that it is worth even an extra cent to publicize vintage aviation, and uses the 21 cent Octave Chanute stamps for his letters.

As to postage for foreign letters, according to British Airways, seven years ago, fuel costs for a transatlantic flight amounted to $14 per passenger. Now it is $170 each! So 40 cents for an air mail letter across the ocean seems rather reasonable, doesn't it?

HAPPY BIRTHDAY, "WINGS"

Seems hardly possible that the Northrop club Flying Wing models contest has been taking place for 15 years. We have been privileged to take part in about 14 of these events, and still eagerly look

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Two "prime movers" of modeling, Hurst Bowers (left) founder of Flyline Models, and Don Srull, F/F and R/C scale modeler. Roth pic.

Magnificent Scottish 1911 Barnwell monoplane by Larry Kruse, CO_2 power and Fulton Hungerford spoked wheels.

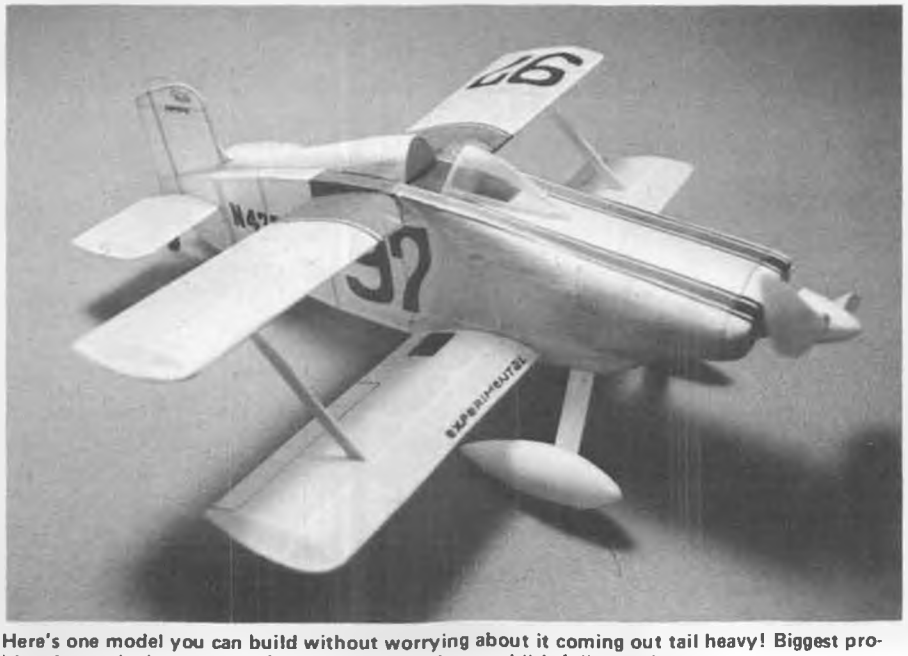
HOT CANARY

By BOB SWEITZER . . . When you take this far out Peanut to the next flying session, you're sure to get a few double-takes when it's first spotted. Length of the rubber motor alone should make for long flight duration. Also, you'll learn something about sheet balsa forming.

• Modelers are continually seeking out the unusual and different scale subjects to build. A quick glance at the cover of *World's Great Aircraft* by Air Progress, revealed a color picture of a little, light yellow racing biplane with negative stagger wings and square fuselage sides. The "Hot Canary" was just what I was looking for. Inside the magazine there were more color photos and a short article on the subject. More research into Racing Planes 1971 annual by Reed Kinert uncovered more photos and the necessary three-views. It was time to sharpen the pencils and design a model.

The "Hot Canary W-4" was designed, built, and flown by Bill Warwick. It was completed in 1970, and competed in its first race at Fort Lauderdale air races the same year. Bill and Canary showed their baptism of fire (it was his first air race, too) by winning the Sport Biplane consolation race. In June 1971 at Cape May, New Jersey, the torrid twosome won both the preliminary heat race and the main event. The Canary has 14'-9" of staggered laminar flow wings that sizzle throughout the air at just under 170mph.

During the preliminary layout plans, it became apparent that the Hot Canary would be more than just a cute model. It would be large for a peanut scale (15 inch long fuselage and 66.7 square inches of wing area), sort of a Walnut scale in a Peanut shell. You may have to carry a tape measure to set any non-believers straight.



Here's one model you can build without worrying about it coming out tail heavy! Biggest problem is convincing anyone it's a peanut. Too big to publish full-size plans.

The model's size and long nose moment requires very careful selection of light, strong balsa. Micro-X Products, Inc. has an excellent offering in 1/64 and 1/20 square balsa. They also carry a good choice of tissue. The cost of their catalog is a worth while investment.

The Canary is not advised for beginners because of the construction methods. I will not cover the construction stick-by-stick, but elaborate in detail on the difficult aspects. The liberal use of molded balsa components, laminated wing tips, and laminated tail surface outlines may not appeal to many modelers. Don't let the formed balsa parts discourage you, because it is much easier than it looks (this was the first time I tried it).

Complete the basic fuselage box frame with all nose formers in place.

Begin the molded balsa components with the nose side cheek, as these are simple and easy and will build up your courage to attack the headrest. Select a piece of 3/8 inch sheet balsa and cut to the outline, using the fuselage nose side view (from F3 to F5) as a pattern. Formers F3 and F5 provide the shape to carve the form block. I copied just the curved section of F3 and F5 on each end of the block and carved to shape. I only formed the curved portion of the nose cheeks because the straight sections will take care of themselves . . . just allow enough

extra balsa sheet. Don't forget to make a right hand and left hand form. Cut a piece of 1/64 sheet balsa, with a good straight grain, approximately a 1/4 inch larger than the curved block. Soak the sheet for about 45 minutes in hot water, and wrap around the mold. Pin only at the edges and let dry over night. When dry, fit and trim the formed sheet balsa to the nose former and glue in place. You can avoid all the difficulty of the nose cheeks by going to carved balsa blocks (hollowed out) and omitting nose formed balsa, but you may have a nose-heavy problem.

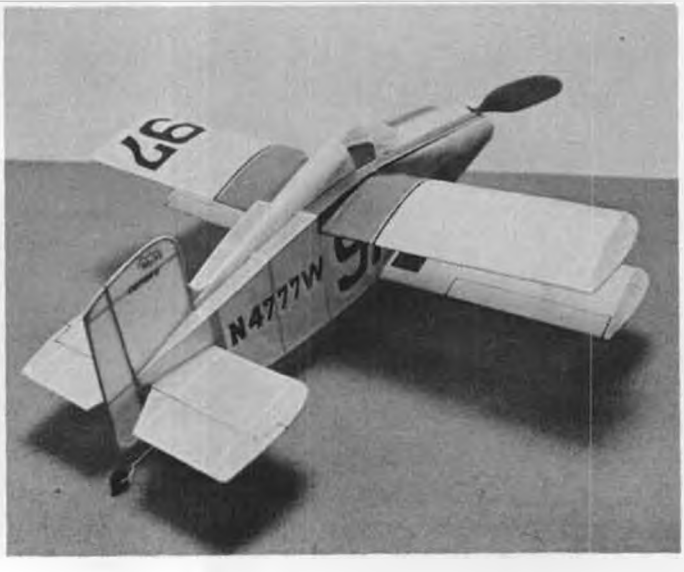
Having completed the nose cheeks (courage in hand) it is time to attack the headrest with the compound shape. Carve a balsa block to the shape desired (about 1/64 undersize for the allowance of the sheet balsa). Use F10 for contour shape at the end and blend the other end into the fin. The block should be finished with two coats of sanding sealer and one coat of car wax (I use *Record Time* by Blue Coral) then buff. Pick a nice piece of straight-grain 1/64 sheet balsa and cut a piece about 3/8 inch larger than is required (you may need plenty of extra for clamping). I use a piece of paper to determine the pattern's size and shape. Soak the blank for 45 minutes in hot water and test bend it slowly around the balsa form. Look for cracking or splitting. If it doesn't want to form, use some household ammonia on it. That stuff will make the most stubborn balsa curl around any block.

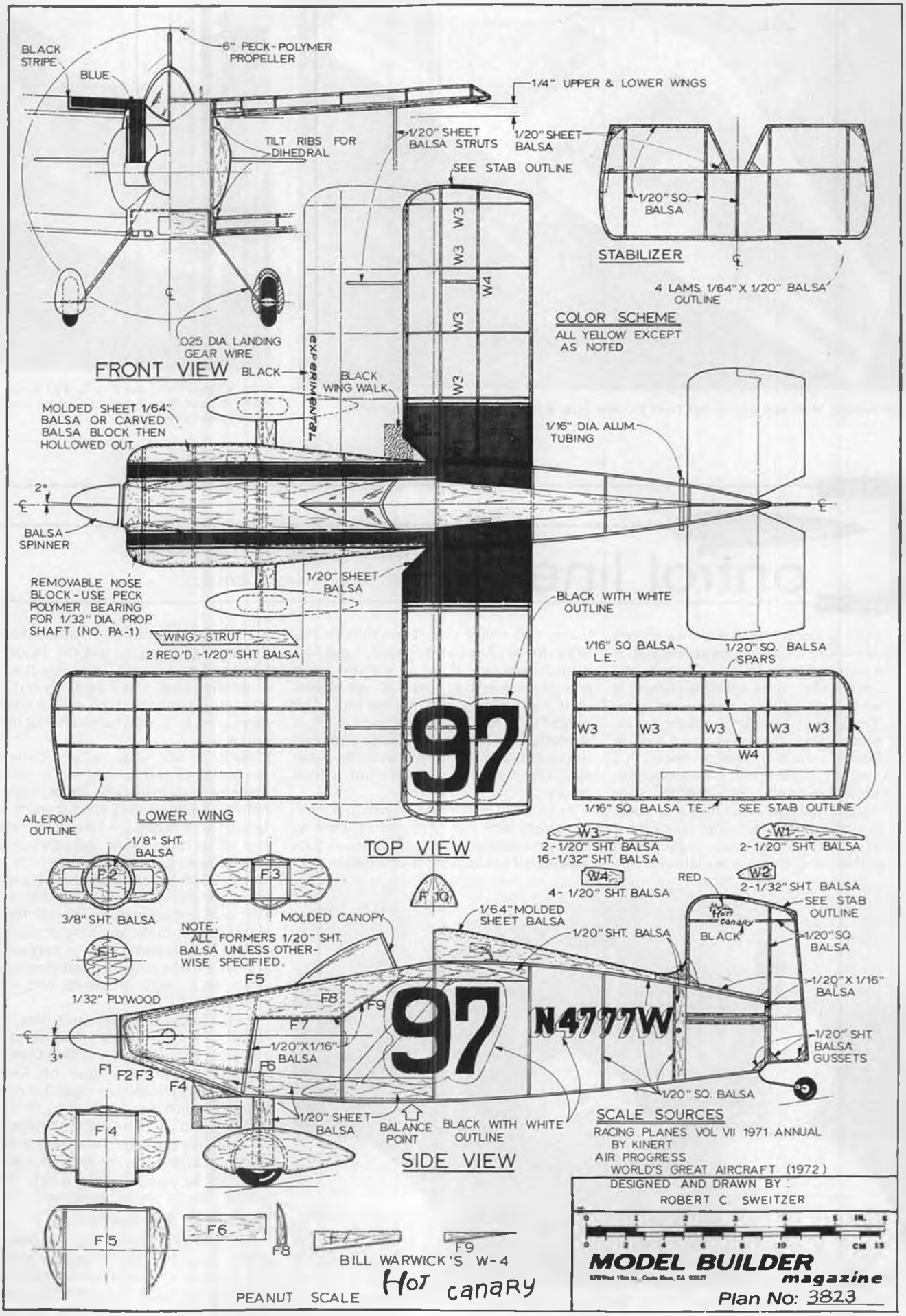
Once on the form (you will still have the compound section near F10 to contend with), clamp the sheet at the bottom of the block and let dry overnight. Now attend to the curvature change portion of the headrest. While still on the mold, cut narrow V-notches (one on top along the center line and one on each side about half way down) back from F10 approximately a 1/2 inch to the point where the compound bend starts. Pull and trim the sheet balsa until it fits the form at F10. Glue balsa slits together on the mold block with Wilhold aliphatic resin and sand lightly when dry. When dry, remove from block, add former F10, and trim to fit fuselage. A coat of clear dope inside the headrest will help hold its shape. Now you have one nice light headrest.

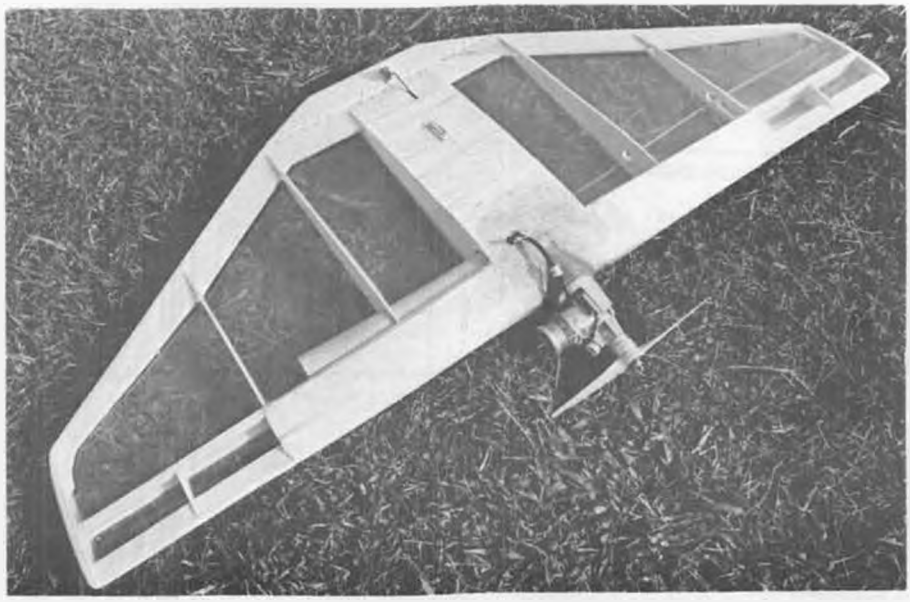
The laminated wing tips and laminated tail surface outlines are not that difficult. Walt Mooney has written much on laminated tips, so I would be just wasting your reading time by repeating it all again. The Peanut Professor uses hard wood for his outlines, where I use 1/20x1/64 balsa, but the principle is the same. The remainder of the construction is straightforward and should present very few problems.

Cover the model with light yellow tissue (Canary yellow), with blue and black tissue as trim. When I covered the molded balsa components with tissue, I was surprised to see that the sides had not become indented. The form balsa

Continued on page 67




BLACK STRIPE
BLUE
6" PECK-POLYMER PROPELLER
1/4" UPPER & LOWER WINGS
1/20" SHEET BALSA STRUTS
1/20" SHEET BALSA
TILT RIBS FOR DIHEDRAL
SEE STAB OUTLINE
1/20" SQ. BALSA
STABILIZER
4 LAMS. 1/64" X 1/20" BALSA OUTLINE
COLOR SCHEME
ALL YELLOW EXCEPT AS NOTED
.025 DIA. LANDING GEAR WIRE
FRONT VIEW
BLACK
BLACK WING WALK
EXPERIMENTAL
W1
W2
W3
W4
MOLDED SHEET 1/64" BALSA OR CARVED BALSA BLOCK THEN HOLLOWED OUT
1/16" DIA. ALUM. TUBING
2°
BALSA SPINNER
REMOVABLE NOSE BLOCK - USE PECK POLYMER BEARING FOR 1/32" DIA. PROP SHAFT (NO. PA-1)
1/20" SHEET BALSA
WING STRUT
2 REQ'D. -1/20" SHT. BALSA
BLACK WITH WHITE OUTLINE
1/16" SQ. BALSA L.E.
1/20" SQ. BALSA SPARS
1/16" SQ. BALSA T.E.
SEE STAB OUTLINE
AILERON OUTLINE
LOWER WING
TOP VIEW
1/8" SHT. BALSA
F2
F3
F10
3/8" SHT. BALSA
MOLDED CANOPY
NOTE: ALL FORMERS 1/20" SHT. BALSA UNLESS OTHERWISE SPECIFIED.
F1
1/32" PLYWOOD
F5
F8
F9
F7
1/20"X1/16" BALSA
F6
F4
3°
F1 F2 F3
1/64" MOLDED SHEET BALSA
1/20" SHT. BALSA
RED
BLACK
1/20" SQ. BALSA
1/20" X 1/16" BALSA
1/20" SHT. BALSA GUSSETS
1/20" SQ. BALSA
1/20" SHEET BALSA
BALANCE POINT
BLACK WITH WHITE OUTLINE
SIDE VIEW
F4
F5
F6
F8
F9
BILL WARWICK'S W-4
PEANUT SCALE
Hot canary
SCALE SOURCES
RACING PLANES VOL VII 1971 ANNUAL BY KINERT
AIR PROGRESS WORLD'S GREAT AIRCRAFT (1972)
DESIGNED AND DRAWN BY:
ROBERT C. SWEITZER
MODEL BUILDER magazine
Plan No: 3823



Gary Arnold, Michigan, uses Super Tigre 15, very little wood, in his FAI Combat models.

Mike Strieter (left) and Phil Cartier getting ready to send Gary Frost into action (using Phil's model and engine).

Control line

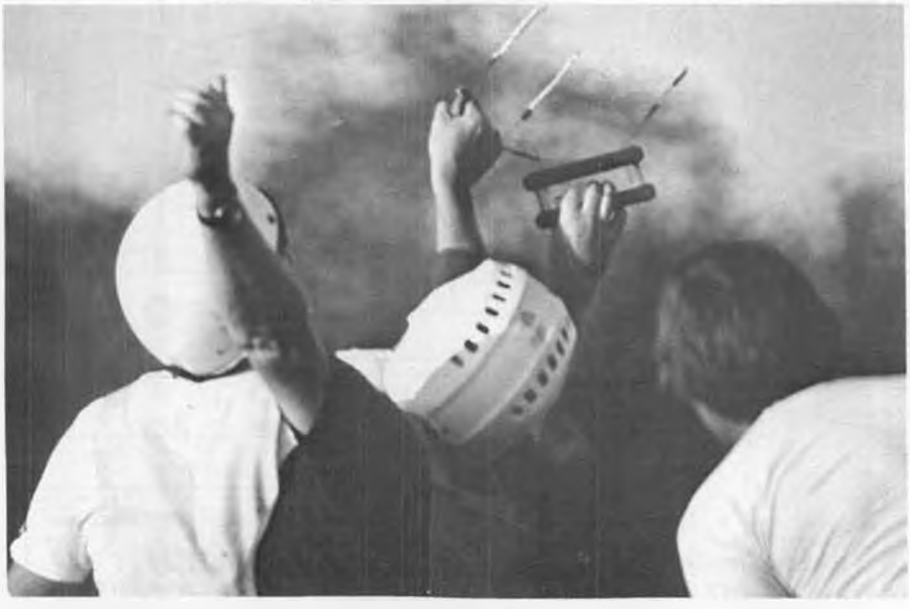
By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

● Covering a new model has always been fun. The thing is finally almost finished, is often your best model yet, so you're proud of it, even when semi-naked and there is always that new color combination to try out. Yes, one new model at a time, covering is enjoyable. It's when you have just finished off a stack of Combat models that covering can become much less enjoyable.

With that in mind I once tried to locate a company that had a machine that could cover almost-complete wings for Combat models, in this case I was dealing with wings that needed only installation of tail-boom and motor pod. Even though this story doesn't have an end (yet), I did find a small company that had a shrink-wrap type of machine that would accept objects up to four feet long and two feet wide. The plastic they had available varied a lot in strength, from the not-acceptable film used to cover plastic model kit boxes to some stuff that was really tough, but a little heavy.

As I recall, the reason I ended up not trying them was that they didn't want to change materials for such a small job, although if I caught them at the right time it would be no problem. As usual, I wanted it done right then, so did the models by hand and never went back. Still, it was an interesting idea, and if anybody out there has any experiences with such a scheme, there are a lot of us who would like to hear about it.



Time out! Max Mearns needs help, referee Paul Curtis about to step in at Team Trials.

Back a few days when something reminded of the search for a covering machine, I got to thinking about plastic film finishes and why they always seem to be heavier than necessary. One of the reasons has to be that, while adhesive is only needed where the covering contacts structure, the film has adhesive on every square inch. For obvious reasons, of course, but that stuff just goes along for the ride and doesn't contribute anything at all. What would be interesting to try is applying the adhesive to the structure and then ironing on a nice, light uncoated film, mylar probably.

Yes, I know that idea isn't new, I first heard about it when reading of the Hunter's FF Satellites, and Rich Lopez has used a similar technique on Combat models, but I think they used 3M contact cement which would seem to be a little heavier, and a lot messier, than necessary. So again the question; isn't there a cheap, widely available, easy to apply glue around that can be used to attach a light, strong plastic film to model structures?

News From the Hunters . . .

Bill sent along a very thin envelope the other day, leading to speculation that maybe they had discovered a dehydrated glue, but instead it contained stickies and some of the usual PR stuff. First, they are

George Cleveland (left) and Gary Arnold have at during elims. Note similarity of expressions. Looks like two-part harmony.

George Cleveland checks out progress of a match. No sense in wasting fuel starting the spare at $25 a gallon.

packaging Hot Stuff and Super 'T' with yet another variation on the this-is-my-handle, this-is-my-spout theme, adding a new spout-type applicator, which means that now you have your choice of three different ways to dispense the glue that made Satellite City famous and the Hunter's rich. The spout looks like it will work okay when needing to apply mass amounts of the glue, as in attaching glass cloth, otherwise you'll probably prefer the old way of doing things for most jobs.

The stickies are also included in each package of Hot Stuff. Notice that one has the world to the left while the other has the world to the right. If you're far-left or far-right, they've got something for you; middle-of-the-roaders need not apply. And if you're really crazy about your Hot Stuff, they also have larger stickies available, just send 'em a stamped, self-addressed envelope. While you're at it, ask for the sheets detailing building tips.

Personal Note: Thanks for the Hot Stuff stickies, Bill, but my kid used up the very few you sent. Please send more, enough to supply him and his friends, so there will be some left over for me to use in patching wings and hiding bits of hangar rash on the models. Also could use a few in a slightly larger size, 50 by 12 inches would be about right, then I could cover a Combat wing with just two stickies. Thanks.

Typical . . .

. . . of the attitude that it takes in making an event like Northwest Sport Race work as originally envisioned was that taken by the '81 NWSR champion, Dick Salter. Last year, Dick had a Fox .35 (the only engine now allowed in this racing event) that really smoked. Well, for a very old design, originally meant for Stunt use only, it smoked. Everything is relative, you know. Anyway, Dick took this motor and retired it before the start of the '82 season, just to even things up a little. How many times have you seen that happen?! If a Sportsmanship award is initiated for NWSR, and *if* Dick can keep from unretiring the motor the first time he loses, he gets my vote.

Gettin' Ready to Fly . . .

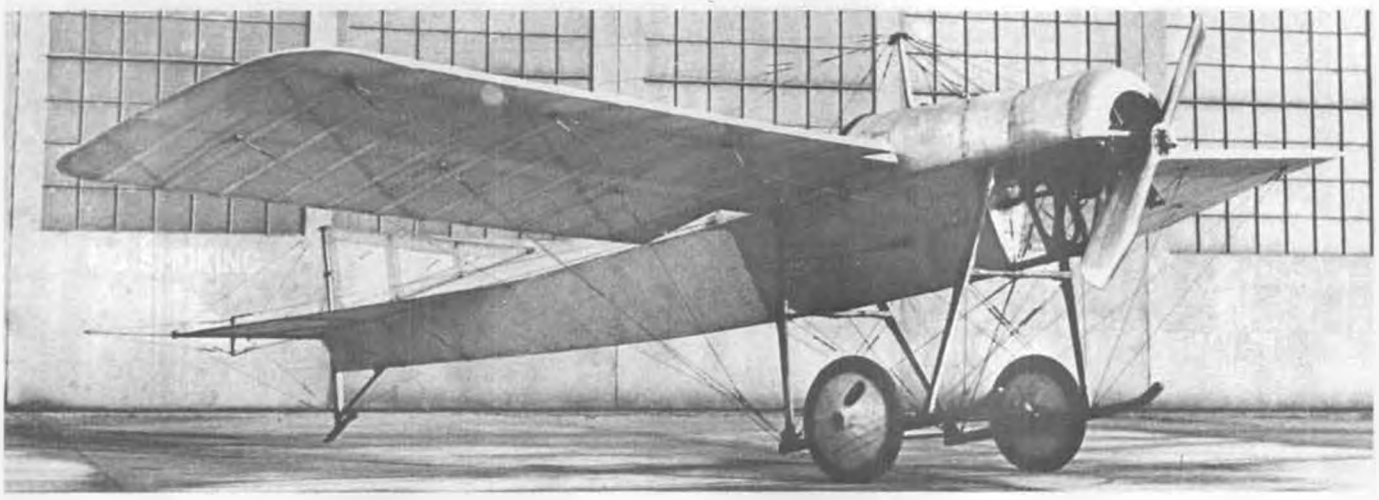
A few months ago, I gave thought to doing an article on what to do with your CL equipment as it was put away for the winter. Then I remembered that nobody actually does all that stuff like rinsing raw fuel out of the motor, wiping off lines before storage, taking the starting battery out of the pit box and putting it on charge, cleaning out the toolboxes and so on. No mistake, an evening spent cleaning everything up before storage is time well spent, it just never gets done.

So it seemed a good idea to write about some of the things that have to be done before making the first flight of the year, as these things absolutely can't be put off, and are much more easily accomplished in the shop instead of at the flying field.

Being a motor freak, I like to start with the noisemakers and try to do a pretty thorough job here, 'cause if the motor don't honk, flying is no fun at all. If the motor in question was running strong the last time out, there is no reason to completely take it apart and several good reasons not to. Just pull the plug out and put it in the practice-flying box. For a look at the internals, pull the back door and check for rust on the rear bearing. If you find any, it is best to replace the bearing, as we run these bearings at the ragged

Continued on page 88

Mike Petri, Neal White, and Stan Youngblood after Stan beat Howard Rush in the final at big Merced meet.



1912 BLACKBURN MONOPLANE

By SID MILLER . . . This model was designed and flown as a free flight, but if you're an R/Cer who is willing to do a little modifying, the plans provide a nice basis for producing a lightweight 3-channel scale ship.

Author/designer Sid Miller with his 1912 Blackburn Monoplane.

● Those aviation enthusiasts who were lucky enough to visit the last open day of the season at Old Warden Airfield (England), would have witnessed the rare sight of a genuine 1912 aeroplane in its natural element.

Piloted by Neil Williams, the Shuttleworth Trust's (Museum) Blackburn Monoplane gave a spirited performance despite its vintage years and there were few spectators left uninspired by the occasion.

Robert Blackburn, the designer, was born in 1885 and was a qualified civil engineer. He became interested in avaiation at the time of Wilbur Wright's visit to France in 1908.

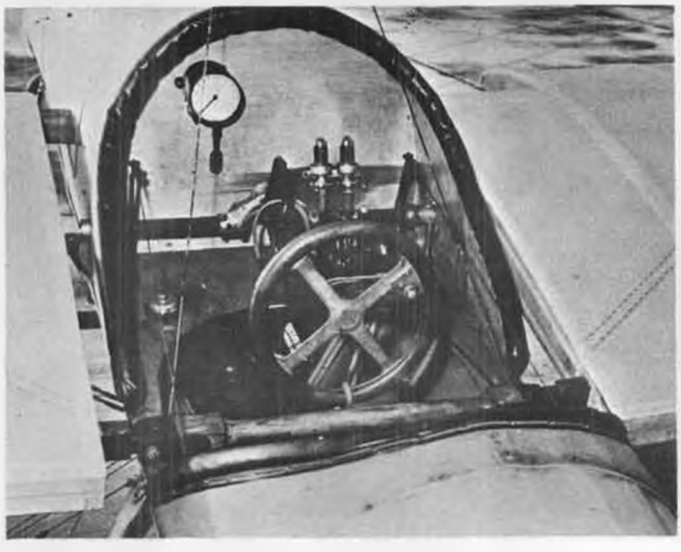
The 1912 Monoplane was the third in a series of designs which extended into a long and fruitful career by Blackburn, of building aeroplanes for the Royal Navy.

The following is a description of the construction of the real aeroplane, which along with the photos of the real aeroplane, should facilitate scale construction and details.

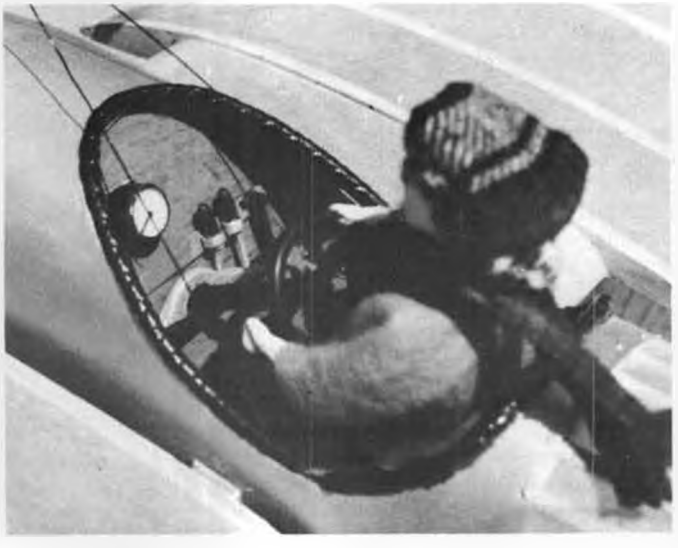
The construction of the airframe is fairly typical of the period. The fuselage is made from three ash longerons, with spruce spacers, the rear turtledeck is faired to a semi-circular section by 11 stringers. Thin aluminum sheet extends to the rear of the cockpit, and this has a dull finish. The wings have no ailerons but are 'warped', and contain two spindled ash spars, with built-up cottonwood ribs.

The tail assembly has single surface covering and both movable and fixed surfaces are attached to separate 1-inch diameter spars of steel tube. The undercarriage (landing-gear), clean for its period, is made of ash, streamlined between joints, with two spreader bars of steel tube.

The pilot has two basic instruments at his disposal, a large revolution counter

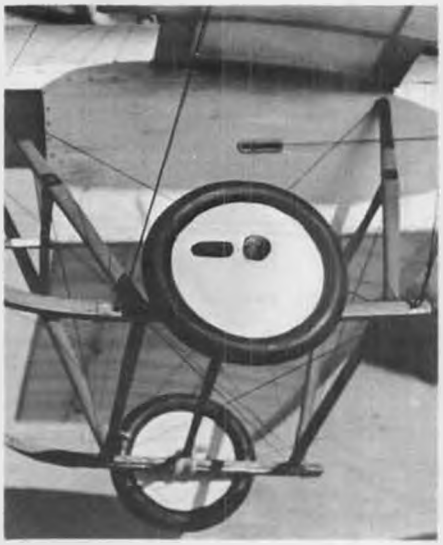


Close-up of cockpit in Shuttleworth (England) Museum Blackburn. Instrumentation totalled one tachometer and two oil pulsator glasses.



Cockpit of model closely resembles real cockpit at left. All museum photos by Bob Meuser.

(tachometer) mounted at the left, and a couple of oil pulsulator glasses. The flying controls consist of a fairly standard rudder bar and a long 'joystick' on which is mounted a 12-inch diameter steering wheel'. This wheel warps the trailing edge of both wings by pulling on two cables which run from the fuselage sides down to pulleys attached to the rear legs of the undercarriage. Each cable at this point divides into three, which run to the rear spars. Corresponding cables from the top surface of the spars run up and over the ash kingpost and perform the duty of the balance cable on modern ailerons. At the time the Blackburn was built, ailerons were virtually unknown.



To keep weight down, Sid built his wheels of ply and balsa.

Standard lifting (flying) and landing wires brace the front spars.

The real aircraft is covered in the normal off-white linen, which darkens with age.

The model, although primarily designed for free flight, is easily adaptable for radio control. The large wing area, deep undercamber, and adequare tail surfaces, should handle a larger motor (.10 to .15 c.i.) and the extra weight of radio gear, with ease. I would like to offer two suggestions along those lines; use of wire and tube wing mounting (as per RC sailplanes), and cables for servo to rudder and elevator hook ups.

CONSTRUCTION

WINGS

Use pattern on plan to make templates for ribs W-1 and W-2. Cut and sand ribs as per number on plan. Make a thick cardboard template of the wing tip shape. Soak strips of 1/32 x 1/8 balsa, bass, or spruce, and laminate four thicknesses around template. Notch trailing edge to receive ribs. Pin leading and trailing edges over plan and glue ribs in place. Slide 1/4 x 1/8 spars (spruce recommended for RC) under ribs, carefully raise and glue in slots. Use scrap to block up spars, to allow for undercamber.

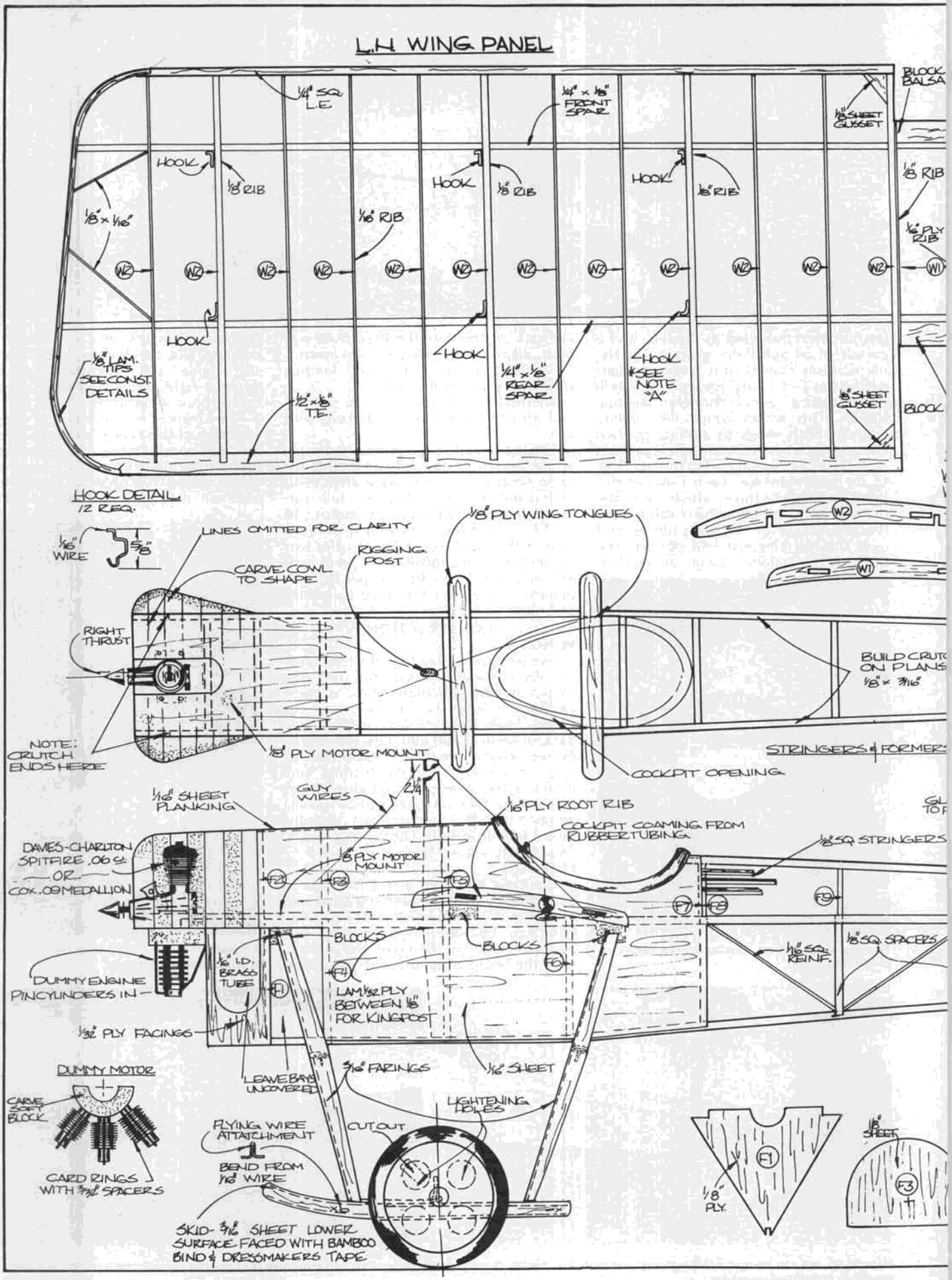
FUSELAGE

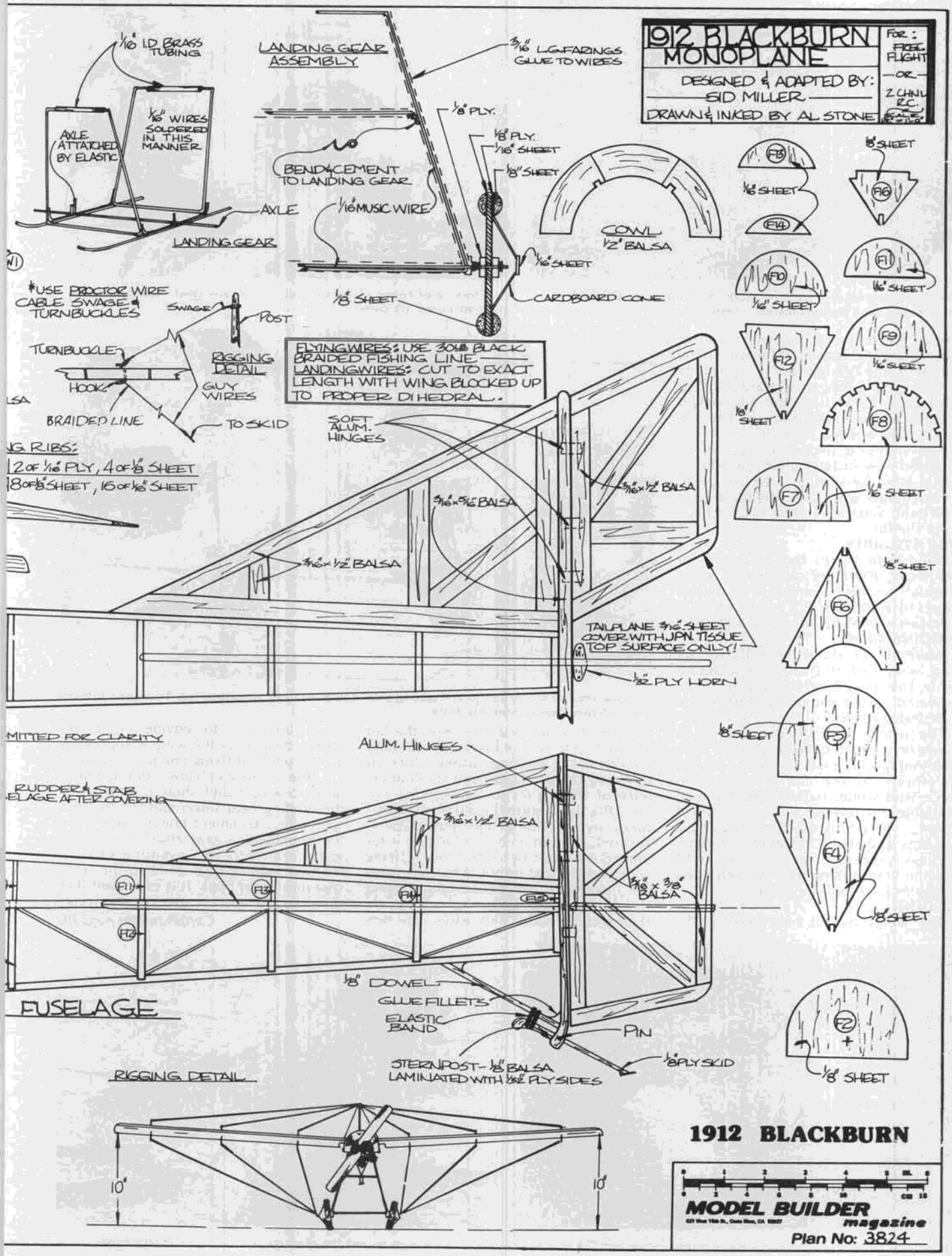
The basic crutch of 3/16 x 1/8 balsa is built directly over the plan top view and using the 'V' formers F-1, F-4, F-6, F-12, F-16, and 1/8 square spacers, add the bottom longeron. Remove the crutch from the board when dry and add upper formers, stringers, motor mount, and cowling. Cut the cowling and mount to suit engine used. From experience, two degrees right thrust and three degrees down thrust is desirable.

The kingpost is a vital part of the construction of this type of model, since the landing wires (top) and flying wires (bottom) actually support the wings. It is a laminate of 1/32 plywood (1/16 for RC), between two pieces of hard 1/8 balsa

A detailer's dream, this photo reveals a myriad of wires, cooling fins, etc.

Here again, we can compare the real airplane with the model. What appears to be wide tail structure is really the reinforcing pinked tape over very thin structural members.


L.H. WING PANEL
1/4" SQ. L.E.
1/4" x 1/8" FRONT SPAR
BLOCK BALSA
1/8" SHEET GUSSET
HOOK
1/8" RIB
1/8" x 1/16"
1/16" RIB
1/16" PLY RIB
W2
W1
1/8" LAM. TIPS SEE CONST. DETAILS
1/2" x 1/8" T.E.
1/4" x 1/8" REAR SPAR
*SEE NOTE "A"
BLOCK
HOOK DETAIL
12 REQ.
1/16" WIRE
5/8"
LINES OMITTED FOR CLARITY
CARVE COWL TO SHAPE
RIGGING POST
1/8" PLY WING TONGUES
RIGHT THRUST
BUILD CRUTC ON PLANS 1/8" x 3/16"
NOTE: CRUTCH ENDS HERE
1/8" PLY MOTOR MOUNT
STRINGERS & FORMERS
COCKPIT OPENING
1/16" SHEET PLANKING
GUY WIRES
2 1/4"
1/16" PLY ROOT RIB
COCKPIT COAMING FROM RUBBER TUBING
1/8" SQ. STRINGERS
DAVIES-CHARLTON SPITFIRE .06 cu. OR COX .09 MEDALLION
1/8" PLY MOTOR MOUNT
F2
F3
F5
F7
F8
F9
BLOCKS
BLOCKS
F6
1/16" SQ. REINF.
1/8" SQ. SPACERS
DUMMY ENGINE PINCYLINDERS IN
1/16" I.D. BRASS TUBE
F1
F4
LAM 1/32 PLY BETWEEN 1/8" FOR KINGPOST
1/32" PLY FACINGS
DUMMY MOTOR
CARVE SOFT BLOCK
LEAVE BAYS UNCOVERED
3/16" FARINGS
1/16" SHEET
LIGHTENING HOLES
FLYING WIRE ATTATCHMENT
CUT OUT
BEND FROM 1/16" WIRE
CARD RINGS WITH 3/32" SPACERS
SKID- 3/16" SHEET LOWER SURFACE FACED WITH BAMBOO BIND & DRESSMAKERS TAPE
1/8" PLY.
1/8" SHEET


1912 BLACKBURN MONOPLANE
FOR: FREE FLIGHT —OR— 2 CHNL R.C.
DESIGNED & ADAPTED BY: SID MILLER
DRAWN & INKED BY AL STONE
1/16" I.D. BRASS TUBING
AXLE ATTACHED BY ELASTIC
1/16" WIRES SOLDERED IN THIS MANNER
LANDING GEAR ASSEMBLY
3/16" L.G. FAIRINGS GLUE TO WIRES
1/8" PLY.
1/16" SHEET
1/8" SHEET
BEND & CEMENT TO LANDING GEAR
AXLE
1/16" MUSIC WIRE
LANDING GEAR
COWL 1/2" BALSA
CARDBOARD CONE
*USE PROCTOR WIRE CABLE SWAGE & TURNBUCKLES
SWAGE
POST
TURNBUCKLE
HOOK
RIGGING DETAIL
GUY WIRES
BRAIDED LINE
TO SKID
FLYING WIRES: USE 30LB BLACK BRAIDED FISHING LINE
LANDING WIRES: CUT TO EXACT LENGTH WITH WING BLOCKED UP TO PROPER DIHEDRAL.
SOFT ALUM. HINGES
3/16" x 1/2" BALSA
3/16" x 3/16" BALSA
TAILPLANE 3/16" SHEET
COVER WITH JAPN. TISSUE TOP SURFACE ONLY!
1/32" PLY HORN
ALUM. HINGES
RUDDER & STAB
3/16" x 3/8" BALSA
1/8" DOWEL
GLUE FILLETS
ELASTIC BAND
PIN
STERNPOST - 1/8" BALSA LAMINATED WITH 1/32" PLY SIDES
1/8" PLY SKID
FUSELAGE
RIGGING DETAIL
10"
10"
F16
F14
F10
F11
F12
F9
F8
F7
F6
F5
F4
F2
1/8" SHEET
1/16" SHEET
1912 BLACKBURN
MODEL BUILDER magazine
Plan No: 3824

Wing flying and landing wires on model are functional. Original aircraft used wing warping instead of ailerons.

Close-up of engine installation on model, also cowl riviting. Original model used .06 diesel.

(spruce for RC) and securely glued in place. Note that it goes all the way to the bottom of the fuselage and is also glued to former F-5. Sheet forward part of fuselage as shown, later cut out cockpit opening and use split black rubber tubing to make cockpit coaming.

Add sternpost and skid. Fin can be glued on now or later after covering. If added later, be sure and remove paper along stringer where fin fits, for a good glue joint. Separate rudder is later hinged to the fin.

TAIL ASSEMBLY

Build both halves flat on plans; for free flight, elevators can be left as individual sections, joined to stabilizer halves by aluminum hinges, and for R.C., elevators should be joined by a dowel.

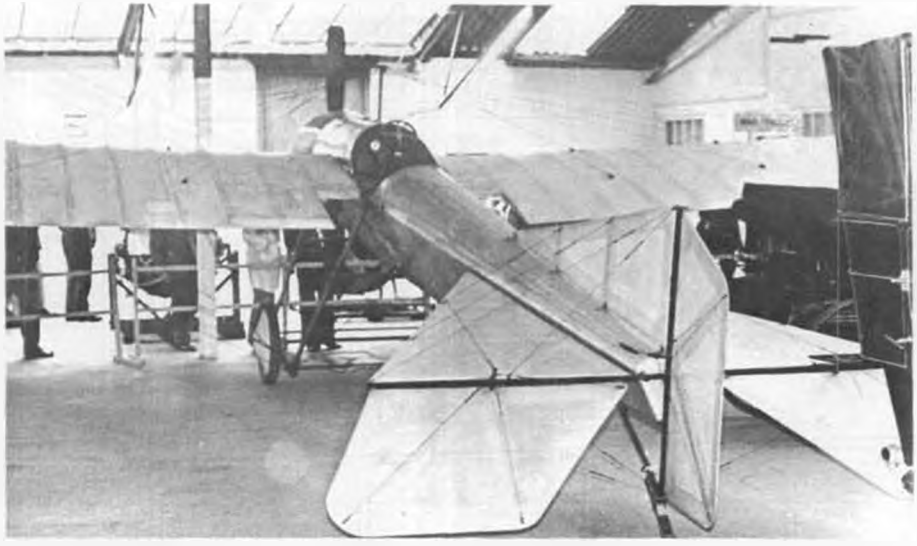
LANDING GEAR

Assemble as shown in full size on plan. Wrap with soft wire and solder all joints. Fair in with balsa and bamboo as indicated; spruce can be substituted and is desirable for R.C.

The wheels can be constructed as shown on the plan or Williams Bros. 3-1/4 inch Vintage Type will do nicely. Assemble wheels on axle and secure axle in place with white, round, elastic thread available in sewing section of local stores . . . it is also used on tailskid . . . and acts as a shock absorber. The landing gear is spread at the open ends to fit into the brass tubing mounts, and cross braces fit into the wire eyelets.

RIGGING

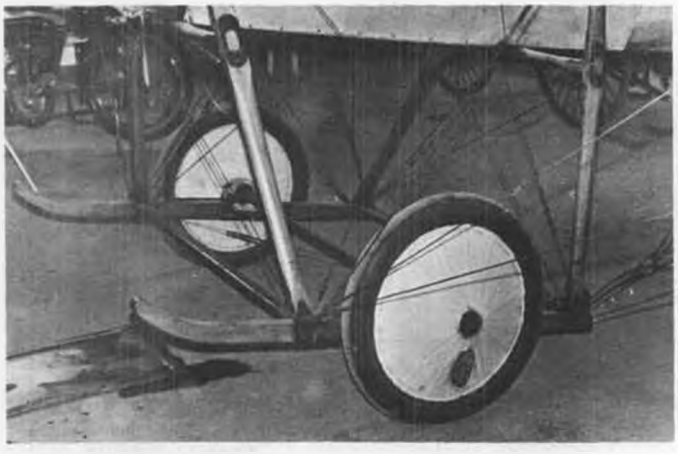
The wings should be fitted on the plywood tongues and then, with the tail blocked up to set the fuselage centerline parallel to the working surface, block up the wing to 10 inches from the leading edge of the tip rib to the working surface. Rig flying wires (lower) of 30 lb. test black nylon fishing line, pulled tight, secured, and trimmed. The landing wires (upper) are constructed of Proctor flying wire, swages, and turnbuckles. The wires are fitted and then pulled taught using the turnbuckles. The turnbuckles are then secured with safety wires. This tension is important to provide a rigid and secure system, as the wing is supported by this series of flying and landing wires.



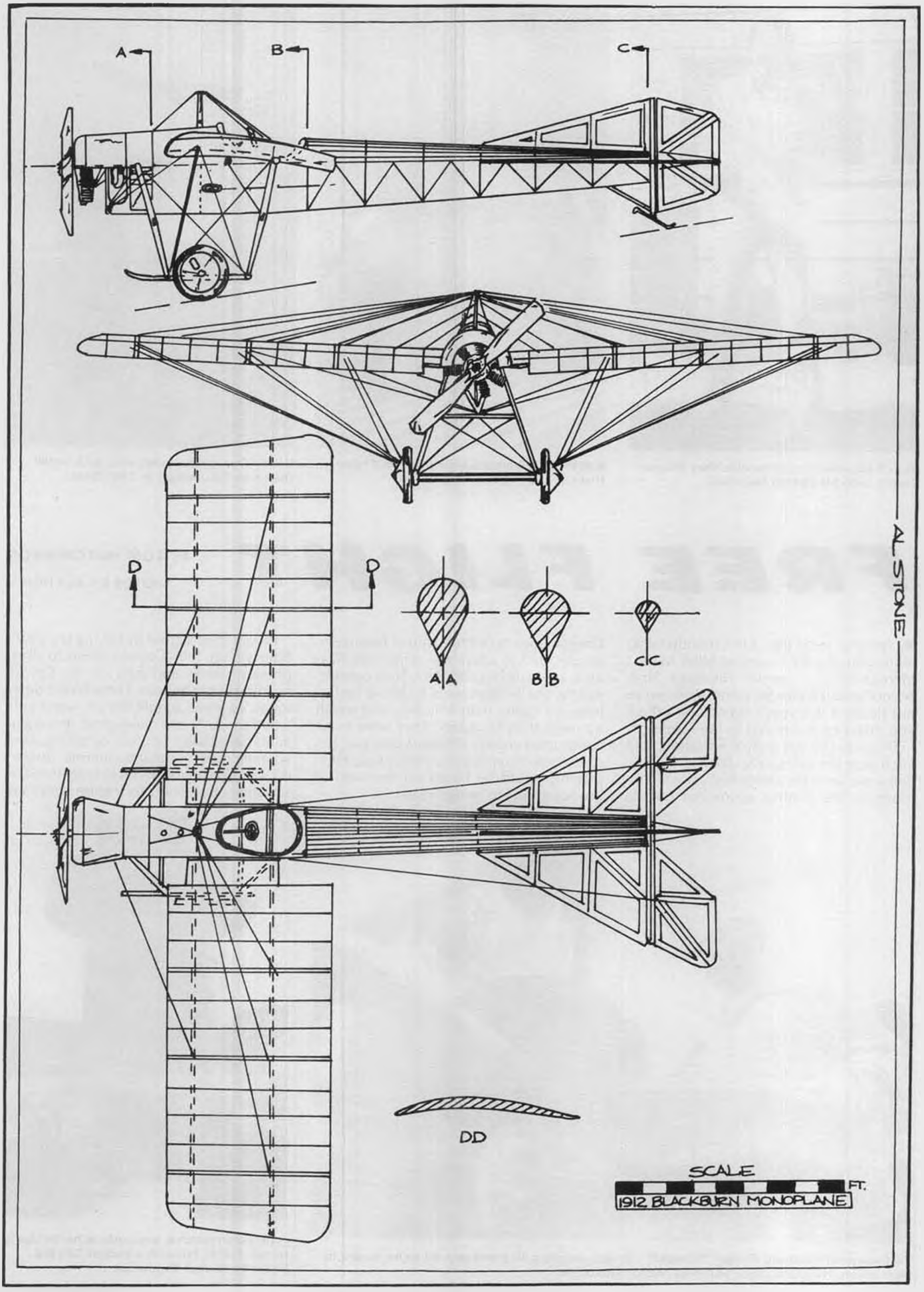
Another view of tail structure and sprung skid. Tail is well braced with wires. Triangular fuselage shape shown clearly from this angle.

There are seven (7) lower braided lines on each wing panel; three from front of the landing hear lower surface to front spar wire attachment hooks; three from the rear landing gear attachment point to the rear spar. The seventh goes from the rear landing gear point to the front spar outermost hook. It is important that there be no upward give in the wings

Continued on page 69



Close-up of landing gear on original and model shows that Sid may have added a few less wires, but the character of the design is very close.


A
B
C
D
D
A A
B B
C C
DD
SCALE
FT.
1912 BLACKBURN MONOPLANE
AL STONE

Don Ross, returning to models after 20-year layoff, with his Upshot Mulvihill.

Bob White launches winning Coupe d'Hiver flight at 1981 Nats.

Bobby Dunham launches class A/B model (based on FAI design) at 1981 Nats.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

● You may recall that, a few months back, in introducing the Fourmost Miter Mate, I mentioned our annual Hillsboro High School Model Bridge Smashoff. Well, we've just finished this year's event, and I think you might be interested in the results.

This was the 8th annual Smashoff, and each year the rules have differed slightly. Since we were the defending state champions in the contest sponsored by the Oregon Society of Professional Engineers, we decided to adopt the same specifications as would be used at the State contest. Briefly, the bridges were to be 16 inches long, no higher than 3 inches, and weigh no more than 30 grams. They were to be constructed entirely of balsa wood, glue (no restriction on type) and cotton string. Final placing would be based on the ratio of breaking load to bridge mass.

Preparation started by having last year's state winner, John Cooney, speak to all my physics classes and pass on his tips for building better bridges. These boiled down to: pick a good, simple design, select your wood carefully, and make good, strong glue joints (Sounds like he could be talking about winning model airplane contests, doesn't it?). John had decided not to enter the local smashoff, but to try to inspire some en-

Test setup for Hillsboro Bridge "Smashoff". Bridge weighing 30 grams gets set to be loaded to destruction. Hillsboro Argus photo by Michal Thompson.

Julie Lavell watches anxiously as her bridge is tested. Placed 5th with a load of 245 lbs! Photo by Michal Thompson.

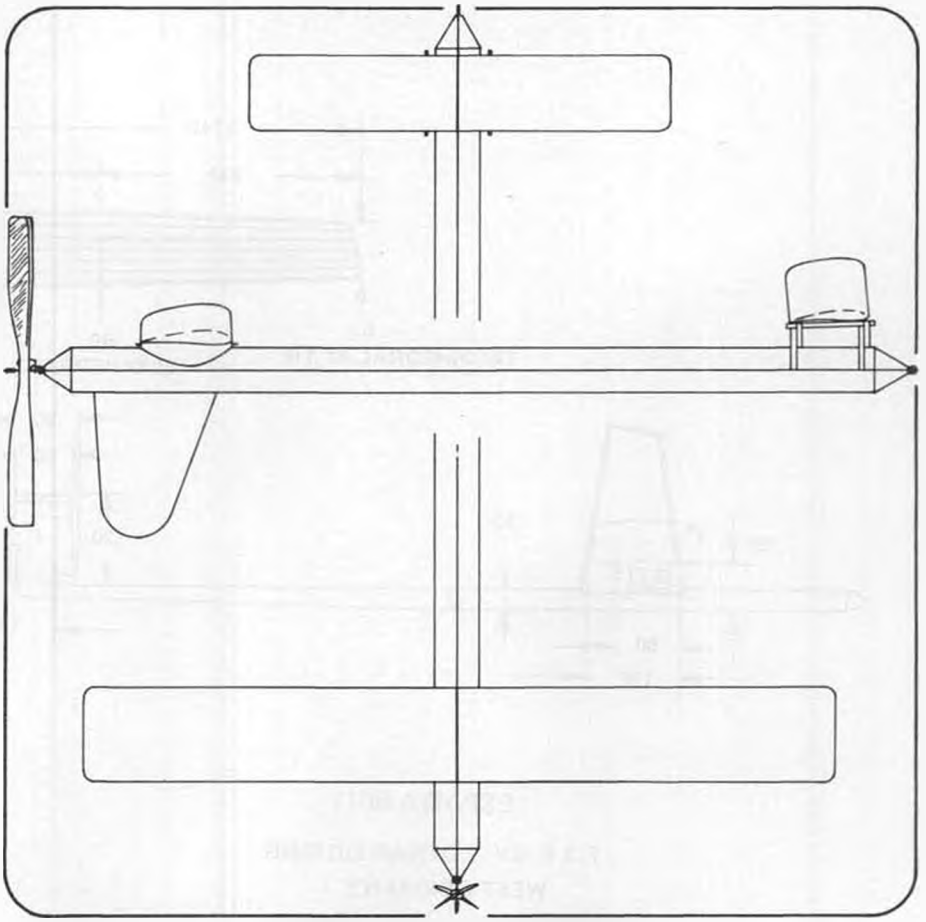
thusiasm for winning the state contest again this spring.

The first hint that things were going to be different this year came in the qualification trials for the final smashoff. Last year, the qualifying standard of 1000 times the weight of the bridge was met by only 35 bridges . . . this year we had about 120! (This included entries from both Hillsboro high schools). When the finals were over, it was evident that standards in bridge building had risen . . . last year's 3rd place winner (which also placed 3rd in the state contest) would have placed 31st! Only 6 bridges had a strength-to-weight ratio greater than 2000 to 1 last year; this time there were 60!

The winner this year was a junior-high student, 13 year old Adam Cooney, John's younger brother, with a strength/weight ratio of nearly 5000 to one (breaking load of 305 lbs.). He used John's design (as did all of the high-placing bridges), a double frame of two simple triangular trusses with a hefty cross-section on top (to take the compression load, as balsa is only 1/2 as strong in compression as in tension), and a thin tension member on the bottom. A few cross-members served to join the two side frames.

The smashoff had a noticeable effect on the shelves of local hobby shops. One beneficial effect was that they were nearly cleaned out of all the super-hard, heavy balsa that's always the only thing in stock when you're looking for 4 lb. C-grain stuff (hard balsa has a higher strength/weight ratio than light balsa). There was also a run on Super Jet, which John had recommended (in order to build and test different designs the same night), so that the local hobby shop had to buy out the wholesaler's stock. (As a sidelight, Kevin Eglehoff made an unofficial entry by repairing last year's 2nd place state winner with Super Jet. At the state contest, it broke under a 297 lb. load; in its repaired state, it broke at 295 lb.)

The evolution of this contest over the past years had paralleled that of any other model event. A basic specification is set, there is a period of trial and error until the best solution appears to be found. Then, when the basic design which suits the rules is found, the winning entries are all very similar to one another. The next step, obviously, is to change the rules, to encourage originality and creativity (Starting to sound like the FAI Power event?). But at least, the contestants are having fun, as the photos attest. (I'd especially like to thank Michal Thompson and Jim Price of the Hillsboro *Argus* for providing me with the negatives of this year's smashoff, and Jeff Dreiling of our Hilhilites staff for making the prints that accompany this column).



MARCH MYSTERY MODEL

MODEL OF THE MONTH, Espada F1B—R. Hofsass/L. Doring

This month's three-view of the 1981 Wakefield winner comes from Free Flight News; the following commentary is taken from the Australian magazine *Airborne*, via Paul Iagan's FF column. Here are Wakefield winner Doring's comments about the winning model:

"I flew this championship with my ***Espada*** *80/1. I have three fairly well-trimmed* ***Espadas*** *with the same design. Distinctions are in the wing airfoils, but I could not see important differences between them.*

"The solid balsa wing is carved from 70-80 kg/m³ (4 1/2 to 5 lbs./cu. ft.) wood. A suitable plank is first cut in such a way as to exhibit quarter-grain on the larger faces and a blank glued together with epoxy so the entire wing surface, made from 6 pieces of balsa, shows the same grain. The wing is covered with Japanese tissue. After covering, the 3-D zig-zag turbulator is carved into the upper leading edge. The wing is operating at Reynolds numbers between 20,000 and 35,000, therefore this turbulator is absolutely essential. the wing is in three parts, the tips being attached with 2 mm aluminum joiners and the two center panels being permanently glued together.

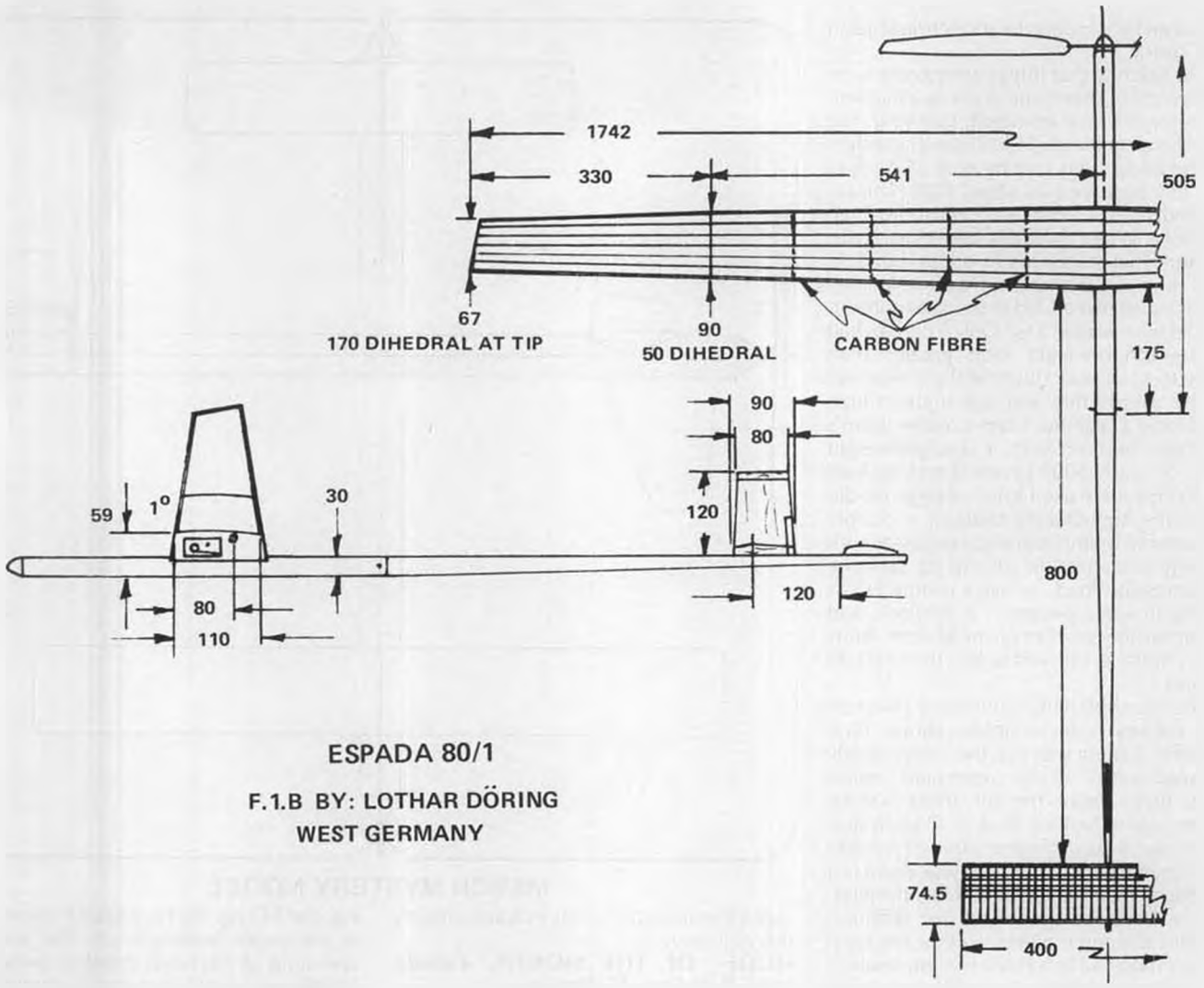
"The conventionally built tailplane is covered with aluminized film weighing 16 g/sq. m. This saves 0.5 gram compared with tissue, does not warp in heat or moisture, and it reflects light on DT, making it easier to spot the model. The only disadvantage is that field repairs are difficult.

"A flat-plate all-moving fin is used, while the fuselage is in two parts; motor tube is 30 mm diameter aluminum tube with 0.2 mm walls, and the tail cone is 1 mm balsa, covered with tissue.

"The propeller is calculated by Theodorsen's method and made from 2 laminations of 1.5 mm balsa, molded on a former, using wallpaper paste, the carv-

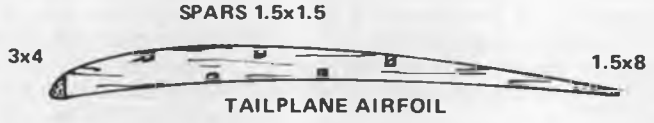
DARNED GOOD AIRFOIL – GOTT. 81

STATION	0	1.25	2.5	5	7.5	10	15	20	30	40	50	60	70	80	90	95	100
UPPER	1.2	3.25	4.4	5.86	7.05	7.85	9.15	10.01	10.76	10.60	9.95	8.61	6.95	4.95	2.7	1.61	0.27
LOWER	1.2	0	0.16	0.65	1.1	1.5	2.15	2.74	3.33	3.28	3.01	2.69	2.15	1.5	0.81	0.4	0

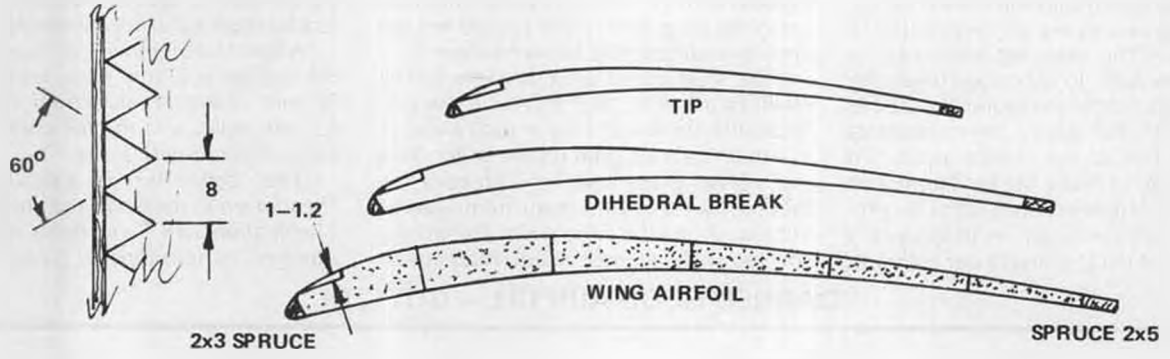


ESPADA 80/1

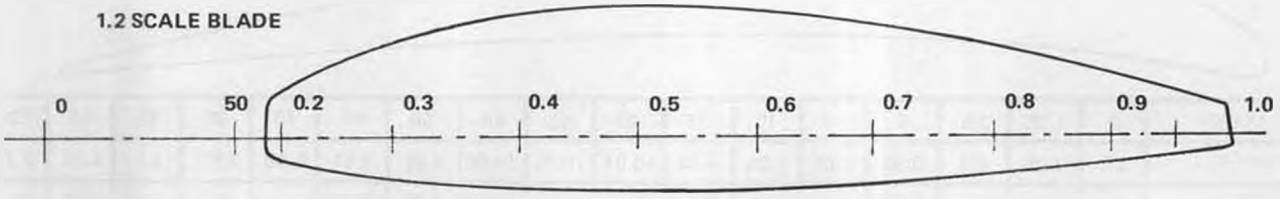
F.1.B BY: LOTHAR DÖRING
WEST GERMANY



DETAIL OF L.E. TURBULATOR



1.2 SCALE BLADE



Hugo Sandroni, Jr., this month's Jr/Sr, with his original design A/2 glider. The pair have done very well at West Coast contests.

"Why, when I was a boy, we built them with wings higher than our heads!"

ing being confined to the upper surface. Thinned epoxy is used to cover the blades with 24 g/sq. m. (3/4 oz./sq. yd.) glass cloth, with 2 layers near the blade roots.

"Under normal conditions I use rubber with a 43cm length to give a power run of 33 seconds. A 3-function Seelig timer holds the tailplane down by 3 mm at the trailing edge for the first 4 seconds of the climb, and also operates the auto-rudder and DT. Trim is right/right.

"Propeller diameter is 620 mm, pitch 730 mm at 200 mm radius. Outrigger attachments at 50 mm radius. Airfoil is a 'Doring 5% (similar to wing airfoil) with a 0.4 mm thread turbulator at 7.5% propeller chord."

Paul Lagan adds these comments: "Reiner Hofsass was the original designer of *Espada* and is in close contact with Lothar in Wakefield development. Much of (Doring's) success comes from having reliable models which can be flown in a wide range of conditions just by altering the motor length and thus the prop run. He used a temperature and windspeed chart recorder pair . . . one pair of sensors located upwind and a second at the launch point. By comparing readings, and from experience, he could judge when a suitable piece of air was coming through his launch point. Lothar read his own indicators and did not seem to depend on anyone else for his model preparation or his lift picking."

DARNED GOOD AIRFOIL Gottingen 81

This month's DGA is another "oldie" from the WW-I vintage tests conducted at the Gottingen wind tunnel. These tests showed a very high lift coefficient (nearly 1.5) at a Reynolds number (uncorrected for turbulence) of about 72,000. Besides, Bill Gieskieng wrote and said that the Gott. 81 looked the best of the lot of airfoils he looked at for flapper use . . . and it looked at lot like the Goldberg G-10! The Gott. 81 flunks the Eppler test for upper surface drop-off, but try it anyway, if you're looking for a moderately thin (7.5%) undercambered section for a Mulvihill or gas model.

MYSTERY MODEL

This month's MM is not just your typical pusher canard rubber model. Well, maybe it is, but it's a little smaller than most published . . . about 140 sq. in. in the large wing. The total weight, less rubber, was less than 2 oz., so it had quite a performance potential on the suggested 3 oz. of rubber. If you think you can identify this mystery model, send in your guess to the **Model Builder** office (621 W. 19th, Costa Mesa, CA 92627) to see if you've won a free subscription.

CHARGE!!

The newest form of F/F propulsion system is electric, and unfortunately, not too many of us "old dogs" have bothered to learn the tricks involved in making use of it. Here are some comments by Nats Electric F/F winner, Bill Baker, on how to make the best use of your "electrickery", as reprinted from the *CIA Informer*:

"The main thing is not to overcharge! *It doesn't matter how fast you charge, just so you don't overcharge. If you use 225 mah Ni-Cds you can charge them at the 10-hour rate (22.5 ma) for 14 hours and they will become fully charged. Why 14 hours? It's because something is lost in heat and so there is not 100% efficiency in charging. Rather than go crazy over such things, just play like your 225 mah cells are really 250 mah cells (like those supplied with the Astro 02). A 250 ma charge times one hour will fully charge in half the elapsed time. So, one amp (1000 ma) times 1/4 hr. (15 min.) will do the same as well, or 2500 ma*

"Even with this flack jacket, I don't feel safe."

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Charlie offers BEST BUYS in R/C Systems.

All Systems convertible up to 5 channels.

Std. System has dry Tx, Rx Nicads & Flite Pack Charger. Deluxe System has Nicads in Tx, plus Dual Charger.

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	DELUXE:	114.95
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SPECIAL 810 R/C SYSTEM

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Complete Catalog - 60¢ in U.S.A., $1.70 Foreign

(2.5 amps) times 0.1 hr. (6 min.) is what I use to get back into the air as soon as possible.

"Measure voltage to tell when the cells are fully charged. It is overcharging that 'kills' the Ni-Cd cells. Should you have 1.35 volts per cell with no load or 1.25 volts per cell with a load . . . you have a full fuel tank. The power curve is like that pertaining to rubber . . . a burst, followed by a cruise, then a sharp drop in power that you can hear. Discharge to this point, which should be about 1.1 volts per cell, and try not to discharge them further. To get the most power, charge them up and run them down to this point . . . then recharge again before your first flight. After the flight, run them down again before recharging. Don't attempt to just replace only what has been used. With good batteries, you might get two or three test flights per charge, but for contest flights recharge for each official flight. The power curve is not really flat during cruise, so you need to fly on the upper part of the curve for most power.

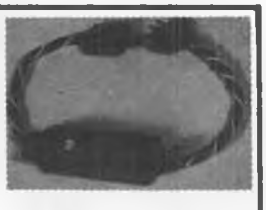
"Do not load the 020 with a lot of prop. Astro Flite says a 5 ¼/3 Top Flite, and it does seem to work well. A larger prop increases current consumption . . . that is, the power curve would drop faster.

"I have an EK expanded scale voltmeter that is a help. It puts a load on the cells and measures from 4 to 5 volts, where 4 is '0' and 5 is full scale. For a 4.8 volt battery pack, this would be 4.4 volts discharged and 5 volts fully charged. You wouldn't need a voltmeter, but they give you a good battery check.

"You do not need an expensive charger either. I charge from my car battery with a commercial VL charger. All it is . . . is an ammeter and a variable resistor, plus a clock that will stop the charge. That is, it can be set for 5 or 6 minutes and ignored, and it won't overcharge the batteries. You can do without it if you remain there with stopwatch in hand. You should have something to measure current and voltage if you are to avoid overcharging.

"Ventilation for cooling of the Ni-Cd batteries is not really necessary for our short F/F runs . . . doesn't hurt though . . . for if your batteries do get hot you may have a problem. For instance, if there is a short somewhere . . . you have burned out a motor . . . etc. It can happen quickly if the motor lands or crashes with the power on . . . stalling the motor with the battery power on."

EMS SR-1 SERVO REVERSER



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Plugs into your system between the Receiver and Servo and reverses the direction of that servo with relation to the Transmitter Stick motion. Available for all popular positive or negative pulse systems with connectors installed. An extremely handy device when installing your system in a new airplane.

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LETTERS FROM READERS DEPARTMENT

From down under in New Zealand, Ron Magill writes: "When I was in California 3 years ago, I was given a plan of the 1941 Mulvihill Winner, by Heller (Mark?) drawn by Roger Gregory. While I was halfway through building it, I read of the kit of the 1941 Mulvihill winner designed by *Reid Hull*. I borrowed a set of magazines to verify the age of my model and found a Nationals report and photo showing a *Raymond Smith* receiving the Mulvihill Trophy. Could you (or your readers) shed some light on this subject?

"I saw the (1/2A Kiwi Power model) design by Lew Mahieu at the first contest that I ever attended and I'd like to build one. . . . Could anyone tell me where to get a plan and also the date of publication or production. NZ rules allow models up to 1st January 1951. Also, what if any motors (.049) were produced prior to this date?"

Well, all I can say about the 1941 Mulvihill winner is that the April 1942 issue of MAN featured plans of the design by Ray Smith as the 1941 winner. H. Heller won the 1940 Mulvihill event, maybe these are the plans Ron H has. *(Ray Smith is located in the Washington D.C. area, and currently holds the world R/C sailplane altitude record at over 4900 feet. wcn)*

I think the Kiwi was produced after the 1951 cut-off date. It was kitted by Gillow's, so there may be some plans in existence (Pond's list doesn't include a Kiwi, but my catalog is 2 years old). I would guess that 1951 vintage .049 engines would include the K & B, Cub, Spitzy, and Wasp, since all these engines were advertised in a January 1951 issue of M.A.N.

For those of you out there looking for thermistor, like Rich Rourke was a couple of issues back, Jose Tellez writes to recommend Omega Engineering (Box 4047, Stamford CT 06907) as having "most anything a human may need in the line of temperature sensing". Write for their catalog to see what's available.

The final letter of the month comes from Donald Ross (Creskill, N.J.), who says: "I returned to modeling about two years ago after a lay-off of about 20 years for the usual reasons . . . family, job, children, etc.

"I was surprised to find that free flight had almost died out and that there was almost nowhere to fly in the Northeast. All around are RC clubs and no one can even build a small HL glider. Many techniques have changed, and covering with Japanese tissue seemed like a lost art.

"After awhile, though, I found a few kindred spirits by attending some local meets and by reading all the mags. I have an extensive collection of mags and plans dating back to the late 40's and was only waiting for the proper time to be able to get started building.

"The enclosed picture shows me with my *Upshot* Unlimited Rubber from Champion Models. The airplane flies very well, and is extremely stable and easy to adjust. The kit is very well made and reminds me of many of the Cleveland kits.

"I really enjoy your mag. Hints for F/F as well as R/C, and a Peanut in every issue. Probably the best all-around magazine for the money." *(The man obviously has excellent taste! wcn)*

Thanks for the kind words about MB, Don . . . nice to hear from a satisfied reader. I suspect that your experiences in re-entering the model airplane world, like Rip Van Winkle, were interesting, to say the least (and probably getting more common). Which leads to the next subject.

RUBBER MAKES A COMEBACK

Back in the old ancient days before the first gas engines, rubber-powered models were king of the hill. The advent of the gas engine made most flyers flock to the latest

thing (as control line did unto F/F, and R/C unto both of them) for their flying thrills. For over a year now, however, I have been reading and noticing tell-tale symptoms that rubber is making an unprecedented comeback. On the West Coast, rubber entries at contests are outstripping the formerly overwhelming numbers of gas flyers. (50 entries in Wakefield at the USFFC in 1981, and more than 40 at the Taft FAI Semifinals.) Rubber-powered scale models are popular, even with R/C clubs. Indoor flying, especially at the local, low-ceiling level, is drawing as much interest as Outdoor.

What's the reason? I had a chance to discuss this with Al Hotard, who dropped by for a visit recently, and who has personally witnessed the renaissance of rubber. One factor in the upsurge is undoubtedly the present availability of good rubber, after a 3 or 4 year drought. But this certainly isn't the whole answer, as the numbers of rubber flyers are greater than before the great rubber shortage.

Al suggests that the reason may lie in the relatively advanced ages of the newer rubber flyers. These are either old-timers (like Don Ross) returning to the hobby, or gas flyers who have decided to switch events. For the returning old-timer, rubber events represent an ideal entry point, as the basic skills of building and flying haven't changed that much, and the models are easier to trim out and fly than today's high-powered gassies.

For a gas flyer, these easy-to-fly models make a welcome contrast to the hair-trigger response of the modern gas models, which are a far cry from the low-and-slow characteristics of the gas models he may have flown earlier in his career. In short, today's high-performance, high-powered gas models may now exceed the trimming ability of older modelers. Rather than put up with a seemingly endless series of crashes on increasingly expensive gas models, he may have decided to try the silent side of the field, and rubber certainly requires less physical effort than glider.

A look at most large contests will show that at least as many rubber events are scheduled as gas events. So, he would still be able to do as much flying as he used to do when flying gas exclusively.

Then, too, the price of rubber motors appears to be quite a bit less than that of today's Schneurle power plants and the fuel to run them. This is probably an illusion of economy, since a serious rubber flyer (Peanut excepted) will probably buy an amount of rubber in a year equivalent to the cost of a new engine.

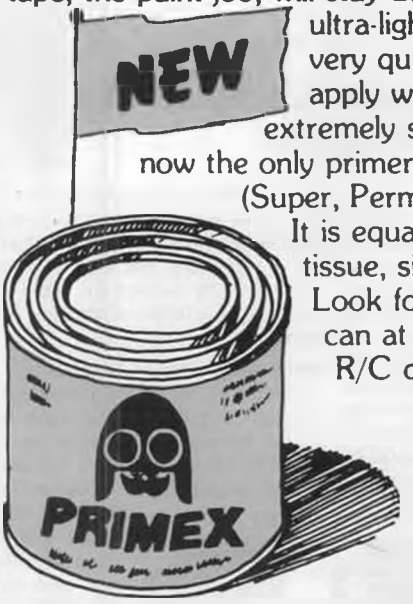
It will be interesting to see if this is only a West Coast trend, caused by the length of the flying season and number of contests, or if it will spread to the rest of the country. *(Our plans sales of rubber ships has been proof that this trend is fact, not fancy. wcn)*

CHAMPION KITS NEW WAKEFIELD

One other reason for a rubber resurgence has been the availability of nice kits from our FF cottage industry manufacturers such as Blue Ridge, R/N, and Champion Model Products. George Schroedter of CMP announces that his Wake-Up Wakefield kit is now in production (at the rate of about 20 kits/month). George managed to qualify for the FAI Finals with his prototype, so it looks like a good way to get started in Wakefield. Price for the complete kit is $39.95 (shipping included). Write George at 880 Carmen Court, La Verne, CA 91750 for a complete catalog. ●

NOW, THERE'S A PRIMER RECOMMENDED FOR COVERITE.

New Primex solves a nagging problem. Now you can be sure, for the first time, of getting great adhesion. Now, when you remove the masking tape, the paint job, will stay down! Primex is ultra-light, smooth, and very quick to dry. Easy to apply with a brush, extremely sandable. Primex is now the only primer to use on Coverite (Super, Permagloss & Silkspun). It is equally great on wood, tissue, silk, nylon or dacron. Look for the bright yellow can at your R/C dealer.



COVERITE

420 BABYLON ROAD, HORSHAM, PENNSYLVANIA 19044, U.S.A.

Short Shaft...*Continued from page 23*

you might consider doing it out of brass. It is probably half again as heavy as an aluminum one, and is possibly a little slower to make on a small lathe, but it has a number of decided advantages. For one, it will not bind up on the shaft and have its threads eaten off by the harder material; it will not cross thread as easily; and the threads will not distort if you are little heavy handed with the prop nut wrench. Try it, you'll like it.

In fact, try the whole system, you'll like it . . . all of it, including the security of knowing that your prop is not going to fly off, now being held by more than 1-1/4 threads. *This* I do understand. ●

Peanut.....*Continued from page 52*

parts acted like they were pre-stressed.

I covered the Hot Canary in the conventional manner until I got to the side numbers (97 and N4777W) and 97 on the left wing. The 97 has a white background and the license number has a white shadow. White tissue doesn't show up well against any color, so I cut out the yellow tissue and glued white on from behind. The white tissue was cut out slightly larger than the opening in the yellow. It takes more time, but I think it looks sharp. The word "Experimental" on the lower right wing was added with a No. 3 Rapido-graph pen after the wing was covered, but not attached to the fuselage. For "Canary" on the fin, I use a No. 1 Rapido-graph pen. "Hot" and the flame was applied with a fine brush and Stearman Red dope (plus a steady hand).

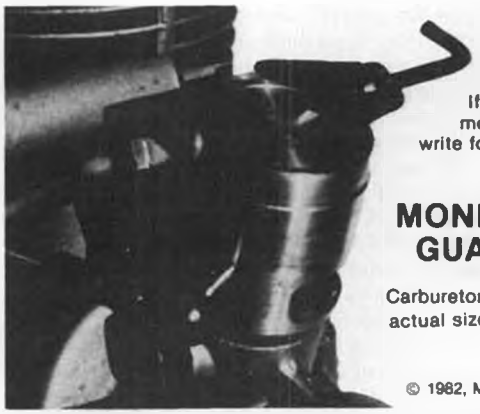
Center the stab in the slot and glue only the stab leading edge to the fuselage. Place shims under or above the rear of the stab for trim.

Build as light as possible, because the long nose moment and large size could produce a very heavy turkey. My model tipped the scales at 7/8 of an ounce (heavy peanut) and required a small amount of tail weight. I changed props from a plastic to a lighter, carved balsa one, and it still needed a little clay on the tail wheel.

The model flies on one loop of 1/8 rubber 15 to 17 inches long. See the plans for the balance point.

The Hot Canary is a real show stopper and is a large fast flier. It likes big circles to the right. Be different. Build the big, yellow bird and maybe you can race a Pitts Special or a Pogo. ●

M&H variable venturi .60 carburetor



Patent Pending

If you would like more information, write for free literature.

MONEY BACK GUARANTEE

Carburetor shown approx. actual size

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Unique new design means smooth idle plus quick throttle response.

Phase I Program

At the Toledo Trade Show, selected modelers with an average experience level of over 12 years were offered an extremely low price on a special new carburetor. In return for this low price, they were asked to help us evaluate its performance by filling out and returning a questionnaire on the carburetor. What they were testing was the M&H Variable Venturi Carburetor, and their responses confirmed our high hopes for this new design. On a one to ten scale, the average rating was 8.6 – and no one scored it below an 8! Best-liked features were its mid-range performance and smooth response to throttle input. 96% said there was no carburetor on the market today they would rate higher.

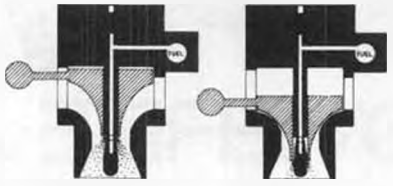
Phase II – Now Is Your Chance

After going over all the evaluations, we made a few minor adjustments and are now in limited production. We did not feel there was any need for "just another carburetor" in the modeling field. If we couldn't offer a carburetor that was substantially better than existing technology, there would be no point in going to the marketplace with it. But this carburetor IS better.

Many Unique Design Features

First of all, the M&H Carburetor is all metal for strength and to hold the close tolerances required for precise operation. As the engine is throttled back to idle, the fuel draw increases due to the location of the idle jet. This eliminates "spitting" of fuel from the intake. Idle adjustment is made by using any common coin for a tool. For your safety, we use an offset needle valve for adjustments to the high speed fuel flow, keeping your hands further from prop. Operation is smooth and response quick throughout the entire RPM range because of the non-linear design of the throttle actuator. And with only 12 parts, the M&H Carburetor is simplicity itself.

HOW IT WORKS



FULL THROTTLE IDLE

Phase III – What Is Next?

By September, this model as well as new models for .40 to .90 engines will be available through distributors and your local shops, but we will no longer be able to offer you this low, direct mail price. So if you've been looking for a better carburetor, now is the time to buy.

Our Guarantee

Order now by sending a check for $19.95 to MARTIN ENTERPRISES, 170 Navajo Street, San Marcos, California 92069. We will pay all postage and handling costs on prepaid orders. C.O.D. orders sent by UPS. Specify model 6000 for sport flying or Model 6000L for Competition flying. (Model 6000L has a slightly larger throat diameter.) If for any reason this carburetor doesn't meet your needs, simply return it within 90 days of purchase, and we will gladly refund your full purchase price.

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We offer the very Best in Scale R/C Model Boat Fittings . . . Quality Fiberglass Hulls & Operating Accessories!

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Dynamic Models

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Hannan . . . . . *Continued from page 50*

forward to the next one. Contest Director Carl Hatrak (free flight), Harry Apoian (R.C.), and their patient assistants, managed to arrange perfect weather again this year, only one day after the full-size fly-in at Ramona Airport was nearly blown away by fierce winds!

The chief appeal of the "wing" meets is their low-pressure, friendly approach to competition. Entries range from charmingly simple rubber-powered types, through tow-liners, gas and electric powered free flights, to quite sophisticated R/C examples. Entries range from brand-new barely-tested radical designs to "old-timers" which appear to have participated in all 15 contests! This year each entrant received an attractive metal plate dedicated to the memory of the late Jack Northrop and his remarkable flying wings.

MAGNETIC MODEL MOUNTS?

According to Southhampton University (England) experimenters, suspension of wind-tunnel models has always been a problem. Mounting the test models with wires or on a rigid "sting" prevents free movement and disturbs the airflow. Under a study contract from NASA, the university researchers are suspending models magnetically, which permits a few degrees of movement and minimizes airflow disruptions. A possible problem, involves failure of electrical power, resulting in test model "flyaway" at 200 mph or so. Oops!

COMET CONSUMER COMPILATION

Bill Bishop, founder of the Comet Model Airplane & Supply Company, favored us with a copy of a consumer survey analysis conducted in March of 1945. This was based upon customer replies to questions enclosed in Comet kit boxes. The average age of the 236 repliers was 13.2 years, by the way. Results were as follows:

Most popular designs suggested:

1. Lockheed P-38 Lightning
2. Northrop P-61 Black Widow
3. Boeing B-29
4. Bell P-59 Airacomet & other unspecified jets
5. Bell P-39 Airacobra
6. Curtiss XP-55 Ascender canard
7. Boeing B-17
8. Messerschmidt Me-109
9. North American B-25
10. Supermarine Spitfire
11. Piper Cub
12. Bell P-63 Kingcobra
13. Helicopters
14. Consolidated PBY-5 Catalina

When asked about the most popular features of Comet kits, customers liked *ease of construction* of Speed-O-Matic models, *simplicity, appearance, use of balsa wood* (remember the war-time shortages, w.c.h.), *authenticity of solid-models, completeness of plans, and building instructions.*

Among *unpopular* features and complaints, customers cited: *difficulty in construction of Speed-O-Matic propellers, "hardwood"* construction in old stock (wartime) kits, *lack of enough tissue* to cover model by inexperienced builder who failed to utilize paper properly, and *use of highly unscale paper colors in flying scale kits* (such as red in a P-47 kit).

By way of suggestions, customers wanted the following:

Formed transparent cockpit enclosures,

Greater variety in range, to include more bombers and foreign aircraft,

More pre-shaped and pre-cut parts,

Include cement in more expensive kits (50¢ and up),

Include plastic or die-cast metal propellers in solid model kits,

Use turned wheels that are truer to scale,

Have new designs on market sooner after disclosure of new aircraft types.

Wonder what a survey of present kits would produce?

NEW PEANUT RULES

Regulations seem always subject to change, and Peanut rules are no exception. In France, where Peanuts are called "Cacahuetes", flight durations have risen so remarkably that an attempt is being made to put more emphasis upon model accuracy and detailing. Initial testing for the new rules was planned for the Sports Palace indoor meet in Orleans, employing both new and old Peanut regulations to enable easy comparisons to be made. The basic framework of the proposed formula is to require three flights of at least 20 seconds each, with rise-off-ground starts. This qualifies the model for static scale judging, the results of which will determine the winners.

In the words of J.F. Frugoli, "The jury's ears will buzz. . . ."

VOTE OF CONFIDENCE

"Big is Beautiful" model columnist Dick Phillips, of Canada, offers this thought for the day: "Government projects are all designed by computers, as no mere mortal could possibly foul things up so completely."

AHA! IT IS A SPRUCE GOOSE!

Well, partly. For years, detractors of the nickname "Spruce Goose" (apparently including Howard Hughes himself) deemed the term inappropriate on grounds that mostly birch plywood was employed. But according to the September, 1945 *Air Trails Pictorial*, the fabulous flying boat also contains poplar, maple, balsa (!) and *spruce*. It seems that the hull frames and bulkheads are of birch, but the stringers are a composite of birch and spruce.

Dr. Vance J. Hoyt, author of the article, also described the very light finish, consisting of one coat of wood filler, one coat of sealer, one layer of tissue paper(!), two coats of spar varnish and one coat of aluminized spar varnish. (It is our understanding that the machine has since been repainted white.)

No firm announcement of a public opening date is available at this writing, but it should be well worth the wait to view this enormous flying machine.

THAT'S SHOW BIZ!

Ken Hamilton, designer of the delightful Flying Flea featured in **Model Builder** some time ago, reminisces: "Years ago when I was a high school senior, I briefly worked after school at no pay, in a tiny model shop trying to get started. The owner arranged for us to make a demonstration in two theaters at Saturday matinee time, the Mesa Theater at Slauson and Crenshaw, and the Leimert Theater at Vermont and Crenshaw in Los Angeles. (The Mesa has since been demolished and the Leimert is now a church.) Both were quite large halls, and for the demonstrations I flew a 20-inch span semi-scale lightweight rubber-powered Fokker Super Universal. If in plan view the theater stage was at 12 o'clock, I launched at the 4 o'clock position; the model circled counterclockwise across the front of stage and landed back at about the 6 o'clock position. It couldn't quite make it back to me hand-wound. Forewarned, the kids froze as the model glided down, and held their freeze until we retrieved it undamaged, and flew again. The theater projectionist kept a bright spotlight on the bright red Fokker in the dark theater, and its clear plastic windows sparkled in light. The kids really went wild over the smooth, steady, circular flight."

SIGN-OFF

From Frank Zaic's recently reprinted 1934 Junior Aeronautics Yearbook: "He who laughs — lasts." •

Blackburn....*Continued from page 60*

when the model is held at the center of each wing.

COVERING & FINISHING

I used white heavy duty silkspan on the fuselage, light weight white silkspan on the wings and tail. The stab and elevator are covered on the top surface only. The whole model should be given at least two coats of clear dope. Thinned (50/50) dope should be used on the wings and tail, with care taken to avoid warps. The sheeted front should be painted dull silver, and the cowling interior flat black.

FLYING

1. Like any other model, the key to success is to make sure the model balances at the point indicated on the side view. The original did not require any added ballast. If necessary, add clay to nose or tail to achieve position shown.

2. R.O.G. your model, using full power with about a 15-second run. If not airborne after a 30-ft. run, gradually decrease downthrust.

3. It is desirable that the model fly left-left if possible, but go with what seems right for your particular model.

4. If climb is too steep, increase downthrust. Glide can be fine trimmed with the elevator. Use rudder sparingly and only as a last resort.

The model is extremely graceful in flight, moving at scale speed, and looking very realistic due to its good size.

Good luck, fair skies, and gentle breezes.

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FAI RUBBER. *Made in U.S.A.*
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SIZES: 6mm, 3mm only, 1mm thick
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TIMERS: KSB, Fuel & DT: $11.50 ea. plus 10% UPS.

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BATTERY BACKER #RED 09. Senses low or intermittent voltage from the primary RX battery and switches to a 100 milliamp or larger backup battery, then sounds an audio alarm. Eliminates the most common cause of radio failure. Backup battery and switch harness are required. 1¾" x ⅞" x ¾" plus beeper ⅝" x ⅝" x ⅞" Total weight 1 oz. $39.95.

DUAL SERVO SETTER #RED 10. Senses loss of radio signal or low battery and moves TWO servos to a pre-selected position. Connectors required. 1⅞" x 1⅞" x ¾". Weight 1 oz. $39.95

AUDIO BATTERY ALARM #RED 11. Can be easily installed in either the RX (4.8 volt) or TX (9.6 volt) system. Senses low battery voltage and sounds an audio alarm. ¾" x ¾" x ¾" plus beeper ⅝" x ⅝" x ⅞". Total weight .5 oz. $19.95

GO BOX #RED 12. Superbright red and green LED's tell you whether your RX (4.8 volt) and TX (9.6 volt) batteries are ready to "GO". Connectors required. 3" x 2⅛" x ⅞". $24.95

AUDIO FLIGHT TIMER #RED 13. Dependable, solid state, can be set from 37 seconds to 20 minutes. Flick a switch to start and stop. 9 volt battery required. 3" x 2⅛" x ⅞". $24.95

IF UNAVAILABLE LOCALLY, ADD $1.00 FOR DIRECT ORDER. NO C.O.D. SEND S.A.S.E. FOR INFO.

Simple Simon... *Continued from page 47*

motor mount, being sure to keep the thrust line in the exact center of the firewall. Place the top fuselage piece on your workbench and epoxy the firewall to the front, using a square or a builder's triangle to keep it square, with equal overlap on each side. The sides are next glued to the top, using cyanoacrylate glue, and epoxy at firewall, again being careful to keep it square both front and rear. Follow this with the chin block behind the firewall (epoxy) and fuselage sides (cyanoacrylate). The block will have to be notched to clear wing doublers. Then, using a triangle to keep things lined up, glue on rear lower fuselage balsa crossgrain. Final step before assembly is to make the fin by gluing parts together. Cover tail assembly separate as described before and then glue on fuselage (also pre-covered) keeping it square with fuselage. Add dowels for the wing hold-down and you're all done with the fuselage.

FINISHING

Simple Simon was entirely covered with World Engines film; which is a low temperature film, partially because it works well on foam, and partially because by covering entirely with film you keep the whole thing light. The area immediately around the firewall was treated with Hot Stuff before covering. Remember to cover the firewall with film before installing the motor mount. Use sealing tape on the wing/fuselage joint.

RADIO INSTALLATION

The Simple Simon prototype was flown with an ACE receiver, Bantam servos, and a 100 ma pack. This battery is sufficient for six flights with no problems encountered. Servos are installed with double-sided tape and receiver and battery are wrapped in foam and stuffed up in the nose just behind and under the tank.

FLYING

Simple Simon was designed to fly on a TD 049, and has no bad habits. Just make sure it balances at the point shown and all surfaces and engine thrust should be set at 0 degrees. Throws to start with should be approximately 1/4 inch up and down on elevator and 3/16 on aileron. Fill up the tank, make a range check, fire it up, tweek it out, throw Simon into the wind and have a ball! •

Pattern . . . . . *Continued from page 25*

it looks, the thing will roll, bank easily and is frankly a smooth flying design. The point here is that the stabs can *easily* provide a rolling force.

On another plane, a pattern ship, we found an odd characteristic. During landings, the thing would drift to one side as it flared. Also, the wing required a slight trim for level flight. We went through a careful measuring checkout and found that one stab half was out approximately 1/16-inch at the trailing edge of the tip. The error had occurred during the Monokoting process. This was easily corrected with the Monokote iron. Both problems ceased.

A Curare with bad pitch-up in left Knife Edge and down in right Knife Edge . . . the reason: twist in one stab. Again, remember . . . one stab half is dominant in knife edge flight.

Minor variations in the wings will also cause weird problems. At a demonstration, I had a spinner come loose and bounce into the wing leading edge about one foot from the tip. It bit out a chunk about the size of a silver dollar. The resulting difference in drag was surprising . . . the thing would drop the wounded wing severely during any sharp pitching maneuver.

I hope no one is saying, "Oh well, I don't need a well trimmed plane 'cause I'm just a beginner." WRONG!! You need it more because you will form *bad* flying habits with a crooked bird.

By the way . . . although we didn't mention it earlier, make certain all hinge gaps are minimal, perferably sealed with a *flexible* tape. You can easily screw up aileron deflection doing this, so be careful.

Please let us know if you have a particularly odd trim problem you solved or would like to share with the readers of this column.

Till then . . . Dick Hanson. •

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R/C Cars . . . . *Continued from page 43*

out and race, have a good time win or lose, and needn't get wrapped up in what is happening on the Pro level, other than to be aware of what can and does sometimes go on there.

CENTER-PUNCH ARTISTS...

As long as this column has dealt with cheap-shots, wouldn't be right not to apply some of this rambling to good old club racing. Even at a local race where people who are at most other times friends, the practice of banging on another car can get started and the solution to the potential problem is to never let it get started, or at least to shut it down immediately anytime it happens... or seems to be happening... as it is only rarely that a take-out move can't be explained away. It's when one or two racers are always doing this explaining that you have to take action.

The best action seems to be a very subtle one, that of having club leaders, generally experienced racers anyway, point out frequently that smooth, crash-free driving is the best way to get back to the finish line as quickly as possible. This can be done via the club's newsletter, at club meetings, and the races. What is so good about this is that it really is true; crashing only slows you down. Sure, you may be able to successfully wipe out the one guy trying to pass, but you will lose time doing it, letting the next car reel you in some more and you might even miss the other car completely, sticking your own car in the boards.

If subtle techniques don't work, there are other ways. One of the best is to have a good announcer on the p.a. Best example I have ever seen personally was at a club race with Gary Kyes handling the mike. We had one racer who seemed to be doing some blocking, although none of us were ever completely convinced it was intentional. Still, it was happening once in awhile, and finally Kyes got on his case, using the racing number of the car to identify who he was after, *not* the racer's name, an important point. Gary went into what turned out to be a hilarious routine about being able to tell one's left hand from the right, slipping into the old "This is my handle, this is my spout" bit, urging the racer to turn to his "handle side" at the end of the straightaway. In this case, it worked.

With another racer, a similar amount of ribbing did not work. Here we finally had to let him know that the next time he leaned on another car, everybody else in that heat race was going to make sure to pound him up against the boards at every opportunity. You see, team driving tactics only work if you have a team; one racer against everybody else hasn't a chance if the others get tired of it and turn on him en masse.

In our club, at least in recent years, we have made every effort to insure clean, competitive racing, and it has made race days much more enjoyable. You can run right alongside anybody on the track and not be worried about him taking a cheap shot at you.

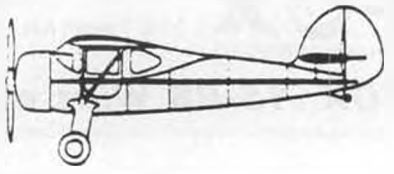
THE SUSPENSION REVOLUTION...

We are all aware of the suspended 1/8 cars out and in development, but here come the 1/12 cars with suspenders, and I must say that I am really surprised by it, having always assumed that flat-pan chassis were ok, and enough lighter than a boinger car to be not worth the trouble. Besides, there is the problem of the motor, which almost has to be close to the axle and to add that heavy chunk to rear suspension would be severe handicap, what with all of the unsprung weight that would mean.

Still, Associated says they have it all figured out, and while early versions of what will be called the RC12i were a little porky, they now have the weight down close to ROAR minimum with production parts. At this time, all I have to go on is a long-distance conversation (my nickel again) with Roger and Gene at Associated, and they say the car really is very good and will be available late February or early March.

Anybody familiar with 1/12 racing has to know that Associated was the first to develop a car that really handled well and it was an instant hit at club races, forcing the rest of the manufacturers to play catch-up, just to stay even. These other factories did an exceptional job of getting back in the race, so to speak. In fact, depending upon your needs in a race car, a very convincing argument can be made that everybody else not only caught up, they also advanced the state of the art further. Now Associated is very close to having *production* suspension cars available when everybody else is fine-tuning flat-pan cars, having done very little in the way of experimentation with full front and rear suspension.

The racing season in '82 will be a very interesting one indeed... ●



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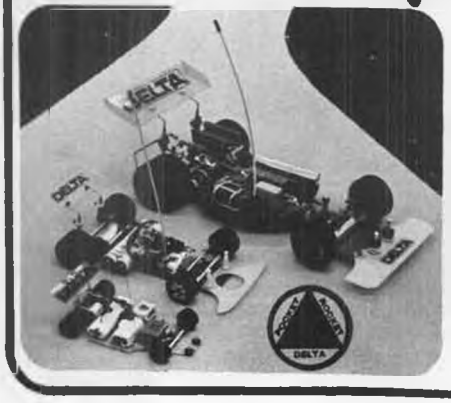

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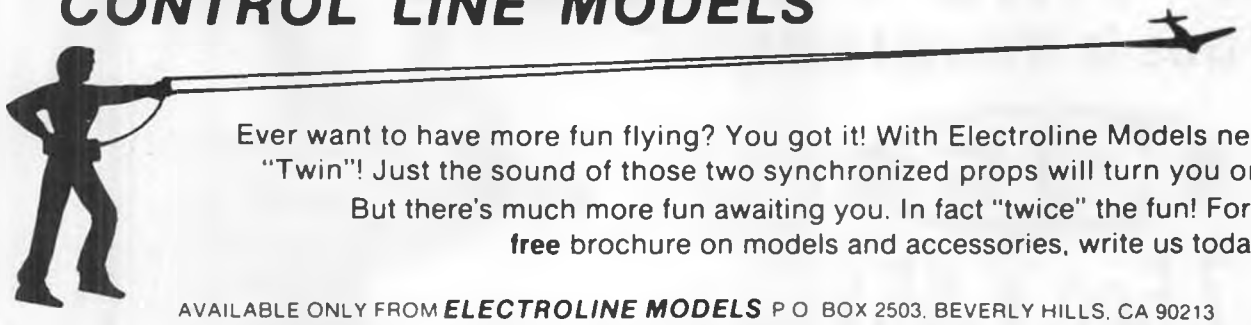

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Sport Scene . . *Continued from page 33*

the line, congratulations on a job well done!

FOLLOW-UP

Last month I wrote at some length on the subject of spray finishing techniques with spray cans. I neglected to emphasize one item adequately. It is vital that you shake the bejabbers out of a spray can before using it. The pigment tends to lump and collect in the corners of the can. You will get lumpy finishes, thin finishes, clogged cans and nozzles, and a very high level of frustration if the paint is not adequately mixed by lengthy shaking of the can. When they say shake for one minute, do it and time it to be sure. A minute is a surprisingly long time as any indoor glider flier can tell you. *(An occasional reshake during application doesn't hurt either. wcn)*

PHOTOS

Got lots of good pix to present this month, so let's get at it. First up we have Ron Lowe with his Warlock .05. Ron is a friend from my days at Cox where he was one of the designers. Ron had extensive involvement with both the U/C and more recent R/C RTF aircraft and car projects at Cox. The Warlock is in bright yellow Monokote and sports a Tee Dee .051. Ron is mostly turned on by racing (would you believe NIGHT 1/2A Pylon racing with LED's on the wings to track the models?) so he mostly practices low, clean pylon turns. But the model has demonstrated a smooth maneuverability in aerobatics too.

Second aircraft is unnamed. The person holding it isn't unnamed, however, he is Roger Newbold, who is an engineer in the toy division at Mattel. The model is constructed with ACE foam wings and has a mind-boggling roll rate. As you see, the wing has some rather sizable ailerons. Control is by aileron and elevator, engine is a Tee Dee .051 running on pressure fuel feed.

Third aircraft is one seen at last year's IMS Show. Midway Model Company puts out this lovely scale-down of Berkeley's 1937 vintage "Cavalier". The model was done in 1:3 scale to come out with 36 inch wingspan. Power is by Cox .020, but I can't make out or recall whether it was the Tee Dee or Pee Wee. I suspect that the model would be a pleasant sport F/F with the Pee Wee, and could fly in .020 OT with the Tee Dee. Plenty of room for a modern radio, be it digital or pulse proportional.

Whoops, we left the wings off the next one! Dumas has a lovely line of sport boats, such as this Coast Guard 41' Utility Boat. In the background is a 15 inch model, and in the foreground a 31 inch version. Since there is no regular competition for models such as this, I figured they fit pretty well in the Sport Scene.

Final photo(s) show an interesting pusher, canard 1/2A R/C model. While wandering around Mile Square one day with camera in hand, I came across this peculiar aircraft. It is an original design by K. Phumirat. Power is by Tee Dee .051 with a left-hand, Tornado prop to make to the wind go the right direction. Weight came out around 20 ounces with an EK radio. Wings are Ace tapered foam panels, remaining construction is mostly balsa. Note that the canard has hinged elevators for pitch control. Landing gear is tricycle, with the nose wheel way up front, and the mains about the center of the wing root. Phumirat said that he trimmed the model out by trial and error, but it wasn't very difficult. Balance came out about 1/2-inch ahead of the wing root leading edge.

Naturally, I stuck around for a flight, and was rewarded with the opportunity of seeing a perfectly smooth-flying and maneuverable aircraft perform.

In closing for the month, why don't we put together a "What the World Needs Mk. III" list. Send me your ideas of what you wish were available, I'll add some of my own, and I'll publish it. I think some good came of the one from last year. See you next month.

P.S. I have requests from readers for more information on the "Red Tailed Duck" by Jim McDermoth and the "Taube" by Greg Davis of Canada. Anyone who might have their addresses, please send them to me so I can pass them along. Thanx! •

Choppers . . . . *Continued from page 21*

box, the belt tensions seemed to be too loose. The large belt deflected 6 mm, and the small belt deflected 3 mm. I tightened the belts to 3½ and 2 mm respectively. During the first several hours of running, the belts will stretch, so monitor them and take up extra slack when they start to loosen up. There are others running belts looser than I am running mine, and they have not had any problems either, so the belt tension looks like it is far less critical than on a Jet Ranger, for instance.

The gear flanges are nicely beveled to allow the belts to "flow" on to the gears. This prevents belt chafing and eventual failure. So far I have had no belt problems at all, they are suited well for the .50 engine being used. There is one spacer on the engine that I would bevel off, refer to the photos for a detail of this.

LANDING GEAR

It is of conventional design, made from one-eighth inch aluminum, with aluminum skid tubes. I added the basswood skid caps as shown. I'll describe an easy way to make these in a later column.

If you are just starting helicopters, or are at a point where you still can't set it down perfectly, do not use the stock skids. Due to the rather high C.G. of the Hughes, it is susceptible to lateral tip over, with corresponding consequences. One good cure is to fashion a temporary training gear out of two aluminum yardsticks that can be purchased at most any hardware store. These have enough strength to support the weight of the helicopter, yet they will give with a hard landing. Just replace the regular struts with the aluminum yardstick bows (bend them by hand so the helicopter sits several inches off the ground) and use the standard skid tubes. In the photos, it shows the skids positioned fairly far forward. If you fly off of grass, the helicopter will have a tendency to settle in tail first, so move the skids farther back for more aft support. If the skids protrude about two inches back from the aft strut you will not have a problem with settling backwards.

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eter, is supported by upper and lower ball bearings, adequately spaced and allowing smooth operation of the shaft. The main shaft can be easily removed for replacement by loosening the bottom gear, a set screw or two, and the wash-out control.

The tail rotor drive is bevel gear driven throughout, with a take-off from the main gear similar to that of a Heli-Boy, but personally, I like this design better. The gears are heavier and will not strip as easily if the tail is dumped in the ground.

When setting the tail boom to the side frames, it is important that you take time to set the backlash so you can feel just the slightest bit of play between the two gears. Too much play will prematurely wear out the teeth, and no play will cause binding, uneven wear, and vibration. As the surrounding black tail tube holders are tightened, the backlash may change depending on how you tighten the bolts. I found it best to set the lower front bolt in the bottom of its slot, snug it up, then tap the rear blocks up or down as necessary, using the front bolt as a pivot point. To get this just the way I wanted took 20 minutes; don't rush and do half the job.

The tail boom is your standard aluminum tube with a foam insert halfway along the length. The front bevel gear (to the main shaft plastic gear) is held in place with two ball bearings in a neat plastic housing. The arrangement is similar to that in the tail rotor gear box. The input bevel gear to the tail rotor has two bearings and the tail rotor shaft is supported by two bearings, see the photos for all of this. The drive shaft itself is not held in place with set screws, but has flattened ends and slides into the gear shafts like the Kavan drive shaft systems. This system is exactly what I was describing a few months ago, and I was pleasantly surprised when I opened up this assembly and found this method of tail rotor drive. The entire tail rotor drive system is as smooth as silk and very trouble free, while it is still easy to disassemble and replace pieces should a crash occur. The entire tail boom is supported by two stainless steel braces which gives a strong aft end.

The tail skid is a single piece of wire, and is good for display; If you have a habit of giving aft cyclic upon touchdown I would recommend that you reinforce it with additional wires. These fixes are common knowledge and I won't go into details here.

TAIL ROTOR, MAIN ROTOR HEAD

The tail rotor blades are wide and long, but with the stock pitch change system, the tail rotor control is poor. In fact, it is still "soft" with all the throw you can get from a standard servo. I devised a quick fix for this by using a bellcrank arrangement which completely eliminates the inadequacies of the stock system. Now tail rotor action is smooth and firm, and can be easily adjusted to

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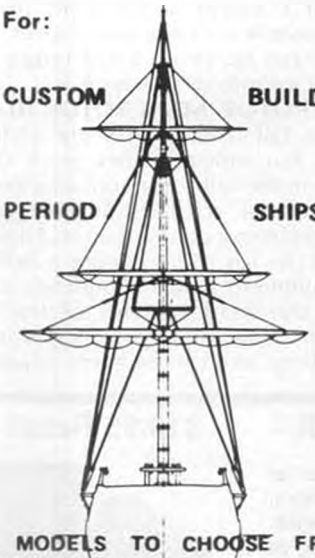

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your personal taste. Details and photos next month.

The symmetrical tail rotor blades come uncovered and are beautifully laminated. They are semi-fuel proofed with dope. I have since covered mine with Fas-Cal, which completes the fuel proofing and avoids leading edge abrasion at the tips if they strike grass or the ground.

The main rotor head is nothing exotic to look at, but the combination of aluminum and plastic used makes it relatively easy to set up and maintain. Not only is it easy to set up, but it stays set up better than most of the commercial collective heads. The aluminum side frames are nicely polished, which sandwich the plastic blade axle holders. (Don't tighten the four mounting bolts too tight, lest the axles bind due to the squeeze.) These feathering units have an outer and an inner bearing which supports the axle itself. They are smooth and absolutely slop free, which aids in the set-up of the head.

The pitch change arms are keyed onto the blade axles, and can not shift position. One bolt holds the pitch arms in the keyed position. If you need to replace one the set-up stays the same, and it takes two minutes to do so.

The flybar is a one piece rod that slides through a plastic block on top of the head. The flybar is retained by set screws on either side of the block, and the entire block/flybar pivots for Hiller control. The Bell control goes directly to the blades. (The head is a Kavan or Bell/Hiller system, whichever you prefer to call it.) The paddles are slightly different from usual, in that they have air ducts through them. I have not had time to really experiment with them, but they feel similar to a fairly heavy, medium thickness wooden paddle. If you desire crisper response you can put on a pair of Heli-Boy paddles and the control reaction as well as effectiveness will increase.

The Main rotor blades are laminted from five pieces of wood. The two front leading edge pieces are hardwood, and the three trailing edge pieces are balsa. This construction gives a rotor blade that is not only attractive to look at, but quite strong and resistant to in-flight flutter. The airfoil section is semi-symmetrical. The blade covering supplied with the kit is a transparent, heat shrink plastic sleeve which is slipped over the blade and then shrunk into place. I have mixed feelings about this material. It is quite strong and resistant to tearing, which is good. But if you shrink it with too hot of a heat source, it will not stop shrinking, and you can turn a perfectly good blade into a pretzel. The instructions recommend holding the blade over a teapot and using steam to shrink the covering. I used me wife's hair dryer to do the shrinking. It has a "dry" and a "style" setting, I used the "dry" position. This produces enough heat to shrink the material over the blade, but not enough to pull the blade out of whack. Essentially, steam does the same thing, but I didn't like the thought of all the humidity around the blade. (Others have used

steam with good results.) The blade covering has a very low shrinking threshold, and an iron or a heat gun *will* melt it. Do not try to shrink the covering with an iron, and if you try a heat gun (which some of you will), keep it far away and shrink slowly. Once I position the blade in the covering, I make a smooth pass over the top, then over the bottom, then over the top again, etc. This method produces uniform shrinking and a minimal chance of warping the blade. If you are kind of clumsy with a heat gun and don't have a hair dryer, you should give serious consideration to completing the covering with Fas-Cal. If you do go with the supplied covering, Hot Stuff the root and tips to complete the fuel proofing after you are finished with shrinking.

RADIO INSTALLATION

I'll detail this next month, but I will say that the radio installation is unique. For collective, both cyclic servos mount on a brass sleeve which slides over the main shaft. This whole unit slides up and down for collective pitch, giving a positive, slop-free collective system. The pivot point for the collective yoke is seen in the photos, along with the arm to give the servo leverage.

Next issue we'll cover the rest of the radio installation, set up, flying, mods for the tail rotor, plus a few other tips and my overall evaluation critique. See you then. •

Electronics . . . *Continued from page 32*

(white for 72, black for 53) and exact frequency, and are officially referred to in the AMA rule book as White/Brown, Black/Green, etc, and *not* Brown/White, Green/Black, etc.

REVERSED SERVOS

No, this is not going to be another dissertation about Normal Normal, and Reversed Normal servos; just a reminder that if your transmitter does not have servo direction reversing switches, and your installation requires an opposite turning servo, there is another way to go.

You can reverse two pairs of wires, but for those of you who don't feel comfortable working on the insides of your system, Ace R/C has a handy dandy Servo Reverser, available both in kit form and fully assembled. It is small, 3/4 x 5/16; and lightweight, at only a few grams. It plugs in between the receiver and the servo whose output you wish reversed, there is no tuning or adjustment required. It works with all positive pulse servos, which excludes only those originally made by ProLine; with both three and four wire models. Connectors are not furnished, as they have to match your system. The best way to go there is to obtain a servo extension for your set, snip it in half, and solder it to your Reverser.

Prices and further information can be obtained from Ace R/C, 116 W. 19th St., Higginsville, MO 64037. *(EMS also has such a device. See ad in MB wcn.)*

FOURTEEN CHANNELS?

Did you ever see one of the German model catalogs? There are a half-dozen or so companies over there that annually publish 200 plus page catalogs, all in full color, and on paper that without a doubt is good enough for the US mint. Truly a modeler's wishbook in all respects, except that they are written in German! A large percentage of them are devoted to those European R/C systems that we never see in this country, and of course, I try to digest as much of the information given as possible, inadequately armed only with my schlaff-kammer Deutsch, and dictionary.

One thing I've learned is not to be impressed by the apparently large number of channels available on their R/C sets, a "14 Kanal" set translates into a 7-channel one by our standards. The Europeans count their channels in relation to the stick/control movements; i.e., left and right rudder is two channels, instead of one as we refer to it.

For the benefit of the newcomers in the reading audience, we did something similar here in this country in the early days of proportional radio control. The first production digital system, by the pioneers at Orbit Electronics, was designated as a 7-14; seven channels, fourteen functions. I still have schematics for it... *(and it all relates back to the old vibrating reed sets, where each channel or musical tone moved a servo in one direction; thus one channel to move it out, and another to move it back to neutral... you hoped! wcn)*

SICK SANWA SERVICE

One of my friends from down below the border recently called to ask about where to send an ailing Cox/Sanwa system. I couldn't tell him, but a quick call to what remains of Cox Hobbies just up the street got me the information that such systems are now being serviced by: Lakeside Games, 4400 W. 78th St., Minneapolis, MN 55439.

The lady who gave me the information couldn't give me any more, and in checking over the ads for independent service

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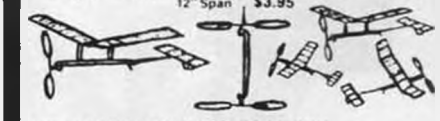

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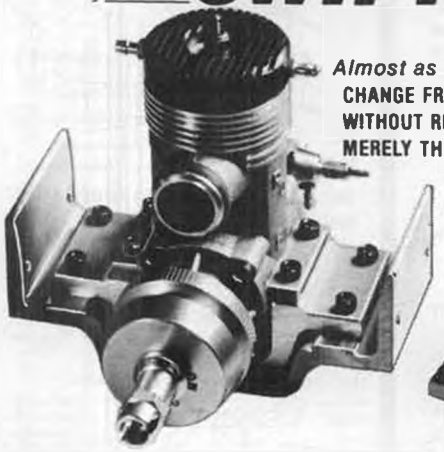

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centers, I didn't find a single one that includes Sanwa in its list, and that includes Don McCarthy at Authorized R/C who I always thought could fix *anything*. But of course, without parts and technical data from the maker or importer, even the best technician in the world cannot properly service a particular system.

I happen to have some not-too-clear Sanwa schematics in my collection. They are labeled "6 Function 72-76 MHz Transmitter," "4—6 Function Receiver," and "SM-311, SM-312 Servo." If you have need for a set, drop me a SASE c/o **Model Builder**. And if you know of someone capable and willing to service these systems, let us know so we can pass the word along.

SWITCH TO RELIABILITY

Last month I talked about switches, their use and misuse. Some time after the column was complete and submitted to **Model Builder**, I received a book sent to me through the courtesy of Micro Switch, the company whose name has become synonymous with plunger-operated precision switches regardless of who makes them. The book is entitled "Applying Precision Switches," is written by a Mr. J.P. Lockwood, and covers in great detail what I tried to condense for our application down to ten column-inches. It confirms what I wrote: "The application of precision switches is an intriguing technical subject. It draws upon many disciplines, including solid-state physics, plasma physics, physical chemistry, metallurgy, stress and vibration analysis, circuit analysis, and many others."

It goes into great detail about the problems involved in getting the maximum life out of a switch, and states that, "as a rule, the lower the current, the longer the switch life." For our use, we can also add, "the longer the life of the airplane." It would appear that for those high currents used by our electric model aircraft power plants, and to keep weight down, what we need is a small servo-actuated Micro Switch, which in turn controls one of the solid state switching devices to handle the higher current. If anyone has done any experimenting along those lines, how about sharing with us?

SWITCHES O.M.T.

In the parts list for electronic how-to articles, you will often run into: Switch, SPST, DPDT, or something similar. The letters describe the physical characteristics of the switch, in terms of POLES, and THROWS. The term POLE denotes the number of completely separate circuits that the switch can control, while THROW denotes the number of different circuits that each POLE can control. A combination of POLES and THROWS thus makes up the more complicated switches that are used for transfer operations in other than simple On-Off circuits. The more common abbreviations are:

SPST—Single Pole, Single Throw
SPDT—Single Pole, Double Throw
DPST—Double Pole, Single Throw
DPDT—Double Pole, Double Throw

There are more complicated multi-POLE and multi-THROW switches also available, which are just physical extensions of the above, though, we don't see much of them in R/C equipment. In general, we can think of a SPST switch as being required to simply turn something on and off. A SPDT throw is used to transfer something in a circuit from one point to another. A DPST switch turns two parts of a circuit on and off, while a DPDT provides transfer functions between two points. The accompanying sketches should make the whole thing easier to see and understand.

There are a couple of other descriptive terms used in specifying switches. One is BREAK, which indicates the number of contacts involved in each switching operation. If the switch breaks the circuit in one place, it is a single BREAK switch; one that breaks it in two places in a double-BREAK switch.

In rotary switches, you will run into MAKE BEFORE BREAK, and BREAK BEFORE MAKE. The former means that in a transfer type multi-throw switch, the circuit being transferred is connected to the new contact before being completely disconnected from the previous one. In the latter type switch, the original connection is completely open and floats momentarily before switching to the new contact takes place. We don't often run into these specs in the switches commonly used in the R/C hobby, they are mentioned only as a matter of general interest.

Enough of this subject, let's "switch" to something else.

PARTS AVAILABILITY

A couple of months ago, I told you about a few of my favorite suppliers for things electronic. Now, I want to put you to work to

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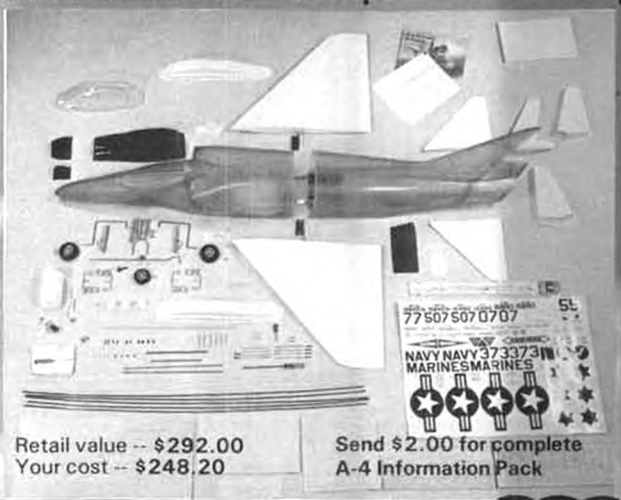

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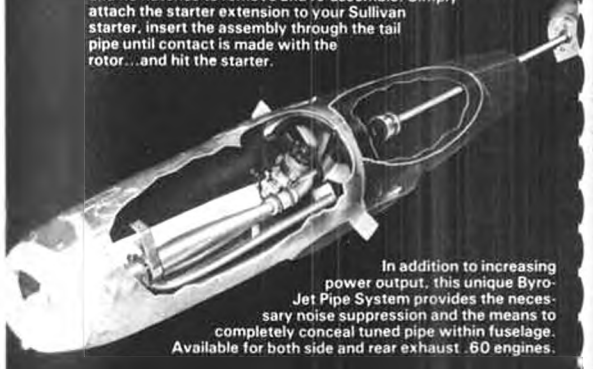

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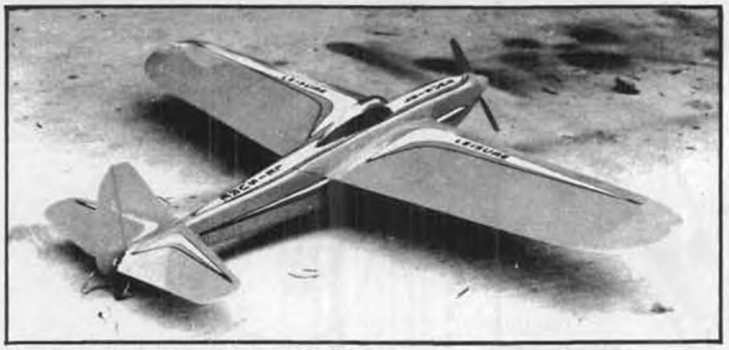

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find more suppliers for us. Specifically, we need a source of 1% resistors; one that doesn't have a minimum order to ten per value, or $50 minimum. Quite often they are needed to achieve precision higher than the 5% types can give, but you can't buy the darn things. At least, I don't know where, so if you do, please let us all know.

Another thing I've tried unsuccessfully to track down is an L200 Voltage Regulator, which I ran across in an issue of Electronics Design Magazine. It mentioned a source as SGS-ATES, 70 Massasoit St., Waltham, MA, but my letter came back marked "Undeliverable, No Forwarding Address."

The reason I am interested is that the L200 should make a great 12-volt glow plug supply, needing only *three* other components to do so. How much simpler can you get, especially if it keeps the glow plug supply voltage from dropping as the battery voltage drops when hit with the high loads placed on it by the starter.

I have read some criticism of such devices being used to drop 12 volts down to the 1.5 needed by the plug as wasteful, and if you believe Ohm's Law, they are. But Marez's Law says that if you are going to use something like this for seconds, and darn few of them, the fact that it is only 12.5% efficient is offset by the simplicity, and in turn, the reliability, of the device.

None of my sources or cross references list an L200, possibly one of our readers in the electronics industry will know something about it, and a source.

WHY DON'T THEY DEPARTMENT

What about that last radio that you bought? After you sneaked it home, into an airplane, and in the air, did it do everything that you expected from it, or did it, in a manner of speaking, let you down? Did the box also include some surprises, good or bad? We're interested, because we believe that the makers, some of them anyway, really care about what we want, and for our mutual benefit, we'd like to mention in these pages more about what we buyer's are looking for and expect.

For example, is the manual clearly written and complete? Are accessories included or readily available. Is there some physical feature of the transmitter that you really like... or dislike? Can you cycle the batteries without taking things apart... there is one transmitter you can't cycle at all without major surgery. In short, let's tell them our side, maybe the next system to hit the market will be more to our liking.

I've mentioned it before, and I'll do so again; our R/C systems are better than ever, and relatively inexpensive for the quality and performance that is now available. But, after all, we've all been hit by the rising costs of everything else, and need to look for the greatest possible value for our dollar. Yep, things are tough, my favorite cook mentioned that the other day she was unable to find pumpernickle on the bread shelf down at the local market... all they have is pumperdime! *(That's enough, Eloy... back to your quarters! wcn)* ●

Counter . . . . . *Continued from page 9*

* * *

The HURRICANE, J-5 Enterprises' latest Deep "V" Offshore is a big 5-1/2 feet long, exciting racing boat, capable of plowing through one to two foot waves! Designed to utilize the Industrial "Hobby" Quadra TML 35 engine, the all-plywood boat has a beam of 18-1/2 inches and a depth of 11 inches. Bulkheads and transom are of 1/2 inch plywood, 1/8 mahogany plywood sheeting and hatch covers, 1/2 inch square basswood chines and sheers (stringers), and 1/2 inch plywood motor mount with 1/4 inch plywood side rails. The J-5 drive kit, including 1/4 dia. steel drive shaft, comes complete with a centrifugal clutch to ease starting and launching chores, and is a recommended accessory item.

The Hurricane is offered as a kit only ($83.90), kit with drive train ($153.90), or kit, drive train, and engine for $273.90. J-5 Enterprises, P.O. Box 82, Belmont, Ontario, Canada NOL IB0, or in the U.S., J-5 Enterprises, P.O. Box 8, North Street, Michigan 48049.

* * *

PAS-M-CO, of Kent, Washington, has plans available for the Bellanca Aircruiser on floats! Done in one-inch scale, this yields a model of 65-inch wingspan. Two sheets of plans, 3 by 5 feet, plus four, 11 by 17-inch documentary sheets comprise

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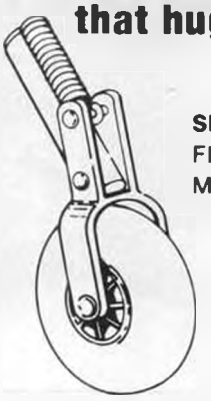

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* * *

Ace R/C, Inc. has announced its latest two options for the Silver Seven Transmitter. These, along with the Exponential Rate kit (#11G500), Electronic mixer (#11G505), Exponential Rate/Mixer (#11G515), and Programmable Push Buttons (#11G510-11G511), give the modeler a wide choice of control functions for his model applications. The #11G510 CAR+DIF. AIL/EPA option lists for $12.95 while the #11G525 CAR+DIF. Ail. Add-on sells for $9.95. These items are kits. The CAR+DIF AIL. Add-on was used by Dwight Holley on his 'Gobbler' to help him capture the title "World Soaring Champion" in 1981. Some of the features of these add-on units are; differential ailerons, coupled ailerons/rudder (switch controlled) and end point adjustments. Write to Ace R/C Inc. for information on these and other custom options for the Silver Seven Series. Enclose $2.00 for the complete catalog detailing the above items. Ace R/C Inc., Box 511, Higginsville, Mo. 64037.

* * *

Now, from Steve Muck's R/C Boats, the first of a series of yesteryear 1/8-scale

hydroplane kits. The first to be released is kit #102, a replica of the Ted Jones/Les Staudacher 30-foot round nose, slab side, built in the late 1950's and early 1960's. This kit will build up to 75 different unlimited hydroplane paint schemes.

The hull is in white gel-coat fiberglass resin with the deck factory joined. The kit includes one rear cockpit cowl, either low or high back. The hull is 45 inches long, 20-1/2 inches wide, and comes with a detailed, step-by-step, instruction manual. Also available are other accessory items, such as dummy Rolls-Royce and Allison engines, steering wheels, windshields, and front cowl covers. There is also available, a hardware set, #68, to fit the hull. If this kit is not available at your dealer, order direct today. A complete catalog of 1/8-scale kits is available for $1.00 from Steve Muck's R/C Boats, 6003 Caven Oakes, Dallas, Texas 75248.

Soaring . . . . . *Continued from page 29*

other transmitters. Short signals rapidly repeated may be in time sufficiently redundant to overcome the remaining interference loss.

In the future, you can program your transmitter to replay your favorite maneuvers, such as axial roll, Cuban-eight . . . and even launch and landing. First you record your stick movement as a function of time after starting the maneuver from a standard entry altitude and velocity. If you didn't like that performance, erase it and read in your next try, repeating this until you have that set of maneuvers you want to repeat at the "press of a button." A more sophisticated transmitter might allow you to enter real-time adjustments as an override to your recorded program, and with sufficient onboard sensing, the airborne pack could take care of these adjustments for you as the maneuver proceeds. Why not let the airborne pack help you reduce the effects of turbulance, imbalance, and inaccurate initial conditions?

With still greater electronic sophistication, your radio equipment might monitor your performance and learn to adapt to your idiosyncracies. You indicate your intent, maneuver by maneuver, and how you liked that last maneuver. Your microprocessor takes all this to "heart" and helps to make your next attempt more pleasing. It might even correct pilot error before the damage is done. An airborne altimeter could correct for any inadvertent low altitude dive at the ground.

Automated dynamic soaring is a real possibility . . . extracting energy from the vertical turbulance by maintaining a nearly constant angle of attack. You might even ask your plane to perform the "Albatross maneuver" (flying an inclined eclipse that extracts energy by averaging over the windshear). Here's a great way to get really long duration flights.

It might even be possible to introduce a collision avoidance device that would reduce the possibility of mid-airs in dense traffic slope soaring. You might want to install some minimal range instrumentation to allow automated launch and landing for beginners, with perhaps a landing assist made for experienced pilots operating under very turbulant conditions. Say, wouldn't it be nice to have an accurate knowledge of what your plane is doing in speed, height, and the individual maneuvers? Aerobatic contests could then be judged in terms of the read-out that shows exactly what happened.

Going beyond this begins to read like science fiction! Why not have self-diagnostic radio equipment . . . not only to tell the technician what went wrong, but to identify and correct pending weakness? Hey, why not build some artificial "consciousness" into your electronic equipment? That is, have it model itself and reference that model in a way that makes it self-aware. You might then ask it questions about its capability and even how it "feels" in a more general sense.

But, there's a danger here. You see, there's a close proximity between consciousness and conscience. At what point might the electronics begin to generate its own goal and become self-serving? How would you like your plane to generate purposes that differ from those you want it to have? You might even have to negotiate the next flight . . . and if it didn't like the way you treated it, it might just fly off in search of another "master." With rechargeable solar cells and automated landing as a background capability, a random mutation might introduce who knows what. *(Who's to say we aren't all a bunch of runaway computers! wcn)*

And there are social trends in our sport, but I'll leave these for the next issue.

* * *

I see renewed interest in military decor and finish. For example, John Lewis of San Diego, California, has "militarized" his Wanderer. It really looks like an RPV (military designation for Remotely Powered Vehicle). In addition to the silver covering and appropriate trim, he incorporated properly pulsing red/green wing tip lights and a tail light. He can now fly on the slope lift well past dusk or use a high start in the dead of night. He plans to incorporate a strobe light that would increase his range of operations. There may soon be a new wave of UFO reports, but you'll know what's really happening!

Ron Leon and Bill Slining, of Costa Mesa, California, have been flying different versions of a militarized Spiteful . . . a sixty-two-inch span flaperon/elevator controlled aerobatic ship. They prefer using an electronic mixer. The all-up weight is thirty-two ounces.

John Schwinghamer, of San Diego, converted a Midwest A-4D ducted fan Skyhawk for slope soaring. This thirty-six-inch span weighs only 15½ ounces. It looks authentic and is a pleasure to see at Torrey Pines.

Murph Misewicz prefers historic military scale. During World War II (1942) the Army Air Corps purchased 110 TG-3A trainer gliders from the Schweizer Aircraft Company. Students received six hours of training in this dual-control plane before being trained on the larger CG-4A cargo glider.

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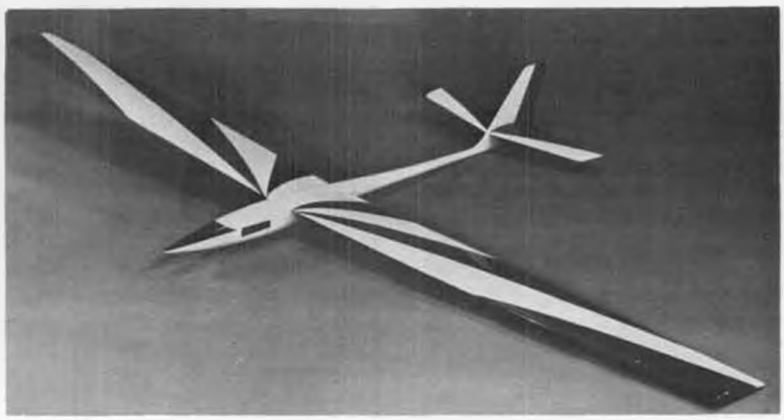

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The wings were of spruce and mahogany plywood covered with doped fabric. The fuselage was a fabric-covered framework of welded chrome molybdenum-steel tubing. It had a single unsprung disk-braked wheel. The controls consisted of rudder, elevator, ailerons and spoilers. The span was fifty-four feet, length twenty-seven feet, seven inches, height eight feet, and it weighed 1,200 pounds when loaded. The maximum speed was 100 miles per hour. It stalled at 38 miles per hour and cost only $4,000.

Jack Hiner designed a 1:4 sailplane scale model of the TG-3, compromising exact scale for the sake of improved flying quality. He even recorded a 3,400-foot altitude flight to prove his point. Murph built this plane according to Jack's plans, and as predicted, it weighs 7¾ pounds. Here is a very realistic military sailplane. A lot of work went into its construction, but it seems well worth it. It handles nicely and is very predictable. In fact, I suspect it feels very much like the full-scale original. Murph used yellow and blue Coverite, and the proper insignia to go with this realistic dull finish.

* * *

If you're a contest addict, you'll appreciate a new convert. If you've never attended a contest, you'll enjoy the perspective offered by Coulter Watt after his first experience. "I've just participated in my very first contest, the Fourth Annual Empire State R/C Soaring Classic. There they were... 80 beautiful models glistening in the sun. It was breathtaking. It's clear that a soaring contest really tests each pilot's skill. You try for a perfect score rather than to defeat the other pilots. You must take into account the weather conditions, the terrain, and many other factors that affect your performance.

"If you've never been to a contest, go and watch what happens. You'll see a lot of things: diverse designs, a variety of flying conditions, various sites, but best of all, you'll make new friends. You meet people who share your passion for balsa wood, glue, servos, airfoils, and the rest. Sure, contests are for competition, but better still, it's the place to share your knowledge and learn from others. Magazine articles are O.K., but there's nothing like seeing things first-hand. You only capture the exhiliration by being there!

"Nowadays it costs more and more to travel and attend contests, so I volunteered to host one of the contestants... Ken Scholl, of Douglassville, Pennsylvania, who flies a Maestro. We had oodles to talk about. I learned a lot, and he saved the cost of a motel. Most of the competing sailplanes were built from kits. I'm less impressed with these pilots than those who demonstrate an ability to design and build from scratch. Each contest should include some points for this aspect of modeling.

"I watched Dwight Holley fly (the winner of the recent Internats) and questioned him after each landing. His Eppler 205 wing is equipped with flaps that go all the way from minus 5° for speed to plus 20° for extra lift while thermaling. The clean uncluttered fuselage was beautiful. The 1/64th-inch plywood sides are fixed to the finpost and extend past it. The rudder fits into this vertical slot. The built-up wings were fully sheeted with 1/16th-inch balsa and careful sanding achieved the desired airfoil. The flaperons were electronically mixed, as were the rudder and ailerons.

"Dwight isn't happy to stay in poor to fair lift. He immediately cranks in some negative flap and the plane really starts to haul toward an educated guess as to where the lift might be. To eek out every inch of lift, it's important to notice remote hillsides, tree lines, and small ridges.

"Although some of the contestants just fly around the sky and have a nice time, all of the better pilots concentrate their efforts.

They were continually looking for clues and signs as the contest proceeded. I watched Dwight study and analyze what was going on. He seems to know whether he's on the edge of lift or just flying through some gusty air... and he pays careful attention to the other pilots as they fly their planes. Although he's highly competitive, he's still a very friendly person, more than willing to share information with you. Here's a really sporting gentleman.

"Running a contest requires a lot of coordination and cooperation. I want to compliment the contest Directors, Gordon Stratton, Bill Meleske and the Winchmaster, Rudy Coleman. And many others deserve credit. Attending this first contest has changed my life. You can expect to find me on the contest circuit from now on." Thanks for the comment, Coulter.

* * *

After a number of years in this sport, you begin to evaluate every scene as a prospective soaring site. If you live in the Washington, D.C. area, you know the Pentagon would make a great slope soaring site. Imagine soaring from the top of whichever five-story wall faces into the wind. Granted, the folks inside might not appreciate such a distraction. I guess it's best to simply enjoy this notion as an abstract idea. See you next month.

* * *

P.S. A couple of months ago I focused on Karl Kirkman's keel design for the 50/800 Bone R/C sailboat. It's interesting to note that his Bone XI won the National Regatta under the expert control of Chuck Black. I also described Terry Allen's 50/800 design philosophy. Five of his Toad's placed in the top ten at that same Regatta. Well, sure enough, Terry has now come up with a new ship called Spot. Now for the tweaking, testing, and preparation required before the 1982 sailing season. It's bound to be a tight race!!! ●

Thornburg . . . *Continued from page 34*

the rib pattern drawn sharply on the top. A good sawyer can cut them out in a flash. Pick a small, friendly shop and the cost should be minimal, maybe as little as a handshake. Balsa, after all, isn't too tough on sawblades.

But the bandsaw method won't work tonight on my Brigadier. My own saw's in storage, it's after 6 PM, and I intend to have the Brig wing framed up before midnight. So I have only two choices left for making my ribs. Let's examine them.

ALUMINUM TEMPLATE METHOD

I've got a drawer full of aluminum templates for wing ribs. I've got templates for the Clark Y, the Eiffel 400 (rest in peace), for most of the early Epplers, for at least four variants of the Bird of Time section, for semi-symmetricals and flatbottoms, for the Starduster and the Mini Hogan and the Royal Rudderbug and... almost every RC and FF I've built in the past ten years.

And that's precisely the trouble with aluminum templates. Once you take the time to cut one, it will be with you forever... another weighty object in that bulging tote-sack of material possessions that modern man is fated to drag behind him through the sweaty cotton fields of Life. Lawdy!

Aluminum templates are not (in my opinion) easy to make, accurately, unless, of course, you own a bandsaw, in which case you don't need the template anyway. So once you've gone to the trouble of making one of the blasted things, you have to go to the trouble of keeping it. And scratching an ID on it. And filing it so it can be located later.

If they're really such a bother, Thornburg, why have you bothered to make so many of them? Well, for one thing, they can be extremely accurate. And there have been times in my life when I thought highly of accuracy. If you're into competition flying, for example, it's very important to be able to tell yourself that your airfoil is vastly superior to that banana your competitor is using. Believing this may not make it so, but it will improve your flying. And should you happen to win, you can even begin saying so out loud. And in print.

Item: you can toss an aluminum template into a drawer with half a hundred other templates, some used sawblades, two fish hooks, and a spiked bulldog collar, and when you go looking for the template in your dotage it will still be useable. You can even loan the template to Harley Hacker and expect to get it back in reasonable shape.

So aluminum has its virtues. But its vices are numberless; I haven't listed half of them yet. You can't make accurate marks on the damn stuff with any instrument under $40.

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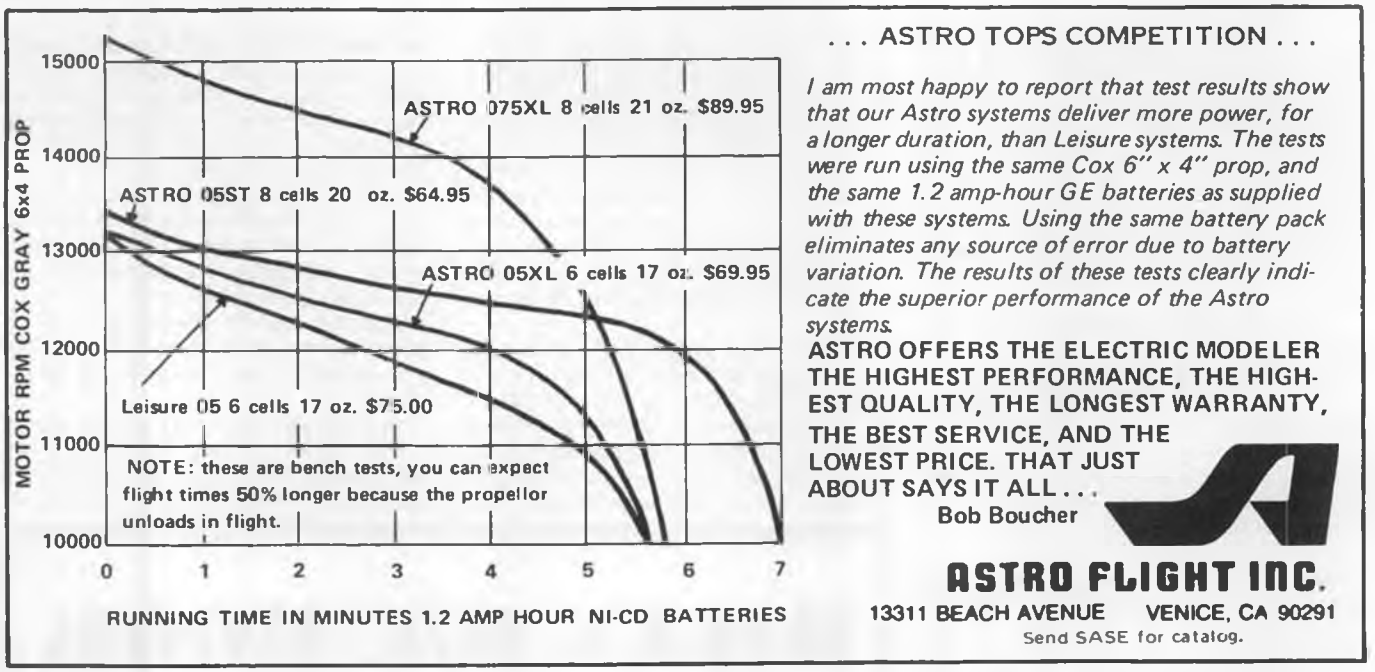

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What you have to do (and this is good practice on other materials as well) is trace your rib pattern accurately onto paper, then glue the paper to the aluminum. After you've cut the critter to shape, don't peel off the paper: use it to record identifying info about the template.

If you don't have a bandsaw you'll have to worry the metal into rough shape with a coping saw or (God help you!) hacksaw, then use a file or coarse sanding blocks to bring it down to perfection. I know highly skilled machinists who hate to make aluminum templates.

And what about those spar notches? Should you cut 'em into your template or not? I've done it both ways. Put them in, and each rib will take bloody *forever* to cut out, but when it's finished it will be near perfect. Leave them out and you'll have to stack the ribs after cutting and do the notches all at once with a Zona saw. One mistake with that Zona saw and you'll hate yourself for weeks. Saw the notches right, however, and they'll be tighter and more uniform than any other method.

In addition, a notch-free template makes it easier to cut those tapering ribs out at the wingtip. And to use the same airfoil on some other design with a different spar pattern.

But I won't be using the aluminum template method for cutting my Brigadier wing ribs. Not if I plan to have that wing framed up by midnight. I don't expect to build another Brig in the future, and the airfoil (a fat flatbottom) doesn't exactly set my heart aflutter. In short, I don't want to invest an hour or more of my precious modeling time to produce a permanent template for the Brigadier airfoil. Which leaves me with rib-cutting method number three:

BALSA TEMPLATE METHOD

Tonight, obviously, this is the method of choice. First, I tape a piece of tracing paper over the rib drawing on the Brigadier plan. Then I trace the rib carefully, using both a straightedge and a French curve. On the (flat) bottom, I trace directly over the original line, because I plan to use the edges of my balsa sheets as rib bottoms.

But the upper curve of the airfoil is a bit trickier to trace. I plan to trace this template onto my balsa sheets with a ballpoint pen. This calls for making the upper curve, as well as both ends of the template 1/32 undersize. (Try tracing around something with a Bic pen and you'll see where the 1/32 comes from.)

I choose not to put the spar notches or the leading edge vee into the template. This makes for a simple tempate indeed, one that can be cut from hard 1/8-inch balsa with a couple of swift strokes of the old razor blade. A touch or two with a fine sanding block to make it conform more perfectly to the tracing-paper outline, then peel off the paper and check the wooden template against the plan. Should be about 1/32 short both fore and aft, remember, as well as 1/32 too thin along the top curve.

Good. Now to select three sheets of 3/32 x 2 x 36 balsa, one medium-hard (for root ribs) and the other two fairly soft. Drawing the outlines of twenty ribs on these three sheets takes less than five minutes. Trusty blade in hand, I attack the sheets: twelve minutes to cut out all the ribs.

Now they have to be lined up (stacked) for sanding and notching. I do this carefully, using a 90° triangle. Not that accuracy is terribly important... the Brigadier is just a sport model, like 90% of the ships we all build... but because I'm into a mellow place in my life where good craftsmanship is pleasing just for its own sake.

So I mark the notches on both ends of the rib stack, and cut them out with the Zona saw. A coping saw won't do here: the blade invariably bows slightly, making the notches in the center of the stack too shallow. Check your notchmaking as you go with a piece of scrap spar stock.

With spar stock filling the notches, I square up the leading and trailing edges with a fine sanding block, then cut the vee notch for the leading edge. (On the Brigadier, the leading edge is a piece of 1/4 square set on edge.)

At this point, my ribs are ready to use. I inspect each one to be sure no ballpoint ink remains along the edges, because it can bleed off later into my fancy silk covering job (not a problem with Monokote.)

Now for the icing on the cake. I have a little stamp set, almost a child's toy, that I bought years ago for a couple of bucks. It contains a regular Gutenberg galaxy of letters and numbers, so I pick out three pairs: W1, W2, and W3. These numbers I stamp, in blue ink, on the appropriate ribs.

Why? Because somewhere in the life of the model there will be somebody who leans down and peers through that yellow silk and exclaims "My Gawd, you actually built this Brig from an old Berkeley kit, didn't you?"

And then I'll be free to tell him either the truth or some happy harmless lie, and we'll both go away grinning like Hogan's goat. ●

EDITOR'S TWO CENTS

● *Being a biplane fanatic of many years, who never built a bipe with anything but ribs and spars, I feel qualified, with my 67.99 I.Q., to make comment.*

Cutting a multitude of ribs may not be the most delightful part of building a model, but it can be somewhat painless. From reading Dave's paper, it's easy to see that he and I have been down the same balsa dust road many times. Would you believe aluminum templates for Gallopin' John, the Gipsy Moth, Phil Kraft's Gimlet, Walt Goods Wag, and many others, all straight wing designs, still in an old shoe box? (Not a very big box, and not very heavy, and just enough patterns to cover the bottom inch of the box.) Also found a root rib (oversize) and tip rib (undersize) of 1/16 micarta, used to make the ribs for the straight-tapered wing on my "Foo-Too" that held the power altitude record for three years.

There's one big difference in my aluminum templates that I think makes it the best choice of Dave's three methods (there's one more method that I'll describe later). My rib templates were quickly and easily cut from soft, thin aluminum sheet about 1/64 thick. It was a hunk of scrap I picked up at a construction site years ago, apparently us-

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ed as a roof gutter liner where two roofs met (usually at a 90 degree angle). There may be different sources, but I'm sure it can still be found.

After tracing and sticking the paper rib pattern to an oversize chunk of this stuff, I could cut the basic outline with a pair of heavy scissors. The aluminum usually curled a little during cutting, but this was easily straightened. with fingers and/or wide, flat-nose pliers. If the spars were internal, I either drilled a pin-size hole at each corner of the spar notch (to transfer the four corners with a pin mark), or gritted my teeth and kept drawing the single edge blade along the pattern lines, finally allowing the notch to be pushed out. The outside notches were made by making two scissor cuts to the proper depth and then using nodleneese pliers (67.99, remember) to bend the tab back and forth, at the right depth, until it popped out. A little cleaning up with rat-tail files and a larger flat one around the outside edge, and the template is complete in just a few minutes.

Oh... one more step. Lay the template on a piece of hardwood and drive a 1/16 wire brad through the aluminum template in two widely spaced spots. Repeat this process on the other side in two different spots. Now we're set to chomp out ribs.

Grab a lap cutting board, your sheets of balsa rib stock, the proper cutting blades, and head for the TV (or wherever your spouse may be, so you can make some sociability points while building). Press the template firmly onto the balsa. The flash from the wire brad holes (My Gawd, you didn't file them off!) Prevent the template from shifting, and occasionally flipping it over may save you some otherwise wasted balsa.

You'll find that tracing around the template with a sharp blade will go almost as fast as tracing with a pen... and when you're finished, you have a stack of ribs and a piece of sheet balsa Swiss cheese! Cut the spar notches as you go. A single-edge blade, pushed straight down until it pops, does the best job on outside notch sides. A pointed blade, such as a No. 11 Uber Skiver (what else?) makes short work of the cross cut (if it doesn't just fall out from splitting across the cut) and is also useful for those inside spar notches. Incidentally, if you forget to notch a rib, the template will re-align itself perfectly in the flash holes. Just shove all the little notch stubs to one side, but don't sneeze until you've disposed of them! If you're watching a good football game out of the corner of one eye while cutting, you'll probably forget to stop in time and end up with some extra ribs.

That fourth method? My old building/flying buddy, Graham Lomax, had the good bandsaw, and once in a while I'd buzz over to his house and cut ribs, sliced bologna style! Start with a block of balsa of the required dimensions, draw a rib pattern on it, and cut out a solid rib blank, notches and all (Inside notches were drilled out roughly on the drill press and then the rectangle shape was finished up with a rat-tail file. Sand the block smooth and we're all ready for the fun.

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Set up a fence next to the band saw blade (fine-tooth saw is best, naturally) and check with scrap wood until you get the correct rib thickness. Now start running the rib blank through, pulling off a rib with every pass. Hope you allowed for how much wood this blade eats up on each pass in order to end up with enough ribs! If the rib section isn't flat-bottomed (the first Big John ribs were cut this way, back in 1962), save the top or bottom piece when you cut out the rib blank and use it as a saddle so the blank can ride through the saw without rocking.

Now all of that must have taken more than a 68 I.Q.! ●

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MARK'S MODELS 1578 Osage St., San Marcos, CA 92069

C/L . . . . . *Continued from page 55*

edge most of the time anyway and any damage, even just spots of rust, make this piece a good item to sell to your least favorite flying buddy.

Assuming all looks okay inside, flush the motor out with whatever cleaner is handy. WD-40 seems to free things up nicely, or you can use a mild solvent. With things clean, double-check to be sure that any old oil has been removed from between the big end of the rod and the crank pin. Now try to wiggle the rod around on the crank pin, and if there is excess slop, replace the rod, as it is another over-stressed piece. How much is "excess slop"? Best I can do for you here, if you don't already know, is to suggest that an experienced flier look at the engine for you. In any case, if in doubt, do an R&R on the rod. For those who don't know, either a broken rod or a grenaded rear bearing wastes a bunch of other engine parts, so don't hesitate to use new stuff.

If the rod is bad, just as well take a close look at the piston, especially the wrist pin holes. Any elongation here is going to cost you later; buy another piston/cylinder set.

All that sounds kinda bad, but most of the time, all that is needed is to clean the motor, check the lower end, install the rear cover with a new gasket, put in a new plug and go flying. If you know how much running time is on the motor already (what do you mean, you don't know, aren't you keeping notes on each engine?) and that the bottom end is in good shape, you will know how much you can depend on it in the next season.

I used to completely disassemble motors, just to tinker with them more than anything else, I suppose, before the start of the season, but there is little to be learned by doing so. Sure, you can fiddle with the piston and cylinder, but it won't tell you much. What counts here is how well the motor was running at the end of last season, as well as how it was starting. So leave the piston/cylinder set alone unless it absolutely has to be removed, as it does when replacing a rod or rear bearing. And then, if the motor doesn't perform, assume

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that you installed the cylinder in a slightly different position and the piston no longer fits the hole the way it should. Remove and replace with new parts . . . Sorry 'bout that. . . .

All fuel lines need to be chucked and replaced with new. Filters must be cleaned real well, and you should probably take the time to look at some of the newer fuel filters on the market, as only the best is good enough here. The tank has to be cleaned well, again a solvent works. Just be sure to do a final rinse with fuel so there is some oil in the tank to keep it from rusting, assuming it is a metal tank, of course. On the plastic tanks, they have to be taken apart to install new internal tubing anyway, clean them at the same time. Du-Bro makes a sintered bronze filter/fuel pickup gizmo that goes in the tank and is very effective at picking up the very last drop of fuel, as well as filtering it. This, backed up by an in-line filter, and using clean fuel, will probably eliminate those "unexplainable" funny engine runs.

For the bladder and pacifier tanks used in Combat, I always just toss all of them out and make a new batch. They are too cheap to trust, even out practice flying. In fact, what I used to do was to make up bunches and bunches of bladder tanks, keeping most of them in the toolbox. Only a few would get to the pit box and after each contest, I would throw away all of the bladders that were in the pit box, just to keep from accidentally using an old one at the next contest. This meant throwing away new bladders once in awhile but saving myself just one bad run per contest made it worthwhile, and surgical-tubing bladders are really cheap and easy to make. If you're using pen bladders, they do last longer but still shouldn't be trusted too long. Use them for practice flying if you just can't bear to garbage-can them. Or sell them, cheap.

The models should be checked over carefully, but actually there isn't much you can do here, as the really vital stuff, the control system bits 'n pieces, are buried inside. If something seems bad, grit your teeth and cut into the model. Or grit your teeth even more when out flying. As a rule, control systems fail with very little warning, and if flown enough, most any model will have this linkage fail sooner or later. There isn't too much you can do about it, other than building bullet-proof linkages in the first place.

Generally speaking, Combat models with lots of flights on them (believe it or not, some last that long) can only be trusted for practice flying, use new models in the contests. My foamie Fast Combat model, the Plastic Nasty, can be counted upon to last 12 to 18 flights and that's about it, as they start breaking up in rather critical places. It's not that it is weak, it's just that it is only as strong as is necessary to last a few flights before getting punched in or hit in a mid-air.

Handles need to be checked over carefully for cracks and frayed leadout cables. Throw out any handles that look suspicious. Or keep them for "loaners." The lines are what really need a close look; run them out and inspect them very carefully over their full length. Like-new lines should be kept separate and be labeled. Bad lines need to be thrown away, not-so-bad lines can be used for practice flying.

Actually, what I have always done is to keep two or three sets of these N-S-B lines in the toolbox, loaning them out to those guys who are always borrowing things like lines. I figure that my junk lines are better than what he has or he wouldn't be borrowing from me, and most of these guys who don't come to a contest with spare sets of lines, especially in an event like

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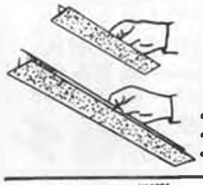

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Combat, very rarely replace borrowed lines with a new set, so why give them a new set in the first place? I adopted this policy one day when somebody borrowed a brand-new set of lines from me and promptly went out and flew into a line tangle. Not a bad, line-snapping tangle, but a tangle nonetheless, and this duck calmly walked over and dropped them off in my box, said thanks and never even mentioned that they should be checked before using them. I marked the box containing the lines with the words "Borrower's Lines," three contests later the same guy wants to borrow lines again, guess which set he gets and the up line broke at a very bad time. And I made very sure that he bought me a new set, just to be sure the point was not missed.

Only two problems with such an approach. First, it can't be a universal policy, as lots of fliers actually do replace the stuff they borrow and break. The other problem is that you can *never* run out of lines yourself, no telling what somebody might hand you...

Those odd cans of fuel left over from last season generally get used for breaking in motors around here, and fresh fuel is used for flying, including practice flying. All fuel, including the new batches, is filtered, one of the easiest ways is to buy some of those paper filters used in Mr. Coffee and similar coffee-brewing machines, stuff the filter in a funnel and pour the fuel through. Do not trust commercial fuels to be perfectly clean. Most of the time they are, but the only way to be certain is to filter it. If you consistently find junk in a particular brand of fuel, consider another brand. In my opinion, anybody who is not careful enough to mix clean fuel is likely to be even worse when it comes time to put in the right amounts of oil.

These are the major items to take care of before that first flying session, but as long as you are getting ready and doing it right, clean the toolboxes, buy fresh batteries or charge the rechargeable ones that you should be using in the first place. Clean fuel bulbs; better yet buy new bulbs, as I have yet to see any that will last very long with all types of fuels. I have owned at least one each of the ones claimed to last for years. Pick up a card or two of new plugs, replace that old glow clip with a new one and go flying. ●

Electric . . . . . *Continued from page 49*

more, with one group giving practical assistance, and another group handling questions. There may also be demonstrations, show-and-tell, a larger display area, and idea sessions. Last but not least, I would like to thank our KRC gas fliers for their help. They worked very hard, without them we could not have done it."

Thank you, Heinz, and Bob, for your reports. I think the Fly Clinic is the best thing to come along since the start of electrics. Usually the beginner's problems are easy to solve by those who know how already, but to the beginner they are major and frustrating. If you are a beginner, and problems come up, without help you have to be very stubborn to make it through. This is really unfortunate, but these are the "early days" for electric fliers, much like the 30's were for gas fliers. My own general recommendation for the beginner who cannot get help is to start with an 05 system on a powered glider, six foot size, and get a charger with an ammeter on it. In addition, get the book from Astro Flight, "The Quiet Revolution". Once you have a plane and motor that works, things go well for your following planes and projects, because you know what to expect.

The temptation is to get a ready-to-fly plane, and, in fact, that is the way I started myself (the Tester gas plane, 10 years ago). Unfortunately, there are very few ready-to-fly electric planes that are any good, especially considering the hurdles beginners have to surmount. The only one I can recommend is the Kraft Cardinal, provided the wing is cut in two and another inch of dihedral is added. The Cardinal is not a "hands off" plane, though, so a beginner would have to have an experienced pilot teach him. There is no reason a ready-to-fly plane couldn't be designed to fly "hands off" for the total beginner, but I haven't seen one yet.

Anyhow, Heinz really did it right for the help clinic. His "field cabinet", which he designed for the meet, has a large marine battery (handles deep discharge well) in the lower compartment, and multiple rapid chargers, voltage booster, cooling fans, voltmeters, and ammeters in the top compartment! That's being prepared! So, if you have problems with your electric, see Heinz at the next KRC electric fun fly!

Last month, I talked about the Astro 05XL, and several months ago, about the Leisure 05, both of which use six-cell sub-C packs. These perform so impressively that I just had to try the standard 05 on six sub-C cells too. By coincidence, Bob Kopski had the same idea at the same time, and we both agree . . . it is *good!* For one thing, the stock Astro 05 on six cells has amazing versatility, it can handle 7x4, 7x6, 8x4, 8x5, and 9x4 props with ease, and this makes it suitable for everything from sport to

"old timer" flying. My Berkeley Brigadier loves this combination with the 9x4 prop. It just floats on up into the sky for six to eight-minute flights. The Astro Sport likes it too . . . with a 7x6 prop it is a fun plane, capable of mild stunts, amiable flying, and astounding altitude, up where you can hardly see it, with six to eight-minute flights that are relaxing and a joy. The Drifter likes it too, with the same type of flight, on the 7x6 prop. Bob says the Astro Sport flies well even on the 7x4 prop, with even more duration. The overall performance in all the planes is milder than the Astro 05XL or Leisure, but as good as the eight-cell 05, with more duration besides. On the technical side, the current draw and rpm on various props are: 7x6, 12A, 9000 rpm; 9x4, 14.5A, 8000 rpm; 8x4, 11.5A, 8500 rpm. Try a "six pack", life gets better! Till next time, fly high! •

1 to 1 Scale . . *Continued from page 24*

span, he cut two feet off each panel. When he couldn't locate a vibration problem, he cut a window in the fuselage side under the wing so he could see the landing gear. While others more versed in the scientific aspects looked askance at his efforts, it was hard to fault the fact that more often than not he was out in front (Unfortunately, little things kept him out of the winner's circle).

All this adds up to suggesting you relax a little and enjoy the hobby/sport if these things have been a concern to you. Use the guidelines available to you to develop your project, but if it seems unorthodox, don't rule it out completely.

A FINISH

Some months ago, I included a product report on Fabricote by modeler friend, Joe Naber. Since that time I have had the chance to use both the original and the light version. I must say that it was a most enjoyable experience.

Several factors, I feel, make the material superior over other fabrics of this type. In the first place, the material has no grain to worry about. This helps a great deal in planning your layout to prevent waste, since no sag develops between ribs

I was pleased that Fabricote works at a lower temperature than some others. I did turn it up a bit when attaching it to aluminum tubing on the newest Hiperbipe, since the metal absorbs some heat, making adhesion a more difficult task. The shrinkage was very uniform and quite able to get rid of all the wrinkles, but not warp anything.

The last feature was the fact that it required very little filling to make it ready for painting. Not only is this a considerable savings in time and money, but it adds up to less weight, and we all know what a valuable item that is.

I would strongly recommend that you check Top Flite's Fabricote the next time you have a covering job to perform.

A NOTE OR TWO

In the December issue of this august

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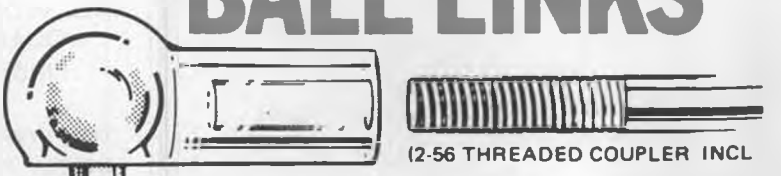

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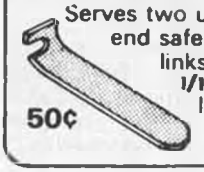

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publication, I included a picture of Cliff "Sleeper" Tacie's Citabria, taken by my daughter, Cathy. A note came from Cliff thanking me for the mention of his accomplishment, but he was wondering where the "Russian" registration came from on the tail. I don't know whether I did it in my darkroom or M.B. managed it, but the print was backward. After we got the note, Cathy and I looked, and there is a page of model photos all headed in the same direction save one; Cliff's Citabria is headed West. Maybe it's an omen of things to be, with the chance of the U.S. getting the Reno bid for the Scale championships. *(We're guilty. The negative was "flipped" during processing. wcn)*

The second note came from E.D. Bridges in California. It seems that Dave discovered some back issues of another magazine (several years) and an article I did on the Alcor C61 Transport. Aside from the fact that I really enjoyed the model and the gathering of material, I found the history of the airplane interesting. It was the last aircraft designed by Allan Lockheed. It lasted only a few months before it was destroyed.

Reading my article on the Alcor prompted him to write the following:

"Dear Bob,

"I recently bought some back issues of Scale RCM and found your article on the Alcor.

"The article and pictures stirred up old memories which I had almost forgotten. I lived in Alameda, California, and used to hike over to Oakland Airport on occasion. I watched the Alcor take shape, fly, and crash.

"On the day of the crash, I heard a high pitched sound of engines winding up. I ran out in front of my house and saw two parachutes, one high and one low, and then the Alcor going almost straight down behind a stand of trees. Although it crashed about a mile away, straight line, the sound was very loud. I started running and got to the crash site in time to see a farmer in rubber boots wading through the shallow water with one of the propellers, which was bent in a 'U', over his shoulder. I picked up a section of plywood leading edge and took it home. Kept it for a long time, but don't remember what ever became of it.

"I am unable to find a copy of the Historical Aviation Album IV in my area. If you still have it, could you send a Xerox of the article and/or a copy of your plans? I will gladly pay for them.

"Congratulations on your model, article, and thoughts expressed.
Sincerely,
Dave Bridges"

I guess the note was doubly interesting because I have accumulated additional information and intend to build another for competition, somewhat larger than the original. I hope to work out an engine/throttle set-up that will allow the use of the FAI option to throttle back and fly it on one. The Alcor was originally designed for such operation. The Black Beauty will rise again!

IT'S FOR SURE!

Since this article is a few days after deadline, we are able to include the news that the bid for Reno or Russia in '82 has been decided. News arrived at the Underwood household via Monty Groves, California, from John Grigg while still at Kennedy International.

The word is interesting and a departure from past experience. Russia will host the control line portion and the U.S. the R/C portions. I will report on more details in the next issue. At any rate, we can be certain that each group will have a bonified world competition, it would appear. Happy day! On to Reno in '82. •

R/C Boats . . . *Continued from page 41*

hull was also being repainted, it made it easy to do the deck and hatch cover at the same time. Repainting the boat also allows for a paint scheme to be developed to reflect the new deck and hatch cover.

Well, if the urge ever strikes you to go do something to that old deep vee beater you've been running for years, you now have some suggestions on how to proceed. If you're not that excited about taking on a deck modification, you can easily make a new hatch cover and make an appearance change in that manner. Originally, I was only planning to make a new hatch cover for my Prather Deep Vee 31. After trying to figure out a way to adapt my hatch cover ideas to the existing deck, it just seemed easier to put on a whole new deck. It might be that decks on other deep vees could easily be modified to accept a new hatch cover design. That certainly would make it a much quicker remodeling job.

AN OPEN LETTER TO ALL MODEL BOATERS

"For those of you who haven't heard, Bill Muncey, driver of the Unlimited hydroplane, 'Atlas Van Lines', was killed at the October 18, World's Championship race in Acapulco, Mexico. For those of us who had the good fortune to know him, he will be sorely missed.

"He had been driving the world's fastest race boats virtually non-stop for four decades. He had won over 60 major regattas, he'd long ago surpassed the legends established in the sport by Gar Wood and established his own standards of excellence that will probably never be challenged in 'his sport'.

"Throughout his career, Muncey challenged death and for almost 31 years came out on top. Along the way he endured numerous accidents and injuries:

"1957: Miss Thriftway disintegrates in Madison, Indiana. Muncey hospitalized.

"1958: Miss Thriftway loses rudder and hits Coast Guard cutter in Gold Cup race on Lake Washington. Muncey hospitalized.

"1963: Notre Dame catches fire in post season test. Muncey suffers burns.

"1966: Miss U.S. spins out in race at Detroit. Muncey finishes heat despite chest injuries.

"1973: Muncey suffers broken ribs racing outboard tunnel hull in Memphis, Tennessee.

"1974: Atlas Van Lines stuffs nose in Detroit River in pre-season test run. Muncey suffers injuries.

"Recognizing the danger, he once called racing 'A cruel sport'.

"I remember Muncey saying prior to the 1977 season that he always feared hydroplanes designed with the cockpit in front of the engine, even though the Atlas was designed that way. In 1957 and '58, Muncey had driven the Thriftway, Too, first of the cab-over designs used in the sport. 'When you're driving up front, you're the first one to the scene of an accident,' he was quoted as saying.

"The 52-year-old Muncey, long acknowledged as the sport's all-time driving star, won a whopping eight Gold Cups, seven National High Point Championships and four World Championships on the Unlimited circuit. He won every major regatta and held every major speed record, both in qualifying and in competition.

"Muncey was the 13th driver to die behind the wheel of an Unlimited hydroplane since 1951. Muncey's loss will likely leave a vacuum in the sport.

"Bill had said that if he had to go, he wanted to go when he was out in front. Entering the second corner on the first lap of the final heat at that race in Acapulco, the Atlas suddenly lifted its nose and danced on its transom for several hundred feet before going all the way over backwards and landing on its top. Bill never had a chance as he was still in the cockpit when the boat landed.

"In a conversation with Herb Stewart, of S.S.T. Boats, the other evening, he was as shocked as everyone to hear of Bill Muncey's passing. Herb feels as I do that we of the model boating fraternity, should do something towards the memory of this fine hydroplane driver who we idolized for so many years.

"As the NAMBA Chairman for R/C Unlimiteds I would like to suggest that we do the following: There has been a scholarship fund set up by the Atlas Van Lines corporation in Bill's memory. If

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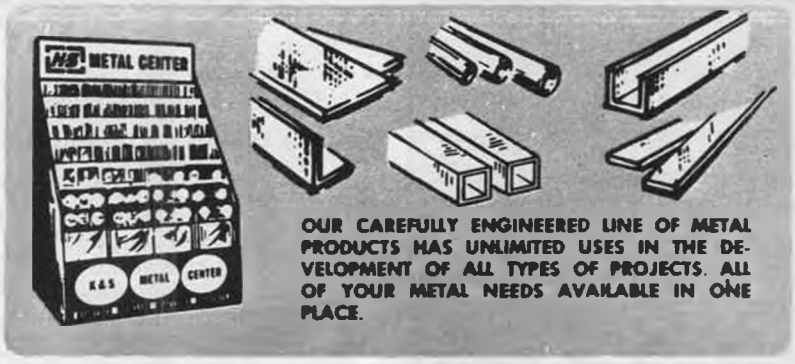

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105	7/32	.45
106	1/4	.50
107	9/32	.55

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125	1/16	.30
126	3/36	.30
127	1/8	.30
128	5/32	.35
129	3/16	.45
130	7/32	.50
131	1/4	.55
132	9/32	.60
133	5/16	.65
134	11/32	.70
135	3/8	.75
136	13/32	.85
137	7/16	.90
138	15/32	.95
139	1/2	1.00
140	17/32	1.05
141	9/16	1.10
142	19/32	1.20
143	5/8	1.25
144	21/32	1.40

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117	1/16	.25
118	3/32	.30
119	5/32	.40
120	1/8	.30

SOFT BRASS FUEL TUBING (12")

121	1/8	.40

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STOCK NO.	SIZE	PRICE EACH
262	3/32x3/16	1.10
264	1/8x1/4	1.20
266	5/32x5/16	1.30
268	3/16x3/8	1.40

BRASS STRIPS (12")

230	.016x1/4	.20
231	.016x1/2	.30
232	.016x1	.50
233	.016x3/4	.40
234	.016x2	.90
235	.025x1/4	.25
236	.025x1/2	.40
237	.025x1	.70
238	.025x3/4	.55
239	.025x2	1.30
240	.032x1/4	.30
241	.032x1/2	.50
242	.032x1	.85
243	.032x3/4	.65
244	.032x2	1.60
245	.064x1/4	.60
246	.064x1/2	1.00
247	.064x3/4	1.25
248	.064x1	1.70
249	.064x2	3.00

SQUARE BRASS TUBE (12")

149	1/16 Sq.	.45
150	3/32 Sq.	.50
151	1/8 Sq.	.55
152	5/32 Sq.	.65
153	3/16 Sq.	.75
154	7/32 Sq.	.85
155	1/4 Sq.	.95

BRASS STREAMLINE TUBE 12"

122	Small	.75

SHEET METAL (4" x 10")

STOCK NO.	SIZE	PRICE EACH
250	.005 Brass	.70
251	.010 Brass	1.10
252	.015 Brass	1.50
253	.032 Brass	2.70
254	.008 Tin	.50
255	.016 Alum.	.60
256	.032 Alum.	.80
257	.064 Alum.	1.35
258	Asst. Brass	1.30
259	.025 Copp.	2.60

BRASS ANGLE (12")

171	1/8x1/8	.40
172	5/32x5/32	.45
173	3/16x3/16	.50
174	7/32x7/32	.55
175	1/4x1/4	.65

BRASS CHANNEL (12")

181	1/8	.50
182	5/32	.55
183	3/16	.60
184	7/32	.65
185	1/4	.75

SOLID BRASS ROD (12")

159	.020	.08
160	1/32	.08
161	3/64	.12
162	1/16	.20
163	3/32	.25
164	1/8	.40
165	5/32	.50

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197	.055	.08
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you would send your contributions and remembrances to my address: Roger J. Newton, 14518 167th Pl. S.E., Renton, WA 98055. I will then in turn send a check along with all of the contributors names to the Atlas headquarters.

"The second thing I would like to see next summer is for all of the model boat racers, regardless of affiliation, whether it be NAMBA or IMPBA, hold a race in each district in the memory of Bill Muncey. And it doesn't necessarily have to be an Unlimited race, as Bill did indulge himself in other forms of boat racing from time to time. I am going to suggest to our district that we dedicate next season's Gold Cup in Bill's memory.

"It will seem very strange next year not to have Bill Muncey driving a boat in the annual Seafair event on Lake Washington as he had done for the last 25 years."

Sincerely,
Roger J. Newton
NAMBA R/C Unlimited Chmn.

NAMBA DISTRICT 9 TO RACE ON 15% NITRO FUEL

In what seems to be one of the more interesting decisions to be made by a group of model boaters in recent years, NAMBA District 9 voted in favor of a proposal at their annual meeting to limit the nitro used in their district races to 15%. Although I don't have a great amount of information about this decision, I understand it was accepted in hopes of keeping down costs that are associated with purchasing higher nitro fuels. This column has carried information about running boats with low nitro or even no nitro. A couple of years ago, we conducted some events using FAI fuel, which is no nitro and about 20 lubricant. Last year there was at least one race in District 9 where 15% nitro fuel was tried.

One doesn't have to talk to very many model boaters to find out that there is a difference of opinion about restricting the amount of nitro a modeler is allowed to use in his racing boats. There are those who rally behind the lines of, "This is supposed to be a race and restricting the amount of nitro I can use hinders my ability to obtain maximum performance." There is no denying the fact that the model racing engines we use in our boats like to use those fuels ranging between 40% and 60% nitro. There are those who contend that limiting the nitro to 15% gives the advantage to the fellow who can "trick" an engine to perform better on lower nitro. And of course there's that great redneck contention, "This is America, boy, and restricting the nitro is a Communist plot to make everyone the same."

On the other side, and there must have been a bunch of them at the District 9 meeting, are those who contend that paying anywhere from $15 to $25 a gallon for high-nitro fuels is becoming prohibitive. If one does much running at all . . . I annually use 15 to 20 gallons of fuel . . . the savings can easily amount to a couple of hundred dollars. Running on lower nitro will lessen the top end performance of most of the engines we now use. However, this could lead to fewer blown glo-plugs, bearing failures, and broken parts. This would also add to a lessening in operating costs.

It's not my place to say if one group is right and the other is wrong. I personally wouldn't object to racing on 15% fuel. Everyone is under the same restraint. However, I also favor running stock classes like the NAMBA stock OPC Tunnel Class and I'm not into racing riggers. We're all entitled to our own opinions. If we can convince sufficient numbers of other model boaters that an idea is worth trying, then that can become the way things will be done. Even those who don't like what District 9 has done won't deny that the decision was reached using the proper procedures and was put to a vote and passed by a majority. And since a majority is 51%, it's very possible that some people are not going to be happy with the decision. Such, however, is how things are in a democratic organization.

I want to thank those of you who have given me a call or sent me a letter with some photos of your boats. Whenever possible, I'll make every effort to use your photos in this column. My address is 119 Crestwood Dr. S.W., Tacoma, WA 98498 and the phone number is (206) 584-7131. •

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Great Lakes..... *Continued from page 19*

Make the nose cowl by gluing pine blocks together, carved to fit the nose former. Hollow out and glue to the "A" former. A fiberglass cowl could be used, but it involves more work and I don't think anything is gained.

The receiver box is made of 1/4-x3-inch balsa. It is made the width of the inside fuselage so it can be screwed to the bottom of the top wing reinforcement piece. Use a 5/8-inch by #6 sheet

metal screw in each inside corner. The receiver is packed in foam rubber and held in place with rubber bands hooked around the dowel pins. This places the receiver in a well protected central location without extension cords, which can sometimes cause trouble. A passenger can be velcroed on the box in the front cockpit.

Wrap the battery in foam rubber and place it just behind the firewall. Hold it in place with rubber bands attached to small screweyes opened up to make hooks. Use at least a 1000-ma battery, you are working too close to the safety margin with anything smaller.

The engine servo is mounted upside down to the bottom of the upper wing reinforcement. It is a little difficult to get to it through the bottom wing opening but can be done. Mount it on 1/4x1/2-inch plywood servo rails glued and nailed at each end with 1/2-inch brads. Use flexible tubing to hook to the throttle, with a Du-Bro ball joint bolted to the throttle arm. My smoke actuating servo is also mounted on the same rails. Do not mount servos too rigidly.

Windshields are mounted in place with pins, then epoxied. When set, remove the pins. Put a piece of masking tape along the base of the windshield about 1/8-inch from the fuselage. The tape will protect it and make a line to work to. Fill in along the bottom of the windshields with a good filler, sand lightly, then remove the masking tape. Put 1/4-inch auto trim tape around the base of the windshields.

The cockpit padding is 3/8-inch plastic tubing slit down one side and worked over the 1/32-inch cowling. This is covered with artificial vinyl leather obtained in yardage stores. Fold over the edge and hold in place with pins. Glue the pins on the inside with epoxy or cyanoacrylate glue and nip off the pins inside when dry.

Louvers are not as difficult to make as they may first appear. Cut 36 pieces of 1/4-inch triangle pine molding each two inches long. Cut a 1-1/2 x 3-inch hole in the side cowls where the louvers are to be located. Glue the triangle pieces in with a 1/8-inch spacer between each one. When glue is set use a sandpaper block with medium coarse paper and sand down to about 1/8-inch thick. Round off the top and bottom so that it blends into the cowl. Then using medium weight sandpaper sand up and down to round off each louver. Finish with fine sandpaper.

To get the seam effect on the engine cowl, use trim tape as used for cars. It is thicker than model tape, showing up better when painted over. Use 1/4-inch first then 1/8-inch centered on top. Put it on the last thing before painting.

WING

The modified NACA M-12 airfoil used on the full-size plane looked good to me, so I used it on the model. It worked so well I will probably use it on any other models I should build in the future.

As shown on the plans, 1/8-inch balsa ribs were used. I haven't tried 1/4-inch foam core board but, after talking to some other modelers, think it should work good on this model. I intend to try it some time.

To prepare for laminating wing tips and tail outlines, first saw a pattern out of plywood or particle board . . . be sure to undercut 1/4-inch. Saw four 1/16 x 3/4-inch strips off a pine or spruce board. If the bend is too sharp for the 1/16-inch strips, soak them in hot water for about 15 or 20 minutes. They should then easily bend around the 3/4-inch pattern. Hold them in place with rubber bands for half an hour or so then remove and let dry. When dry, glue and replace. If long model airplane rubber is not available use knotted dime-store brands. Let set overnight.

I have also used closely spaced nails in a board to form a pattern, using clothespins to hold the laminations together. It is a little easier if a bandsaw or jigsaw is not available. Either way should work OK.

Use a sharp plane to smooth the edges then saw down the center and plane down to 1/4-inch. This gives you two perfectly matched wing tips.

Glue a 1/16 x 1/8-inch strip centered inside. Use clothespins to hold it in place until dry. This will strengthen the wing and tail outlines and make a better joint for the rib ends.

While the wing tips are drying, set up the basic wing structure, which is typical of most built up wings. I always build the ailerons in place then cut the trailing edge out later.

The ribs are notched into the aileron spar 1/16-inch. I use a bandsaw for this but a wide blade saw with fine teeth, such as a keyhole saw should do the job just as well.

On each end of the 1/4-inch brass torque tube, insert a piece of wood dowel and slide a 1/4-inch inside diameter brass tubing over the end to reinforce it for the No. 6 bolt.

If the pushrods on the wing servo are set as shown on the plans, a slight differential is built in, giving slightly more up than down, which helps banks

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and turns.

The ailerons must work freely. A little bit of very light lube with silicone will help. Do not use oil, as it will get sticky and in time make matters worse.

Wing struts are made from 5/16 x 9/16 pine cut to a streamline shape. The ends are slotted lengthwise with a thick saw blade such as a keyhole saw. Most keyhole saws are sold with a fine-tooth metal blade that is just right for this job.

Slots are out into the 1/16-inch plywood insert for the .055 wire wing fitting attachment. Assemble with ample alphatic glue and clamp.

Be sure to make the N-struts far enough apart at top and bottom to keep them tightly in place when snapped in. Trim and finish off with sandpaper. Wire can be bent slightly if necessary to get a good fit to wing.

The hand holds on the top wing over the front cockpit were not used on all models, so may or may not be built in.

There are three 5/8 No. 6 sheet metal screws through .035 aluminum fittings on each side for rigging wires. Drill a pilot hole for each one in the hardwood block at the base of the outer wing struts.

Run the six screws into place then back them out. Put a few drops of cyanoacrylate glue in the holes to harden the wood threads left by the screws. When set, run the screws back in. These six screws are removed to disassemble the wings, the flying wires are left on the fuselage.

The fuel gauge is made of balsa or pine turned on a drill or carved out by hand. It is held in place with a piece of 1/8-inch plywood. Just cut a notch in the bottom of the center rib and put a 1/4 x 1/4-inch balsa stick on each side. Stick a printed fuel gauge on the back flat side.

The gas cap on the top wing is made out of a 3/4-inch plastic cap off a bottle or tube.

TAIL STRUCTURE

Begin the tail by making the laminated outlines first, using the same method as used on the wing tips.

The ribs could be shaped first, but the easiest way to build tail surfaces having airfoils is to build them flat, then shape after assembly. Sand with coarse paper to a symmetrical shape, with the maximum thickness at the spar. Glue sandpaper to a 1 x 2 x 12-inch block, fine on one side, coarse on the other, to give all the ribs an even contour.

After the tail section is framed, make saw cuts in the tips with a hacksaw as shown on the plans. Force some glue into the slots and insert pieces of 1/32-inch plywood. Doing this takes little time and insures that the tips will not work loose in the future.

Hinges are the new extra large Robart Super Hinge Points. They are easier to install than the conventional hinges.

The brace wires are bolted directly to the tail rather than using fittings, for a reason. Besides making the job easier, it lessens the chance of static noise interference to the receiver.

Be sure to install the stabilizer and elevator before the fin and rudder. They are covered and finished on the fuselage.

LANDING GEAR

The landing gear on the Great Lakes is a bit more complicated than average. Bend the front 3/16-inch music wire first, which is also the axle. It bolts to the front of the firewall and should be assembled, with the rest of the gear, on the fuselage.

Bend the 1/8-inch rear wire and bind and silver solder to the front wire.

The pine streamlining can be added now or later. Do not use balsa, as the pine is needed to strengthen the wire.

The upper fuselage landing gear braces are made of 1/8-inch wire. The ends are heated red hot and bent around a 5/32-inch rod. Let it cool slowly. Bend the other end to a right angle. They slide through the 1/4-inch brace on each side and bolt to the back of the firewall. You will have to elongate the hole in the fuselage to take the bent wire.

Take a piece of 5/32-inch brass tubing and spread one end out by tapping a center punch in it. Cut it off about 3/8-inch long and insert it into the loops of the 1/8-inch wire. Spread out the other end and tap each end with a flat hammer to make a tight fit. Add streamlining.

The shock strut is made of a 1/2-inch inside diameter brass tube. Put a one-inch long piece of 1/2-inch outside diameter in the top for reinforcement and press down in a vice so it will fit over the upper landing gear brace, then file to shape.

The lower section is 1/2-inch outside diameter brass tube that slides into the upper against the spring. If you use a tubing cutter, it will press in the sides enough to hold against the spring.

The bottom is reinforced with double tubing one-inch long, also add a piece of 1/16-inch aluminum 1/2-inch wide inside the end for extra strength and flatten in a vice. Drill and slide over the axle. The spring should be fairly stiff. I figure the tires will take the good landings, and the spring shocks the hard ones. What? You say you never make hard landings. OK, better put good springs in anyway!

Standard tires were 24 inch by 5-1/2 inche (6-inch on the model) high pressure. "Airwheels" 22 inch by 8-1/2 inch (5-1/2 inch on the model) were extra. The low-pressure 22-inch wheels were the most popular. The 5-1/2 inch Du-Bro wheels are just right and work nicely.

TAILWHEEL

As far as I know, no planes came from the factory with steerable tailwheels, but were added on in later years. So either a skid or wheel is acceptable. Both are shown.

The tailwheel spring is made of three thicknesses of .035 hard aluminum 1/2-inch wide. Make a bearing of nylon (outer Nyrod) with a No. 10 nut forced over each end to hold it onto the spring. If trouble is encountered getting the

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nuts over the nylon, warm it until soft then try again.

Use a No. 6 bolt on the caster with micarta or similar material for the cross-arm. Metal may be used, but there is always the chance of static noise.

Du-Bro ball joints are used to hook the coil springs to the rudder cross arm. Run a cutoff brass threaded coupler, drilled to take the spring, into the nylon socket. Put some tension on the springs.

When assembled, coat all the nuts with epoxy to keep everything tight. When final assembly is made on your model be sure to lock all screws and bolts in place with a drop of glue to prevent any loosening by vibration.

COVERING AND FINISH

I used a lightweight polyester cloth for covering. It can be purchased in fabric stores, and is used for lining drapes, clothes, or whatever. Ask the clerk for 100 percent polyester sheath lining or "Applause." It also comes under different trade names, the clerk will know. Be careful not to get preshrunk.

Use dope to attach it. Then tighten with a flatiron set by starting at a medium temperature and gradually raising it until the fabric tightens in a few seconds when the iron is passed over it.

Of course Coverite is excellent for large models but expensive. Do not use the plastic coverings. They do not have the strength for a model this size.

I don't think I ever finished any two models alike, so use your own favorite method. I'm still looking for the perfect finish.

Acrylic lacquer was the big thing when my model was ready to paint, so thought I would give it a try. It was nice to work with, but when fully dry, I found it was too brittle for fabric and tended to crack. So if you use acrylic lacquer add a plasticizer.

The Great Lakes came in a variety of colors, but usually used the same layout trim, which was a basic color with the nose of a different color that tapered to a stripe the length of the fuselage. I just made believe I had bought a standard Great Lakes and added some extra trim to personalize it.

The wing registration numbers, upper on the right and lower on the left, were usually black, six inches high, four inches wide, one-inch thick, with one-inch spacing. Rudder numbers are 3/4-inch high, between the first and second rib from the top, although pictures show them in various positions.

The Great Lakes trademark is made by tracing on clear Monokote or similar plastic covering with pen and India ink. The ink seems to adhere better if a little pressure is used on the pen. I use a Rapidograph but a Speedball should work just as well. If trouble persists, try rubbing with toothpaste to cut the glaze of the plastic.

When dry, trim to the edge of the drawing and then iron on another layer of clear plastic to seal it. Use just enough heat to make it stick. Too much heat will cause wrinkles. Trim the second piece of plastic a little larger and it is ready to mount on the fin.

Use rub-off or decals for lettering. Spray very lightly with a clear spray to protect them.

CONCLUSION

The 2T-1E doesn't seem to have any bad habits as far as I can see. I have spun it power off and on. It comes out in less than a turn. It loops, snap rolls, and rolls nicely, but is a bit slow.

Do not try rolls too low (guess this is good advice for any model). Takeoffs and landings can be made realistically with smooth ground tracking.

Well, this about sums it up, so get started, you won't be sorry.

Most of my information was obtained from William A. Wylam's very detailed drawings in *Model Airplane News*, May 1956: Peter Westburg's excellent drawings of the 2T-1A, December 1977 to February 1978 **Model Builder,** and U.S. Civil Aircraft, A.T.C. Numbers 301-400, Volume 4. •

Plug Sparks . . *Continued from page 38*

attempting to keep the 1/2A Texaco Event the way it was intended: i.e., strictly fun competition. All Contest Directors should be fully aware of the implications of this article. In the future, when a protest is voiced, the complaint can be easily investigated using the above criteria.

ENGINE OF THE MONTH

The engine featured in this month's column is one of the main reasons that model gas engines were not popular in the early thirties. Until the advent of the light-weight Brown Jr. at 6-1/2 ounces, gas models with these heavy motors were generally heavy and clumsy, easily prone to breakage.

The Power Model Boat and Airplane Co., then located at 134 South Clinton St., Chicago, Illinois, were the manufacturers of typical engines of that era. The engine, which had no name to start with, was designed for boats employing flywheels to keep the motor running. The aircraft version was offered by the simple expedient of press fitting the drive washer on a slightly tapered shaft.

First advertisements appeared in the boat oriented magazines. When it appeared, gas models were gaining unprecedented popularity, the PMB&A Co. put out brochures featuring a black knight motif and calling the engine, the Knight Single Cylinder engine. For its day, the motor had a progressive look to it, although it was quite heavy for airplane use.

The engine was made mostly of cast iron with bronze bearings and bronze con rod. Actually, the buyer was offered two versions; one with alloy aluminum and the other in cast iron. (The alum. alloy engine is a very rare engine as very few were made.)

A variety of options were offered. If

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one was inclined mechanically, he could machine the parts (an alum. alloy casting set for $5.75 or a cast iron set for $6.75). If he lacked the expertise and still wanted to build an engine, the finished parts cost $10.75 and $12.75 respectively. For those who wanted an engine ready to run, prices were $18.75 for the aluminum alloy model and $19.85 for the cast iron version.

Much of the history of this line of motors has been lost to antiquity, but the general consesus is that the engines were the brainchild of Gilbert Knight, who was also responsible for the large Gil (bert) engine. The latter engine was a huge engine that we will feature in one of our later columns.

Rather surprising in spite of its rather modern looks, the engine was only rated on their brochure at 4000 to 6500 rpm. Looking over the engine from the Karl Carlson collection (from which this drawing was derived), the exhaust porting is quite reminiscent of the early Loutrel engines. As in the case of the Loutrel, the exhaust porting was generally insufficient to allow the engine to "breathe" hence the rpm was limited.

Another of the attendant problems in running the engine was the float type carburetor. The check valves were forever giving trouble, in many cases requiring a micrometer to set. Then, too, at any high revolutions, the valves had a tendency to flutter, which would flood the engine. Modern modelers don't know how simple things are today with the spray bar and needle valve setups to run engines.

Advertising brochures claimed the tank supplied was good for 20 to 30-minute run time (the tank must have been huge). This, of course, could only be attained by running the engine slowly, hence, again, lack of power. The recommended propeller for the engine was a 15 inch dia., 10 inch pitch, as produced by the PMB&A firm. For $2.25, this beautiful walnut prop was cheap for its day!

In addition, the firm also produced boat and airplane kits. The airplane offered was a 90 inch wingspan Stinson Reliant. Kit was priced at $17.60, which included all materials, plans, and wheels. Weight of the model was an astonishingly light 2-7/8 lbs.

For the technically minded, the Knight engine featured a 1 inch bore with 7/8 stroke, rated at 3/16 h.p. Weight of the aluminum alloy version was 10 ounces, while the cast iron model ended up at 15 ounces. A simple flat type tension arm, provided with the point, allowed for an adjustable gap.

As mentioned before, the cylinder was cast iron or alum. alloy with a cast iron piston having two rings. Later brochures had a different engine, slightly smaller, with 7/8 bore and 3/4 stroke, giving 1/8 horsepower. This was basically the same engine, although specifications only gave 3500 rpm with a 12 inch propeller.

There are not to many of these engines floating around these days, as 50 years is a long time for an engine to survive the scrap heap.

WEST COAST O/T R/C SCHEDULES

Boy, are we loaded with news this month! As a matter of fact, this columnist has had such a time, he is quite late (to the disgust of his Editor), but we did want to get the latest schedule in now that it has been pretty well firmed up. Some of the dates may not be exact, but these will be clarified as we receive the information and publish it in subsequent issues.

DATE	NAME	CLUB	LOCATION
Feb. 27	Aeroneers Annual	SAM 41	Perris Valley
Mar. 20/21	Browns Valley International	SAM 30	Marysville
April 9/10	Spring Bi-Annual	SAM 49	Taft
May 14/15	W. C. SAM Champs	SAM 21	Sacramento
June 4/5	Salinas Aero Modelers Annual	S.A.M.	Salinas
July 10/11	"Fly-for-Dollars" Annual	Sun-Herald	Colusa
Aug. 22	Marin Co. Annual	SAM 27	Petaluma
Sept. 11	SAFFS Annual	SAM 34	Reno
Sept. 24/25*	Pond Commemorative	SAM 26	San Luis Obispo
Oct. 15/16	Fall Bi-Annual	SAM 49	Taft
Nov. 5/6	Team Challenge	SAM 30	Marysville

*Note this meet has not been firmed up as of this date. We do hope Monti Ferrell will put on another of his excellent meets.

DICK HANSON MODELS

Our Flying Hippo 825 is pretty light on his feet. We have supplied a number of these to active competition fliers, internationally as well as here in the U.S.A.

The new 750 sq. inch Tipo also gets around. According to the feedback we recieve, both types are doing extremely well at local, regional and national contests.

Custom built airframes of these and other winning designs is still our main business but we are adding kits this year of the Tipo's and two new designs— The Formula 750 and the "Cheep Trick", A 625 sq. inch rear exhaust 40-46 Bird.

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1938 MYSTERY MODEL REVISITED

In a recent issue of the AMA publication, *Model Aviation,* Doc Mathews had a good yarn about the "Mystery Model" that won on the last flight of the day. Of course, the winner came in for his share of glory, but we did want to remind the reader that the fellow who got nosed out was a well known, long time gas expert.

We are indebteded to Joe Ott for Photo No. 6, showing Carl Carlson with his original design that flew so well, and get this . . . with a three pound Wall engine! The photo of Carl preparing to crank up was taken at the old 63rd Street Field, Chicago, which today is the Midway. Neat looking design. Too bad we can't locate Carlson.

BOO-BOO DEPT.

We might have known it, the identifi-

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cation of Curt Sanford as the flyer of the snappy So Long at the Sequin AFB Nationals turned out to be Roger LaPrelle. He further goes on to increase the red face by saying he wished the engine as identified really was an Ohlsson 19. Maybe someone will write Roger at 8014A Pinedale Ave., Austin, TX 98758. He could use the engine!

BRUCE LESTER SPECIAL

Just about every issue, this columnist has been fortunate enough to be able to run a photo taken of the 1937 through 1939 Nationals, as photographed by Bruce Lester with his trusty Brownie camera. Let's listen to what Bruce has to say about Photo No. 7.

"Upon arriving at Wayne County Airport with my 132 sq. in. model, I was informed by one NAA (pre-AMA) official that I would not be able to compete as the rules had been changed to the 200 sq. in. Lord Wakefield rules."

"As I have been corresponding with Vernon Gray in New Zealand and was aware, this model had been put aboard a boat destined for New York, c/o Polks. I was asked to assist in uncrating the models in a long storage hangar. I took some photos, but this one was a test by someone who was supposed to fly them (Bert Pond probably).

"The model in the photo was the most beautiful thing I had ever seen, with a flush fitting two-bladed folding propeller that nestled right into a recess in the skin at the front of the fuselage. Charlie Grant (MAN Editor) and T.N. Bobrovsky couldn't find a flaw in it, only that it did not comply to the area change that had been made after the models had been shipped."

RUBBER POWER ONLY

According to Tom Brennan, of 588 Cedarberry Lane, San Rafael, CA 94903, because of the successful rubber powered O/T meets that they have been staging, the Marin Club has pretty well decided they will get a SAM Chapter Charter for strictly rubber powered model enthusiasts. This is simply great!

Tom also indicates they will have the following rubber power model contests in 1982 (no dates as yet):

1. Pre-1939 Wakefield (30" max w/s)
2. Joe Ott day (three events)
   a. Scale, 20 inch and under
   b. Scale, over 20 inch
   c. Non-scale, any size
   (all based on Joe Ott designs)
3. The Great Pacific Ace SAM Challenge
4. Multi-engine Scale

Does that ever sound like an ambitious program! As the old saying goes, "Nothing succeeds like success." All rubber power fans are urged to write Tom Brennan for dates and contest info. Should be a ball!

PHOTOS! PHOTOS! PHOTOS!

This columnist has been writing about activities so much he has sort of left out the photos. To rectify this, we received a letter from Jerry Persh, 4908 Sauquoit Lane, Annandale, Virginia 22003, wherein he enclosed five photos.

Photo No. 8 shows one of the four rubber powered models that Jerry went out to fly that day. The columnist selected the photo of the Henry Struck "Flying Cloud", as we don't see that design very much in photos. Then too, this gives an

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excellent shot of the field used for flying back east.

As Jerry says, "The loss of the Brain Busters field was a real blow. Around Washington, the Bowie, Maryland field is in very bad shape with all sorts of obstructions. However, the good news is that the Park officials at the Manassas Battlefield Park are allowing 'silent flight', which includes rubber and glider models."

As you can see from the photo, the field is good size, but as usual, there are always the trees and cornfields surrounding the area. Jerry reports the Flying Cloud seems best suited for this field as it seems to have a propensity for staying in bounds and out of thermals. Jerry concludes by saying 1981 was a bad year for flying and hopes 1982 will be better. So do we!!

Photo No. 9 depicts Bob Lane, of the SAM 21 Club, with a Miss Tiny as designed by Barney Synder, of Modelcraft. Bob has put an .049 Black Widow in the model to fly it in the 1/2A Texaco Event.

While he didn't do too good at the Club meet at Chesbro Reservoir Area, Bob feels this airplane is a real fun model that fits the concept of the new 1/2A Texaco Event. Bob has the right idea. You don't have to win to have fun!

Photo No. 10 shows what this columnist considers the guttsiest modeler of all. We are referring to Cliff Silva, who is strictly a free flighter despite the fact he is confined to a wheelchair. Cliff is an avid competitor and dearly loves to compete in the Texaco Event.

Recently, Silva was featured on the cover of the British modeling magazine, *Aeromodeller*. Cliff was cited as the outstanding man to commemorate the International Year for the Handicapped. Editor Ron Moulton couldn't have found a more fit subject!

Photo No. 11 is one that we have been putting off for a long time, looking for a spot. Most everyone knows of the So Long, as published by Air Trails and kitted by Aircraft, but darn few know that Bill Englehart had a class B version, simply an extended wing So Long. I list it as the Class B So Long.

VIKING REVIEW

Some time back we ran an article on the Viking Twin in the "Engine of the Month" section (August 1981). This prompted William E. Bain to write his recollections of the engine. Let's hear what Bill has to say.

"I purchased my Viking in 1946 from a Wichita Hobby Shop and ran it in several controline models. I say 'ran it' because that is what the Viking did best . . . run. It would start quite easily, but had very little power and suffered from low rpm.

"As I recall, I put the engine in my old Berkeley Buccaneer, which I had converted after years of fun with it as a free flight, wearing out a Bunch Mightly Midget in the course of action.

"To my disappointment, the Viking exhibited even less power than the Mighty Midget, as the Buccaneer would hardly lift off the ground except for my strong-arm whipping technique. Actually, once I had whipped it into the air, the model would make several circles, descending all the time from lack of power.

"I thought maybe I was overloading the engine, so installed it in a Testors Profile. Still same lack of power! But what the heck, I got my money's worth out of it, as the Viking was a nice looking twin in those days and the real fun was just to start up the engine and let it run for the benefit of the onlookers.

"As I remember, the hobby dealer only had one Viking that sat around a long time before I bought it. I don't think he ever bothered to restock, as he had seen my problems with flying. Incidentally, my Viking came without the fancy spinner and three-bladed plastic prop.

"I must have tried every size pitch and diameter propeller in an effort to get more power. I failed to obtain anything resembling something to fly the model (s) in a level course. I will admit the Viking was a beautiful engine to look at, to start, and run

"In 1950, I gave the Viking to an engine collector in Maine who simply couldn't live without it. Sure wish I had it now, after all the memories your article brought back!"

FOREIGN NEWS

ENGLAND

This columnist was up to Sacramento the other week to visit his long-time modeling friend, Charlie Werle (since

1934). While there, discovered a letter of praise for Werle's Reid Hull Kit from George Stephenson, 22 Princess Close, Brunton Park, Newcastle Upon Tyne 3, England.

George was quite enthusiastic about the model and offers the opinion this is the best performing rubber powered stick model he has ever flown. Anyone who has seen one of the Werlewind kits will agree with George's assessment. Not only does the kit come with all parts cut, but the propeller is completely hand carved. That kit is truly a love of labor!

Those interested in obtaining one of these excellent kits can do so by writing Charles Werle, 3620 Morse St., Apt. 8, Sacramento, CA 95821.

GERMANY

Gerhard Everwyn, 12A Dachstein Str., D-8000 Munich 82, West Germany, writes to say that the SAM movement in Deutschland is starting to catch on. He is also writing a column in the German modeling magazine, "Flug", with astonishing results. There are still a surprising amount of German gas power, rubber, and towline glider plans to be found. Between Gerhard and this columnist, we may be able to come up with still more German plans.

Everwyn goes on to say he has a goodly stock of Zaic Yearbooks, Air Trails, and Model Builder to help spread the word on old timers and to provide Xerox copies of the articles. Great stuff!

AUSTRALIA

This columnist has been corresponding rather heavily with Merv Buckmaster, Editor and Publisher of the Australian modeling magazine *Airborne*. In addition, he has also been writing to Max Starick, column writer for the O/T section called "For Old Timers Sake".

Old Timer activity has caught on so well in Australia to the extent the MAAA (Model Airplane Association of Australia) will be offering four events at the Nationals. This columnist is so enthused he is planning on attending the Nats at Horsham, Victoria, starting on 29 December and concluding 5 January. This should be real kicks. Hope to have a separate writeup on what is going on down under.

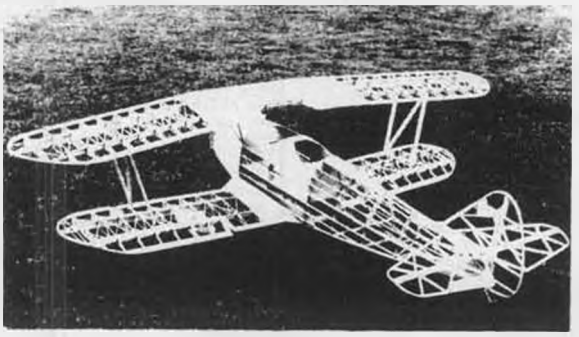
EFFINGER ECHOES

Hard on the heels of the photo featured in the December issued of Joe Raspante's "Snow White", Bill Effinger advises this columnist he is still putting out new plans all the time under the company name of W.E. Technical Services, Inc., located at 526 Lorell Terrace, Atlanta, Georgia 30328.

Bill goes on to say his plans have been updated to include patterns of the cut out parts (both balsa and plywood), plus shop drawings of the various parts. These will be known as "Plan 'N Pattern" sets.

Also scheduled in the near future are the following plans (called "20'S"): Waco SRE, Super Buccaneer, Mureaux Interceptor, Snow White, DH Puss Moth, and the 77 inch span Custom Cavalier. That should generate some interest.

Bill Effinger closes off by saying Berkeley Models simply ran out of money from lack of cash flow. When you get too many accounts receivable and can't collect, your accounts payable will catch up with you! One of these days, Bill will write a long story on Berkeley!



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OBIT NOTICE

Seems like we just featured an old photo of Joe Culver the other day, when a notice comes in from Joseph Skorski, 106 Henderson Lane, Oak Ridge, Tenn. 37830, informing this writer of Culver's death.

Skorski goes on to say that Joe Culver passed away on Nov. 9 at the age of 71. Culver was noted for his work at University of California in the atomic program, and later transferred to the Oak Ridge National Laboratory to work on nuclear reactors.

Joe gave up modeling in the mid-sixties when he collapsed during a contest. At that time, he and his family were into free flight gas, outdoor rubber, hand launched glider, and controline speed.

Of the old Oakland gang, Schumacker, Doyle, Culver, et al, the only one left is Charlie Pottol, to this writer's recollection. Truly a shame to see the old gang go!

THE WRAP-UP

Thanks to Newsletter Editor Harry Murphy, I have been receiving the monthly issues of the C.I.A. *Informer*. Murphy writes such an informative paper it is hard to put down. While I do not always agree with his viewpoint, I think his comments on the latest round of rules revisions for the Nostalgia Event bear repeating:

"This issue is pretty well water-logged with articles about rules, but it is that time of the year when we pause for a moment and reflect last summer's experiences and contemplate next year's activities, so rules analysis is justified and timely. Bob Larsh advises me that all four of the proposed Nostalgia Gas issues were voted in. I feel an urge to summarize the supposed effects:

1. That nice single page that contained some simple rules for some fun events has now spilled over on to an additional page.

2. Instead of a single approved engine cutoff date, the rules are now complicated with two categories of engine cutoffs with the 1962 cutoff being the most ineffectual unless someone spends a tremendous amount of research time in preparing an "approved engine" list that will require continuous updating.

3. You can no longer walk into a hobby shop and purchase an engine that will permit participation in Nostalgia classes A, B, or C. You either must have the engines or be prepared to pay exorbitant prices for someone's junk, as the collectors have gobbled up all the new-in-the-box specimens.

4. While the disqualification of the Cox TD. .049 would appear justified, the elimination of the larger Cox engines appears just as hypoocritical when comparing a Cox .15 to a Torpedo .19.

5. Weight rules contributed no value in the fifties, so why should they be expected to contribute anything to the events in 1982. Anyone who can keep a Ramrod 600, which is to be powered by a Torpedo 23, to weigh out at 23 ounces or under . . . all I can say, he deserves applause, not criticism.

6. Finally, it appears that a lot of ballots

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were marked and submitted with little forethought to their ultimate effect on the big picture. Nevertheless, the CIA turned the rule procedure over to those who participate so that all could have say in their formulation. The vote is valid, the rules are effective Jan. 1st, and I will comply."

To this columnist, this sounds just like the fix the SAM movement finds itself in. From the simple one-page rules written by this author, we have "graduated" into eight or ten pages of bewildering rules and counter rules. I don't know how we do it, but someone always manages to foul up the "FUN". Keep the faith, men!

Workbench.....*Continued from page 6*

ments by Dan Rutherford and a letter writer by the name of Ed Hopkins, in Dan's December '81 C/L column (mustn't be too much C/L activity to talk about), in which we . . . I (along with others) was taken to task for using the so-called editorial "we" in all of "our" column writing. As a long-time admirer of Howard McEntee's writings on radio control in the old *Air Trails*, as well as the years and years of writing by Bill Winter, "we" figured it was best to follow in their footsteps. Besides, as it says in the dictionary, "we" is used by editors and writers to avoid any appearance of egotism from repeated use of "I". There is nothing more boring to me than listening to a long string of "So I said this. . ." and "I says to him. . .", and also a continual flow of "I's" in written material. On the other hand, however, I. . . me. . . Bill Northrop, do agree that in certain applications "we" and "our" get a little ridiculous too. . . "We glued the cross piece in just ahead of bulkhead C". Nuts! I was in the garage all by myself and "I" glued the cross piece in!

Anyway . . . you get the drift. From here on I will use "we" when appropriate, and we will use "I" when appropriate . . . in my or our opinion.

NOT REALLY QUARTER

"Quarter Scale" is probably the most confusing misnomer in the history of model aircrafting (somehow can't drive myself to say "model aviation"). Large scale model aircraft have been around, though in less number than the past couple of years, for a long time. A Miniature Aircraft Taylorcraft flew in the '62 Nats R/C Scale competition, and my Gipsy Moth flew in the 1965 and 1966 Nats competition. In those days, however, they were merely called three-inch-to-the-foot scale models. Bill Bertrand's huge, but super-light Fokker D-VII flew at the Glenview (Chicago area) Nats in about '70, and my recollection is that it was larger than three-inch scale . . . but maybe not.

The model group in Las Vegas, headed by Eddie "Mad Man" Morgan, can probably be credited with originating the term "quarter-scale", and appropriately enough, when the real, big R/C model movement began, most of the scale subjects were lightplanes and/or classics from the pre-WW-II days that were the right size for quarter-scaling. However, since then, many modelers have sought further variety, often finding that three-inch scale was not practical, calling for models that would be too small (Pitts, Eagle, etc.), or too big (B-17, Hughes "Spruce Goose", etc.).

Can you imagine the poor outsider who hears about quarter-scale, and then sees a one-third scale Pitts and a one-twentieth scale Spruce Goose at a "Quarter-Scale" meet? We're not finding fault with the fine work and promotion which the QSAA has done for the hobby of large-scale model aircraft. Just wish they had come up with a more fitting name.

Col. Art Johnson (7-1/2 foot P-38 in June 1978 **MB** and 93-inch P-40 in June 1981 **MB**, a Nats winner) has some other thoughts on the subject.

"I sometimes think that the people several years ago who tried to make the term 1/4-scale equivalent to large scale models did the hobby more harm than good. Actually, there are very few man-made objects that vary as widely in size as do aircraft. Restricting the reproduction of these aircraft to 1/4-scale limits the choice of practical subjects to the relatively small light planes, homebuilts, and trainers. Efforts to tie Giant scale models to the arbitrary 1/4-scale criteria led some designers to attempt larger military aircraft in this scale with usually disastrous results, or the flight of a model at ridiculous speeds due to inadequate power.

"On the other hand, a 1/4-scale model of some aircraft, such as the small Pitts, produces a model smaller than those normally flown by scale enthusiasts. If a 1/4-scale diehard tries a B-29, he will wind up with a model larger than a full size WWII fighter. Practical?

"Fact is that the development of large models has been dependent on the same factors as for full scale aircraft. Namely, bigger, faster, and heavier means more power. Large models have been around as long as modeling, but large engines have not. Recent production of larger glow engines and conversion of industrial ignition engines for model use has expanded the variety of aircraft that can be modeled in larger sizes, but not when tied to any arbitrary scale. Maybe we should forget about the term one-quarter or any other fixed scale. It bears about as much relation to the actual size of a model as the term full scale does to the actual size of a real aircraft.

"If we still want to differentiate between large and small models, then weight seems to be the best criteria. We may be able to build large light models, but small heavy models are not around for long. The current AMA rulebook cutoff at 15 pounds for Giant Scale seems reasonable. However, even here, the rules allow for much lighter than 15-pound models to be called Giant Scale so long as they are built to 1/4 or more scale. Sound nutty? I think so too.

"So maybe we should just build our models to whatever fractional scale will fly right with the engine available. If it comes out over 15 pounds and has a practical wing loading, it may not be better, but it will be big."

"CECONITE R/C"

Old friend, Jerry Nelson, is back on the modeling scene. Jerry needs no introduction to the hobby industry and to radio control modelers. He is co-owner of Midwest Model Supply Co. hobby distributors and was sales manager for 10 years, former president of Circus Hobbies, innovator of Formula I pylon racing and Sport Biplane events, rules originator and contest director for five Tournament of Champions competitions, noted R/C aircraft designer and writer, has now established his own R/C model supply company in Reno, Nevada. Product line is directed towards the larger radio control model aircraft.

Working directly with Ceconite Incorporated, a pioneer in the full scale aircraft covering industry, a product line of Ceconite R/C has been created to provide modelers with a new type of covering material and associated supplies. The following items are now available.

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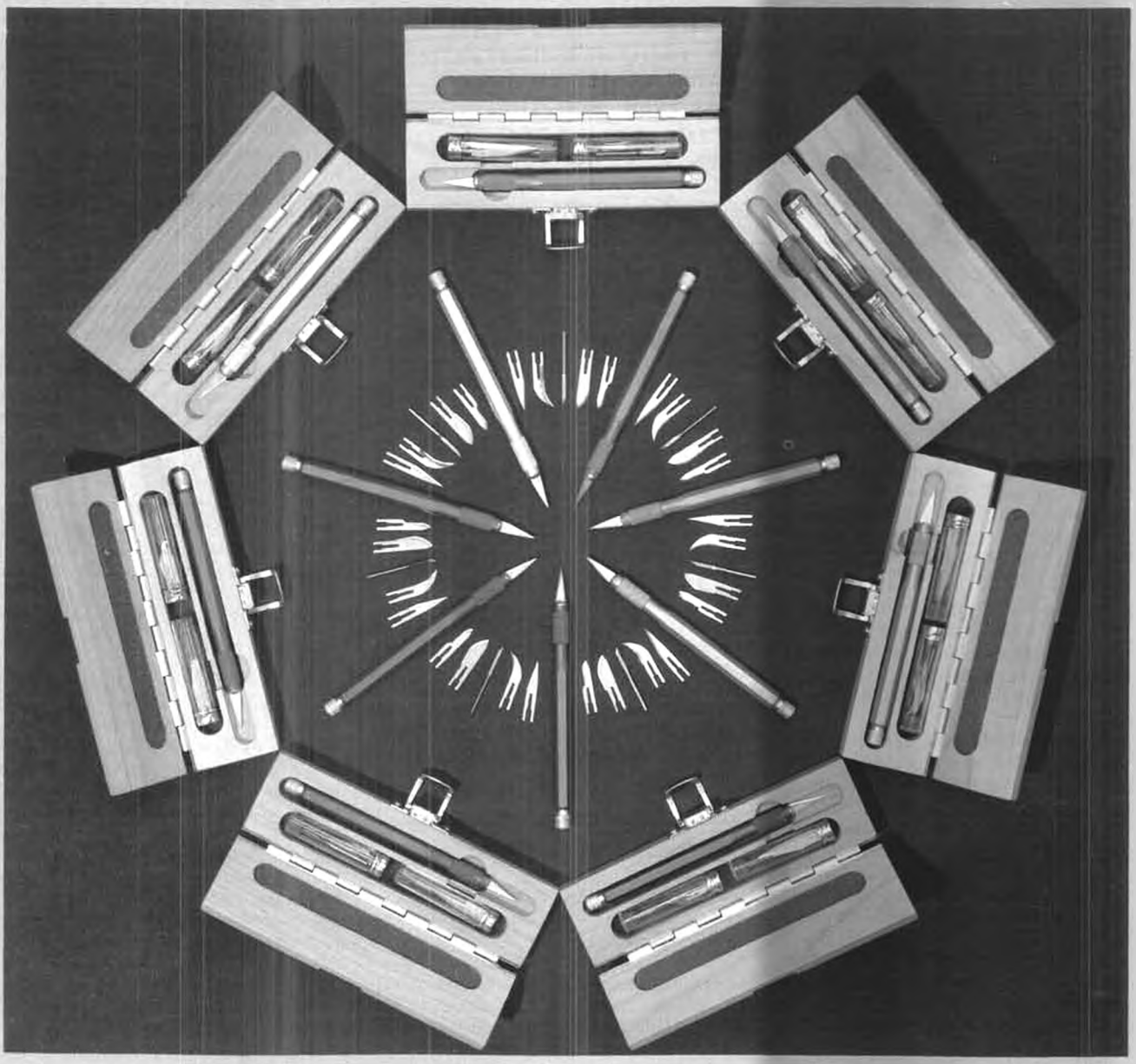

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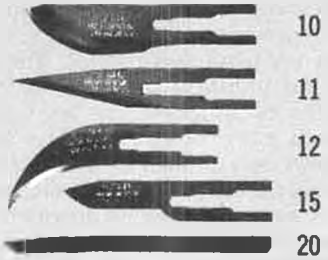

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Also soon to be available will be a selection of R/C plans by Jerry Nelson. First plan will be a 1/4-Scale Super Cub. Other plans by R/C designers from around the world will also be made available. Write to Ceconite R/C, 3510 San Mateo Ave., Reno, NV 89509; (702) 322-0664.

Jerry introduced his new product line at the IMS Pasadena Trade Show in January. The new covering material will be reviewed in a near future product test by Al Alman, on the Sig 1/4-scale Clipped Wing J-3 Cub.

CANNON GUIDED ROCKETS

Hey, you R/C model airplane nuts, do you know what's going on in R/C model rocketry lately? They're firing rocket-powered model aircraft (Radio Controlled Boost Gliders, in rocket lingo) into the air and staying up for as long as 3-1/2 hours. (Well . . . they just happened to fire them up at Torrey Pines, so the duration came about from slope soaring.) However, that was good enough for three new world records, all taken from former USSR records!

Chris Flanigan and John Langford set three new Boost Glide duration records, in Categories S1A (2.5 Newton Seconds power level), S4C (10 ns), and S4D (80 ns). Flanigan's S1A and S4C Boost Gliders stayed up for 2,180 seconds and 7,537 seconds respectively. Beating the Soviet Union records of 1,038 and 1,405. John Langford's S4D glider was up for 12,406 seconds (3-1/2 hours), beating the Russian record of 8,953. All boost gliders used Cannon Super Micro radio systems. Incidentally, the speed during the rocket boost, before the power pod is dropped, can reach up to 400 mph!

The 1980 American Space Model Team also used Cannon Super-Micro's in their FAI 40 newton-second Boost Gliders to win a Silver Medal in the World Championships at Lakehurst, New Jersey.

A typical 40 nt-sec. rocket powered boost glider, with two-channel gear aboard, weighs less than 240 grams. They climb to approximately 300 meters (over 900 feet) in six seconds (!) before dropping the rocket pod. The duration maximum is five minutes, which ships like this can easily attain in dead air.

THINGS TO DO

The Westerville (Ohio) Model Aeronautics Association is sponsoring its 12th Annual Radio Control Hobby Show on March 20, 1982, from 0900 to 1600. (Why can't we all use this simple and positive time-keeping system, instead of AM and PM? First we gotta convince the watchmakers. Hah! Lottsa luck!)

The WMAA show is located at 3850 Stelzer Rd., Columbus, Ohio. Site is less than two minutes from the Morse Road exit to the I-270 Columbus outer belt, contains 11,000 sq. ft. of display area, and parking for 1,200 cars. Contact Show Manager Rich Ritchison, 1834 E. Beaumont, Columbus, OH 43224, for more information. •

Twin Pusher...*Continued from page 39*

those who have been curious enough to give 'em a try, are usually staunch supporters of the concept.

Perhaps all that's needed to invite others to give the T.P. a try, is a set of full size plans, and thus our decision to present this one. A close look at the plans will probably suggest some immediate changes in structural design, but we'd suggest that you at least stick to the basic force set-up. And for equal performance, keep the weight as close to a 4-ounce maximum as possible.

Those "I" beams should present an interesting challenge . . . a good exercise in precision table-saw work, or glue them up from three strips. The criss-crossed bamboo braces add lots of rigidity to help the beams carry 10 strands each of rubber. The article suggests only an inch or two of slack, as this will stretch to four to six inches, and any more than that hangs down from the "cans" and kills the glide. Leading edge of the wing should be 14 inches from the thrust bearings . . . no balance point is suggested.

Give it a try, and let us know if doubling your props "doubles your pleasure." •

R/C World .....*Continued from page 12*

★ ★ ★

While you, the dedicated hobbyist in the midwest and nor'east, are building furiously for the coming flying season, and we, here in Southern California, are able to fly 13 months out of the year (that wasn't nice, was it), we thought that another 'quiz' would be in order for a one-year subscription to **MB.**

This aerobatic maneuver is not too well known. First performed in 1951, and considered impossible by many experts, especially so considering the aircraft involved, and at the altitude the pilot in question performed said trick, this would explain its lack of fame. At the time, it was considered to be the first completely new and original aerobatic maneuver in 20 years! I have tried it with pattern birds (have you ever tried to explain to someone not familiar with model aviation, what is meant by a *pattern* bird, or, that you fly *pattern*?), aerobatic bipes, and various assorted R/C birds, and got close, once. A big heavy bird (inertia!), or a tw-- will be the answer, or lots of rudder . . . The maneuver was named after the man. . . Enough clues, now. . . OK, the man's name AND the name of the maneuver, to my attention, c/o **MB** . . . and I have a few more 'gems' ready for the troops, W.C.N. allowing. . .

Scale model boaters, take notice. We have included a picture of the "Bluenose" fishing schooner. The model utilizes plank-on-frame construction, white pine planks with glass cloth and resin for strength. Overall length is 83 inches and the beam is 12 inches. Weight with ballast is 40 pounds and two-channel radio handles it all; head sails being preset, with a sail winch handling the main and foresail. Designed by Douglass Henderson of Moscow, Idaho, we hopefully will be presenting a construction article in the future.

★ ★ ★

R/C off road racing is hitting the country and Southern California by storm. RCH Hobby Marketing sponsored (co-sponsored by MRC) and hosted the Western Championships recently and drew a tremendous group of drivers and spectators alike. One hundred twenty entrants participated in 46 races over the two-day weekend. A specially prepared track was set up to really give the drivers and their off-road bombs a real workout. When 'fine tuning' gets down to the proper weight oil in your shocks, that says a bunch for 'what's happening.' As has been mentioned in the past, RCH and its track is just several doors down the street from **MB**, and any evening finds a large group running and tuning cars. In this area, electric power equates to co-existance. Fire up a fuel powered car and lose a racing site. The quiet revolution is here. . . •

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213 345-7300 Lou Peralta

R C H Raceway
653 West 19th Street
Costa Mesa, CA 92627
714-631-1555
Larry Van Osten

Skate City, Great Western Hobby Raceway
14330 E. Telegraph Road
Whittier, CA 90601
213-946-1402 Bob Teeple

The Pit Shop
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714-623-1506 Joe Lynch

Bishop Enterprises
Vegas R/C Raceway
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