



IMPROVED 1/3 Scale **Pitts Special**

Now available in both *basic and complete kit form! *\$130.90

Wing Span - 68" Wing Area - 1400 sq. in .ength 62" adra engine or .60 Byro-

eight: ready to-fly, less fuel, * Under 15 lbs. with Econokote finish. * Under 17 lbs. with Epoxy/Fiberglass

At Byron Originals, product improvement plays an important role in each and every phase of the manufacturing process. Our improved Pitts Special is a prime example of this total commitment to quality, performance and value. We're confident you will appreciate both the improvements and additions to this proven and well-known kit.

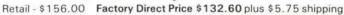
- Improved and re-located cabanes offer better aerobatic performance plus more precise scale outline.
- Standard (deluxe) kit now includes semiscale cockpit insert.
- New molded mounting cavities and wood inserts for stab and fin braces have been added.
- 4. New tail wheel design offers improved ground handling characteristics.
- 5. Scale, counter-balanced aileron linkage, including all necessary hardware, is now included in the standard (deluxe) kit.
- 6. New and improved I-strut design makes wing assembly & disassembly a quick and easy operation.

STANDARD (DELUXE) KIT

Retail \$292.80 Factory \$248.88 plus \$12.50 shipping

(Includes al	items in basic kit and completion package)	
--------------	--	--

	Deluxe decal kit (Charlie Hillard)	Qty. 1	Optional Pitts Completion	Kit	Screw #2-56x % " Ig. Short control horn	
		set		1423	Blind nut #8-32	
		set	Alum, I-strut insert	4	Nylon aileron connectors	
		1 pr.	Axle, tail wheel, 3/32" dia. wire	1	Screw hook	
	16 oz. fuel tank (suitable for glow fu	Jel	Tail wheel, 1 ½ " dia.	1	Screw #2-56x7/8" lg.	
	or gas)	1	Washer, 3/8" dia. flat	1	Washer 3/8" dia. flat	
	8 oz. fiberglass tape (firewall		Retainer	1	Locknut #2-56	
	reinforcement)	1	Leaf spring, Nos. 1, 2, 3 & 4	1	Aluminum strip 3/8"x6"	
	Foam rubber for tank & radio		Nut #6-32	2	Hinges, nylon	3
e	installation	1	Screw, #6-32x1 1/2" lg.	2		
	Wheels, 41/2"	2	Dowel, 3/8"x2" lg.	2	Die-cut Wood Parts	Qt
	Spruce wing spars	8	Clevis, nylon	2	1/8" plywood cowl inserts	
4	Firewall wedge	1	Female ball link, nylon	4	1/8" spar splice	
2	Torque tube cavity covers (balsa)	2	Screw #4-40x1 %" lg.	4	1/8" plywood wing inserts	- 1
12	Hardwood tailwheel mounting dow	ale 2	Clevis, steel	6	1/8" plywood servo mounting tray	s S
"lg. 4	Maple wing mounting blocks	2	Solder clevis	4	1/8" plywood fuel tank mounts	
la. 1	Balsa sheet (%x4x36)	1	Male ball link, steel	4	1/8" plywood landing gear mounts	es ()
lg. 1 1 lg. 1	ABS cockpit insert	1	Link, brass	4	1/8" plywood aileron control	
2	Awi	1	Rod, 1/16''x4''	6	horn insert	
2	½ ''x13½'' alum, streamline tube	2	End cap, nylon	4	1/8" plywood firewall (5-ply)	
1	Kwik-link wire, 30"	5	Strut tape, 1/8"x3/8"x28" lg.	1	1/8" balsa aileron end caps	1
nopy 1	Aluminum push rods, 28''	2	Screw nylon, ¼ 20x2'' lg.	2	1/8" balsa belly pan cover	
nt 1	Upper stab brace, ¼" alum,	4	Screw, #2x %"/lg.	15	1/16" plywood inspection plate	
r 1	13%" lg.	2	Wing bolt, nylon	6	1/16" plywood rudder control	
glass 1	Lower stab brace, ¼" alum,	4	Guard, aluminum	1	horn insert	
active of the	Lower stab brace, A alum,		Vinyl disc	1	1/16" plywood belly pan insert	
1 set	24 ½ ″ lg.		8-32x2" bolt	4	1/16" plywood cabane assembly j	10
manual 1	Tail wheel spring	2	Alum, threaded insert	7	1/32" plywood cabane mounts	'y
manual 1	Steering arm	1	Speeds nuts	6	1/32'' plywood stab inserts	-
	Set screw					-1
	Wheel collar	1.	Elevator control horn, 5/32" steel	2	1/32" plywood aileron linkage	
	Alum. Torque tubes (drilled and		Control horn	3	covers	
	tapped)	2	Screw #2-56x1" lg.	-4	1/64" inter-plane strut exterior	



Byron Originals, P.O. Box 279, Ida Grove, Iowa, 51445, 712-364-3165

Basic Pitts Kit

Basic kit components	Qty.
Fuselage, right half	1
Fuselage, left half	1
Upper wing	1
Lower wing	1
Stabilizer	1
Vertical tail	1
Elevator, (L&R half)	2
Rudder	1
Belly pan, fuselage	1
Belly pan, landing gear	1
Aluminum landing gear	1
Aluminum spreader bar	1
Screw. #8-32x3%" lg.	1
Compression spring	1
Axle, 5/16-24 thread	2

Basi Fuse

Suggested Retail \$154.00 Factory Direct Price \$130.90 plus \$12.50 shipping

omponents	Qty.	Starwasher
ight half	1	Half nut 5/
eft half	1	Washer, ny
9	1	Screw #8-3
q	1	Screw #6-3
	1	Screw #6-3
ł	1	Locknut #6
&R half)	2	Triangular
	1	Locknut #8
fuselage	1	2-piece but
anding gear	1	Nylon caba
landing gear	1	Nylon caba
spreader bar	1	Engine cow
-32x3%" lg.	1	Templates
on spring	1	wood par
-24 thread	2	Owner Ass

Starwasher	4
Half nut 5/16-24	2
Washer, nylon	12
Screw #8-32x1 1/2 " lg.	4
Screw #6-32x2" lg.	1
Screw #6-32x1 ½ " lg.	1
Locknut #6-32	2
Triangular nut	2
Locknut #8-32	1
2-piece bubble canopy	1
Nylon cabane, front	1
Nylon cabane, rear	1
Engine cowl, fiberglass	1
Templates all	
wood parts 1	set
Owner Assembly manual	1

01	- ALC	Short control horn	
	1.1	Blind nut #8-32	
	4	Nylon aileron connectors	
	- 32	Screw hook	
	1	Screw #2-56x7/8" lg.	
	1	Washer 3/8" dia. flat	
	1	Locknut #2-56	
	1	Aluminum strip 3/8"x6"	
	2	Hinges, nylon	
	22	act in the second s	
	2	Die-cut Wood Parts (1
	2	1/8" plywood cowl inserts	
	4	1/8" spar splice	
	4	1/8" plywood wing inserts	
	6	1/8" plywood servo mounting travs	
	4	1/8" plywood fuel tank mounts	
	4	1/8" plywood landing gear mounts	
	4	1/8" plywood aileron control	
	6	horn insert	
	4	1/8" plywood firewall (5-ply)	
		1/8" balsa aileron end caps	
	2	1/8" balsa belly pan cover	
	15	1/16" plywood inspection plate	

-56x ¾ " lg.

32 Qty.

10

16

12 14

24



John Drobshoff goes WAY back. His contributions to our hobby are many as witnessed by his life membership in "THE GAS MODEL PIO-NEERS" presented to him by *Model Airplane News* in 1939. John has been responsible for countless revolutionary design developments including his famous "Challenger" shown here in the ½ A Texico R/C version, built with Hot Stuff of course!

Dear Bob & Bill:

"Who says you can't teach an old modeler new tricks? In my fifty years of model building and flying, **"HOT STUFF"** is absolutely the best adhesive I have ever used. I can now build models more easily, much stronger and in one-fourth of my usual time!

John Drobshoff SAN FRANCISCO, CA

Dear Mr. Hunter:

"I enjoy using "HOT STUFF" because it's easy to use and holds tight. I use "HOT STUFF" on all my airplanes so I can get them done fast!"

Melind

Melinda "Minnow" Anderson AGE 11 HAUGHTON, LA

Melinda is just what modeling needs, young modelers! She is one of the "Flying Andersons" all of which are avid modelers. They don't, however, spend all their time in the building room. You guessed it, every model is built with "HOT STUFF!"



"HOT STUFF" & SUPER 'T'

YOU JUST CAN'T BEAT THEM FOR SPEED, STRENGTH, LIGHTNESS, QUALITY OR PRICE! LOOK FOR THE "HOT STUFF" DISPLAY AT YOUR FAVORITE HOBBY SHOP AND PICK UP YOUR FREE TIP BOOKLET

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OCTOBER

1981



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volume 11, number 117

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Cover: Karen Kitson makes it very difficult to concentrate on her father Bob's Heath LNB-4 Parasol quarter-scale R/C ship. But what the heck... there are lots of nice photos of the model, alone, with the construction article, beginning on page 17. Bob shot this 35mm transparency at their home in Lighthouse Point, Florida.

The inset photo is of Art Bauer's half-inch scale PT boat, really cutting the water at the full-speed urging of a battery-driven Astro 25 motor. Is that you, McHale? See page 31 for construction article on this 39-inch, fiberglass-hulled model.

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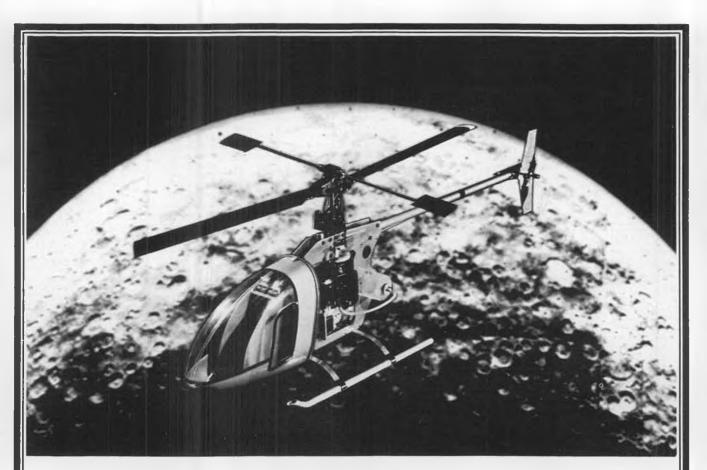
MODEL BUILDER (ISSN 0194 7079) is published monthly by RCMB INC . 621 West Nineteenth Street, Costa Mesa, California 92627. Phone (714) 645-8830.

Subscriptions \$25.00 per year, \$47.00 for two years. Single copies \$2.50. Add \$3.50 per year for postage outside the U.S. (except APO and FPO).

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WE PUT THE THRILL BACK INTO R/C*

... 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 kitl 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

ANTIS

Still \$169 Price subject to change without notice.

IXED PITCH

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

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OCTOBER 1981

3

ESIGE ESIGE THE LARGEST SELECTION OF AAA AIRCRAFT BALSA AVAILABLE ANYWHERE

28

31

37

43

54

68

76

SHEETS - 18" Lengths

B 173 1/32 × 2

B 174 1/16 x 2

B 175 3/32 x 2

B-176 1/8 x 2

B 178 1/4 x 2

B 179 3/8 x 2

8 152 1/16 1 4

8 153 3/32 x 4

B 154 1/8 x 4

8155 3/16 x 4

B 156 1/4 x 4

B 157 3/8 x 4

8 158 1/16 x 6

B 159 3/32 × 6

8 160 1/8 = 6

B 161 3/16 x 6

8-162 1/4 x 6

B 163 3/8 = 6

B 177 3/16 = 2

		Ī
3	STICKS - 36 Lengths	
B-001		
B-002	1/16 = 1/8 12	
B-003	1/16 # 3/16 15	
B 004	1/16 + 1/4 20	
B-005	1/16 1 3/8 24	
B 006	1/16 = 1/2 27	
B 007	1/16 x 3/4	
8 008	1/16 x 1	
8-009	3/32 x 3/32 13	
B 010	3/32 x 1/814	
8 011	3/32 = 3/1616	
8-012	3/32 = 1/4 20	
B-013	3/32 = 3/8 26	
8014	3/32 x 1/2 32	
8-015	3/32 = 3/4 43	
8-016	3/32 = 1	
8 017	1/8 x 1/8 14	
8018	1/8 # 3/16 20	
B-019	1/8 = 1/4 24	
B 020	1/8 × 5/16 27	
8 021	1/8 x 3/8	
B-022	1/8 x 1/2 35	
B-023	1/8 x 3/4	
B 024	1/8 x 1	
B-025	3/16 x 3/16 24	
B-026	3/16 ± 1/4	
B-027	3/16 = 3/8	
B 028	3/16 x 1/2	
B-029	3/16 x 3/4 53	
8-0-30	3/16 x 1 65	
8-031	1/4 x 1/4	
8-032	1/4 x 3/8 41	
8-033	1/4 x 1/2 48	
8-034	1/4 x 3/4 68	
8-035	144 x 1	
B-036	5/16 x 5/16 44	
B-037	5/16 = 3/8 55	
8 038	5/16 × 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 1 103	
B-045	1/2 x 1/2 82	
8 046	1/2 x 3/4 1 10	
B-047	1/2 × 1	
8-048	5/8 × 5/8	
8 0 4 9	5/8 x 1 142	
8-050	3/4 = 3/4 1.33	
8-051	3/4 x 1 1.57	
TRIA	NGULAR CUT BALSA 36	

1/2	82		
3/4	1 10	8	ULK B
1	1.36	ħ	lot Sta
5/8	96	B 508	1/32
	1 42	B-509	1/16
34	1 33	8 510	3/32
1	1.57	8-511	1/8
		8-512	3/16
R CUT BA	LSA 36	B-513	1/4 1
	43	8-514	3/8 1
3/8	52		
1/2	66		00
3/4	83	1	PACK
	1 10	8 534	Pack
-			

	HUKS 46 Languns	
	1/8 x 1/8 20	
	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	
8 066	3/16 = 3/4 70	
8-067	1/4 x 1/4 46	
8-068	1/4 # 1/2 62	
B-069	1/4 x 3/4	
B-070	5/16 x 5/16 57	
8-071	3/8 3/8 77	
8-072	3/8 x 1/2 92	
8.073	3/8 x 3/4 1 09	
8-074	1/2 = 1/2 1 06	
B-075	1/2 x 3/41 43	
	48" AAA SHEETS	
8 368		
B-389	1/32 ± 3 1 08 1/16 ± 3 1 21	
6 390		
B-392	1/8 x 3 164 3/16 x 3 202	
0.392	1/4 x 3 2 33	
	3/8 1 3 307	
8 395		
6 396	1/16 x 4 1.76 3/32 x 4 2.00	
	1/8 1 4 2 26	
8 398	3/16 1 4 2 84	
	1/4 x 4 3 30	
8 400		
	1/16 2 6 3 14	
8-402	3/32 × 6 3 58	
	1/8 x 6 3 96	
	3/16 # 6 4 57	
B-405	1/4 x 6 516	
8 406	3/8 x 6 655	
Dang	3/0 1 0	
	MODEL BUILDER'S	
	ASSORTMENT	
8-600	Balsa Wood Assort 10.20	
LAPP	ED EDGE BALSA SHEETS	
8-610	1/16 x 3-1/4 x 36 1 06 3/32 x 3 1/4 x 36 1 25	

STICKS - 48" Lengths

E 6 4 57	8-141
x 6	8-142
z 6 6 55	B 143
CL 0100 050 %	B 144
EL BUILDER'S	B 145
a Wood Assort 10-20	B-146
a wood w22011 10-20	B 147
DGE BALSA SHEETS	8 148
1 3-1/4 1 36 1 06	8 149
1 3 1/4 1 36 1 25	8-150
1 3 1/4 1 30 1 23	B 151

2 15

N	ot Stamped or Sorted						
B 508	1/32 # 3	.6					
8-509	1/16 # 3	6					
8 510	3/32 1 3	8					
8 511	1/8 x 3	.9					
8-512	3/16 x 3	1.13					
B-513	1/4 x 3	1.3					
8-514	3/8 x 3	1 7					
	ODDS & ENDS						

AGE OF BALSA ARRS



SPEND LESS TIME IN THE WORKSHOP-MORE ON THE FLYING FIELD

B 416 1/4 x

B-417 3/8 J

8418 1/2 -

B-419 3/4 x

B-420 1 x 1



B-627 3/32" x 12" x 36". ... \$5.30 BACK BY POPULAR DEMAND. PRECISION MADE BY A

NEW METHOD OF SAWING AND SANDING THAT HELPS INSURE EVEN THICKNESS THROUGHOUT THE SHEET

10.11.1.2		
B-180		
B 181	1/20 ± 3	8
B 182	1/16 x 3 45	Ð-
B 183		8
B-164	1/8 х 3 62	8
B 185	5/32 # 3 67	8
8 186		8
8 187	1/4 = 3 88	8
8188	5/16 x 3 1.05	B
8 189		B
B 190	1/32 x 4 59	Ð
8-191	1/16 x 4 70	B
8-192	3/32 x 4	8
B-193		8
8 194	3/16 # 4 L 07	8
8 195		8
8-196	3/8 ± 4	8
		B
5	HEETS 36 Lengths	В
B-134		В
B 135		8-
B-136	3/32 # 2 74	8
8 137		В
8-138		B
B 139	· · · · · · · · · · · · · · · · · · ·	8
8 140	3/8 x 2 1.50	
8-141	1/32 x 3	-
8-142	1/20 x 3	8
8 143		8
B 144	3/32 x 3 106	8
B 145	1/8 x 3 1.25	B
B-146	5/32 x 3 1.35	B
B 147		B
8 148		B
8 149	5/16 = 3 2.08	8
8-150		8
B-151	1/32 ± 4 1.19	8

1.42

1.52

1 75

215

2.66

3 29

2 42

2 70

3.02

3.42

3 90

5.00

-	and a start of the	
B-251	1 + 1	
8 252	1.1.2	29
8 253	2 x 2	39
B 254	1 x 3	39
B 255	2 # 3	53
B 256	3 = 3	83
E	BLOCKS 6 Lengths	
8 266	1 x 1	30
B-267	1/2 x 2	40
8 268	3/4 x 2	46
8-269	1 x 2	55
8-270	1-1/2 1 2	66
8 271	2 x 2	76
8 272	1/2 x 3	50
B 273		61
B-274	1 x 3	76
B-275	1-1/2 x 3	.91
B-276	2 x 3	05
B-277	3 x 3	65
B-278	1/2 = 4	76
8 279	3/4 ± 4	85
8-280	1 + 4	94
8-281	1-1/2 = 4	
B 282		45
B 283	3 1 4 2	
B 284	1/2 = 6	
8-285	3/4 x 6	
8 286	1 1 6	
B 287	1 1/2 x 6	2 07
8 288	2 = 6	
8 289	3 = 6	
8	LOCKS - 12" Lengths	
B 299	1 x 1	57
8 300	1/2 = 2	
8 301	344 x 2	90
B 302	1 = 2	1.10
B 303		1 32
8 304	2 = 2	1 51
B 305		97
8-306		1 20
8-307		1 51
8 308		1 81
8-309		2 18
B 310		3.30
8-311		
B-312	1/2 1 4	1.51
8-313	1/2 = 4 3/4 = 4	1.51
	3/4 x 4	1 69
8 314	3/4 x 4	1 69 1 87
8 314 B 315	3/4 x 4 1 x 4 1 1/2 x 4	1 69 1 87 2 39
	3/4 x 4 1 x 4 1 1/2 x 4 2 x 4	1 69 1 87 2 39 2 90
B 315 B 316	3/4 x 4 1 x 4 1 1/2 x 4 2 x 4 3 x 4	1 69 1 87 2 39 2 90 4 59
B-315	3/4 x 4 1 x 4 1 1/2 x 4 2 x 4 3 x 4 1/2 x 6	1 69 1 87 2 39 2 90 4 59 2 11
B 315 B 316 B-317 B-318	3/4 x 4 1 x 4 1 1/2 x 4 2 x 4 3 x 4 1/2 x 6 3/4 x 6 2	1 69 1 87 2 39 2 90 4 59 2 11 2 55
B 315 B 316 B-317	3/4 x 4 1 x 4 1 1/2 x 4 2 x 4 3 x 4 1/2 x 6 3/4 x 6 2 x 1 1 x 6 2 x 1 1 x 6 2 x 1 2 x 4 2 x 6 2 x 4 2 x 6 2 x 4 2 x 6 2 x 7 2 x 6 2 x 7 2 x 7	1 69 1 87 2 39 2 90 4 59 2 11 2 55 2 99
B 315 B 316 B 317 B 318 B 319	3/4 x 4 1 x 4 1 1/2 x 4 2 x 4 3 x 4 1/2 x 6 3/4 x 6 1 x 7 1 x 7	1 69 1 87 2 39 2 90 4 59 2 11 2 55 2 99 1 13
B 315 B 316 B 317 B 318 B 319 B 320	3/4 x 4 1 x 4 1 1/2 x 4 2 x 4 3 x 4 1/2 x 6 3/4 x 6 1 x 6 1 1/2 x 6 2 x 7 2 x 7 2 x 7 2 x 7 2 x 7 2	1 69 1 87 2 39 2 90 4 59 2 11 2 55 2 99

New

BLOCKS 3" Lengths

8-333	1	R	1		85
8-334	1	2	2		E 65
B-335	2	1	2		2.25
8 336					
B 337					
B-338					
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TAF B-097 B-098 B-099	14 3/1 1/4 5/1	E 3	6' 3 3	Lengths 1/2 3/4 1 x 1.1/4	41 53 67 81
TAF B-097 B-098 B-099	14 3/1 1/4 5/1	E 3	6' 3 3	Lengths 1/2 3/4 1	41 53 67 81

BLOCKS 18 Lengths

B-228 2 x 6 13 70 B 229 3 1 6 19.25 36" C-GRAIN AAA 8-12 LBS B-470 1/32 x 2 62 8 471 1/16 x 2 66 8-472 3/32 × 2 .79 8473 1/8 1 2 89 8-474 3/16 x 2 1 12 8-475 1/4 1 2 1 44 8476 3/8 1 2 1.55 8-477 1/32 # 3 89 B 478 1/16 x 3 97 8.479 3/32 # 3 1.11 B 480 1/8 x 3 1.31 8 481 3/16 x 3 1.57 8-482 1/4 1 3 1 80 8 483 3/8 # 3 2.38 VH VERY HARD 8-493 1/16 x 3 97 8 494 3/32 + 1 1.11 8-495 1/8 x 3 1.31 8-496 3/16 x 3 1.57 B-497 1/4 x 3 1.80 8498 3/8 ± 3 2.39 CONTEST BALSA - 36" Very Light 4 6 Lb Stock 8 454 1/32 = 3 92 8455 1/16 x 3 1 00

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8-457 1/8 + 3

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PLANKS - 36" Lengths

1.69

2 25

2.65

3.30

3 95

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2 90

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4 50

5.45

6 55

9.90

4.50

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5 60

7 15

8.70

13 75

6 30

7 65

8.95

12 40

8-206 1 x 1

B-207 1/2 x 2

8-208 3/4 x 2

8 210 1 1/2 x 2

8-209 1 4 2

B211 2 4 2

B212 1/2 x 3

B-213 3/4 x 3

8 215 1-1/2 + 3

2 = 3

8-214 1 + 3

B 217 3 1 3

8.218 1/2 × 4

B-219 3/4 x 4

8-220 1 x 4

B-222 2 = 4

B-224 1/2 = 6

B-225 3/4 = 6

8-226 1 = 6

B 227 1-1/2 1 6

B 221 1-1/2 1 4

8-216

B 223 3 8 4

BAGS OF BALSA B 524 Bags of Balsa 3 10

SIG AIRCRAFT LOCK NUTS

THESE PLATED STEEL AIRCRAFT LOCK NUTS COME WITH A SPECIAL NYLON INSERT TO HELP PREVENT LOOSENING FROM VIBRATION. AVAILABLE IN SIZES TO MEET EVERY MODELING NEED. 8 in Package

SH-651 4-40-69¢

SH-652 6-32 - 69¢

SH-653 8-32 - 696

1.14

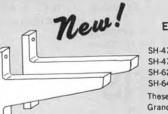
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NOW OFFERS ALUMINUM MOUNTS IN 4 SIZES SIG



	EXT		NE MO	UNTS	(Per P	air)
			А	в	с	
	SH-477	SMALL For 0925 Eng.	1.34"	2-1/4"	5/32"	\$1.59
1	SH-478	MEDIUM For .1960 Eng.	2"	3''	3/16"	\$1.99
	SH-626	LARGE For .60 .91 Eng.	2''	3-1/8"	5/16"	\$2.25
	SH-644	EXTRA LARGE For .80 - 1.25 Eng.	2.1/2"	4''	3/8"	\$3.99
	Grandua	gged, low-vibration mounts are extru- ted sizes to cover a large range of mu- te them easy to fit into tight quarters	odel engi			

New Extra Large Size!

See your dealer first! To order direct, add \$1 postage under \$10, postage free over \$10. No C.O.D. PLACE YOUR ORDER NOW FOR SIG'S LATEST COMPLETE CATALOG - NO. 43 - \$2 POSTPAID SIG MANUFACTURING CO., Inc. . . . Montezuma, Ia. 50171



HE TEAM NATS CAR. WHAT IT TAKES TO WIN. AND WHAT IT TAKES TO DIAL IT IN.

Take a look at Associated's new Team Nats Car, virtually a carbon copy of Kent Clausen's National Champion Modified car. The Team Nats

RC12E, in kit or assembled form, is loaded with the extras Kent used in his big win. Full-race equipment like a of Kent Clausen's 1980 National Champion RC12E The nylon parts of Kent's car have been liquid dyed black powerful Reedy Modified

motor, Sanyo NiCads and precision ball bearings are included. And because you've got to tune your

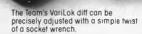
Team Nats Car to individually suit your driving style and every type of track, we've also included a full range of spur and pinion gears, our race-proven, adjustable VariLok differential

	ROAR No	tionals Expert Clo	ass 1:12 Scale E	lectrics
		Production	Stock	Modified
1978	4 cell	No event	MRP	RC12E
	6 cell	No event	RC12E	RC12E
1979	4 cell	No event	RC12E	No event
19/9	6 cell	RC12E	RC12E	RC12E
1980	6 cell	MRP	RC12E	RC12E

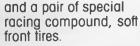
enjoy on the track. Choose the right

ratio for battery life and top end, with our special, lowfriction gears. Select the right tire for quick response without spinouts.

Then dial in the diff to get every last bit of traction.



If you are a serious racer, check out our Team Nats Car at your Associated Dealer. It's everything you need to put together a winning performance.



There is even a stock motor for use in Production and Stock Class racing.

These options the Team puts into the Nats Car become options you



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



from Bill Northrop's workbench

PERUSING THE FOREIGN MAGS

One of the nice things about being in the model magazine publishing business is exchanging issues with similar magazines from all parts of the world. At the present time, in exchange for monthly copies of **Model Builder**, we receive monthly model publications from Japan, Australia, England, France, Italy, Germany, Spain, Holland, Sweden, Finland, Czechoslovakia, and Poland.

Although we can't read a lot of them, there are many expressions that pass through the language barrier, and as is often said, a photo is worth a thousand words. It's surprising, also, how many times an English word will pop up out of the confusion, sometimes obviously words that simply have no other translation, such as "Hot Stuff". Of course, you better learn the metric system if you want to know the size of anything.

Point of this is that it suddenly occurred to us that a lot of what we see and mentally note could be of interest to our readers, if they had the opportunity to peruse these publications. Best we can do, other than invite you to our library anytime, is to tell you about some of the interesting items that appear. F'rinstance: In the March '81 issue of Holland's HB Model & Techniek (in English, under "HB" it says Hobby Bulletin) there is a photo of a huge Lockheed "Hercules". Span is 6000mm (about 19-1/2 feet), weight is 43kg (around 95 pounds), and it is powered by four Moki 25cc engines (1.5 cubic inch each). In one photo, three people are unloading the fuselage from a covered trailer. We would estimate the fuselage diameter to be about 30 inches! It is 16-1/4 feet long.

Anyway, we'll make it a point to keep our note pad handy as future overseas mags come across our desk, and try to let you in on the fun.

Bee floats. July 5, 1981. Photo by Jerry Lafavor.

JOHNSON ENGINE PRESERVATION SOCIETY (JEPS)

A note from Peter Feldman, Box 591, Times Square Station, New York, NY 10036, informs us that the above organization has been established, with the intention of preserving and propagating the engines conceived and developed by the late Hi Johnson.

Any modeler wishing a preliminary newsletter on the Society and its aims, can send an SASE to Peter, at the above address.

We never had direct experience with any of Hi's engines, but we fitted one of his carburetors (the one that came with three needles, each with a different taper) to the Super Tigre 51 which pulled our "Foo Too" model to a world record altitude of 16,600 feet back in 1965, and to 19,300 feet three years later. We still have that engine and carb.

WELL WHADYA KNOW!

In the process of chasing down some information not long ago, we had John Elliot place a call to Ed Sweeney, who some of you may remember, was the owner and operator of American Modeler magazine a few years back. Imagine our surprise when Jerry Nelson answered the phone! Jerry, who recently left the employ of Circus Hobbies, has now joined with Ed in the manufacturing and sales of ultralight aircraft, powered hang gliders, if you will. Ed's company, Gemini International, 75 Banks St., #13, Sparks, NV 89431, produces the Hummingbird, a conventionally arranged V-tail design, powered by two lightweight engines. For more info, drop Jerry a note, or call (702) 331-3638.

Jerry has promised (and now he's publicly committed!) to prepare an article for us on this newest and rapidly expanding phase of man's continuing attempt to fly with a minimum of outside help. In a model magazine? Why not? The ultralights aren't that much bigger ... or heavier ... than some of our giant scale creations!

COMING SOON

Ah, how sweet it is! Ye editor/publisher eases his 7-year-old Powerhouse on to the water at Lake Elsinore. Radio is 1972 Pro Line, power is K&B 40, 11 x 4 prop, K&B 500, old style Gee

And speaking of giant scale creations, it never rains but it pours! Within the last few weeks (this is late July) we have been looking at preliminary plans for the following models that will appear as construction articles in coming issues of **Model Builder**: a stock version of the Great Lakes Trainer, Harold Krier's Great Lakes, and a Waco CTO Taperwing, all to quarter-scale, plus a Bucker Jungmeister in one-third scale. Yup, all biplanes! And did you know DeHavilland had a staggerwing bipe in World War 1? Stay tuned!

KRAFT GOES DIRECT

As you will read in detail in "Over the Counter" this month, Kraft Systems, Inc. has really taken the radio control systems sales bull by the horns and thrown it into a totally new position. Ray Forbes, Kraft's Marketing Manager, says the new program has been "initiated to stabilize the eratic, chaotic price situation that has evolved on Kraft products during the past several years."

Ray goes on to say that, "...the irresponsible business practices by discounters were destroying the hobby dealers' opportunity to make a reasonable profit on our R/C systems and accessories."

Ray's feelings about the radio control

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 specilied. 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

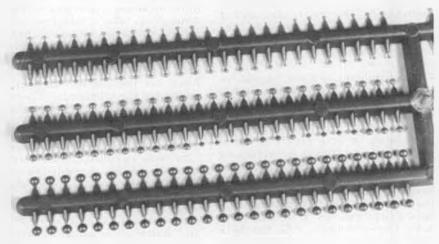
 MRC announces the ultimate in offroad racing with the introduction of the MRC Land Jump Four-Wheel Drive! Loose sand, soft snow, or large puddles will not stop this all-terrain vehicle; if one or two wheels should lose traction, the other wheels will take over and move you out. A chain drive, with adjustable tension, operating a torque clutch on the front sprocket, evens out the power to the front wheels. The trailing arm suspension system, fitted with oil filled shocks are featured, along with a disc brake and centrifugal clutch, as standard equipment. An Enya 19X or 21X is the recommended engine to power the Land Jump 4WD over the roughest terrain around. For further information see your dealer first, if he can't help, contact: Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817.

Kraft Systems Inc., of Vista, California, has instituted a new, Dealer-Direct Sales Program, according to Ray Forbes, Kraft's Marketing Manager. This new program provides a uniform discount to all qualified hobby retail outlets, and gives the dealer control over his own competitive situation. "Kraft strongly believes that a strong, loyal dealer network is the key to our future success, and to that of the entire hobby industry".

Fully stocked distribution warehouses on the East and West Coasts have been established with Gordon Boudewyn and



Fully operational R/C submarine USS Patrick Henry, from MRC.



Molded rivets from IM Products.

Bill Johnston as western and eastern regional sales managers. Sales representatives involved in both dealer and modeler contact, include Dave Johnson, Tom Smeltzer and John Massari, with further expansions being planned.

Kraft Systems Inc., a subsidiary of Carlisle Corp. (NYSE) for nearly 10 years, has been producing premier radio control systems and accessories for almost 20 years. Dealers should contact Ray Forbes of Kraft Systems Inc., 450 W. California Ave., Vista, CA 92083; or call (714) 724-7146 for more information.

Sig Mfg. Co. announces it has been able to hold the line on the price of fuel in 55-gallon drum lots. What with price increases in small containers and rising labor costs, drum purchase allows the



MRP's Vee Sport Electric for 2-channel R/C.



Top Flite has added "Circus Pink" Super MonoKote and Bright Aluminum EconoKote to its heat-shrink covering line.





local hobby dealer to compete with the cut-rate mail order fuel outfits. For "No better fuel at any price", the customer simply brings in his own container and saves! Modelers have reported to Sig that some of the cut-rate mail order fuel has very poor performance. Sig has made no shortcuts in ingredient quality. Available in 5, 10, and 15 percent nitro formulations, FAI mix is also offered. Dealers should contact: Sig Mfg. Co., Inc., Rt. 1, Box 1, Montezuma, IA 50171; or call (515) 623-5154.

Circus Hobbies, of Reno, Nevada, has available, for the scale hobbiest, instruments in several sizes. Item #IM 21001 contains 1/10 and 1/12 scale sizes while item #IM 21002 has 1/6 and 1/8 scale instruments. A large variety of instrument faces are included. For enhancing the surface detail of your scale model aircraft, ship, or armored vehicle, Circus Hobbies has come up with 'rivets' for that finished look. Each package contains a large quantity of rivets in three sizes Circus Hobbies, P.O. Box 5215, Reno, NV 89513, or one of the Circus Hobbies district managers.



MRC's Land Jump Four Wheel Drive for 19 or 21 engines.

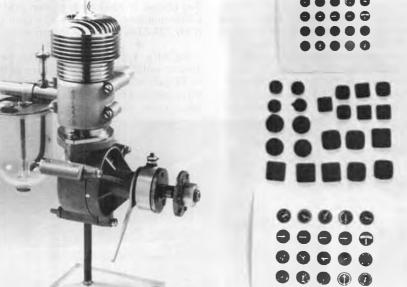
MRC has launched its first Radio Controlled Submarine, a 1/80th scale model of the USS Patrick Henry. In kit form, including a fiberglass hull strong enough to take a lot of abuse and protect your investment, it includes an instruction manual that will make assembly as much fun as running your new sub! Assembly time is estimated at 20 hours for the average modeler. Designed for the ultimate in realism, the sub has 2 ballast tanks for buoyancy control, each powered by a heavy-duty Mabuchi 540 S electric motor. Should the sub dive too deep, it will automatically 'blow' its ballast tanks and surface. A 4-channel radio is needed to control diving planes, forward speed, rudder, and ballast tank levels. Over 56 inches long, almost 6 inches wide, with a draft of 5.7 inches, the all up weight with radio and batteries is approximately 42 pounds. Surface speed is 2.5 mph, while it will attain 3.7 mph when running



Thrust offset/incidence wedges from Sterling Models.

submerged. The kit contains all necessary hardware and includes a highly polished, brass propeller. Suggested retail price is \$659.95. See your dealer for your 'USS Patrick Henry', or if he can't help, write to: Model Rectifier Corp., 2500 Woodbridge Ave., Edison, NJ 08817. ÷ +

Top Flite Models introduces several new items, the first of which is an expansion of its line of large diameter maple props. New 15 and 22-inch diameters as well as several varieties of pitch are included. They are suited to larger planes with reduction units or bigger engines. The 15-inch diameter props are available with 6, 8, 10, or 11-inch pitch; 16-inch diameter props with 8 or 10-inch



Ohlsson Gold Seal recreation engine from Herbs Model Motors

Scale instruments from IM Products.



Kraft Systems' Marketing Manager, Ray Forbes.



R/C harbor tug, "Karl", by Curacao Modelbouw.



Radial beam mount for Rossi 90, by Tatone Products.

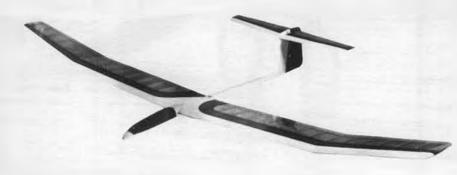


Lots of new maple prop sizes from Top Flite.

pitch; 20-inch diameter props in 11 and 12-inch pitch, and 22-inch diameter props in 8, 10, and 11-inch pitch. Produced from select, straight grain, rock hard maple, they combine accurate balancing, fuel proof finish, true aero-



"Hobby Swap News", cover-to-cover classified ads.



The "Challenger", two-meter R/C sailplane from Precision Model Products.

dynamic pitch, and a highly efficient airfoil for minimal tip flutter and maximum thrust.

New to Top Flite's extensive line of covering materials is 'Circus Pink' Super-MonoKote and Bright Aluminum Econo-Kote. Both materials are available in 26inch, 6-foot rolls, or economical 26-inch, 25-foot rolls. Aluminum EconoKote's low heat application makes it ideal for covering foam type model aircraft. These superior coverings eliminate the need for sealing, sanding, doping, and polishing your plane. For the latest catalog, prop chart, and a free sample of MonoKote and new FabriKote, send your request with \$1 to: Top Flite Models, Inc., 1901 N. Narragansett Ave., Chicago, IL 60639.

* *

Sterling Models wants to remind modelers of its very handy 'thrust wedges'. Made from pure, virgin nylon, and packaged 2 each of 1, 2, and 3degree wedges to the package, it's the perfect answer to fine tuning the thrust line of your engine for optimum flight of your model. They also serve to cushion and dampen engine vibration. They can also be utilized to adjust wing and stabilizer incidence. The three sets provide adjustments from 1 through 6 degrees. Sterling Models, Inc., 3620 "G" St., Philadelphia, PA 19134.

Herb Wahl, of Herbs Model Motors, the re-creator of Hurleman and Brown Jr. engines and parts, has announced a limited production run of the famous 'Ohlsson Gold Seal' engine of the 1930's. Orders for this superb engine, each one being hand-crafted and test run by Herb, will be closed December 31, 1981. Irwin Ohlsson has authorized this recreation and has provided advice and has approved any method variances necessary to produce this limited run of engines. The cylinder, as a matter of interest, is finished in 24K gold... For further information, send a large, stamped (36¢) envelope to: Herbs Model Motors, Box 61, Forksville, PA 18616.

In keeping with its program of providing timely items, Tatone Products announces the availability of its new radial beam mount for the Rossi 90. Cast in high grade aluminum alloy, heat treated, and machined to provide true alignment surfaces, all mounts are drilled and tapped with engine mounting screws provided. Rossi .90 engine mount, #Q-5 lists for \$19.95. Tatone Products, 1209 *Continued on page 96*



R/C Pilot Logbook, from Champion Hobbies.



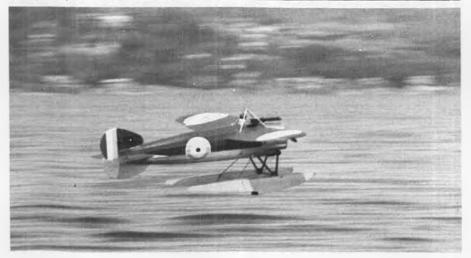
Jim Rau, Dave Henry, and Merle Meyer, gently lug big "Herk" to the deeper waters of Lake Elsinore on July 5, 1981. "No flex" wing is covered with 1/16 English aircraft ply over foam, three vertical spars . . . strong. Jerry Lafavor photo.



Text and Photos by JOHN ELLIOT

• In our August issue report of the Southwest Modelers Show in Dallas, we mentioned that Randy Getchell's prizewinning J-3 Cub was built from Sid Morgan's plans. Not so, t'was built from a Balsa USA kit. Apologies all around, gentlemen!

IS IT TRUE THAT ??? ⊘.'.Э⊪¬∿`\©≻⊣≟∎JL٦ħ⇒↔∂↗₭→><⊢∘Г∠∩∿©≃<⊨



Harry Apoian's 1/4-scale Bristol M1C with 'non-scale' floats, lifts off after short run. Muffled O.S. 90, 16/4 provide ample urge. Jerry Lafavor photo.

Our thanks to Pete Sepulveda for this new interpretation of the 'Aresti Key...

Last month, we flashed a couple of pictures of some unusual multiple cylinder engines, one a 6-cylinder radial made up of K&B .40 engines and the other, a 3-cylinder jewel made up mostly of Saito FA-30 parts, with a lot of 'homework' added. This month, another jewel has been unearthed. This one should really blow the minds of the Quarter Scale pure-at-heart types. We would like to quote from Precision Products Engineering the following: "A quarter-scale, five-cylinder radial engine manufactured under the name of 'Good Aero Engines,' and produced by Precision Products Engineering, 6430 Carolina Circle, Buena Park, CA 90620, will be on the market by early 1982.

"The brainchild of Elmer Good, an avid modeler for over 30 years, who has been a staunch backer of quarter-scale since its original concept, believing that bigger is more fun.

"Mr. Good, realizing a need for a realistic looking and sounding quarterscale engine to replace the flying chainsaws and weedeaters, began to work on the idea of what would hopefully be an ideal engine. Approaching a long-time friend and precision machinist and modeler, Carl 'Corky' Burden, the two



Plaque, awarded to irv Ohisson by Harry Apoian, has spigot, with instructions to raise or lower water level of lake, as required.

began to work out the details of such an undertaking.

"Carl, in turn, contacted a close friend, Garold Frymire, of Fryco Engineering in Fullerton, California. Garold is the manufacturer of the famous 'Frypans', which have set so many world records in tether car racing. (See July, November 1972 **MB**.) Calling upon Frymire's invaluable knowledge of the gears and their specifications would enable them to make this engine a reliable success.

"With Carl and Garold working closely together, the engine began to become a reality. Built around five O.S. four-cycle 60s, the engine has a displacement of 3 cubic inches. The engine has no problem swinging a 24 x 10 prop at 6500 rpm. On the other end of the scale, the engine will idle down to the point of almost being able to read the name on the prop. The sound this engine produces until now has only been heard at your local grass roots airport.

"Believe it or not, this engine is so realistic, it even duplicates one of the inherent problems of its full-size relatives ... carburetor icing! One consolation is that if you suddenly become 'dead-stick', on final you can always blame it on carb ice.

"Horsepower, torque, and thrust at this date have not been fully documented, with elaborate testing still in process. However, indications are that horsepower figures are in the range of 5 to 7. At present, fuel consumption is about 16 ounces for 11 minutes. Engine may be on ignition before production begins. Also in the works at this time are a quarter-scale 7-cylinder built around the same concepts as the 5, and a 9cylinder quarter-scale Pratt and Whitney, built from the ground up...

"Mr. Good hopes to keep the cost of manufacturing at somewhere between \$1400 and \$1700, depending upon outside manufacturing costs such as castings, gears, etc. We also want to thank John Maloney at World Engines without whose support this project would not have been possible."

(We've known Elmer Good, the motivating force [spelled B..U..C..K..S] behind the project for about 10 years, and we know he has the determination and capability to bring this fantastic engine to reality. We've seen and heard the prototype shown in the photos, and it is absolutely spine-tingling. Pictures don't do it justice. wcn)

*

All work and no play make Jack a very boring person, or something like that... The 5th of July saw an awful lot of activity, mostly R/C ROW at Lake Elsinore, California. Seaplanes, flying boats, and amphibs of many sizes and types abounded at this "Gathering of Ducks." Unfortunately, a few birds bit the d--- er, water.

Every now and then, engine pioneer Irwin Ohlsson and cronies, Harry Apoian, Danny Lutz, Joe Bridi, and a few others, decide that a trip to Lake Elsinore, to indulge in some flying, rise-off-



Proclamation, by King Neptune, sez that one Irwin G. Ohlsson to be permanent keeper of Ohlsson Lake, formerly Elsinore.

water style, complete with an all-day picnic type affair, is in order. So, it comes to pass... July 5 was a nice hot, almost calm (until breezes sprang forth in the afternoon) day. Several hundred onlookers braved the heat of the day (and cooled their feet in the lake) to enjoy the flying activities. Even long-time modeler, lover of airplanes with two or more wings, and past altitude record holder, one each Bill Northrop, charged the batteries in his 7-year-old Powerhouse fitted with Don Foster's Gee Bee floats and left his cluttered workbench long enough to get in some relaxing flying. The pics prove it. . . Harry Apoian was flying his giant scale Bristol M1-C, hurriedly fitted with floats, and having great fun with it. Takeoff speed was about 15 mph and landing was about 12 mph, or so it seemed!!

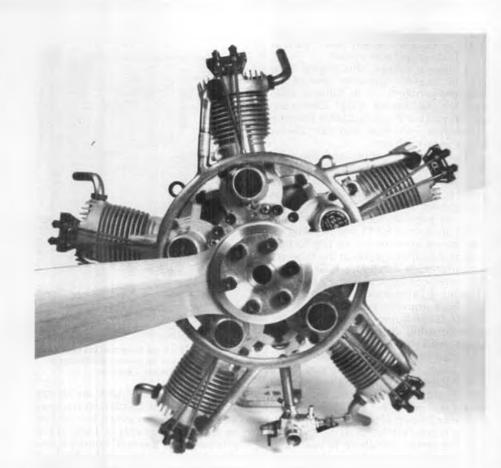
Darrel and Merle Meyer brought out their Hughes HK-1 flying boat for an airing, too. After setting up a closely watched transmitter impound area (Ohlsson's famous Grumman Widgeon



Sad moments, reflecting on crash cause of famous 'Ohlsson' Grumman Widgeon, may be rebuilt with parts of first. Jerry Lafavor photo.



Bill "Watzisname", MB's Editor, turns off radio. K&B .40 powered Powerhouse produces long take-off runs. Plan No. 874 O.T. very popular. Photo by Jerry Lafavor.



Here's the engine for your quarter-scale, Kinner-powered models. It's the prototype for a production unit available in early 1982. See text for more information.

had just previously gone in, later discovered to be a broken battery lead in the transmitter, of all places), the eight K&B 61's were fired up and checked out. Then, the tank was topped off and all eight engines were started in less than 70 seconds (that's 1 minute, 10 seconds, Jack). After a few problems with swells generated by ski boat activity, liftoff was effected. Super-calm air allowed a very smooth 15 minute flight, complete with low-level fly-bys, and a splash and go, much to the delight of the onlookers. Since most of the flying of the "Goose" is done at a predetermined power setting (8,000 rpm), fuel mileage is quite good. Even after 15 minutes of flight time, almost two quarts of K&B 500 remained in the one-gallon tank. Landing in the trough of a swell caused a tip float to trip up what would have been, hopefully, a textbook landing.

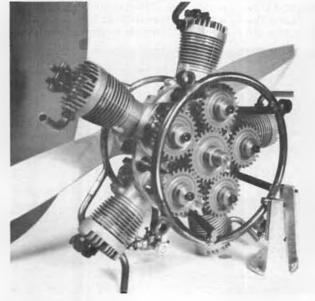
Danny Lutz had his problems, too. Flying an O.T. Pacemaker designed by Irwin, he suffered the indignities of a fractured receiver crystal, and he too,

went into the drink... Dapper Col. Thacker's smallish Supermarine racer dunked itself a time or two, also, but still managed some very successful flights. As a side note, our modeling cousins in England and Italy have had their '1981 Coppa Schneider' at Varese, Italy, on the 11th and 12th of July and are planning activities for September 12 and 13 at Calshot, England. Imagine, a lineup of Macchi M-39s and Macchi-Castoldi MC-72's Gloster V1's, Supermarine S-5 and S6-B's, along with a Curtiss CR-3 thrown in for good measure, lining up to 'have a go' at it. These 'Schneider Trophy Racers' are ranging in span from 5 to 6 feet, and appear to be powered by .60's. Wouldn't it be neat to see four of these birds tooling around a pylon course on a cool lake, Bunkey?

Anyhoo, back to Elsinore... Taylor Collins was seen testing another Grumman Widgeon and sorting it out. The first short flight wasn't too successful, but it should be a fine flier when it's dialed in. All in all, a lot of flying and a lot of fun was had by most of those present. Even a couple of Ultra Lights on floats treated those present to a fly-by in slow motion...

Pre-programmed flying, or, "My computer won the contest!" I know this statement will probably rankle a few pattern fliers and probably a few equipment manufacturers as well, but let's look at all sides of this many-headed coin before we reach for the brickbats.

The AMA rulebook states, as follows, in Section 4.4 and we quote: "There shall be no radio equipment or aircraft control function limitations in any pattern class, except in pre-novice. Radio equipment is only limited by FCC regulations." Clear, concise, and to the point. Shall we dissect this a bit? We could say that the rulebook is a bit archaic and perhaps it is. Some will also say to let a good thing alone, or let sleeping dogs lie. Really, some of the *Continued on page 103*



Details of gearing; will be enclosed on production models. Seven possible ratios available to fit same shafts; 1.4 to 1 shown.



Engine is built from highly successful O.S. 4-cycle 60 units. Intake manifold collector ring design still being optimized.

THORNBURG AT LARGE

WHERE ARE ALL THE FEMALE MODELERS?

• Back in the 1950's, when model mags were still written and edited for an audience of bright 12-year-olds, *Flying Models* used to run a monthly cartoon series called "Fixit Wright." The strip had three main characters: our hero Fixit, his bumbling sidekick Tailskid, and Tailskid's sexy sister, Bunny.

None of us bright 12-year-olds cared a lick for Fixit or old Tailskid, who were just there to show us the right and wrong ways to do things like installing firewalls. But that Bunny ... ah, now, Bunny was something else. Was she smart? You bet! And built like a bright 12-year-old's dream; a kind of prep-school Daisy Mae. But this was the clincher: Bunny not only liked model airplanes ... she was actually a modeler herself! Controlline, freeflight, radio ... Bunny built 'em all, and usually outflew the boys.

The result was that a whole generation of us bright 12-year-olds not only learned to install firewalls the "Wright" way. We also learned to dream of finding, somewhere out there in the frightening world of courtship and corsages, our very own Bunny ... a modeling mate.

Alas.

At the time Bunny appeared in *FM*, there might have been a dozen such women in the entire United States ... women who lived and breathed model airplanes, whose passion for the hobby was bone-deep obsessive, lasting ... women who went to the flying field for the love of flying, to the building board for the love of building ... and not simply to be with a father or brother or lover. There *might* have been a dozen such women afoot in the 1950's. I do not think that a full dozen could be found today.

And yet women, they keep telling us, comprise 52% of the population. What's going on here? Where are all the Bunnies? Just what is it that makes model airplaning such an exclusively homosexual sport? (That line's for people who love to quote things out of context.)

Don't tell me that women simply aren't interested in things technical/ mechanical. I know too many women carpenters, women mechanics, women architects. Making stained glass windows is an art both technical and mechanical, yet there are at least as many women as men who practice it.

And please don't tell me that model flying is too active for most women. The average female on the tennis courts burns more calories in a single game than your typical modeler burns in an entire Sunday of flying. And there's no shortage of female tennis players.

Maybe it's the tedious, exacting hand labor of modeling that discourages the ladies? Try this experiment: set a women and a man to the same unfamiliar task, one that requires both patience and manual dexterity . . . hand-rolling a cigarette, for example. Odds are, the woman will master the new task quicker than the man, and be able to repeat it faster with fewer errors. Women work extremely well with their hands. How many men do you know who can type 60 words per minute? And who do you suppose assembled your receiver and those sub-mini servos?

If women have the interest, and the energy, and the skills, then what is it that keeps them on the sidelines of modeling? Why are they always the spectators, the helpers, the cheesecake holding some (male's) model on the magazine cover? Why are they so seldom the builder, so very seldom the flyer, and almost never the competitor out on the flying field? (Women aren't competitive, you say? What monastary you come from, Father?)

In thirty years of modeling, I have never known one single, solitary female who was totally consumed by the love of model airplanes ... one who spent every free evening building, every free weekend flying ... one who ate, slept, breathed the hobby in the way that so many males do... one who was hooked, not for a week or a year or a decade, but for life ... one who was, in short, obsessed.

Not that women are incapable of obsessions. I have known women who were obsessed with raising poodles, with showing horses, with babies, with men, with sewing, with painting, with classical music. But with modeling, the way the mythical Bunny seemed to be? Never.

And the reason, I think, lies in the unique nature of our hobby. Modeling isn't really "like" any other hobby or sport you can name. If a fly fisherman spent sixty minutes tying a fly for each minute he actually fished with it, and then threw back every fish he caught ... that would be *something* like modeling.

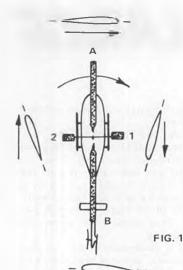
If a dollhouse maker set fire to his creation after it was finished, then immediately began to build another and better one . . . that would be *something* like modeling.

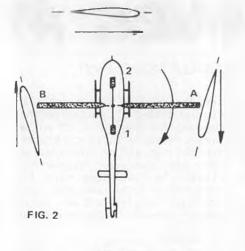
If an archer spent at least five hours making each of his arrows, and expected to lose or break three of them every time he went target shooting ... that would be something like modeling.

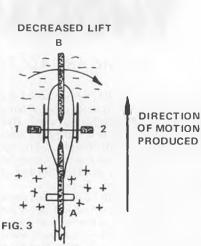
If an alcoholic ... but why go on? In no other hobby or sport are the results so delicate, so personally satisfying, and yet so short-lived as in modeling. You don't build a model airplane to pass on to your grandchild. You don't build a model airplane for your family to eat and enjoy at Sunday dinner. You don't build a model airplane to sell for a profit.

You build a model airplane strictly for yourself ... for the unique and totally self-contained pleasure of the creation ... for the satisfaction and success you feel when it actually flies, however briefly ... for the flame-like dream that it ignites in your mind, and your mind alone: if this one was good. I can make the next one really great!









INCREASED LIFT

CHOPPER CHATTER

0

By RAY HOSTETLER

• This month we're going to take a look at some basic areas of blade design that affect the way a helicopter flies, examine how the blades control the helicopter's flight attitudes, and explain why different types of blades respond differently to collective pitch changes. Several months ago we described how to set up a constant rotor r.p.m. (or nearly so) and promised to finish up with this discussion on blades.

For your interest, if we take our Jet Ranger and figure *disc* area vs. weight (2596.4 sq. in. at 14 lbs.) we get a "wing loading" of 12.4 oz. per sq. ft., which approaches that of a sailplane! However, figure both rotor blades as wing area (127.8 sq. in.). Now if our engine stops in flight we go from "disc lift" to "wing lift" and our wing loading jumps to 252.4 oz. per sq. ft. as soon as the blades stop rotating. And that is one good reason helicopters without a sprague clutch don't glide with the fan off ...!

Our ideal rotor blade would have a 13.5 to 1 aspect ratio and be strong enough to withstand any aerobatic maneuver. However, like mixing, blades are a compromise. The best blades for precise maneuvering in a hover are the original Jet Ranger design. They have a 13.5 to 1 aspect ratio with a 13% airfoil thickness. Essentially they are thin and long. On the ground they perform quite well, but in the air they are a bit too flexible to fly aerobatic maneuvers such as loops and rolls.

Several years ago, Kavan introduced the expert blade to attempt aerobatics with the Jet Ranger. This blade had a wider chord, a thicker airfoil (16%), and a shorter length, bringing the aspect ratio to 11 to 1. It was excellent for the

PHOTOS BY THE AUTHOR

high G's it was designed for, but it had a rather "stiff" feel for hover work. Then Kavan took the standard blade (13.5 to 1 a.r.) and increased the airfoil thickness to 16% in an attempt to beef it up, yet retain the standard blade efficiency. These blades, best described as "neuter" (neither standard nor expert), performed in between the expert and standard blades. If the expert blades rate "100" and standard blades rate "0", the neuter blade will rate "35-40". In other words the neuter blade performs more like a standard blade than an expert blade.

These blades demonstrate the three major blade design philosophies. Absolute aerobatics (expert), absolute ground precision (standard), or the compromise between the two (neuter). The Heli-Boy and other designs similar to it use the expert blade. One of these helicopters in forward flight is the best way to feel the "groove" of the aerobatic blade, while a Jet Ranger with standard blades is the best way to feel a grooving blade in precision hovering. American R/C's new collective Mantis uses the neuter blade with excellent characteristics on all areas of flight. Expert blades, due to their thickness and width, respond relatively softly to cyclic and collective pitch changes. The standard blades are crisper on cyclic, collective, and lift more efficiency than the neuter or expert blade.

The expert blade can actually be the best blade for a constant rotor speed if you can accept the way it feels in a hover, and your engine can deliver the extra power it tal-es to run expert blades. Usually there is no problem with the power requirement, unless you have a heavy helicopter or an engine that's going "over the hill."

As we stated earlier the expert blades respond softer on collective and cyclic. Maybe the best way to explain this is to say that there is a more constant "drag factor" on this type of airfoil as it varies in angle of attack vs. thinner airfoiled blades. Another way we could relate this to you is through a description of a pattern airplane's airfoil. If the section is too thin, the pilot will have more difficulty achieving a constant speed through all maneuvers. Thicken up the airfoil, and the increased drag will help with the constant speed, whether the ship is in a climb or a dive. Back to choppers, that's why we get the softer feel in flight and the ability to run large collective pitch changes without the response getting too touchy.

Standard blades must be handled more carefully in collective set-up because of their efficiency. In other words, excellent results can be had with standard blades but the compromise stands on a "thinner edge" than the expert combination.

As usual, the neuter type of blades stand in the middle. They lift more efficiently than expert blades but are still less efficient than standard blades. The same goes for collective set-up; eaiser than standard blades but not quite as tolerant as the expert blades.

Personally, we like the standard bladed system even if it is a little trickier to set up properly. Those of you who fly your helicopter the way an airplane flies will undoubtedly be better off flying expert blades, and we would recommend them to you.

We must admit, though, that there

ying

By DICK HANSON . . . Part 16: Three Reverse Inside Loops, Aileron Turn, Reverse Double Immelman.

 Those of you who have followed our series on Pattern flying have probably noticed we have not recommended any particular designs or equipment for Novice pattern fliers. Lately I have read various articles recommending brand X models, putt putt engines, glitch and wiggle radios, etc. . . . as entirely satisfactory for novice class flying.

If you simply want to enjoy the company of the guys at the contest, this kind of equipment is, of course, entirely satisfactory. However, if you want to learn to fly pattern with the least effort and frustration may I suggest the following:

1. Learn the very basic flying skills with any good, straight trainer, 3 or 4channel.

2. Forget the so-called intermediate designs and the old-fashioned very fast high wing loading designs. You can only learn bad habits.

3. Go directly from the basic trainer to the current state-of-the-art designs in airframe, radio, and engine. And, most important, obtain the aid or instruction of a competent pattern flier, not a hot dogger, and go through a dedicated training program. (Just like learning to play a musical instrument.) If this sounds crazy, let me assure you that we have seen fliers go from 0 experience to top caliber national competition skill in 2 years time using this technique. The key is a proper training program and equipment which is fully competition ready no overweight, crooked, or oldfashioned designs, they are just handicaps that create bad habits.

As long as I'm blowing steam I'll add the following comments concerning the myths about "complicated masters type models". My current engine (O.S. V.F.) is one of the least critical engines of any size or type I've ever used. Also, at the flying field, we let novice fliers try our competition planes. The standard comment is that they are easier to fly than the trainer types.

Somewhere along the line the "ultimate" pattern designs were assumed to be unbelievably complex, tricky, high-

are those times when we do like to zip around the sky for a while, yet we don't want to change our standard or neuter blades to expert blades for the occasion. There are still several factors to be considered that can take care of this requirement.

If you are like us and want standard blades with strength enough for fast forward flight without blade flutter, try fiberglassing the entire blade with a speed rockets that require years of experience to handle. I'll end my commentary with this word on that assumption . . . Horse Pucky!

Now on to this month's lesson. We have selected for review three downwind maneuvers that share many of the same characteristics; they all start high and they are all "mirror images" of other maneuvers.

Due to the rule allowing fliers to make up their own pattern, you may never see some of these maneuvers at any contest. The reason? Many fliers are using the simplest possible schedule that will give the 450 points! Don't blame them ... the rules caused this situation.



THREE REVERSE INSIDE LOOPS

Again we start high (and slow), calling the maneuver early enough to do the roll to inverted and the one second delay required before starting the loop at frame center.

The loops are done in the same style as used for the basic "3 inside loop" sequence, because the uphill side is now, of course, upwind. The exit and rollout occur after the mandatory onesecond pause. The easiest mistake to make on this one is to forget what you are doing and exit at the bottom of the loop!



AILERON TURN This is very simple if the plane is

medium weight cloth. This by itself will make the blade significantly stronger, while retaining it's original ground characteristics.

There is another way we can attain fast forward flight without using expert blades. We do this by increasing the "disc rigidity". Disc rigidity is a term we'll use to describe the overall rotor disc's avoidance to flutter and ability to keep the individual blades in track. It

correctly set up. You need a very fast roll rate plus neutral pitch sensitivity on speed buildup. Basically you slow the model down to minimum speed as you enter the frame at maximum altitude. Call the maneuver early enough to allow for an exact center starting position.

The push to vertical should be fairly abrupt to prevent excessive altitude loss in establishing a recognizable vertical dive. Then, make the 360° roll and correct if necessary any over or under shot on the remaining vertical dive. Make the pull to level flight before adding power . . . remember there is no penalty for not centering the roll vertically but watch the judges, they may not interpret the rules that way.



REVERSE DOUBLE IMMELMAN

For some reason, I see judges giving high scores to fliers who ignore the "immediate rollout" requirement on this and the standard Double Immelman maneuver. Some judges have told me "it looks better", when I question the late rollout. Oh well ... My favorite technique on this one is to coast to the start of the push over and complete the 1/2outside and the roll to upright before adding power. The second ½-inside loop and final rollout are done at full throttle. This permits a more constant speed appearance to the entire sequence. I know that some very successful fliers may disagree with all this emphasis on slow approaches to maneuvers, but I'm convinced the trend to the slower, smoother design is inevitable.

One final thought . . . Don't practice any maneuver until you are certain you know what it is supposed to look like, and if you don't know . . . ask.

can be raised by using heavier tip weights in your rotor blades or running a faster rotor r.p.m. The disc rigidity of a Heli-Boy is already excellent in stock kit form, mainly due to a high rotor speed and expert blades. The Heli-Boy also has a very solid mounting of the swash plate in the foreaft axis, which is important to give smooth forward flight. The Jet



Ted Hyde's quarter-scale FW-190A features sliding canopy, original pilot, and full cockpit. Landing gear is non-retracting. Span 8-1/2 ft., weight 31 pounds. Needs more than Quadra.



By BOB UNDERWOOD

• We humans are interesting creatures! We are mixtures of the most extremes of emotions, temperments, attitudes, desires, and overall interests. All of these seem to swing in great cycles that consume our time and energy over reasonably well-defined periods of our life. We are often somewhat unpredictable and while we are sometimes quite selfish, we can be found performing the most magnanimous feats of unrequested generosity.

It is, I suspect, this vast range of behavior that has made working with people rather than thing so much more interesting for me. While I can savor the thrill of being able to dominate a thing, a machine, it is the interaction of my ideas and thoughts with those of other people that provides the stimulation to make this brief stay in the universe really significant. A professor during my training years for the teaching profession suggested that it takes 50 years for ideas or minds which are in opposition to fully resolve the conflict. In other words, if you and I do not agree, it will take half a century before either of us can fully convince the other that our opinion is correct. At the outset, I tended to feel that such a thought was ridiculous and far too pessimistic to accurately assess human relationships. As I approach my 50th year. I am beginning to realize the accuracy of his teaching.

It was the same professor who suggested that the only way one could lead a healthy, happy life was to retain truly open-mindedness toward accepting change. His theory held that those who had closed their mind to any change would ultimately be reduced to a ranter and raver at whatever they felt was wrong with the world, instead of working at achieving the best compromise for

all ideas and attitudes.

This little excursion into thought was occasioned by several occurances in my life recently as well as in retrospect over the years. In scale modeling activity, I hear many things which reveal the many different areas of thought. For instance, I recall almost a decade ago when an outstanding scale modeler in the St. Louis area, who was then the District VI Scale Contest Board member, voiced a serious concern over the adoption of a new scale event called "Stand Off" or Sport Scale. He suggested that its inception would begin the death knell of what we now call precision scale. While I did not agree with his assessment then, I must, of course, admit now, almost a decade later, that we have not seen any increase in the numbers in the classification of precision level of scale modeling. What has happened with resulting unrest is the vast upgrading of model quality in the Sport Scale classification to the point that many consider them to be precision in most every way. This then, creates a paradox, for while many cry to keep the event simple, others work diligently to upgrade the quality of their offerings to become more competitive. The gulf then widens, as on the one hand, we see some attempting to "keep it simple" and others improving their skills and maintaining that you cannot legislate medocrity. In actually, it is the familiar "gocart" syndrome. The weekend pastime some years back of putting a lawnmower engine on a crude frame and four wheels and put-putting around the shopping center parking lot, resulted in competition. The competition resulted in improving the equipment to the point that speeds, dollars, and risk factors all increased to a level that it was no longer "fun" and the whole idea went down

the tubes. The same thing happened with slot cars.

If you are expecting an answer here from me, you are going to be disappointed. A few years ago, I would have had a distinct opinion. I am far less certain of myself now. I can say that I feel competition is just that . . . competition. While I don't really mind losing and I can live with it quite easily, I do not purposely try to lose. I will make every effort, short of cheating, to attempt to win, but basically it is the challenge, the comradeship of the fellow competitors, and the pride at having accomplished something, that allows me to compete.

Some other feelings which have surfaced for me recently that may or may not indicate some change in the direction of my thinking include:

RULES: Live with them or work actively at changing them, but don't bellyache about them without suggestions. So many people have suggestions for changes, sometimes excellent ideas, but they never get beyond the vocal level and into the working level because the person fails to put their ideas in action. I suspect you can hope that someone else will take up your canoe and go through the work of putting it in action, but you run two risks. Your idea may fall on deaf ears, or it may be distorted and misinterpreted along the way

MECHANICAL OPTIONS: We have to limit them or figure out how to more accurately judge them. The former is easy, the latter is difficult. I personally like the Mint Julep Division I - Division II categories in both Sportsman and Expert classes. In that case, you have two skill levels and you have two equipment levels. (For those who are not aware of the Division I — II idea, the breakdown revolves around model complexity. Division I is wide open, within the AMA rules, as far as mechanical options are concerned, and Division II is limited to one mechanical option with limitations on types of aircraft.)

Yes, I realize that small local contests cannot support 12 trophies for scale. But how about something like the first and second in two or three categories? Maybe a breakdown like Sportsman-**Expert-Open Division II. Very little more** investment is required and no changes in contest procedure is required. You just might very well attract more people.

MULTI-ENGINE POINTS: At a recent contest, someone suggested to me that if I get 20 points for keeping two engines going for the whole flight, why shouldn't he get 10 for keeping one going? You know, that's a darn good question! The original concept of awarding the complexity and added risk of flying a multiengined model has merit, but one heck of a problem is created by the inability to award the multi-anything but the max of 20 points if they run the whole flight. When you consider that most sport scale contest's results hinge on just a few points separation, the "sure fire" 10's give probably a two to four-point advan-



HEATH LNB-4 PARASOL

By ROBERT KITSON . . . This is the kind of Quarter-Scale that is large, but not monstrous, the kind we promoted in our "Mammoth Scale" articles a few years ago. One of the prettiest of the pre-WW-II kit or homebuilts. Any .60 engine will do the job, but it's a natural for the O.S. 4-cycle.

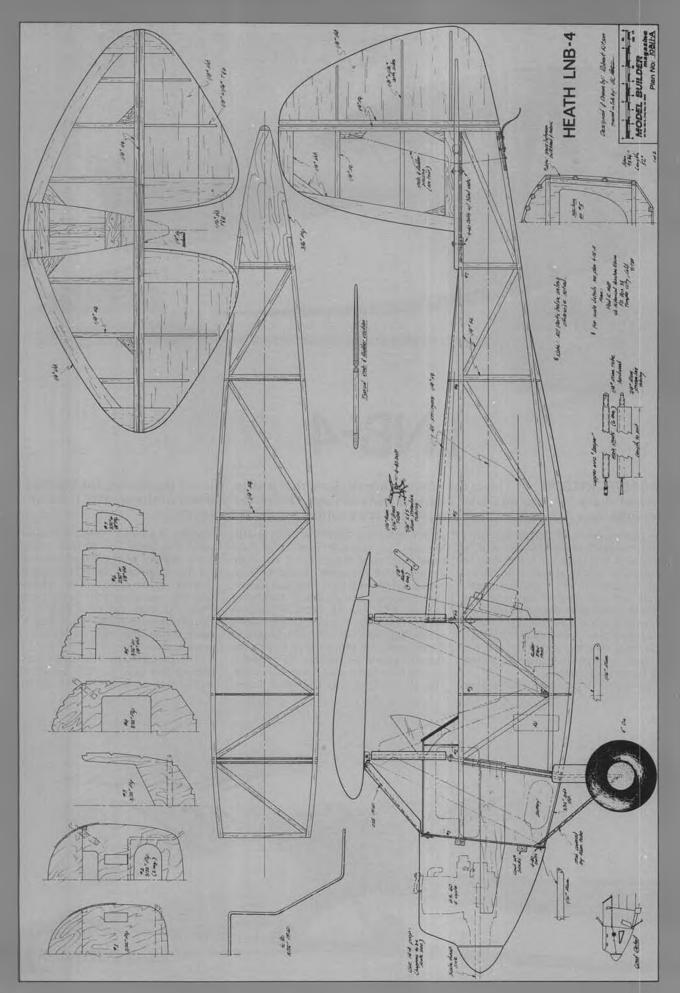
• This one-quarter scale Heath Parasol is for the model builder interested in a large model that is easy to build, easy to fly, and, with a little attention to detail, can be entered in "RC scale" competition. It was selected to provide this builder the relaxation therapy necessary to recover from a P-51 project. Criteria were as follows: fixed gear, no flaps, simple color scheme, accessible engine, and large enough in size to be flown easily by an inept pilot.

Construction is about as challenging

as the 1938 Ace Whitman 10-cent kits. Merely use 1/4-inch instead of 1/16 balsa strips, and bigger pins. For scale details, these drawings should be supplemented by the Paul Matt plans available through the Aviation Historical Society, P.O. Box 33, Temple City, CA 91780. These are excellent three-views of the full size aircraft with plenty of detail, and are exactly one-fourth the size of a quarter-scale plan. Two modifications have been made from true scale. The thrust line was lowered threeeighths of an inch so the airplane would cowl the Ogawa FS 60 four-stroke engine and the wingspan was lessened by six inches at each tip so it would fit the Toyota automobile. These alterations will slip easily past the scale judges at most contests. (In case Bob gets the opportunity to judge your Heath, we have shown the wing with the proper scale span. wcn)

The first Heath "Parasol" was designed and built in 1926 by Ed Heath, instigator of today's well-known "Heath-





FULL SIZE PLANS AVAILABLE - SEE PAGE 100

MODEL BUILDER

kits". The LNB-4 modeled here was certified by the U.S. Chamber of Commerce and manufactured in 1932. It was also available in kit form for homebuilders. Twenty-five horsepower gave it a 62 mile per hour cruising speed. This model floats along at a very realistic speed of about 15 miles per hour.

Begin construction by drawing the fuselage centerline and bulkhead positions on a strip of shelf lining paper over a wooden working surface. Build the lower portion of the fuselage first by pinning the bulkheads, bottom up, into position over the centerline. The bulkhead width will determine the position of the two main longerons forming the basic fuselage crutch. The landing gear is bent from 5/32 wire at this time and sandwiched between the double plywood bulkheads (#2) with a generous amount of epoxy glue and plywood fillers. The remaining longerons, engine mounts, and stringers are now pinned and glued into position. Carefully chosen hard straight balsa strips should be used here. By pawing through the supply at your local hobby shop, quality wood should be selected for the entire project.

Continue by placing diagonal braces in every rectangular space of the top, bottom, and sides, keeping in mind that they were omitted from the plans for the sake of clarity. The exact position of these braces is not critical, but they firm up the structure tremendously and their weight is not a factor. Be sure that formers One through Four are of 1/8 aircraft plywood.

Remove the lower fuselage section from the work surface (did you remember the waxed paper?) and add the top formers and turtle deck stringers. Sheet the nose with 3/32 soft balsa after deciding whether to leave a rectangular cave or a hatch on top (as we did) for access to the fuel tank.

The adhesives used on the entire model were quick-setting epoxy and cyanoacrylate. Baking soda was added to the cyanoacrylate for bulk and increased setting speed (we're impatient).

After the fuselage frame is completed, lightly tack-glue pieces of polyurethane foam to the firewall. Carve and sand this material to blend into the fuselage, while following the correct profile, then remove. Cover with two or three layers of two-ounce glass cloth and resin, sand smooth and dig out the foam. Cut out the necessary engine and cooling openings with a carborundum disc on the Dremel. This method is fast, easy, and produces a strong cowling.

Pieces of aluminum strip which are the attachment points for all struts are now cut to length, drilled, and bolted to the plywood formers. Use 1/16 material to support the main struts which are attached with quick links, and 1/8 material to support the cabanes which are attached with 4-40 x 3/8 bolts. Servo mountings can now be installed and pushrods fitted. Our pushrods were 3/8 square balsa strips.

There is just not much more that can



Close examination reveals the pinking tape which actually came from a drug store! Note sturdy aluminum brackets for mounting struts on fuselage, aileron pushrods behind pilot.

be done with the fuselage at this point except sit back and admire the classic lines. It is ready to cover.

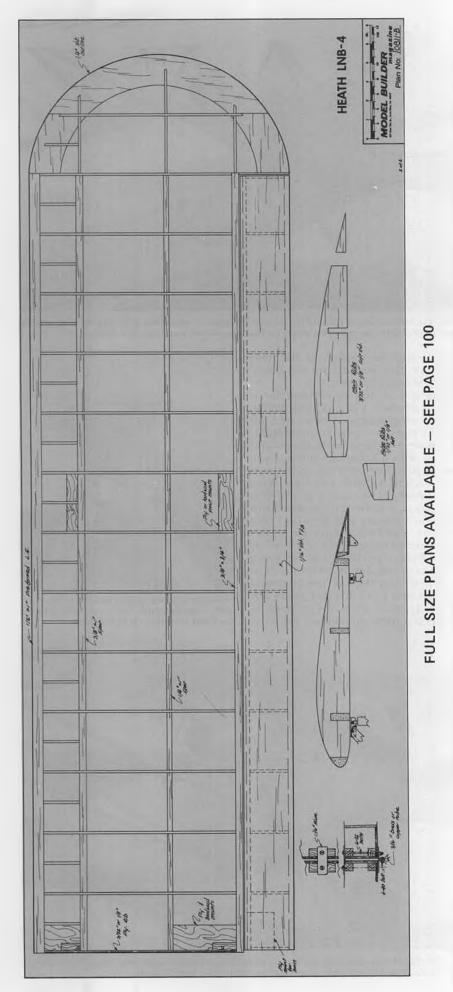
Wing and tail surface construction is about as simple as a peanut scale model. The left wing panel can easily be built over the right wing plan by most build-ers. Those who tend to daydream and take off with a collapsed antenna will have to pay close attention in order to avoid ending up with two right wing panels! Beef up the stress areas and strut attach areas, as shown on the plans, with hardwood blocks and plywood. We made an aluminum template to expedite cutting of the 44 ribs and half-ribs from 1/8 soft sheet balsa. Soft balsa may not be as strong, but it is a lot easier to cut. (We are lazy also.) Hit the aluminum template with a nail in 2 or 3 places and the sharp projections on the reverse side will keep it from slipping on the balsa



Holes were drilled in bolt ends to safety-wire wing mounting nuts. Strut-end bolts and nuts are fixed permanently to brackets.



This view should help you with cowling shape as interpreted by Bob Kitson. Accurate sections on this are not readily available. Good idea to obtain Paul Matt 3-views.



while in use. The center ribs are of 1/8 plywood and sufficient hardwood and plywood reinforcement is added as shown on the plans to support the four wing mounting bolts. Tiny holes were drilled in the ends of these bolts for little safety pins which gave us "piece of mind" during initial flights. We have not, however, seen any tendency for these nuts to loosen in flight. The "strip ailerons" are built up from 1/16 sheet balsa.

It is absolutely essential to locate perfectly straight balsa sheets and strips for the wing leading edge, spars and ailerons. This will require some searching, even though standard sizes are used. Pre-carved leading edges were purchased and modified as shown, to form the Clark Y airfoil. Once this effort is made, sit back and relax. The wing will practically build itself.

The completed tail section is attached as one unit with four 4-40 bolts into blind nuts as shown. The tail bracing wire is one piece of coated cable fishing leader held in place with the swaged lead sleeves made for this purpose and attached to the fuselage bottom with quick links. This allows the tail section to be easily removed for storage or transport.

The main wing struts were made by sliding 1/4 inch aluminum tubing through K&S 3/4 inch streamlined tubing. Wooden dowel is then fitted and glued into the 1/4 inch tubing to support the attachments as shown on the plan. Eyelets screwed into hardwood blocks in the wing allow the struts to be bolted to the wing but folded flush against the bottom surface for transportation. Quick links, with soft copper wire "keepers", attach the struts to the fuselage.

The cabane struts are made from 5/32 brass tubing with the ends flattened and drilled to accept 4-40 bolts. These brass tubes are then slid into 7/16 K&S streamlined aluminum tubing for added strength and scale appearance. Only the streamlined tubing was used on our model for the forward cabane, but a length of music wire was contained in it for added security.

This model was covered with Silkspun Coverite and finished with K&B primer and Super-poxy. We have strayed and finally returned to using these fine products. We followed the method outlined by Dave Platt in his excellent article on the subject of finishing model aircraft and which is available from "Dave Platt Models", 6940 NW 15th St., Plantation, FL 33313.

A pinked edge tape about a 1/2 inch wide with adhesive backing is available in most drug stores. Ladies apparently use it for sticking hair to their heads, but it does equally well dressing up the seams on large scale model aircraft.

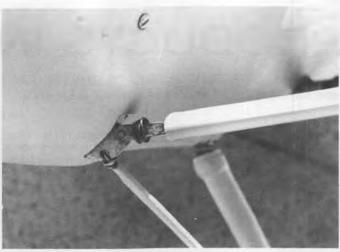
Our model was designed to house the very quiet OS Four-Cycle engine, which has plenty of power to fly the model realistically. A Zinger 14-4 prop worked best for us and it just happens to be scale size. Coordinated rubber and ailerons are needed in the turns as in the full size



What else can you say? Ed Heath "done good" when he created the Parasol, and this LNB-4 version was about the prettiest. The model certainly does it justice, and has Precision Scale capabilities.



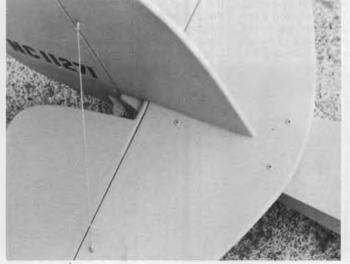
Close-up of cabane strut and aileron pushrod linkage. Obviously, the outboard struts as well are fully functional!



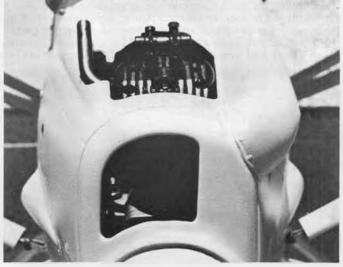
Functional wing strut end clevises are wrapped with soft wire to prevent accidental opening.

counterpart. It will roll, loop, and spin, but with the obvious effort of the full scale 1932 airplane. This model will literally land and take off by itself. We found no additional weight for balancing was necessary and the model weighed in at 10 pounds, giving it a wing loading of 21.3 ounces per square foot.

After several flights, it became obvious that a sizable payload was being wasted. Why not some aerial photography! A Vivitar "autowind" camera was placed in the cockpit and attempts to photograph other models in the air have been entertaining and challenging. The camera was activated by a Kraft mini servo glued directly to the camera. The servo arm depresses the shutter button each time it is keyed and the camera, which weighs a mere eight ounces, automatically winds itself for the next exposure. While attempting a good plane-to-plane photo of your friend's scale model on a 24 exposure C110 cartridge, be prepared for 23 exposures of highways, golf courses, and cloud formations. One good shot, however, of the Red Baron waving from his own cockpit and with his white scarf clearly *Continued on page 95*



Tail surfaces are bolted to fuselage, and depending on your transport equipment, may be permanently attached.



Another useful view of cowling. It's fiberglass, layed over a carved foam mold, which is dug out later. O.S. 60 Four-cycle fits nicely.



Midwest Jetster, ready for first flight as engine "spools up" to takeoff RPM. Looks like it came direct from 1945.

Cradle made out of plywood for test running. Fan shell cover not installed for convenience while in the cradle.

PRODUCT\$ IN U\$E

MIDWEST "JETSTER" and RK-20B DUCTED FAN, and the K&B and the K&B 3.5 MODEL 8445, by AL ALMAN ...

• Becoming both a daddy and a grandpa within a very short period of time was kinda traumatic. . .

Which probably explained my sudden susceptibility to old wives tales about total abstinence and the benign father figure bit. I was advised, in no uncertain terms, that "having reached *that* point in life," everything must become a spectator sport.

Fortunately Walt Schroder (the only real benign father figure, because he's so much older than anyone else) rescued me by offering the Midwest Jetster for a product review (while still with MB. wcn). Variety truly can be the spice of life, and the welcome change of pace this fan-powered bird provided, galvanized my poor aging mind and body into high gear, cleared away the fuzzy thinking, and thankfully ended my short-lived career as a professional spectator.

And since the benevolent Mr. Schroder did save me from a terrible fate, it's only right and proper, and in accordance with our American way, that I continue this holy crusade against myths and old wives tales. And what better place to PHOTOS BY THE AUTHOR

start than with the horror stories perpetuated by those who have little or no current knowledge about ducted fans but who, nevertheless, feel obligated to spread their ghastly gospel.

So, here's some solid reassurance: First, there's nothing mystifying or magical about ducted fans and they no longer require expensive and exotic fuel or equipment; second, this review was not written after only one or two short flights . . . but was, in fact, based on 33 takeoffs (and, as it turned out, 33 landings), all of which added up to a tad over three hours of flight time; and third, when I started on this project, I also was totally ignorant about the care, feeding, and handling of ducted fans. And since fan opreation was new to me, I eased into this evaluation by starting with something I knew about, like building... THE AIRPLANE

It's easy to understand why Dick Sarpolus came up with this particular design. A pod is the easiest and most efficient way to mount a fan, and since installing it under the fuselage would allow the fan to ingest all sorts of debris and make it prone to crash damage, Mr.

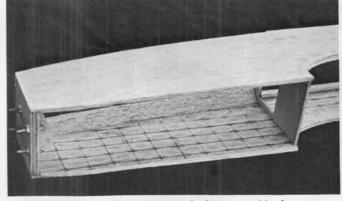


Turning final. Engine runs beautifully, top end 22,500 down to 3,200 RPM solid idle.

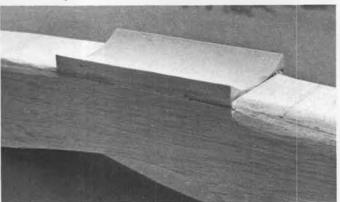
Sarpolus wisely put it on the top. The twin (non-movable) rudders add a nice touch and help give the Jetster its different look. And the slight leading edge sweep is not only pleasing to the eye, but adds the effect of dihedral and allows for a more rearward balance point.

The box the Jetster comes in is not really big as kits go, but the impression when opening it up is that some parts might be missing ... 'cause once the crumpled newspaper is removed, there's enough room left to add the makings for another Jetster!

Midwest did a nice job of kitting this bird and didn't lie about the contents: the wood is good; the parts are cleanly die-cut or precisely machined; and the hardware package is "comprehensive." Also included is a molded foam inlet cowl (bellmouth), formed landing gear,



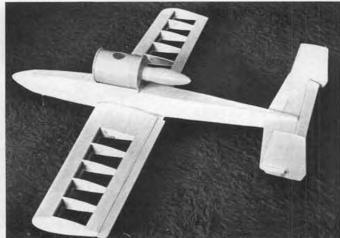
Nosegear, radio, go up front. Lines on doublers are guides for even application of Hot Stuff using the "Blind Rivit" method.



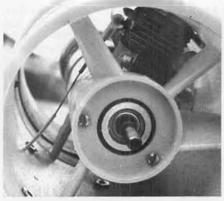
Fan cradle installed on fuselage top. Rough shaping completed, ready for application of sandpaper, with block . . .



Al Alman, intrepid modeler, displays business-like Jetster. Although very happy with flights, normally smiling Al, very calm here.



Bird's 'bare bones' and the fan unit without the inlet, tailpipe, or outer fan cover installed.



Flex-cable routed through cradle, fan housing, connects to carb arm via Du-Bro ball-link.

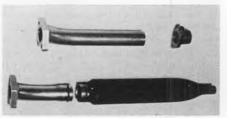
and good instructions. The building sequences are numbered, include sketches, and are right there on the plans; the finishing and flying tips are on a separate sheet.

The Jetster is easy to put together; construction really is "straightforward." A few of the steps might seem odd, though ... like putting a solid hunk of balsa where the engine usually goes, and then installing the hardwood fan mounting cradle where the canopy would normally be found. And, unless you're a glider-guider, the radio installation might also seem weird because everything goes into the area usually reserved for just the fuel tank and battery pack. Although the fuse is slab-sided, meaty triangle stock allows the corners to be well-rounded and, voila ... a streamlined shape.

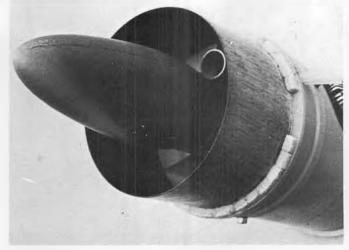
The wing is built around a high-lift, 16 percent semi-symmetrical airfoil and has its own set of numbered instructions. By the way, my entire plane was put together with both regular and Super-T Hot Stuff; I was shooting for the lightest possible airframe. And I found that Super-T almost makes a pleasure out of the tedious and time-consuming jobs of planking and capstripping.

Inadvertently, I did make a change in the wing; I misread the instructions and cranked in only two inches of dihedral instead of the recommended four inches (Strange ... the same thing used to happen occasionally to builders of the Midwest Tri-Squire. wcn). In retrospect I think I may have done it "accidentally on purpose" because I do remember thinking that the bird just wouldn't look right with all that (9-3/4 degrees) dihedral. No sweat though, 'cause the 4-1/2 degrees I did build in was aided and abetted by the dihedral effect of the leading edge sweep. The tail surfaces are made from 1/8 sheet, and care must be taken in aligning the fixed twin rudders to the horizontal stab. The rudders must be vertical to the stab and parallel to each other and the fuselage centerline. If you don't do your homework here, the Jetster will require offset trim and won't fly right.

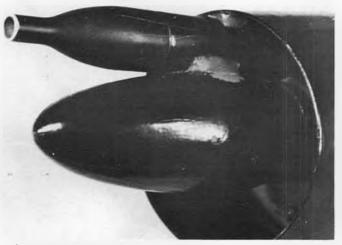
I "moneykoted" the wings and empennage; the fuse was covered with Super-Poxy over squeegeed resin and well sanded primer. The entire craft was done in black with white Luftwaffe markings and trim. I decided on Monokote hinges and installed the main gear with silicone rubber (a finger wet with saliva will easily smooth and contour fresh silicone and epoxy) after putting in a few degrees of toe-in on each wheel. I found the nose gear to be much too



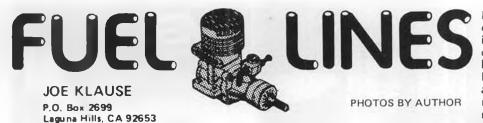
Long header used for 20 flights. Mac's new pipe, header, adds quiet and power!



Inner tail pipe and 3/16 balsa bits bonded to rear stator shell, 4-inch header pipe, 6-1/2 ounce tank clearly visible.



Silicone 'saddle' supports, insulates pipe and retains stinger without need for ugly bracket, sez Al.



• You're at the test stand. Right? Well, that's where we left off last month. You've just overhauled your engine, and now is the time to check it out. Naturally enough, you're using a solid test stand ... somewhat like we discussed in this column exactly a year ago. The first photograph illustrates the point ... sturdy, heavy wood to absorb vibration, and a stand that's also readily transportable and easily storable ... right on!

The engine in the first photograph is the new OS Max VR-P, ABC, which was designed specifically for Formula 1 pylon racing. The prop is a Top Flight 9-6 Super M. But, chances are you're not checking out a racing .40. What prop should you use for your particular engine, and what fuel for break-in? Good questions! We'll try to give you some guidelines that will cover the range of engines that are common to our hobby. First, however, it's important to understand the reasons that break-in is necessary. The purpose of this procedure on new engines or new engine parts, especially a sleeve and piston or ring, is to "mate" the parts together under controlled operating conditions. Any new part has been subjected to manufacturing stresses . . . typically casting, forging, or machining. These forces cause the part to "take a set." All that means is that the part will assume certain dimensions. However, as this new part is operated, engine heat will cause the part to slightly change dimensions. Stresses will be relieved, and as is often said, sleeves and pistons will 'grow." They'll change shape ever so slightly. Thus, no matter how carefully

they've been machined and fitted, they must wear and mate together under operating conditions.

The next most logical question is, "How much break-in or mating of parts will be necessary?" Fortunately, the quality engines on the market today do not require extensive break-in. Some years ago, it was quite common that an engine would require three or even more hours of running before you could say you had a "good" engine. This was usually true with slug piston engines... simply because quality control wasn't anything to brag about.

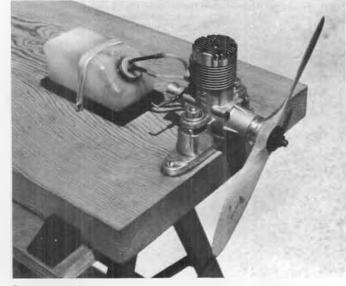
Please note that I've said "quality" engines today do not require extensive break-in. Well, what's a quality engine? Obviously, this is somewhat subjective, and, if I were to provide a list (shudder! wcn), there would be plenty of room for valid disagreement. About now, you may be thinking this is nothing but a big hedge, rather than being helpful. Not so. The simple fact is that there are plenty of quality engines available in almost every displacement. How do you decide? Well, price is a pretty good general guideline. Look at and compare manufacturer's suggested retail prices, and then shop around for the best buy. Be wary of a relatively unknown, very inexpensive engine. If you're a newcomer to our hobby, ask some experienced modelers at your flying site.

OK, so you've purchased a quality engine, how long is a reasonable breakin period? Up to one hour. Now, if that shocks you, and if you think that, "Five minutes ought to be enough," well, then we're not on the same frequency. I'll be the first to admit that no one really enjoys spending a lot of time breakingin an engine on a test stand. But as onerous as it may seem, it sure can save a lot of heartaches. Being more specific, I'd suggest that at least fifteen minutes are needed to seat a ringed engine. On a new stock, slug-piston engine, think more in terms of an hour. Naturally, these times apply to completely new engines. On your overhauled engine, these estimates only apply to new rings and/or new slug cylinder/piston assemblies. A new rod, wrist pin, or ball bearing, will only need five or ten minutes of break-in.

How about fuels and props for breakin? If you're sport flying, just break-in with the fuel you intend to regularly use For competition flying, where you may go up to as much as 70% nitromethane, start with 15%, go to 40%, and then go on up to the real expensive stuff. During break-in, use 20% lubricant. After that, you may want to use less. Refer to this column in the December 1980 issue for more detailed information on lubricants.

Before providing a suggested list of props, a comment or two on the rationale of a break-in-test-reference prop is in order. Experience has proven that new parts best "mate together" when temperature is modest, lubrication is ample, and RPM's are up. The first two of these require a slightly rich mixture. But, with a rich mixture, it's usually difficult to get high RPM ... unless you use a small prop! Stated another way, the theory is simply to not overload or overwork the engine during break-in. Overloads cause extra heat, and that increases the odds of galling new parts.

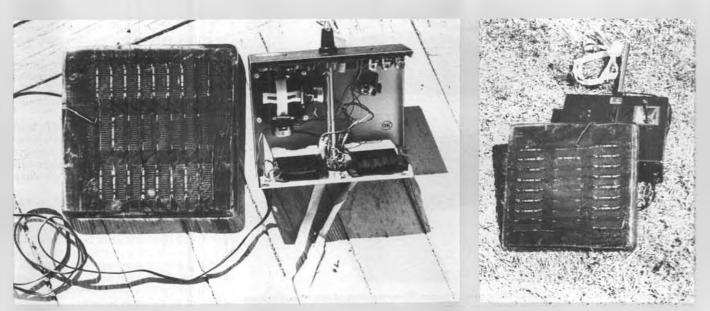
Now if you think about these last five sentences, you'll better understand why I say that there's only one place to conduct a break-in, and that's on a test stand. I completely disagree with those who brag that they break-in their engines in the air. On take-off and climb you put a significant load on the engine, you usually have no immediate control *Continued on page 80*



Proper set-up for running in new, or re-conditioned engines. Solid mounting of engine and mount, foam pad under tank, clean area.



Tools of the trade for running in. Hearing protection most important. Hearing damage is accumulative. Have good tach, clean fuel, and tools.



Whether at the flying field, or sitting on the window sill at home, the solar cell transmitter charger can keep your unit fully charged. You can fly all day, if no one else needs the frequency clip!

the Electronics Corner

SOLAR TRANSMITTER BATTERY CHARGER

By ED KARNS... A sequel to the author's article in last month's issue on an airborne system charger, we now build the transmitter charger. And you begin to wonder.. what happens to battery "memory" when it never gets a chance to "forget"? The third installment gets even *more* interesting! PHOTOS BY AUTHOR

• After the great success we had with the Airborne Solar Battery Charger (see Sept. '81 issue of Model Builder), the next obvious step was to come up with a Solar Battery Charger for transmitters. There are a number of possible approaches to this problem, but it seems best to try for a design that would keep the transmitter battery up to full operating voltage throughout a whole day of use, even in partly cloudy weather. The charger should be portable (say, less than 5 pounds, smaller than a bread box, etc.). It should be reliable (100% solid state) and rugged enough to step on or drop without any damage.

Well, this one meets all these requirements and then some. This Solar Transmitter Battery Charger is physically STRONG, in fact, it's almost bulletproof. It's reliable; all the solar cells, hookup wires, and voltage control devices are sealed in plastic resin, and over-engineered for long life. It is conceivable that if you use a reasonable amount of care in construction, this solar battery charger could last for HUNDREDS of YEARS! This is something that you could pass on to your grandkids!

The charger is not very large, about $8 \times 8 \times 1$ inch thick, and the prototype weighs less than two pounds, so it is quite portable (it can even be hooked on your belt). Hey, sailor, it floats! And it's very corrosion resistant.

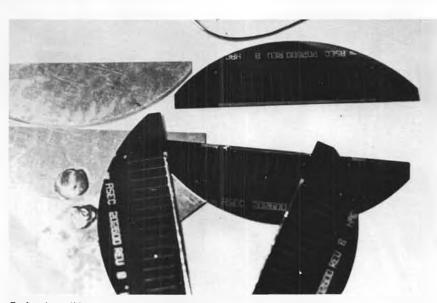
It is true that over the years the plastic begins to turn a little yellow from the sun, but this condition stabilizes at a loss of solar cell efficiency of less than 6 or 7%. In fact, the solar cells themselves actually improve in efficiency over the years, so the gains and losses just about cancel each other out. HERE IS HOW IT WORKS

Most everybody's R/C transmitter uses 9.6 volt NiCd batteries. The batteries themselves are rated anywhere from 400 to 800 milliamp/hours, but the most anybody can normally expect is 3 to 4 hours of use before a recharge. Most transmitters consume electricity at a continuous rate, usually between 125 and 175 milliamps (even the big 6-channel jobs don't draw more than 175 milliamps). It's true that some old fashioned jobs work on 12 volts and some suck up as much as 250 milliamps, but read on.

The Solar Charger puts out between 50 and 150 milliamps at 10.6 volts, depending on sky conditions. This means that on a partly cloudy day your trans-



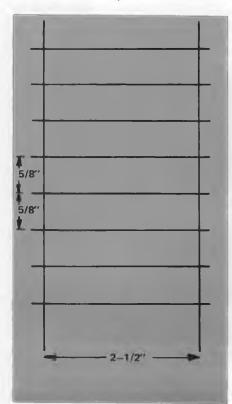
Pyrex potting dish, fiberglass cloth, and various epoxy/casting resins that can be used to construct this easily-made transmitter solar cell charger.



Each solar cell is prepared with a bead and a spot of solder. When overlapped and placed in oven, the cells join together. Text describes technique in detail.

mitter could operate continuously for up to 6 hours. On a bright day you could turn on the transmitter at 6 AM and it would run all day long and right on into the evening! On the days when you are not flying (or soaring, or sailing, or racing) you just prop the charger up in the window to catch the sun (30 minutes per day is enough) and your transmitter is ready whenever the mood strikes to go.

Each little solar cell puts out about 150 milliamps and about 0.5 volts, so to make a charger they are hooked up in a long string (a series circuit) of 24 cells (30 cells for a 12-volt charger). A string of 24 cells produces a little over 12 volts in bright sunshine, so we add some voltage regulation diodes to bring the output down to about 10.6 volts (13 volts for a 12-volt



charger). There are three of these, a blocking diode to prevent discharge when it's dark, a Zener diode to bypass all excess over-voltage, and a pullup diode to set the output at exactly the voltage we want (see diagram). What appears to be wasted electricity, (the difference between 12 volts and 10.6 volts), is really insurance for those partly cloudy days. It should be noted that on days when it's solid overcast (and raining so you don't want to fly anyway) the solar charger doesn't put out very much at all.

THE ACTUAL CONSTRUCTION

The whole thing can be put together in 2 or 3 evenings and doesn't require any special skills except patience and a steady hand.

You will need a 25 to 75 watt soldering iron, a kitchen oven capable of heating to above 500° F., and a relatively flat surface a little larger than this magazine.

The parts required are:

* 24 solar cells (30 cells for a 12-volt charger, more on these particular cells

later).

 two silicon rectifier diodes (1N4001 or equal, these are very common, cost about 10¢ each).

* one 10.0 volt, 5%, 5-watt Zener diode (1N5347A or 1N5347B, second choice is 1N5347, 1N5348, or ECG 5125, or equal, not so common, not so cheap, about \$1.75).

* a miniature plug and jack (to fit your) existing jack on your transmitter, however, I hooked up a separate jack because the power switch on my transmitter cuts the existing jack out of the circuit when it's turned on).

* about 5 or 6 feet of #18 to #22 stranded, polarity-marked, insulated zipcord (if you are really brave, you can get the plug and zipcord by cutting it off your existing plug-in-the-wall charger).

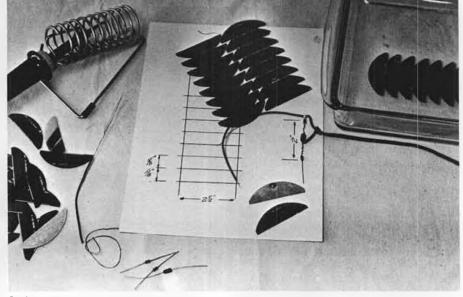
* a piece of construction grade plywood (or better) cut to a 7-inch square.

* a piece of woven fiberglass cloth

also cut to a 7-inch square. * about 12 fluid oz. (3/4 pint) of casting resin (clear) and catalyst (Chemco water-clear polyester, Tapox "50/50" clear epoxy resin, Tapox "4-1" clear epoxy resin, Chemco Ultra-Glo clear plastic resin, K & B Super Poxy Clear Polyester Resin or equal from your hobby dealer or larger hardware stores or from body and fender shops).

* You will also need some candle wax (or a commercial mold release), some small diameter (1/32) rosin core solder (for electronics), and a Pyrex cake dish (8 × 8 × 2 inches deep, available at almost every TG&Y, K-Mart, some hardware and larger supermarkets, or kitchen supply stores, less than \$5.00).

Heat up your soldering iron and lay all the solar cells on top of a piece of clean white paper (this will prevent the hot cells from picking up any crud that might not come off when they cool down). Carefully deposit a small amount of solder at the top of the rounded part of the cells on the shiny side (see the photo and stay away from the edge by about 1/8 inch). Do this to all of them



Grid serves as guide to oven-solder cells in three rows, which are then joined in series. Diodes are pre-assembled and connected to transmitter lead.

and turn them over so the blue/gray side is up. Note the grid pattern. The broader grid line that runs across the bottom edge is where the contact is made.

Trying not to let any solder run over the edge, deposit a *small* amount of solder all along this wider grid line. After you have done about 6 or 8 of these you will be a pro and can go back and redo the first few. Start in the middle, heat the cell for 2 or 3 seconds, add about 1/8 inch of solder, slowly move the iron toward one end, then back across the middle to the other end, adding a touch more solder as you go. The solder obediently flows right along behind the iron in a nice little trail about 1/32 wide and about 1/64 deep. Sounds hard but it's quite easy.

After all the cells are done, draw some lines on the piece of paper as shown (8 horizontal, 5/8 inch apart, and 2 vertical, 2-1/2 inches apart ... looks like a railroad track). Place the Pyrex cake dish on top of the paper, lay 8 of the cells in the dish, blue/gray side up, use the line drawing to center the cells so they overlap and the soldered areas are in close proximity. Take your time and line them up on one of the "rails" and the straight edge of the cells lined up with the "ties".

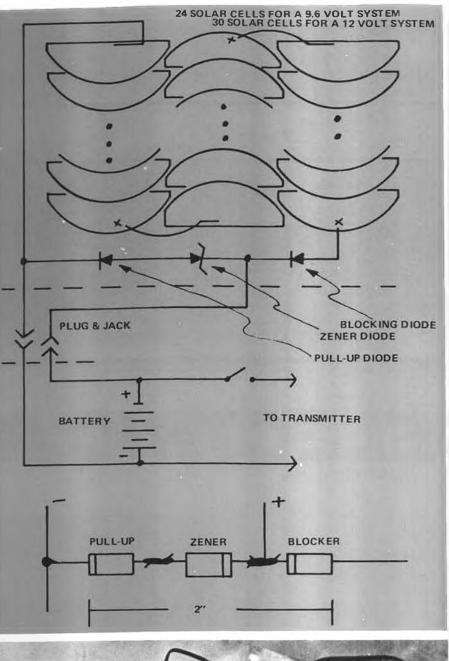
Preheat your oven to 500 to 550° F. Set the Pyrex dish and cells in the oven carefully (don't tilt the dish). Wait 15 minutes, leaving the oven set on preheat. Turn off the oven, open the door and let it all COOL DOWN (too hot, and the solder is still liquid). Remove the cool dish and take out the solar cell array. If they tend to stick to the dish, pour in a little alcohol (rubbing or denatured) or some acetone or fingernail polish remover to dissolve the rosin that is holding the cell array down (don't try to bust them loose or you will only bust them).

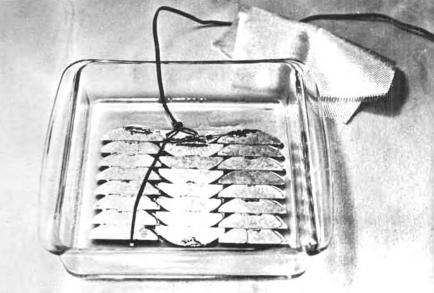
Make the other two cell arrays in similar fashion.

If you want to test the arrays, touch (don't press) the leads of a voltmeter to the grids of the first and last cells in the arrays. Should be about 4 volts in the sun or about 0.6 to 1.2 volts under a 50 watt light bulb!

Lay the solar cell arrays out as shown and prepare some wires to inter-connect the arrays. To do this, cut about 7 inches of wire from the zipcord. Separate the two wires and strip all the insulation from one of them. Twist the strands together and cut it so you end up with 2, #18 to #22 bare stranded wires about 3 inches long. Strip about 3/4 inch from the ends of the other wire so you end up with a piece of insulated #18 to #22 stranded wire about 7 inches long with stripped ends.

Examine the three diodes, the Zener diode is the larger one. All the diodes have white (or colored) bands around them close to one end. Orient the diodes according to the cartoons and photos and twist the leads together so that the bodies of the diodes are about a 1/2 inch apart and in a string about 2





Complete solar cell assembly is laid over first pouring of epoxy, pressed into the semi-hardened material, and then more epoxy glass cloth, and plywood are added.



The quiet before the electrical storm at Mile Square! Bob Sliff's neat winning Rearwin Speedster reposes in the foreground. Fournier RF-4 looks quite small alongside 1/4-scale Farman Moustique. Photo by Bob Boucher.

ELECTRIC POWER

This year, I chose to go to the IMS indoor R/C scale meet instead of the annual electric championships sponsored by Astro Flight and Model Builder, a hard choice to make. Both were within a week of each other, and both were in California, a thousand miles from where I live, so both time and money ran out. However, Bob Boucher very kindly sent me all the details and photos for the R/C events of the seventh annual meet, held at Mile Square on January 18th, so now I'll give you his account. I had really intended to do this sooner, but better late than never!

The weather was beautiful, clear blue skies and a gentle breeze, a welcome



Roger Chastain's Porterfield Collegiate utilized an Astro-15 belt drive system. Note wing tip skuff-gards! Fine bird finished fourth in the scale event. Bob Boucher photo.



Winners! Back row (I to r) Ross Thomas, Annie May and Tony Naccarato, Dale Black, Steve Mangenelli, Ken Banks. In front, Bob Sliff, Bruce MacAvenew, Steve Nev. Bob Boucher photo.



Annie Naccarato's Farman, thrid in scale. Model was 1st at indoor I.M.S. in January. Astro 020 belt drive, 5-cell battery was motivation. Cannon radio. Bob Boucher photo.

MODEL BUILDER



Karl Binder, of West Germany with stretched wing Jetster and Geist equipped electric fan. K. Binder photo.

change from the 20 mph winds of the year before. The four R/C classes were Sailplane, Old Timer, Scale, and Aerobatics. Radio controlled sailplane was a hotly contested event and many different design philosophies were evident in the competing models. The eventual winner, Steve Neu, had a fast and rather heavy wing loading FAI type model with

a direct drive Astro 15. The climb was relatively flat, but very fast, and it got a lot of altitude in the allowed two-minute motor run. The other extreme was Dale Black's Miss Fragility with an Astro 075, turning a 10×7 Zinger prop through the Astro Flight speed reducer (3:1). This model was quite light and climbed out at between 30 to 40 degrees! It got the

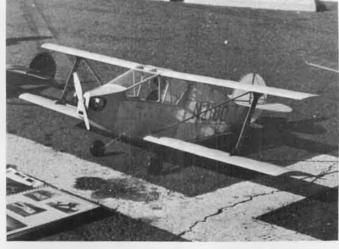
RESULTS

R/C Sailplane (12 entri	es)						
1. Steve Neu	Original Design	Astro 15 direct drive	1268 pts.				
2. Ken Banks	Ocitillo	Astro 05 belt drive	1253				
3. Dale Black	Miss Fragility	Astro 075 belt drive	1092				
4. Ross Thomas	Playboy	Astro 15 belt drive	1065				
R/C Old Timer (3 entri	ies)						
1. Bruce MacAvenew		Astro 15 belt drive	1116 pts.				
2. Ross Thomas	Playboy	Astro 15 belt drive	1102				
3. Bob Sliff	Playboy	Astro 10 belt drive	1065				
R/C Scale (10 entries)							
1. Bob Sliff	Rearwin Speedster	Astro 15 belt drive	15 pts.				
2. Tony Naccarato	Sorell Guppy	Astro 020 belt drive	14				
3. Addie Naccarato	Farman Moustique	Astro 020 belt drive	14				
4. Roger Chastain	Porterfield Collegiate	Astro 15	13				
5. Steve Neu	Cessna Citation	Twin Astro 020	11				
R/C Aerobatics							
1. Steve Neu	Tri Star	Astro 05					
2. Steve Mangenelli	Devil	Astro 05					
3. Bob Sliff	Air Chief	Astro 15					
4. Roland Boucher	Electra Fly	Astro 05					
Overall Grand Champion (all events) — Steve Neu							

highest by far on the two-minute motor run. Yet another variation was Ross Thomas's Playboy old timer which was entered in both the sailplane and old timer categories. All of these planes are capable of maxing (seven minutes) on the two-minute motor run in still air.

The old timer event was a close race among Bruce MacAvenew (Long Cabin), Ross Thomas (Playboy), and Bob Sliff (Playboy). They all got maximum flight points in each round, and the landing points were all that separated first, second, and third place. It was interesting to note that the Long Cabin won, since the Playboy has dominated the electric old timer contests in California for the past three years (hey, wait a minute. Bob, I won first in the '78 and '80 championships with a Berkeley Brigadier! Mitch).

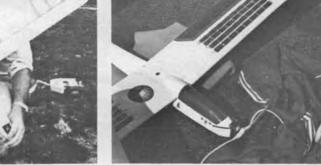
The scale event is a real crowd pleaser and is my favorite. This year there were ten entries, but only one was a twin engine model. The rules give extra points for twin motors, and since twin motors are so easy with electrics, this is a good opportunity for extra points. Bob Sliff took top honors with his beautiful Rearwin Speedster built from Cleveland



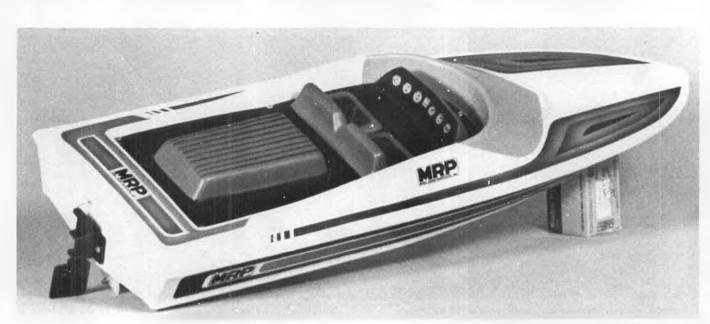
Sorrel 'Guppy' by Tony Naccarato, placed second in scale event. Astro 020 powered model, also flew indoor at IMS show!



Kim and Cynde Waddell receive O.J.T. from Jim McDermoth on his model of the Hummer I. Power by VL Hytork. Bill Stroman photo.



Larry Blakey's Super Monterey uses solar panels to power receiver. Big panel charges motor batteries. Bob Boucher photo.



The new MRP Vee Sport Electric; high performance and realism.

R/C POWER By JERRY DUNLAP

THE CURRENT THING IN

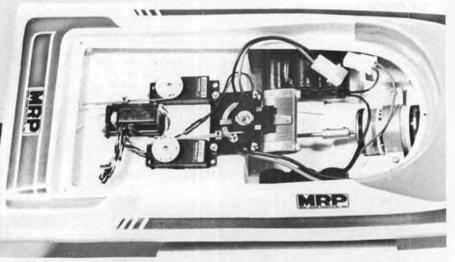
MODEL BOATING... OR WATTS NEW? Although there hasn't been too much coverage given to electric powered model boats in this column, mention has been made of a few happenings in the electric boating area. I personally haven't been active in the area of electric power for boats, however, I've felt for some time that this power source hasn't really received the attention or publicity it should receive. Hopefully, the material in this article will help increase interest in this form of model boating.

One of the possible reasons for the

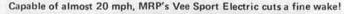
lack of interest in using electric motors for powering race type boats has been the absence of competitive equipment. With the surge of interest in electric race cars, equipment suitable for model boating application is becoming much more readily available. Manufacturers *Continued on page 75*



Paul Dunlap displays Vee Sport. Excellent boat for youngsters starting in the hobby.



Clean installation. Foam radio mounting system also serves as floatation.









ABT BALLER A commercial for Dynamic

By ART BAUER ... A commercial for Dynamic Models? Well maybe. But all you get is a fiberglass shell, and the rest is up to you. This will help you through the scratch-building of most any similar scale R/C power boat. PHOTOS BY AUTHOR

PT Boats in WWII were "weapons of opportunity" that carried the fight to the enemy on a variety of missions. They met the enemy at closer quarters, and with greater frequency than any other type of surface vessel.

Built originally to perform the mission that their name, patrol-torpedo boat, implied, they wound up being used as sub-chasers, assault support vessels, gunboats, etc. Their armament varied from the original two twin .50 cal. machine guns and four torpedo tubes,



Completed hull framing. Note temporary spreaders, also gussets and deck supports.



Astro 25 lined up with shaft before epoxying mount. Vertical extension for lubricating.

to vessels equipped with 20mm., 37mm., 40mm., and 75mm. guns, depth charges, and 4.5 in. and 5 in. rockets.

PTs varied in size, the first experimental boats, which were copied from a British design, were 70 footers. These were found to be too small to carry four standard 21-inch diameter U.S. Navy torpedos, so the next set of boats were increased in size to 77 feet overall, models of which saw service at Pearl Harbor and the Philippines at the beginning of WWII.

Demands for a more seaworthy boat that could carry heavier loads led to the 78 foot model by Higgins, and the 80 footer from Elco. These two boats became the standards for the Navy. Elco turned out 320 of the 80 footers, while Higgins produced 205 of their 78 foot boats.

PTs were designed for speed, and in their speed was their beauty. They were squat and beamy lying dead in the water. As a PT gained speed, it lifted it's bow clear of the water and began to plane over the surface, throwing out water from the chines on either side and a



Keel and shaft housing (stuffing box) held in place for epoxying.

rooster tail astern.

As fast as they were, the speed of PTs have always been exaggerated. They did not make 70 knots, or 60 knots, or even 50 knots. With proper maintenance, ie: a clean bottom, engines tuned up, and with everything just right, a PT could be expected to turn around 40 knots (45 mph) without difficulty under a normal war load. In looking for a scale model boat, simple to construct, that would perform at high speed, what better subject then a PT boat?

The model presented here is of a



Chines and rub rails are soaked and bent to shape in this manner, before gluing.



All decking in place, ready for trimming to rub rail. Straight sheer line simplifies.



Rear/middle cabin assembly ready for finishing. Cabins joined by turret and shields.



Model clamps hold parts in position, but "Super-Jet" provided "no wait" gluing.

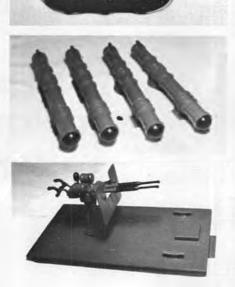


Further sub-assembly of front cabin. Inside fillers located to avoid inset of gun turret base.



Front cabin top and front pieces glued in place. Windows cut parallel to roof line.

typical WW-II78-foot PT boat in 1/2 inch scale, built using the fiberglass hull, plans, and accessories available from Dynamic Models, Drawer 'C', Port Jefferson Station, New York 11776 (catalog \$3.00, refundable). Typical is the word used, because as soon as these boats left the yard after commissioning,



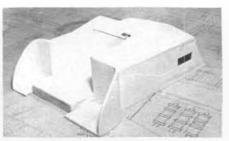
Life raft, torpedo tubes, and 20mm guns made from Dynamic Models kits.

they were "customized" by their crews and no two ever wound up alike, even when in the same squadrons.

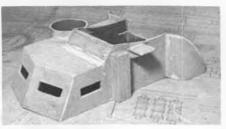
It is easy to build, and when running, is fast and maneuverable, and gives the appearance of a full size boat with the water thrown out in a scale manner. HULL

Sand the inside of the hull where the deck framing and the running gear components will be installed. This is to remove the surface wax of the resin used in the hull lay-up, and will insure a good bond between the fiberglass of the hull and any parts that may be glued to it.

Fit 1/4 sq. spruce strips to the top edge of the inside of the hull. You will have to kerf an area about 12 inches long in the bow end of each of these strips to get a good fit to the curvature of the hull. Soak these strips and clamp them in place until dry so that they will assume the correct shape. After they are dry, glue them to the hull along the top edge of the hull. After the glue has set, fill in the kerfed areas with body filler and sand them level with the hull top edge.



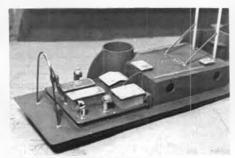
Front cabin, with entranceway armor plate and floors in place. Windows parallel to roof.



Completed front cabin, ready for paint. Note blending of turret base and antenna support.



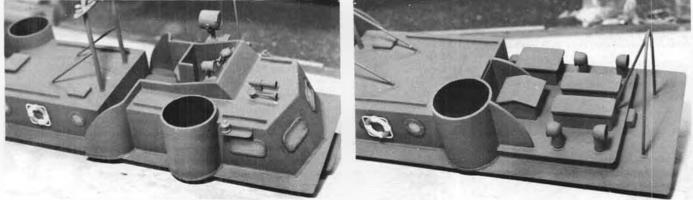
Completed machine gun mounts. Guns salvaged from old plastic airplane kit.



Rear cabin superstructure, with all detailing, ready for flat Navy gray painting.

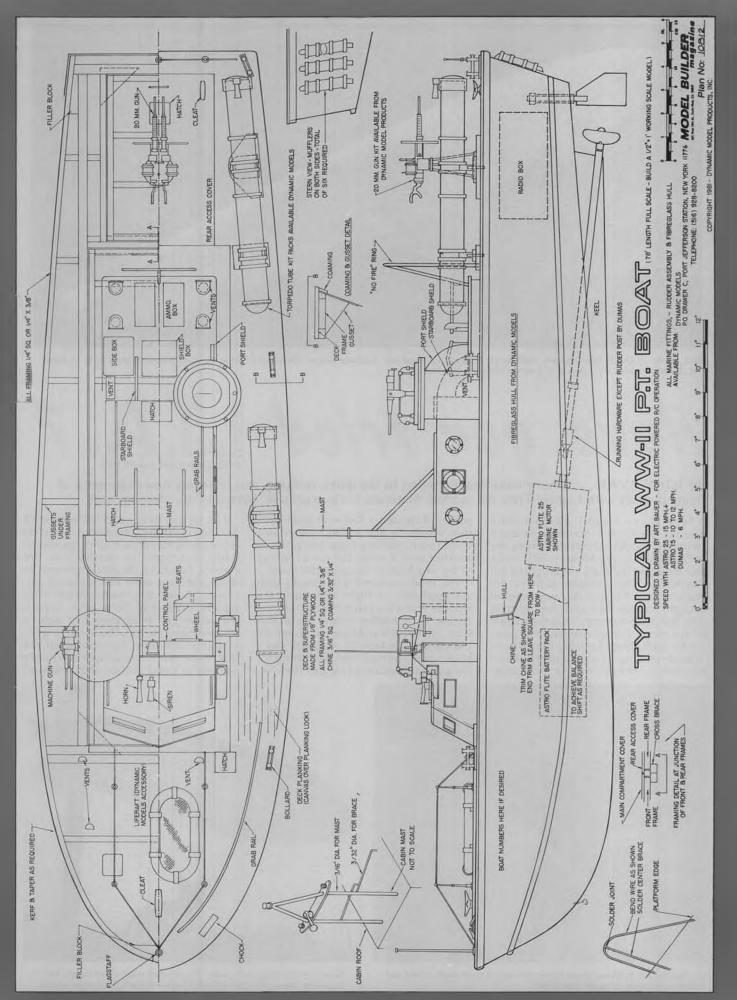
Cut and fit the 1/4 sq. and $1/4 \times 3/8$ spruce strips for the remainder of the deck framing as shown on the plans, making sure that the interior frames, where the superstructure and rear access hatch frames will fit, are square.

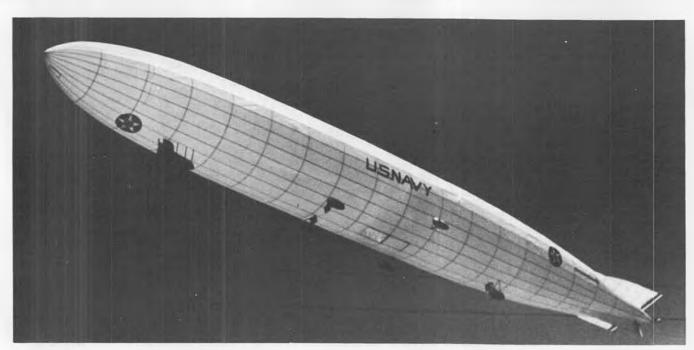
Continued on page 88



View of forward superstructure, with detailing and flat Navy gray paint. Machine guns still to be fitted.

Rear cabin superstructure, shown above, with flat paint added. Ventilators are operative for motor and battery cooling.





Scale model of U.S.S. Shenandoah, made from 1/16 square balsa and Japanese tissue. Though 13 feet long, small diameter gives only 15 cubic feet. Lack of useful lift limits it to electric powered free flight.

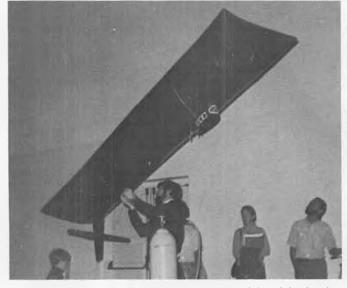
By TONY AVAK ... A very tempting invitation to the quiet, relaxing, and relatively new experience of flying indoors with Lighter Than Air models. Materials are inexpensive. Save that dry-cleaning bag!

ave you tried

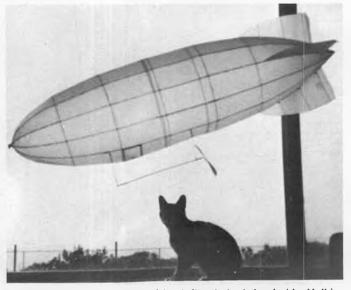
• Several years ago I was fortunate enough to take a Summer Science course in model aeronautics from the Los Angeles County Museum of Science and Industry. The class was taught by Bill Warner and his student assistant Bill Watson. On the first day we were all brought in together and saw, turning slow but deliberate circles in the middle of the room, a small rubber band powered model blimp. I was fascinated by its uniqueness and its ability to fly almost effortlessly through the air. All rubber powered models I had ever built until then would fly like a bird trapped in a small room, dashing from one point to another until it either ran out of energy or lay in a broken heap on the floor.

This model seemed to fly forever, with a smoothness of flight that made me wonder if it wasn't suspended from the ceiling by a hidden string. Since that class, I have built and flown many model blimps and airships of my own, but I have never lost my initial fascination for the grace and beauty of Lighter Than Air. For the past three years I have entered R/C blimps at the International Modelers Show in Pasadena, California, developing techniques in construction and control that have steadily improved as new problems were encountered and solved. There is still much to learn in this rapidly expanding field, with experimentation and innovation just waiting for someone to try. The interest generated at the show has convinced me that there are many people who have wanted to build airships, but few who

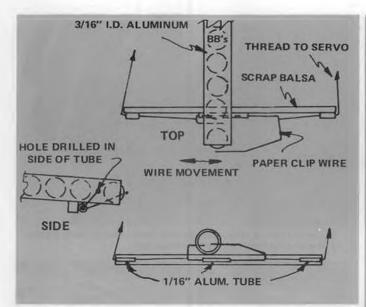
PHOTOS BY WIL HARKINS



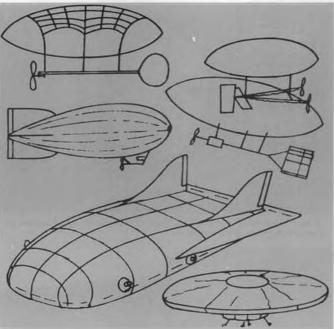
Airship by Keith Shaw, made from two plastic trash bags joined endto-end with tape. Is radio controlled.



Small rigid airship (3 ft. long) has inflated plastic bag inside. Hull is Japanese tissue on 1/16 sq. balsa frame. Weighs 3/4 ounce empty.



Sketch of BB drop mechanism. Sliding paper clip wire is pulled from side-to-side by thread attached to elevator servo. As one BB drops, the rest are held back by part of wire going through tube. Cut-and-try this one!



Variety of possible experimental design shapes. Use your imagination to create more.

knew how to start. It is for these people this article is written; to introduce simple building techniques so that anyone can begin construction of their own model airship.

For the most part, all model airships must be considered as indoor models. Unless sufficiently powered to fight headwinds, thermals, gusts, and other common atmospheric disturbances, your ship is likely to be carried away and never seen again. Unlike conventional aircraft, airships do not fly so much as float. They need just as much power and control to go down as up. I have a friend who built a series of R/C blimps from taped-together plastic trash bags. He lost one gas powered model when he flew it outdoors and encountered difficulties in control. He called a local radio station to request an announcement: Be on the lookout for a lost flying model trash bag blimp. It must have been an interesting broadcast.

The cost of building and flying a blimp is like any other field in modeling: it depends on what you want. The materials needed to make a small one can already be found in most households. Larger models need more sophisticated materials for construction, but the cost can usually be compared to that of a small glider.

Helium is the only gas you should use to inflate your model. It is a perfectly safe gas (non-flammable, non-toxic), easily available from welding supply shops or party catering businesses. The small percent extra lift you would get using hydrogen gas is not worth the extra hazard of handling it. Hydrogen is a powerful explosive when mixed with even small amounts of air, and is capable of being set off by electric sparks or cigarette flames. (Remember the Hindenburg! wcn)

Tanks are available at different sizes

and costs. I usually rent an 80 ft³ tank for \$16 (plus a tank deposit), with another dollar for a balloon filler valve. This is enough to fill the largest of my ships four full times. If you want to make it a club project, you could get a larger tank and fly several models at once.

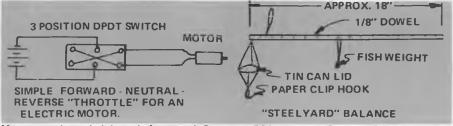
The advent of smaller radios has made blimp radio control more practical. My personal favorite has been the Cannon super-micro system which (with a 100 mah battery) weighs only 2.9 oz. for two and 3.4 oz. for three channels. By stripping the system down, you can reduce the weight by another 0.4 oz. Because of the slow speed and lack of vibration, there is no need for the protective cases around the receiver or batteries. I also remove them from the larger styles of servos. When the weight of a paperclip can make a noticeable difference in a six foot model it helps to remove weight wherever you can.

There are a variety of materials available from which to make blimp envelopes. For beginners and experimenters, half mil (half a thousandth of an inch) polyethylene plastic is the easiest to find and work with. You can buy it at any local hardware store as a plastic drop cloth, or pick it out of your closet as a dry cleaning bag. Trash bags work well when using the tape method of construction, but I have had trouble using my heat seal method on it. (To be explained shortly.) Bill Watson has used Gold Kapton for his airships. It holds helium well, but is subject to fatigue and cracks after a period of use and wear.

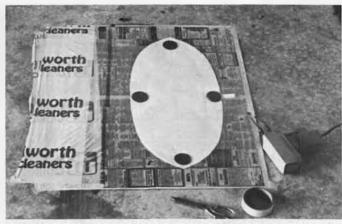
My personal favorite is half mil mylar plastic. I have found it to be the strongest and most gas containing material I have used. Although sometimes difficult to find, it is worth the effort. It is available in both clear and aluminized form, the aluminized holding helium the better of the two. If not available in your area, I can recommend a couple of plastics distributors in the Los Angeles area that can supply it for you. All of these plastics are available in larger thicknesses, and you are welcome to use whatever works best for you.

There are two basic methods of making the bag: tape and heat sealing. Taping gives the cleanest, best looking bag. Heat sealing, while producing a somewhat wrinkled product, is by far the fastest, lightest, and easiest technique. In a recent issue of Model Aviation, Lou Bruhn detailed the tape method of construction. I won't repeat his article, but briefly it consists of cutting out the plastic gores and then carefully taping the seams together. He required about a week of work and produced a good, clean bag. My method of heat sealing can be done in a single evening and is ideal for most modelers.

Sealing is done with a common



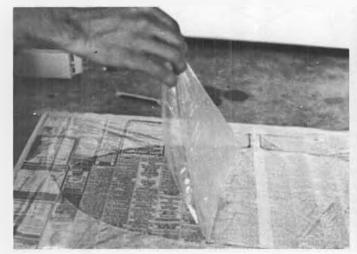
Motor reversing switch is made from stock 3-position DPDT switch. "Steelyard" balance is described in text. Tin can lid has about 1/2-oz, of solder added to bottom for balance.



1. Everything ready to make bag. Doesn't take much. Note outline of inflated bag inside cutout pattern.



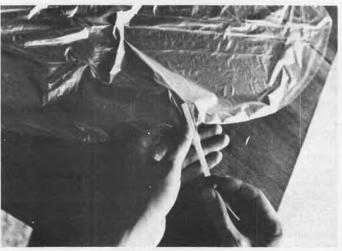
2. Cutting part of filler tube opening. Piece of wood holds pattern and also guides movement of soldering gun.



3. After running iron completely around pattern, the bag is carefully lifted away to avoid tearing.

soldering gun. Use a plastic cutting accessory if you have one. This narrow knife-edge attachment reduces the amount of plastic actually melted and is much easier to work with. Soldering irons might work, but I like the control that you get with a trigger and handle.

To make a bag, the first thing you need is a pattern. How big should it be? My rule of thumb is V=1/2D²L. That is, volume equals one-half the diameter squared times the length. Helium is easy to calculate with in that it has a direct ounce-to-cubic-foot ratio. For example: If I made a bag seven feet long and two in diameter (a 3.5 firmness ratio), it would have a volume of 1/2(2)²x7, or 14 cubic feet, able to lift 14 oz. of weight. Because bags don't always inflate completely round, I usually estimate the volume as 20% less than my initial weight-volume calculation. That is, our 14 ft³ bag would actually lift closer to 11.2 oz. when inflated. Even so, volume can vary a great deal depending on the shape of the bag. A more pointed or



4. Soda straw filler tube is attached with plastic tape. Plug tube with clay or small cork. Fill with dry air to test seam.

streamlined bag could have as much as another 20% removed from its calculated volume.

What is a good length/diameter ratio? I like to think that 3.8 is a good number to figure with. It is a good compromise between streamlining and volume. With only a few calculations, you can see that diameter has a much greater effect on volume than length, but don't get carried away. Airships with less than a 3.2 fineness ratio begin to have stability problems at relatively low speeds and



Simplicity of model speaks for itself. Tape motor stick to bag as shown, fill with helium, and you're ready to go.



By using a detachable motor stick, various configurations can be tested using same bag.

require larger (not to mention heavier) vertical fins to keep the nose forward.

Well, now that you've decided what you want it to look like, let's make it! Your next step is to draw a full sized pattern on a large piece of paper. I usually just tape newspaper together until I've got enough. Keep in mind as you draw your pattern that when it is inflated it will round out, so your pattern diameter must be larger than your desired result by a factor of /2. Your bag will also shorten, but the effect here is not as noticeable. Be sure to leave a place for a filler tube for your helium. On large bags I now have two: a small soda straw for filling and a large (3/4 inch) tube in the tail for quick deflation. I use a small cork or piece of clay to plug the straw, and a tight fitting plastic cap to cover the large tube.

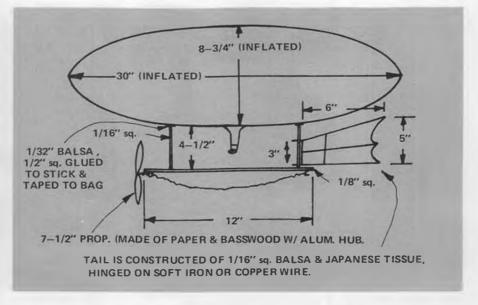
Spread the plastic of your choice on a smooth concrete surface. The floors of most garages are ideal, but if you think yours may be too rough, a layer of newspaper may serve as a protective surface. Be sure that your floor is scrupulously clean, to avoid any sand or grit from wearing into and puncturing the bag as it is being made. I usually damp mop our garage floor before construction.

If you are using aluminized mylar, be careful to have the plastic side in, the metal side out, otherwise the heat seal will not stick.

With two layers of plastic gently stretched across the floor with tape, place your pattern on top and hold it down with small paint bottles (or something similar) to keep it from shifting around as you work. The plastic must be pressed together when you seal it. To do this, take a short, straight stick, place it on the inside edge of your pattern and, holding it down gently, draw your hot iron along the edge. The stick presses the plastic together, gives you a firm, straight line, and helps hold the pattern down as you work with it. I have found that designing a bag as a series of short (3-4 inch) straight lines is not only easier to build, but also gives a better looking bag when inflated. Be sure to overlap your heat seals as you make them, and watch out for smoldering paper! Setting fire to your project will almost certainly cause a delay in the building procedure.

Work quickly and smoothly. Too fast, and you may miss some spots or apply inadequate heat. Too slow, and you concentrate too much heat at once and melt excessive plastic away. Practice on a few pieces before you make the actual bag. Speed varies with the type of plastic used.

Gently lift the pattern off of the plastic, and then pull the plastic from the floor. Watch out: you don't want to tear your new bag. If all looks well then you may tape your soda straw filler tube to the bag and proceed with air inflation. Use only dry or room air. Don't inflate it with your lungs. The moisture from your breath will condense inside, making a wet, heavy bag. A hair dryer blowing cool air works well. If the air is hot it will



Dimensional sketch of blimp in construction photos. Finished model weighs 0.30 oz. without helium, which allows small amount of useful lift for ballast. Power is 24" loop of 1/16 sq. rubber, which easily produces flights indoors of better than 5-minute duration.

give the illusion of a leak in the bag as it cools to room temperature and decreases in volume.

Look for a slow, steady deflation of the bag when under a very slight pressure. Even an apparently small (1/16) leak in the heat seal will become obvious in a few minutes. Scotch tape makes an excellent patch. It is important to the performance and pleasure of your model that you get all of the leaks now if you can. It is very annoying to have to remove weight or reinflate your model every few minutes once you are flying.

That's all there is to the bag! Attachment of the bag to the rest of the model can be done with more scotch tape. How it is done depends on the model. Small blimps need only one or two points, where larger airships would need many to minimize the stress on the material at any one point. I find that a pair of 1/8 or 3/16 square balsa pieces taped to either side of the bag with the frame suspended below by thread works very well. It is a good idea to make the bag detachable if possible. It adds a versatility to the model, like changing wings on a model plane. You can use one bag for more than one frame, trying several different ideas of power/control variations without making several bags.

There are many ways to design the rest of your model. There are only a few general rules to follow. Keep the center of mass of the model (there is no real balance point when ready to fly) directly below the center of volume of the bag, otherwise it may need extra weight just to balance it nose to stern. On larger models, a system for dropping small amounts of ballast by radio is very useful. This can keep the ship in trim as it flies. I've included a sketch of my favorite method that drops one BB at a time when using extreme (trim included) updown movement of the elevator. Water ballast, released one drop at a time, is another method.

Another feature that works very well is pivoting motors. In the 1930's the Navy airships Akron and Macon had propel-*Continued on page 100*



Tony also builds HTA (Heavier Than Air) models. The Eclipse was featured in Oct '74 American Modeler. Span 15 feet, weight 7 lbs, 2 oz. Red transparent MonoKote covering.



4. Joe Ott gives Ed Konefes's "Cloudsnooper" the once over. Probably wondering if it's a SoLong. Both from Chicago.



2. Bruce Chandler, free flight CD, with his next weigh-in system. Ran a great meet. Jay Jackson watches.



• "Welcome to the Fifteenth Annual SAM Champs" was the greeting extended to those modelers who had heard and read about Taft, the mecca of free flight. The immense area available for free flight models is absolutely awesome, and those modelers who came from England, Canada, and South Africa were in perfect agreement.

However, one of the big drawbacks to Taft is the lack of local accommodations, forcing many modelers to commute between 30 to 45 miles each way, as Buttonwillow and Bakersfield are the closest with large motels. Noted on the field proper was a big contingent of campers, house trailers, tents, vans, and shelters quite reminiscent of the U.S. Free Flight Champs held the month

By JOHN POND

before over the Memorial Day holidays. Rather than try to describe a large

three-day meet of this stature, the columnist will present a series of photos and comments on the SAM Champs that should give an excellent insight on what happened.

Photo No. 1 just about sums the meet up. Tom Alden, a Canadian from Vancouver, B.C., is caught in the act of launching his rare Daniel Clini Record Tractor. Note clear skies, complete absense of clouds, the bronzed skin attesting to the abundance of sun, and the lack of attire indicating the heat. Temperatures over the three days started at 102°F and finished off at 106°F.

Most of the modelers were aware of the expected hot weather and came well

prepared, bringing tents, shelters, and flys that provided an abundance of shade. There was very little complaint of heat exhaustion or sunburn.

Photo No. 2 shows the fellow responsible for the well-run free flight events. Bruce Chandler used his house trailer as headquarters and all processing paraphernalia. Many Contest Directors would do well to notice the excellent weigh-in scale that completely clears all obstructions.

Photo No. 3 depicts the other end of the field, the R/C Assist end, with Otto Bernhardt and Joe Ott looking over Dick Huang's Shereshaw Cumulus entry.

Otto was a last-minute replacement for John Targos, who was the scheduled C.D. for R/C. Imagine being called the night before the contest starts and being asked to run a meet. Otto gathered his family; wife Marge, and sons Phil and Mike, to organize and run the events. Of course, there were a few stumbling blocks, but you can't knock volunteer help.

Incidentally, Phil Bernhardt was in charge of the Electric Event sponsored by the Electric Model Industries, headed up by Bob and Roland Boucher. Only six



3. A gang at the R/C weigh-in station. Otto Bernhardt and Joe Ott looking over Dick Huang's Shereshaw Cumulus.



1. Tom Alden, Vancouver, B.C., displays little-seen Daniel Clini Record Tractor (JASCO 1935 Yearbook).



6. Charlie Werle placed his Willian Ying Class D Record model (1934 JASCO Yearbook) with only two official flights.

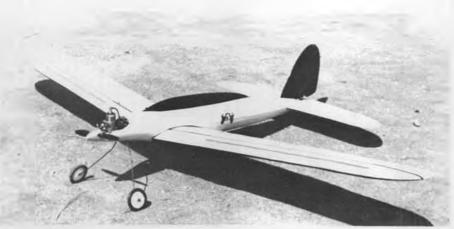
competitors, but rather startling in view of the fact the event was only announced five days before the start of the meet.

All models entered were Playboys, with the exception of Pond's entry, a Turner Special. Most all models used Astro 10 motors, while the columnist's model contained the large, heavy Astro 25. Guess who was dead last?

Also in the picture is Joe Ott, who was invited to the Champs by the writer. Originally, Ott had come to Seattle for some first class fishing, or so he thought. Getting "skunked", he contacted Teen Becksted living in the San Francisco Bay Area. It was only a matter of time until the twosome contacted the columnist for a good old fashioned get-together.

Upon being invited to attend the SAM Champs, Joe Ott thought this was a great idea and his enthusiasm was transmitted to Teen, who took Joe to Taft. The writer took Ott in tow and promptly introduced him to many of the modelers who had cut their teeth on Ott models. It was simply great the stories that arose from various modelers about their experiences with Ott and his models.

In conversations with Joe Ott, the best remembered feature of Joe Ott kits was his "Ott-O-Former" style of building that set the pace for a style of construction that allowed many a modeler to



7. Ross Thomas built this unusual Col. Bowden low-wing design, the P.L.W. No. 4, a 1937 model.

easily construct that tough former model.

Brought out during the gabfest was that Joe had not been in the kit manufacturing business for the past twenty years. He had dropped the model business in favor of a packaging and merchandising business.

In his heydey, Joe Ott employed 600 people, turning out 38,000 kits a day!! This is a true picture of Joe's unflagging energy and devotion to the modeling game. A popular anecdote about Joe concerns the time he was selling kits to department stores and large chain operations. Upon being informed by one large operator that his 30-inch kit was too large and cost too much (probably 25¢ or 50¢), Joe Ott promptly went home and designed up a series of 15inch models for the minificent sum of 15¢. Appearing two days later, he made an immediate sale for several million kits. What energy!

Photo No. 4 is another shot of Joe Ott with an old time friend, Ed Konefes, brother of Joe Konefes of Buzzard Bombshell fame. The model under discussion is Ed's design, called a "Cloudsnooper".

Ironically enough, Ed had contracted with Aircraft Model Co. to produce his Cloudsnooper (looks like a king size So Long, but according to Ed, it was the other way around with Bill Englehardt



Roland Boucher with his 67-inch Playboy powered by Leisure 05 motor; speed reducer, six 600 mah Sanyo batteries, 32 oz. weight.

adopting the salient features of this design). Just before going on a production basis, brother Joe won big at the 1941 Nationals with the Buzzard Bombshell.

With so much national attention being generated, the Aircraft Co. dropped Ed's design in favor of the Bombshell. This kit turned out to be one



5. Bruce Norman started the epidemic of Shereshaw Cumulus models with his fine flying version.



8. Mark Hinton of England, is getting to be a fixture at USA SAM Champs. Playboy Senior.





9. Don Garfalo, New Jersey (left) tells Lee Freeman (right) what's what with his Scientific Varsity. Wade Wiley and Woody Woodman.

10. Chuck Provance, with little known Frank Zaic design that appeared in Popular Science known as the "Miss America."

of the best selling free flight kits ever. Without national recognition, Ed has to admit his model probably would have been just another free flight kit.

Although the design has been approved for old timer flying, plans are not yet available, as Bob Larsh, the SAM Midwest Vice-President, is engaged in drawing them up. Hopefully, by the end of the year, the Cloudsnooper plans should be available.

Ott was extremely interested in the old timers and was impressed to the extent he was seriously considering getting back into the model manufacturing business. At present, he has several tentative designs on the board, and if the Champs didn't imspire him, this writer will be the most surprised person of all.

Photo No. 5 shows the "Texas Terror" of SAM 29, Bruce Norman, with his highly successful scaled Shereshaw Cumulus. This model has proven so successful, most of the fellow members of SAM 29 have built this 10% enlargement with excellent results. Matter of fact, the flyoffs in the R/C Antique event featured two Cumulus models out of three, placing first and third. The only saving grace was Loren Schmidt's fine performing Yates Cabin that flew to second place.

Free Flighters in SAM remember Bruce well, when four years ago at Wright-Patterson AFB he and wife, Leslie, won seventeen trophies! Now Bruce is over on the other side of the field tormenting the R/C Assist boys. Count your blessings. fellows!

While on the kick of acknowledging old timers who have contributed much over the many years, Photo No. 6 is a pic of Charles Werle, who has been building models since 1933. (This columnist has known him since 1934.) Werle has always had an affinity for the William Ying model that set the Class D rubber record in 1934. Appearing in the 1935 Jasco Year Book, one could quickly see the Gordon Light influence as the Ying model does resemble the 1932 Wakefield winner.

Werle, who runs Werlewind Products, producers of many good rubber kits, found the model performed excellently. Unable to get back in time after a long chase, Charle had to settle for two flights that were good enough to place him in the rubber event.

Probably the biggest surprise in this event was the winning of the event by Sal Taibi, a confirmed free flight gas man. Taibi was first noticed flying a Lanzo Class D Record model at the U.S. Free Flight Champs. Attention to detail is the watchword, and with careful adjusting, Sal had a fine flying model, good enough to win over the old rubber experts!

Switching back to the R/C side of the field, the writer spotted a rare model as shown in Photo No. 7. Ross Thomas, who has been looking for a good low wing performer, spotted the P.L.W. #4 in the

old timer lists (P.L.W. stands for Petrol Low Wing). Colonel C.E. Bowden's designs were anything but pretty and his craftsmanship looked like it was suffering from the effects of a double-bitted axe.

This is not to detract from "C.E.B." as he was one of the leading pioneers of free flight gas in England and its most prolific designer. Ross has proven one can take one of Bowden's designs, clean it up a little, and end up with a surprisingly attractive looking model. The P.L.W. 4 features a heavily underscambered wing which may or may not affect the stability. At present, we have received no reports on how the model flies.

Talking about England is a natural lead-in to Photo No. 8, depicting Ken Hinton, of England, with his good flying Playboy Senior. Ken is getting to be a fixture at the SAM Champs, as he has attended the last three out of four SAM Champs. Many fellows in the USA cannot brag of that attendance!

We have featured pictures of Ken and his son, Mark, before, but it is interesting to see how all the models come apart to keep the shipping crate as small as possible. In talks with Ken, it appears the British Overseas Airways have been a tremendous help in getting his models to the various competitions at little or no cost. Imagine getting TWA or United to do that!

Photo No. 9 says what the SAM Champs is all about: fun, comraderie,



11. Line-up for R/C weigh-in on Class C day. Otto Bernhardt and son, Mike, check Woodman's entry.



12. Group of the New Jersey boys compare notes on Taft; Fair, Beshar, and Woodman.



13. New 30-Second perpetual trophy sponsored by Marquardt Corp. (I to r) Roy Marquardt, Al Helman, Bruce Chandler, and Ken Woodgrift.



15. Class C R/C Gas Event winner, Charlie Critch, with K&B powered Ehling Contest Winner.

meeting the other fellow, and best of all, enjoying old timers. The photo could have been captioned East versus West, as Don Garafalow and Woody Woodman are from New Jersey, while Lee Freeman and Wade Wiley represent the SCIFS of Southern California.

Garafalow is particularly interested in Scientific models, such as the Varsity, as Don was the draftsman for Scientific Model Co. for many years. According to the stories he tells, one of them is that he was never able to put his name on a drawing he made. Johnny Frisoli, owner of Scientific, would also edit all drawings and erase any draftsman's name. Don thinks he may have snuck one plan through with his initials on it but can't remember which one. If you find it, remember we told you!

Probably one of the most profilic plan purchasers is shown in Photo No. 10. Chuck Provance has about every old timer plan produced by any firm or magazine supply house. It is no surprise when he shows up with a different model.

Pictured is a "Miss Science", a design by Frank Zaic, showing heavy influence of the very successful Miss America kit. Drawn for Popular Science, the model readily derived its name. It remained for Bob Osenga of Quartz Hill, California, to uncover this unknown model and mail the magazine to this author. Voila! Another O/T plan!

Photo No. 11 again directs attention to the work of the Contest Director, which goes largely unappreciated. This picture shows the lineup and the clever gantry type weigh-in system devised by Otto. Seen in line are George Albrecht with an Ehling Contest Winner, Monti Ferrell with a Lanzo Record Breaker, and Ed Konefes with his Cloudsnooper. The reader's attention is directed to the background which really shows the magnitude of the field. If a model actually makes it over the hills, one is liable to find it in Ojai, an oil town 60 miles distant! It has happened!

Actually, Taft is a great place to fly in the Spring, when grass covers the barren area. When the heat comes, the grass goes, and so comes the dust. Best time to fly is in the morning before the dust devils come up, but unfortunately, the best times are made after 11:00 a.m.

Photo No. 12 is another pic of a typical bull session, one of the many goings-on

at the Champs. This time, the New Jersey boys have gathered to compare notes; Larry Fair, Joe Beshar, former SAM President, and Woody Woodman. SAM East Coast Vice-President.

All three came West in different ways; Woody with his wife in the station wagon on vacation; Joe Beshar flying out on business; and Larry Fair airplaning into the San Francisco area on a possible job transfer to that area.

At this point, it might be a good idea to tell of the preliminaries to the SAM Champs itself. Originally introduced by SAM 1, The Model Museum Flying Club, the Annual Bean Feed (generally held outdoors on the field the eve of the flying) has served as a vehicle for all old timers to get together and renew old acquaintances.

This year, the festivities were held at the Elks Club, which provided a large hall for meeting and dining. Although the hamburgers might have been a mite small, one could not complain too much of the price and convenience of a wet bar.

During the "Bean Feed", last minute announcements are generally made, and questions answered. These are sort



14. Don Rasmussen uses three 3-bladed prop to ensure adequate ground clearance. Thrust just as good as with two-blader.



16. "Mik" Mikkelsen built this Korda "Stickler". Surprisingly, not a popular Korda design.



Abe Gallas, Huntington Beach, with old reliable Cloud King, Photo 17.

of get-togethers one cherishes and looks forward to the next year. SAM ANNUAL BUSINESS MEETING

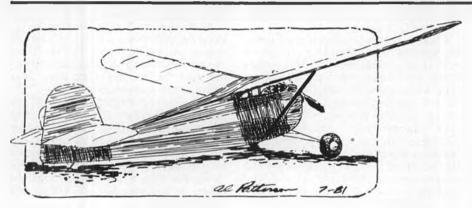
Normally held on Wednesday (or second day of the Champs), the Annual SAM Business Meeting was held on



Dick Huang, SAM 29, shows his 10% scaled-up Shereshaw Cumulus. Texas boys love it! Photo 18.

Tuesday night, the first day of the contest. Fifty brave souls turned up at the meeting, an indication that quite a few of the fellows came to fly rather than hassle over the rules. Regardless, quite a bit of business was transacted, albeit mainly on the R/C end of SAM competitions, which is still suffering growing pains.

Following reports by the Secretary Treasurer, Al Hellman, the SAM Champs Continued on page 82



• The model section in the July 1940 issue of Air Trails started on page 29. (Oh yes. . . All the U.S. model magazines contained many articles on full-scale aviation, though most of the advertising support came from the model industry.) The inside cover (sound familiar?) shows a group photo of the Oklahoma City Gas Model Association, 22 members present, with their aircraft spread out in front of them. Zippers dominate the scene, with Mercuries and Clippers making it a strong commercial for Comet. There's also a Custom Cavalier, but not one single radio antenna!

Turning the page, we find a construction article for Louis Garami's two-footspan gas job, the "Half-Pint", based on the Mighty Atom engine. One photo shows Louis carrying the disassembled model in a paper bag.

MODEL MATTERS occupies pages 32 and 33, featuring "The Dope Can", by Gordon Light. Photos show Sal Taibi with his "latest job". Perhaps the Hornet is unidentified because Model Airplane News got the construction article! (Our O.T. of the Month in the August '81 issue.) Also shown is Bruce Lester, a regular photo contributor to "Plug Sparks", with his 10-foot span glider powered by a Brown Jr. Yes, Fred, a powered glider! Is there nothing new? Another photo shows two of Elbert Weathers' classic controversial landing gear-dropping "Mystery Men". And next, a gas model that flies on the end of a string (no, he didn't say G-string, he said "G-Line"), and the name is Victor Stanzel, and U-control has not yet become a commercial name or product!

The next three pages contain a construction article for the 1939 Open Class Flying Scale event at the Nats, Henry Thomas' Rearwin Speedster...followed by solid-scale 3-views of the Spitfire, by Martin Dickinson.

Following full-size plans for a classylooking R.O.G. design by H.A. Thomas, we come to our O.T. of the Month, "Old Square Sides", by John Sprague.

Isn't it funny? Even in 1940, modelers were looking back at designs from the "good old days". With the Zipper leading the trend toward high performance and away from full-scale aircraft appearance, some modelers were reminiscing about the days of cabin models with windows, "square sides", V-dihedrals ... realism.

You could almost believe that John

OLD SQUARE SIDES

OLD TIMER Model of the Month

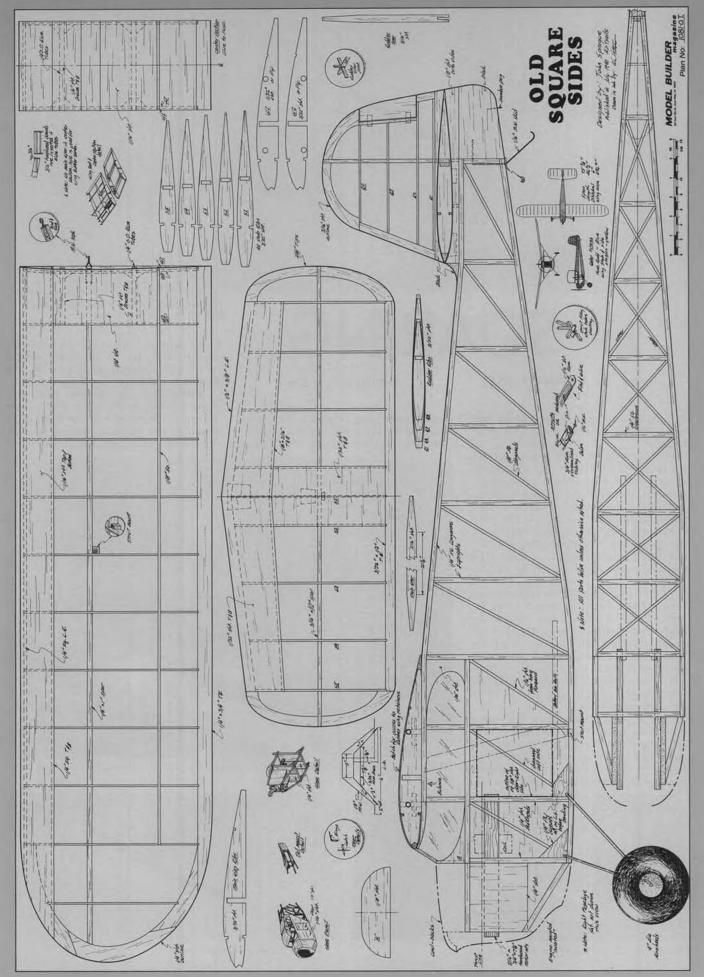
Designed by:	John Sprague
Drawn by:	Al Patterson
Text by:	Bill Northrop

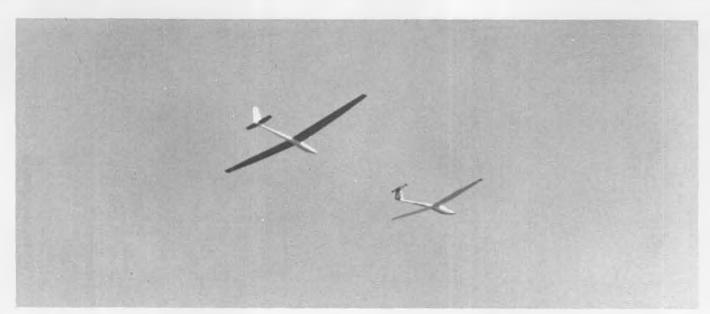
Sprague sat down at his drawing board and said, "Not only am I going back to the good old-fashioned model . . . I'm also going to come up with a design that will be perfect for O.T. radio control about 40 years from now." Boy . . . did he ever!

If O.S.S. has any faults, we'd have to say that some of the structural problems were solved the hard way. But as usual, we present the plans as they were done originally, leaving the choice of modifications to the builder. Modern materials and adhesives have simply changed the ways we do certain things.

In typical O.T. fashion, no balance point is shown on the original plans. With its flat-bottom wing section and symmetrical stab, we'd suggest starting at 30% to 1/3 back from the wing's leading edge. And with that short nose moment, better watch your construction weight toward the aft end, or a bunch of free-loading "tail lightener" may have to be stuck inside the cowl.

If you're thinking about flying off water, take a look at the scaled-down O.S.S. on floats in last month's "Sport Scene" column. Looks like it just emerged from the Canadian bush country.





R/C SOARING

by Dr. LARRY FOGEL

• Records are made to be broken. But, what if the established record is already fantastic?

Well, on May 9, 1981, Jerry Krainock established a recognized FAI world record for R/C sailplane single flight distance. In one flight he flew 66 miles! And Jerry is the first person in the United States to hold such a record for open distance flying. This historic flight took place over the Antelope Valley in Southern California. He used an open-class Pierce Paramount designed by Ed Slobod.

At the same time, Benny James set two Junior AMA distance records using his Pierce Paragon, a plane also designed by Ed Slobod, while Gary Ittner flew his original design, the Tai-pan, to set five AMA distance records to a previously declared goal of 12.21 miles. These fliers are members of the San Fernando Valley Silent Fliers, a club long interested in cross-country flying.

Now Ed Slobod has come up with a new design, the Gemini, but rather than describe this plane, 1'd prefer to pass on some of Ed's thoughts on design objectives: "Suppose your primary design objective is thermal endurance. It would

PHOTOS BY AUTHOR

be nice to be able to launch, then bring your plane down only to recharge its batteries. Heavier-than-air craft come Richard Black's ASW-17 and Bill Winans' DG-100 in close proximity.

down sooner or later. All too often, it's sooner than later. The plane's weight must be counterbulanced by the lift. The trick is to cut down the drag. "Ordinarily, it's assumed that your

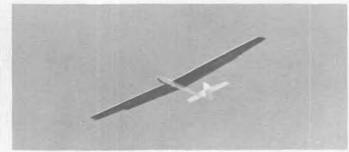
"Ordinarily, it's assumed that your plane is flying in stable air, that is, that there is no movement of the body of air in which the plane is suspended. But, this is seldom the case. The air can move



"R/C Soaring" editor Larry Fogel, flying his Camano 111 1/2 at Torrey Pines. Note hang glider at upper right.



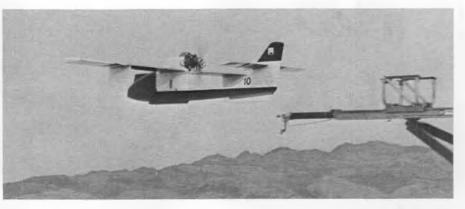
Bill Winans' DG-100 kit is from West Germany.



Fogel's Camano with flaps down.

laterally (wind) and/or vertically (lift or sink) in varying amounts. So, to maximize endurance, we have to fly out of the sink and into the lift ... and to do this with least loss of altitude.

"So, while minimum sink (endurance) is our primary design objective, we also recognize the need to cover ground with minimum altitude loss (maximum lift-to-drag ratio [L/D]): Once again, drag is the culprit. The ability of the model to fly about the sky without sinking out of it is often referred to as 'penetration'. The term L/D is used only to define horizontal distance traveled divided by the vertical distance lost. It





Air Force RPV (Remote Piloted Vehicle) XBQM-106 on launch stand, and at moment of launch. Reminiscent of British F/F sport design called "Pushy Cat".

says nothing about how to do that. The model's ability to penetrate relates to how rapidly it can move, when tuned to do so, while still having an acceptable rate of sink. This is a particularly desirable quality when you're operating against a stiff wind.

"If you're going to guide your model around the sky in some intelligent manner, it would certainly be nice for it to be maneuverable and have acceptable handling quality. A plane is maneuverable if it responds to your commands and changes its flight path as desired. Handling quality refers to the ship's having no 'bad habits' (such as porpoising, tip stalls, unfortunate cross-coupling, flutter, lag in response, instability, and so forth). But there are trade-offs here. The model that's 'hands-off' stable is more resistant to change of attitude ... that is, it's less maneuverable.

"You see, I design planes with a number of objectives in mind ... low sink speed, high L/D ratio, maneuverability, handling quality ... all this with special attention to launch and landing. We're still a long way from the perfect design."

Bob Dodgson of Camano Island, Washington, has also proven his ability to design fine R/C sailplanes. First, there was the Todi (1972), a versatile plane having two sets of wings, one for thermaling and one for aerobatics. Over the years, I've owned two Todi's... and it's likely that I'll own another some day even though this kit is now "out of print". Just for the record, this sailplane operates on 100 or 76-inch span wings (700 square inches and 450 square inches, respectively). The larger wings (15 to 1 aspect ratio) use an Eppler 387 airfoil and operate at seven ounces per square foot. The shorter semi-symmetrical wings operate at ten ounces per square foot. The T-tail can be coupled to the flaperons. Select the flap position... the kind of airfoil you desire. This imposes a small bias on the elevator to maintain the flight attitude. At the same time, these flaps are very effective ailerons. The Todi requires only three servos.

Later, Bob designed various configurations of the Maestro. The Mark III has 18 to 1 wings that span 132 inches and cover 990 square inches. The flat bottom airfoil is only 8-1/2 percent thick. The flying weight is 64 ounces . . . just twice the weight of the Todi. The Maestro Talisman is exactly the same except for its use of the Eppler 193 airfoil. The Maestro Caliente carries 995 square inches, but all this within only 100 inches span. With the reduced aspect ratio, the plane becomes extremely maneuverable. It can carry up to two pounds of ballast for speed runs. Thus far, I've owned and enjoyed two different Maestros.

Now Bob is kitting the Camano in both 111.5 and 100-inch span versions. The 1-1/2 inch wide fuselage is fiberglass capped with a wooden deck. The larger built-up wings use the modified Eppler *Continued on page 101*



Steve Rounds is almost ready for the first flight of his new Rich-Air LS-1... a beautiful scale bird!

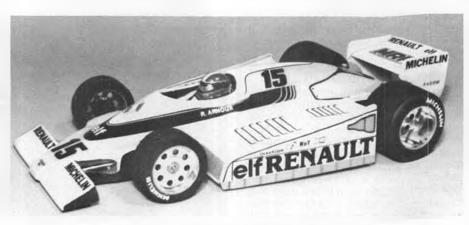
R/C AUTO NEWS **By DAN RUTHERFORD**

PHOTOS BY AUTHOR

On July 5, 1981, in Indianapolis, Indiana, Ú.S. driver Arturo Carbonall won the rain-interrupted, 1/8-scale World Championship race by over two laps, beating the best drivers from all over the world. Ermes Tadiello, of Italy, was second, and Katsurori Kondo, of Japan, was third. The real hit of the race, however, was little Ralphy Burch, of Texas, who was second fastest gualifier behind top qualifier Kondo. The other big guns of the U.S. team had problems in the heat races, and were unable to get into the top 10. The fastest drivers of Italy, England, and Holland had the same problems.

The main event was quite a mixture of drivers and cars: two Americans, two Italians, two Japanese, two Britains, one Dutchman, and one Frenchman. They were driving: two Deltas, two SGs, one Kyosho, three 3 PBs, one Serpent, and one Associated. The dominance of the U.S. team has disappeared. The rapid rise of the suspension car, the widespread use of the differential, and a neat four-wheel drive competition car, have not come from the U.S.

Read all about the race, the drivers, and the cars of the 1981 World Championships in two articles by Chuck Hallum, coming in the next two issues.



MRP did the molds over, bringing its 1/12 Renault F1 body up to 1981 specifications.

• Some columns demand a little thought, just to get the fingers to the typer with something decent to say. Not this time, there is so much to go over that it will never fit into the space provided. **GOOD STUFF FROM DELTA**

If you're looking for a piece of support equipment that can help you go faster in 1/12 scale racing, check out the Dyno-Tach now available from Delta. I suppose I should have a lot of experience with it, but have actually only used it a couple of times, so can't detail all of the ways in which to use it. However, the first time I played with it, I found that I could gear my twelfther even higher and still have plenty of battery left for the main event. This was subsequently proven out at the next race, so realworld experience indicates that the DynoTach is an accurate instrument that can help, not just be a novelty for the shop.

The leads hiding behind the Dyno-Tach can be hooked up to the car's electrical system and will show the amps being drawn at any speed, although top speed is all you really care about. A flip of the switch and touching the drive wheel on the DynoTach to a rear wheel on the car will also give a readout of actual mph. In practice, this mph reading very well may not match exactly the mph turned by the car on the track, but all that is really important is for the instrument to be consistent and it is, showing improvement or loss in top speed, as well as crummy gear mesh and so on.

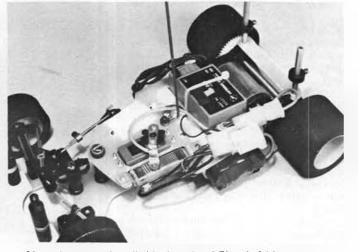
With a little practice, the DynoTach will allow you to get the car set up very close to optimum, eliminating hours of on-track testing. Even so, only on-track testing, stopwatch in hand, can get the very last bit of performance while still being able to run a full 8-minute, plusone-lap race.

The only criticism is that the instructions are kinda screwed up. All the information is there, you just gotta read everything a couple of times to get it all, as well as doing a few practice runs with it before everything starts to make sense. Price is \$48, from Delta Manufacturing; see their ad for address and phone number.

Moving to the beastie 1/8-scale cars, Delta has released its own starting board and, as usual, it is outstanding. The pins very accurately locate the chassis so that lining that starter wheel up against the flywheel is no problem. And the pins index to the front cross-bar and chassis pan, so that the board works no matter what body style or length of front bumper is being used. Naturally enough, to make it work right, it is designed to work only with the Delta Super J, although the board will also accommodate the Associated RC300 nicely with a



Panel on face of Airtronics transmitter conceals switches and adjustments. More information in text.



Airtronics system installed in Associated Electrics' 1/12 race car. Small servos fit well, will take pounding.

couple of simple modifications. For other 1/8-cars, it will probably be necessary to relocate the positioning pins, but even this is an easy thing to do.

Even though it may not be clear from the picture, the rear of the side hangers on a Super J drop right down on the two switches at the rear of the starting board. These switches are strong enough that they will hold the car up clear of the starter wheel, so between heats we just leave whichever car we will race next right on the board. To fire the car, all you do is push down on the rear bumper. This depresses the switches: the Sullivan starter spins, and you're off. Simple as that.

At first, having had a switch on my homemade board fail once, I was wondering about the use of two of the things, but these turned out to be heavyduty numbers, and they are wired in such a way that even if one gave it up the other will still activate the starter.

Although I haven't done anything about it (yet) there is plenty of room inside the starter box for a built-in glow plug battery, which would be nice. Going a step further, there would still be room for a couple of motorcycle batteries to run the starter, making it heavier but self-contained.

Not shown well at all is the special starter wheel that Delta designed and is molding. You might be able to resist the starter board itself, at least until you see one in use, but this wheel is something that all 1/8 racers need stuck on the end of their starter. The wheel is about 3-1/4 inches in diameter, and the rim is over 5/8 inch wide. At the inside diameter, flanges make the wheel 1-1/4 inch wide. so it is wide enough to go on and stay there. Material is a hard rubber compound that will last a long time. We have used our board at several races, plus practice sessions, and there is no visible wear at all. So it will be a long time (two or three seasons of racing) before we need a new starter wheel.

A word of caution: when installing the Delta wheel on your starter, get everything real clean and then glue it in place with Sears steel-filled epoxy. Contact cement might work OK, just do it as if



The ultimate 1/8-car starting board, designed expressly for Delta Super J, works with Associated RC300, will adapt to other brands.

you were mounting rubber on a regular wheel, but with the starter wheel being so important at races and being on there a long time, I would only trust a healthy smear of filled epoxy. Besides, with epoxy you have time to get it all lined up just perf.

MR. CONCOURS PAINT

For some reason, I find the name "Mr. Concours" a little tacky for a line of paint, but that is what the folks at BoLink have elected to call it. What isn't tacky is the way it works. This has to be one of the best things to come along in a long while, at least as far as the finishing of bodies is concerned. You see, the problem of what-do-I-paint-it-with has been around for a long time. And for just as long, there have been a couple of pretty good answers. Several kinds of acrylic lacquer work real well, but you have to know what you're doing, especially when choosing and using a thinner, or the body can be ruined. And the stuff almost has to be sprayed, availability is not very good, a decent selection of colors can be expensive . . . you get the idea.

So, for a great many racers, BoLink has the real answer with their paint. It is water soluble, so thinning and cleaning of equipment is no problem at all. The stuff is quite thick straight out of the jar, a heavy cream consistency, so it can be brushed with good results. If it is thinned, it can also be sprayed, and that is the way to go for the best and lightest finish.

There are seven colors available presently (white, silver, yellow, green, black, red, and blue) with more to be released soon. All colors are bright and clear, plus if you don't like the shade they can be mixed to get almost any color you want.

Like all of this kind of stuff, we actually used it. Just to put the paint to the real test 1 painted a 1/12 body, using a cheapo brush. As long as it was being brushed, I decided to try eliminating all that time-consuming masking of windows and stuff, instead using molded-in lines to go by. And it worked. Not being the best at freehand painting, there are some small holidays, but even first try came out good enough to be a "10 foot paint job", meaning that at a distance of 10 feet or more, it looks damn good.

Using the brush, and it's being a poor one at that, meant an extra coat of paint to get full coverage, so the body did come out a little heavier than I like. A good brush, better yet, spraying, would eliminate this problem.

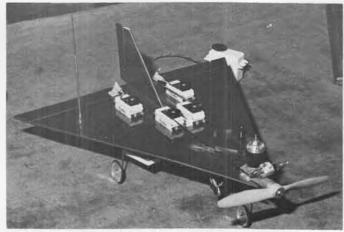
Continued on page 84



'El Tricko' DynoTach from Delta for 1/12, hand held, will tell all except ambient temperature!



"Mr. Concours" paints for Lexan body shells, available from BoLink and distributors. Bright colors, good paint, easy to use. Water soluble.





Hot Delta from Ace R/C? Nope. Just demonstrates "mixing" of Ace's Silver Seven.

Forthcoming .10 powered four-channel "Fly Baby" from Sig. Hurry Maxey, it's cute!



By LARRY RENGER

• 1 received a fascinating package of photographs from Djau Carter, (1604 Palm Springs Dr., Vienna, VA 22180). Unfortunately, we could not reproduce them. Djau is interested in the Hydro Ski concept and also float planes in general. He showed a variety of ROW aircraft, ranging from CO₂ free flights to a Tee Dee powered two-channel using a floating fuselage which then is lifted out of the water by a hydrofoil. The engine sits on a pylon above the fuselage nose, giving the look of an old VHTL Free Flight. He says that they lift off and land very smoothly, and the weight and drag penalty are low compared to conventional floats.

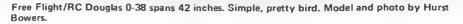
Another project of his is the conversion of one of those styrofoam hand launched gliders (the ones with both elliptical wings and elliptical dihedral) to .010 ROW FF. A single float is used. The float seems to be carved from bead styrofoam, and he has incorporated an adjustable rear strut on the float to allow the angle to be set accurately.

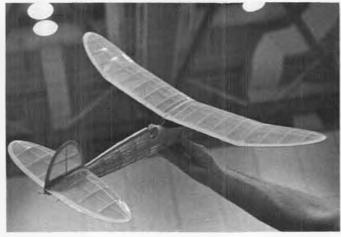
Djau seems to be quite the craftsman in addition to his inventiveness. He *Continued on page 70*



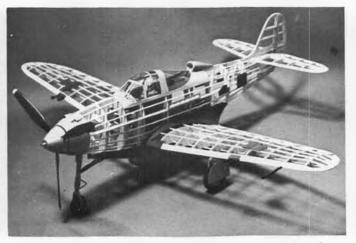
New Mirage from Circus Hobbies. Use hot .049 or G-Mark .06 for go!

giving the look of an old VHIL Free Flight. He says that they lift off and land



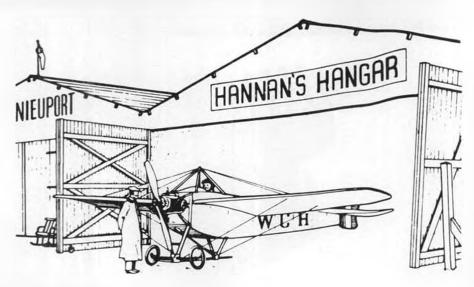


Midway Models 31-inch span Struck 'New Ruler', small RC or pulse rudder, anyone?



A shame to cover! New offering, P-39D in 3/4 inch scale from Paul K. Guillow, Inc. Guillow photo.





"The philosophical tree has its roots in the air"

• Our lead-in line this time is by Carl Gustav Jung (1875-1961) via Richard Miller.

WHAT'S IN A NAME?

Plenty! Or so it would seem from enthusiastic response to dropping the "R/C" appendage from MODEL BUILDER. Throughout the history of publications, magazines have experimented with title changes, and aviationoriented journals have conducted their fair share. AIR TRAILS is an example which springs to mind, having undergone numerous changes in names and format, probably hitting rock-bottom with its HOBBIES FOR YOUNG MEN.

What first gained our attention as UNIVERSAL MODEL AIRPLANE NEWS passed through a succession of cover titles including MODEL AIRPLANE NEWS, MODEL AIRPLANE NEWS WITH NEW! SPEED & SPORT, which vanished after a time to be replaced during 1979 by "WITH R/C BOATING," followed by "WITH R/C BOATS & CARS".

The fondly remembered FLYING ACES went through a series of changes culminating in today's FLYING MODELS. Perhaps their most regretted change was the loss of the immortal Phineas Pinkham. A real pitty, since author Joe Archibald is still very much alive. Hint, hint.

The British favorite (incorporating



"A cast of thousands" (well almost) at a Paris indoor contest, described in text. Photo by J.F. Frugoli.

MODEL AIRCRAFT and MODEL AIR-CRAFT CONSTRUCTOR) has a different sort of title distinction, having at various times and places appeared as AERO

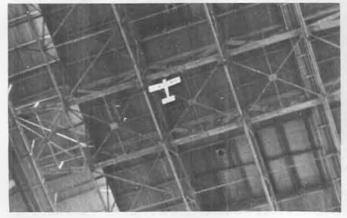


Greg Smith with his Peanut Scale F.451 Farman Moustique, at Mile Square Park.

MODELLER, Aero Modeler, AERO-MODELLER, Aeromodeller and (at present on the front cover) Aero modeller!

And speaking of magazine cover titles, what about RCM? Nope, not that RCM, but a new French model mag entitled Radio Commande Magazine. Judging by thickness, use of color and profusion of advertising, it is already doing very well. One of the more entertaining columns is George Chaulet's "ET POURTANT CA VOLE" (which loosely translates to "nevertheless it flies") being devoted to a potpourri of unusual flying machines. Our best wishes to Editor Philippe Loeillot and staff on the new enterprise. AND IN JAPAN

Another new model building publication has been launched, according to Ichiro Yamada. Edited by Mr. Tatebayashi, it seems primarily devoted to the simpler aspects of the hobby. Although we are unable to read the Japanese text, the universal language of art and photography reveals beginner's models, classroom model building in-*Continued on page 73*



A Glenny and Henderson "Gadfly" at altitude inside the enormous Lakehurst blimp hangar. Photo by Capt. Ed Toner, TWA.



A 1-inch scale Flyline Stearman built for display only, by Bill Kee, Twin Falls, Idaho. Brilliant in red, blue, and silver.



By STEVE GARDENER ... One of the last of the prop-driven military fighter aircraft, and certainly one of the prettiest. Build with the "gear up" for improved performance . . and looks . . in the air.

• I saw my first Sea Fury at the EAA fly-in at Wittman Field, Oshkosh, in 1975... It was very big, very solid, and very beautiful. I had seen pictures of it in different books and had always said that it was a very good looking plane. But now I wonder if all the other planes that I see in different books and say, "that is a good looking plane", will impress me like the Sea Fury did when I saw it for real.

I walked up to it from the front and started to feast on the prop first. It is huge! Five blades with very coarse pitch and a blade cord that isn't to be believed . . and when it turns, it turns to the left! The cowl is an example of the perfect way to hide a radial engine of this size. Right behind the cowl is the wing leading edge with it's radiator intakes (oil cooler) yawning at you and its fake cannon barrels looking very well. With a shallow dihedral break half way out on the wing, and the elliptical outer panels, it makes a pretty shape with lots of area. The canopy is perched on top of the crest formed by the slope of the tail meeting the slope of the nose, and is just

the right shape. The fuselage tapers down to the well proportioned empennage in a long sweep that is just the right length to balance the wing and tail areas. Over all, it is a very handsome airplane, and with its large wing, it is a good choice for a Peanut.

You should always pick your Peanut materials very carefully to get a light model, but when you plan to add some weight with an opaque finish you should be doubly careful about the weight of all the other items. The model in the photos is very heavy for a Peanut, and it must struggle to make 20 seconds, although a lighter model could easily do twice that. The next one I build will be covered with one coat of thinned clear dope on Cpaper or Japanese tissue. If you fly indoors, you might try smaller wood sizes than are called out in the plans, or leave the landing gear off to save weight.

Start the model by building the tail surface. This model has a long tail, so sand everything a lot before you cover it, to keep the tail light. You might build the rudder and elevators separately if you are very careful about weight. It helps to trim the model without having to try to keep some warps in and some warps out.

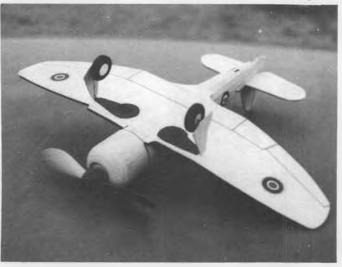
The wing is the prettiest part of the plane when it is in the air, floating around on all those square inches. The airplane has a bunch of area for a WW-II fighter, but still, if you can see your way to it, you might leave off the landing gear to save weight. If you do leave the gear off, you can use lighter balsa for the dihedral rib. Pick hard balsa for the leading edge and medium or light for the rest of the wing. The outer bays of the wing, out past the dihedral break, were covered with the tissue wet. You must pin the surface down when you are done covering, before it has dried, to prevent warps.

Start the fuselage by cutting out all the formers of light balsa. Use fairly hard balsa for the keel, as it takes all the handling loads and some of the rubber tension loads, too. All other stringers are made of 1/20 square balsa, or if you can make them of 1/32 square balsa, you could save some weight.

Continued on page 80



Steve went a little overboard on the finish for this one, but it's worth it and he can still get 20-second flights indoors.



By building extra light and using retracted gear configuration, all that wing area should produce a real flier.

OCTOBER 1981

The Complete Line

K-LINE SERIES KP-2K

Complete 2-channel R/C system, featuring dual neutral positions on left stick, precise trim controls, 2 fast-response low current-drain servos, 3 µV sensitivity receiver, 72-75 MHz – ideal for model airplanes, cars and boats.

K-LINE SERIES KP-3KW

Complete 3-channel R/C system, featuring exclusive "trigger" throttle/brake control, adjustable steering throw and limit controls, servo reversing, plug-in transmitter and receiver frequency modules, 2 rugged fast-response servos, NiCad conversion kit available,

27 MHz – ideal for model cars.

K-LINE SERIES KP-4K

Complete 4-channel R/C system, with full rechargeable NiCad battery packs and AC charger, precise ratchet-type trim controls, 4 fast-response servos, $3 \mu V$ sensitivity receiver, 72-75 MHz – ideal for beginner and experienced flyers.

SPECTRUM KP-5X

Complete 5-channel R/C system, featuring new double-tuned receiver, precise trim controls, 4 fastresponse long-life servos, gear retract switch, new durable direct-coupled control sticks, full NiCad battery packs and AC charger, 72-75 MHz.





of R/C Systems

GOLD SPECTRUM KP-6C

New high-styled programmable 6-channel R/C system, with dual rate elevator and aileron switches, shielded double-tuned 3 µV receiver, 4 long-life servos, externally accessible 5-channel servo reversing, rechargeable NiCad battery packs, plug-in RF module, 72-75 MHz AM and 53 MHz AM & FM.

DELUXE SERIES KP-7C & -7CS

World standard competition model 7-channel R/C system, featuring built-in roll button, adjustable dual rate elevator and aileron controls, adjustable length open-gimbal sticks, plug-in RF modules, shielded doubletuned highly selective 3μ V receiver, trainer system, 3-function dual RF output and voltage meter, high-reliability rechargeable NiCad battery packs, dual rate charger, choice of 4

high-performance servos, available on 27, 35, 40, 53, 72 & 75 MHz, including FM. Single Stick Model KP-7CS also Available. ... Now featured, along with a full array of modeler-designed accessories and components, at your neighborhood Kraft Dealer.

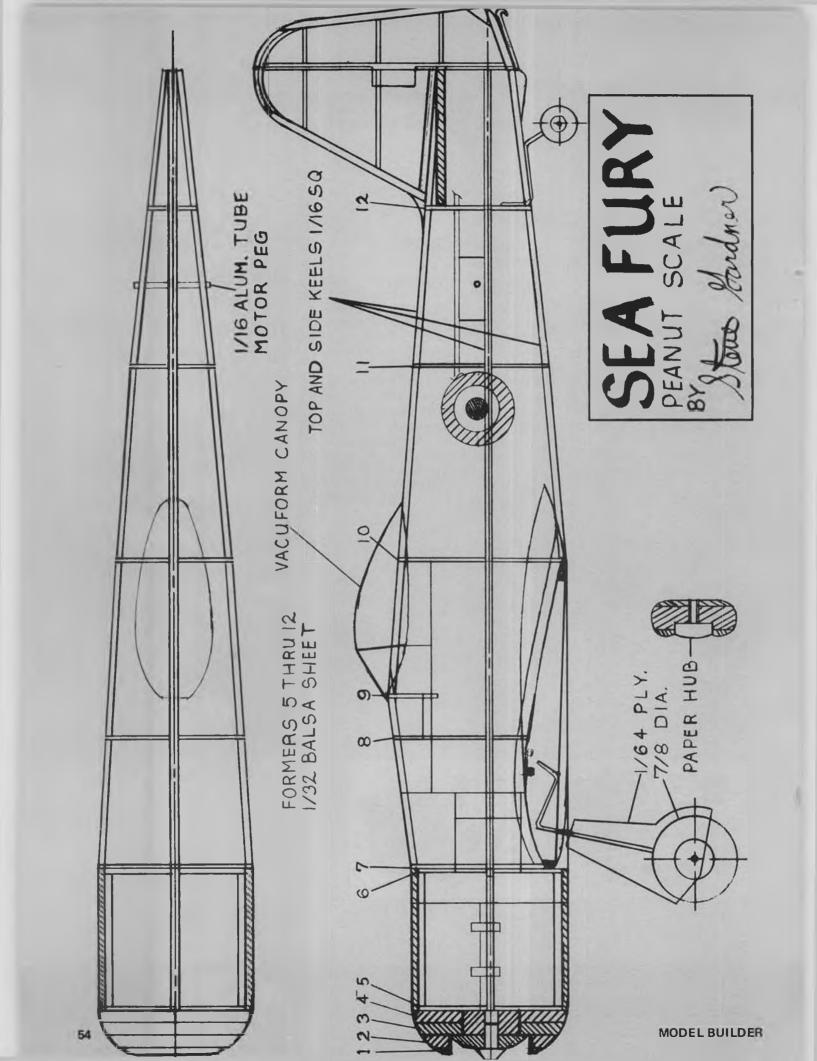


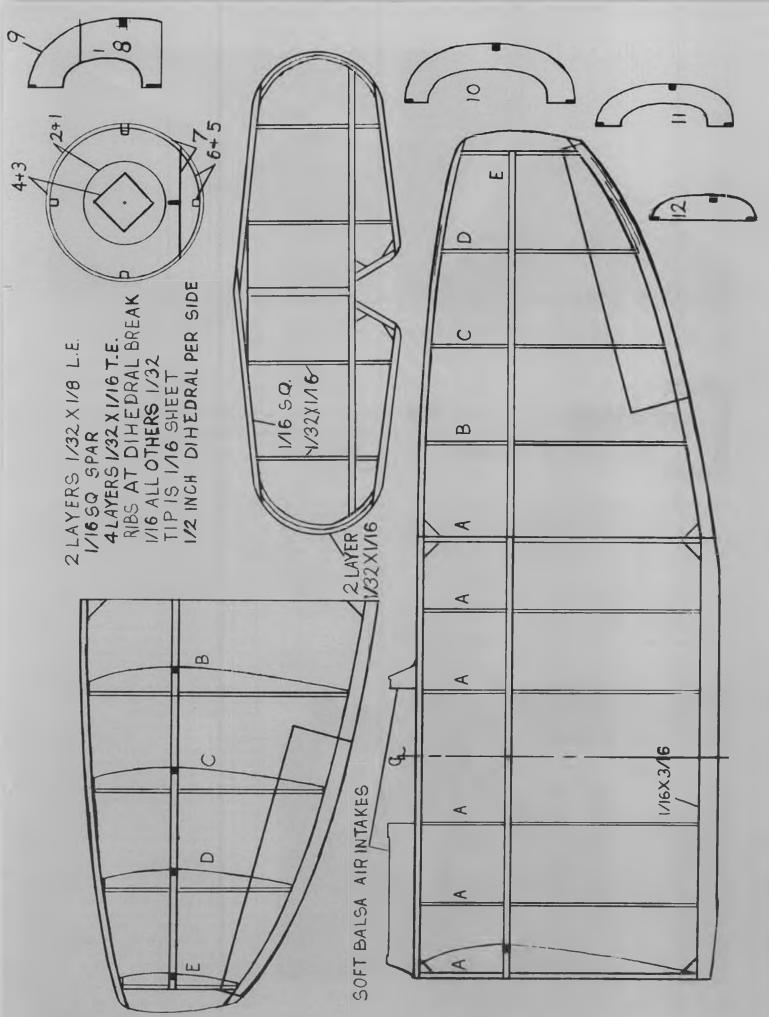
Photo courtesy of West Coast Hobbies, San Diego, CA

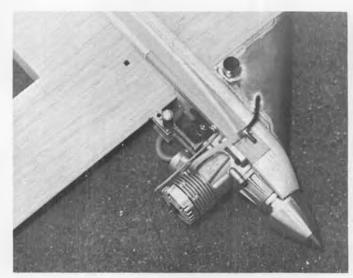
KREFT



A Subsidiary of Carlisle Corporation Since 1972







Steve DeBord, El Cajon, Calif. is building this AMA Slow Rat. Nashville tank, Texas K&B 35 with carb and Gillot fuel shutoff valve. Spinner is OK, but point must be rounded.



Another Steve DeBord model, flown in AMA "A" speed; 78% nitro, Newton metal wing, and Rumpel type body and tail. 'Case you hadn't noticed, power is HGK.



THE ANSWER TO THE QUESTION

I plead guilty to having been something of a science fiction nut for about as long as I can remember, reading just about all of the good sci-fi books around. These stories themselves are enough to convince you that there really is life in outer space and then when confronted with the mathematical probabilities coughed up by the scientists and astronomers, one is generally doubly convinced. But if someone should ask you about life on some planet that is so far from our little world the distance is inconceivable, how do you answer? Only very little hope of actually changing the questioner's point of view if he doesn't believe in life in outer space.

But someplace I just recently heard the answer to the question, "Do you believe there is life in outer space?" The answer is, "Of course I do, we're here, aren't we?"

Now if that doesn't make you think for a minute, nothing will.

KEEPING IT LIGHT

One of the heaviest components in most models are all the big and small



No, it's not a Lite beer commercial, it's the happy winners at Jed Kusik's (3rd from right) Combat meet at Whittier Narrows. Myles (Striped shirt), won it all.

pieces of plywood we stick in. Sometimes they carry a lot of load, as in a bellcrank platform, and so have to be plenty stout by themselves as well as glued to every structural member that is close by. But a lot of the ply that I see used in models is a waste of material and an unnecessary increase in weight.

Before citing examples, just stick the thought in the back of your head that whenever adding doublers, primary use of ply in models, you can no doubt get away with just using that real thin 1/64 ply commonly available. In fact, in a few cases, like the aft portion of ply doublers used on the nose of a Stunter, you can even cut the ply full of holes and still have plenty of strength.

Hmmmm, guess I jumped right into an example without even realizing it. Another one is the center rib on many of today's Combat models. Many of us are just using a thick center rib, no sheeting at all, whether the model is primarily foam or wood construction and hanging the engine, bellcrank platform and boom all on the one rib. Understand that with a vibrating, honkin' engine on the front trying to shake the rib apart, a bellcrank in the center doing its best to pull the rib in half, and a boom at the rear, right where the rib is the weakest, transferring much higher-than-yourealize twisting forces into this rib, it becomes apparent that this component needs to be plenty strong. So guys build the model and use glops of 5-minute epoxy to laminate 1/16 and even 3/32 ply to a 1/2 or 3/4 inch thick chunk of balsa. What a waste of time. For years I have used 1/2 inch thick medium light



Cigar chomping Ron Hester fires up engine on son Russell's fast combat model during meet at Whittier Narrows, California.



Ron Columbo does the flasher bit to show off his multi-pocketed pitting coat. Paul Curtis, John Gladfelter, and Forest Adkins (I to r).

balsa, laminated with 1/64 ply on both sides and have never had a failure here ... well, short of somebody flat flying through the center of the airplane, there has never been a failure.

Going a little further, using epoxy for this center rib laminating is not a good idea. Too much weight build-up. And if using the 5-minute stuff, by the time you get it all spread around and the ply positioned, the epoxy has only a minute or two to sink in and get a good grip. One of the glues I have used successfully for this laminating is Goldberg's Blue Goo, a contact cement. You do have to be careful, as it is easy to get too much on, but it does work just fine. Now that both Goldberg and Satellite City have thick-bodied versions of their instant glues, these are the way to go for laminating most anything. (Watch out, these aren't as slow-setting as you may think! wcn)

As long as we are talking about this center rib, I suppose it should be obvious and yet still needing mention, that the best way to build it up is to just buy a couple of sheets of 1/2 inch balsa, preferably 4 feet long, if you can find it, and a sheet or two of 12 x 48 x 1/64 inch ply. The ply, still in one piece, is laid on a flat surface, one of the chunks of balsa position on it, and with a pencil a guide line is drawn showing exactly where the balsa lays on the ply. Pick up the balsa, liberally apply Hot Stuff "T" or Super Jet to the ply and slap that balsa right down on it. Might even want to weight it down for a couple minutes. With this done and and the glue dry, a sharp knife run along the edge of the balsa separates it from the rest of the ply, and you repeat the above operation.

When finished, you have a couple of pieces of the strongest balsa around, yet they are still quite light. From here it is easy to trace center ribs onto the rib blank and then cut them out on a bandsaw. If you're really careful, might even be able to do it with a coping saw and still have accurate parts.

For a parting caution, it will be tempting to ignore the grain direction of the balsa, trying to get more ribs from the blank. You can fudge a little, but not much.

When used as doublers on a one-off model, the 1/64 ply is very easily worked, as plain old scissors can do the cutting and trimming. In fact, you can make two blanks, stack them on top of each other and still cut it with scissors, ending up with perfectly matched parts. Don't forget to cut lightening holes in the aft ends and the previously mentioned new generation of gap-filling instant glues are the only way to go.

Another interesting trick with 1/64 ply is to laminate it into stabs, rudders and wings that are solid, like on many CL racers. Stabs are the easiest, on a few Plastic Nasties (Fast Combat design from Dirt) I cut ply to match the outline of the stab, punch in a bunch of 1/2-inch lightening holes, and laminated it between top and bottom pieces of 3/16" balsa. The stabs came out light and strong and carving the symmetrical airfoil is very easy, as all you have to do is shave wood down to the ply. And the stabs were much more resistant to knicks, but that should be too obvious to need mentioning.

The same technique works well on wings for an AMA Goodyear model. You just have to watch the wood sizes used so that the airfoil comes out like you want, whether semi- or full-symmetrical.

One of the best things about this thin ply is that if you have some odd chunks laying around, you just find more and more handy uses for the stuff. At one time I was having trouble with heavythumbed pit persons helping me out by mashing on the fuel line in Fast Combat models. They would usually squeeze down on the line at the handiest place, right where the line left the bladder compartment, but this area was just foam and so easily crushed. Little doughnut-like patches were cut out of scraps of 1/64 ply and glued over the bladder tank access hole. End of problem.

The list could go on and on. Just get some of the stuff, start using it for doublers and such, and keep the scraps for . . . who knows what?

BUILDING FROM KITS

I would suppose that many of us got our start in CL by building a kit model. Most of them are lacking in several areas, some in more than others, but it is the easy way to go with what I always thought was an oddly high percentage of first-timers, even going so far as to paint the model exactly as shown on the box art.

An approach here that I certainly didn't take and that very few do, would be to first pick out a rather decent kit model, one that has been well proven over the years, and as soon as it is flying, start on another. Only on the second, why not build it from the plans that came with the original kit, using a higher grade of materials hand-selected from the balsa racks? While we have many pretty good CL kits on the market, it has to be understood that the kit makers buy balsa in bulk and so have to use all of it, anything tossed in the garbage is profits. As you can imagine, not all of the wood is top quality, sometimes by design, as that nice, light wood so loved by competition modelers does not die-cut well enough to be usable.

In a few instances, the manufacturer is selling kits as well as finished lumber. The kits get the heavier wood, both *Continued on page 104*



Tim Gillott releases Goodyear at Buckeye 1980. Note atomic glow driver attached to belt and the novel pit helmet. With all the nit-picky safety rules, head protection for Rat and Slow Rat pitmen goes unnoticed!



Jack McCracken's beautiful Jumbo class Fairy 3F.

FREE FLIGHT SCALE

• On Father's Day, the Flightmasters staged their first R.O.W. at Lake Elsinore since the "big flood" a couple of years ago. I have really missed this flying site. Elsinore is one of those rare places where you can fly any kind of model from Peanut to R/C in either land or float configuration. Presently, there are acres and acres of green vegetation suitable for test flying. This is most unusual for this time of year, but the excess water has provided for this marvelous situation.

The weather for the contest was just beautiful, with clear skies, warm temperature, and no wind. There were many contestants and spectators with several new models on hand. It is really a thrill to see a scale model take off from water, fly, and then land on it as well. This is no easy task, and whenever someone's model took off, the crowd gave out a cheer. It is quite easy to "stub" a float in water, which often results in the model going over on its back. There's nothing like a complete drenching of a rubber model!

One interesting lesson I learned the hard way (How else?) was with my Blackburn Shark (Incidentally, this is a good subject for jumbo, and it is a great flyer.). When I built this model a couple of years ago, I thought that I had put the thrust angle in relationship to the floats at about scale. As it turned out, it couldn't have been. The angle was such that the model didn't do anything but taxi along like a boat. With the model in the water, the thrust angle was too high. My thought at the time was that the model should just leap out of the water. No so! With such a high angle of attack, the wings were actually at the stall position. So no wonder it never left the water. When I hand-launched, it flew just beautifully, however, the floats hung down at the front so much that they just sheared off when the model landed. When I finally got around to fixing it for this contest, I rearranged the angle of the floats so that it now rises from the water consistently.

In the typical Flightmaster's fashion, the contest emphasis was on fun. Looking around, I would say that everyone was enjoying themselves. There was only one disheartening incident that took place. Chuck Conover brought along his beautifully constructed Jumbo

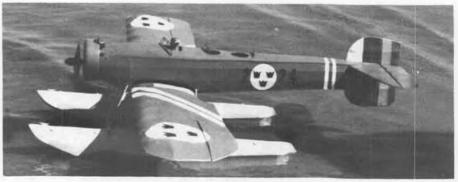
By FERNANDO RAMOS

Aeronca (built from a Comet kit) to get it finely tuned. On its last flight, it drifted over and landed on a narrow but deep finger of water, and flipped on its back. There was no way to get to it, so Chuck had to wait until it had drifted to the other side. Soaking a model that long doesn't do much good in maintaining straight flying surfaces!

Bob Haight finally had a bit of good luck. He had a diesel powered Heinkel He 5 that had never been flown or even



Would you believe 4 1/2 biplanes in 1? Caproni by Carl Godel, powered (but not enough) by four CO₂ engines.



Nice looking Heinkel HE-5 by Bob Haight, Las Vegas. Flew well on very first test hop ... at contest, of course!



Ken Smith about to release Northrop N3PB. Flies well.



Tom Laurie launching his diesel powered Sikorsky S-39. Note Quicksilver ultralight on floats, in background. Elsinore is popular ultralight flying spot.

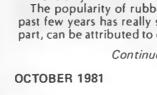
tested to see if it would float. Bob got the engine fired up, placed the He 5 on the water, and off it went. It flew around as stable as a rock. The engine run was longer than needed, and soon the model was circling over the parked cars. As luck would have it, the He 5 was headed for the side of a large camper. The owner of the vehicle caught the model with a lawn chair, as the engine was still running. The only damage was to a small section of the leading edge of one wing panel. It is not often that a F/F gas model will fly so well the first time out. One thing is certain. The added weight of the floats hanging where they do (pendulum effect) seems to really add stability to a model, whether it is gas or rubber power.

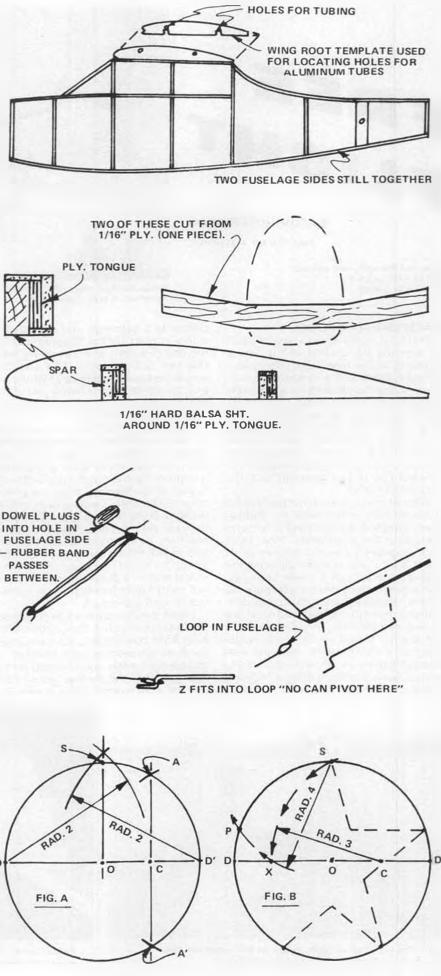
After the contest, Ken Smith and I drove over to the Corona airport, and rolled out the Charger. We took a short hop, finishing what was already a super Father's Day!

The popularity of rubber scale in the past few years has really soared. This in part, can be attributed to club organiza-

Continued on page 77

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PHOTOS BY AUTHOR

Tom Hutchinson's new address 20518 S.W. Leeds Ct. Aloha, OR 97005



Norm Beattie's new Wakefield uses Kevlar motor tube constructed in manner described in text. Tube is light, and really bullet-proof.

"EACH ONE TEACH ONE"

That's Dr. Larry Dona's prescription for insuring no decline in the future numbers of the free flight population. Larry has been active in beginner programs in the Seattle area for quite a few years, so he knows what he's talking about. For 5 years, he ran a program at a local junior high school, teaching kids control-line in the fall, indoor in the winter, and free flight in the spring. In fact, he often gives "prescriptions" for an AMA Cub to kids, redeemable at the local hobby shop.

With all this, however, not many of his students have stuck with the hobby, even though they come back to him and remember the good times. What Larry now proposes is a more intensive effort towards a current modeler directing the individual efforts of a single beginner. This would include directing his building efforts, helping him trim his models, transportation to contests, and coaching during competition. (A side benefit to the teacher would be the ready availability of a "fetchermite" to assist with retrieving of his own models at contests.) Larry envisions clubs starting a program among members, with each member recruiting a beginner, and culminating with a contest for the "apprentices" at the end of a year, with awards for both teacher and student. (The coaches would not be allowed to do anything but give advice during the flying part of the contest, but if they've done their job, they shouldn't need to.)

I personally think that Larry has gotten to the crux of the beginner problem. Flying Free Flight is too complex a subject to be taught well at the group level. It requires intensive, individual attention to pass on the "secrets" from one generation to another. Large groups of kids building Delta Darts may produce publicity photos that make AMA HQ happy, but they don't make model builders. Lots of kids will do things like this with a group of other kids for awhile, but unless there is a deep desire to succeed, not many future free flighters will come out of such a program.

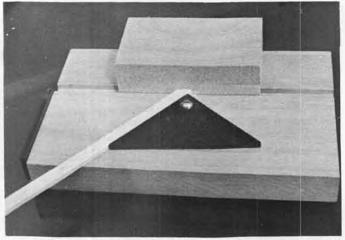
I think the idea can work, even without the impetus of a club competition. (Perhaps AMA could offer a dues reduction for those sponsoring a new member... maybe even a free membership for the first year that the protege joins.) After all, the master/apprentice system is a tried and true method of keeping many obscure crafts alive ... why not free flight? (Actually, this system has been used, mostly by fathers and sons, to recruit most of the younger flyers now competing.)

So what's really needed is a concerted effort by those of us who still practice the art of free flight, to find and train an apprentice. How do you do it? My suggestion would be to look around at people you know who have expressed an interest in your hobby. Take them flying with you, give them an exposure to free flight. You don't have to drive them 100 miles to the nearest contest site, either . . . you can demonstrate the joys of free flight at a local school yard just as well. (Remember, also, that your apprentice does not have to be a youngster ... adult beginners are welcomed, too.) You can even use these schoolyard sessions to stir up interest among people you don't know.

Be selective in choosing your apprentice. Remember that you're going to commit about a year or more of your spare time, so you should be compatible with each other. Not much is going to happen if you have a rapid turnover of



KVG Cox radial mount saves weight on F/F columnist Tom Hutchinson's Nostaliga 1/2A Spacer. Helmick pic.



Ralph Cooney's Miter-Mate is handy gadget for making good rightangle or mitered joints.

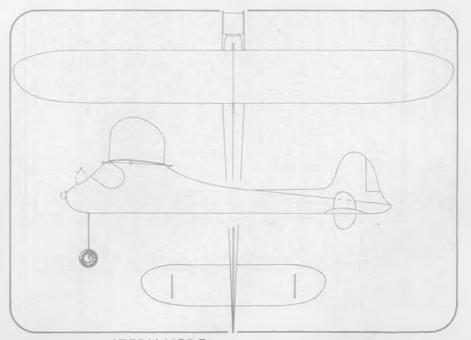


Junior Modeler of the Month, Adam Tracy, age 10, who qualified for FAI Semi-Finals with this Wakefield designed by his father, Dan.

students, so choose the ones with perseverance and determination. If possible, find a student who has been interested enough to try building some models in the past, and has made some progress on his own . . . they are most likely to have the interest and desire to continue past the apprentice stage.

You may have to do a bit of group instruction (no more than 4 to a group!) to assist you in choosing the most likely prospect. Choose a simple rubber model (Zaic X-12 or X-18, Peck ROG, Mather's Twiggy) and have the group build and fly them. Even in a selected group, you will soon find a standout ... someone who has the "feel" for models, the desire to make his fly better than the others. That is going to be your apprentice.

Don't make things too easy and convenient for your student. Model building is a trial-and-error process, and he must be interested enough to want to succeed. Set up the first building sessions at YOUR conveience, to see if there's enough interest to overcome obstacles. Avoid the tendency to do TOO much for the student ... give him a chance to profit from his mistakes by letting him make them.



OCTOBER MYSTERY MODEL

Building sessions should take place in your shop, where tools and materials are readily available. Choose the first project to suit your shop area, flying site, flying interests, etc. It's probably a good idea for each of you to build the same model at the same time, so your work can serve as a model. Try to pick something that can be completed in a reasonably short period of time, with building sessions about twice a week until completed.

Your apprenticeship program should concentrate on the basic skills of building and flying. Teach your student how to make untwisted flying surfaces, proper-fitting joints, to use sandpaper so that his models will turn out reasonably well. Educate his eyeballs, teach him how to sport warps, to put the balance point in the right spot, and to make sure the model is lined up correctly. Try to teach him patience, and the importance of re-doing parts not done correctly the first time.

By all means, take your student to contests, but show him the importance of preparation by taking him to the testflying field first. Show him how to testglide, how to use a DT to fit the field, and how to make small adjustments, one step at a time. Show him how to put up contest flights and still retain his cool, how to spot good air and bad air, how to make his model fly in different weather



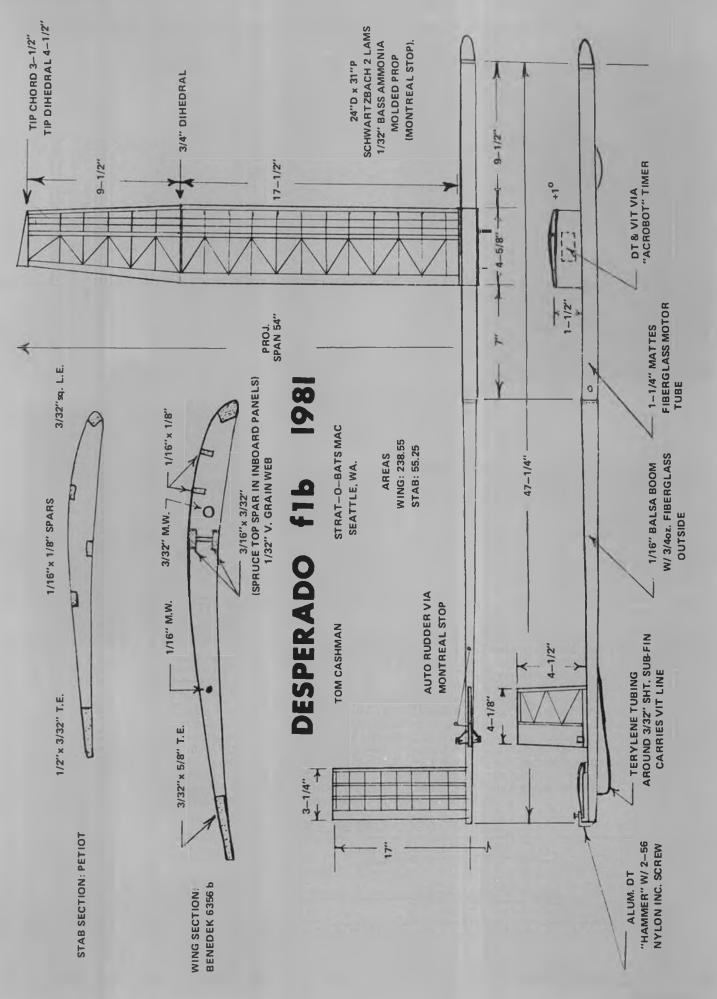
Jim and Diane Thornberry, shortly before taking temporary leave of Pacific Northwest, so Jim can work on post-residency fellowship at Mayo Clinic next year.

conditions.

There's an old adage that says, in order to learn a subject really well, you have to teach it to others. In showing your apprentice how to build and fly, you'll probably learn as much as your student. And if you're successful, there'll be one more free flighter in this world. I think

DARNED GOOD AIRFOIL – GOTT. 437

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UPPER	0.7	2.15	2.95	4.3	5.3	6.1	1.3	8.1	0.7	0.00	1.03	0.9	5.5	3.05	2.13		



it's worth the effort. DARNED GOOD AIRFOIL Gottingen 437

This month marks the return of some of the more-neglected Gottingen sections that look good for model use. The Gottingen 437 looks like it might be useful on a wide variety of free flight types. Thickness is 7%, with a maximum camber of 5.2% and an upper camber drop-off of less than 5% between the 40% and 80% stations. I'd be tempted to try it on an A/1 or Coupe, but it might make a good windy-weather A/2 foil or work well on a Wakefield. Could even be useful for a power model, too. **MYSTERY MODEL**

This month's MM dates back to the early days of 1/2A flying, when the baby motors were regarded mostly as novel toys. The inspiration for the novel sparless construction was the purchase by the designer of some nice, light, quartergrain 4-inch wide sheets of balsa (remember the days when you could find the stuff?). Other identification features are the triangular fuselage cross-section and the set of auxiliary ribs on the stab. The design was later kitted, I believe.

So, if you think you can guess the design, send your entry to the Model Builder office (621 West 19th St., Costa Mesa, CA 92627) to see if you can win the free subscription.

MODEL OF THE MONTH

Tom Cashman's Desperado Wakefield. This month's mailbag brought a 3-view and commentary on Tom's newest Wakefield design, along with some nice photos by Steve Riley. Here are Tom's comments about this design:

"Desperado is intended to be a moderately high aspect ratio Wake that can be used effectively in both still air (4 minute) rounds as well as thermal conditions. It's also my first V.I.T. Wake . . . the Akrobat timer system has worked perfectly! (Tom's referring here to the DT timer setup he uses, made from a Tomy Toy mechanism. Light, cheap, and apparently reliable, these type DT timers are becoming quite popular in the Seattle area for all types of ships from HLG to Coupes and Wakefields. —TH)

"I don't yet know if it's capable of a consistent 4 minutes in still air, but it loves thermals! I lost my first *Desperado* at the recent US FF Champs on a practice flight, OOS even through DT'd, in a Taft boomer. Desperadoes #2 and #3 are under construction and will use Kevlar motor tubes (instead of fiberglass), and a thinner Benedek 6356 airfoil." **ROLLED BALSA AND**

KEVLAR MOTOR TUBES

By Louis Joyner (from the Bat Sheet) Louis says that he can assemble a tube in 15 minutes with this technique, and he goes on to say that ... 'It's much better than sitting around for 3 hours watching an aluminum tube etch.' And it is a lighter and easier alternative for Wakefields and Mulvihills ... not as messy as it might sound.

1. Obtain a plastic golf tube, a sheet of 1/16 balsa 4-1/2 inch wide, 1.8-2.2 oz. Kevlar cloth, Hobbypoxy #2 glue, wax



Tom Cashman displays his "Desperado" F1B design, featured as this month's 3-view. Photo by Steve Riley.

paper, K&B measuring cups or equivalent, and a piece of dowel stock or aluminum tube of appropriate length that is a sliding fit inside the golf tube (tape the outside of the dowel or tube to get this fit... this step is necessary, since the golf tubes have an elliptical cross section as well as a slight crook to them).

2. Slide the dowel inside the golf tube; cut a sheet of 1/16 balsa to approximate length and sand 1/4 in. bevel on one edge. Soak in water and wrap around golf tube. Let dry overnight and remove.

3. Cut a piece of Kevlar about 4-3/8 inches wide by the length of the balsa. Use a very sharp model blade or razor blade to cut the Kevlar.

4. Next, freehand score 2 parallel grooves about a half-inch apart, the full length of the golf tube wih a knife.

5. Spray the golf tube with a silicon spray as a mold release.

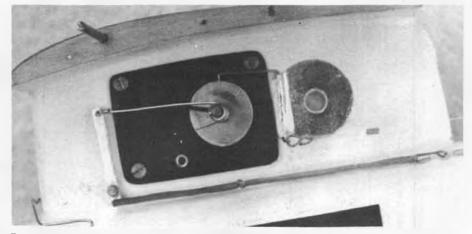
6. Spread Kevlar out on a piece of waxed paper that is about an inch bigger all around.

7. Mix about 3/4 oz. of epoxy glue and spread it evenly on the Kevlar. Use a piece of scrap balsa as a squeegee to work the epoxy into cloth.

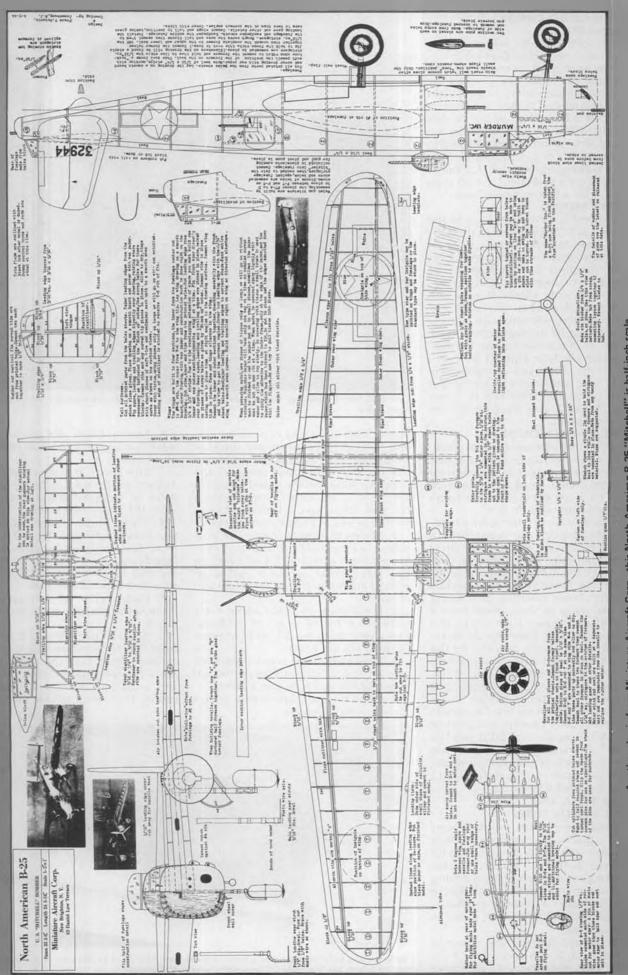
8. Clamp one end of the dowel in a vise horizontally and slip golf tube on. Next, lay Kevlar/waxed paper combo lengthwise and Kevlar face down over the golf tube and carefully press and smooth it around the form.

9. Carefully peel off the waxed paper. If the Kevlar lifts off in spots, press it back down.

10. Slip the pre-formed balsa tube from Step #2 over the whole mess, being careful not to snag the cloth. Wrap a piece of waxed paper around the balsa and wrap with an elastic bandage or rubber strip. Be sure that the beveled Continued on page 81



Fancy-looking timer on Cashman's Wake is made from \$1.89 Tomy Akrobat toy, weighs less than 10 grams, has 5-minute DT capability, works VIT system.

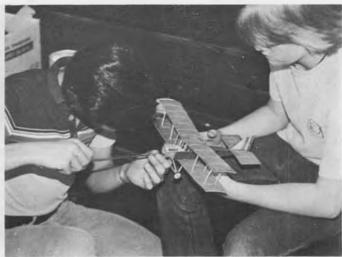


Another classic from Miniature Aircraft Corp., this North American B-25 "Mitchell" is half-inch scale. E.L. Haley, Littleton, Colorado, who also sent us the P-35 plans in the August issue, provided this one. Full size plans also include a clear print of each different piece of printwood.

MODEL BUILDER



Our Indoor columnist attaching rubber to rear hook on Butterfly One (page 67). Motor length controls performance, Sunderland pic.



Young modelers installing new motor in Peanut DeHavilland DH-6, very popular MB peanut plan by the prolific designer, Walt Mooney.



• Most indoor models, with the exception of hand launch gliders, or possibly electric or CO2 models, are powered by rubber bands.

To get the optimum flights on your models you must have the right rubber motor; the right length, the right thickness, and the right number of turns. The rubber must have a high torque output and high break resistance. A difference of .005 in cross section can make a great difference in the flight times your model logs.

If the motor is too weak the aircraft will not climb to the rafters, the clock will show a poor time. If the motor is .005 too thick, the climb will be too steep. Also the model could hang up on a beam or shelf and end the flight. So it is important that the motor be just right.

The only thing of equal or greater importance on your indoor model is the propeller. If the prop has the wrong pitch or uneven pitch the performance will be disappointing. You will need all the help you can get to win that next contest or flying session.

Rubber always comes to the modeler in 1/4 inch widths or less. Most model shops stock a few smaller sizes in cellophane packs or little blue tube boxes. Many times the rubber is old or rotten. Open, exposed spools of rubber are often seen on the shelf where the light, heat, and smog can attack them. Either the shopkeepers don't know these elements will do harm to the rubber, or they don't care. The unsuspecting novice rubber modeler will buy this tainted rubber and usually destroy his model as the rubber "blows" out the fuselage on his model. Often times the disappointment will end the modeler's interest in rubberband airplanes.

What a shame! Think of all the good times he or she will miss because a few simple facts about how to select and care for strip rubber were not made available.

When you shop for rubber in the store, test the end by holding it in both

hands and pulling rapidly several times. Then inspect the pulled area for small tears on both edges. If the tears appear, the batch is not good. If the rubber breaks as you tie both ends in an over and through knot, don't use it. I always use this kind of knot on one-loop

Some modelers tie a square knot and tie a short length of thread into the knot, to keep it from untieing. Still other flyers cement the tied knot with Hot Stuff. Never lube the tied knot, or the area where the propeller hook passes through the loop.

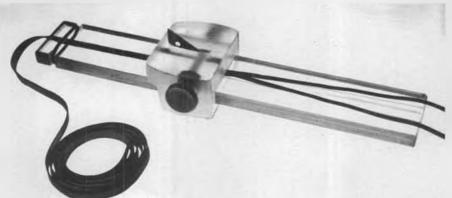
On multi-loop motors, I tie a square knot and then tie a knot in each end outside of the knot.

MOTOR BREAK-IN

Many modelers wind their motors to break them in. I do not. I think this tends to cause small tears. Stretch break-in is the method I have used for many years. On small motors I hold one end in each



Pretty Lynn Buben and her model of the Dean Delt-Air 250. Full size homebuilt didn't fly as well as model. Anyone remember the R/C version that also flew successfully at a Chicago Nats in early '70s? Believe the contestant was Loren Tregellas. Photo by Tony Naccarato.



The Jim Jones rubber stripper described in this month's column. Note wheel lock located on each side. A necessary item for indoor modelers.



Chmn. of proxy flying at the World Peanut Gran Prix, West Baden, Mike Arak, of Florida.

hand and try to open my arms as far as the rubber will allow. I hold this position for several minutes before bringing my arms together. Then repeat.

On single-loop ornithopter motors, the motor is not broken in. Some of the power in the rubber is lost here, and in flappers you need every bit of power you can get. So a new motor is used on each official flight.

Above all, keep the rubber cool (in a styrofoam pail, if possible) and away from the sunlight. Smog is a rubber destroyer. If you drop the rubber in the dirt, wash it off before you wind it. After returning from a meet, wash the used motors with soap and water and towel dry.

A few select model shops do stock a variety of smaller sizes of indoor strip rubber. Seek out these shops and look for packets of rubber by Micro-X Products, the Sig blue tubes, Indoor Model Supply and Peck Polymers clear cellophane packets. These packets sell for only \$1.00 for 16 ft. of rubber.

If you care to order by mail, write to F.A.I. Model Supply, P.O. Box 3957, Torrance, CA 90510. F.A.I. rubber is sold by the spool at \$12.50 each. The sizes are



Barnaby Wainfan (left) and Al Hieger with "Planarian" Bostonian, designed by Barnaby. The 14 gram model has won several contests. Photo by Tony Naccarato.

1/4, 3/16, 1/8, 3/32, 1/16 by 1mm (.042") thick. The new Pirelli rubber is \$15.00 per hank with sizes of 6mm, 5mm and 4mm. This Pirelli rubber has high torque output, but is sometimes inconsistent in break resistance. I recommend inserting a winding tube in your scale model when using Pirelli.

The ideal way to go in supplying your indoor rubber needs is to buy larger quantities, either off your hobby shop shelf (if you are sure the rubber is good) or from the above mentioned F.A.I. Supply, and stripping your own. The ideal length to strip is about 15 ft.

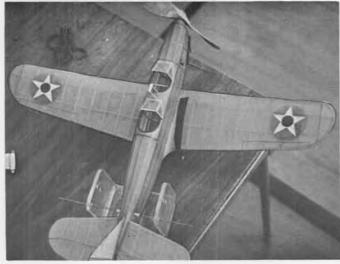
To do this you will need a rubber stripper. Unfortunately, the selection of



rubber strippers is very limited. After the frustration of making my own stripper and attempting to strip with it, I decided to buy one. A wheel stripper from Poland is sold for \$65.00, and the quality of this product justifies the price. However, most average modelers will seek out a stripper at a more modest price.

The ideal selection is the pull stripper by Jim Jones, 36631 Ledgestone, Mt Clemens, MI 48043. Phone (303) 791-0651. This model comes with 3 lengths of plastic, measuring 9-1/2 × 1-1/2 × 3/8. These have diagonal tracks running lengthwise on each side. Each track is a different width. There are a total of 6 tracks. A rubber retainer ring is located at the rear of each strip, to hold the rubber in the track.

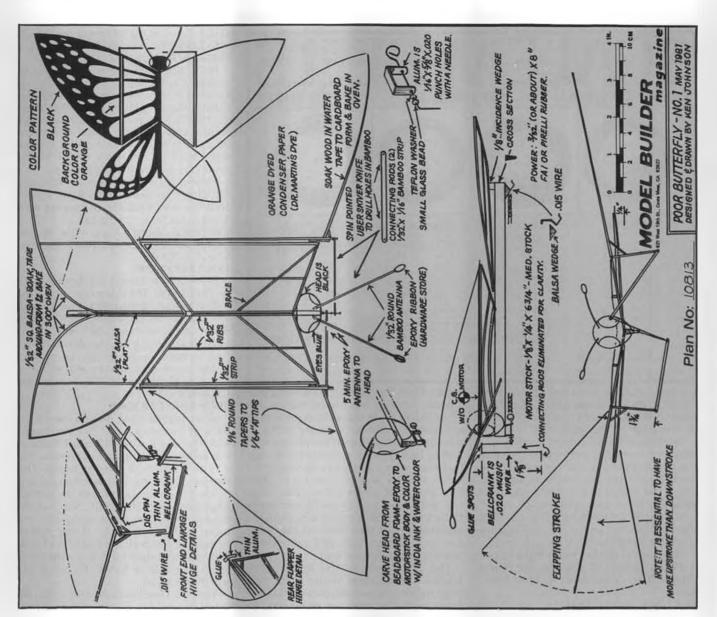
A carrier block which holds the cutter blade rides straddling the plastic sheet. A wheel screw bolt is located on each side of the block. One bolt locks the blade in position while the other locks the carrier block against the plastic sheet. A mat knife type blade (Stanley or Red Devil brand) is inserted into a slot on top of the carrier. After the strip is put into the track, under the retainer ring and through the carrier, it is pulled out



Beautiful indoor PT-19 by Flightmasters president Mike Mulligan. Won recent indoor annual. Good scale subject. Bob Warren photo.



Hobby shop owner Addie Mae Naccarato with her tissue covered Easy B. Builds beautiful models that fly well. Johnson photo.



FULL SIZE PLANS AVAILABLE - SEE PAGE 100

the other end of the track. The knife blade is pushed down through the rubber strip to be cut.

Start to strip the 1/4-inch rubber first. The carrier should be positioned so that the white line on the front of the carrier is pointing down at the middle of the track. The rubber will be cut approximately in the middle. The block is held in the left hand (if you are right handed) and the rubber is pulled through the stripper slowly and smoothly about 6" at a time. You may wish to attach the stripper to a table top with a large Cclamp so that both hands are free to pull the rubber.

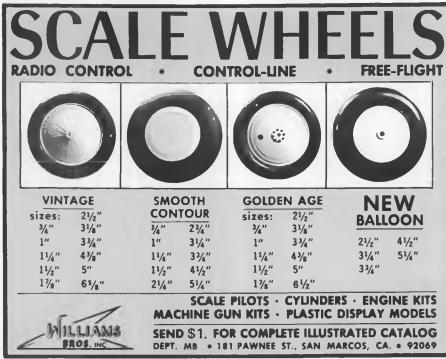
If the rubber resists pulling or breaks completely, the reason could be: the



Mik Mikkelson's Westland Widgeon has been around for several seasons. Covering is dyed condenser paper. Photo by Bob Warren.



An Albatross peanut by Czech modeler, Mr. Cook. Note Hungerford wheels. Also builds CO₂ models. Photo by Ing. Lubemir Koutny.



blade is dull or broken, the rubber needs to be lubricated with rubber lube water, the cut is being made too close to to one edge of the rubber.

Practice with old rubber so that you perfect the pulling technique. Try moving the carrier back and forth along the track to change the width of the cut. Once the technique is mastered, stripping will be as easy as falling off a log.

When the 1/4-inch strip is cut in half, the two pieces can be fed into smaller tracks and reduced in size, and so on.

The price of the Jim Jones Pull Stripper is \$15.00, plus \$1.50 postage. Jim calls it "the A.R.S." (Adjustable Rubber Stripper).

THE UBER SKIVER KNIFE

I have been using the X-acto brand

hobby knife for years, little knowing that a better product was on the market. An Uber Skiver knife was sent to me and to my delight, I found it superior to the Xacto. It comes in a handy wood case with a snap lock. Several pointed blades are included with each knife. A variety of other shaped blades is also included. The anodized violet color (also blue, red, gold, black, green, and silver) of the knife handle makes it easy to spot on my building board. The back of the knife handle twists to lock and unlock the blade at the opposite end.

The big bonus to this knife is the blades. The stainless blades hold their edge much longer than any other blade I have used. The knife was even used to cut heavy illustration board on my job



and it stayed sharp far longer than the Xacto blade. I'm sold on Uber Skiver. **ORNITHOPTER KIT**

Have you seen the new offering by Indoor Model Supply? Lew Gitlow has kitted a nifty new indoor ornithopter called "Flapping Flyer". I saw 3 of these models fly at recent Burbank High School sessions. The performance was impressive in each case. All 3 models were built by modelers under 16 and none had built a flapper before.

Have you wanted to try an ornithopter, but didn't know where to start? This kit could be the beginning of flapping wing models for you. If you can't find it at your local hobby shop, write to: IN-DOOR MODEL SUPPLY, Box C, Garberville, CA 95440. 1934 YEARBOOK

Frank Zaic's newest yearbook is now on the market. The title of this one is the "1934 Junior Aeronautics Year Book."

It's a historical collection of modeling information, tips and plans, etc. If you have never seen a Zaic book you have a treat in store. For your copy, check your hobby store or write to: Model Aeronautic Publications, Box 135, Northridge, CA 91324.

PROP SHAFT HOOKS

What type of hook do you use on the back of the prop shaft? Are you happy with the way it works for you? Pictured this issue are several of my favorites. No. 1 is the simplest one to bend. This diamond hook has no curved angles and holds the loop of rubber in perfect alignment with the shaft. No. 2 is the return hook. I've been using this one more and more, lately. If the rubber decides to climb off the end of the hook, it is returned right back onto the hook again. It's a little harder to bend, but worth the effort.

The No. 3 hook was developed for my ornithopters. For a time, it seemed my flappers were being destroyed mostly by the motors climbing the hooks. This snap-over or locking hook solved the problem. At first, the end of the hook was delicately forced over the shaft with needle-nose pliers. It seemed much easier just to thread one end of the untied rubber through the already locked over hook and simply tie the knot in the rubber after it was on the airplane. But, regardless, the lockedover hook stopped my flappers from being shattered by climbing rubber. The last hook, No. 4, works the best on

scale models. Again the diamond shape, but this time a flattened collar of alum. tubing slides back over the shaft and hook end to close the opening. The tubing should be filed smooth and could fit snugly over the wires. A short length of surgical tubing can be slid over the diamond area only, to protect the rubber from any burrs on the hook. SCALE MODEL BUTTERFLIES

As promised last issue, here is the first of 6 butterfly ornithopters built so far. All 6 are different and all fly well.

The tinkering with butterflies began about 4 years ago back in Dayton, Ohio. My efforts were unsuccessful for awhile



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because the wings hinged at the center. The linkage didn't work right and the models had little or no lift. The effort was abandoned.

On my return to California, I met Bill Watson (of the Gossamer Conder and Albatross team) and marveled at a 3 inch model butterfly Bill flew one evening. The craft was so small that the rubber used to power it came from Bill's old socks. It would flap along for about 15 ft. and you have to listen hard to hear any sound from it.

My interest was rekindled. I built Bill Watson's model, but again my effort was unrewarded.

Finally, the light broke through. What my model needed was a stationary center section in the wing. More lift for sure. But the big plus was that the flappers hinged out further from the bellcrank and now everything worked.

The new concept was drawn up and built to a span of 13 inches. The model was covered with dyed condenser paper and decorated with markers. The back of the tail was elevated 1/8 inch (for incidence), and the head was carved from styrofoam. To bring the balance point forward, the antenna (1/32 round bamboo) were added. Small bulbs were formed at the front of the antennae. These bulbs are made from a product called Epoxy Ribbon (from the hardware store). It is a solid putty-like epoxy that can be molded, like clay.

The wing spars are sanded to 1/16 round at the root to 1/64 round at the

tip, then soaked in hot water, taped around a curved form and baked in a 300° oven for 30 minutes. The bamboo antennae are formed in a like manner. Remember, when you cement the antenna to the styrofoam head and the head to the motorstick body, you must use white glue or epoxy.

The motorstick is teardrop shaped and solid. All the wood parts are dyed with Dr. Martin's water color dye before assembling. The color is brown. A cotton swab is used to apply the dye. The small glass bead (used for a bearing, at the front) is from your local beading craft store. A paperback book on butterflies, used for authentic color patterns is available at most local bookstores.

The balance on this model can be controlled by the length of the rubber motor. If the model dives, use a longer motor. If it stalls, use a shorter one. If the model dives to one side as it turns, try winding the motor backwards.

It's true that a butterfly has no fixed wing in the center. But then, butterflies don't fly all that well, either.

The butterfly models have attracted much attention wherever they have flown. I know you'll have fun with this project.

Next time, a plan of Dick Baxter's Park Street Bostonian and maybe something on indoor Air-XX.

Ken Johnson, 16052 Tulsa Street, Granada Hills, CA 91344.

Sport Scene . . Continued from page 48

showed three Cox engines which he has converted to side port induction. He wanted the engines to run smoothly in a lower power configuration for his sport models. Side port, like reed valve, will run in either direction, but due to the constraints of engine geometry, the timing tends to be very conservative. The only production sideport engine that I know of currently, is the Mills replica diesel. In the past, the system was popular, and, for instance, the Fox .07 was timed that way.

Fourth project is a tractor canard configuration. The stabilizer sits way below the wing and features three-section dihedral. The fuselage goes straight back to the main wing and vertical fin from the engine mount.



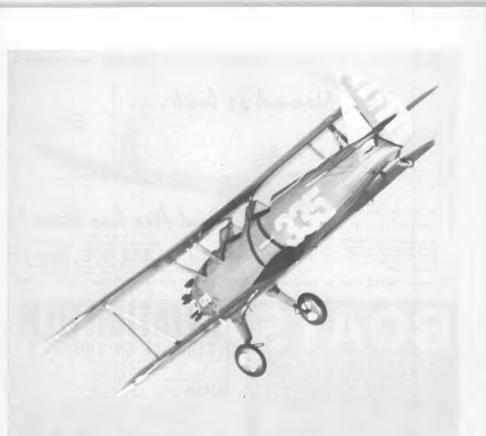
Final interesting idea that Djau is using, is to control the flight direction of his R/C pulse proportional models with a rudder in the front. Basically, this is a steerable forward fin, so just a bit of extra vertical tail area is required to retain directional stability. After all, we steer cars with the front wheels perfectly well, and there is no reason not to do the same thing with an aircraft. The advantage is the simplified linkage to control, no torque rods going back to the tail of the aircraft. There are even photos of this system on a rubber powered R/C aircraft, so you know it has to be a light weight and simple solution.

I think that the sort of modeling that Djau is doing is very beneficial to the entire hobby. He is experimenting with some really new concepts, and doing it in little quick and easy steps. He is having fun and learning things at the same time. Others can learn from him and develop more finished designs or branch out in even newer directions from his work.

After all that free flight and radio information, let's consider control-line. At the recent model trade shows here in Los Angeles, it suddenly occurred to me that control-line has become practically invisible. At the MACS, for example, there was only half of one table of control time aircraft on display, and many of them had been shown before. In the manufacturer's booths, I don't recall a single control-line aircraft on display, and the only C/L stuff shown at all, was some hardware from SIG. I talked briefly with Hazel Sig about the situation, and she agreed that the sales had fallen off drastically. Despite that, she continues to support the C/L enthusiasts with her line of models.

On the home front, I know that it has been quite some time since anyone has written to me with comments or photographs relating to C/L. I even get more free flight stuff than C/L now! I want to keep this column open to sport fliers of all types. Although I do have a propensity to stick to engine powered aircraft, I am personally interested in gliders, rubber power, free flight, C/L, indoor, outdoor, etc. If it flies, floats, or runs, I'm interested. The one thing I really prefer to avoid is the contest scene. It is too much like work, and to win you have to do too much of the same thing repeatedly to get competitive.

One last soapbox item, then I'll get on to the models for the month. Recently I was flying a small, pulse proportional model in the local park next to our library. (Using a muffled .020 diesel, no one was disturbed, in fact I couldn't hear the model once it was in the air.) Several people, both adult and young, came over with questions. Some had never seen a good flying model of that type before, others didn't know where the nearest hobby shop was (Jet Hangar Hobbies and Hobby Warehouse are both less than a mile away from this park). The point of all this is that part of the answer to the Junior problem is that those of us who can cause aircraft of any type to stay aloft and perform as they



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should, have, I think, a responsibility to get out and fly where the kids can see us! If you always fly a big, powerful, fast model and go to the local club flying sites, about 98% of all the potential future modelers will never get to see a model fly. Glider people have an advantage here because they can fly full competition aircraft from almost any schoolground.

My recommendation, then, is to put together a simple, small, sport model, and make a habit of occasionally flying where you can be seen. This goes for free-flighters too! Bill Warner makes it a point to fly Sleek Streeks for kids to show them just how easy it is to get exciting performance if you know a few simple tricks, like rubber lube and stretch winding. Heaven knows that you could put on a really good control-line show with a 1/2A Flite Streak and a QRC .049 almost anywhere. There are a multitude of small, slow flying R/C kits around for the neighborhood show and tell, too. The key is to make sure the engines are VERY quiet. Diesels with mufflers are the best thing going here. Even if you regularly fly power, consider rubber or a glider. Hand launched or high-started small, free flight gliders are a great attention getter. Usually you will find yourself ankle deep in volunteer retrievers, too.

First airplane for this month is a scaled down Old Timer. Midway Model Company has an entire line of these little gems. The one presented this month is





the "New Ruler". Wing span is 31 inches and power is provided by the Tee Dee .020. This particular model is free flight, but of course it can be modified to carry radio. I would probably put a pulse single channel system in it myself, but it could certainly lift two or three of the new smallest servos and receiver.

Next photo was shot at the IMS show this year, it is the "Fly Baby" from SIG. The model was not displayed at MACS, and when I enquired, Hazel said that it was on the list of things to do, but I should apply some pressure to get Maxey Hester to work on it. So, all you Fly Baby fans out there, write in to SIG telling them to get that kit out pronto! It might help if you are sure to buy one when it is available, they might get annoyed, otherwise. The prototype was very light, a beautiful model for a .10 size engine and 4 channels. There certainly is lots of room in the fuselage for equipment. The airfoil is nearly symmetrical, so aerobatics should be fun with the Fly

friend Colnel Hurst Bowers. It is a Douglas 0-38. He sized this model at 42 inch wingspan and .049 power. I would swear that the engine seems to be a Mills diesel, but that would be an .075. Anyhow, the biplane is relatively simple of line, but with lots of character. Hurst said that he has flown this model both as a free flight and single-channel R/C.

Next we see one of the display items from the ACE booth at IMS. Consider the mayhem if they really did fire up the engine and try to fly it. I wonder how far it would get! Look close to see that each elevon is run by a separate servo ... guess who was demonstrating the electronic mixer on the Silver Seven transmitter?

Last month I showed the new Hellcat kit from Guillow. This month, you get a peek at the bones of the other new warbird, the Bell P-39D Airacobra. First thing I noticed was that this model is smaller than the Hellcat. Clever me, it only took a little while to figure out that they were built to the same scale and the real Airacobra is smaller than the real Hellcat! The scale, by the way, is 3/4 inch to the foot, and results in a model with 25-3/4 inch wingspan. The aircraft in this series feature a good number of preformed plastic parts, and a variety of operational features. I always give a little sigh of regret when I cover a stick and tissue model, because then I can't see all that pretty structural work any more.

Final item for the month is an upcoming model to be imported by Circus Hobbies. IM products of Japan makes a growing line of foam aircraft, which feature inclusion of all hardware and prepainting of the components. I have

already built, flown and written a review of IM's .049 F-16 (featured last month) and by the time this is in print, should have done the same for the .25 powered F-15. Here is the third jet in that series, an intriguing two-channel delta. The Mirage was not built up at the show, but the components were in the box. It is light weight compared to the wing area, and my suspicion is that it should outfly the F-16 (which did fly well). If I get my hot little mitts on one, you can bet it gets a hot Tee Dee or maybe even a G-Mark .06 crammed in the nose. It is such a pretty aircraft, it deserves to have LOTS of power. I really do like vertical victory rolls.

In closing for the month, let me remind you that the only way I can let the world know what YOU are doing is if you let me know first. Photos for publication must be black and white, and keep the backgrounds simple. If you want them returned, say so, and include an appropriate sized S.A.S.E. I do eventually write back, and will cheerfully answer questions.

Thornburg ... Continued from page 13

In this respect, modeling may be the last "pure" art form. In the nineteenth century, it was still possible to draw or paint or write for one's own pleasure, or the pleasure and approval of a few close friends. Today, every painting has its price, every piece of writing sells or fails. Very little art is created for the pure love of creation.

Not so with model airplanes.

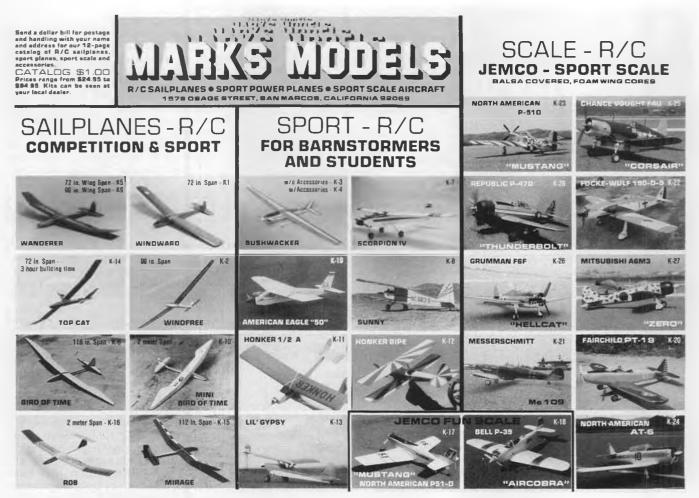
You can argue that you build models because it keeps you home nights, off the streets and barstools, and this is good for the family. You can argue that you build models because it's something you can share with your kids. You can even argue that you build models because it's pretty much an all-male sport, and this is safer for your marriage.

But the plain fact is, gentlemen, you build models for your own personel pleasure and satisfaction. For the hours of solitude at the workbench, for the second of blissful panic on the flying field. Family and friends can share these things from a distance, but the essential experience is yours and yours alone.

And this is where women get off the bus. It's a rare female of our species who can understand a totally selfish act. Most women, whatever their politics, simply aren't built that way. Some of the most liberated females I know still manage to dedicate a larger proportion of their daily lives to serving others than does the average male. Look around you and you'll see that it's true.

For this reason, an activity like modeling seems pointless and unappealing to most women. It puts no bread on the table, no clothes on the kids, no money in the bank, no smile on anyone's face but the modeler's.

Maybe women don't need the retreat into pure fantasy that modeling provides. Maybe, because they're the crea-



tors of life itself, they don't need the satisfaction of creativity-for-its-ownsake. Maybe they don't need the particular kind of *thing*-oriented (rather than people-oriented) camaraderie of the flying field. Maybe they simply don't know how to play...

Whatever the deep reason, you won't find many women on the flying field; not yesterday, not today, not tomorrow. So don't spend too much time looking for your Bunny there; Bunny exists only in the mythical world of Li'l Abner and Little Annie Fanny.

Out here in the real world, you may be able to lure your real-world honey into the hobby for a while. Probably she'll be happy just playing crew member. With a bit of luck, she may even elect to build a few models of her own. But don't be forever disappointed when she fails to become a wild-eyed balsa-butchering fanatic like yourself.

Because deep down, she's a very different creature from you. She has different values, different needs, different satisfactions. If you're very, very lucky, she may be able to understand the peculiar pleasures of modeling, even if she doesn't share them. She may be able to understand why a person would want to climb a tall hill alone and blow soap bubbles into the wind for the pure pleasure of watching them fly away.

She may be able to understand, but she probably won't choose to join you on the hill. Not for very long, anyway. Don't be to disappointed at this: remember that one of the reasons you climbed the hill originally was for the solitude.

Just remember not to spend too much time up there alone. First thing you know, gentlemen, you be *talking* to them soap bubbles. And that, gentlemen, just ain't healthy.

Hannan Continued from page 50

struction, a model transportation box and flying scale models of the rubberpowered variety. Full-size plans for the "Twin-Plum" model featured in our July "Hangar" were included in the copy we received.

AND DOWN UNDER

The Australian publication AIRBORNE also passed through diverse titles during its history. Introduced in 1971 as AIR-BORNE, it was successively transformed into AUSTRALIAN AIRBORNEMODELS, AIRBORNE & R C MODELS, and eventually full-circle back to AIRBORNE. Our congratulations to Editor Merv Buckmaster and his crew upon celibrating their tenth anniversary! Special items from the April, 1981 issue which caught our attention were: "A superior pilot is one who stays out of trouble by using his superior judgement to avoid situations which might require the use of his superior skill". (Mel Gillott's column).

Dinner menu from the Australian Albany Nationals:

"Prawn cocktail with Peanut Scale

sandwiches

Fish fillet in PVA sauce

Chicken on the bone (ribs, longerons and spars) with vegies

Coffee (half cup available — provide your own balsa knife)"

And from the "Out of the Blue" column, by "Updraught":

"Advancing age or abdominal dimensions proving a problem in retrieving A/2gliders? There's breakthrough looming! Yes, we're in the final stages of training labradors to retrieve free flight models. The reader must have noticed how they will retrieve everything else: Old boots, other people's newspapers, etc. Wrap a thick piece of foam around the fuselage to enable the dog to get a good grip and avoid tooth marks on the model. Some initial problems were encountered with the trainees attempting to carry the aeroplanes by, say, a wingtip. This has been overcome by mixing some of that stuff they put on children's fingers to stop them biting their nails with the last couple of coats of dope.

"We have experienced a few problems with model carrying dogs diving through seven-wire fences, but I'll let you know how we get on as things improve."

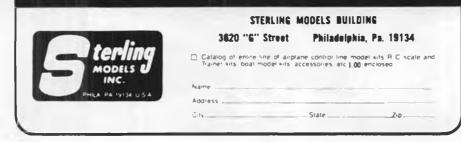
THANKS EDITORS AND PUBLISHERS!

Model builders of the world owe a major vote of thanks to all those dedicated souls who keep us abreast of our favorite hobby/sport. They seldom have the chance to do nearly as much building or flying as they might prefer. Regardless of magazine title, format or

If **BIG** is **BEAUTIFUL** Sterling has them

Build a . . . Stearman PT-17, (Kit FS20), 651/2"; Piper Super Cruiser, (Kit FS6), 72"; or a Schweizer 1-34, (Kit FS26), 981/2"... or any of the other 20 Model Kits for R/C.

FS38 REAL SPORTY at your **Dealer Late September**



country of origin, we love 'em all! (Amen to that second sentence! wcn) WILLIAMS MASTERPIECE

At last, Ron Williams' long-awaited book BUILDING & FLYING INDOOR MODEL AIRPLANES has been released by Simon and Schuster. Truly a labor of love (some three years in preparation), this remarkable publication examines virtually every facet of indoor modeling in a most comprehensive manner. The more than two hundred drawings clarify aspects of model building techniques to a degree that must be seen to be appreciated.

Regular MODEL BUILDER readers may recall the Ron Williams October 1977 "Yeloise" indoor model feature (one of my favorite front covers) which gave a fine preview of Ron's artistic mastery. His new book examines in minute detail simple stick models, EZBs, Pennyplanes, microfilm models, Manhattans, flying scale types, and handlaunched gliders. Additionally treated are tools and accessories employed by indoor model builders, and the very special model transportation boxes.

Ron is a relative newcomer to the hobby, having first become involved during 1971. Yet, he has managed to achieved a level of expertise in such a short time span that he can much more closely relate to beginner's problems than the average "old-timer". This perspective, coupled with Ron's artistic abilities, results in a confidence-build-

ing style not usually found in such publications. As indoor model World Champion Erv Rodemsky so neatly summed it up in his FORWARD: "I invite you to read this book, build the models, and join us with your very own rubber-powered rainbow.

Ask for BUILDING & FLYING INDOOR MODEL AIRPLANES at your local book store, hobby shop, or write to the publilishers: Simon and Schuster, Rockefeller Center, 1230 Avenue of the Americas, New York, NY 10020. Please tell 'em Model Builder sent you!

LAKEHURST ACTION

And speaking of indoor flying, Ed Toner favored us with an account of a scale meet held in dirigible hangar No. 1, at Lakehurst, New Jersey, long a mecca for east coast modelers. How big is this hangar? Well, according to a recent American Aviation Historical Society Journal, famed Navy flyer Al Williams once flew a full-size aircraft through the building during a sanctioned air show! So evidently the authorities felt little risk was involved, at least from an adequate clearance standpoint.

In the recent model meet, some fifty entries were flown, and Contest Director Pat Ciambrello provided splendid supervision of the affair. Toner noted a refreshing absense of Fikes and other low-aspect ratio designs, and said the most impressive performers appeared to be the Glenny and Henderson "Gadfly" lightplanes and the Chambermaid

racers. **NEATNESS COUNTS?**

Ever feel guilty about your cluttered model workshop? If so, you're in distinguished company! From the fascinating new book A DREAM OF WINGS, by Tom D. Crouch, which concerns American aviation pioneers and projects circa 1875-1905, we were intrigued to find Katherine Wright's mention of Wilbur Wright's description of Octave Chanute's room: "It seems that he has models of flying machines suspended from the ceiling so thick that you can't see any ceiling at all." MOUSTIQUE MYSTIQUE

The Farman Moustique (mosquito) series of vintage lightplanes have proven popular model building subjects, ranging in size from tiny Peanuts through the quite large electric-powered indoor R/C version so successfully flown at the IMS show. But, until now, no known full-size example was available for inspection or research purposes. During the recent Paris Air Show a restored Moustique, belonging to the Musee de l'Air was displayed. Quite a bit of mystery has surrounded this particular craft, which has been in storage for many years

Prior to having been dismantled for storage, it had served as inspiration to Hurst Bowers, who was stationed in France at the time. He had been shown the machine by Maurice Bayet, the senior model magazine editor and founder of MRA. Hurst had been puzzled, however, by certain features of the Moustique which did not match those of published illustrations, and he felt confident that radical alterations had been made. Lightplane specialist/author John Underwood was later able to confirm this, pointing out that the usual 4-cylinder opposed type AVA engine had been replaced by a 2-cylinder Czechoslovakian Praga unit. In order to maintain proper balance, the forward portion of the fuselage had been extended. Also, it appeared that the original large diameter wheels and tires had been replaced by much smaller items.

In the museum's own catalogue for 1962, the Farman was listed as a type F.450, of 1936, and as a "monoplace" (single-seater). However, in the museum catalogue for 1971, the craft was represented as a type 455 "monoplane". However the illustration given was that of a type F.451 single-seater.

But suddenly about two weeks prior to the 1981 Paris Air Show, the nowrestored Moustique was announced in AVIATION INTERNATIONAL as being a FARMAN F 37 "Super Moustique"!! Determined to see for himself, Alain Parmentier attended the Air Show at Le Bourget, searched out the Farman and its descriptive plaque bearing the inscription F.455 biplane or two-seater. No wonder so many scale modelers have problems with proof-of-scale documentation!

ALSO FROM PARIS

Both Alain Parmentier and Jean Frugoli



sent reports of the Louveciennes contest, which attracted some 130 entries. Conducted indoors, it included EZB, 33 cm, F1D, Sainte Formule (similar to U.S. Manhattan), Peanut Scale, and a special novelty event.

Nearly 80 Peanuts participated, including 13 "Cadets" (Juniors) making this the most popular category. Results were as follows:

- 1. C. Frugoli Gossamer Condor "Mojave
- 2. A. Meritte Poullin JP 30
- 3. R. Jossien Leningradec 4. C. Frugoli Farman Moustique

5. E. Fillon Gossamer Condor A sampling of other varigated types entered: Pottier, Waterman Racer, Miles M. 18, Fairchild 24, Bleriot 6, Morane G, Chiribiri, Ganagobie, Bucker Jungman, Heinkel V8 and the inevitable Pipe Cub. Oh yes, the aged "Hangar" Farman Moustique finally made its debut in France, proxy-flown by Michel Frugoli to 11th place.

Returning to the novelty event, "Fous Volants", described as "flying madmen", the conclusive winner was Claude Weber, who successfully lofted a scale model of the Eiffel Tower! (Was it flown top first, base first, or au natural? wcn)

R/C Boats... Continued from page 30

are also taking a more serious look into the possibilities of marketing model electric racing boats. One such manufacturer is Model Racing Products or MRP, 12702-D.N.E. 124th St., Kirkland, WA 98033. MRP is widely known and respected in the area of model car racing. Anyone who follows the R/C cars even casually has heard of MRP.

In the summer of 1980, Bob Welch, one of MRP's head honchos, asked me to consider drawing up a model boat that could use some of the same components that are used in electric cars. After discussing some of the design requirements with Bob, I suggested using a Day Crusier type design since I believed this type of hull would work best with the type of engine available and battery power needed. Bob was provided with a rather simple sketch and some magazine pictures of typical Day Crusier designs.



Using some of my suggestions and many of his own ideas, Bob developed the Vee Sport Electric Boat. The boat certainly bears a striking resemblance to the Day Crusier type of hull.

The Vee Sport Electric is 20 inches long, with a 7-1/2 inch beam. Made from high impact-resistant plastic, it is available in three different packages. For \$260, you can purchase the RTR (Ready to Run) version with a Futuba radio system installed. There is also a Basic Kit that sells for \$49, which consists of the hull and hatch, the hardware and linkages, and the mylar trim sheet. However, the version I believe most people would be interested in is the RTR-less-radio package that sells for \$122. This package has all the stuff making up the basic kit plus the stock .05 MRP electric motor, six cell battery pack, and speed control with receiver tap. The tap off the speed control allows you to use the six cells to power your receiver and eliminates the need to carry a receiver pack in the hull. All three packages include a very complete instruction manual to assist in getting things working properly.

PLUGGING IT ALL TOGETHER

I received an RTR-less-radio version of the Vee Sport Electric. Actually it should be called ARTR (Almost Ready to Run) because it is necessary to connect the rudder and throttle linkages as well as install the batteries and make a few

simple electrical connections. Compared to the setting up of a typical gas powered hull, these items are easily and quickly accomplished. I'll not waste time giving a blow-by-blow account of how to install the radio or connect the linkages. The photo included in this article showing the radio, motor, and battery installations is certainly the one picture worth those thousand words.

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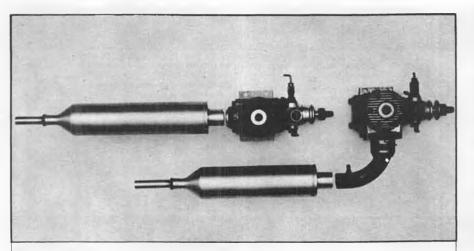
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MUSTANG ZERO MILES M-18 DRUINE

I will share two things that anyone obtaining the Vee Sport Electric will want to consider. There isn't a large selection of props available for this size of boat or power source. The prop provided with the boats works adequately. However, I think it is possible to improve performance by working with cut-down version so the A-7 prop from J.G. Products, or cut-down versions of the aluminum prop that is supplied with the K&B .21 Outboard. I personally haven't had sufficient time to really go to work on small props, but I feel there is potential in that area.

The other items I would suggest is the addition of ride plates to the transom of the boat. These can be made from sheet brass and screwed into the transom. The plates need only be about two inches across and extend about one inch back of the transom. This addition will assist in eliminating the bouncing action that occurred when the boat was run without ride plates.

RUNNING THE VEE SPORT ELECTRIC Although this boat isn't going to keep





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up with a gas model powerboat, it does move along surprisingly well for a stock .05 motor and just 7.2 volts. The speed range would appear to be somewhere between 15 and 20 mph. The boat is very responsive to rudder and turns equally well both to the left and right. The speed control provides variable forward and reverse speeds plus neutral. However, you want to be careful when putting the boat in reverse, as the transom is flat and rather low in the water, which allows water to come over the transom. Even though there is a hatch over the boat, operating the boat at full throttle in reverse isn't recommended.

The operation time on a full charge of the batteries was four to five minutes, depending on how much of the time

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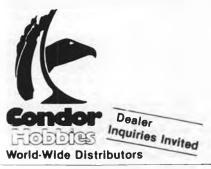
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- 6065 Rear: .60-.65 c.i. rear exhaust (\$49.95)

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was spent at full throttle. Something to be aware of is that when the batteries drop below a certain voltage, I think below 4 volts, the receiver may cease operating and the boat will tend to go into a slow circle. Usually, if you watch the performance of the boat carefully, you can notice this drop in speed and then begin heading the boat back to the shore.

Boats like the Vee Sport Electric can offer great enjoyment to the model boat enthusiasts. I think we are just beginning to develop the potential for this type of model boating. Electric boats offer some unique possibilities in the competitive realm. Because there is no noise or pollution from gas, this type of boat can be operated in areas where gas boats are banned or not feasible. Small ponds, reflecting basins, large indoor swimming facilities, all become possible race sites. There are some "electrifying" possibilities available as this particular facet of model boating gains in acceptance and popularity.

IS THIS THE TIME TO CONSIDER A PRODUCTION CLASS FOR ELECTRIC COMPETITION MODEL BOATING?

Since model electric boat racing is still in what might be considered the infant stage, this might be a good time to offer a few suggestions. Electric motors, like gas motors, can range from mild to wild along the performance scale. Even though I've never even entered an electric model boat race, I'm beginning to see some possible problem areas in competition activities. The biggest problem I see at this time is the expense that can be involved in the area of purchasing "trick motors" as power sources. If electric model boat racing is going to ever catch on, I don't think it wise to allow the "unrestricted motor" class to be the only class available for those interested in participating. When N.A.M.B.A. first started running stock outboard tunnel some five years ago, there were complaints that a "stock class" just won't work. Well, the growth of stock outboard tunnel in N.A.M.B.A. would certainly seem to dispell that claim.

It is my contention that adopting a set of rules similar to those used by R.O.A.R., the model car racing organization, to govern model electric car racing, would encourage the development of and interest in model electric boat racing. R.O.A.R. has a set of rules pertaining to Production Class. According to these rules, "The purpose of the production class is to eliminate the need for costly parts and custom modifications which give one car an advantage over other cars." The rules then give specifics that must be adhered to regarding engine types, batteries, and costs. For those who just can't stand the thought of having to run "stock," there is a Modified Class.

It seems to me that the best hull type to use in a Production Electric Class would be the offshore type of boat. This would give potential manufacturers of hulls an excellent selection of designs to make into models, plus, there are some existing model boats, like the Dumas Deep Vee 10, already available. I would restrict offshore tunnel designs from the class in order to keep the boats basically of similar design and appearance. The easiest type of race to run would be an enduro race for a specific length of time, probably five minutes. Since a Production Electric Class boat wouldn't have speeds over 20 mph, the course should be shorter than the typical courses used for power boats. It could feature some irregular shapes to place the emphasis on driving skill and not just all-out speed.

I am of the opinion that such a Production Electric Class would be a great entry level into model electric competition boating. An individual currently running a gas powered boat has all the necessary radio equipment and would need only to acquire the boat, speed control, and batteries. I can easily imagine a bunch of guys renting the local swimming pool once a month during the winter months and racing their electric boats. Our local high school pool rents for \$15.00 per hour. If ten guys each chipped in \$5.00 you could run for three hours and still have a little money for refreshments when you were finished. Can you begin to see some of the possibilities?

Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. The phone number is (206) 584-7131. I'd be interested in hearing from any of you about what you're doing with your model boats.

F/F Scale Continued from page 59 tions such as the Flightmasters, Flying Aces, Maxecuters, and other similar groups where rubber scale is the predominant event. There is no question that the incredible work of Walt Mooney has also brought rubber to the forefront, especially Peanut Scale. Modelers are tackling subjects that a few years ago would have never been considered. Building rubber models is less expensive than most other forms of aeromodeling, and they can be flown at most school grounds without anyone hardly knowing you're there.

Building techniques, I feel, have made such strides of late, that more unusual subjects are being built and flown successfully. These are being built lighter without sacrificing strength, and are also being finished in such a way that many resemble power models. The building and flying of rubber scale models has really become an art, and yet, one that is not so complex that everyone can't get involved. Jack McCracken and I have pretty much come to the conclusion that we will hardly ever build another rubber scale model that is not at least 30 inches in span. Why, you may ask? Simply stated, larger models fly better. Look what has happened to R/C. Quarterscale models are being built at such a rapid rate, and for what reason? Certainly, it isn't because they are cheaper to build and fly. Beside the fact that you can really load these beauties with infinite detail (and weight!!) they fly better. But let's get back to something a bit more practical for we free flighters.

Small models, in my opinion, flitter as opposed to fly. I feel that the larger models penetrate the winds better instead of bobbing, like a cork! I realize that there are times that larger models should not necessarily be considered. Models with low aspect wings, such as the Thompson Racers, would be a case in point. Build a Thompson with a 30 inch wing, and the fuselage gets pretty long . . . hmmmm maybe not a bad idea! Let's look at some of the advantages of the larger models. As mentioned before, they fly better, this in itself is reason enough for me. They are easier to build, as larger materials can be used. They are



less prone to warp due to the size material used. Certainly more visible detail can be added and carried without altering performance. Also, different kinds of airfoils can be used, such as the RAF 34 or the M6, whereas I doubt that these two airfoils would have an appreciable affect on models under 20 inch span.

There are a few disadvantages, but these will vary depending on the individual, such as bigger meaning a bit more cost. If your flying site is too small, bigger won't help here. Transporting can be a problem, as many people nowadays are driving compact cars. I'm sure there are probably others you can think of, but I'm convinced that the advantages outweigh the disadvantages. I'm suggesting to some of you; if you haven't considered a larger model, do so. The amount of time involved building the larger model isn't that much more ... though you'll find yourself spending more time detailing your model since it can take it! This in turn will give you more satisfaction, because the finished

product will look more realistic. Then, after you've flown the model for the first time, you'll definitely realize you've made a good choice. Give it some thought, I'm sure you won't regret it.

For those of you who have already ruled yourselves out due to space problems, both home and auto, here are some suggestions. Make the wings removable, and I don't mean using rubber bands. Here are a few different ways of doing so with little effort. The simplest to make is the one that I use the most frequently; the plug-in type using aluminum tubing and piano wire (see sketch). This system can be used for almost any size model by adjusting the diameters of the tube and wire. I prefer to use this method on high wing monoplanes and biplanes, where there are struts and bracing to help maintain the dihedral angle.

I first start out by making a pattern of the wing's root rib, which includes the locations of the two aluminum tubes. These are located right on top of the wing spars so that the piano wire can be



easily attached to them. While the two fuselage sides are still together, I carefully place the template where the wing would go, then drill the two holes for the tubes. After the fuselage has been framed, the two aluminum tubes are inserted into the previously drilled holes. This insures that the wings will be aligned properly. For a 30 inch model, 1/16 O.D. tubing and 1/32 wire should be more than adequate, with very little weight gain. The wires which are attached to the spars will most likely have to be bent slightly because of diehedral. These, in turn, are wrapped with thread around the wing spars and given a good coating of glue. If these wires are bent askew just slightly, they should fit snuggly in the tubes and won't slip out in flight.

For low-wing models, I like to use the tongue and box as shown in the sketch. I start by making the two tongues out of 1/16 plywood, and they are cut so that the dihedral angle is part of them. These are laid out so that when they are permanently mounted onto the fuselage they are just ahead or behind each spar, and also tangent. After the wings are built, I slide them into the plywood tongues (wax them first) through slits in the first two wing ribs. At this point, the wings are checked for squareness to the fuselage, and for the proper dihedral angle. Any adjustments should be made at this time. With the wings pinned or clamped in place so that they can't move out of adjustment, I take hard 1/16 balsa sheet



and build a box around the tongue. One side is already done for you, that's the spar. Care has to be taken that absolutely no glue will ooze onto the tongue. If it does, you'll never be able to slide the wing off. When the box has thoroughly dried, remove the wings and soak the boxes with Jet. One bit of caution with this last set up. I recommend that plywood or very hard balsa bracing be used where the wing's trailing edge meets the fuselage. If the model comes in hard on a wing tip, the wings can and will be forced rearward. This in turn will buckle the fuselage at that point. But if it is reinforced properly, the wings will just slide off from the tongues with no damage to the fuselage. The wings are merely plugged in again for the next flight!

The third way is one used by Jack McCracken, and is probably the most effective for knock-off capabilities or one that will save destruction in the event of a crash (see sketch). Jack makes a tiny wire loop that is permanently mounted to either side of the fuselage where the wing's trailing edge meets it. On the underside of the trailing edge of the wing, a fine piece of wire is bent into a "Z" shape and is permanently bonded to the trailing edge. Near the front of the root rib is a locating dowel and a wire hook. The "Z" wire is inserted into the wire loop, and a rubber band is placed between the two hooks. Two dowels are plugged into the respective holes in the fuselage, and the wings are now aligned. The "Z" wire and loop are acting like a pivot point. If the model hits on a wing tip, all the wing will do is pivot rearward with absolutely no damage. Pop the wing back into the holes and you're in business again.

There you have it, three easy ways to make removable wings for that next large project you're going to start.

Bob Berreyesa, of Sacramento, has sent in his way of making the venerable star so many of our models use. Follow this one...

FIVE POINTS TO STARDOM

Becoming adept in the use of a compass (for drawing, not for acquiring merit badges) will improve the accuracy of, and greatly speed up the brainstorm/ pencil work part of your modeling effort, as in finding true lengths; so here is an interesting compass exercise for laying out five equidistant points on a circle, an obviously very useful process to a U.S. modeler.

This detailed description will take ten times as long to read as the actual drawing, so pay attention! Again, accuracy is imperative. Put the compass point and the (sharp) pencil lead exactly on the line intersections when swinging arcs and drawing lines.

Fig A: Draw circle, and diameter D-D'; markingcenter, point O. Without changing the span of the compass, put the point on D' and swing arcs across the circle in two places (points A and A'). Draw light line between A and A' crossing radius O-D' at point C. (This is "bisecting" line O-D). Now open up the compass to approx. three quarters (not critical) of the circle diam. (shown as rad 2), and swing arcs centered at D and D', intersecting above the circle. Draw light line up from pt. O through the arc intersection, establishing pt. S on the circle. (This is one method of drawing a radius at exactly 90° to the diam.). Now ignore everything except the circle and diam, point C, and point S. The rest was just 'scaffolding''

Fig B: Swing arc centered at C, (rad 3), from pt. S down across the diam, establishing pt. X. Now with pt. S as center, swing arc from pt. X, (rad 4) up across the circle, establishing pt. P.

circle, establishing pt. P. Points S and P are two of the Star Points. Using rad 4, step off one more point down the left side, then step off two points down the right side, (starting at pt. S as before).

If the distance between the two lower points comes out exactly rad 4, you were just darn lucky... or accurate. Which do you think?

In closing this month, I want to remind you that the Flightmasters Annual will be on September 19th and 20th. The judging will take place on Saturday afternoon from 2 p.m. to 6 p.m. at my home on 19361 Mesa Drive, Villa Park, CA 92667 ... (714) 637-6312. Flying will take place at Mile Square Park in Fountain Valley from about 8:30 a.m. to 1 p.m. AMA rules prevail for this contest. Everyone is welcome. Also, there will be another

REGULAR JET and SUPER JET The BEST are now BETTER!

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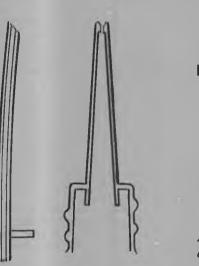
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Typical Long

Applicator

Tube Tends

To Clog.



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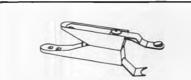
FULL 2 OZ.

1/2 oz. bottle

1/4 oz. bottle

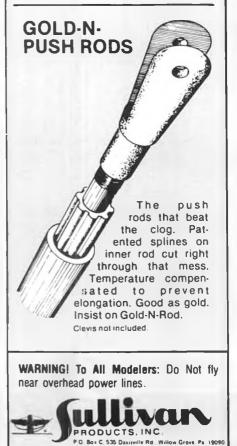


mous Sullivan Starter but it's actually the new Sullivan **Super** Starter... with tons of power in reserve. Hook up to your 12-Volt battery and it'll start most any engine. Incredible power. And this same starter can even be used with power supplies up to 24-Volts to start balky engines and ¼-scale monsters.



GLOW PLUG KLIP

Fully assembled and unbreakable Strain relief feature ends broken wire problem Free replacement if this Glow Plug Klip ever breaks





R.O.W. contest at Lake Elsinore on October 11. Don't miss this one either.•

Fuel Lines . . . Continued from page 24

over the mixture, and the chances are you'll run the engine longer than you should without a complete cool-down. Further, the engine installation in your plane may provide less than ideal cooling. The final straw is if you have to use a muffler at your flying site. Mufflers generate heat you don't want during break-in. On a test stand, you can use a light load prop and have complete and instant control over the engine.

Here's a list of suggested break-in prop sizes for various displacement engines. NOTE: DO NOT USE NYLON OR PLASTIC BREAK-IN PROPS. They can throw a blade too easily at high RPM. Use a wooden prop.

Displacement	Break-In Prop
.049/.051	5x3
.09	7x2-1/2
.1015	7x3
.2025	8x3
.30	9x5
.3540	9x6
.4550	10x5
.60	10x7
.90	13x6

As you can see from the list, these breakin props are shorter and/or have less pitch than normally suggested flying props. Thus, they'll provide less of a load on the engine.

In the second photograph you'll see some of the things to have handy in addition to a glow plug power supply. The wrenches are meant to be a reminder to check the prop nut before each start, together with the test stand hold-down lugs. Similarly, the Allen and other small wrenches should be used to check the engine bolts and nuts. If you look carefully at the fueling bulb, you'll notice a filter in the fuel tubing. Using one is a good habit to acquire. Likewise, a prudent modeler will use some form of hearing protection, such as you can see in the photograph. Extended exposure to high decibels of a screaming engine will unquestionably damage your hearing. (And it's accumulative ... each exposure adds to the previous exposures. Ask someone who constantly works near loud machinery . . . if they can hear you . . . wcn)

Okay, fire up the engine and adjust the needle valve for fast, burble-sounding, four-cycle operation. Let it run this way for about two or three minutes, and then shut it down by pinching off the fuel line. Let it cool down thoroughly. Restart it, and set the needle on the rich side of two-cycle operation . . . just after the engine switches from four to twocycle operation. About every minute or so during this second and subsequent runs, peak the engine out for about ten seconds, and then richen it slightly again. Be careful not to overlean the engine. An engine should never be run, other than momentarily, at an extra lean setting. Run the engine in this manner for periods of several minutes at a time with thorough cooling in between runs. Repeat the cycle until the engine runs steadily at the peak setting without sagging or RPM loss. For increased performance with high nitro fuels, repeat the same process until the engine will hold a steady peak RPM without sagging or overheating with the higher percentage of nitromethane. When your break-in is complete, you'll not only have a good sense of satisfaction for a job well done, but the chances are you'll also have prevented a good bit of aggravation.

Guys, until next month, it may sound trite, but safety really is no accident.

Peanut Continued from page 51

After you have the fuselage framed up, you can tack glue the wing to it to make the wing fairings. A trial-and-error fit of the fairings is the best way to get them perfect. After you get them made you can cover them with the same color tissue that you used for the wing.

The cowling is a source of trouble for some airplanes, but this one is easy to build. Go ahead and use hard balsa for the cowling because you will need the nose weight, and this is the first thing to hit the ground anyway. Build some down and right thrust into the nose plug so you will have to worry less later about thrust shims.

Make the canopy by carving a plug of the proper shape and stretching hot butyrate plastic over it. Trim it to a nice fit and paint the frame lines on it with the correct color paint for plastics.

Assemble the model in your favorite order. Be sure you get the cowling on in the right position, so that the down and right thrust is pointing down and right. I toyed with the idea of a five-bladed, lefthanded scale flying propeller, but decided to install a five-inch Peck-Polymers plastic one instead.

The model flies on one loop of 1/8 grey rubber about 10 to 12 inches long. Balance it at the spar or just in front of it, and use up-trim to get a good flat glide. Make sure everything is straight except for 1/16 washout in both wingtips and 1/32 rudder deflection to the left. If the model spirals to the left, remove the washout from the left wing. Try for about a 30-foot diameter circle indoors, and a 50-foot diameter outdoors.

I hope you like your Sea Fury and I hope that if you get a chance to see one for real at Oshkosh (or Chino, Calif.) you will take it. You will see other things of interest to you, too.

F/F Continued from page 63

edge of the balsa is properly overlapped by the other edge of the sheet.

11. Allow the whole assembly to dry overnight, then unwrap and slip dowel out of golf tube.

12. Now, this is the fun part. Punch a 1/16 hole between the score lines at one end of the golf tube. Run a piece of 1/16 wire with a hook at one end down the tube and hook it through the hole. Slowly pull on the wire and 'unzip' the 1/2 inch wide strip from the length of the golf tube. Then, gently break out the rest of the golf tube using a twisting motion.

13. Front and rear of the motor tube can be reinforced in the usual manner with plywood rings. Run a bead of Hotstuff along seam, sand outside smooth and cover with 3/4 oz. fiberglass cloth. Louis gives the balsa exterior a couple of coats of dope, then applies the cloth with thinner.

14. At rear anchor end, flats can be cut out on either side of the tube and plywood inserts glued in place, then drilled for the anchor peg.

There you have it. Finished weight will depend on the balsa density, amount of resin used, and the length of the tube. Louis's weighed about 37 grams for a 21inch tube (1.76 grams per inch of tube length).

NEW PRODUCT REPORT

Cooney Miter Mate. One of the highlights of my school year was our annual bridge building competition for the Physics classes at Hillsboro High. The objective was to build a bridge spanning 16 inches that weighed not more than 30 grams, using only balsa wood, glue and string. Winners are judged on the strength-to-weight ratio, and the competition became a tradition at the school for the past 7 years. After our local "smashoff" this year, I managed to persuade some of the more successful bridge builders to enter the State contest, sponsored by the Oregon Society of Professional Engineers. We wound up taking the top 3 individual places, (finishing in the same order as at the local contest), plus the team title. Our best bridge managed to hold a concentrated load of over 350 pounds! Try to beat that with some 3/8 sq. balsa and Super Jet sometime!

The reason for all this background is that the winner, John Cooney, managed to use a bit of advanced technology (in addition to his hard work) to give his bridge an added edge. John's father is Ralph Cooney, who produces the neat molded goodies from Fourmost Products. Ralph put together an ingenious jig for insuring good glue joints on the



bridges, then figured out a way to make it commercially for model builders to use. Producing a balsa-wood bridge with a high strength/weight ratio depends as much on good construction techniques as advanced structural design.

W.E. TECHNICAL SERVICES, INC.

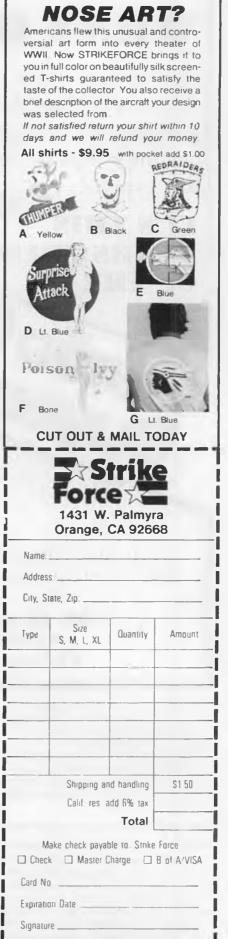
P.O. Box 76884-B, Atlanta Georgia 30328

As you can see from the picture, the Cooney Miter-Mate is well-suited to producing good joints, either of the right angle or mitered variety. The triangle in the center can be rotated to any desired angle to match your construction, then a couple of swipes with the guided sanding block will true it up. You Old Timer types will find this to be a very useful gadget for building fuselages or built-up tail surfaces. Price will be \$7.50, from your hobby shop, or order direct from Fourmost Products, 4040 24th Ave., Forest Grove, OR 97116.

KVG Cox Radial Mount Backplates. If you fly 1/2A, you know the importance of a lightweight airplane. One of the best ways to save weight is with a lightweight engine mount. Kevork Fags is now producing and selling the lightest mount yet available. The KVG Cox Radial mount replaces the backplate of your TD .049-.051, giving a 1-1/8 inch diameter mounting flange to attach to your firewall. The whole assembly weighs less than 5 grams, which means that an engine mounted on the KVG mount weighs less than a gram more than the bare stock engine. The mounts also permit a quick interchange between Class A and 1/2A, without change in thrust adjustment. The mounts came undrilled, so you can match them to whatever firewall arrangement now in use

Kevork sells these for \$4 (incl. postage), and has a good stock available for immediate delivery. If you prefer a combination tank/mount, he's also producing the Competition Models Tankmount at \$7.25. Write him at 236 Thayer St., River Vale, NJ 07675.

Windsor Balsa Stripper. If you've been searching for an inexpensive, convenient balsa stripper, go down to your local hobby shop and get one of the Windsor units. Ever since 1 first unsuccessfully attempted to use an X-acto type stripper, I've been looking for one that works. The Crocket Copy Cutter is nice for stripping long strips or tapered strips,





but takes a lot of workbench space to set up. The Windsor gadget is small enough to keep on the bench for cutting a short length of a particular size strip. The sample I purchased had one slight flaw: the guide edge was curved rather than straight. But a few swipes with a sanding block straightened it out (the glass-filled nylon sands nicely).

Plug Sparks . . Continued from page 42

Contest Manager gave a full report on the Champs indicating after all expenses were paid, the contest only lost approximately \$240.00. In this columnist's opinion an admirable job of financial managing. No problem in keeping the SAM Treasury healthy with financial reports like that!

Hellman also indicated entrees were 67% free flight and 33% R/C. In a breakdown of costs, trophies for free flight took 70% of the trophy expenditures, while R/C cost 30%. Pretty close match to the actual number of competitors!

Although the Marquardt Trophy was introduced at the Victory Banquet, this is a good time to run Photo Np. 13, showing Roy Marquardt (President of the Board of Directors, Marquardt Corp.), Ken Woodgrift, President, holding the trophy. Behind Roy is SAM Vice-President and SAM Champs Contest Manager, Al Hellman, along with Bruce Chandler (project engineer of Marquardt), the SAM Champs F/F Contest Director.

Shown in the photo is the new perpetual trophy for the Thirty-Second Antique Event honoring Roy Marquardt for his many contributions to the science of model building. The trophy features a Dennymite engine used by Roy in his modeling days, and also has a SAM logo and room for many names. Best part of all, a well built case is provided for storing the trophy!

Also during the meeting, Woody Woodman presented a proposal spelling out those events to be held for the R/C Assist portion of the SAM Champs. As the situation stands now, only the basic free flight events are required. This leaves considerable latitude for the Contest Manager. The motion was adopted as a recommendation to all future SAM Contest Managers. In this same line, Don Bekins pre-

In this same line, Don Bekins presented a proposal to create an R/C Rules Board that would be comprised of the SAM Board of Directors and concerned SAM members. This was also adopted with action to be instigated upon appointment of the board members by the President.

Fred Lehmberg also presented a perpetual trophy to SAM as contributed (and constructed) by his son. This trophy was accepted on the basis that Fred would find a suitable event of modeling flight for award.

The last item of business was the adoption of an R/C O/T Electric Event as presented by the Electric Modeling Industry, Roland and Robert Boucher. This event would be held at the SAM Champs, time and space permitting.

Before adjourning, a motion to hold the 1982 SAM Champs at Westover AFB, Chicopee, Massachusetts, over the Fourth of July holiday under the auspices of SAM 7, was approved.

Getting back to contest action, Don Rasmussen displays a three-bladed prop on his Zipper in Photo No. 14. Don reports this type propeller is quite successful in preventing nicked propeller tips from too little ground clearance. The three-bladed propeller appears to work as well of not better than the standard two blade.

Photo No. 15 is one we simply had to take, as Charlie Critch, of SAM 21, barely aced in at the last minute to win Class C. With the contest closing at 4:30, Charlie was finally able to get that precious frequency pin at 4:25. Under pressure, Charlie performed like a champ, the K&B 40 pulling the Ehling Contest Winner to a good enough height to find that elusive thermal for a "max" flight.

While wandering around the field in search of little seen or photographed models, the columnist ran into "Mik" Mikkelsen with a Korda "Stickler" as seen in Photo No. 16. This model design by Dick Korda has remained in relative obscruity, partly because Dick himself didn't think it performed in the same fashion as his Wakefield winner. Not so, sez, Mik, it is a good flyer and placed third, to show the boys.

Photo No. 17 was taken of the SAM

Free Flight Rules Coordinator, Abe Gallas. As noted in the caption, Abe has had this model for a long time, but gives the design credit for being a good and stable flyer that does not readily crash. Abe reports even if he didn't win, he had a heckuva good time!

Thought we would run another pic of the popular Cumulus. Photo No. 18 shows the model to good advantage. As one can readily see, a midwing arrangement is a very unstable free flight design. but for radio assist, this is a terrific combination! Dick Huang, a very active member of the Ft. Worth group, SAM 29, flew exceptionally well in the Antique Event but blew the flyoff flight with an overrun. Oh well, sez Dick, I left a few trophies for the other guys. Ha!

As a summary to the SAM Champs, this columnist would like to quote George Wagner, newsletter editor of SAM 41. George had this to say about the SAM Champs at Taft.

"The Contest Manager and Contest Directors did an outstanding job. There was no waiting time for the free flight timers. Contestants could just about pick their own time to fly. It would have been nice if a similar situation had prevailed at the R/C end of the field.

"The ladies who ran (take a bow, Marge Bernhardt) the desk did all they could, but the pileup and interminable wait on the frequency pin took the fun out of the flying. The fault was with the flyers themselves and their thoughtlessness of others. The 'four minute' rules was not enforced. In one case, the fellow who had the pin ahead of me retrieved his model near the kitty litter factory (a la F/F) with the transmitter and pin in hand. A forty minute wait in all! We reemphasize that management did a great job but the fliers need to police their own ranks.

This writer can't help but agree, but the solution is in pre-registration with no more than 7 to 10 entries allowed on any particular frequency. It was frustrating to note two frequencies completely tied up with the rest being a berry patch (no waiting!). Most all glider and pattern contests do this, hence this is one of the recommendations being made to next year's Contest Manager.

VICTORY BANQUET

Those fellows who complained about the bean feed being a little sparse could not find fault this time as diners were served second and even third helpings! This columnist thought the awards went off in great style.

Worth mentioning is that Fred Lehmberg finally decided to award his Feather Merchant trophy to the fellow making the highest amount of time using ignition engines strictly. Ross Thomas was the lucky recipient this year.

During the introductions at the Victory Banquet, noted were four from England (Hinton, England, Billington, and Payne) two from Canada (Newman and Alden) and Jack Abbott from South Africa. No one can say the Champs were not truly international.

Sweepstakes winners turned out to be



Sal Taibi for Free Flight and Don Bekins for R/C. Bruce Norman narrowly missed winning when he let his one-hour-plus flight land off the field in a time that would have won the Texaco Event quite easily. (R/C rules call for landing on the flying area.)

We could talk all day about the wonderful time we had at the SAM Champs and some of the classic competition, but the results should speak volumes for themselves. Here they are:

FREE FLIGHT

- Class A Cabin (34 entries) 1. Art Suhr (So Long/OR 19) 2. Phil McCary (Commando/Arden) 676 3. Bruno Markiewicz (Cabruler/Arden) 665 4. Bill Cohen (Cabruler/Bantam)
- 5. Sal Taibi (Cabruler/Bantam)

Class C Pylon (43 entries)

754

573

538

1. Leon Nadolski	
(Sailplane/McCoy 60)	1200
2. Leslie Norman (Zipper/OS30)	1093
3. Ray Chalker (Sailplane/Spitfire)	999
4. Bruno Markiewicz (Sailplane/OR60)	838
5. Sal Taibi (Swoose/Forster 30)	715
30 Sec. Antique (38 entries)	
1. Wade Wiley (Rambler/OR33)	806
2. Terry O'Meara (Clipper/Madewell 29) 730
3. Sal Taibi (Powerhouse/Forster 99)	719
4. Bob Dodds (Rambler/Brown Jr.)	692
5. Bruno Markiewicz	
(Diamond Zipper/OR33)	642
Hand Launched Glider (12 entries)	
1. Al Heinrich	299
2. Bob Boyer	237
3. Brad Levine	217
4. Wade Wiley	211
5. Dick Williamson	194





FOX .25 RC

With a Fox Up Front you have enough \$ left for the rest of the aircraft.

run across is the panel hiding some switches, on the left are a couple that reverse the throttle and steering servos. This is a terrific feature, one that shortly will be a standard thing, it is so good. Obviously, you just install the radio system where it fits best and worry about servo rotation later. But many times this feature is handier than that. For instance, on the Associated RC12E, the steering servo normally has to be reversed by popping it open and switching some wires around. No big deal, but you have to know how, and nobody likes working inside these critters. Compounding this problem is the fact that a lot of serious racers go to the track with spare servos, just in case. If one is reversed, to be fully prepared, you gotta have two servos. But if your transmitter has a reversing switch, one spare is plenty and with servos costing around \$40, you can see the advantage.

On the right are some switches that initially are just confusing. The LIN/ EXPO switch means that you can have either servo work in a linear or exponential fashion. Forget the long word. . . What it means is that in linear mode, if you move the wheel, say, 25% of full travel to the left, the servo will also go to 25%. But in exponential mode, at 25% of wheel travel the servo will go to . . . Hell, I don't know what percentage! For illustration, we'll say that the servo goes to 20%. At smaller wheel movements, the effect is even greater, while at full wheel (or throttle) movement, the servo gets caught up and still delivers full travel. What you notice is that around center for the steering and at low throttle for power, things are a whole bunch less sensitive. A touchy car will all of a sudden now be easily driven down the straight and through corners while not sacrificing turning ability. I think that the exponential control on steering will be the most used, but definitely do not overlook also using it on throttle, as we have had very good success doing so and it is especially helpful on an over-



F sumen M

powered 1/8 car.

A neat trick with exponential available is that you can actually trick yourself into driving smoother. What yo do is to practice with the switches in linear mode. Then when the first heat comes up, flip them over to exponential and you will be smooth and fast. Experts will scoff, but this does work, particularly with inexperienced racers.

Even though only working when the exponential option is used, another handy feature is adjustable servo travel, from full throw right down to just perceptible movement... Another super feature that you have to play with to appreciate. Many of you guys are setting your car up with a ton more front wheel travel, left to right, than you will ever need. With the Airtronics XL radio, at least you have the ability to pop off the panel and try a little less throw. You will be surprised to find that the car will work better with just adequate throw and that if you need more steering what you'll have to do is fiddle with wings, front tires and rear tires.

In addition to all this, the radio has a fine trim on the throttle control, as well as the usual coarse one, so proper adjustment of the throttle servo is simplified; further helped along by the #22500 Propeller not included Full Size Fox .25 RC 3-View is available, send a stamped sell-addressed envelope

.95



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fact that the servo output shaft and the servo wheels are a splined arrangement offering very fine tuning.

As can be seen by the picture, we have been using the Airtronics radio in an RC12E and have had no problems at all. I am used to slightly faster servos, so we once wired the receiver direct to the 6cell pack, but the servos got really jumpy, to the point of not being usable. Wiring in just one dropping diode, instead of the usual two, left the servos quicker and solid in response, so we left it at that.

The Airtronics radio is well worth taking a close look at, both because it works and there are a couple of features (like the soft steering wheel cover) that I haven't gone over.

MORE RADIOS COMING...

Next month we'll look at the new Futaba race car radio, as one is due to show up here and then it will be the new Kraft import car radio that gets a thrashing, as I keep hearing good things about it, especially from racers of 1/8 cars. And





both have their share of whistles 'n bells...

THE END...

Yes, I know that we were going to put a wrap on the thing with the Associated RC12E, but I've used up all my space for this month. Next time...

OH, YEAH. .

Join ROAR (Radio Operated Auto Racing) now. The newsletter has now gone from infrequent, to good, to excellent, and getting better with each issue. The insurance package is working out well, in itself worth the cost; in fact a necessity for any ROAR-sanctioned race. A junior rate is available for those 16 and under, costing just \$10. For \$20, a family membership is available, but most are individual memberships, going for \$15 and worth a lot more. Send your money, name, address, age, etc., to: ROAR, Inc., 12008 Welland, Cumberland, IN 46229.

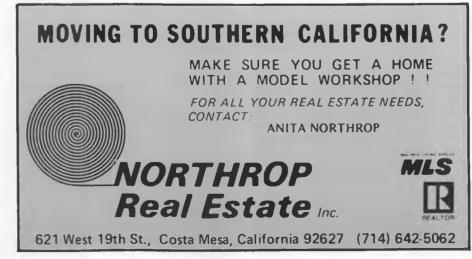
FLASHO!!!!

At the World Championships in Indianapolis, Indiana, Arturo Carbonnell smoked 'em all off, but good. In the 200lap Final, Art was first one through the first corner, pulled away until the lead over second place was about two laps, and then stroked the rest of the way, winning easily.

Art drove a stock Delta Super J to the win, and I made the boys at Delta promise to send me the car Art used, so in next month's column we will take a very close look at the current World Champion's race car. Of course it will be an exclusive, would I bother otherwise??!!

Charger.... Continued from page 27 inches long (measured on the bodies). Trim the excess leads from the middle connections but leave the end leads long for now. The two smaller diodes should have their bands to the left and the larger, Zener, diode in the middle should have it's band to the right. Solder the two middle connections.

Lay the diode string in it's position next to the cell arrays. Lay the cut and stripped wires in their positions on the arrays. Tie a small knot in one end of the zipcord about 1-1/2 inches in and strip about a 1/2 inch of insulation from the wires at this end and separate back to the knot. Solder the polarity marked wire to the connection between the banded end of the Zener diode and the banded end of the blocking diode. Shorten the lead on the pullup diode (the one



farthest from the band on the Zener) to about 3/4 inch and make a small loop in it. Connect and solder the unmarked wire of the zipcord and one end of the prepared 7-inch insulated wire to this loop. Lay all this back on the cell arrays and route the 7-inch insulated wire under the cells and bend it so it will match up with the soldered grid line of it's proper cell. Solder the 3-inch bare wires to the back (shiny) side of their proper cells (as shown). Solder the long lead of the blocking diode to the back side of it's cell. Lay the whole thing down with the blue/gray sides up (Wires in their places? Diodes underneath? 7-inch wire under?) and move the cell arrays around and in close to each other so they intermesh and there is about 1/16 (more or less) gap. Bend and shorten up the ends of the bare wires and the insulated wire so that they will make a 3/8 to 1/2 inch long connection to their appropriate grid lines.

Paying close attention to maintaining the interlocking and 1/16 inch spacing of the cell arrays, solder these last three connections. Now let's test it. Carefully (it's not hard to pick up if you leave it on the paper) take it all out into the sun. The voltage across the ends of the zipcord should be 10.6 volts plus or minus 0.3 volts. You may have to tip it up into the late afternoon sun to get this. If it's not, check it out against the diagram and make sure you don't have any "cold" solder joints. A good field test for this circuit without a voltmeter is to lick (with your tongue) the free ends of the zipcord or the plug (you can install it now or later, just hook it up so the plus (polarity marked) wire goes to the tip of the plug. Using this test should give you a nice little buzz.

Set the array aside and find a candle about 3/4 inch in diameter and about 4 inches long. You can substitute a commercial mold release for the candle wax. Put it in the cleaned Pyrex cake dish and the dish in the oven and set the oven to 200 to 250° F. About 15 minutes later, take the dish out with pot holders and slosh the melted wax around so bottom and sides are covered (up about 2 inches) completely. Pour off the excess wax (and the wick, if you used a candle!).

Sand down the 7-inch plywood square to taste and with the soldering iron, woodburn your name, address, phone number, voltage and current rating (10.6 volts, 150 milliamps), date of manufacture, directions for use, name of the designer (the author), hat size, blood type, and anything else you can think of on one side only of the plywood. Put the plywood square in the oven at about 200 to 250° F. Leave it there till you're ready for it or for 2 or 3 hours. This will dry the wood real good and make it suck up the plastic when you put it in the mold.

Read the directions on your plastic resin container. If you are using the catalyst type, use the lesser recommended amount of catalyst as too much for a quick set will only cloud or crack the finished product.

Do this on the back porch for ventila-

tion. Mix up about 4 oz. of plastic resin (or epoxy, or whatever) and hardner (or catalyst), stir slowly so you don't make too many big bubbles. Pour all this (4 oz.) into the mold (waxed cake dish) and let it set up, level, to where it is no longer fluid (doesn't move around much, acts like it would take a week to pour out if you let it) but not quite as thick as Jello.

Lay in the Solar Cell Array, blue/gray side down, shiny side up, diodes and wires on top, square with the edges of the dish. Use a toothpick (or whatever) to maintain the 1/16 spacing and proper interlocking of the cells. Push gently on top of the cells so the plastic squirts up between the cracks a little, coating the edges of the cells. Plenty of time, so straighten the wires and diode string with needle-nose pliers, and route the zipcord over to the nearest edge of the mold and up and over the side. Push the knot down into the goo a little ways. Make another 4 oz. batch of plastic and pour some in on top, just enough to "wet" the top of the cells and the wires, etc. Lift the wires away from the tops of the cells so the plastic gets under to form a little insulation. No cells touching, no wires touching each other or the cells, squared up, looks good? Then lay in the 7 inch square woven fiberglass cloth, square it up and pour in the rest of this 4 oz. batch of plastic. Poke at the air bubbles with the toothpick, then lay in the plywood, woodburned side up, square it up, and push it down just a little to sink it about an extra 1/8 inch. Make up the last 4 oz. batch of plastic and pour in enough to "wet" the top of the wood and also fill in around the edges of the plywood. Poke at the bigger air bubbles rising up from the wood, then set it aside for at least 24 hours.

Remove the casting from the mold by putting the whole thing in the oven, set it to 200° F. or less to melt the wax. You may have to use a knife to score the edges where the plastic meets the glass to remove it. Pull it outslowly to allow air to get underneath (vacuum lock). Don't pull on the zipcord! Remove the excess wax with hot water and dry it off. Any rough surface features or scratches can be fixed by "painting" on more plastic resin. This is the way to take out scratches in the future, makes it bright and shiny again.

Hold the Solar Battery Charger up to the sun and lick the plug. Zap! It's guaranteed not to rip, rattle, rust, or warp, and will probably last for hundreds of years.

Open up your transmitter and install the jack in a place where there is lots of room. Run some wires over to the battery area and hook up right across the battery terminals or right to the battery wires. The wire from the plug tip connector on the jack should go to the plus (+) terminal of the battery, the plug shank connector to the negative. If you don't want to work inside your brand new transmitter, have your dealer do it. **IN OPERATION**

Leave the Solar Charger plugged in most all the time and prop the charger



up in the window (facing east or west, not north or south) when you're not flying (or sailing, or racing) and it will keep the batteries up all the time. All it needs is about 30 minutes per day to keep them up, and about 12 hours worth to bring the batteries up from the dead. Once every few months, run your batteries through a cycle (run them down real low and charge them up again, NiCds love it).

When you're out working with it just lay it in the grass beside you or hang it on your belt (drill a hole in the corner and make a hanger. Don't drill through a cell, of course!). We don't use our plugin-the-wall chargers any more, so we've been stripping them for parts.

THE SOLAR CELLS AND WHERE TO GET THEM

These Solar Cells (made by Applied Solar Energy Corporation) are edge cuts from a rather High Technology manufacturing process, and because they are special, they are not readily available off the shelf. This cell shape was chosen so that as many as 30 cells (need 30 for a 12volt charger) can be put in the above mentioned 8 × 8 mold. This shape was chosen because it lends itself nicely to the oven soldering process. These cells were chosen because nowhere else in the world can be found a fully tested, 150 milliamp cell for the amazingly low price of \$2.00 each.

Bearing this in mind we made up a



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Kit #150-13 = same as #150-10 except 30 cells and proper volt. reg. diodes for a 12-volt charger, price \$77.00.

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Stay tuned to this magazine for our Solar Powered Electra-Lite, a 93 inch sailplane with an .05 electric motor flight system.

Electric Continued from page 29

plans. The plane flies beautifully and is very realistic in flight with the Astro 15 and reduction drive. Second place went to the Sorrell Guppy built and flown by Tony Naccarato. This model was built for the IMS indoor electric event held the week before at the Pasadena Center. It was too light and underpowered for outdoor flying, but performed nicely nonetheless. Tony claimed the mild breeze was a strong wind! The wing loading is only 3 ounces per square foot. Tony also piloted his mother Addie's plane to third place. The Farman Moustique had won the IMS contest the week before, but again, it was underweight for outdoor flying with the Astro 020. It has over 1000 square inches of wing area and only weighs 23 ounces (it is guarter scale) . . . fantastic! Tony plans to install an Astro 05 for outdoor flying for "brute power"! Fourth place went to Roger Chastain for a very pretty Porterfield Collegiate done in transparent red Monokote. This covering gives the effect of silk and dope, and shows the stick construction of this Astro Flight kit to best advantage. Steve Neu took fifth place with his twin-motor Cessna Citation. Steve used twin Astro 020 motors in

this tiny twin (36" span) which zips right along at 50 mph. It was definitely the fastest scale plane entered.

Thanks, Bob, for the report, and the photos of all that beautiful sunny summer weather in California in January! Last month, I described Karl Binder's electric ducted fan Jetster 20, and I can't resist one more photo of it if the editor has the room. Karl is holding the plane with a good top view, so the extra length in the wings and fuselage are easy to see. So far as I know, this is the only R/Celectric ducted fan ever, a real first!

Bill Stroman sent some photos of the free flight event at the January 18th electric championships, and Jim McDerm-oth's "Hummer I" really caught my attention. Bill gave a very complete report on the free flight event in the May issue. This is the plane that Jim loaned to Cynde and Kim Waddell so they could compete in the Junior event. It is powered by a VL Hytork motor, and the more I look at it, the more I think it is on the right lines for "simple" indoor R/C. The time is right for some easy-to-build and fly indoor electric R/C models. Who will be the first to try it? I think a flying weight between eight and twelve ounces, with a wingspan of three to four feet, would be ideal. The super mini Cannon weighs 3 ounces for three channels, the VL Hytork is 3 to 4 ounces, depending on the battery pack, so the airframe would be about 3 to 4 ounces for the upper weight limit. I have flown a Mattel Superstar indoors at eight ounces all up with an Ace Rudder-only radio, but it flew too fast, and met its demise on the gym wall! The weight loading has to Le low, about 3 to 4 ounces per square foot. So, there are still frontiers to conquer with electric, let's try it.

PT Boat.... Continued from page 32

This will avoid a lot of problems later on when the deck coverings are put in place. Use 1/32 spacer strips all around the main deck interior framing, or 1/16 spacer strips on one lengthwise and one crosswise side of the deck interior framing before building the superstructure and rear access hatch frames. When these frames are now built tightly against the interior frames, they will, when complete, have a clearance all around of about 1/32. More than that amount of clearance is not needed in a model of this type.

When all glue has dried, coat the entire framing with resin. Not only will it waterproof the framing, but when dry, will give a real secure final gluing.

Lightly sand the hull exterior where the keel, chines and rubrails will be positioned to insure a good bond.

Cut a piece of 1/4 inch plywood to the shape of the keel as shown on the plans, making it full length to include the area shown on the plans for the shaft housing. Measure the outside diameter of the shaft housing you are using and cut this amount from the stern end of the keel blank. Lay the keel on the plans and mark off the shaft angle and location of the shaft housing at forward end. Cut the keel along the marked line. By making this one cut, you will now have the correct angle to install the shaft housing as well as having the keel come out the proper length. Mark the location of the hole through the hull for the shaft housing and drill and shape as required. Place the keel pieces and the shaft housing in place, holding them with scotch tape. When they are properly aligned with the bow of the hull, epoxy the shaft housing in place. After the epoxy has set up, glue the keel pieces onto the hull. Use body filler to blend the keel and shaft housing into the hull and one another.

Mark the location of the rudder. Drill a hole for the rudder housing and epoxy into place.

Make and install a motor mount according to the power source you have chosen. The mount for the Astro .25 shown in the pictures was made from 1/2 inch flakeboard epoxied into position. Insure that the motor and the prop shaft are in as near perfect alignment as possible. Although a universal joint will operate in an out-of-alignment condition, there will be a power loss (loss of RPM) in proportion to your misalignment. This is a good time to test run the motor, and check out the sources of any vibrations or other problems that may appear. It is easy to correct these at this stage and not later on when the deck is in position.

Measure two pieces of 3/16 sq. spruce for the chines. Soak them and clamp to the top outside of the hull so they will dry basically in the correct shape. Glue them in place, starting at the stern and following the lines of the hull to approximately 22 inches from the bow, then start curving them up as shown on the plans. Use of a glue like "Super Jet" for this operation will give you fast set-up time and let you work the strips into position a little at a time. Use body filler to fill in the gaps between the hull and chines and sand to the final shape as shown on the plans.

The rubrails are made from $3/16 \times 1/4$ spruce strips prepared in a similar manner to the chines. After the soaking, clamping, and drying, they are glued on even with the top edge of the hull. Fill and sand to shape as shown on the plans. Do not forget that a rubrail also goes on along the stern of the hull.

The main deck framing is covered with six pieces of 1/8 plywood. Why six pieces? There are six straight edges that will come into contact with the superstructure and rear access hatch. The superstructure and rear access hatch frames are built with straight edges. What is easier to cut and fit than straight edges?

The six pieces used to cover the main deck framing consist of the following: from bow to front deck opening, a piece on each side from the front deck opening to the beginning of the rear access hatch opening, a piece on each side from the beginning of the rear access hatch opening to the stern, and a piece



across the stern between the other pieces. The outer edges of these pieces should be large enough to overlap the rubrails. Glue the deck pieces, on making sure that the edges of the deck opening are perfectly in line with the deck framing. Fill the joints between the deck pieces and between the rubrails and the deck pieces and sand to shape.

Cover the superstructure and rear access hatch frames with 1/8 plywood fitted to the edges of these frames with one exception. The rear access hatch decking should be extended beyond the frame at the forward end to cover the support between it and the superstructure. The hull is now complete except for final finishing, painting, and the addition of the accessories that will be attached later on in the construction process.

SUPERSTRUCTURE AND ACCESSORIES

With the hull ready for finishing, construction should begin on the superstructure. The rear and middle cabins are nothing more than boxes to which the fittings are added. The front cabin is a little more complex in that two pieces will have to be bent, and some pieces will have to be cut to outlines shown on the plan.

The entire superstructure on our model was built from 1/8 plywood, with the exception of the cabin bases and the gun turrets. The only glue used in the construction of the superstructure and the assembly of the fittings was "Super-Jet". Its ability to join dissimilar materials, along with its fast working time, enabled me to move along with the PT construction as fast as I was able to get a piece ready, without waiting for previously glued pieces to set. It really is the modeler's dream glue. The construction sequence that was used was to start with the simplest structure and then go on to the more difficult ones. The rear cabin, the middle cabin, and the front cabin were built in that order.

Cut a piece of plywood to the outlines of the rear cabin top as shown on the plan. Scribe a line 1/4 inch in along the edges of this piece. Cut a piece of 1/4 inch balsa to fit inside the scribed lines for the cabin base. Cut strips of plywood to the height of the rear cabin sides and

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glue them to the edges of the base. Glue the top in place, making sure to leave an 1/8 inch overhang all around.

Cut a piece of plywood for the middle cabin top. On this piece scribe a line 1/8 inch in from the edges, as on this cabin, there is not overhang on the roof. Cut the cabin sides to the height shown on the plan less 1/8". Before gluing the sides to the base, drill the holes for your portholes. (Note: Many of the WW-II PTs had portholes, many had the rectangular windows on the middle cabin. Portholes are available to frame the holes drilled and this is what I used. The choice is yours.) Glue the sides to the cabin base, then glue the top in place flush with the sides.

The rear and middle cabins are joined together by the rear turret base and two pieces of armor plate. The rear left corner of the middle cabin and the front left corner of the rear cabin will have to be cut away to accommodate the 2-1/4 inch tubing used for the turret base. I used Plastruct ABS plastic tubing for the turret bases on my model, cut to the height shown on the plan. Using the tubing for a template, mark and cut out the areas of the cabins that the turret base will be glued to. Making sure that the cabins are correctly aligned, glue the turret base to the cabins. Cut out pieces of plywood for the armor plates as shown on the plan and glue into place. Fill in any gaps between the turret base and the cabins.

Cut three identical pieces to the outline of the front cabin side as shown on the plan. Mark and cut out for the windows. Take one of these pieces and cut it straight back from the top of the lower control area to remove the cockpit armor plate from this piece. This will become the right cabin side. The other two pieces will be used for the left cabin side and the middle support.

Cut a piece of 1/4-inch balsa and a piece of plywood to the width of the cockpit floor shown on the plan. The balsa piece should be about 1 inch longer than the length shown on the plan, while the plywood should be long enough for you to cut the cockpit floor, cockpit forward wall, cockpit control panel, and the cockpit front armor plate from it, insuring that they will all be the same width. Glue the cockpit floor to the base and mark off the location of the cockpit forward wall and the entranceway length on it.

Glue the left cabin side and the middle support to the cabin base. Glue the cockpit front armor plate in position to square up the other pieces to the base. Then glue the cockpit forward wall and the cockpit control panel into place.

Cut two filler pieces to hold the right cabin side to the middle support and glue them into place. Set the filler pieces far enough apart so that when the front cabin is cut out for the front turret base, they will be clear of the cut area. Glue the right cabin side into place. Cut a piece for the right entranceway armor plate and glue into position. This piece should be the same height as the cockpit armor plate and wide enough so it will be flush with the right cabin side. Cut a couple of pieces of plywood for the control panel searchlight platform and glue into place.

Cut the front cabin top to the outline as shown on the plan and glue into place. Since there is no front view on the plan, the two pieces for the cabin front should be cut to the bottom width shown on the top view of the cabin and the height of these pieces should be the length shown on the side view of the cabin. Fit these pieces so that the center joint is perpendicular to the cabin top, and the angle at the center joint is the same angle as the front of the cabin sides. After they are correctly fitted, cut out for the front windows, making sure that the windows are parallel with the top of the pieces, and glue into place.

Cut two pieces of plywood for the right and left entranceway armor plates. Soak them well, and then clamp them to a round object about the same diameter as the armor plates should be when dry. While they are drying, cut pieces of plywood for the entranceway floors and glue them in place. When the armor plates have dried, fit them to the cabin and the floors, sand to shape and glue into place.

Use the 2-1/4 inch tubing for the front turret base as a template to mark and then cut out the area on the right cabin side for the turret base. Glue into place and fill all voids.

Cut and glue into place the armor plate and the seats in the cockpit area, as well as the left searchlight platform. The radio antenna support was made from a piece of $1/2 \times 3/4$ inch wood cut to length. Cut, fit, and glue the pieces for the ammo boxes, shield box, side box, and the hatch covers that will go on the rear and middle cabin tops. These hatch covers (and those that will go on the forward deck) were made from a piece of 1/8 plywood used for the top and a piece of 1/16 plywood used for the under piece. The between-cabins vent was cut from a piece of 1/2-inch wood.

The mast is made from 3/16 dowel with 3/32 brass rod used for the braces. A 3/32 brass rod is also used for the nofire ring of the 20mm. gun. On my model, this no-fire ring serves also as the



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handle with which I raise the superstructure.

The two twin .50 cal. machine gun mounts were made from 1/4 inch plywood, by using hole cutters of the proper size. Cut 1/8-inch pieces from the leftover 2-1/4 inch tubing and use for the gun rings. A piece of 1/8 plywood is used for the gun mounting plate.

The no-fire rings for the machine guns were made from 1/32 brass rod soldered to 1/16 brass rod used for the no-fire ring stanchions. The guns shown were made from some leftovers from a plastic kit, although they should be available from Dynamic Models shortly. The 20mm. gun, the liferaft, the torpedo tubes and the mufflers were made from the kits for these items available from Dynamic Models.

This completes the construction of the superstructure sub-assemblies and everything should be ready for final assembly and finishing.

FINAL ASSEMBLY AND PAINTING

Fill, seal, and sand the superstructure components and the superstructure deck to fill all voids and seams. Paint those places that might prove difficult to reach with paint later on. The only paint used on this model (except that used for highlights) was a gray primer that was close to the Navy gray desired.

Layout the location of the front and rear/middle cabin assemblies and glue them into place on the superstructure deck. Make sure that the cockpit floor and the entranceways fit flush to the middle cabin. To eliminate any space between the cabins and deck, add a molding in these areas.

Drill two holes in the superstructure deck and one in the rear cabin top and glue the no-fire ring into place.

Drill four holes in the rear cabin top for the ventilators and glue into place. These can be made operational if you desire to provide fresh air to the motor.

Glue the ammo boxes, shield box, side box and the between-cabins ventilator in place.

Layout and drill holes in the middle cabin top for the mast and glue into place. Cut two strips of 1/32×1/8 spruce for the hand rails and glue them into place, along with the two hatch covers on the middle cabin top. Paint the superstructure and the other accessories that will go into the superstructure, such as the searchlights, portholes, horn, lights, siren, etc. When the accessories are dry, glue them into place.

Glue the prepainted machine gun assemblies on to the turret bases, and the superstructure is complete.

Sand and seal the rear access hatch cover and glue onto it the 20mm. gun assembly, a hatch cover, and the cleats. Paint and set aside. Fill, sand, and paint the hull assembly gray. Mark off the waterline, and paint below this line with a reddish color

Paint the mufflers black and glue to the stern with the exhausts just above the waterline.

All of the hull accessories that will now be added should be painted before they are glued to the deck.

Drill holes and glue the front ventilators in place as shown on the plans.

Drill the three holes near the stern and glue the stanchions into place. Use 1/32 brass rod for the railing.

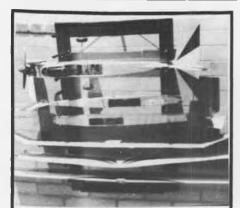
Drill the four holes for the bow stanchions and glue them on. Use the 1/32 brass rod for the railings for these, and extend the railing at the superstructure end through the deck. This will be used for the radio antenna, as explained later on.

Glue into place the front hatch covers, cleats, flagstaff and the bullards.

Cut four 1/4 inch square blocks and use them for the liferaft supports. Glue them and the liferaft into place. Glue the four torpedo tube assemblies into place.

Spray the entire hull assembly, superstructure and rear access hatch assembly with a coat of flat plyurethane clear. This not only will give your model a hard durable finish, but will help hide any errors that may have sneaked in while painting. If you have never used this material for a final finish, try it, you may like it.

Install your radio gear. Set the rudder arm so you will get the maximum throw on the rudder. If you are using electric power, use an electronic speed control to extend your battery life. We used a RAM Redline 20 amp. speed control on our model and have found it to be a very satisfactory unit at a minimum price.



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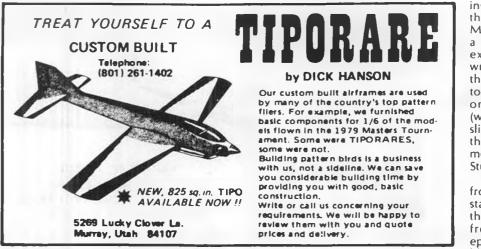
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Solder the receiver antenna to the front handrail to use it as your external antenna. In doing this, you will leave your superstructure free of any internal attachment in order to gain fast and easy access to the hull interior.

With everything completed, batteries charged, it's off to the lake and watch the water fly! Happy running.

Jetster Continued from page 23

short; even the plans show the plane sitting in a ridiculously low negative attitude. My junkbox yielded a longer strut that jacked the nose up to a suitable horizontal position. (I hate surprises like



Characteristics of the second state of the sec

a sudden zoom on the first takeoff.)

A good, safe nominal 30% balance point is shown, but I would also like to see incidence angles spelled out on the plans. My measuring indicated that both the wing and the stab are supposed to be parallel to the thrust line, but wanting more insurance, I installed the wing with one degree of positive incidence (the Robart Incidence Meter makes a hard job easy). I balance my wings just prior to covering, since any difference in weight is usually due to the varying density of the wood and amount of adhesive used.

My ultra reliable 6-channel Royal receiver, four Titan servos, and a 500 mah battery pack took care of the brains and muscle needed for guidance; even though the rudders are fixed, the fourth channel is used for steering. I hate an antenna flopping around on the outside, so I routed it back through the fuselage via a nyrod conduit, being very careful to keep it away from servos and power leads.

All four servos were installed with 1/16 double-sticky tape (been using this method for over 12 years with nary a problem); the elevator was connected with regular nyrod; the steering with a short piece of 1/16 cable and nyrod; and the ailerons to torque rods. My throttle hook-up would have to wait until I trial-mounted...

THE FAN UNIT

Unlike the RK-40 and the RK-049 Axiflo fans, which are actually kits, the RK-20B falls right into the ARP (Almost Ready to Power) category. Now made of rugged nylon, and designed around the powerful K&B 3.5cc (.21 size) engine, this Axiflo unit contains only six major parts: spinner, rotor, engine mount, front stator/shell, rear stator/shell, and fuel tank. According to the informative 33-page instruction booklet, the RK-20B can be fully assembled in less than an hour. That's quite true, it can be however, there's more to this unit than just the nylon parts.

The exhaust pipe, which is now available in molded foam from Kress Technology Inc., has to be fabricated out of 1/64 ply. Getting this to fit right proved to be a bit tricky, in spite of the full-size templates, and was compounded because neither the text nor the drawings really spell out how to attach or affix the 1/64 plywood to the rear stator/shell flange. My photos show how I chose to do it, using scrap balsa and good old Hot Stuff. The fan outer cover is also made from 1/64 ply, and can be fitted with ease; this cover is held to the fan by small sheet metal screws. As a point of interest, the molded foam inlet cowl, the tailpipe parts, and the outer fan shell cover come with the airplane (if needed) ... not with the fan unit. It all depends on whether or not the fan will be podmounted, as with the letster, or an internal installation, like the Skyhawk.

All the nylon parts fit very well and the

instruction booklet takes you through the assembly with a minimum of fuss. Midwest is on the ball and also included a supplement construction sheet. For example, the booklet recommends wrapping a piece of plastic tape around the fuel tank/center-body joint in order to keep the tank in place. However, once the tape becomes fuel-soaked (which takes no time at all), the tank slides aft causing all sorts of problems. So this supplement sheet describes a dandy method of securing the tank using Hot Stuff and micro-balloons.

The bellmouth, held flush against the front flange with sheet metal screws, started to loosen up before I even ran the unit; you can expect just so much from foam. After I rectified this by epoxying in pieces of nylon to act as blind mounting nuts, I found out that Kress Technology has new inlet cowls with tapped metal inserts built right into them.

Although I couldn't see any way to avoid having the needle valve extension sticking out the side of the fan shell, I did take a hard look at the recommended throttle installations. Since both of these were also on the outside of the bird, I decided to use thin cable and nyrod and come right up through the mounting cradle and fan shell bottom into the duct itself, connecting to the throttle arm with a ball joint. This method has worked well, caused no problems, and doesn't seem to have had any adverse effect on fan efficiency.

The four mounting pads were attached to the stator/shell bottom very close to the positions shown on the detail plan sheet, although I used Hot Stuff (which makes a great bond) instead of the recommended silicone. Then the rotor blades were trimmed to give a healthy 3/64" clearance between the blade tips and the inside of the duct.

The next step was balancing the rotor, and although the instructions describe the procedure and recommend using a High Point Balancer, they do not emphasize how absolutely vital this balancing is to the efficiency and longevity of the fan: a 300 to 400 rpm gain after careful balancing is quite normal. I used the High Point and, by Hot Stuffing small amounts of micro-balloons on the inside of the hub, was able to fine tune the balance of my rotor to a gnat's behind.

I went along with the 4-40 bolt and blind mounting nut installation for the fan unit. I drilled holes through the hardwood cradle, mounting pads and bottom of the stator housing, roughed up the inner nylon surface with 100 grit, and used filled epoxy to fasten the nuts to the inside of the duct. A 10-inch long T-handle hex wrench, together with 4-40 Allen head bolts, made removal and reinstallation of the ducted fan unit easy.

Then I installed the fan in a plywood cradle so I could run...

THE ENGINE

And, boy, does it run! K&B has a great powerplant in the 3.5, and many car and boat racing people latched on to this little jewel right from the start, helping



to build its good reputation.

Test running any engine makes sense, and with a fan installation, it's really the only practical thing to do; otherwise you're at a disadvantage by not having any feel for what to expect and not being able to set the idle properly. By checking rpm (and thrust) on a test stand, you can face that first flight with a wonderful feeling called "peace of mind"; you've got the world by the tail when you know there's enough thrust to safely fly that "jet" plane.

The only change I made to the engine/ fan combination was to replace the stock 5/8-inch header pipe with a Mac's Products 4-inch header; I didn't want to burn the inside of the rear duct and I did want to get all that exhaust gunk out of the way. The header does a few other nice things also, like adding 200 to 300 more rpm to the top end and knocking the decibel level down a bit.

Almost all the test running and the first 25 flights were made with this header ... using my regular 5% sport fuel. I really didn't know what to expect, since no one has ever mentioned using less than 15% nitro in a fan. What a pleasant surprise on that first run when my Pro-Tach indicated a steady 19,800. And that pleasant surprise turned into happiness when I checked the performance curves in the booklet and found I'd have three pounds of thrust to depend on.

But since this was all new to me, I still needed more assurance and reinforce-

ment. So I hooked up our 25-pound baby scale, getting thrust readings from both the cradle and aircraft installations. And my happiness turned to absolute joy ... 'cause that beautiful baby scale also indicated three pounds. Got to admit that my needle valve adjustment was very broad with that 5% mix, more so than I've ever encountered before, but there was no real problem finding a good setting ... it just took a little longer.

By the time I finished checking wingloading and thrust-to-weight-ratio (TRW), I was literally bouncing up and down with excitement. With a gross takeoff weight of 4 pounds, wing loading was a nice, easy-to-take 21.5 oz./sq. ft.; and since, according to Axiflo designer Bob Kress, anything over .70 was a good TWR, I felt very comfortable with the .75 my calculator flashed at me. Any doubts I had were gone; I was ready to go...

FLYING

Everyone had left the field by the time we arrived, and after dutifully taking the necessary static pictures, I filled the 6-1/2 ounce tank and made a range check. With my wife Dee holding, I jammed the starter on the spinner, cranked the engine to life, and tweaked the rpm to ... an even 20 grand. After due consideration, though, I backed the needle valve off 'til I read 19,800... just to be on the safe side.

While Dee was getting the camera ready, I tried a few high speed taxi tests

and found that my steering was not positive ... I had to work at keeping the plane on the centerline. I eyeballed the bird closely and noticed she was sitting a bit nose-high; I reckoned that the wings were producing enough lift to make her too light on the nosewheel and this was compounded by having no rudder to steer with. It was a real pain to have to loosen the steering arm and shorten the strut, but I certainly didn't need a meandering airplane. Another high speed ground run confirmed that tracking was okay, so I lined up for takeoff ... and heard a familiar voice ... mine.

"Hey, Big Al, how about that lag the fan has in getting up to full rpm? Remember, baby, this runway is only 250 feet long and the wind is mighty light. If she doesn't gin up enough flying speed and gets broken..."

For a few seconds I did consider having Dee hold the tail while the fan stabilized at full power...but only for a few seconds. I was determined to make a "normal" takeoff, and that was that; after all, hadn't my \$7.95 calculator verified that she'd fly OK?

The wind was barely 5 knots and quartering as I gave Dee a plucky smile and advanced the throttle. The Jetster started to roll slowly, and I was so anxious that it seemed like one helluva long time before she really started to scoot. In fact, I was about to abort when abruptly this slow motion sequence ended and my black bird suddenly acted as if she had just gotten a great big boot





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in the behind. I committed myself to the takeoff, promising her every inch of runway. As she rotated, I fed in a bit too much back stick and watched her come off the runway at a very (GASP!) steep angle. I immediately released some back pressure, she assumed a more shallow climb . . . and I started to breathe again. Attaining flying speed had been no problem with aileron and elevator control being solid, even at that high angle of attack. At 200 feet I came around in a gentle, right 180 degree climbing turn and realized she was accelerating. By the time I leveled off at about 400 feet, she was flat moving. If it hadn't been for the unusual profile, I could have sworn I had a "Quickie" type or pylon racer on the receiving end.

A nudge of down and right on the trims and she was hands off. I tried loops and found that she had a tendancy to flop over on her back if she came over the top too slow. This was due, I'm sure, to the weight of the pod. Rolls were the real surprise: they were tight and axial and very little elevator mixing was required to keep her level. I tried some Immelmans, Cuban Eights, and inverted flight, and was impressed; the 3.5 had the guts and the airplane was quick, nimble and capable.

Stalls were next, while I was still at altitude; I also hate surprises on the first landing. That forward balance point sure kept her acting like a lady; when forced into a stall, she'd wallow a bit and then drop her nose sharply, recovering easily as soon as enough airspeed had built up. I set up a right hand traffic pattern, and it wasn't 'til after turning final that I noticed how much drag the pod had at low rpm. I also couldn't help but notice that my idle was too high. I made two attempts to land, but aborted both times because of the high idle; I couldn't bleed off enough speed no matter how long and strung out my pattern was. As I added power on my last approach and grabbed for altitude, I realized that the "feared lag" in going from idle to full power was barely noticeable; it was there, but certainly nothing to worry about. I leveled off at 200 feet and pulled the throttle and trim all the way back. Following orders, the K&B quit, and the plane assumed a flat glide . . . almost too flat, I thought, as I thumbed in just a whisker of down. The drag from the pod acted very much like a small amount of spoiler deflection on a sailplane; descent was steepened, but control response was still firm, even at that lower speed. As with propeller-driven aircraft, there was less drag deadstick than with the engine at idle. Due to the increased sink rate, I just managed to drag her in on the runway at the same angle of attack she'd had on takeoff.

I was really turned ON; the sound of the fan, and the look and speed of the plane added to the full flavor of flying a "jet." Now, 32 flights later, I'm even more enthusiastic about the RK-20B, because I've had no problems with parts breaking, cracking, coming loose, or falling off. This has proved to be an extremely viable, off-the-shelf unit, which is exactly what's been needed.

Keep in mind that the Jetster is not a large plane, and she's fast, so your reflexes should be honed a bit before you take her on.

Also keep in mind that a fan installation *is not* as straightforward as the conventional installation. The mounting, throttle control, and needle valve details will differ quite a bit from bird to bird because the placement of the fan unit will be different, especially on scale-type planes. And you've just got to pay attention to those little details that will mean the difference between maximum flying time... and a severely bent bird. Sloppy work habits or craftsmanship will bite you right in the butt. **OPTIONS AND SUCH**

There is only one problem with this basic fan/engine installation: NOISE. With a light ship, the four-inch header and five percent nitro provide more than adequate power, but the noise will get most guys banished. My club, the 114th R/C Aero Squadron, has a little old lady living adjacent to our field who complains bitterly about everything, including the Dallas/Fort Worth Airport traffic. Most clubs have someone like her to contend with, and we can't afford to give these people the ammunition to shoot us down.

So... for those who list noise as their first priority (first after safety, that is), contact Mac's Products in Sacramento, 'cause Wally has got a fantastic pipe made specially for the 3.5/RK-20B. The only catch here is that in order to get the pipe to "come on," you'll have to go to 15% nitro fuel. This pipe is smaller and much shorter than standard pipes, and far less obtrusive. (I sprayed mine with black hi-temp paint to make it blend in with my finish). And, guys, it does a magnificent job of lowering the decibel level while extracting more power.

Without the pipe (just the 4-inch header) and 15 percent nitro, rpm went to 20,500, but the noise was terrific ... like a db reading of 93. Just adding the pipe raised rpm to 21,200 and brought the decibels down to 80 ... which is far quieter than most all-prop type installations. Even at max rpm, you can be scant feet away and still carry on a conversation in a normal voice.

Now for those who lust for power and want their bird to go like a raped ape, here are some recommendations for boosting thrust and satisfying that burning yearning for speed. Start by replacing the stock carb with a K&B.40 Perry or Irvine Carb; this will give a solid 500 rpm increase immediately. Then procure an aluminum mount and two housing support rings from "Dandy Don" Dombrowski at the House of Balsa; you'll add a good 300 rpm just by switching to the more rigid metal mount. With these mods, plus Mac's perking pipe, the 3.5 will typically put out 22,500 to 22,700 rpm ... which translates into a full four pounds of thrust. (Midwest says this will handle up to six pounds of airplane.) Of course this is all predicated on using a 15 percent mix.

If you don't have, or don't want to get, a .40 carb, but do want that four pounds for maximum go, make all the other mods and service with 30 percent nitro; this should also get you up to the 22,500 range. I was not inclined to push my engine beyond 22,700 because 15 percent and the pipe do such a great job. And besides, the higher nitro fuel costs too damn much and why knock hell out of an engine for no reason.

Once again a reminder about those little things that do make a big difference: finite balancing of the rotor; proper installation of both the bellmouth and the tailpipe so the airflow, in and out, is as smooth as possible; streamline tubing over the fuel lines; and solidly mounting the fan to the cradle. Also keep in mind that designer Kress feels very strongly about three areas that most affect fan performance: a smooth, proper-shaped inlet, a good engine/ fan combination ... and a L-I-G-H-T aircraft.

I found the vibration level to be the same as in any other well-built plane with its prop balanced. And about that "pronounced" lag when adding power . I found it to be minimal. After dozens of touch and go's I just don't feel that it's a problem, not in my installation, anyway. As for flying off of grass . . . I didn't try it. We have a paved runway and I didn't have access to any reasonably smooth, well-mowed areas. However, I'm certain that takeoffs would be no problem on a well-manicured grass runway if larger wheels (mine were 1-3/4 inch), 15 percent fuel, a .40 carburetor and the pipe were used.

Do make sure your 3.5 is Model #8445; it has the high-timed sleeve and piston designed for the pipe and high rpm. Incidentally, K&B is seriously considering making this fan engine available with a .40 carb (thanks to Don Dombrowski); this will insure that even a mediocre engine will still deliver adequate power, especially if used in the less efficient internal configuration. And a few words about plugs: contrary to popular belief, I did not burn out a plug on every run. In fact, I'm still using the same plug that came with the engine because a pod installation allows better cylinder head cooling.

Back in the dark ages, fan operation was dependent on an engineering degree, exotic fuel and plumbing, a host of incantations and, most important, outstanding freestyle body English. Things have changed, however, and reliable off-the-shelf fans are here, just begging to be used. So get a taste of the pioneer spirit that shaped our country's destiny and be the first grownup kid in your neighborhood to fly-a-fan.

Take it from a revitalized grandpa ... doing it is always much more fun than watching someone else do it. Flex-I-Grit

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Heath Continued from page 21

K-S

EX-I-GRI

flapping in the wind, will make it all worthwhile. We are still striving for this. Be warned that one of the hazards here is becoming too attentive to the aircraft being photographed. The best of pilots can suddenly find themselves trying to fly the wrong plane! The Heath will usually allow one to come to his sensors before disaster strikes as it circles lazily overhead with thumbs off the sticks.

To sum it up, if you want a plane that is easy to build and fly and perform well with that smooth quiet OS four-stroke engine, try the Heath. And with a little searching for documentation an average pilot might win a scale trophy.

Workbench.. Continued from page 6

systems industry follows in line with our concern for all hobby lines. The grass roots hobby dealers all over our country provide the showcase for all hobby products. Without them, everything the modeler consumes would be bought sight-unseen, not a very healthy or satisfying condition. The local hobby shop must stay in business if our industry is to remain alive. By the same token, hobby shop owners must realize that





mail order discount is a fact of life. It will not go away. Hobby shops can and must learn to live with the M.O.D. houses, but the M.O.D.'s must also realize they cannot live without the "local hobby shop."

SPEAKING OF RADIOS...

We have one pet peeve with most of the radio manufacturers of today. We said "most", as one or two that we know of do have what we're about to jump up and down about...coupled rudder and aileron! And we don't mean a "Y" connector to two servos from the aileron channel. We mean electronic coupling available upon transmitter switch command at any time ... couple or uncouple.

A new R/Cer learns to fly on rudder, elevator, and throttle. The model (usually) has sufficient dihedral that when the rudder is deflected, the wings bank in a pleasing and proper attitude, providing a coordinated turn. When the encouraged pilot goes to an aileron ship, he begins to skid, gain and lose altitude, and generally fly in a sloppy manner. Some learn the coordinated turn eventually, but many don't. The new giant ships, in particular, must be flown like a real airplane ... feed in some rudder with the aileron and keep that ball in the center. The big gliders are finally catching on in the U.S. They need coordinated rudder/aileron turns, too.

OK, so you're supposed to learn to use both sticks (or one plus the knob), but why not make your radio customer feel confident, and make him comfortable and proud of his nicely banked turns? Let him "couple up". And when he's ready to side-slip, hold some knife edge, or simply get in an axial roll or two, let him uncouple ... in the air ... with a switch. Hell, we could do that 17 years ago with our old Quadruplex! **THINGS TO DO**

Talk about things happening right

Sutside your front door! Going out the front door of our office and turning left, you pass the Golden Arches of Mac-Donald's, walk by a Taco Bell, and you're at RCH. Don't take offense if you're a redhead, this is Radio Controlled Hobbies, proprietored by Larry Van Osten. The shop is 99% R/C electric cars and Larry is a top-notch promoter. He's also a manufacturer, as you'll note by his advertising which starts this month.

If you're not tired yet, just walk on another 50 yards and you come to a vacant lot bordered on one side by a black-topped parking lot. Alternating every two Sundays a month, Larry puts on 1/12 Formula racing on the parking lot, or off-road racing on a banked, water-trapped, hill-climbing off-road course carved out of the vacant dirt lot. The turnout every two weeks stops traffic on busy, four-laned 19th Street in Costa Mesa, California.

Well, Larry's gonna try and stop all the traffic in CM on September 26 and 27, 1981, when he, with the co-sponsorship of MRC (yes, the one on our back cover!) will present the Radio Controlled Western Off-Road Championships. Preentry is \$15, limited to the first 200, and the deadline for entries is not far away, September 10. For rules and info, call (714) 631-1555. We'll see ya there! CO-RECTIONS

How many of you caught us on the Douglas/North American boo-boo in the August '81 issue? The 0-47 is North American, of course. We've never seen a flying model of it. Plans anyone? We remember seeing a live one at the old DuPont Airport just west of Wilmington, Delaware, many years ago...

*** * *** George Wilson, author of the "Two Sides of Scale" article in the August '81 issue, was quick to point out some typo errors in the Scaling Factors Table I, page 23. If your calculations haven't been working out, put a square root sign around the "F" factor for Speed and the "F" factor for power. Also, "Proportional Speed" should be "Propeller Speed". Our proof reader must have dozed off about the time he was checking that one!

PLEASE, NO OFFENSE

We've heard from several of our friends who we silently passed by on the cross-country drive we wrote about in the August issue. Being so near, so many times, to friends and acquaintances along the way, made keeping our schedule a constant fight with temptation. However, had we not, the issue would never have made it to the printer, as we were automatically four days behind schedule the day we returned! **PEN PAL**

We'll assume you're a modeler if you're reading this. But if you're also an architect in your spare time between models, why not write to Francesco Falanga, P.O. Box 58, 70100 Bari, Italy. Francesco is an architect, and wishes to correspond with architect/modelers in the USA. Anyone out there with an AIA, FAI after their name?

Counter.... Continued from page 9 Geneva Ave., San Francisco, CA 94112;

(415) 334-7189.

Curacao Modelbouw announces a new release for 1982, the 'KARL', a harbor tug designed for extreme maneuverability. Steering is accomplished via two propellers located near the middle of the ship. As with all of their kits, the 'KARL' will be quite complete. For further information, write to: Curacao Modelbouw, P.O. Box 470, Curacao, Netherland Antilles, Caribbean.

* 1

Due to the many requests received by L.R. Taylor and Co., they have announced the addition of a retrofit Dual Rate system to its well-known line of electronic R/C products. Each dual rate unit (one required for each channel that dual rate is wanted for; can be used on aux channels, too) comes assembled with instructions for simple installation. At present, it's available for most Futabas, Hobby Shack's Aero Sport and Cirrus Systems. Send a SASE to: L.R. Taylor and Co., 208311/2 Roscoe Blvd., Canoga Park, CA 91306; or call (213) 360-1178.

"MRP", or Model Racing Products, Inc., a pioneer in R/C racing cars has utilized its vast knowledge and expertise in electrical technology to create the 'Vee Sport Electric'. Capable of speeds up to 20 mph in stock form, the Vee Sport features thermoformed high impact hull, "Hot Boat" day cruiser design, stainless steel driveshaft, molded foam flotation/radio mount, proportional forward/reverse speed control, colorful trim sheet, boat stand, high rate fast charge batteries, and a full dress interior. The boat is excellent for "Pond cruising", or possibly a single design competition class. Available three ways, the Vee Sport can be supplied ready to run with a Futaba 2L radio installed as #990, ready to run, less R/C system as #991, or as a basic kit with partial hull assembly and installed driveshaft as #992. See your dealer for the Vee Sport Electric, or contact Model Racing Products, 12706 N.E. 124th St., Kirkland, WA 98033; or call (206) 823-0800.

+ Mark's Models, Jemco, Hi-Flight, and Southwest Sailplanes are now under one roof. The four companies will retain their separate identities, although they are owned and managed by Mark and Rod Smith. Twenty-eight R/C airplane kits, covering the major areas of interest of the R/C builder/flier, are available from the company. There are 9 sailplanes, 8 sport trainers, and 11 scale kits. The company also manufactures carbon fiber structural members, adhesives for carbon fiber, winch kits and winch reels for the launching of sailplanes. Distributor inquiries are invited. A 12-page catalog is available for \$1. Mark's Models, 1578 Osage St., San Marcos, CA 92069; or call (714) 744-9605 for more information.

Seeking a ready-built plane, boat, helicopter, sailplane, or car? You'll find all of these, plus radios, engines, kits, and other items advertised in Hobby Swap News. Do you have an item no longer being used? A 35-word ad is only \$4. Your first ad FREE with a subscription of only \$10 a year for 10 issues of Hobby Swap News, the model enthusiast's "Used Equipment Guide." MC & Visa accepted. Write to Hobby Swap News, Dept. RL-32, P.O. Box 834, Santa Maria, CA 93456.

Astro Flight Inc. sends word that the Astro Solar Electric System equipped Dupont Solar Challenger recently attained 14,300 feet of altitude during test flights at Bakersfield, California. The Solar Challenger has since been shipped to Europe and, on July 7, successfully flew from an airport outside of Paris to Manston, an RAF base in England. The total distance flown was 218 miles at a maximum altitude of 11,500 feet. Time for the flight was 5-1/2 hours. The Dupont Solar Challenger is now on tour

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in Europe and will return to North America in November. For information on the power systems for possible use in R/C planes, boats, and cars, write to: Astro Flight, Inc., 13311 Beach Ave., Venice, CA 90291; or call (213) 821-6242.

* World Engines now has available, in stock, the O.S. Max .40 and .46 VF Engines. These new additions to the O.S. line were developed specifically for high performance pattern flying. Hanno Prettner's Minare or Wolfgang Matt's Arrow scaled down to .40 size would be excellent designs for these engines, also, these two aircraft permit incorporating the tuned pipe in the fuselage. Engineered for high output, these are the first mid-range engines to utilize a 16mm crankshaft. The connecting rod, bearings, and other parts are also suitably beefed up. ABC piston/cylinder construction and Schneurle porting are other important features of the VF series of engines. Available from World Engines, 8960 Rossash Ave., Cincinnati, OH 45236 and their dealers; or call (513) 793-5900.

Champion Hobbies has produced an R/C Pilot Logbook and Flight Record. No more measuring flight time by the number of gallons of fuel consumed! The log will record flight time, flying sites, weather, instruction, cumulative hours, and much more. The Log has a black, durable hardbound cover that will weather well in your flight box. Sufficient space is provided for many

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years of flying by the average R/C pilot. Price is \$6.95 at your dealers, or order direct from: Champion Hobbies, 3715 Reemelin Rd., Cincinnati, OH 45211.

Precision Model Products has introduced its entry into the 2-meter, high performance sport and competition sailplane arena with the 'Challenger.' Designed for thermal and slope soaring, it features the Eppler '205' airfoil and T-tail design for maximum efficiency. A full flying stabilator is an important part of the design concept. Machined and die-cut parts, nylon pushrods, complete hardware package, and a very comprehensive construction booklet with assembly sequence photos are included. With a wingspan of 78-1/2 inches, 588 sq. in. of wing area, and a flying weight of 24 to 26 ounces, the wing loading falls between 5.88 and 6.37 ounces per square foot. Distributor and dealer inquiries are invited. Precision Model Products, 21489 Cold Spring Ln., Diamond Bar, CA 91765; or call (714) 598-7641.

Choppers.... Continued from page 14 Ranger's rotor disc is prone to flap up severely or "dippity-do" at high forward speeds. The key to eliminating the majority of the JR's fast forward flight inadequacies lie in tip weight and rotor speed.

While we're on the subject, tip weights in a Jet Ranger blade, or a similar blade on a similar sized ship are fairly critical.



The minimum weight we would run in standard or neuter blades is 18 grams of lead in each tip. For the type of flying we do (mostly scale performance with a few stall turns and some fast passes), 25 grams in each tip is good. If you fly fast and hard all of the time, we'd recommend anywhere from 30 to 35 grams in each tip along with fiberglassing your blades, or using the neuter or expert blades. During the period when we experimented with expert blades we found that 18 grams in each tip suited us best. The expert blades can also go without tip weights due to their greater weight and rigidity, the prime example being the Heli-Boy blades. Heli-Babies, Revolution 40's, and Crickets have such small blades that they don't use tip weights, but a lighter set of blades will have slightly quicker control than heavier blades. (Too much weight in blades with fixed pitch control systems gives far too sluggish altitude control in hover, that's why such set-ups do not use tip weight.)

From what we've said, a rotor disc running at 1200 r.p.m. will obviously have more rigidity than a disc running at 1000 r.p.m. With specific reference to the Jet Ranger: Last year Kavan released a new gearing arrangement that brought the rotor speed up 13% over the original speed, so Jet Ranger owners, you can now get increased disc rigidity without running the engine over it's peak power curve. We've flown this system ever since it was released and recommend it to everyone because it just is better than the original ratio. Run Heli-Boys at the manufacturer's quoted r.p.m. and you will have no problems with inadequate disc rigidity.

Now that we've looked at the basic parameters of the blades, we'd like to explain how the blades control the helicopter. The Hiller system controls the rotor disc through a servo rotor compromised of the flybar and paddles. It is the Hiller system that is used on the Heli-Baby, Revolution 40, Cricket, and other simple fixed pitch designs. Refer to Figure 1. The paddle's and blade's angle of incidence are shown beside each tip. Note the arrow under the paddle or blade showing the direction of rotation. We put in forward cyclic control. Paddle 1 increased lift, paddle 2 decreases lift. Due to gyroscopic precession, the control input to the paddles and blades does not become effective until the rotor disc rotates 90 degrees. Therefore, paddle 1 has maximum lift at Figure 2 in the position shown. The flybar is now down at the nose of the helicopter and up at the rear. This flybar movement puts positive pitch in blade A and negative pitch in blade B (Fig. 2). Blade A now has increased lift, but its lift does not become effective until it rotates another 90 degrees as shown in Figure 3. Now the lift is decreased in front of the main shaft and increased behind the main shaft. As a final result the helicopter moves forward. It sounds complicated but it all happens rather simply. This process is the same for all control inputs. Depending on where the initial control is put in affects which motion is produced. You can see that the Hiller system needs 180 degrees of rotor rotation to move the helicopter. In Figure 1, paddle 1 is to the right. At the end of the process in Figure 3, paddle 1 is to the left, or 180 degrees from its starting point. After you understand the Hiller system the Bell system is easily understood. (That's easy for you to say! wcn)

With the Bell system, control is put directly into the blades without going through the flybar. Referring back to Figure 2, if we put in forward cyclic, blade A increases lift and blade B decreases lift. This takes effect 90 degrees later, which gives more lift at the rear and less lift at the front of the helicopter, causing it to move forward. The Bell system is a 90 degree arrangement compared to the Hiller 180 degree system, because it only takes 90 degrees for the Bell control to affect the helicopter once it has been put in.

All flybarless systems such as Hubert Bitner's Horizon use the Bell system alone to control the helicopter. The Heli-Boy, Jet Ranger, Alouette, collective Mantis, and Hirobo designs all use the Bell and Hiller systems in combina-

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tion. These are slightly different systems only in execution, the theory is the same in each.

Drawing some conclusions from the foregoing, the Bell system is quicker in hover than the Hiller because the control inputs are going in twice as fast, and the blades are moved directly by the servos. If you take a Hiller system and put lots of weight in the paddles the stability becomes such that the flybar doesn't move much even though the paddles are trying to move it through their increased or decreased lift. (Remember, it's flybar movement that controls the rotor disc in the Hiller system.) In a general sense, the lighter PEANUT SCALE Vultee P-66 \$1 50 WALNUT SCALE P-66 and Vought V-143 \$2 00 ea plus 40¢ postage SAE for complete list or \$1 00 for sample plan and list David Diels. Box 101_ Woodville OH 43469

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we make the paddles the more flybar movement allowed, with the following greater control of the disc. Even at its best, the Hiller system will not approach a Bell system for quick, precise control in a hover.

Most .60 sizes models use the Kavan or "Beller" system by necessity; the Bell system for quick hover control, and the Hiller system to supplement the Bell system by helping the servos move the rotor disc in forward flight.

Only recently have servos been available for the Bell system that are strong enough by themselves to move the blades in forward flight without stalling. SEVEN full pages of ready-built models and used equipment bargains in the last issue of "Hobby Swap News." Hundreds of items of all descriptions. 35 word ad only \$4 BUY-Sell-Trade, your first ad free with subscription \$10/yr (10 issues), \$19/2 yr., \$27/3 yr Add \$3/yr for first class postage Canada and Mexico must use 1st class rates MC & Visa accepted Hobby Swap News. Dept FLC-31, Box 834, Santa Maria, CA 93456

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Therefore, flybarless helicopters depend on powerful servos for adequate flight characteristics. This is not saying that the helicopter won't fly with lesser servos, but that the full potential of the rigid rotor flybarless concept will not be realized.

One thing that is clear, we can significantly affect our helicopter's performance by using various types of rotor blades and control systems. There is no "right" system, only the combination of factors that suit your type of flying best. Don't be afraid to experiment. Try various set-ups, then stick with the one you find that satisfies the majority of your requirements.

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L.T.A..... Continued from page 37

lers mounted on horizontal pivots that could turn to face backwards or straight down, giving control even at zero airspeed. The same is true of model airshipes. Properly built, they can move in any direction from a standstill.

A simple forward-neutral-reverse throttle can be made from a threeposition double-pull double-throw (DPDT) switch, shown in the diagram. Other lightweight throttles for electric motors can be made from micro switches. My last airship used 4 micro switches to give half reverse-neutralhalf and full forward control from one servo.

You may find that your elevators don't work the way you think they should. This is because the dynamics of a model airship are different than that of a plane. On a plane, when the trailing edge of the tail goes up, the tail goes down, the nose goes up, and the rest of the plane follows. With an airship the T.E. goes up, the tail goes down, and the rest of the ship goes with it! In essence, your controls are "reversed". It may help to see your blimp as a submarine with diving planes instead of a plane with horizontal tails. Dynamically speaking, airships have more in common with submarines than airplanes. Only the media of travel is different.

When you fill your bag for flight, be sure not to over inflate it. There's no need to over stress those heat-sealed seams. Fill until just full, and then add ballast until trim. A chain of paperclips is No. 8811 MINI BIRD \$4.00 Two-meter version of Dave Thornburg's well known Bird of Time. Mark Smith.

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- No. 7812 BIG PROP CHARTS \$1.50 Charts for determining best engine and prop sizes for the "biggies". John Burns.
- No. 7813 GREAT EXPECTATIONS \$1.50 West Coast/Mooney Bostonian design for beginner or expert. By Ernie Wrisley.
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- No. 5811 CURTISS P-40 \$10.00 Exact-outline giant/sport R/C scale for .90 power, 80" span. By Art Johnson.
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very handy to work with. Remember: Even the best made bag will leak as the helium diffuses through the plastic, so be sure to allow for some removable ballast on your ship.

It is best to fly with a neutral or slightly heavy ship. The heavier the ship, the greater forward speed you must have to make use of dynamic lift. If you fly your ship with a slight positive buoyancy it is very possible to send it to the ceiling and not get it back until sufficient helium has leaked out.

It is a good idea to make a small, accurate scale; either a pan balance or steelyard. I made mine from a tin can lid, fish weight, 1/8 inch wooden dowel, and button thread. It weighs anything from zero to 1.6 oz.; is marked in tenths of an ounce, and is invaluable for finding the lightest possible materials. I calibrated it with clay weights that I made up on a balance at our local high school.

Something you learn quickly in building and designing your own model is the meaning of the word "tradeoff". One mil mylar plastic holds gas twice as well as half mil, but it is also twice as heavy. A heavier ship requires a larger bag, which in turn requires a larger motor to pull it effectively through the air, which needs larger batteries to keep it running as long as the motors you had before, so you had better design an even larger bag, in turn requires... Every little addition to the model adds weight, and those tenths of ounces add up very quickly. I usually build the bag after completing the rest of the ship, in order to have a more accurate idea of the size envelope I will need. Be sure to include

No. 5811 BLANIK L-13 & L-13J \$9.50 Czech 2-place sailplane in 1/5 R/C scala. Optional power. Span 126". L. Houha.

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No. 481-O. T. POU DU CIEL \$3.00 Finely detailed 22-inch span rubber scale, Oct, '36 Flying Aces. By Ken Hamilton.

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the weight of the bag in your calculations! I always make it as small as possible to minimize drag.

For those interested in building something bigger, but don't want to go to the trouble of making a large bag, Peck-Polymers has recently made available an 11-foot model blimp envelope. When fully inflated it has a useful lift of 28 ounces, which can carry almost anything you can think of. This size is large enough and the bag is tough enough to design an outdoor model, useful for carrying cameras, airhorns, or whatever. You might even consider painting advertisements on the sides for local businesses.

This article can only touch on a few points in model Lighter Than Air. It is still so new that innovation and invention lurks at every corner. Lifting bodies, tethered and U-control models, rigids, saucer shaped models, and many others are just waiting for someone to build. You are limited only by your imagination.

I would enjoy helping anyone with questions about LTA, and am eager to hear from anyone who has built a model. It is best to contact me through this magazine as I expect to be moving to a new job site in late summer or early fall. Besides AMA, I belong to the Association of Balloon and Airship Constructors (ABAC), a group interested in the promotion and development of all forms of LTA both here and abroad. You can contact the ABAC through its quarterly journal publisher, George Wright, P.O. Box 7, Rosemead, CA 91770. Membership is \$15 a year, and includes the quarterly journal. There is a

small but growing segment of association members who built models, and we would welcome any information that you might like to pass along. Progress comes when people begin to share ideas, and I know this magazine would also be glad to serve as a forum for new developments in this field. As you send in your letters, pictures, and ideas, you help to encourage others to try this unique form of flying; Floating through the air with the greatest of ease!

Soaring Continued from page 45

193 airfoil and have 936 square inches... a 13 to 1 aspect ratio. It operates at 7.5 ounces per square foot. The smaller wings are foam core covered with 1/16inch balsa sheeting. These foam wings are about four ounces lighter than the larger built-up wings, so the wing loading is nearly the same. The flaps and ailerons are cut out after the sheeting and sanding is complete. The solid core ensures accuracy of the airfoil and therefore smooth and precise handling quality. These planes have a wide unballasted speed range, and adding ballast makes them FAI-F3B competitive.

Lately, I've been flying the larger Camano. It responds instantaneously and clearly demonstrates its efficiency. On the other hand, the plane deserves ... in fact demands ... continuous attention. It's well-behaved, but very sensitive to its environment. Clearly, it's not a "floater." The four control channels take care of coupled aileron/rudder, elevator, flaps, and spoilers. The elevator is raised to keep it above the wing wash (and there's less chance of damage in rough field landings). This is the plane that's winning so many contests in the Northwest.

All in all, the Dodgson planes are well respected. For example, Bob Baugher won the 1980 AMA NATS with a modified Maestro. Terry Edmonds placed first in five contests in three states and in the 1980 National Soaring Society Regional meet flying his Maestro. The Northwest Soaring Society (home of the 1980 United States FAI winner and long-time Maestro flier, Carl Blake) has once again been dominated by Dodgson designed planes. Dave Johnson, flying the new Camano, had the highest season score again this year. That's the third straight year that Dave has won the season championship with the Dodgson gliders. It's the ninth consecutive year that Dodgson designed planes have been flown to victory by the champion. Dave entered nine two-day contests and won five of them, placing second in three others. Guy Russo, also flying the Camano, placed second in the season championship standings. The top four places at the end-of-the-year championship contest were won by Dodgson designed planes, the first place going to Jack Pitcher, flying a Maestro Mark III. and, that's not the end of the story.

Tom Neilson of the Portland Area Sailplane Society is now flying his Modified Camano. Instead of the flaps and



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spoilers shown on the plans, he's using turning spoilers (small spoilers located on the wing's outer sections. These are designed to function much the same, although without the drag producing hinge lines and complex linkages. The flaps were left off for the same reasons. Test flights indicate that everything works very well indeed, though some throw adjustments are needed for responsive turning. Dave Johnson of the same club has a two-meter sized version of the Camano, still retaining the full control functions and releaseable towhook. He calls this slanted tail fin plane his "K-minnow". It looks good!

While visiting Wright-Patterson Air Force Base, Dayton, Ohio, I stopped to chat with Dr. Ted Helmeniak. He's an expert on materials so I asked the obvious question: "What comes after Kevlar and/or graphite fibers in epoxy or resin?" "Clearly the answer is PBT!"

"PB what?"

"Poly paraphenylene benzbisthazole and its relatives PBO and PBI (blahoxyzole and blah-minazole, respective-

ly)?" "I'm sorry I asked. Aside from the name, what's so remarkable about, say, PBT?'

"Well, here's a class of rigid rod extended chain aromatic heterocyclic polymers that promise much better performance in terms of strength and weight. You see, the ordinary polymers are liked cooked spaghetti ... the molecules are twisted and interweaved. These new compounds are very different. It's as if the spaghetti remains uncooked ... the strands are stiff and remain parallel. The result is far greater tensile strength and a significant weight saving. For example, look at this comparison:

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S-glass (fiber)	
Graphite-Type A (fib	er)
Steel (q7-4 stainless)	
Aluminum (2024-T3)	
PBT (fiber)	



BARON 58 (As featured in June '79 Scale R/C Modeler) PLANS BEECHCRAFT BARON MODEL 58: 212 Scale-85 wingspan-1000 sq. In. (3) 3 x6 sheets \$15.00 Beechcraft Fin Insignia \$2.00

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"Remember that the modulus of elasticity is the slope of the linear portion of the stress/strain curve. If you want strong light wings . . . use PBT. It equals Kevlar in strength and is almost as light as nylon."

"OK, I'm sold! Where do I go to buy some of this miracle membrane?"

"No, you can't buy it yet. This is an experimental program. It takes a long time from first laboratory demonstration to the final aircraft products. If all goes well, we should have PBT in the air by 1990.

"I'm not sure I can wait that long."

"Well, you have no choice. All you can do is watch our publications and stay in touch. For example, the July or August issue of the Journal of Macromolecules will include a number of relevant technical papers."

'Right on!" I acted as if I keep old issues of that journal by my bedside for late night reading, then complimented him on his research and excused myself.

I also had a chance to chat with Don Lowe, of the Flight Dynamics Laboratory.

Modulus of Elasticity (x 10º psi)	Strength (x 10 ³ psi)	Density (lbs/in)
0.475	11.8	0.041
19.	400.	0.052
12.6	656.	0.090
28.	390.	0.065
28.5	195.	0.281
10.6	70.	0.100
40.	400.	0.051



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He has a full scale model shop ... the usual "tools of the trade," semi-finished flying machines, and a few "ready to go" mini RPV's, such as the XBQM-106. This 200-pound "technology demonstration platform" spans only 13 ft. and is driven by an 18 horsepower engine. It flies at 90 knots, the range and mission being determined by what you put onboard. Here's the poor man's cruise missile. By the way, the vertical control surfaces under the wings provide lateral flight control, should that prove desirable. In his off-hours, Don devotes his attention to aerobatic competition . . . a busman's holiday if I ever saw one.

It's good to learn that "Ye Olde Hobby Shoppe" is still on the scene. You know the kind. The friendly shopkeeper is a modeler. He recommends a kit, then stands ready to answer any and all questions as you build. He's the kind of guy you'll find at the Club site on Sunday afternoon . . . willing to teach you to fly the beast.

Well, I received a note from Hans Weiss, of the Wilshire Model Center, 3006 Wilshire Blvd., Santa Monica, CA

90403, inviting me to a Fun-Fly Picnic. My first inclination was to decline. I travel far too much, and it's hard to be away from Torrey Pines on a weekend. But, it sounded so tempting that I couldn't resist. We drove up the coast from Santa Monica, past Malibu, to find the flying site just across from the African Violet Nursery. Here you launch from about 250 feet over the ocean. With a steady wind, there's no lack of lift.

This was a family affair ... about 20 pilots and assorted relatives. The planes ranged from micro to macro. There were the usual trainers, larger span craft, and a number of scale sailplanes. Hans was busy instructing at the cliff edge, while his wife Mattie prepared the cookout. The food was fantastic! The Fun-Fly Picnic turned out to be much more than promised ... a wonderful afternoon spent with friends who share the joy of our sport. Thanks Hans! •

See you next month.

R/C Scale Continued from page 16 tage to a multi over the well flown

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maneuver that might get an 8 or 9. I guess you could downgrade, but nothing specific is suggested other than if they don't run the entire flight. Maybe you could consider "engine note" (out of sync, in sync, whatever) or as one person suggested, only max points if they could be throttled separately as full scale would actually be. Phew! What a problem.

How have your ideas changed over the years? What are your suggestions for some of our knotty problems?

NASA NOTES

A recent questionnaire to the membership on three subjects brought an outstanding response. Some 40% of the membership responded with comments, helpful suggestions, and offers of help to the following proposals: That NASA working with AMA should host a 1982 Scale World Championships. The answer was 'yes' with only one negative vote out of almost 100! The plans for this are moving quite well, however, they are contingent on the bid being accepted by the AMA Executive Council and by the FAI over the earlier bid by Russia. The basic groundwork is being done by Monty Groves, working with NASA and AMA, and all systems will be go to hand out the necessary paperwork at Paris if the bid is accepted.

I was profoundly encouraged by the huge numbers of people who offered to help with this enterprise. All facets of aid were proposed from judging to crowd control and just general "go-fers"! One man offered a check in lieu of his being able to attend! We are working toward Reno in '82!

A second proposal on the questionnaire revolved around the development of a Masters Team Selection utilizing a basic program similar to the present Southern California Scale Squadron's Masters event. While the approval was not quite so high as the first, it was still quite convincing. There were 8 votes against and others that approved of the idea with some modifications. The few concerns revolved around site selection almost exclusively. NASA will be developing a proposal for such a program and hopefully will have some firm decisions before the first of the year so that in the event it is accepted by the membership and AMA, we will be able to implement it for the 1983 team selection year. Again your comments and suggestions are eagerly solicited.

The third item on the questionnaire was relative to scale information. NASA is attempting to provide a comprehensive library of at least three-views to go with the soon-to-be updated Source Guide. The problems involved are great, since some three-views are presently commercially available and others are not. We can provide copies of some and not others. Therefore, it is an earnest plea that NASA requests the following:

Any commercial supplier of aircraft documentation (three-views, photos, etc.) that wishes to be included in a

NASA publication, please send a listing of the specific materials available, preferably typed on $8-1/2 \times 11$ paper, single spaced. Include mailing address and current cost of items. If you wish to only have us include your name and address with a general description of what you have available, we will do so, however, it will not be as valuable to the members or to you. Bear in mind that this information will be sent worldwide, as we have members in many foreign countries.

Secondly, any person who has scale three-view materials that they are willing to share with NASA members, send them so that we can develop a central clearing house for them. There are scads of materials out there which are no longer available commercially or which were never available commercially, that would be of use to others. At the present time, send these lists of materials to me at 4109 Concord Oaks Dr., St. Louis, MO 63128.

SCALE PRESENTATIONS

Out there in the recesses, highways, byways, and the hither-thither-and yon, I hear voices lamenting that once again I am speaking to the competitionoriented when considering scale presentations. I suggest to you, however, that the need or desire to create a presentation does not hinge on your competitive desires. Every scaler, when he creates a model, harbors a desire to share it with others. The casual visitors to the home, the spectators at the field, or his fellow modelers, become targets for explanations and information concerning the subject. It is a natural and rewarding experience for the modeler to participate in, and would it not be a good idea to create some type of material to share with others when they admire your handiwork? I've found spectators and guests to my home are most interested, since it makes them much more aware of what you have actually created.

Therefore, we will make several assumptions so we can begin. We will assume that you have all of your materials and we will assume that you are making a presentation for a sport scale model. The first point you must bear in mind is that you are limited in competition to 6 pages $8-1/2 \times 11$ or the equivalant. This includes written material, photos, drawing, and whatever.

Consider your collection of photos and determine which set shows the aircraft to the best advantage. A variety is wise, hopefully, showing both sides, front view, etc. The point would be that you not become so enamored with one particular view. Judges like to have as much help as possible and hate to guess what the other side is like. Your photos should include at least one photo of the actual subject aircraft, if possible. To hope that judges can differentiate between various models of the same aircraft in the brief time available may prove to be fruitless, especially since some changes are subtle and difficult to distinguish. An oft-made suggestion is to



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make certain that what you have included does not prove your model is inaccurate!

There are photo considerations that must be made if they are part of a magazine article. Since some usable material may be printed back-to-back, you are forced to determine which is the most usable. Of course, if you can locate more than one copy, that problem is solved. You may have a photographically inclined friend who can copy the photo for you, although you probably will lose some detail.

Three-views generally will fit very nicely into a one or two-page format and may leave some room for written material. Type the material and be certain to include your declaration listing prefabricated parts and signature stating that you are the builder of the model. Written material telling about the aircraft or the model is optional. If you feel the aircraft is obscure enough or you have functions or details on the model that you wish to call to the judge's attention, be certain to do so. Do not provide more written material than can be read in a minute or two. Sometimes photo captions can provide enough info to serve the information functions. Just don't burden the judge with more material than he can assimilate in the brief time he has.

Distinguish what is to be used for your color documentation. It is possible that you may have more than one color representation and they may not agree, so be certain to designate what you want the judges to use.

The most common manner to organize your material is in a loose leaf binder. Using plastic pages will help to protect your material. You may want to use the non-glare variety, since it causes less problem in the bright sun. Be careful, because the non-glare tends to hide some detail, so if the photos are not very clear, don't use them.

To finish off the project, check out a local dealer for art or business supplies and pick up some of the various sized vinyl letters. They punch out and have sticky on the back and will really dress up your presentation.

There are, of course, other approaches to putting a presentation together. One



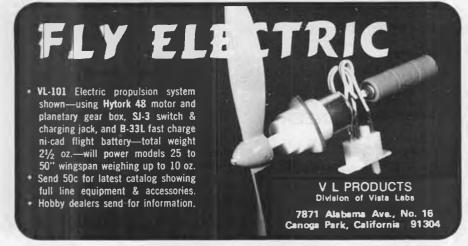
I've seen used and very attractively so, is the single board type. The judges can see the material at the same time. Such a card, if folded in the center, can stand on its own. Granted, such a method is a little harder to store. With a little care on your part, everyone will enjoy using your presentation to learn more about your model.

R/C World ... Continued from page 12 thinking dates back to the days of Class I, II, and III, with regards to escapements, single-channel, etc. Remember when proportional was being utilized in "rudder only" models for rudder and throttle control? Time marches on ... and sometimes we stop to catch our breath, but Father Time, ah, yes...

Surely, a lot of pattern fliers will consider the context to follow to be sour grapes or regression, but this is not the point. Yet others will say, where do we draw the line with transmitter/system concepts? Read on, MacDuff... We fly pattern (aerobatic) models to test our ability; the radios, planes, and engines are the tools, or means to the end.

Having enjoyed participating in pattern contests some years ago, one of the most unique and challenging concepts observed was the occasion when Larry Leonard, CD'ing a pattern contest at Sepulveda Basin, had the top five placers in the old D expert class, put in one flight each, to determine the final finishing order. Larry provided a Lanier 'Caprice' set up with a Mode I, Mode II, and a single-stick transmitter, all match-tuned to the parent receiver in the plane. The results separated the boys from the boys... There is a parallel here; pilotage. Each expert, flew the same plane, once...

What I'm really getting at, is the fact that buttons and switches are the prime factors in winning pattern (aerobatic) contests, rather than control sticks, fingers, and consumate skill. Advances in technology are great if utilized properly. Servo reversing switches, mixers, i.e.: elevons for example, end point adjustments for adjusting control surface throw and fine tuning are one thing, but when we can utilize three different 'roll buttons'; regular rate for three rolls, one for the slow roll, and one for higher than normal (what's normal?)





when sliding down the back side of a top hat, where did the flier of the model (pilotage) go??

Really, we can't fault the manufacturers, as they develop and produce what the fliers (contest) inputs happen to be. True, competition does improve the breed ... take a look at gimbal/ servo design and technology. To refresh your memory a bit, roll and spin buttons go way back to the first analog (proportional to you younger types!) systems and even some reed transmitters have had roll buttons installed on them, heaven might know why, I don't. (Where were you then, oh contest board?)

But, when we can push one (1) button on our tranny that will, at the proper time, feed in the proper amount of up (or down) elevator, rudder and aileron, and receive, for our effort, a perfect snap roll, well, whoopee... Sure, 1 know, it takes time to find out how much of each control movement needs to be fed into the computer, er, transmitter.

Have you ever gone back to the spectator area of a pattern contest and listened to the comments, especially if you were asked to describe how some of the maneuvers were performed? Have you had a somewhat knowledgeable aviation minded type, frown just a bit when he discovered that a 'button' helped accomplish that extra nice set of three axial rolls? Interesting food for thought...

How many pattern fliers have stopped to think about the foreign R/C equip-

ment manufacturer which, several years ago, brought to the Tournament of Champions, a control signal recording device that received the transmitter signal and recorded each channel via a separate stylus for each channel, as a maneuver was being performed by the better fliers. Now, we can sit back and analyze, at our leisure, the control stick movements as they cranked out the maneuvers that generated the 8-1/2s through 9-1/2s and even the occasional 10. It can generate the basic information necessary to create a pretty good program. Sure, there are other variables to be applied, but it's a darn good start. . .

The will and desire to win has to be there in the first place, or there is no improvement or advancement. What would happen to full size aerobatics, if gyros and other 'programmable' goodies were allowed in the Pitts and Laser 200's?? Leo could simply sit there, push a button, and receive a '10'. All we have to learn now, is how to program the judges... Really, stop and think about the future of pattern (aerobatics) flying. Any comments?

C/L.... Continued from page 57

because it is easier to punch, and because modelers sifting through a stack of balsa in the rack won't buy it. But it can be slipped into kits and few are the wiser. Or even care.

So. You take care of the plans. If the manufacturer is hedging on a bet and not supplying tull-size plans, you make templates, which is easy enough to do ... either directly on wood or even heavy paper works fine. And you build another model from lighter materials, pieces that are also a bunch straighter, as you did take the time to pick out straight wood. Didn't you?

This is an easy way to get into scratch building, as you're not so much as starting out on your own design as you are optimizing an existing one, eliminating several potential problems. When finished, assuming the first model is still surviving your efforts to destroy it, you will be able to see what a big difference there is in the flying of identical models, one of which is lighter and straighter.

Another point is that when designing

a model for kit production, there are a whole bunch of problems being faced, many of these compromising the flying ability. For instance, if a manufacturer produces a model that is designed only to fly superbly, it will be lightly constructed with every area made up of minimum sized pieces. Sometimes construction techniques will be more difficult, it itself something to be avoided, but what really happens is that in every area of the country, some bozo or two will buy this kit and build it in a haphazard manner, making all of the mistakes you and I know to avoid. Out at the flying field, the model goes to junk in a flight or two, and the self-proclaimed expert modeler, the previously mentioned bozo, announces to one and all that the kit is a dog. End of sales for the kit.

This really can happen, and the way the kit makers avoid it is to overengineer the kit. Make that sucker strong enough that half the stuff can be left out and it will still fly. This leaves the rest of us buying kits that are designed, not always but in many cases, for our bozo friend, as his type can hurt kit sales more than better modelers can help them ... especially as many of the better modelers are building from scratch.

To take advantage of this situation, just be aware of it and when cranking out that second model, do something about it. Eliminate any overly strong pieces, cut holes in most everything, use thinner doublers, taper the aft ends of motor mount stock, and consider buildup tail surfaces instead of the usual flat slab.

And if you follow this approach, by your second or third kit model, you'll be way ahead in building experience and, most important of all, you will have proven to yourself just how much better a light model flies. This is something that many of the "experts" around know as fact, but have never had proven to them so graphically as in flying a kit model and a "scratch" kit model in back-to-back flights.

JET SPEED

This bit won't tell you too much about Jet Speed, as I don't know hardly anything about the things ... doubt if I could even get one of them fired up. However, while roaming about last weekend, went by the Boeing Space Center and who should be out and about but Jerry Thomas, a very wellknown jet flier. Naturally enough, a jet model was close, belonging to Curt Sackett. Jerry was out of semi-retirement long enough to get things sorted out in the new model. The one test flight we watched was like all jet flights, even a slow one, and that is mind-warping. What a beautiful roar those things make. And things have changed in jet; the flight was 193 mph, regarded as not near good enough, but the last time I saw lerry out campaigning a jet, the speed would have been very close to a new record.

Told you I wasn't going to tell you much about jet...



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