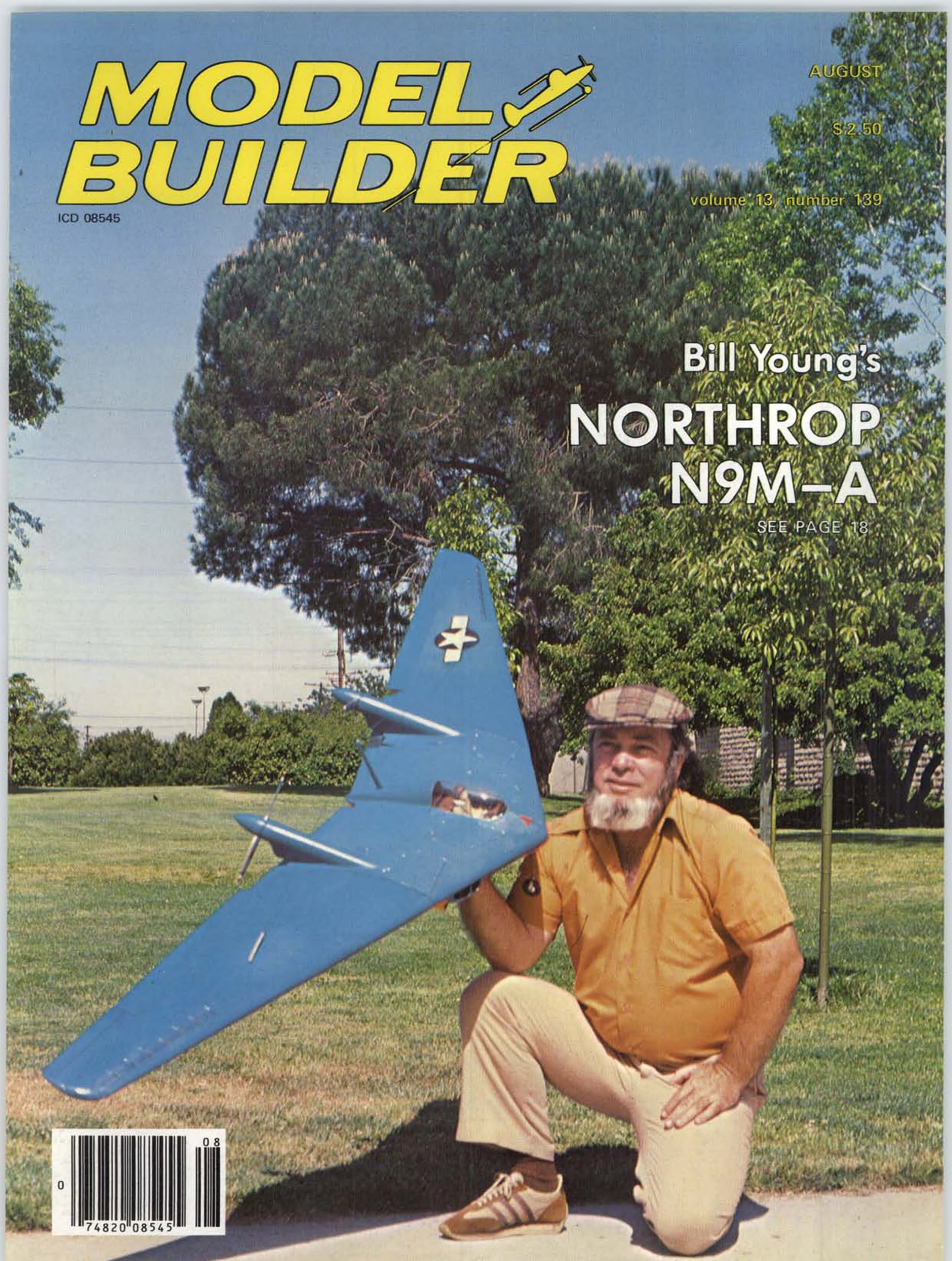
MODEL BUILDER

AUGUST

$2.50

volume 13, number 139

ICD 08545



Bill Young's NORTHROP N9M-A

SEE PAGE 18

0 74820 08545 08

Recognized for Quality
THE WORLD OVER


Staggerwing Beech
1/5 scale


Christen Eagle II
1/3 scale


V-35 B Bonanza
1/6 scale


T-34B Mentor
1/6 scale


MiG-15 (ducted fan)
1/6 scale


F-33A Beechcraft
1/6 scale


Pitts Special
1/3 scale


T-34C Mentor
1/6 scale


Mirage (ducted fan)
1/7 scale

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

General information about these new product releases found in catalog.

NEW for '83

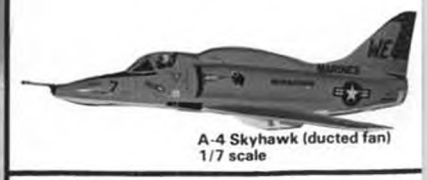

Kfir
1/7 scale

Beech Baron 58
1/6 scale

CAP 21
1/4 scale


P-51 Mustang
1/5 scale


A-36 Beech
1/6 scale


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


F-16 (ducted fan)
1/8 scale


MiG-15 (ducted fan)
1/6 scale


Byro-Jet ducted fan
(for .60 engines)

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—R/C—
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Ray scratch-designed this beautiful stand-off scale Rumpler C-1. Among the many awards this model has won is best WWI Award, Toledo.

—INDOOR F.F.—
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This indoor "peanut" scale Heath Parasol was built by Ray to an all-up flying weight of only 7¼ grams. That's ¼ ounce!

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AUGUST

1983

volume 13, number 139

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CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: After two-and-a-half years of research, model design work, and flight testing, Bill Young has come up with this beautiful 1-1/4-inch-to-the-foot scale Northrop N9M-A flying wing. The N9M series of "wings" was the forerunner of the famous Northrop flying wing bombers, the XB-35 and the YB-49. Few people realize that the N9Ms were actually 1/3-scale versions of those bombers. Contrary to rumor, Bill Northrop is no relation to the company of the same name. The construction article begins on page 18 of this issue. Kodachrome transparency by Tony Naccarato.

MODEL BUILDER (ISSN 0194 7079) is published monthly by RCMB INC., 621 West 19th St., Box 10335, Costa Mesa, California 92627-0132. Phone (714) 645-8830.

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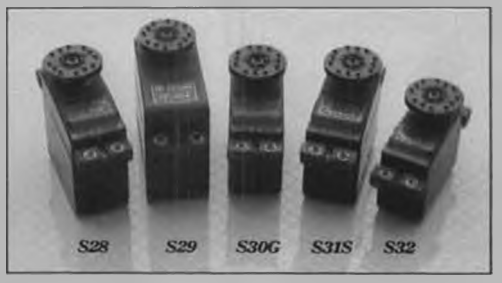

	S28	S29	S30	S30G	S31S	S31SH	S32
Height:	1.59	1.71	1.36	1.36	1.40	1.40	1.20
Width:	0.91	0.91	0.77	0.77	0.79	0.79	0.71
Length:	1.71	1.71	1.52	1.52	1.59	1.59	1.46
Weight:[1]	1.86	2.10	1.47	1.47	1.75	1.72	1.13
Transit:[2]	0.24	0.25	0.24	0.34	0.22	0.16	0.16
Torque:[3]	41.7	48.7	55.6	65.3	69.5	44.5	33.4

[1] weight in ounces [2] transit time for sec/60° [3] torque in oz/in.

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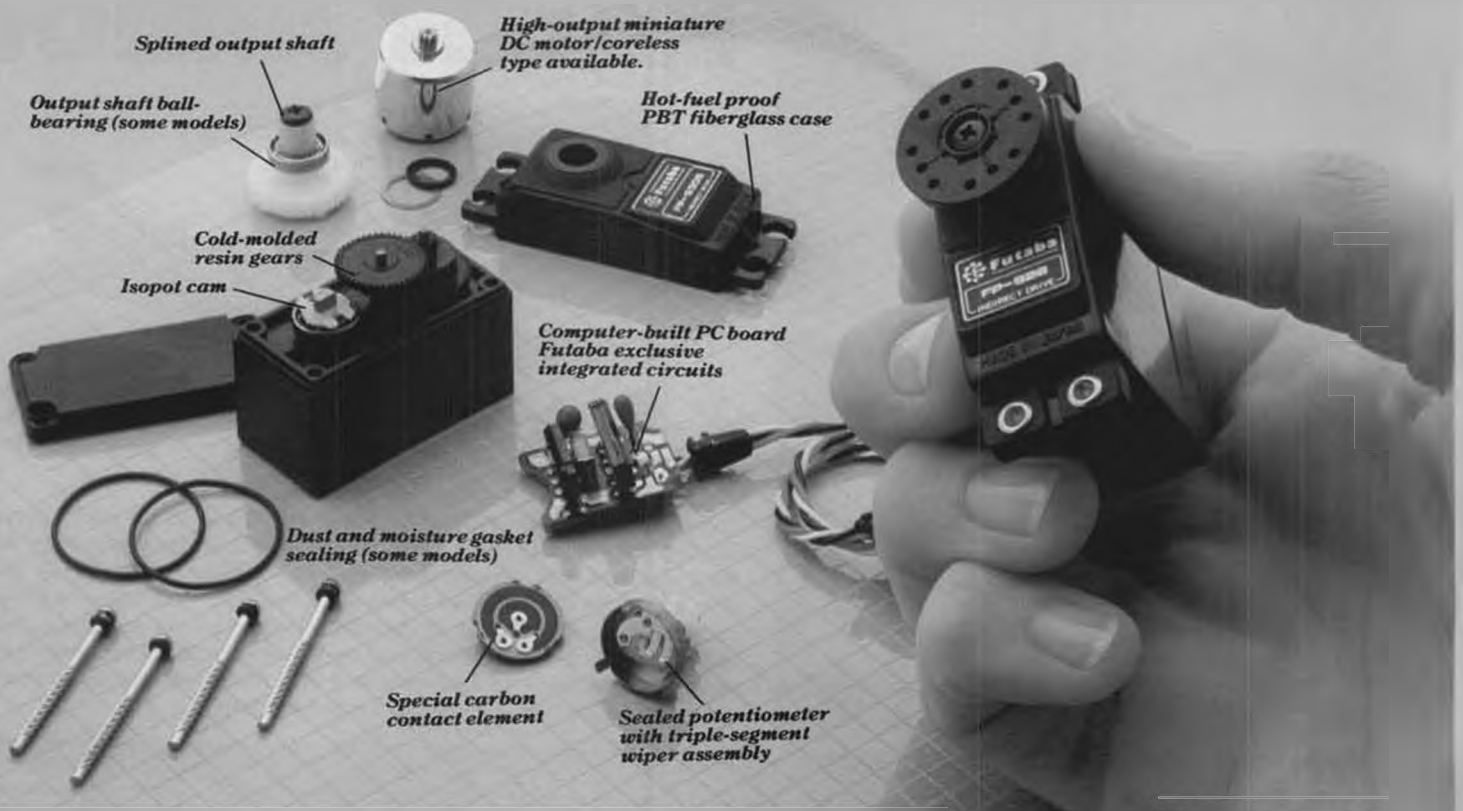

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PH 215-837 6681
LANCASTER
The Flight Box
Lancaster Shopping Center
LANSDALE
Penn Valley Hobby Ctr
837 W Main St
LEHIGHTON
Carpenter Hobbies
R D 3 Box 111
MILTON
Kreb s Newsstand
83 Broadway
PITTSBURGH
Bill & Walt's Hobby Shop
116 Smithfield St
READING
Iron Horse Hobby House
60 South 6th St
READING
Ott's Hobbies
536 N 10th St
SLATINGTON
Valley Hobbies & Collectibles
102 Main Street
WARMINSTER
J C R/C Hobbies
13 York Road
PH 215-672 5200
WAYNE
Hyatt Hobby House
Gateway Shopping Center
PH 215-687 2244
SOUTH CAROLINA
GREENVILLE
The Great Escape
Pleasantburg Shopping Center
1426 Laurens Road
PH 803 235-8320 or 242-4229
MYRTLE BEACH
Ed's Hobby Shop
Hwy 501 Next to Fanjoy
Sign Company
TENNESSEE
KNOXVILLE
Tennessee Model Hobbies
Rt 62 Oak Ridge Hwy Soway
PH 615 482 2900
NASHVILLE
The Toy Mart
113 Graylynn Drive
PH 615 883 1648
TEXAS
ABILENE
The Hobby Center
Westgate Mall
ARLINGTON
The Hobby Hub
903 A Pioneer Parkway West
AUSTIN
J & J Hobbies
610 Kennisten Dr
CORPUS CHRISTI
Leisure Time Hobbies
1326 Airline
DENTON
Yellowbird Hobbies
117 W Hickory
EL PASO
Hal's Hobby Shop
No 57 Sunrise Center
PH 915 755 1914
FORT WORTH
Hobby Stop
400 C Semmary Dr E
PH 817 334 0197
FORT WORTH
Moff's Hobby Shop
7241 Grapevine Highway
PH 817 281 0921
HOUSTON
Clear Lake Models
117 Camino S Shopping Ctr
PH 713-488-6315
HURST
Roy's Toys (For Big Boys)
1309 Norwood
SULPHUR SPRINGS
Miller's Hobbies
624 Bellview St
UTAH
OREM
Miniature Aircraft Prod
811 W 400 N
VERMONT
NORTH FERRISBURG
Yandow's House of R C
Route 7
SWANTON
The Hobby Shop
RFD 1 Rt 7
PH 802 524 2715
VIRGINIA
ANNANDALE
Model Masters Inc
6920 Braddock Rd
RICHMOND
The Hobby Center
1709 Willow Lawn Dr
VIRGINIA BEACH
Hobby Craft Centers
#1 967 Providence Sq s/c
#2 62 Princess Ann s/c
WASHINGTON
BELLEVUE
R/C Model Shop
14020 N E 21st St
PH 747 9914
BELLINGHAM
Hobby Hvg (Graham's)
111 E Mangolia St
KENT
Kent Hobby
1313 W [illegible]
PUYALLUP
Fr grove Model Supply
10611 136th St East
PH 845 7675
SEATTLE
Webster Supply Co
17818 Aurora Ave N
TACOMA
Bill s Hobby Town
14914 Pacific Ave
PH 206 531 8111
WALLA WALLA
Harley s R/C
Route 1, Box 277A
PH 509 529-2618
WEST VIRGINIA
CHARLESTON
Fountain Hobby Center
200 W Washington St
WISCONSIN
MARSHFIELD
Bird Wisconsin Hobby Center
Northway Mall
503 E Ives St
MENOMONIE
True Value Hardware
1512 9th Street
L Mart Shopping Ctr
MILWAUKEE
Casanova s Hobby
1423 S Muskego Ave
PH 414 672 2700
WAUSAU
Pops s Hobby Land
640 South 3rd Ave
CANADA
BAWLF ALBERTA
B & P Transport Ltd
Box 6
PH 373-3953
CALGARY, ALBERTA
Hobby World Canada
Box 968 Stn M
CALGARY, ALBERTA
P M S Hobby Craft
Calgary North Hill Centre
WINNIPEG, MANITOBA
Cellar Dweller Hobby, Ltd
1354 Main St
PH 589 2037
ST JOHN S, NFLD
Capitol Hobby Centre, Ltd
6 Freshwater Road
DUNDAS, ONTARIO
Skycraft Hobbies Inc
139 York Road
SCARBOROUGH, ONTARIO
Toronto R/C Hobby
1869 Lawrence Ave E
PH 416 755 1766
WILLOWDALE, ONTARIO
Keith's Hobby Shop
5205 Yonge St
PH 222-4721
ARVIDA QUEBEC
LeModele Reduit Enr
118 Mathieu CP 341
PH 418 548 2136
HAUTERIVE QUEBEC
La Centre Du Modelisme
Allard 1223 Laval
MONTREAL QUEBEC
Can Air Hobbies
5850 Gouin Blvd Ouest
PH 514 332 3565
SASKATOON, SASKATCH
Collins Aero Craft
238 First Ave North
PH 652-4775
YORKTON, SASKATCH
Radio Control Hobbies
39 Betts Ave
AUSTRALIA
BRISBANE QUEENSLAND
Underwood 4119
The Hobby Warehouse
30 Kingston Road
COLUMBIA, S AMERICA
Aeromodelos los Britannia Ltda
Apartado (P O Box) 52530
Bogota 2, Columbia
PH 212 7309
NEW ZEALAND
INVERCARGILL
Model Shop
55 Arcade Dee St
PH 89439
SWEDEN
S 871 02 HARNOSAND
Modell Produkter
Box 2060
VENEZUELA
CARACAS 1070 A
Hobby World, C A (Dist)
Apartado Postal 75054
PH (02) 34 33 02

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

from Bill Northrop's workbench . . .

George Perryman lofts his Great Speckled Bird which will soon be enshrined in the AMA Model Museum. We at *Model Builder* are very proud to have had the privilege of featuring George's GSB in our July 1978 issue, and to have had George and his granddaughter on our June 1974 cover.

• This month's column will, of necessity, be a little short. Just over a week ago (May 2), I received a call from Sarasota, Florida, informing me that my mother, who is 89, had undergone an emergency operation. Indications were that the operation was a success (also no cancer involved) and there was no great concern. However, I grabbed a plane the following day, and expect to remain here in Sarasota until about mid-May.

At LAX (that's airport talk, meaning Los Angeles International. . . Gee, suppose they changed its name to something else. Then you would refer to LAX as something in the past . . . EX-LAX, for instance). I picked up a copy of the May 9, '83 issue of *Time* magazine. On page 70, under the heading of Science, I read something that surprised me. The metric system has been adopted all over the world . . . except in Brunei, Burma, North and South Yemen, and . . . you guessed it . . . the good old U.S.A.! I knew the world was trying to go metric, and that we, in the USA, were dragging, but I didn't realize we were the only major nation of the world that was behind the times in this category.

Oh . . . in case you're like me, I'll save you the trouble of going to your Atlas or dictionary. Brunei is a British sultanate in northwest Borneo, south of the Philippines, in the Malay Archipelago. Burma, of course, is in southeast Asia, an independent republic. North and South Yemen are kingdoms in southwest Arabia.

It goes without saying that a change like this, with inches, feet, yards, and miles so firmly entrenched in our minds for centuries, cannot be accomplished overnight. The saying, "You can't teach an old dog new tricks," is very appropriate. In our lifetimes, and this applies to everyone from the oldest on down almost to three-year-old toddlers who are beginning to count blocks, we'll have to be content to translate every measurement to and from multiplies of an inch and multiples of a meter. However, starting with our pre-school children, they should be taught to talk "metric", so that their expressions of measurements are direct . . . not an easy task. *Time* quoted David Goldman, head of the National Bureau of Standards' metric office, as saying, "It will be a generational change. Only when youngsters who learned metrics in school reach upper-level management will the change really occur."

In modeling, we find metrics in all measurements applying to FAI-qualified engines and aircraft. That's only natural, as France, where the FAI was founded, was the first nation to officially adopt metrics. Major European model suppliers, such as Graupner, Robbe, etc., all cut balsawood to metric thicknesses. One millimeter is about 1/25 of an inch, 2mm is about 1/13, and 3mm is a little thicker than 1/8, etc.

How can **Model Builder** join the metric move? For a long time now, our full size plans have included both a metric and inch scale as part of the title block. As dimensions aren't normally given, except possibly for calling out dihedral, wheel sizes, prop diameter, etc., we don't have many size callouts. If we gave wood sizes in metric, they would have to be to the nearest standard metric sizes available, and this could only be helpful to overseas scratch builders, a very small percentage of our plans buyers. If our readers think it's worthwhile, we'll see if we can convince Al Patterson to "go metric" when he's producing our plans!

TAXATION WITHOUT REPRESENTATION

The second stage of the 1984-85 rules proposals has just been completed, with the intermediate voting by the Contest Boards having been due by May 1. When each new set of proposals is being discussed, the same old controversy always arises. . . Should someone who does not actively compete in any given competition category be allowed to propose new rules for that category?

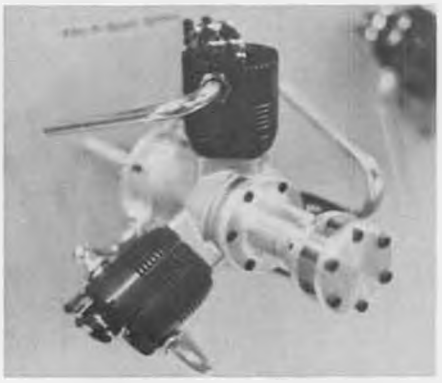
From the point of view of the active competitor, it is not logical that an "outsider" can not only propose new rules governing "his" competition category, but even more unfair, that "disinterested" people may take part in the decision making through the signing of petitions to the CB members, thus possibly influencing the way in which they vote.

The first part of that situation is definitely true. Any AMA member may propose a rule change or new rule,

Continued on page 104

OVER THE COUNTER

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



Pearson Power Products Magnum V-Twin (1.82 cu. in.), and Three Cylinder Radial (2.73 cu.in.).

• Pearson Power Products is now importing the latest versions of the complete line of quiet, powerful, economical, four-stroke engines from Magnum Engines. Three basic engine configurations are available: the Magnum 91S (.91 cu. in.), the 1.82 cu.in. V-Twin, and the 2.73 cu. in. Three Cylinder Radial. All are available in glow plug only versions for model aircraft as seen at the Toledo Show last April. The Magnum 91S and V-Twin are currently available with factory installed transistorized ignition systems, and the Three Cylinder Radial will soon be available this way also. For R/C boaters, the 91S and V-Twin glow engines are currently available in water cooled marine versions (special ordered).

For complete specifications and prices, write to Pearson Power Products, RR2 Box 64, Effingham, IL 62401, or call (217) 868-5848.

★ ★ ★

Kraft Systems Company, P.O. Box 1268, Vista, CA 92083, has introduced *three* new Kraftkits. The Tercel (meaning a male hawk) is a small, 50-inch span, ultralight sailplane (under 12 ounces) for hand-launch R/C soaring, slope soaring, and thermal soaring. The Tercel is perfect for flying over that small slope soaring site you've had your eye on, or the neighborhood school yard. The Eppler 205 airfoil was chosen for the Tercel for its proven performance characteristics. Ask for the Tercel at your local hobby shop, or order directly from Kraft (part no. 004-053, $24.95).

The second new Kraftkit is the Bre-Zee biplane. This sporty 51-inch span, .50 to .60 powered, fully aerobatic model designed by Joe Bridi is an excellent performer as well as a good-looker. The kit features precision cut balsa and hardwood parts, formed wire cabane struts, formed dural landing gear, a glass-filled nylon engine mount, and assorted hardware. The Bre-Zee's specs are: span, 51-1/2 in. top wing, 48 in. bottom wing; total wing area, 885 sq. in.; overall length 46 in., recommended engine, .50 to .60 glow, or .60 four-cycle; flying weight, under eight pounds. The Bre-Zee is part no. 004-052 from Kraft, and lists for $99.95.

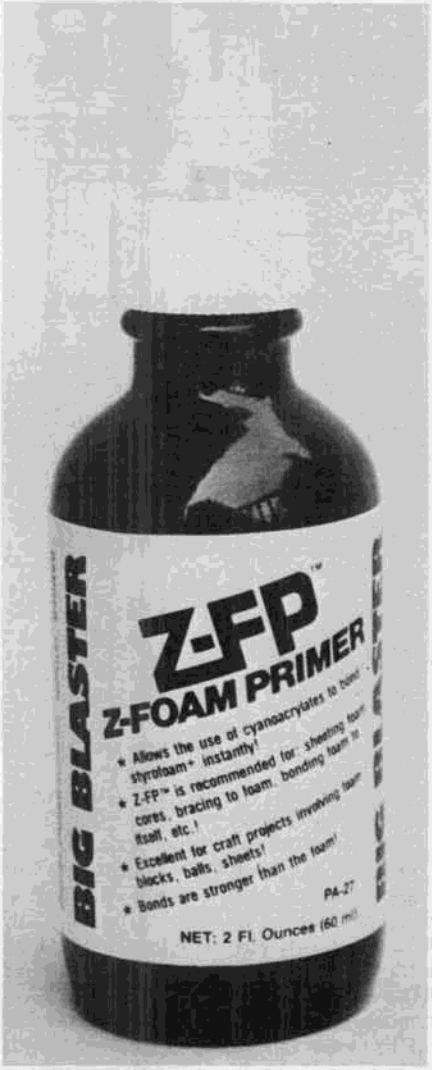
The third new product from Kraft is the Wind Surfer 100 R/C sailplane. This new standard class soaring machine is the big brother of the two-meter Kraft Wind Surfer, the product review of which appeared in the January 1983 **Model Builder**. The Wind Surfer 100's specs are: span, 98-1/2 in., wing area, 790 sq. in.; overall length, 45 in. The Kraftkit features a molded, clear plastic canopy, open frame flying surfaces, plug-in wing and stabilizer, assorted hardware, and selected balsa and plywood construction. Two-channel R/C system required. The Wind Surfer 100 is part number 004-054 from Kraft, and lists for $57.95.

★ ★ ★

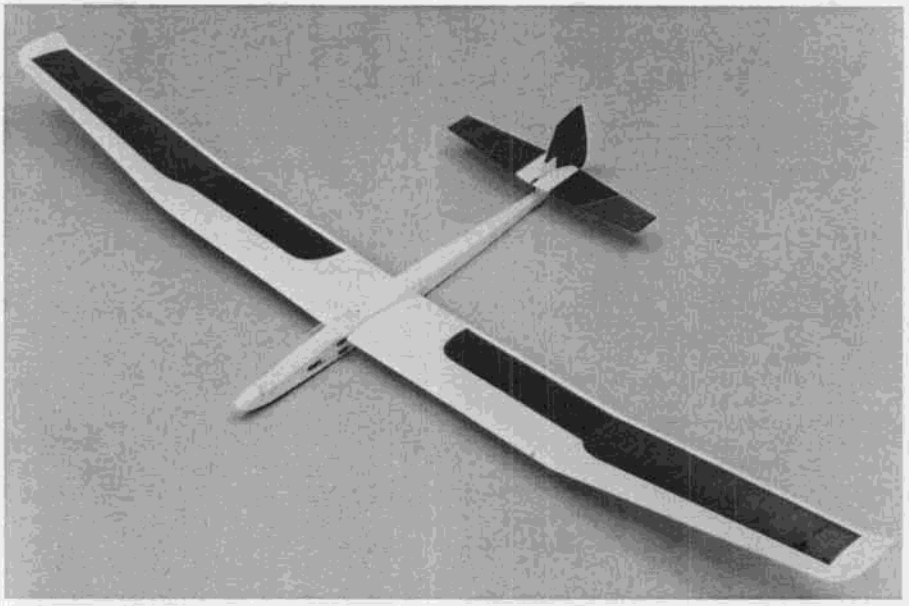
Indoor Model Supply, Box C, Garberville, CA 95440 has it newest catalog available for indoor modelers of all interests. It sells for $1.50, and is not only

Leisure Electronics Keller KE 50/24 electric motor.

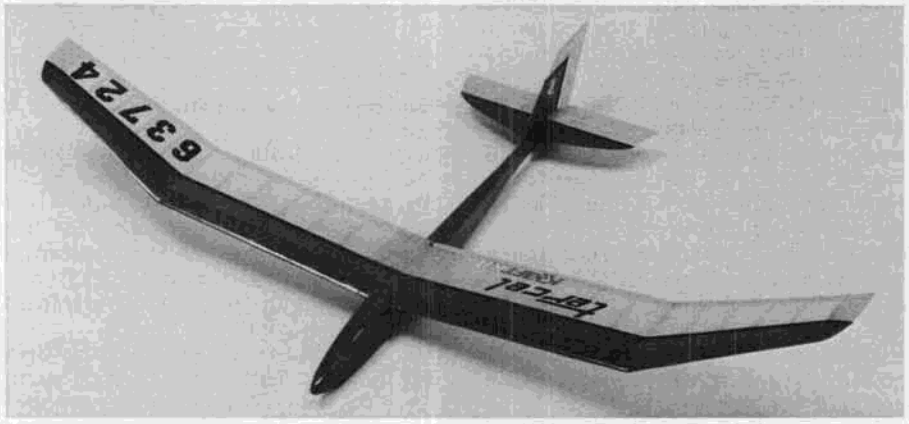
Kraft Systems Kraftkit Bre-Zee 51-inch span bipe.



Pacer Technology Z-Foam Primer.



Kraft Systems Kraftkit Wind Surfer 100, new big brother of two-meter Wind Surfer.



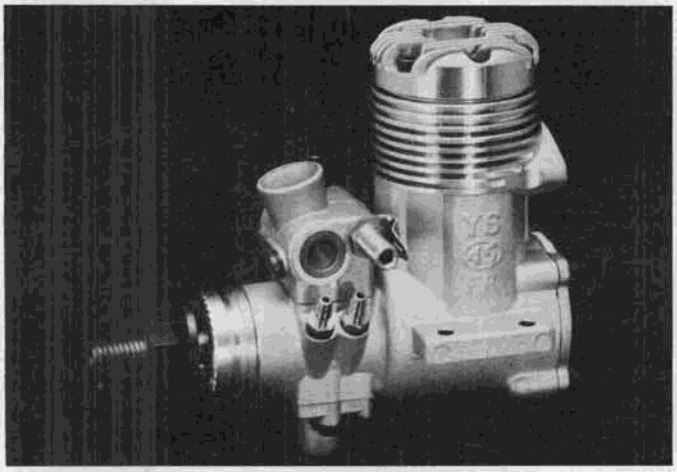
New ultralight R/C sailplane (50 in. span) from Kraft Systems, the Kraftkit Tercel.

a showcase for all of the fabulous IMS indoor models, but is an instruction booklet for building techniques as well. The new catalog features five new Miniature Scale Aircraft kits. These kits all include a scale documentation sheet with three-view, engine details, reference material, markings, a transfer sheet which has details than can be applied to tissue and sheet balsa with a hot iron, and in the case of the Alco Sport or the Heath Parasol, plastic engine cylinders. The Aeronca K (pictured) has plastic balloon wheels and tail wheel.

The Aeronca K was called a "powered glider" in its day (1937) because of its large wingspan. In Peanut scale, this translates to a wingspan of 16 inches! AMA rules allow this when a model's fuselage is nine inches or less . . . the Aeronca's is! The Aeronca is available for $6.95. If you send IMS a check or money order for $16, you can have the Bill Hannan book *Peanut Power* (an $8.95 value), a free new catalog (a $1.50 value), and the Aeronca kit . . . all postage paid in the continental US. Go for it.

★ ★ ★

Here's a very unusual product. It's called the Space-Dart, and it's made by Galaxy 3000 Inc., P.O. Box 502, North Dartmouth, MA 02747. It's unusual because it doesn't look like anything you've ever seen before . . . it's a hand- or catapult-launched free flight glider



YS Engines new line of .45s with side or rear exhaust.

Indoor Model Supply Aeronca K (Miniature Scale Aircraft series).

Aviation Book Co. 48-page catalog.

with circular wings and a "Hyperflo Tube" for flying surfaces.

The Space-Dart features (from nose to tail): an adjustable nose cone; a circular, one-inch diameter canard "Lifter"; a two-and-a-half-inch diameter main wing; a 5/8-inch diameter tube; a paper clip catapult launch pin; a two-inch, semi-circular stabilizer; and a tapered fin and rudder. All flying surfaces are Lexan plastic. The fuselage is strip balsa. The kit includes a four-page instruction sheet, a full-size blueprint of the model, and all necessary parts (less glue), and costs $9.95 plus 75 cents for postage and handling.

The Space-Dart has been clocked at speeds of around 200 mph, and has flown the length of a football field. You can program (trim) the model to fly straight-line, or make turns, loops etc. Write to Sam Gamburd at the above address, and order your Space-Dart

RJL K.61 with all new carburetor.

today.

★ ★ ★

Leisure Electronics has announced that it will be marketing two new Keller electric motors in the US. The first is the Keller 25 motor, a samarium cobalt motor for Two-meter and Standard class sailplanes, or sport scale aircraft. It's about the same size (physically) as a "standard" 05 motor, but has the power to fly .19 to .25 glow engine powered planes.

The second motor is the Keller 50/24. This cobalt motor is the one you'll hear a lot about in F3E flying. Big sailplanes are no sweat for this motor! If you want, try it in a .40-size pattern or scale airplane, it'll go like a .50! For the uninformed, the "/24" indicates the number of sub-C NiCd cells this motor uses for its power source.

For more information and/or prices, write Leisure, 11 Deerspring, Irvine, CA 92714.

★ ★ ★

Pacer Technology introduces two new cyanoacrylate products for modelers who enjoy building quickly and

McCoy .29 (C/L), factory close-out from RJL.

surely. The first is Pacer's Z-Foam Primer, and the second is Pacer's Plasti-Zap.

Z-Foam Primer is intended for use wherever there is contact between expanded bead polystyrene foam and cyanoacrylate adhesives. With its special formulation and balance of chemistry, Z-Foam Primer prevents melting of the foam while providing a strong adhesive anchor and immediate cure. An example of one of Z-FP's applications is the sheeting of foam core wings with balsa. First, you spray the foam core with Z-FP and allow it to evaporate for 5 to 10 seconds. Then, apply Pacer Zap-A-Gap to the sheeting surface (balsa, ply, cardboard, fiberglass sheet, etc.), and mate this sheeting accurately to the core. After holding for 10 to 15 seconds, the sheeting job is all done but the trimming and sanding.

The second new product is Pacer's Plasti-Zap. With Plasti-Zap, the modeler can reinforce foam core wings, spruce spars, balsa pieces, leading and trailing edges, helicoper rotor blades, *whatever,*

Continued on page 96

"Pizza Cutter" cuts F/G, leather, etc. Aircraft Spruce & Specialty Co.

J&J hats with colorful graphics. Show your frequency.

Jim Lime's 1/4-scale "Mr. Mulligan" in low pass fly-by.

ONE-EIGHTH AIR FORCE FLY-IN

By ELOY MAREZ . . . Our intrepid Electronics Corner columnist turns reporter once again, this time to cover the scale fly-in in Phoenix, Arizona hosted by the One-Eighth Air Force.

• Did you ever stop to think about just how lucky we are to be model builders and flyers. Of course, modeling is not *the only way.* What we are lucky in is that we have found something which keeps us involved and interested, doing and thinking! Something that in spite of all of the work, and sometimes disaster, still keeps us going, helps us to relax and to forget the problems of everyday living. How many guys do you know without this type of involvement, whose most-looked-forward-to activity is a six pack of beer and watching someone else do something on the boob tube?

Well, I feel especially lucky in that I have been able to enjoy our hobby around the world. I have shared in and participated in modeling activities in places like Christchurch, New Zealand; Tokyo, Japan; Frankfurt, Germany; Rio de Janeiro, Brazil; etc., and I am now pleased to add one more city to the list: Phoenix, Arizona! During the weekend of March 26 and 27, I was fortunate, and happy, to attend what has grown into one of the annual highlights of scale R/C flying in the Southwest, the annual 1/8th Air Force Fly-In, sponsored by the club of the same name, under the expert pilotage of President John Hightower.

And a rousing success it was . . . again! How else but successful can you judge a


At age nine, Tim LIme was definitely the youngest competitor at the One-Eighth Air Force Fly-In.


Jerry Kitchen's Clipped Wing Cub touches down on the runway after beautiful flight.


The largest plane flown at the Phoenix meet was Steve Tillson's Aeronca C-3.


Tony Arand flew very consistently and impressively with this camouflage painted B-25 bomber. Model is very well built, finished, and detailed.

Shelley Platt is the perfect model to go with her daddy's "Zero" WW-II fighter. Like all of its forerunners, Dave's "Zero" flies well.

Bruce "Red" Schamber drove all the way from Naples, Florida, in a motorhome full of large planes, including this "Jeep".

Charlie Beverson, Phoenix, Arizona, brought this Rossi .81 powered Byron F-86D. Rossi/Byron fan combo is a very powerful system.

Bill Mikesell's most realistic Ryan FR-1 "Fireball." Bill is from Elgin, Ill. Model uses OS-61, Kraft radio, and is 1-1/2 inch scale.

scale R/C event with 129 official entries? Official entries, mind you, though the actual number of airplanes there exceeded that by at least another 20 percent. Some were not quite finished, some not yet tested, but everyone that brought one in that condition also brought one to fly, because this is certainly a *flying* fly-in. And fly they did, people came from eight states to do so . . . and remember that we are not in the northeast where you can cross eight states in one day's driving. This event really draws them; Dave Platt and Bruce Schamber came from Florida, believe it or not! Curtis Mees came from Georgia, William Mikesell and Dennis Crooks came from Illinois; we won't even bother to mention those who came from the nearby states like Texas and Colorado, or us neighbors from California.

Continued on page 86

Best Mechanical Option Award winner. This TBM-3 Avenger built by Dennis Crooks featured R/C operated wing folding mechanism and locking pins. Weighs 22 lbs; belt drive OS-90.

Joe Zimmerman's Quadra-powered Pitts towers over his AT-6 "Texan". Consolidated Models will soon kit the .15-.19 "Texan".

Best Save of the Meet. Ted White flew in the remains of his Bucker Jungmeister after a mid-air with a Zlin ZL-50 which crashed.

Ted White's fantastic OV-10 Bronco was the victim of a freak mishap . . . which caused it to shed its receiver with expected results.

Col. Bob Thacker's scale Sopwith Camel *does not have* a Gnome rotary engine under its cowl. If it did, it would most likely be a scrap pile by now!

Planes n' Facts n' Chicken Tracks...
or What Is the Sopwith Camel Effect?

By FRED LEHMBERG . . . Gyroscopic precessionin the Gnome, Bentley, and Clerget rotary engines was both a blessing and a curse to the pilots who flew the aircraft that used them. Read on and see why!

• There's a story about a girl who entered an Old Timer meet that (as I recall) was skippered by John Pond. After launching her 1/2A Texaco, she discovered she had not turned on the radio! Naturally, a long hike resulted. Bill Cohen, watching through his zoom binoculars, was ready to help the maiden in her moment of need, but Pam pointed out that his Madewell wasn't running right, and that he had best spend more time with it than with the binoculars and his retrieval machine. Always competitive, he followed her advice and, after a quick look at the lass legging it across Taft's kitty litter surface at full zoom, he returned his interest to the Madewell.

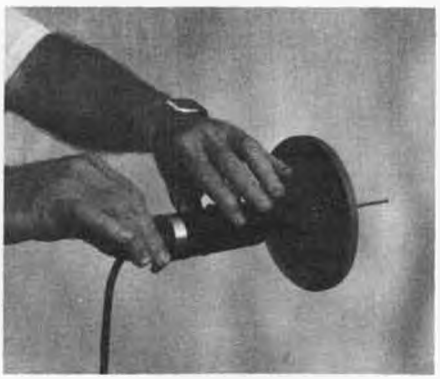
In due time, she saw the model descending. At the same moment, she saw a rabbit racing by at full throttle, checking his watch as he muttered something about being late for a very important date. If this seems strange, as someone once said, "You ain't seen nothin' yet!" Both the clock watcher and the model (Hey Pond, was it a Lanzo or a Granieri?) disappeared into a hole, soon followed by the chaser. You will not believe the wild things that happened to this chick!

During the underground tour that ensued, she ran across a number of exceptional characters. These included a critter who was an eagle up front (Fox?), but had the fuselage of a lion. Another was a turtle who claimed he *used to be* a turtle, but wasn't anymore. What I'm saying is, this gal met people you don't often see in combat circles!

At any rate, this ex-turtle could only talk about his school life. To cut down on the dialog, he said he only took the regular courses. The girl, being quite polite, and really wanting to ask where her . . . I really think it was a Granieri . . . was, asked what the courses were.

"Reeling and writhing, of course," the phony turtle said, "and the varieties of arithmetic: ambition, distraction, uglification, and derision." The real cropper, though, was when he told this chick that he also took drawling, and stretching, and fainting in coils!

This story is so unbelievable that I think I've had enough of it. It seems the frill's name was Alice, and she was visiting from England. I am sure John could back me up, because she paid her entry fees in pounds, and was short-changed due to John's well-known applications of mathematical theory. To provide some kind of an ending, however, she found her . . . I believe it *was* a Lanzo . . . in the midst of a bunch of flamingos who decided to have a free flight contest after they got tired of being used as croquet mallets. Isn't it nice to have a happy ending to a story?



Sopwith Camel Effect can be demonstrated with a Dremel tool model as described in the text. Hold at CG, and move end around.

So, what does this have to do with model building? How can it pretend to be a candidate for a series of articles in a pretty magazine with glossy pages (the ink rubs off on your fingers if you are not careful), interesting covers (an editor's wife once told me that a stacked cover sold magazines), excellent articles, and advertising by only the most reputable vendors? How can it possibly pique the interest of an editor who writes the longest editorials of any magazine including the *Smithsonian*, and, even after that, always has enough ribbon left to make remarks in the columns of his contributing editors? This preamble was used to make several points.

The first point is that Mock Turtle (which is the name Lewis Carrol assigned the foregoing ex-turtle in *Alice in Wonderland*) with his course descriptions, justified the title of this article. Another point was the use of his puns to

illustrate our society's attitude towards things of a scientific and/or mathematical nature; not all of you readers have this attitude, but a few! How often have you heard, or perhaps even said to yourself: "When I got to that math and scientific stuff I turned the page?" Or, perhaps, "Are you playing around with that page full of chicken tracks again?"

I am not putting down the people who say these things. High school students get a lot of math and science tossed at them, even those not set on mathematical or scientific careers. Many of these students begin their working lives and find they seldom have a use for these tools which they struggled so hard to learn. Part of the reason why people feel they learned something of little use probably lies with the teacher, who may have taken the dogmatic approach to "spreading the word". A roll call, for instance, on the first day of attendance, could have yielded a listing of students' hobbies and interests. The teacher could then show where math, physics, and chemistry apply to these hobbies and interests. If the teacher can get the student's interest, that student will make some scientific discoveries on his own, even if it is the reinvention of the wheel. I can still remember my math teacher's reaction when I came to her with my problem of meeting the minimum cross-sectional area requirement on the fuselage of a rubber job. I had come to the conclusion that a fuselage of circular cross-section would have less surface area than would a fuselage of square, rectangular, or any other geometric cross-section, therefore less drag . . . which is true. From her reaction, I think she thought I was Isaac Newton! I believe I was about thirteen, but her methods of teaching had stimulated my original thinking so that I invented the wheel again. It could be said that it was a case where she felt credited, and I got the benefit.

Now, if you please, let's go to class. We shall discuss a little history, a little physics, and then apply what we discuss to model aircraft. You will note that I did not mention mathematics. This is because the subject is being examined qualitatively . . . not quantitatively. The briefest definition of the qualitative approach is that it is an attempt to answer the two-part question, *"What* and *why* does something happen?" The quantitative approach is to attempt to answer the question, *"How much?"*

The subject to examined is what I like to call the Sopwith Camel Effect. My peers at work don't like the expression . . . they prefer the scientific term "gyroscopic precession." As Bill Shakespeare said when his model landed in a rose bush, "What's in a name? The thorns still get you, even if you call them something else."

No pilot who flew the Camel was ever indifferent to it. He either declared it a bloody good flyin' machine, or else

Continued on page 97

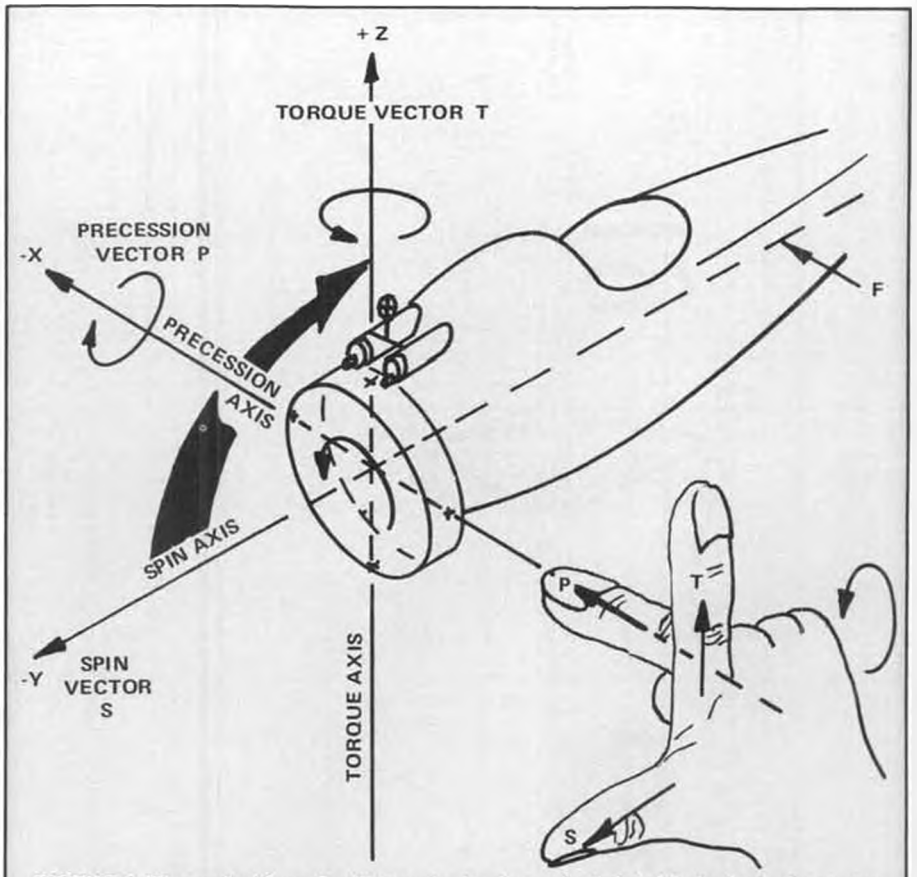


FIGURE 1. The applied force F will turn the fuselage to its left, initiating both the torque vector and the precession vector. The spin vector, trying to move into the also-moving torque vector, causes the nose to rise and the tail to fall.

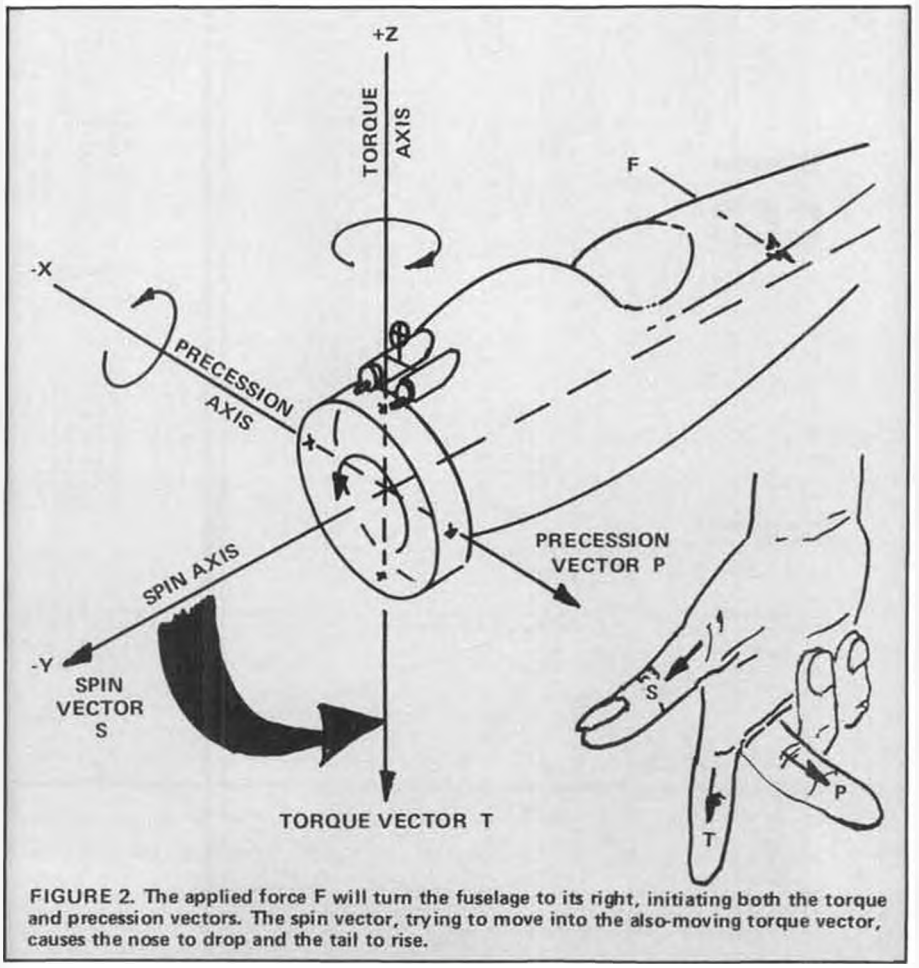
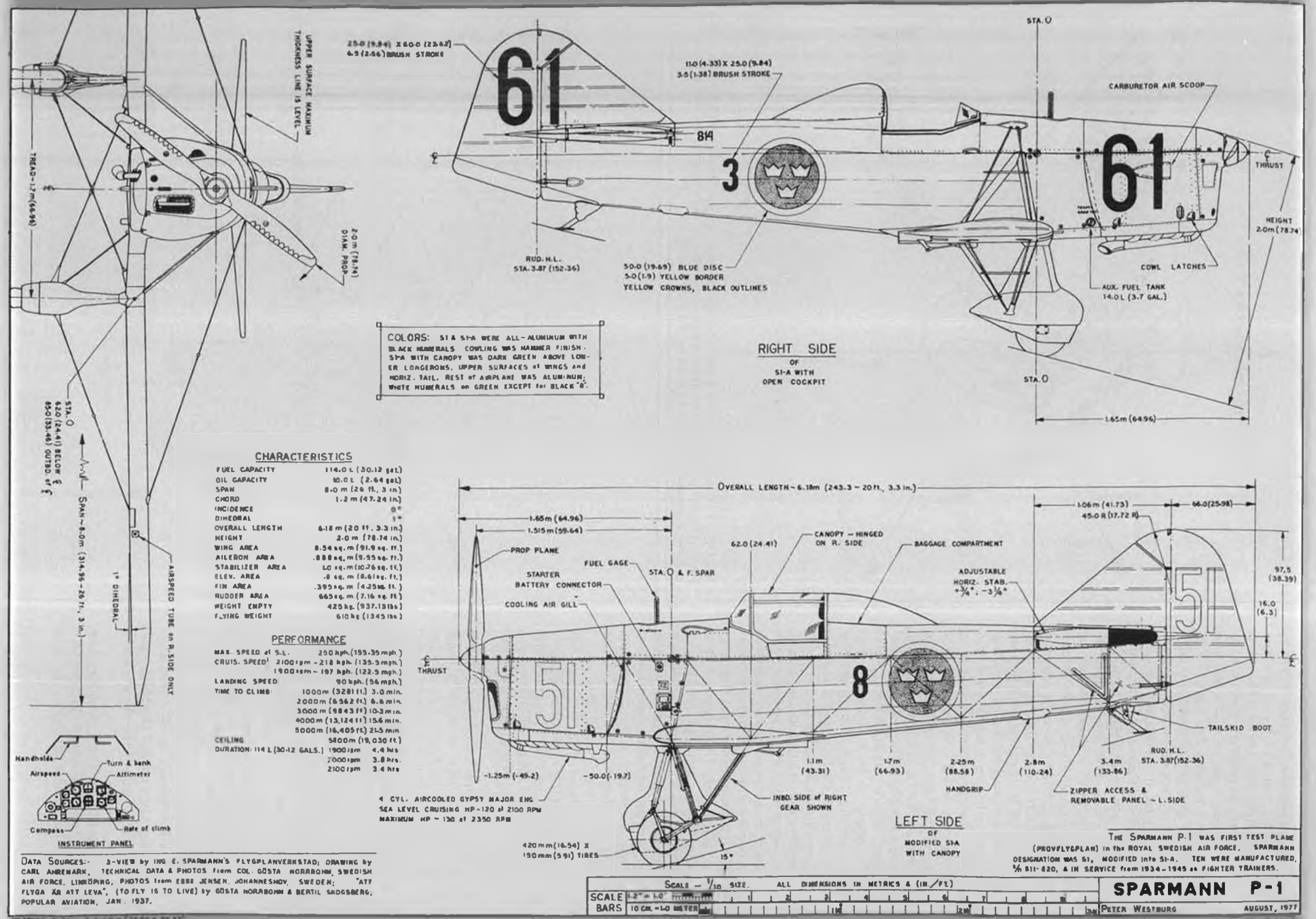


FIGURE 2. The applied force F will turn the fuselage to its right, initiating both the torque and precession vectors. The spin vector, trying to move into the also-moving torque vector, causes the nose to drop and the tail to rise.



COLORS: SI A SI-A WERE ALL-ALUMINUM WITH BLACK NUMERALS. COWLING WAS HAMMER FINISH. SI-A WITH CANOPY WAS DARK GREEN ABOVE LOWER LONGERONS, UPPER SURFACES of WINGS and HORIZ. TAIL. REST of AIRPLANE WAS ALUMINUM; WHITE NUMERALS on GREEN EXCEPT for BLACK "8".

CHARACTERISTICS

FUEL CAPACITY	114.0 L (30.12 gal.)
OIL CAPACITY	10.0 L (2.64 gal.)
SPAN	8.0 m (26 ft., 3 in.)
CHORD	1.2 m (47.24 in.)
INCIDENCE	0°
DIHEDRAL	1°
OVERALL LENGTH	6.18 m (20 ft., 3.3 in.)
HEIGHT	2.0 m (78.74 in.)
WING AREA	8.54 sq. m (91.9 sq. ft.)
AILERON AREA	.888 sq. m (9.55 sq. ft.)
STABILIZER AREA	1.0 sq. m (10.76 sq. ft.)
ELEV. AREA	.8 sq. m (8.61 sq. ft.)
FIN AREA	.395 sq. m (4.25 sq. ft.)
RUDDER AREA	.665 sq. m (7.16 sq. ft.)
WEIGHT EMPTY	425 kg. (937.13 lbs.)
FLYING WEIGHT	610 kg (1345 lbs.)

PERFORMANCE

MAX. SPEED at S.L.	250 kph. (155.35 mph.)	
CRUIS. SPEED[1]	2100 rpm ~ 218 kph. (135.5 mph.)	
	1900 rpm ~ 197 kph. (122.5 mph.)	
LANDING SPEED	90 kph. (56 mph.)	
TIME TO CLIMB:	1000 m (3281 ft.)	3.0 min.
	2000 m (6562 ft.)	6.8 min.
	3000 m (9843 ft.)	10.3 min.
	4000 m (13,124 ft.)	15.6 min.
	5000 m (16,405 ft.)	21.5 min.
CEILING	5800 m (19,030 ft.)	
DURATION: 114 L (30.12 GALS.)	1900 rpm	4.4 hrs.
	2000 rpm	3.8 hrs.
	2100 rpm	3.4 hrs.

DATA SOURCES:- 3-VIEW by ING E. SPARMANN'S FLYGPLANVERKSTAD; DRAWING by CARL AHRENARK. TECHNICAL DATA & PHOTOS from COL. GÖSTA NORRBOHM, SWEDISH AIR FORCE, LINKÖPING. PHOTOS from EBBE JENSEN, JOHANNESHOV, SWEDEN; "ATT FLYGA ÄR ATT LEVA", (TO FLY IS TO LIVE) by GÖSTA NORRBOHM & BERTIL SKOGSBERG, POPULAR AVIATION, JAN. 1937.

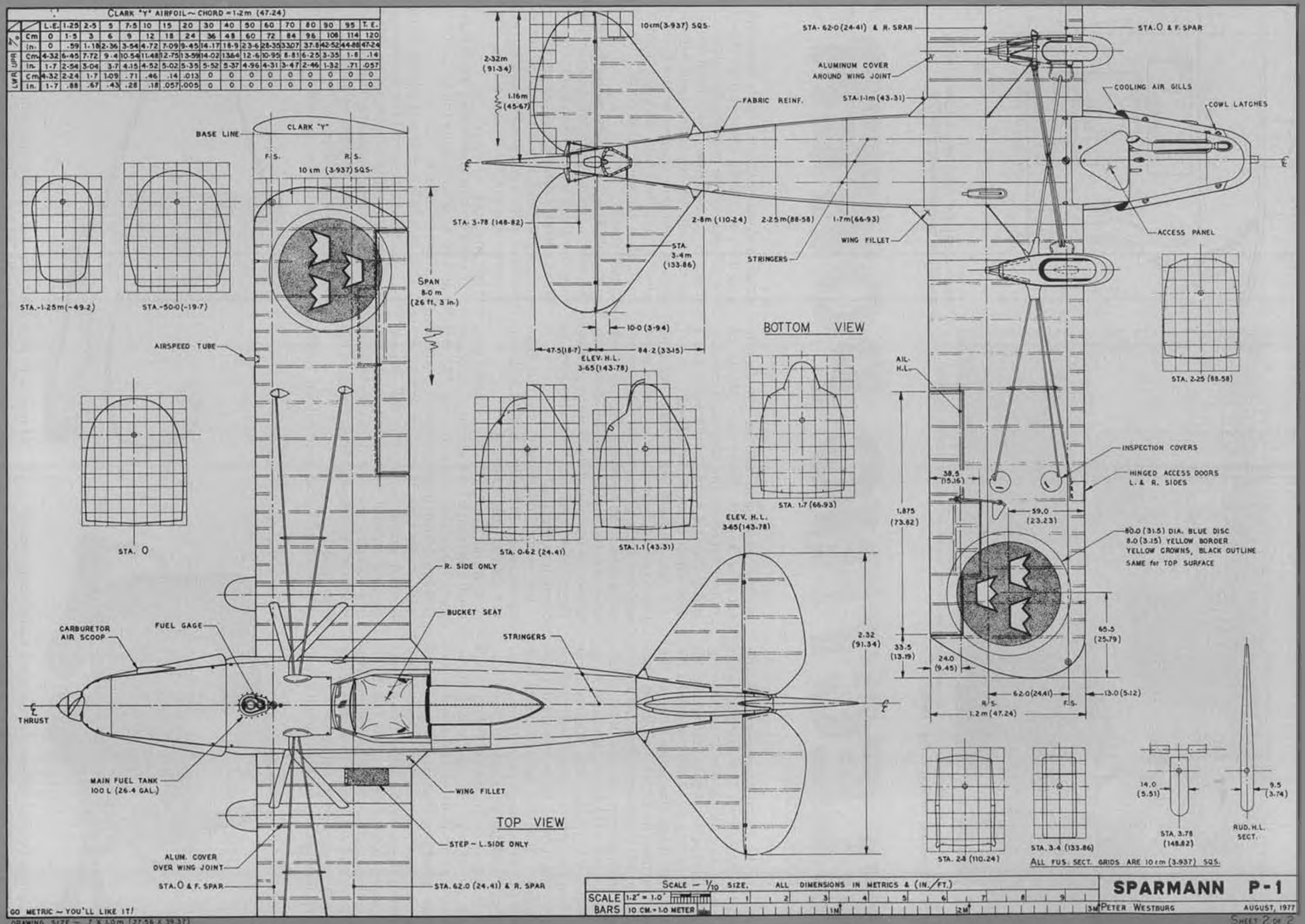
THE SPARMANN P-1 WAS FIRST TEST PLANE (PROVFLYGPLAN) in the ROYAL SWEDISH AIR FORCE. SPARMANN DESIGNATION WAS S1, MODIFIED into SI-A. TEN WERE MANUFACTURED, 5/6 B11-820, & IN SERVICE from 1934-1945 as FIGHTER TRAINERS.

SCALE — 1/10 SIZE. ALL DIMENSIONS IN METRICS & (IN./FT.)

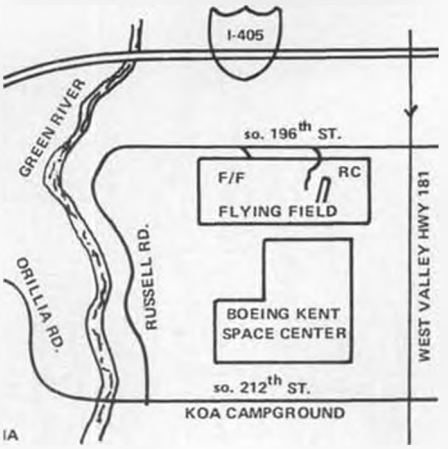
SCALE BARS 1.2" = 1.0' | 10 CM. = 1.0 METER

SPARMANN P-1

PETER WESTBURG — AUGUST, 1977


CLARK "Y" AIRFOIL ~ CHORD = 1.2m (47.24)
% | | L.E. | 1.25 | 2.5 | 5 | 7.5 | 10 | 15 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 95 | T.E.
UPR | cm | 0 | 1.5 | 3 | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 114 | 120
UPR | in. | 0 | .59 | 1.18 | 2.36 | 3.54 | 4.72 | 7.09 | 9.45 | 14.17 | 18.9 | 23.6 | 28.35 | 33.07 | 37.8 | 42.52 | 44.88 | 47.24
LWR | cm. | 4.32 | 6.45 | 7.72 | 9.4 | 10.54 | 11.48 | 12.75 | 13.59 | 14.02 | 13.64 | 12.6 | 10.95 | 8.81 | 6.25 | 3.35 | 1.8 | .14
LWR | in. | 1.7 | 2.54 | 3.04 | 3.7 | 4.15 | 4.52 | 5.02 | 5.35 | 5.52 | 5.37 | 4.96 | 4.31 | 3.47 | 2.46 | 1.32 | .71 | .057
LWR | cm. | 4.32 | 2.24 | 1.7 | 1.09 | .71 | .46 | .14 | .013 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
LWR | in. | 1.7 | .88 | .67 | .43 | .28 | .18 | .057 | .005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0
BASE LINE
CLARK "Y"
F.S.
R.S.
10 cm (3.937) SQS.
STA. 1.25m (49.2)
STA. 50.0 (19.7)
STA. 0
AIRSPEED TUBE
SPAN 8.0 m (26 ft. 3 in.)
10cm (3.937) SQS.
2.32m (91.34)
1.16m (45.67)
STA. 62.0 (24.41) & R. SPAR
STA. 0 & F. SPAR
ALUMINUM COVER AROUND WING JOINT
FABRIC REINF.
STA. 1.1m (43.31)
COOLING AIR GILLS
COWL LATCHES
STA. 3.78 (148.82)
2.8m (110.24)
2.25m (88.58)
1.7m (66.93)
WING FILLET
STRINGERS
STA. 3.4m (133.86)
ACCESS PANEL
STA. 2.25 (88.58)
10.0 (3.94)
47.5 (18.7)
84.2 (33.15)
ELEV. H.L. 3.65 (143.78)
BOTTOM VIEW
AIL. H.L.
STA. 0.62 (24.41)
STA. 1.1 (43.31)
STA. 1.7 (66.93)
INSPECTION COVERS
HINGED ACCESS DOORS L. & R. SIDES
38.5 (19.16)
59.0 (23.23)
1.875 (73.82)
80.0 (31.5) DIA. BLUE DISC
8.0 (3.15) YELLOW BORDER
YELLOW CROWNS, BLACK OUTLINE
SAME for TOP SURFACE
ELEV. H.L. 3.65 (143.78)
R. SIDE ONLY
BUCKET SEAT
CARBURETOR AIR SCOOP
FUEL GAGE
STRINGERS
2.32 (91.34)
65.5 (25.79)
33.5 (13.19)
24.0 (9.45)
62.0 (24.41)
13.0 (5.12)
R.S.
F.S.
1.2 m (47.24)
THRUST
MAIN FUEL TANK 100 L (26.4 GAL.)
WING FILLET
TOP VIEW
STEP ~ L. SIDE ONLY
ALUM. COVER OVER WING JOINT
STA. 0 & F. SPAR
STA. 62.0 (24.41) & R. SPAR
STA. 2.8 (110.24)
STA. 3.4 (133.86)
14.0 (5.51)
9.5 (3.74)
STA. 3.78 (148.82)
RUD. H.L. SECT.
ALL FUS. SECT. GRIDS ARE 10 cm (3.937) SQS.
SCALE ~ 1/10 SIZE. ALL DIMENSIONS IN METRICS & (IN./FT.)
SCALE BARS 1:2" = 1.0' | 10 CM. = 1.0 METER
SPARMANN P-1
PETER WESTBURG
AUGUST, 1977
SHEET 2 OF 2
GO METRIC ~ YOU'LL LIKE IT!
DRAWING SIZE ~ .7 X 1.0m (27.56 X 39.37)

Bernard Cawley with Astro Sport. Contact Bernard for information on the Boeing Electric Fun-Fly scheduled for September 18th.



Here's a map for those who are planning to attend the Boeing Hawks Fun-Fly.

ELECTRIC POWER

By MITCH POLING

• At last! The Pacific Northwest joins the electric revolution! The Boeing Hawks will have an Electric Fly at the Boeing Hawks field, on Sunday, September 18, starting at 9 a.m. This meet will be patterned along the same lines as the KRC Electric Fly, which will be at Hatfield, Pennsylvania on August 20-21 (for more information on the KRC meet, contact John Hickey, 1624 Maple Ave., Hatfield, PA 19440). The Boeing meet will feature awards for the best looking plane, the longest flight time, the most aerobatic, and the best Golden Age (1928 to 1941 vintage planes).

There will be an Electric Clinic too, run by yours truly, Mitch Poling. I will have all of my test equipment there (there's a lot of it!). I can test for just about anything that could go wrong with an electric, and in ten years of flying electrics I've seen just about everything! So, bring your electric that has been gathering dust, or has been giving you trouble, and we'll find out what is going on and how to get it flying.

The Hawks field is right in Seattle, just slightly south and east of the Seattle Tacoma airport. There are plenty of motels there, as the airport is nearby, and there is a KOA campground just a mile south of the Hawks field.

If you are from out of town, we urge you to come, September is usually good weather in Seattle, and the scenery has to be seen to be believed. The family will like the harbor tours, the delicious salmon at Ivar's, and the ferry boat rides. There is something for everyone, so come join the fun!

For more information, contact Bernard Cawley, 21037th SE Apt. 43, Auburn, WA 98002, (206) 939-1778.

As usual, the field itself is located on a small road that is hard to find, so here are some directions. Take the No. 152 exit (188th St.) from the freeway, I-5. You will want to go east. If you are exiting the freeway going south, this will involve curving around, and going under the freeway after the exit. If you are headed north, it's easier, just keep going to the right (east).

You should find yourself on Orillia Road, and going down a fairly steep hill into the Kent Valley. Once you are down the hill, you will be heading directly east. There is a small river, the Green River, on the side of the valley, and immediately after you cross over the bridge which spans the river, look for a small road that parallels the river, this is Russell Road.

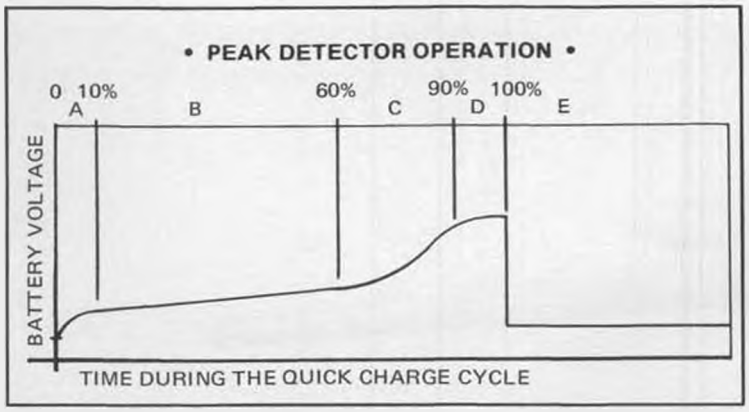
Russell Road wanders along beside the river, heading north for about a mile, then turns east into S. 196th St. Once you are on 196th heading east, keep an eye out for the field, it will be just south of the road, with a good-sized parking lot. Keep an eye out for model planes, and there you are!

If you come to West Valley Rd. (Highway 181), you have gone too far, so turn back and try again.

This should do it, but if all else fails, buy the Seattle map put out by Murray the Map Man (The Map Box), available at drug stores, hardware stores, and 7-11 stores. This map shows this area in detail, and sure helps to find things anywhere in Seattle. Actually, I am all

Delta's Peak Detector charger. Has automatic trickle charge feature to prevent overcharging, ammeter/voltmeter.

Econocharger from MRP. Features a simple timer with auto-trickle. Ideal for ESV meter as in May '83 *Model Builder.*



Graph of voltage and elapsed time for charging cycle of Delta Peak Detector charger. See text for explanation of graph.

Keith Klingebiel, of Colesville, Md., sends this photo of his 48 oz. Leisure Playboy. ROGs in 75 feet. Vantec speed control.

too familiar with trying to find my way around new cities, and I've finally admitted to myself that I have to get maps!

MRP ECONOCHARGER

I have been doing a lot of work with chargers lately, inspired by a request to talk about chargers at a recent Boeing Hawks electric clinic. I wound up talking for two hours! My voice was about gone by then!

So, lets deal with some chargers and charging.

First-off, the Econocharger by MRP is a new item, it will charge six or seven sub-C cells, or eight AA cells. It takes fifteen minutes to charge six sub-C cells, and twenty-five minutes to charge seven sub-C cells. The charge rate is about four-and-a-half amperes for six cells, and three amperes for seven cells.

Once the timer is off, a trickle current of .15 amperes continues to flow, so you can charge the pack overnight on trickle. This is a handy feature to make sure that all the cells are charged up, that is, to achieve a balanced pack. I recently tested a seven-cell pack that had never been overcharged, and had never been damaged, and I was shocked (no pun intended) to find that two cells were nearly discharged when the rest of the pack was still at 50 percent capacity. I hadn't damaged the pack yet because I had been charging by ESV and by digital chargers, and had always stopped the charge when the voltage stopped rising. So, I hadn't ruined any cells, but I also hadn't been getting nearly the time out of the pack that I should have. Overnight charging does avoid this type of problem.

The instructions did not say how long to charge eight AA cells with the 101, so you might check to make sure if you want to use it to field-charge your transmitter. I would guess about 15 minutes would be about right.

The Econocharger is part No. 101, and sells for about $25 from MRP, 12702-D NE 124th St., Kirkland, WA 98033.

ASL 3 CHARGER

Let's take a look at a charger that does it all, the ASL 3 charger from Germany. I mentioned this charger in the May column a few months ago. It is amazing, it will charge up to 24 sub-C cells from a 12-volt battery, and does it all completely automatically. It senses when the batteries have peaked, and switches to a trickle charge.

Up till now, if you wanted an ASL 3, you had to order it from Germany. Now, it is available here in the US from Wilshire Model Center, 3006 Wilshire Blvd., Santa Monica, CA 90403, (213) 828-9362.

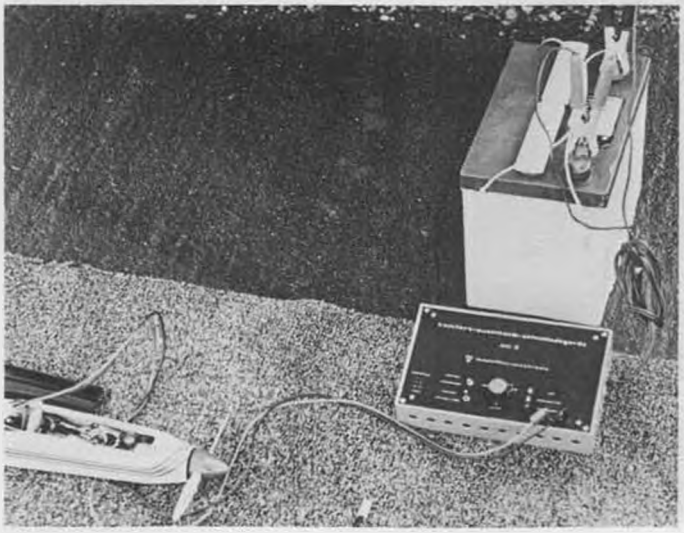
I watched Mike Charles and Larry Jolly use them at the Astro '83 Champs, and I was impressed. These chargers do their job well. Hans Weiss at Wilshire Model Center says that there are two models available, one is the "black box" version as seen in the photo, the other has an LCD display so you can watch the action. It is really not necessary to visually monitor a charger as sophisticated as this one, but it is more fun for the operator (spectator?). Hans quoted a price around $200, but as that was a phone conversation (and I didn't write it down), do check with Wilshire for the details.

DELTA BC 804 CHARGER

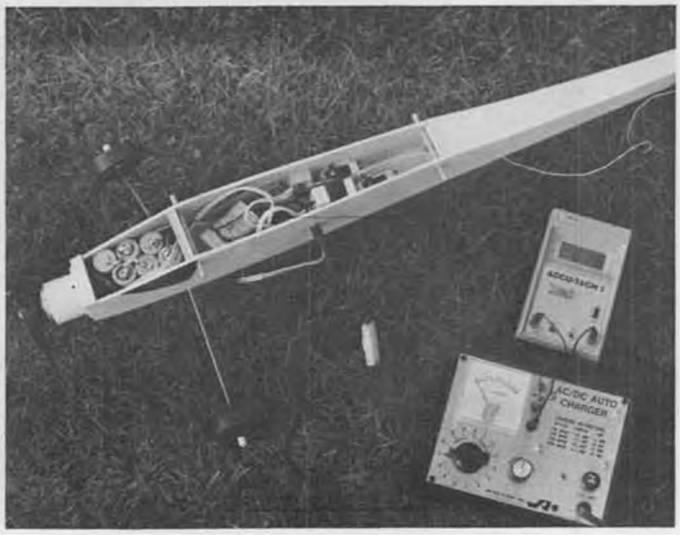
Another super charger that I haven't covered in this column, the Delta BC 804 charger, has been reviewed by Dan Rutherford in his car column. I haven't used it myself, but the specifications do look very impressive. It can charge up to six sub-C cells with automatic cutoff. The current is adjustable and regulated so it will not change during the charge period.

This charger is especially interesting to me because it uses an ESV to see the voltage peak. (The smallest scale divisions are two-hundredths of a volt.) I have been using ESVs lately as an inexpensive way to follow the peak, and the

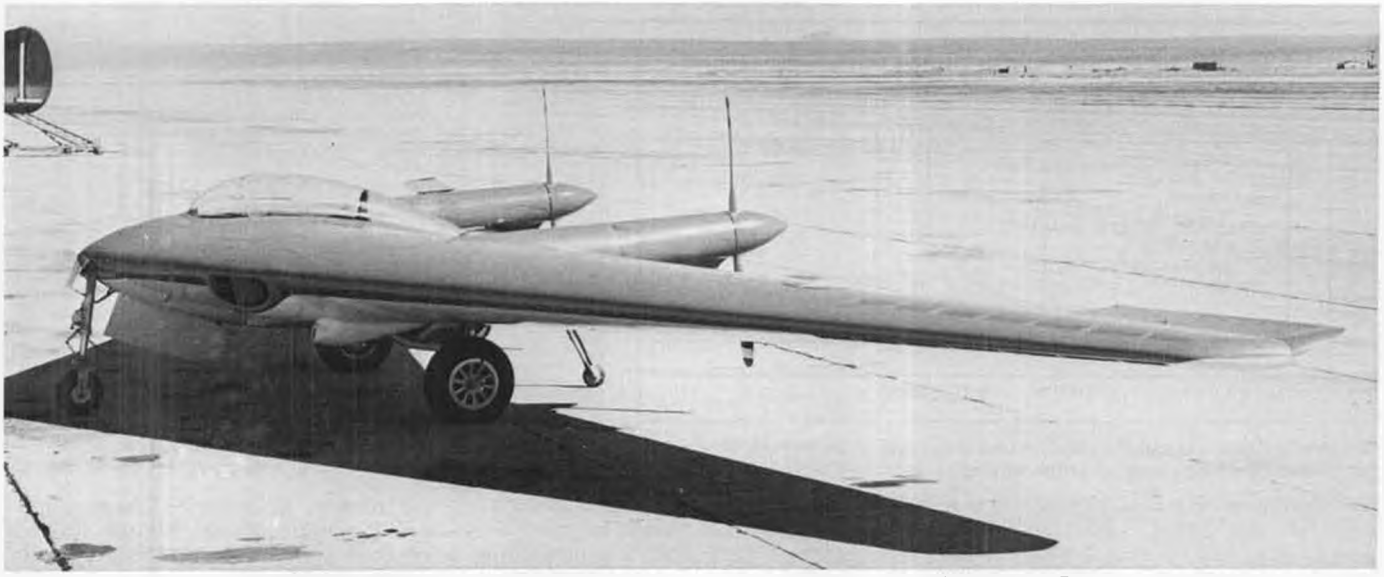
Continued on page 74



Modellbau-Electronic ASL3 charger from Germany. Fully automatic, charges six to 24 cells, available at Wilshire Models.



Accu-Tach 1 is used as a voltmeter with the Astro Flight AC/DC charger. Easy to detect voltage peak with this set-up.



Northrop N9M-A rests on flight apron at Edwards AFB, California. Photo courtesy of Edwards AFB Historical Dept.

NORTHROP N9M FLYING WING

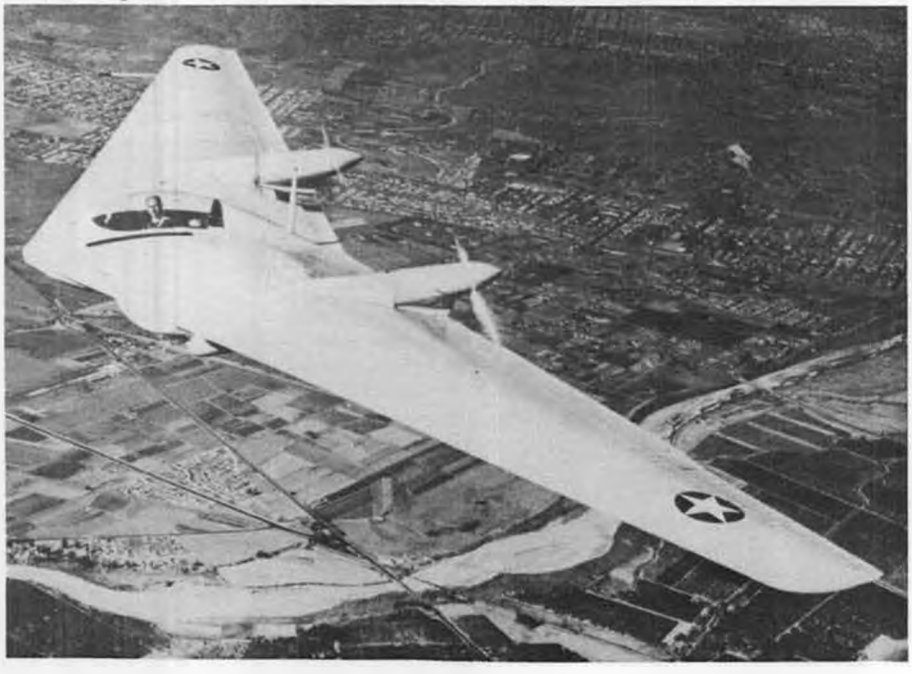
By BILL YOUNG . . . Here is a fabulous scale subject for the modeler looking for "something different." The Northrop N9M series of flying wings differed mainly in detail only. Bill chose the N9M-A model.

Full-size N9M photos courtesy of Northrop Corporation, Edwards AFB, and Jerry Balzer. Model N9M photos by author.

• I think that a little background might help other modelers to understand what goes on when trying to document, build, and fly an unusual subject. I have been interested in flying wings for many years, and in November of 1980, I attended the flying wing contest at Mile Square, in California. I immediately began looking for a scale subject to fly in 1981.

Well, I found what I wanted in the Northrop N9M. It was propeller driven, simple, esthetic, multi-engined, and had a pretty color scheme. The N9M's were the flying scale models of the XB-35 and YB-49 flying wing bombers made by Northrop Corporation. They were exact, 1/3-aero-dynamic equivalents of the big wings. All of the control systems, control surface sizes, shapes and locations, flying techniques, and training of pilots were carried out on these aircraft in the same manner as the larger aircraft. Three N9M's were contracted for, and a fourth was built, to replace the N9M-1 which crashed in May of 1943. Approval of the first contract was in October of 1941, and the first flight was in December of 1942.

The aircraft were of mixed wood and metal construction. The outer wing panels were all wood and the center section was a welded steel tube frame covered with wood or metal. The first three aircraft N9M-1, N9M-2 and N9M-A were powered by Menasco Super Buccaneer engines, and the last aircraft (the N9M-B) was powered by special Franklin flat sixes. The N9M-B still exists, and is currently being rebuilt at Planes of Fame Museum in Chino, California.



Wouldn't you love to have seen the N9M-2 flying wing up this close on one of its flight tests over Southern California? Note lack of L.E. slots or slats to prevent tip stall.

First, I built a 45-inch glider to test the feasibility of the layout, and to see if I could fly the airplane. This model flew unexpectedly well, and is still flying.

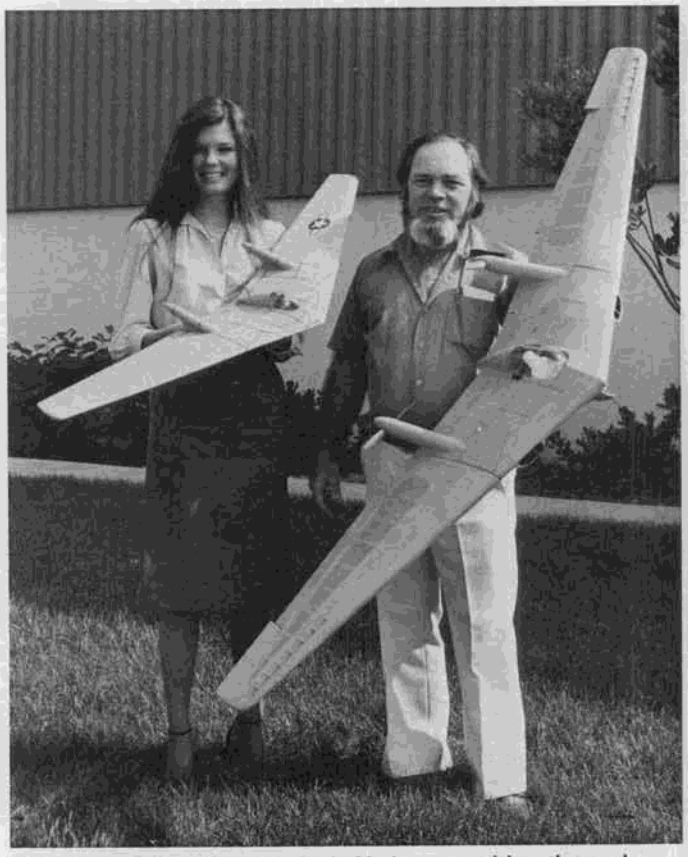
Next came a twin Astro 02, 60-inch version, which flew well until I tried to load it to 18 oz. per sq. ft., and managed to get the CG too far back. Scratch one wing . . . and the 1981 contest.

Meanwhile, I was still gathering scale data from many sources, and finding that the data was extremely scarce. I finally approached Northrop Corporation and Wright-Patterson AFB Museum. This yielded a few more pieces. It was becoming obvious that all the existing drawings were inaccurate in many ways, and lacked important details.

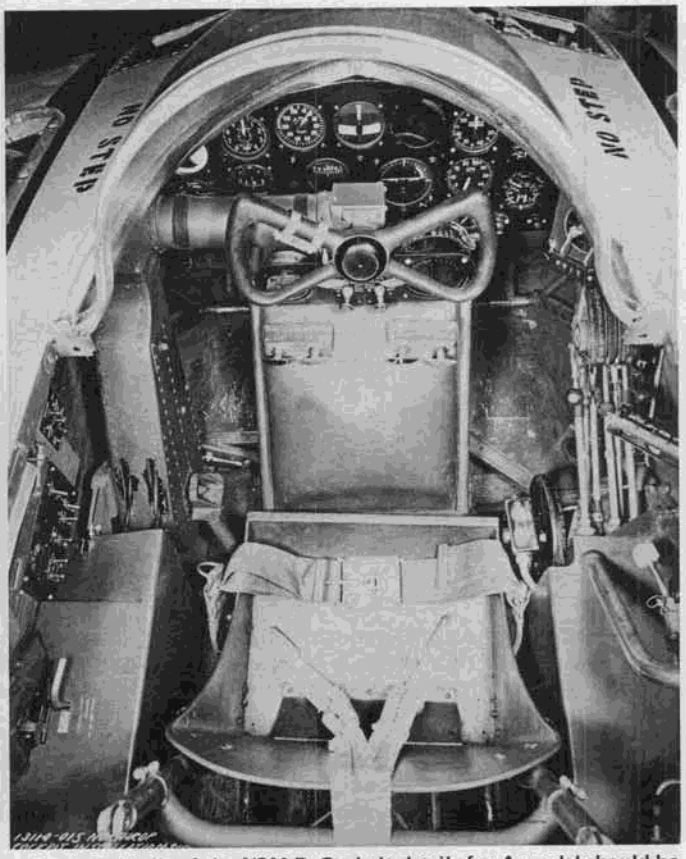
I began to draw a set of scale plans from which to build a stand-off scale model. I began construction in June of 1982. It was scheduled to fly the following November. (Scale drawings are available from the author.)

Now remember, at this point there were two previously built and flown models (one of which was still flying) thus insuring that the basic airplane was sound. However, sometimes the builder isn't. I experienced a series of frustrations:

First outing: Flight is best described as high speed taxiing. I forgot to bring different props to test. Try again later.



Northrop public relations rep. Cindy Macha poses with author and N9M "Wings." Smaller model is glider, larger is twin 05 cobalt.



Cockpit details of the N9M-B. Cockpit details for A model should be the same. Photo courtesy of Jerry Balzer.

Second outing: Again, hi speed taxiing. Insufficient power to take off with Astro 05XLs and eight cells.

Third outing: Astro 05 Cobalts installed in the place of XLs. Take-off is OK, and stable flight is achieved out to 300 yards. Radio loss. Minor crash.

Fourth outing: Scene is the flying wing contest. I have returned the radio, tested the batteries, moved the antennas, and range-checked the model. Net result: crash.

Fifth outing: With a new radio, extensive testing, range-checking, etc., the net result was the same . . . a crash!

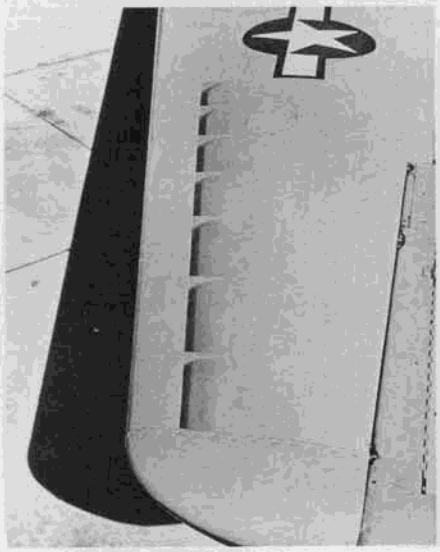
Nuts!!! The glider is still flying perfectly well, and I now have a second 035 powered craft which is flying well. I am sure that the stand-off scale aircraft is OK, and I plan to keep going with it until I find the gremlin.

By this time, enough scale documentation had been accumulated to go ahead with the *scale* version of the N9M. It was the next project, and the subject of this construction article.

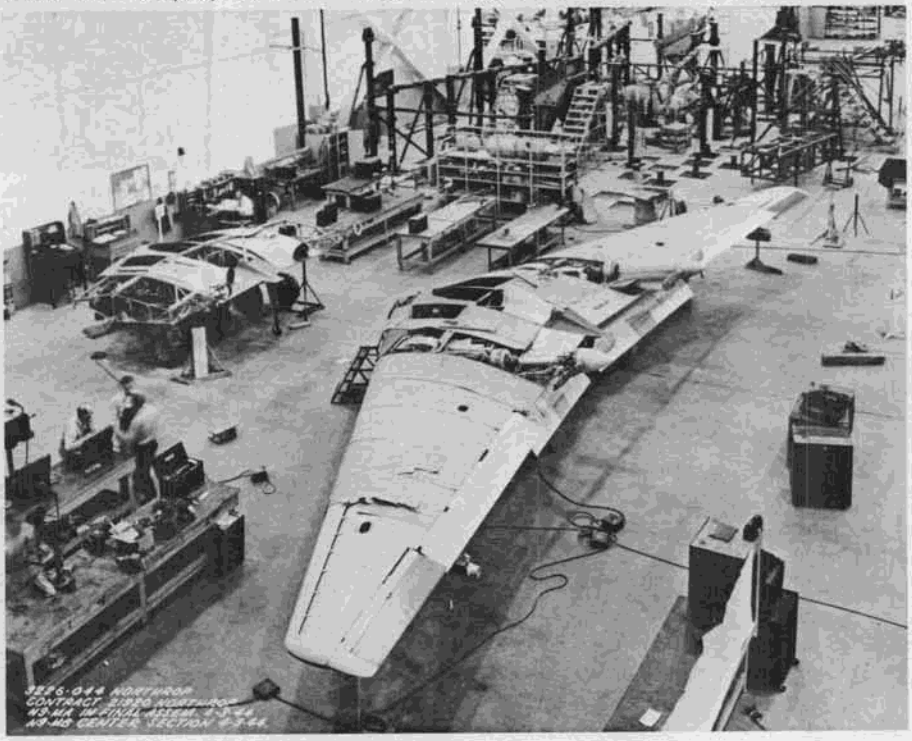
So much for the fun part of scale modeling. If you still want an N9M, and I'm certain that it will fly well (as is my pilot, Tony Nacarrato), then let's proceed.

OUTER WING PANELS

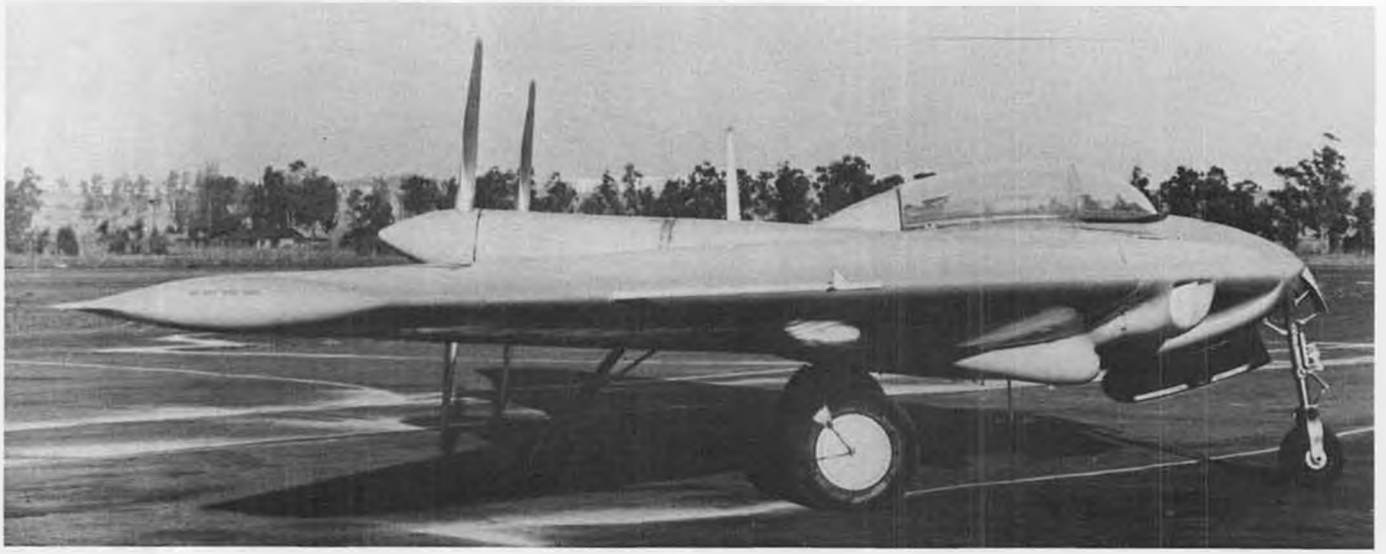
Cut out all of the parts before attempting assembly. Mark the appropriate ribs



N9M-A wing tip slots. N9M-B had automatic door which opened slots at low speed.



The N9M-A in final assembly, N9M-B center section (4-3-44). Outer control panels controlled pitch when landing flaps were deployed, and split apart to cause yaw. Elevons between the two.



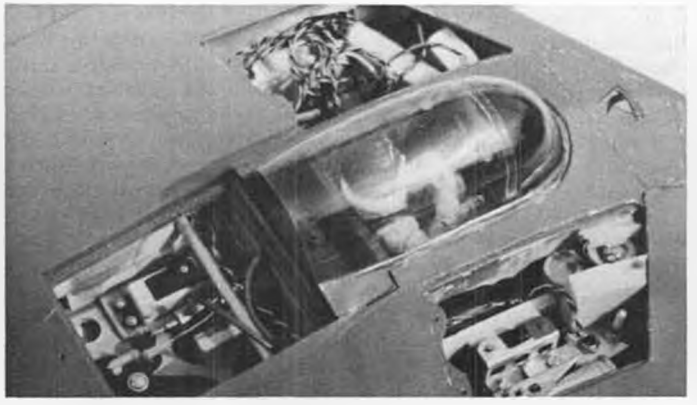
Right side view of N9M-2 at Northrop Field, Hawthorne, California. Slats were added to leading edge later in flight testing to cure slow speed/high attack angle tip stall. N9M-A and -B featured built-in slots.

near the tip for the cut-outs for the tip slot. Please note that there is a continuous twist in the wings totaling five degrees of washout. Make a jig to hold the root and tip ribs in their proper alignment (upside down) from scraps of balsa tack-glued to the workbench and the parts. Now, add the leading edge, the rear spar, and the top main spar. Carefully add the ribs in between, checking for alignment as you go. Install the main spar webbing and the bottom main spar. Sheet the forward part of the wing and the root section next. Now, add the rear spar and rib cap strips. Be careful to include the sheeting in the landing flap area. The root rib is doubled with 1/32 plywood. Install the bellcrank mounts and the bellcranks. Cut and fit the push rods. Make a mount for your favorite servo, and install it between the first two ribs. Cut the slot ribs now, and make a cut-out in the bottom sheeting. Install sheeting on the front and back of the slot. Cut and fit false ribs in the slot. Leave the top sheeting off to allow any last minute adjustments to the internal structure.

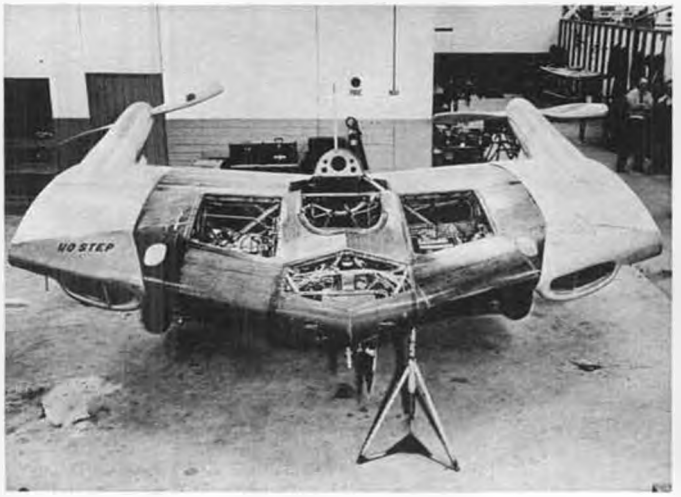
PITCH FLAPS AND ELEVONS

Lay down the bottom sheeting, and install the ribs in place. Use 3/32 sheeting between the hinge ribs. The hinge ribs are 1/32 ply. Be sure the hinge ribs

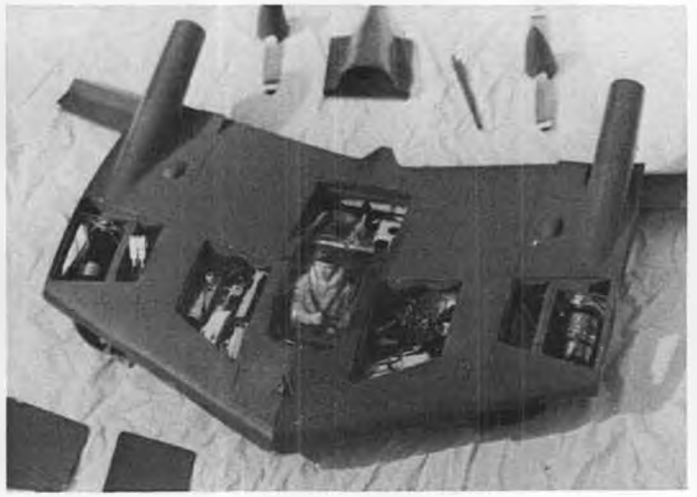
The N9M-A model uses two Astro 05 cobalt motors with long drive shafts. Scale airfoil yields lots of room inside.



Installation details. Y-connector from aileron output of receiver goes to nose gear servo (visible) and to electronic mixer for elevons.



If you think the model was complex . . . take a look at the full-size N9M-A! Photo taken by Northrop, February 18, 1944.



Five hatches cover all of the model N9M-A's innards. Let's see . . . 05 motors, fuses, retracts, motor control switch, nose gear servo . . .

Drive shaft housing and exhaust port. Flap restricted hot gasses to warm cold engine.

N9M-A model on static display with landing flaps deflected. Top of the aircraft is a medium blue, the bottom is orange-yellow. Model does not feature the split surface yaw control.

are square with the L.E., and vertical to prevent binding. Install 1/16 ID aluminum tubing between the hinge ribs to act as a hinge pin guide, and support with scrap balsa. One of the hinge ribs has the control horn integrally mounted. On the pitch flaps, the control connector is within the envelope, and a false rib will need to be installed so that when the clearance cutout is made there will be sides in place. Check the alignment of the top surface with that of the wing, and then install the top sheeting. Note that the elevon is hinged on the centerline, and that the pitch flap is hinged near the top. Cut out the hinge tongues that fit into the wing from 1/16 ply, and insert 1/32 hinge wire to hold them in place. Make the tongue locations on the rear spar, and make cut outs. Glue in the tongues, and brace with scraps of balsa. Make cut-outs where necessary in the sheeting and the rear spar to clear push rods. Cut and install the push rods. Remove the control surfaces.

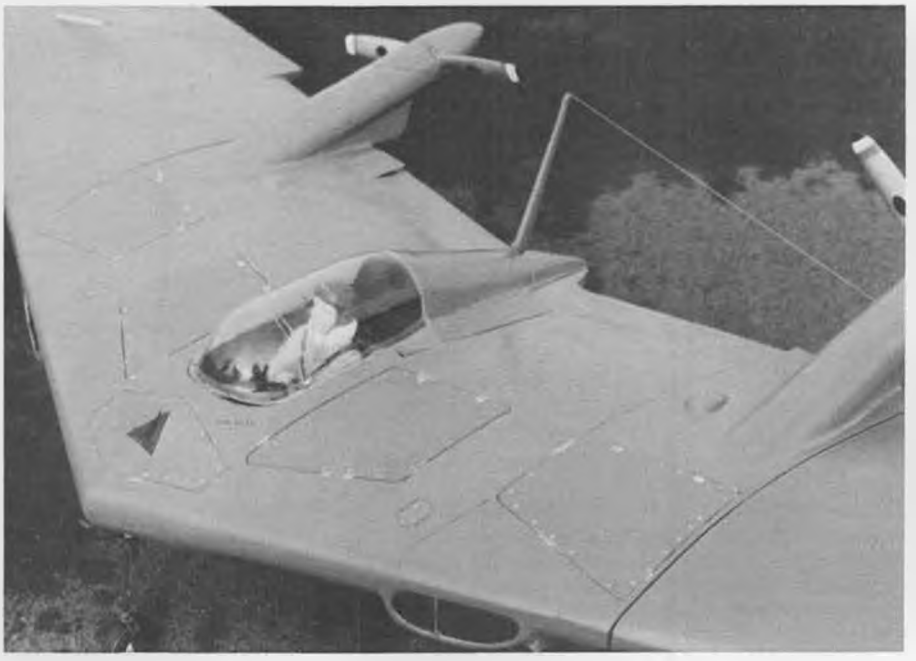
CENTER SECTION

Cut out all parts for the center section before beginning construction. Begin by assembling the center ribs to the center cross bulkheads. Make a jig to hold this assembly upside down, and locate the outer ribs in their proper alignment with two degrees washout. The top spar is flat from wing tip to wing tip. Make this jig from scraps of balsa wood tack-glued to the building board and to the parts. Check this layout with the outer wing panels for a match of LE and rib alignment. Install the LE and the rear spar. Install the top main spar and the remaining ribs. Install the main spar webbing, and the bottom main spar. Install 1/8 plywood mounts for the retracts and don't forget to install balsa reinforcement around these mounts. Plank the center section bottom, and sheet the wing stub on the bottom. Now is a good time to install the wing wires and locating tubes in the center section and the outer wing panels. Coat the wires with a petroleum jelly to prevent gluing them in. Make certain of the alignment and glue the tubes in place. Brace with scraps of balsa wood.

Now is a good time to install the retracts. Mark the mounting holes in the plywood mounts, and drill for blind nuts. Each gear will require a cut-out to be made in the bottom sheeting to clear the retracts and wheels. Mount the retracts. Locate and mount the retract bellcrank on the rear retract mounting plate. Now route push rods to each retract. Mount one Sonic Systems air cylinder to operate the bellcrank. Check that the whole system works freely, and insure that the gear-down, locking position is positive. Remove the retracts, and build the wheel wells at each location.

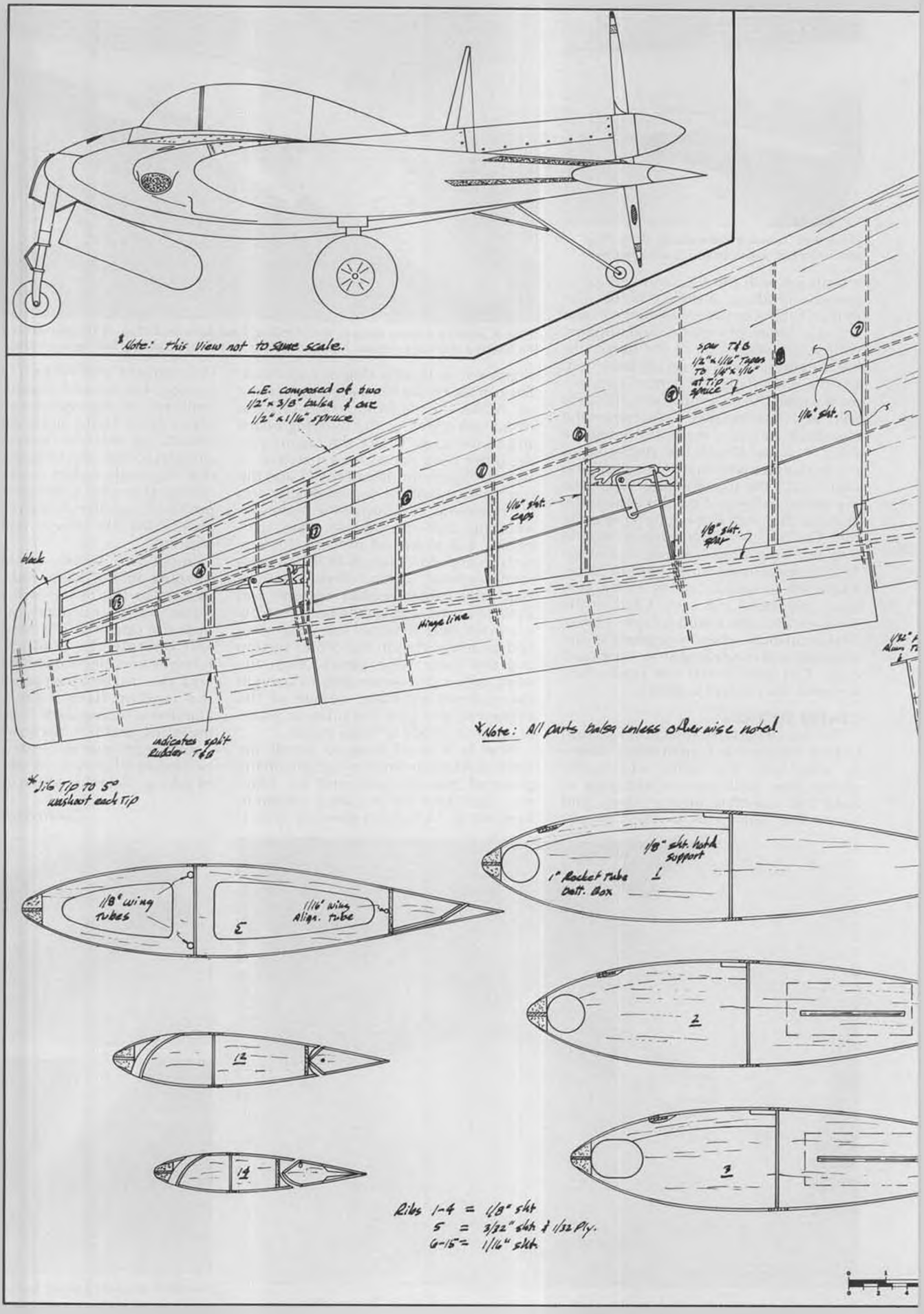
Install two servos in the left-hand opening in the wing stub. The servo nearest to the center will operate the retract valve and micro switch in the opposite opening. The remaining servo will operate the landing flaps. The receiver and electronic mixer go in this area also. Make up an actuating bar for the landing flaps from 1/4-inch ID aluminum tubing with 1/4-inch doweling inside, and 1/16 cranks where shown. Before putting on the end cranks, slip on two bearing tubes of the next larger size of tubing. Slide this whole assembly into

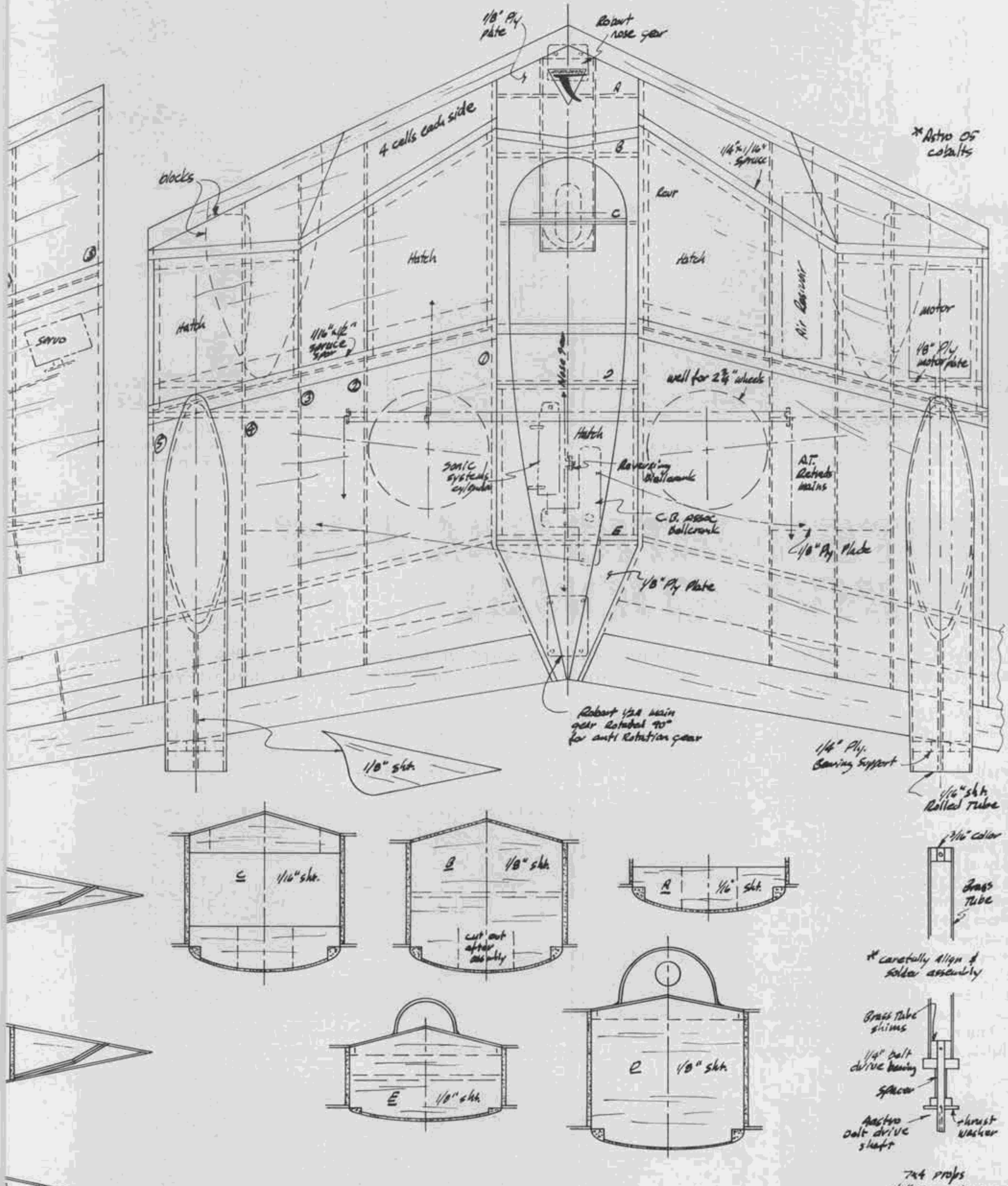
Continued on page 70



Here's a close-up shot of center section scale details. Canopy is cut-down Sig part. Props are 7x4 Rev-Ups. Northrop logo is red and black.

The N9M-A model's wings feature adjustable pitch control surfaces near tips (no servo), elevons, and true-to-scale L.E. slots.


*Note: This view not to same scale.
L.E. composed of two 1/2" x 3/8" balsa & one 1/2" x 1/16" spruce
Spar T&B 1/2" x 1/16" Tapers To 1/4" x 1/16" at Tip Spruce
1/16" sht.
1/16" sht. caps
1/8" sht. spar
Hinge line
Note
indicates split Rudder T&B
*Note: All parts balsa unless otherwise noted.
*Jig Tip to 5° washout each tip
1/8" wing tubes
5
1/16" wing Align. Tube
1/8" sht. hatch support
1" Rocket Tube Batt. Box
1
2
3
4
Ribs 1-4 = 1/8" sht
5 = 3/32" sht & 1/32 Ply.
6-15 = 1/16" sht.

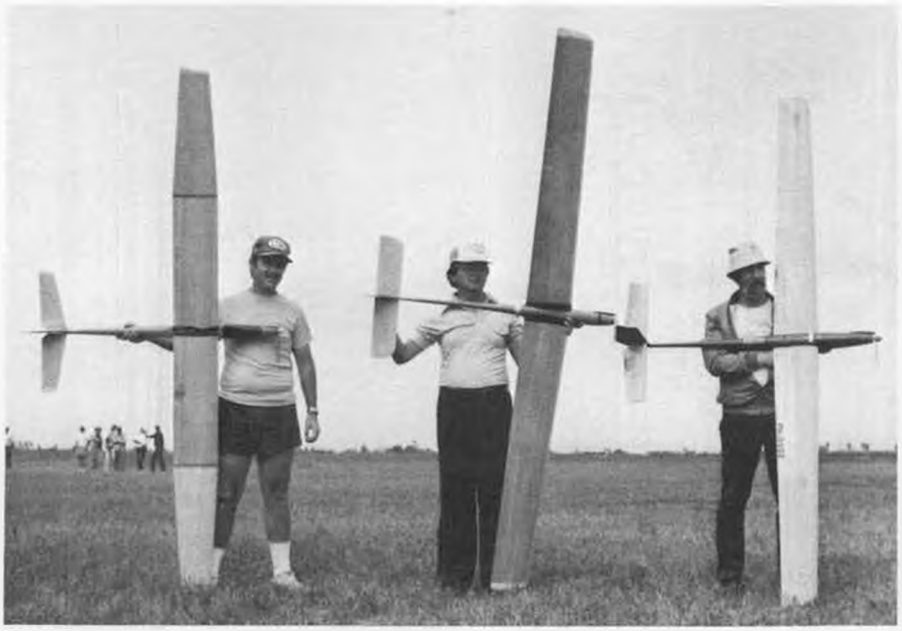


NORTHROP N9M-A

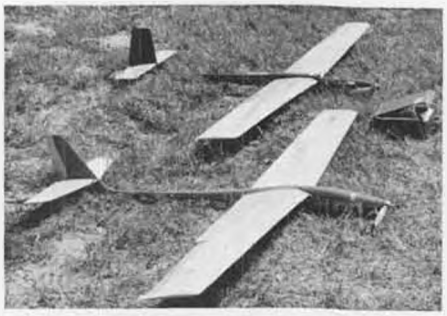
Designed by & Drawn
Bill Young

IMPORTANT CONSTRUCTION NOTE: Because of the complexity of this model, these plans are limited in many of the building details. Construction is recommended for skilled scratch-builders only.

MODEL BUILDER *magazine*
Plan No: 883-O.T.



The top three places in the F3E Challenge went to Mike Charles (U.S.A.) flying an IBA 26, Bob Gerbin (U.S.A.) with Ampere, and Hein van't Laar (Holland) with original design.



Hein van't Laar's primary (foreground, top photo) and back-up planes. Hein flew the contest (bottom pic) with back-up called "VAW."

FIRST EVER

US/INTERNATIONAL F3E OPEN INVITATIONAL

Photos by MIKE CHARLES and BILL FORREY

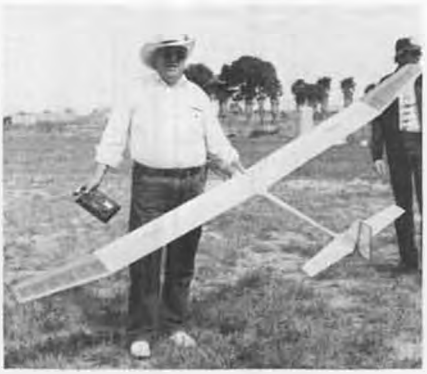
By MIKE CHARLES . . . Last year's Leisure Grand Championships winner becomes this year's *first ever* U. S./International F3E Open Invitational contest winner as well . . . and writes about it here for you.

• April 17th, 1983. To some modelers it was just another ordinary Sunday to go flying.

For a small group of people from places around the world this Sunday was anything BUT ordinary, it was a day of FIRSTS.

What for instance? Well to start with, it was the day of the *first ever* U.S./International F3E Challenge for Electro-Powered Motorgliders. It was the *first* time a day had been assigned by the FAI on their worldwide contest calendar for this type of event in the USA! It was the *first* time that contestants from foreign countries had ever in this type of competition (using the international rules) on US soil! The event was co-hosted by two *first* clubs; Harbor Soaring Society who graciously supplied their flying field (previously known as the Harbor Slope Soaring Society, the *first* formally organized, *soaring only* club in the US) and SEAM Chapter 1 (the *first*, but hopefully not the only local organization to emerge from the Society of Electric Aircraft Modelers, a national organization), also known as the Orange County D/C Flyers. It was also the *first*

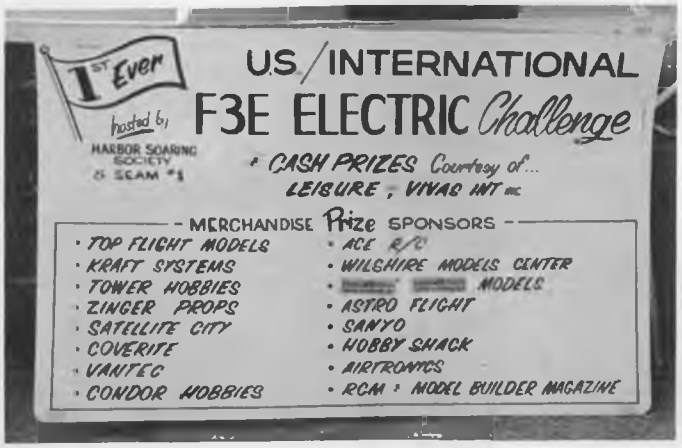
Hans Weiss (with a name like that he *should* be from Germany!) of Wilshire Model Center, Santa Monica, Calif., flew this pre-fab Hot River. Geist folding prop, Geist motor.



Herr Keller (Germany) poses with his "sport model" featuring Astro Californian wings!

First place winner, Mike Charles, takes possession of the Grand Prize, a $500 check from Leisure's Roland Boucher.

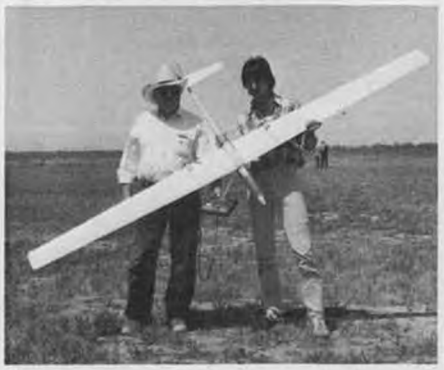
Bill Winans readies his Olympian, a Larry Jolly design. Geist 40 motor and 16 cells.



The List of industry supporters was prominently displayed at the frequency control table. (Keller Motoren stickers.)

Hans Leudi (left) times for Daniel Bosshart (both from Switzerland) who passes through "gate" for duration half of flight. Model is an IBA 26.

Larry Jolly heaves his Olympian into the air on his way to 13 laps.



Heinz Keller, Ralf Liebler (Germany). Ralf's plane is a twin pusher (Keller 35s).

Hans Leudi launches Daniel Bosshart's IBA 26. Running start is a must!

look for many people (myself included) at some of the best high-technology European E-flight aircraft and attendant support equipment.

If that's not enough *firsts* to impress you, then how about a 10th?

April 17th just happens to be the 10th anniversary of the *first* (there's that word again) public demonstration of R/C electroflight by Mr. Roland Boucher, one of the event's main sponsors.

Now, I can hear some of you saying, "What the heck is an F3E glider, and what do you do with it?"

The first question is easy, just read on, look at the pictures, and you will find out more about the aircraft. As for what you do with them, that's another complete story in itself, and would take too much space to print here. I can tell you that if hearing the word "multi-task" makes your heart beat faster and your eyes glaze over with that uncontrollable look of excitemenmt, the F3E may be for you. Suffice to say that a little digging in a long neglected section of your trusty AMA rule book will unearth the concept and rules for you. Now back to the job at hand, giving you the details on this event.

Before going too much farther, it's only fair to say that I believe you, the reader, are entitled to more than just a dry accounting of facts and figures, so maybe a little background info about the *hows* and *whys* of this particular contest are in order.

The idea to hold this event was born in September of 1982, and came strictly out of necessity.

I had just returned from Joliet, Illinois, and an unsuccessful bid for the 1983 US Soaring Team. *(Mike is the second alternate to the US team, so he wasn't completely unsuccessful! wrf)* I decided not to dwell too long on the past, but rather to go on to the next challenge. Having read somewhere that the world championships for electric flight would be held in 1984, I placed a call to AMA headquarters to find out where and when the team selection process would

European organizer, Peter Blommaart, "bends" Bill Northrop's ear between flights.

Rick Schrameck (U.S.A.) and Electrocutioner. Whisper F/G fuselage, E-178, Astro 40/18.

Hans Weiss receives "backseat" coaching from German F3E ace, Charlie Binder.

Charlie Binder (Germany) checks out Larry Jolly's Olympian. Larry had electronic motor switch trouble and DNF the contest.

Pit area of Mike Charles and Ralf Liebler. Chargers are (left to right): ASL 3, Leisure, Keller. First class.

Peter Blommaart (Belgium) with Graupner "ASW 22". Easily modified, flew well.

Barbara Travers, of Huntington Beach, Calif., checks out the souvenir T-shirts.

Ron Black (U.S.A.) flew this 05-powered Electricus (*M.B.* plan no. 3831) in Fun-Fly.

begin.

I talked to John Worth, and he gave me some rather distressing news . . . there were no team trials scheduled. Why?, because, as yet, the FAI wasn't sure that the interest in E-flight was great enough to warrant having its own world champs. What then, I queried, would be needed to help bring this action about? Mr. Worth seemed to think that an internationally attended competition hosted in the US might help, but as yet, he knew of none being planned.

I hung up knowing something had to be done *soon* because of the time factor involved in dealing on an international level. The time was close at hand for the scheduling of the next yearly FAI contest calendar. With my notice of intent in their hands, our AMA reps were off to the yearly CIAM plenary meeting in Paris. A place on the 1983 international calendar was applied for, and granted by FAI.

At this point some luck was on my

Continued on page 83

Mike Neverdosky launches John Krug's (U.S.A.) original with polycarbonate skinned wings.

Hans Leudi secures the wing of his original pylon model for a demo flight Saturday.

Mike Neverdosky and "Man of Leisure," E-205 wing, Leisure Gear Motor (LT50, 3.6:1), 7-cell.

Fun Contest participants lined up for this group photo to show you their enthusiasm for this type of novice-oriented, no-pressure competition. Simple, rudder/elevator "floaters" were the predominant sailplane type, yet the variety of models was incredible.

R/C SOARING

By BILL FORREY PHOTOS BY THE AUTHOR

• Experts in any field begin as novices. There will always be more novices and amateurs in any given field than experts or professionals. Nowhere is this more evident than in R/C soaring. For proof of this, one only has to ask the local hobby shop owner which sailplane kits sell the best, the Geminis, Sagittas, and Camanoes, or the Wanderers, Gentle Ladys, and Oly 650s. The former group of airplanes is not for first time builders or fliers, while the latter group is.

Did you ever wonder where all these kits end up? I have. I've wondered because so few of them end up at the local club flying field. Why is this? Well, undoubtedly, some of those kits never get finished; either the builder gets discouraged with his (or her) handiwork, the final product doesn't work right, look right, or even fly . . . there are scores of reasons why . . . not the least of which is a lack of good instruction for the novice flier. Think back to your first R/C model. Who was there to instruct you?

Admittedly, the responsibility for a novice's R/C training falls primarily on the novice himself . . . he must *ask* for help before anyone will know that he needs it . . . but that can be a very hard thing for a beginner to do. Often, those of us who are seasoned fliers appear to be so busy with our own flying and our own socializing and having a good-old time, that the guy who doesn't know the first "dumb" thing to do is reluctant to interrupt. You probably have seen this happen where you fly. How many aspiring pilots never get up the courage (or should that be humility?) to come to the flying field for instruction? I'd wager quite a few of these unfortunates just go out to a field or slope in some secluded

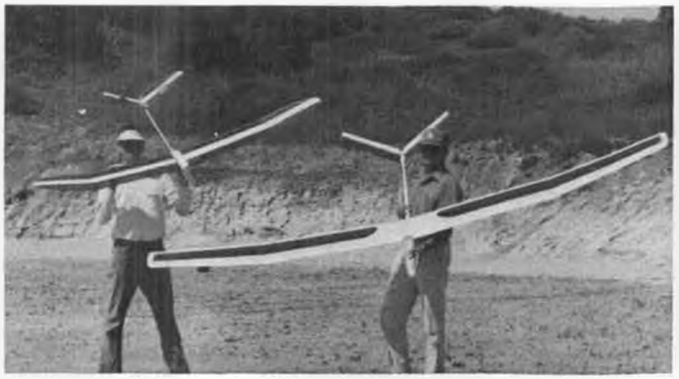
Johnny Leal and his dad, Joe, came to fly their Thermic 36 and beefed-up H.O.B. 2x2. Joe's dad was spectator at contest. Three-generation modeling family!

Bill Hill modified his Wanderer to accept Cox RC Bee (.049-.051) engine or noseblock.

Curt Stevens organized the Fun Contest and rounded up *mucho* industry support!

More "industry support." Literally a table full of goodies! Something for everybody.

Leon Hodge's Paragon suffered loss of wing tips in shoot-down. Flew again anyway!



Bill Anderson (Jr. and Sr.) with pre-production Grand Espirit (Airtronics), and Lil' Esprit built from RCM plans. Lee Renaud designs.

Dieter Kaltschmid (Austria) scratch-built this Grunau Baby. Span is 9.5 feet. Original plane was a 1935 German design.

Bill Turner and his Predator. Jack Chambers 7.8% (no. 14) section, blue foam core wing with I-beam spar, sub-spar, and 1/16 balsa sheeting.

Dieter's first hi-start launch with his Grunau Baby. Everyone held his breath . . . but launch was perfect!

part of the country where no one can laugh at their mistakes, and total their creations on their first flight. They are the ones that nobody hears about, and few even care about.

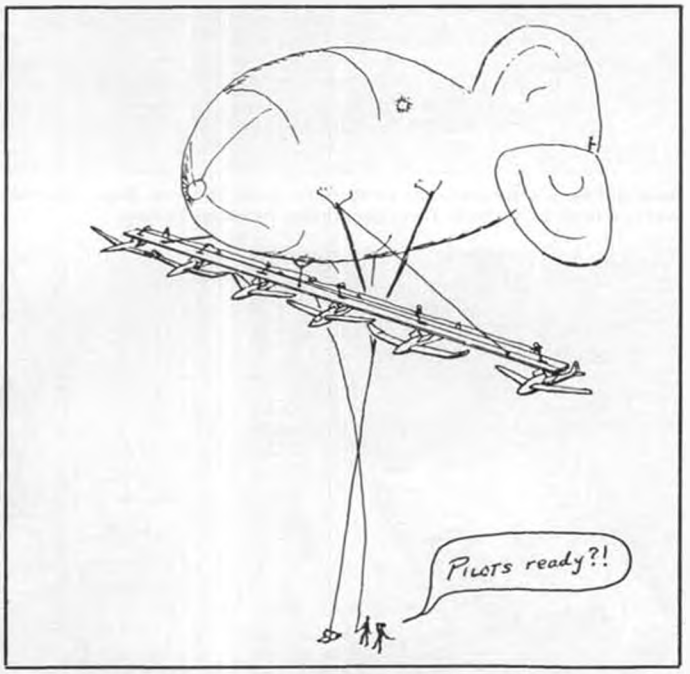
Enter a really great guy with a very good idea, Curt Stevens. To some of you, the name Curt Stevens will ring a bell. For those who have never heard of him, a little intro is in order. Curt has been a modeler for many years. His AMA number is 219. He has been a manufacturer in this hobby; most old timers will remember his company, Competition Models (1958 to 1968). Currently, he is a real estate broker in the Mission Viejo area of Southern California. He has two sons who are also modelers and AMA members.

His idea was to organize a contest for these beginners. Now, before you start thinking, "Hey, beginners need instruction on the basics of flying, not competition!" give me a chance to explain, better yet, please allow Curt a chance to explain. What follows is a letter Curt wrote to as many R/C manufacturers as he felt could benefit from the exposure which his contest would provide their products. It is self-explanatory, and might be a good promotional tool to keep handy in case you think Curt's idea of a fun contest for beginners is something you'd like to emulate.

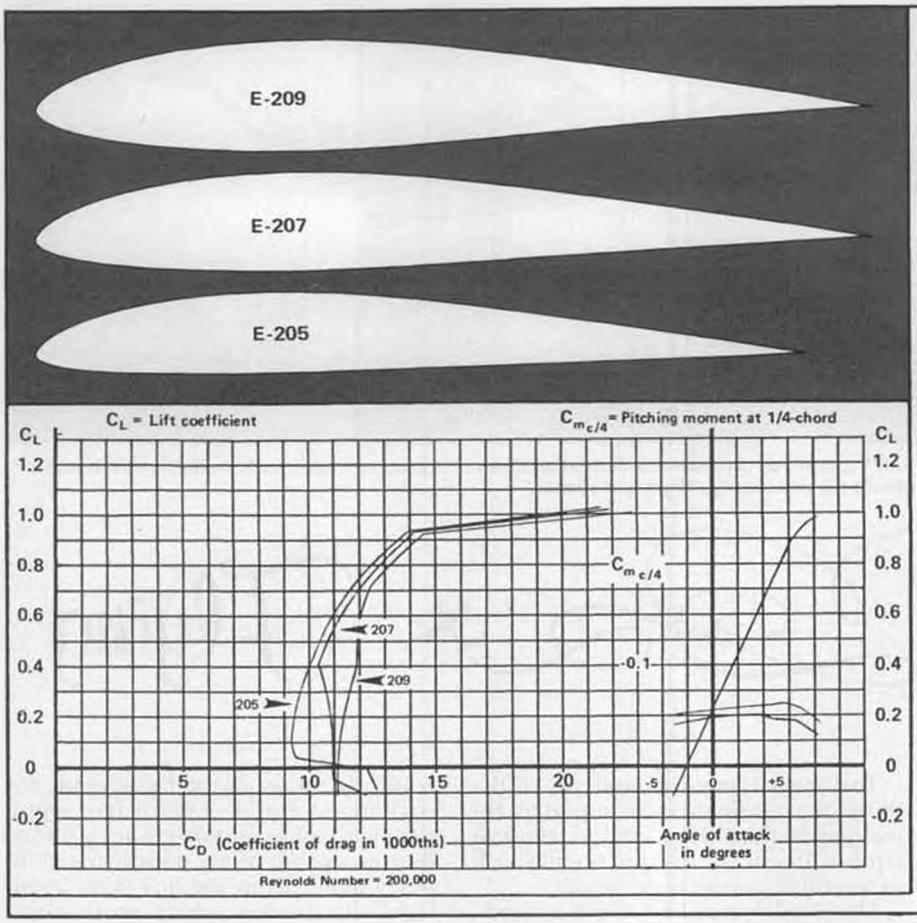
Dear Manufacturer,

A group of modelers in Southern Orange County are forming a large R/C glider club. As the first step in identifying potential members, we have sched-

Mark Rebeck of California Slope Designs holds his latest kit, Mini-Savage, a 48-inch version of his popular, foam core Savage.



This might be the most equitable method of getting all F3B gliders up to the same launch height . . . but it opens up a whole new set of problems for contestants. Cartoon courtesy of *Airborne* magazine.



Theroretical glide polars for the Eppler series: E-205, E-207, and E-209. Pitching moment curve on top is E-209, and the bottom is E-205 (E-207 omitted for clarity as it falls between the two). Data from *Model-Technik-Berater (MTB1) Eppler Profile.*
Only Reynolds Number of 200,000 is shown for the sake of clarity.

E-209

X:	100.0	96.97	89.08	81.58	72.74	63.05	53.03
Y:	00.00	0.557	2.027	3.253	4.634	6.065	7.393
X:	43.18	38.44	33.84	29.42	25.21	21.21	17.46
Y:	8.380	8.657	8.764	8.694	8.448	8.037	7.490
X:	13.99	10.85	8.065	5.656	3.651	2.066	0.916
Y:	6.830	6.073	5.237	4.341	3.406	2.454	1.517
X:	0.216	0.007	0.398	1.379	2.852	4.804	7.219
Y:	0.635	-0.108	-0.775	-1.467	-2.140	-2.765	-3.329
X:	10.07	13.34	16.98	20.97	25.26	29.79	34.52
Y:	-3.821	4.233	-4.561	-4.799	-4.943	-4.985	-4.909
X:	44.52	55.06	65.61	75.59	84.45	94.52	100.0
Y:	-4.322	-3.409	-2.446	-1.576	-0.884	-0.222	00.00

E-207

X:	100.0	97.01	89.13	81.63	72.80	63.13	53.13
Y:	00.00	0.489	1.841	3.011	4.352	5.759	7.079
X:	43.31	38.57	33.98	29.57	25.36	21.37	17.62
Y:	8.075	8.362	8.483	8.430	8.205	7.819	7.300
X:	14.16	11.02	8.225	5.808	3.791	2.189	1.015
Y:	6.669	5.944	5.143	4.282	3.383	2.468	1.565
X:	0.279	0.000	0.304	1.212	2.628	4.543	6.943
Y:	0.714	-0.015	-0.626	-1.204	-1.750	-2.234	-2.649
X:	9.807	13.11	16.82	20.89	25.29	29.97	34.86
Y:	-2.991	-3.257	-3.448	-3.565	-3.611	-3.586	-3.487
X:	45.16	55.86	66.41	76.28	84.95	94.70	100.0
Y:	-3.044	-2.425	-1.787	-1.212	-0.744	-0.239	00.00

E-205

X:	100.0	97.05	89.17	81.68	72.87	63.20	53.22
Y:	00.00	0.427	1.668	2.786	4.088	5.470	6.782
X:	43.41	38.68	34.10	29.70	25.50	21.50	17.76
Y:	7.785	8.081	8.214	8.177	7.970	7.606	7.111
X:	14.30	11.16	8.360	5.937	3.909	2.292	1.097
Y:	6.507	5.811	5.040	4.211	3.344	2.461	1.589
X:	0.331	0.002	0.233	1.065	2.419	4.291	6.669
Y:	0.766	0.055	-0.506	-0.988	-1.420	-1.776	-2.053
X:	9.534	12.86	16.63	20.78	25.29	30.10	35.15
Y:	-2.252	-2.378	-2.436	-2.435	-2.384	-2.292	-2.168
X:	45.75	56.59	67.15	76.91	85.40	94.86	100.0
Y:	-1.859	-1.516	-1.180	-0.876	-0.614	-0.252	00.00

uled an R/C glider contest for April 17 in Mission Viejo. The Mission Viejo Company, a land development company owning about 70,000 acres in this area, has agreed to furnish an ideal flying site, and help with newspaper publicity for this contest.

Early interest seems to indicate a turnout of 60 fliers minimum, and possibly over 100 contestants. Since we announced this contest, one local hobby shop's sales of glider kits has increased from two to three per week to 22 kits the first week, with a total sell-out of simple, inexpensive kits the second week. Hopefully, we will start our new club by turning all this activity into 50 members for our new club.

We need your help! As you can see from the attached fliers, we have no sponsor, no club (yet), no prizes (yet), and only a $1 entry fee. I would like to invite you to help us make this first contest a big success. Join a select group of manufacturers, and support our efforts with a number of inexpensive prizes.

Being a former kit manufacturer (Competition Models 1958-68), I am well aware of the demands placed upon your doorstep by every club planning a contest, fund-raiser, raffle, etc. We would like for you to examine the structure of our contest, its purpose, and the future of our hobby in this area. Notice that our contest is aimed at the modeler who is not a regular contest flier, but rather is slanted towards bringing in a large number of newcomers, and with our new club, keeping them interested. Did you notice that there is no AMA requirement? Of the 30 or so regular glider fliers in this area, only five are AMA members, and my sons and I account for three of the five.

Our contest is meant to appeal to the 90 percent who buy 75 percent of all modeling supplies. These are modelers who will appreciate your generosity. Your donations will be clearly acknowledged at the contest site, and in our other advertising.

Your contributions may be sent to us at: Fun Contest, Curt Stevens, 24692 Nympha, Mission Viejo, CA 92691. U.P.S. or U.S. mail are satisfactory.

I would be happy to answer any questions you may have. Feel free to call me at my office (office and home phone numbers given here).

Thank you very much for your partici-

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Angel Sanchez-Figueroa scrambles on his knees, vainly trying to catch a totally-stalled Camero flown by Casey Geller at an F3B team practice session. This is a very good case against the FAI-imposed "weak link" safety measure. If the plane had been a little higher, tip stalled, and turned into the crowd . . . it wouldn't have been very "safe", would it? Let's support a *minimum* line strength rule and contest organizer supplied winches for some *sane* safety margins. Anything-goes winches and "weak links" are crazy by anyone's safety standards.

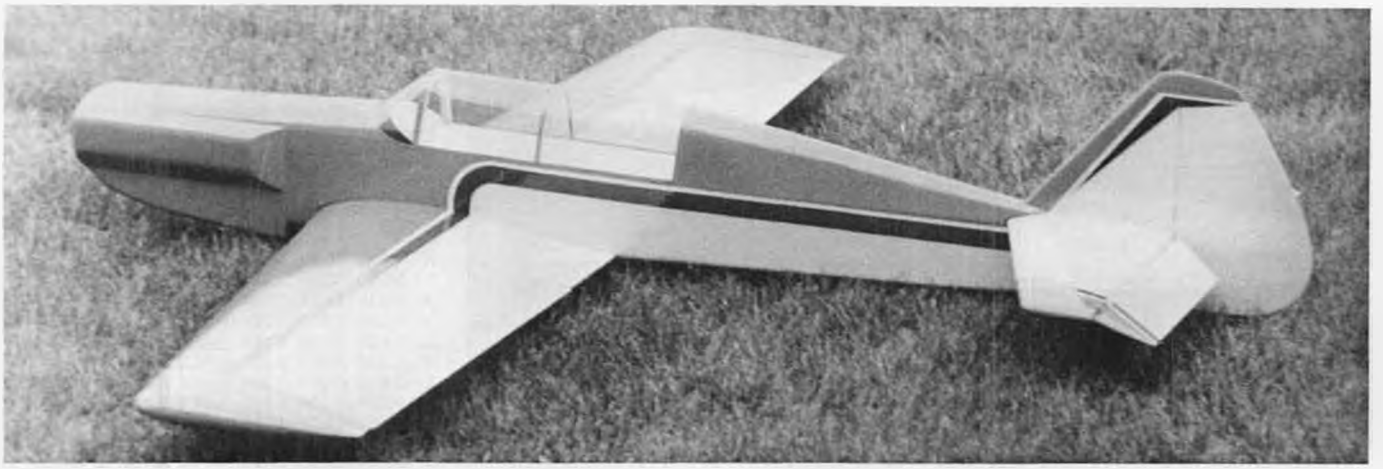


Photo No. 1. Dick Hanson, our "How to Fly Pattern" columnist, describes the desired qualities of a good aerobatic scale model in this month's article. His 840 square-inch wing area Dalotel expresses his philosophy, "light and simple."

Pattern Flying

By DICK HANSON

• We started flying R/C in 1970, beginning with a homemade trainer. At the time, we had a three-channel radio which was the latest thing. It was a "Digit Midget" by World Engines. The servos were S-6 Lowboys which I thought were very good.

All previous flying has been with U-control stunt models, the Nobler, Stunt Wagon, Brave, Maverick, Lil Duper Zilch, Super Duper Zilch, Mini Zilch, and god knows how many original designs. (This probably gives away the fact that I'm over 21.)

The trainer incorporated all of the things that I thought were important for learning to fly: aileron control, elevator control, motor control, but no frills such as steerable nosegear or rudder.

The model weighed three pounds, had 500 square inches of wing area, utilized a K&B 19 greenhead, and was entirely covered with Monokote. Although the design was a low-winger, it had absolutely no bad habits, and we soloed it in a few flights. About six I believe.

I foolishly believed that because I could fly this pussycat I was ready for anything. A hot 40 pattern bird and a couple of other mistakes quickly bit the dust as a result of my poor flying abilities. I didn't know the first thing about handling models which were overweight or had poor characteristics at low air speeds.

I finally learned to fly the heavy pigs, as well as some scale types which were real handfulls, but I never learned to *LIKE* this type of model. To me they were

Continued on page 77

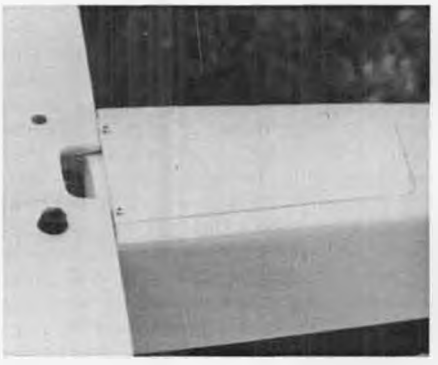


Photo No. 2. Aft fuselage hatch and exhaust exit.

Photo No. 3. Cowling is removable, hides all of engine except head fins.

Photo No. 4. Access to fuel tank, fittings, engine, and pipe coupler with cowl off.

Photo No. 5. Empennage details. Vertical fin bolts through stab and aligns itself.

Photo No. 6. Arrow points to rudder hinge bolt. Loosen when adjusting stab angle.

Photo No. 7. Super Monokote secures plastic canopy. No mess, perfect seal.

1. Dick Bringgold (SAM 31) at Southwest Regionals with a Super Cyclone powered Playboy Sr. Albrecht photo.

2. Chuck Patterson had no problems winning with his scaled Class AB Playboy Cabin. Mc Coy .29 engine. Albrecht photo.

PLUG SPARKS

By JOHN POND

• With the rain in California (all up and down the state) setting all-time, 100-year records, this writer has decided to build an ark. I will take two of everything: two Playboys, two Super-Cykes, coupla gallons of fuel, etc., etc.

Regardless of the foregoing levity, a few old timer meets have been staged with various degrees of success, depending on the weather of the particular day. Hence, this column will revert to contest reporting in this issue, as we do have more than a few to talk about.

The first western old time contest of the year is always the Southwest Regionals held at Buckeye, Arizona, in January. SAM 31 (the Cactus Club), under the direction of Dick Bringgold of 1216 E. Encantada, Phoenix, AZ 85014, assumed the responsibility of running the old timer events, both R/C and free flight.

Photo No. 1 is a shot of Dick Bringgold with his Super Cyclone powered Playboy. Dick says the Bud can at the right was necessary to offset the bad Arizona water. Dick also notes that this was the first large contest put on by SAM 31, hence it was no great surprise to anyone when the SAM 49 members literally walked off with all the trophies and/or prizes.

Out of seven events, Doc Patterson took three firsts, one second, and one third, enough for him to win the perpetual Russ Oliver Memorial Trophy. Jack Albrecht, who sent in most of the photos of this meet, was a close runner-up, coming in with two firsts, and two seconds.

Photo No. 2 shows Charles Patterson with a scaled Playboy Cabin using a McCoy 29 for power. He had no problems in winning Class AB Cabin with that combination!

One of the fellows who were also-rans was Bob Angus of Tucson, Arizona whose Folly II can be seen in Photo No. 3. This pretty, Rod Doyle design is powered by a Super Cyclone. Might be worth noting that the entire field was dominated by spark ignition engines. That 55-second motor run us a terrific help for altitude!

Photo No. 4 is a picture of Chuck Thompson, the amiable editor of the SAM 49 newsletter. Although he didn't win with his Forster 99 powered Lanzo Record Breaker, he had himself a ball.

Dick Bringgold concludes his report by saying the free flight end of things was poorly attended, necessitating the cancellation of the Class ABC Pylon, and the Class ABC Cabin events. One bright spot, however, was the .020 Replica event which always seems to enjoy popularity . . . eleven entries there. Next year should be better. How could we have a repeat of the five months of long, rainy weather!!?

3. No matter how you photograph the Folly II, it always looks great! Bob Angus is builder. Albrecht photo.

4. SAM 49 newsletter editor, Chuck Thompson, is pleased with his Lanzo Record Breaker. Forster 99. (Albrecht)

5. Ken Sykora always wears his army campaign hat! He holds a Ohlsson powered Foote Westerner.

6. Brad Levine (SCIF) launches his Buzzard Bombshell (scaled to 75 percent). Plane is a new 4K's kit.

SCIF KICK OFF MEET

The first old timer free flight meet of the year is annually conducted by the SCIF club on March 5th and 6th. Again, the weather was threatening, and it held down the amount of contestants. According to Ken Sykora, newsletter editor of the "Flightplug", he feels the SCAMPS (cross-town rivals) forgot to come. Either that, or they were too tired from their battle with the wind at the blown-out VAMPS meet at Henderson Dry Lake, Nevada.

After all of the foregoing, we simply had to run a shot of Ken Sykora, Photo No. 5. Ken always comes complete with his army campaign hat. Didn't win anything with the Ohlsson powered Westerner he is holding, but Ken enjoys the meets . . . period!

Photo No. 6 shows Brad Levine with one of the new 75 percent Buzzard Bombshell models being kitted by the 4K's Co. Ed Kelly has been pretty ill of late (leg problems again!), so production of the kits has been pretty slow. Hope that Ed recovers soon, and is able to get around!

If you ever wanted to know what the "lineup" of wanted posters looks like in the post office, look no further, Photo No. 7 tells it all. This is a portion of the SCIF which seems to attend all the meets come rain or shine. Left or right, we see Larry "Lefty" Clark, Lee "Mouthpiece" Freeman, Ken "Sarge" Sykora, Andy "Three-wheel" Faykin, Sandy "Doll" Chapin, and Brad "Junior" Levine.

Before moving on to other matters, the foregoing SCIF photos were taken by Mik Mikkelson, SCIF president. Mik is quite enthusiastic about the meet as his rubber job performed faultlessly, making three maxes. Nothing like good flights to make a good day!

SCIF "TWO-BIT" EVENT

The Southern California Ignition Flyers have come up with a fun event that has all the signs of catching on. Called the "Two-Bit" (25-cent) event because wingspans are limited to 25 inches, the rules are simplicity themselves, designed to encourage the beginner and expert alike with a challenging but fun event. The rules in a nutshell are:

1) Any published or kitted old timer rubber model with a maximum (projected) wingspan of 25 inches, and with landing gear is eligible.

2) Any type of design is eligible (i.e., cabin, stick, ROG, etc.).

3) Original propeller design must be used. No folding props.

4) All models must ROG and fly for a minimum of 20 seconds and a maximum of two minutes.

5) Three official flights will be made with fly-offs to break ties.

After you look at Photo No. 8 featuring Carl Hatrak and his Megow Junior Commercial, you will rush right out and order your favorite Scientific (most popular), or one made by companies of that era. This event looks like it can be flown both indoors and outdoors!

RULES "VALIDATION" CONTEST

SAM 26, the SAM Chapter located in the Santa Maria area of California is making a strong bid to become the O/T R/C club of mid-California. With Bob Angel and Ron Doig spearheading the action, the club has picked up a half-dozen or so new members . . . this year!

Their first contest at Taft on March 12 and 13 suffered from poor weather (you wouldn't guess that it rains in California) holding down the number of entries. The rules "validation" contest was called

7. This SCIF gang photo could pass for a post office bulletin board "most wanted" poster. Site is Taft, March '83.

8. Carl Hatrak displays the latest craze in rubber flying . . . the "Two-Bit" model, actually a Megow Junior Commercial.

9. Joe Weather's Pacificoaster as it appeared at Western and Rosecrans (L.A.) in 1946. Codding photo.

10. "Tip" Smiley built this beautiful Pacificoaster from a very rare kit. Gorgeous workmanship!

to check out the 1982 and proposed 1983 rules. Of course, 1982 rules will be used at the La Junta Champs.

Also, a new gimmick was tried out for determing the sweepstakes winner. The system works like this: (1) select any three of the five events; (2) submit to a "sealed box" before your first flight; (3) scoring by a slightly modified SAM Champs method will give some weighting to the number of entries. Try it!

ENGINE OF THE MONTH

World War II was over, and engine manufacturers were happily producing engines to satisfy the tremendous demand built up in four years. Realizing the enormous potential, many new engine manufacturers made their appearance during this dynamic period from 1945 to 1950. Among those was the Melcraft Co. of Saginaw, Michigan with its Melcraft 29, later called the Melcraft Blue Streak.

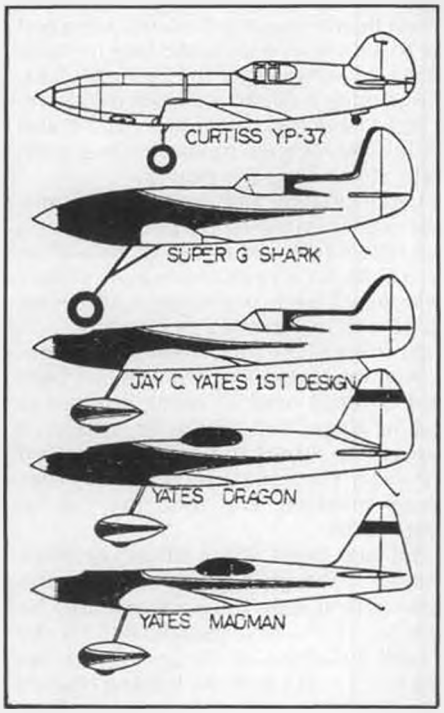
Initial advertisements announcing this engine appeared in the December 1945 issue of *Model Airplane News* priced at $20.75 with coil and condenser, and $18.75 without. Most surprising was the offer for immediate delivery, inasmuch as the priorities on metals had just been relaxed by the government.

Every new motor that comes out has to have a "gimmick" to attract attention of the modeler. The Melcraft engine was no exception as their ads emphasized "Super Charged", immediately inferring the engine was superior.

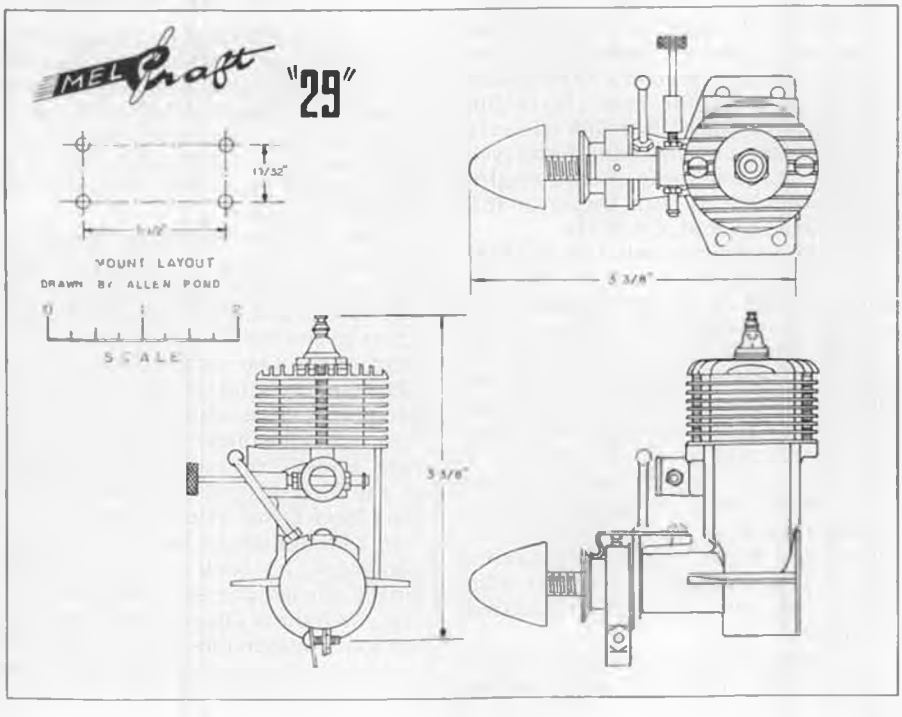
Actually, before someone gets the idea that this engine had a blower, a quick examination of the drawing will show that the intake is facing directly into the propeller air blast. The upper extension of the crankcase incorporated a cast-in passage running around to the intake side of the engine. This patented feature connected to the intake, which in turn faced the prop, which theoretically pressurized the intake manifold, and forced a greater charge into the crankcase . . . hence the claim of supercharging.

One neat idea was to run this gas

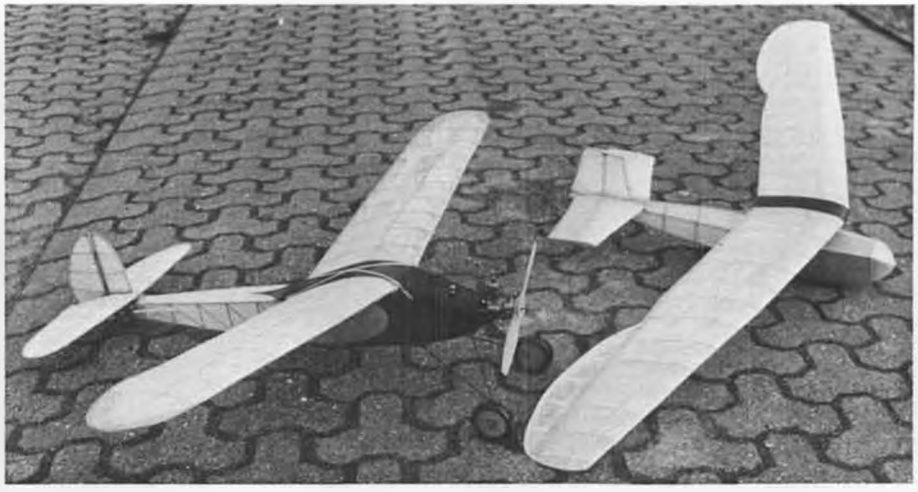
11. Karl Spielmaker's latest creation, the Megow Aero Champ Kit. See text for details.



12. The evolution of the J.C. Yates "Madman" control line model.



13. Russel Snyder and his orig. design, Gambler, C/L stunt model. (1948)



14. Two German old timer models: gas powered Hummel, and F/F glider, Falke-R5, by Eric Punke.

passage directly under the integral-cast exhaust stack to give the charge a preheating effect. According to figures released, this gave rpm figures of 1500 with a 12/6 prop, 6050 with an 11/6 prop, 5500 with a 10/8, and strangely enough, only 5000 with a 10/6. However, it must be remembered that propeller types were not specified. As everyone knows, there was a heckuva difference between a Super-Scru and a Flo-Torque prop. In this same line, the company advertising brochure recommended a 10 inch by 9-8 pitch prop for controline, and a 11/4 for free flight. No rpm figures available.

An interesting note regarding tank installation for the Melcraft was contained in their price catalog. It stated that the gas tank must be mounted level with the bottom of the carburetor intake tube. This meant raising the tank considerably higher than standard rotary valve intake type engines.

In 1946, oils hadn't seen much progress, hence, the old, standard SAE 70W oil was recommended in a three-to-one ratio of white gasoline to oil. (Try finding white gas nowadays!) SAE 70W oil can be found in some of the older motorcycle shops, or from some of the engine collectors such as Dick Dwyer at 1837 Flood Dr., San Jose, CA 95124.

For the technically minded, the Melcraft 29 featured a bore of .7656 in., stroke of .625 in. giving a displacement of .787 cu. in. Weight was listed as 5-1/4 ounces, although later charts quoted an eight-ounce weight. The crankcase was die cast aluminum alloy with matching points only at the cylinder, main bearings, and cover plate. The alloy steel cylinder was "hogged" out of solid bar stock, the head being integral. Because a bronze wristpin was employed, the upper end of the alloy steel connecting rod was not bushed. A Chrysler oilite bearing was provided at the crankshaft crankpin.

The Melcraft was advertised at 1/5 h.p. (same as the Brown Jr.) when turning 8000 rpm with an 11/4 propeller. Not too shabby for a Class B engine! However, no matter how good an engine performs, unless it conforms to the standard configuration of front or rear intake at crankcase level, these types enjoy only a relatively short span of popularity. And so it was with the Melcraft Blue Streak.

30 YEARS AGO, I WAS. . .

Photo No. 9, as so kindly supplied by Gordon Codding of 3724 John L. Ave., Kingman, AZ 86401, is a nice shot of Elbert "Joe" Weathers' new model in 1946 called the Pacificoaster. This photo was taken at a contest in Los Angeles at the Western and Rosecrans GMAASC model airport. Here is the impression the model made on Gordon Codding:

"The model had the usual Weathers beautiful paint job and multi-coat gloss finish. The plane appeared to be heavy (and as turned out, *it was!*) for a free flight duration contest. The Orwick 64 engine sounded very, very healthy . . . as a matter of fact, downright frightening!

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FLYING MIDGET

OLD TIMER Model of the Month
Designed by: Thracy Petrides
Drawn by: Al Patterson
Text by: Bill Northrop

• Well, they did it again! The subject this month was published in the August 1937 issue of *M.A.N.*, and credited to Thracy Petrides and Malcolm Abzug. We don't know which one was the perpetrator. The drawing was by Abzug, but the lines of the model, particularly the wing, look like Petrides' work.

What did they perpetrate? It's the old "change the name of the model" trick! Title of the article is *The Flying Midget Gas Model*, and the writer of the article refers to the model in the text . . . well, most of the text, as the Flying Midget (three times in the second introductory paragraph, once under *Wing* construction, and once under *Tail Assembly*. But then, under *Prop and Miscellaneous*, all of a sudden the text says, "The prop for the *Cloud-Kisser* is carved from . . . etc." And four sentences later, in the same paragraph, it's back to Flying Midget. Finally, the last one-sentence paragraph says, "We think this new idea of making gas jobs a reasonable size is the greatest (or should we say smallest) thing that has hit gas-jobbing thus far, and after your first Cloud-Kisser, so will you!"

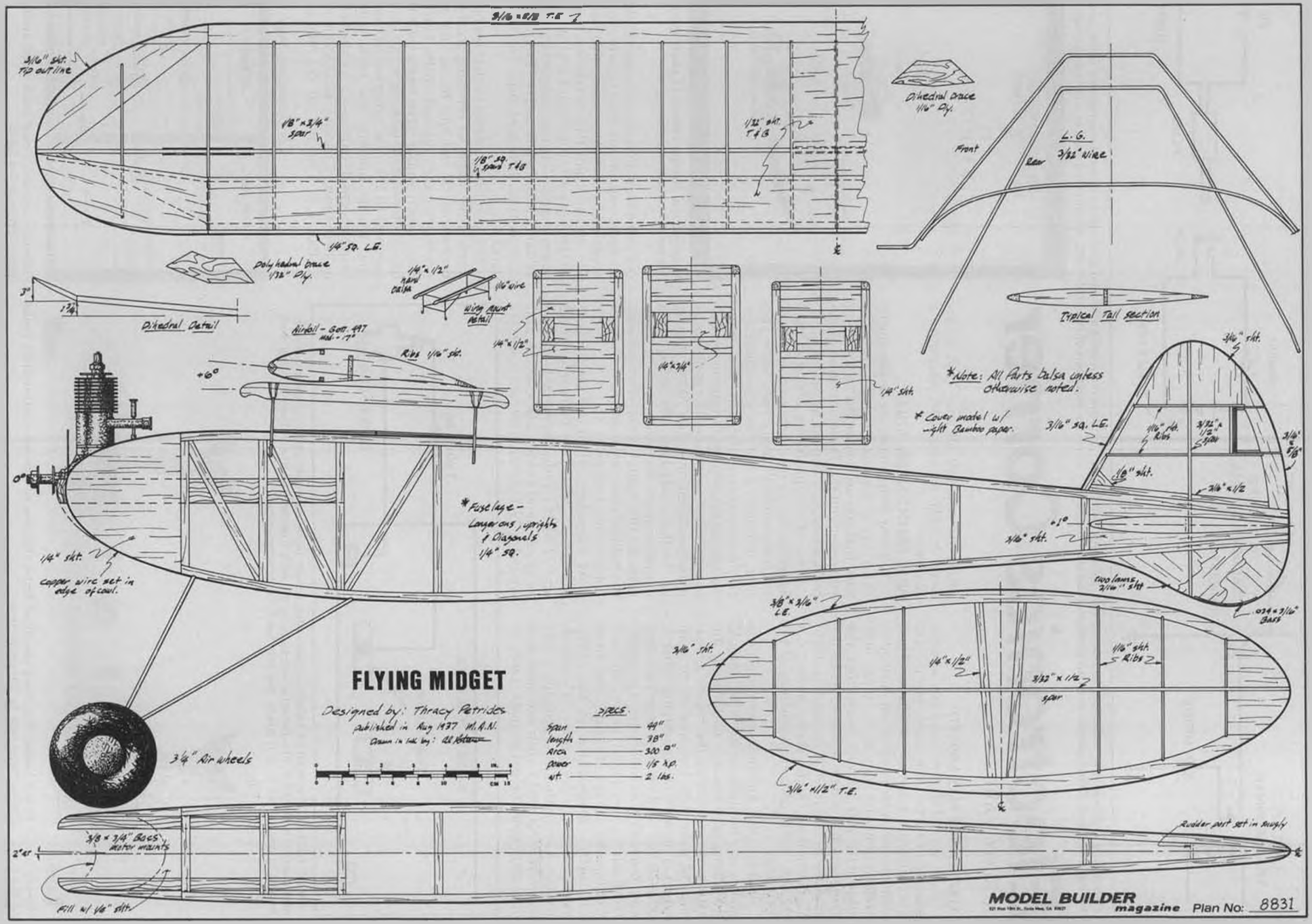
I give up!

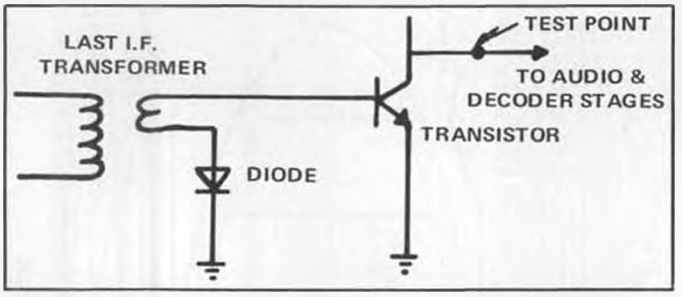
Anyway, the 49-inch span model was truly a midget for its time, as it was designed to be powered by a Brown Jr. In modern times, it is not unusual for a 300 sq. in. area model to handle the power of a .19 to .35, which is about the power range of a Brown Jr. But for 1937, when Brown-powered models averaged six to seven-foot span and two to three times the wing area of the Flying Midget, it was quite a departure from the norm. It must have had a very hasty climb and glide! The long tail moment was a great help in handling the power.

Unfortunately with today's rule limiting displacement to .10 per 225 sq. in., the max size is a nothing .13. By adding 37-1/2 squares, you can use a .15. Otherwise, you'll have to settle for a .10. Seems to be a fallacy in the rules here.

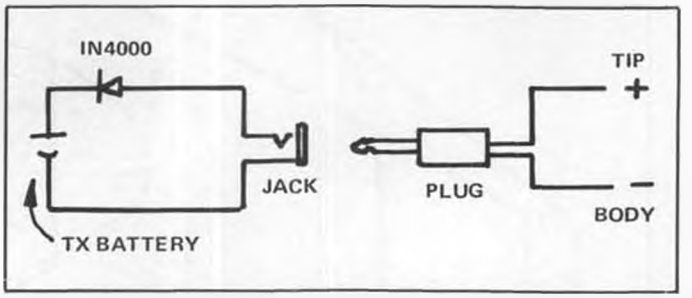
Nothing tricky about the construction. It was suggested that the stab be built and covered prior to being inserted in the fuselage. Top of the fin/rudder is built next, then the spar is inserted through the fuselage from the top, glued in place, and then the sub-fin parts added.

Balance point is not shown or mentioned in the text, but considering the symmetrical stab, it would probably be safe to try the first test-glides with the model balanced at 50 percent of the chord . . . that's with the leading edge of the wing even with the second fuselage station. •


3/16" sht. T/E outline
1/8" x 3/4" spar
1/8" sq. in spars T & B
1/32" sht. T & B
1/4" sq. L.E.
Dihedral brace 1/16" ply.
Front
Rear
L. G. 3/32" wire
Typical Tail section
Polyhedral brace 1/32" ply.
3"
1 3/4"
Dihedral Detail
1/4" x 1/2" hard balsa
1/16" wire
Wing mount detail
Airfoil - Gott. 497 mod. - 7%
Ribs 1/16" sht.
+6°
0°
1/4" x 1/2"
1/4" x 3/4"
1/4" sht.
*Note: All parts balsa unless otherwise noted.
* Cover model w/ light Bamboo paper.
3/16" sq. L.E.
1/16" sht. Ribs
3/32" x 1/2" spar
3/16" x 1/2
+1°
3/16" sht.
* Fuselage - Longerons, uprights & Diagonals 1/4" sq.
1/4" sht.
copper wire set in edge of cowl.
two layers 3/16" sht
.024 x 3/16" brass
3/8" x 3/16" L.E.
3/16" sht.
1/4" x 1/2"
3/32" x 1/2" spar
1/16" sht. Ribs
3/16" x 1/2" T.E.
FLYING MIDGET
Designed by: Thracy Petrides
published in Aug 1937 M.A.N.
Drawn in ink by: [illegible]
SPECS
Span — 49"
Length — 38"
Area — 300 sq"
Power — 1/5 h.p.
Wt. — 2 lbs.
3 1/4" Air wheels
3/8 x 3/4" Bass motor mounts
2"
Fill w/ 1/16" sht.
Rudder post set in snugly
MODEL BUILDER magazine Plan No: 8831



Commonly used receiver amplifier/decoder circuit, showing location of tuning test point. Other components are present, possible variations.



Circuit showing addition of diode to prevent momentary short caused by insertion of plug into jack, when being used as a charging system.

Electronics Corner

By ELOY MAREZ

AIRTRONICS HAS MOVED!

I am sure that Airtronics has already started to spread the word, but in case you missed it everywhere else, and you own or are interested in an Airtronics R/C system, or one of its other fine products, you should know that the company has a new address. As of the middle of April, it is located at 16191 Construction Circle West, Irvine, CA 92714, with phone number: (714) 551-0180.

Incidentally, Airtronics has a neat little wallet-size frequency card, which should go a long way towards eliminating the confusion created by the recent allocation of new R/C frequencies, at least when it comes to identifying what is what. It lists all of the now-legal frequencies, by channel number where assigned, frequency, and color code; aircraft frequencies are on one side, and those for surface models are on the other. Write and ask for yours, it's worth having. I know that this company is very supportive of AMA club activities, and you can probably get enough cards to distribute amongst all your club members. A SASE on your part would be a courtesy.

NEW FREQUENCIES, STILL!

The new frequencies are beginning to show up at the local flying fields, I'm sure that you are beginning to see them wherever you fly. There are some problems which you should be aware of...

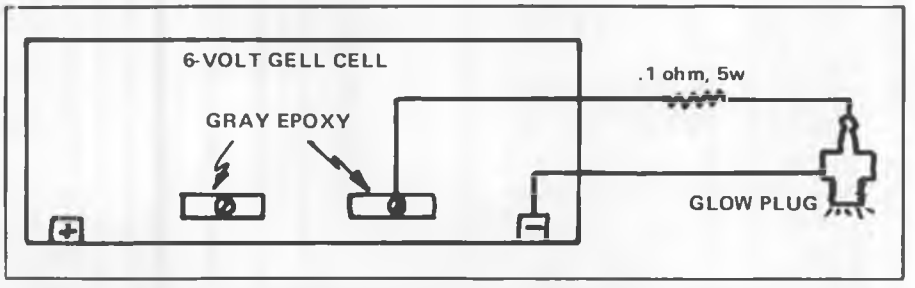
One of the problems is that, "They assigned the same colors to two different frequencies!" Well, "they" didn't do that, although a definite possibility for confusion exists, as the same two colors do appear for different frequencies, *but in a different sequence.* The problem as it exists was not caused by "they", but by us, the fliers, aided and abetted by radio manufacturers' literature, and in some cases by the model press, who got into the habit of referring to our R/C channel color code *in reverse!*

As intended, when we progressed from the 27 MHz only band into the 53 and 72 MHz bands, the latter two were assigned band colors, *black* for 53, and *white* for 72. Further, different colors, as per the internationally recognized electronic component color code, were assigned to each spot within that band, for the two-color flag system we are all so familiar with. Thus, *black and red* told us we were on a certain frequency in the 53 band, while *white and red* indicated a completely different one, in the 72 band.

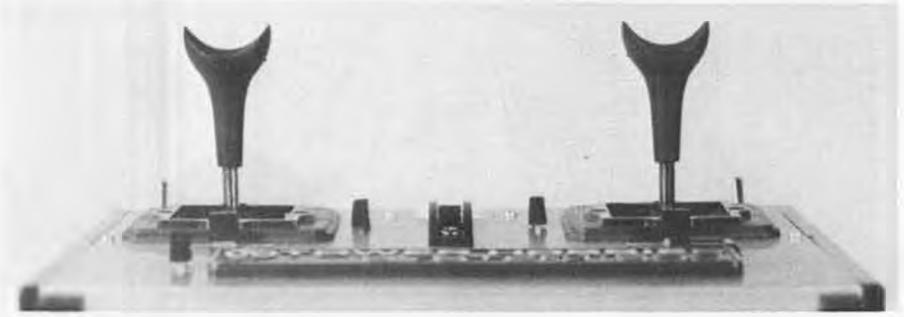
The confusion comes in that we have formed the habit of referring to them backwards, as *red and black, red and white,* etc., etc., instead of the correct way, which would have been with the *band* color first. In looking at the colors assigned to the new assigned frequencies, we do run into the same colors being assigned to different frequencies, in two cases, Channel 40 (72.590) and 53.400; and Channel 50 (72.790) and

Continued on page 88

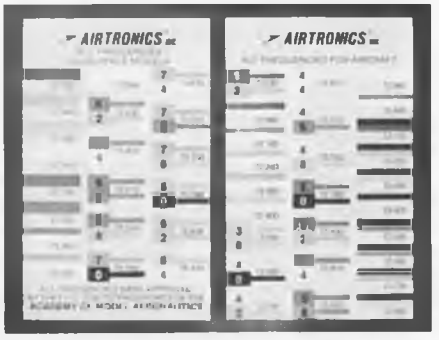
Although not directly related to electronics, this book is worth mentioning.



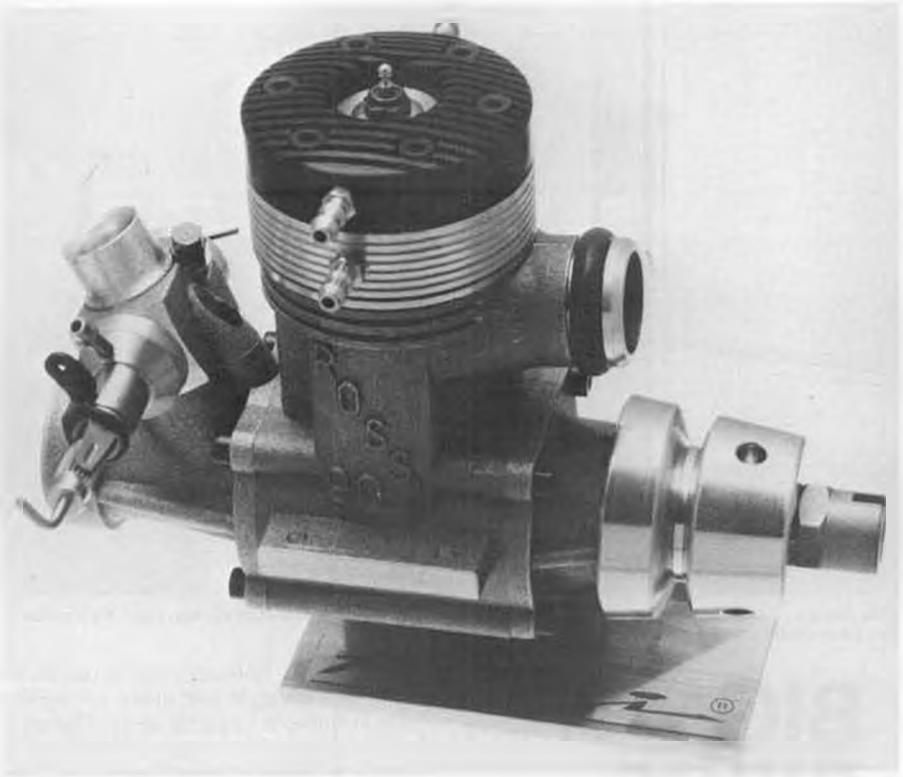
"Mike" Michael's method of obtaining glow plug power from a six-volt battery. A no. 4 sheet metal screw is inserted into the strap connecting the cells together, until a voltage reading is obtained to one of the output posts. See text for further description.



Hungry birds? Robot hands? Star Wars weapons? Nope, they are new design control sticks found on Germany's Brand-Electronik R/C transmitters.



Full-color frequency card (both sides) available from Airtronics for SASE.



Here's the latest version of the Rossi .90 marine engine. Literature supplied with the engine indicates the crankshaft is supported by two needle bearings.

FUEL LINES

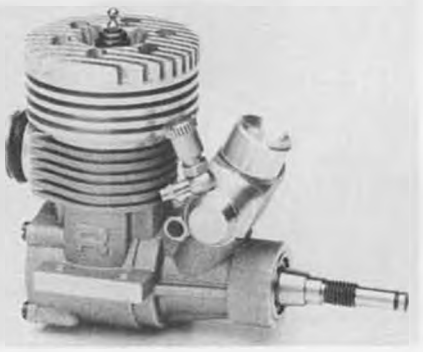
JOE KLAUSE
P. O. Box 2699
Laguna Hills, CA 92653

• Some years ago, Danny Kaye and Virginia Mayo starred in a movie that I think was entitled, "The Secret Life of Walter Mitty." In the film, Danny, as Walter, was just an ordinary guy who used to imagine himself performing herculean feats, or what-have-you. I'll never forget one scene. Walter was day dreaming that he was the heroic sea captain of a sailing ship. The ship was engulfed in a raging hurricane . . . incredible winds, rain and waves. Walter was on deck at the helm, valiantly straining both arms at the wheel . . . to stay the course. About that time, Virginia blew across the deck and exclaimed, "Oh Walter, you're hurt!" Walter casually responded, "It's nothing, just a broken arm. . ."

Guys, that has to be a close second to Clark Gable's final line in "Gone With The Wind." What's all that have to do with modeling or engines? Maybe not a lot, but earlier this month, at the Toledo trade show, I couldn't help but think about the aspiring Walter Mitty.

To begin, Toledo is probably the premier show of the modeling year. Naturally, there were hundreds of mind-boggling models on display. There were also many, many thousands of spectators during the three day show. Most of them were just ordinary modelers, like you and I, and some of them must have had a bit of Walter Mitty in themselves.

Some would look at the extraordinary workmanship of the models, shake their heads, and then mosey on. Some others would stare glassy-eyed for seemingly interminable lengths of time. It wasn't difficult to imagine what their thoughts might have been, "I'm gonna build one like that. No, even better. And when I take it out to the field, do multiple inverse-reverse Lomcoevaks, and majestically recover six inches off the ground, then . . . Wow!"



New 3.5cc car engine from Rossi. Initial reports about performance are good.

OK, back to the real world. Was there anything new and different in the way of engines at Toledo? No, not really. But there were considerable refinements. It was refreshing to see the number of new, smaller displacement four-cycle engines. By that, I mean the .90 and under four-cycles. I don't mean to backhandedly bad mouth the two to four cubic inch conversion type engines which have become popular in quarter scale and larger. They have their place in modeling. Nevertheless, all modelers, or even the majority, do not have access to flying sites which will accommodate the very big models and engines. There unquestionably is a need for engines that will provide realistic, scale-like performance in modest size models which can be accommodated at *most* flying sites. That means under .90-size engines. For sport scale flyers, it also means a four-cycle engine. Today, and for the reasonably imagined next couple of years, the engine manufacturers have recognized this potential market. Some of these engines are now available, more have been very recently announced, and I suspect you'll see many more within a year.

In this regard, next month, I'll have a report on the Enya .90 four-cycle. If you're a sport scale flyer (about 65 percent of the AMA membership) you'll probably like this one. The model/engine possibilities are considerable. Matter-a-fact, another one of your contributing editors and I may come up with a plane and engine combination article in the not too distant future. If I mentioned that Big John just might be the plane for this Enya .90, I suspect that YOE (ye olde editor) wouldn't object. We shall see.

Well, with the ever increasing variety and size of engines available, have you ever wondered how many engines are sold each year in the United States? I have, and recently I tried to get some answers. Guys, my information says that more than a quarter million engines were sold in the U.S. last year. That does not include engines in small plastic models! The above figure represents individual engine sales.

In 1982, AMA membership averaged a little over 83,000. Does that mean that they bought an average of three new engines each? Not really. You must also consider that the annual turnover rate of AMA members is in the neighborhood of 25 percent. Not all of those who drop out of AMA give up modeling. And, certainly, not all modelers are AMA members. Thus, it's relatively easy to understand the above approximation of annual engine sales. I wonder how many golfers there are, and how many golf balls are sold each year? I wonder how many golfers emulate Walter Mitty?

Back to engines. Included in this column are a couple of photographs of some new Rossi engines. I'm sorry to say that I haven't had the opportunity to run

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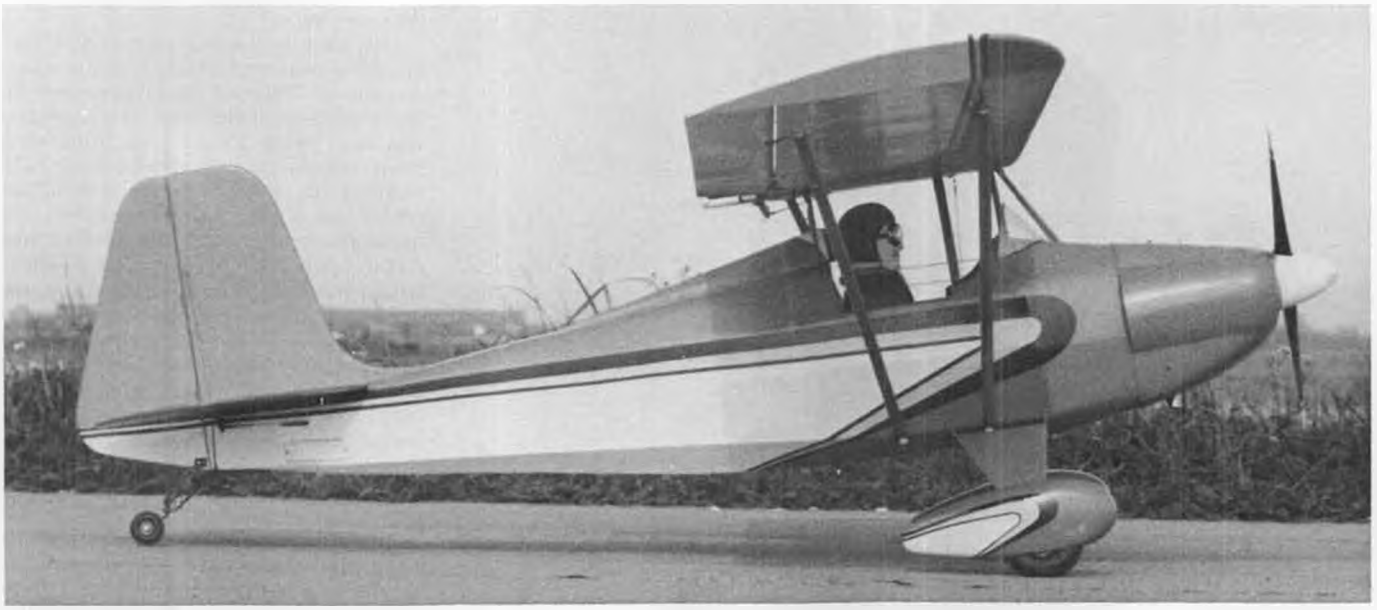


Ken Runestrand's Pober Pixie is built from very nice plans . . . and what do you know . . . the plane looks nice and flies nicely, too! Ken's obsession for a Pober Pixie could only be satisfied by scratch-building this 10-foot miniature. See text.

BIG BIRDS

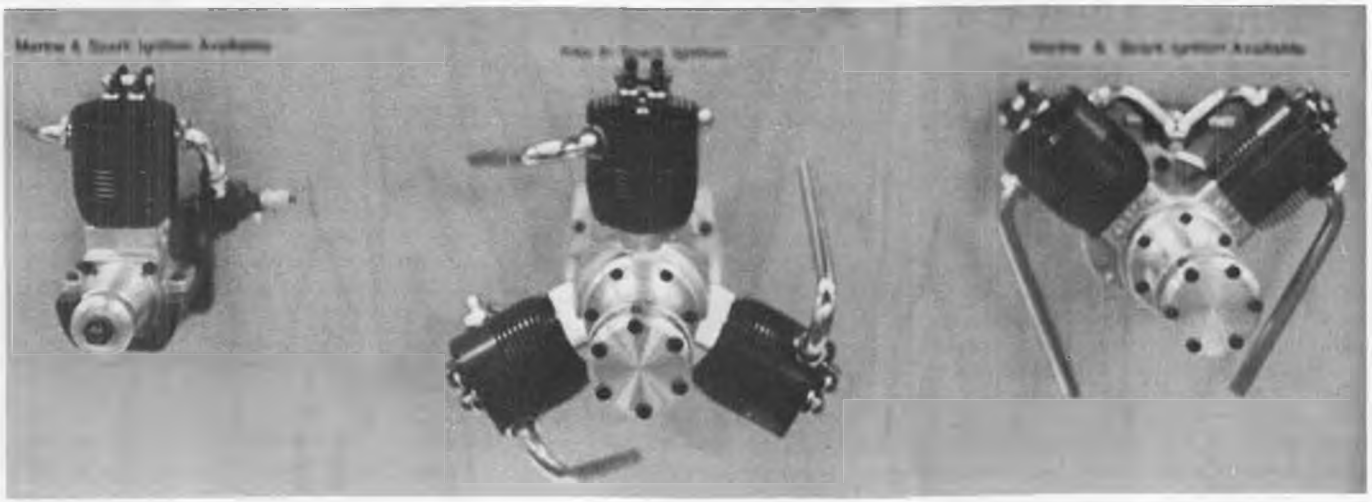
By AL ALMAN

NATURE IS A MOTHER. . .

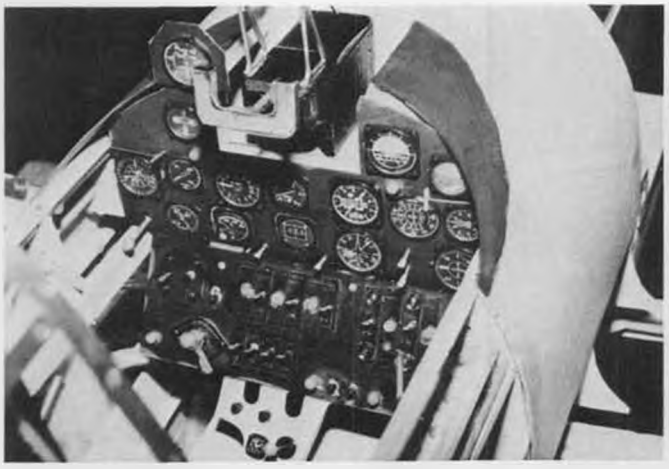
Which is, to say the least, a full-time job . . . so how she ever found the time to get a PhD in aeronautics is beyond me. But she did, and she certainly knows her business.

A prime example of her competence is the flying squirrel. PBS's "Life On Earth" series recently aired some dandy footage of these remarkable flying animals, and as the operative word here is *flying*, my three-year old Adam, and I, were a captive audience. We watched those little buggers launch themselves, undaunted, off of the top of the tallest tree . . . and it became obvious why they are so inherently brave; once they spread all four legs and bring that "webbing" into play, their wing loading is dramatically reduced, allowing them to cover one helluva lot of ground, and to land with style and grace on another tree hundreds of yards away. The squirrels regulate their speed and rate of descent by the amount of spread and angle of those tiny legs.

All this reminded me of the Tournament of Champions and the trend toward BIG Birds with L-I-G-H-T wing loadings . . . and the accent on realistic flight. If you've been ignoring wing loading as a factor to be reckoned with, or figure that you need excess weight on board for better penetration, think again. A properly designed aircraft (suitable airfoil, the right incidence, etc.) can do what you want it to do without having to make it into a lead sled. Our BIG Birds are efficient, and a 35- to 40-ounce per square foot wing loading is a darn good range to shoot for. Too much less and you'll float a lot; too much more and you'll approach the lead sled category, placing an unnecessary load on your engine. Don't be one of those guys who demands more from an engine than it can deliver; if your new bird is heavy (not exceeding 12 pounds per



One more time for Pearson Power Products' new line of English four-strokers called "Magnums": (left to right) .91 cu. in. single (91S); 1.82 cu. in. V-Twin; 2.73 cu. in. Three Cylinder.



Jerry Schumaker's P-40 cockpit. When canopy is open, it kills the engine and pulls on full choke; when half-closed, engine is "hot", starter engages, and half-choke till warm; when engine is warm, canopy closes, choke goes off, and nav and panel lights come on! Fantastic!

RAM Simple Cycler . . . no fancy frills or packaging . . . just solder appropriate connectors, and cycle those NiCds!

cubic inch is as good a yardstick as you're going to find), stuff some extra "cubes" up front. If it's *really* overweight, face that fact head-on, and don't try to fly it. It's foolish to put your plane, and possibly someone else, in jeopardy.

Unlike our friendly flying squirrel, we can't change or vary wing loading in flight. What you takeoff with is what you're gonna have to do with . . . so make sure you know where you're at. And don't let that "impatient bug" bite you; it has big, sharp teeth that sink deep, and they'll make you do things you will be sorry for later . . . like taking off with jittery servos and no range check. Be prudent!

WARM COCKLES

They're certainly nice to have . . . and mine have recently been warmed up quite a bit by a bunch of plans I've had the pleasure to look over.

Unless you really know what a particular designer's work is like, buying plans could very well be much like buying that old pig in a poke; you don't know what you're getting. Now some guys say, "There ain't no bad plans, it's just that some have more detail than others." I can't quite buy that approach because you're forking over hard-earned money, in good faith, and you should expect to receive your money's worth. This is only reasonable. Inadequate and/or incomplete plans and instructions (they usually go hand in hand) don't spur anybody on to even *start* a new project . . . and, if by chance, you do get crackin', the odds are you're gonna run out of steam in short order because it becomes a chore with no end in sight.

Good, clear, informative plans, on the other hand, make you want to get that bird completed and in the air . . . and during those inevitable "jaded" periods, help you overcome any lethargy, and get your interest sparked up again. It's almost impossible to rekindle an interest which was at low ebb to start with.

Here are four cockle-warmers for your consideration (actually five including plans for the floats); they're all different types of BIG Birds, so you've got a nice variety to choose from.

A good choice for your first biggie would be E&R Hobbies' Dakota Hawk 96, which, strange as it may seem, has a 102-inch span. (Hey, Erv, shouldn't it be the Hawk 102?) This sort of picks up where the Big Stick left off. Erv Jackson says she builds FAST and handles great, both on the ground and in the air. A lot of you guys will be happy to know that the Hawk has training whee. . . (oops, sorry about that), I mean trike gear, and is designed for E&R's new very heavy-duty nose gear. This is a capable, aerobatic machine that weighs in at 19-1/2 pounds with Quad . . .

The plans are very well done, as are the five pages of instructions . . . and this design has been well-flown and tested in its element. She'd fill the bill for a good, everyday, knock-around bird to help keep your reflexes honed, and should also be an excellent choice for a fun-fly. Erv obviously spent a lot of time drawing up these plans and included all possible information.

E&R does plan on marketing a first class kit of the Dakota Hawk 96 (102?) in the near future, but in the meantime if you're interested, send $30, plus $2.50 for shipping and handling for the blueprints and manual, to: E&R Hobbies, RR 1, Box 10, Edgeley, ND 58433. And if you want to talk to Erv first, dial (701) 493-2015.

★ ★ ★

Next is Dave Richardson's UPF-7, another of the great Waco bipes. Here, also, the plans are clear, and you should end up with a 21-pound bird that does well with a decent turning Quadra. At 86-1/2 inches and 2200 squares, she's a really BIG Bird, and has got to look impressive while doing her thing.

Dave's instructions are good, they supplement his plans nicely, and he's done a lot of flying with this Waco design. The ship has proven herself . . . and the designer tells all in his instructions. The plans show a somewhat different mounting arrangement for the engine; instead of the usual ply box, Richardson uses (and recommends) four, large dowel standoffs. All I can say is, *why not?* As with many similar bipes, the tires and gear spreading take up the shock of landings.

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E&R Hobbies Dakota Hawk 96 is an outstanding choice for fun-flies or sport flying. Watch for complete kit, soon!

One of the Wasserman Boys poses with his excellent Piper Brave 300 ag-plane. This plane flies well, has foam core wings.

Larry Jolly demonstrates one of the reasons why the Ishimasa Skylark is an excellent choice for a first-time helicopter. Experts will have a blast too!

Who says electric helicopters don't have performance!

PRODUCT$ IN U$E
ISHIMASA SKYLARK EH-1

By LARRY JOLLY . . . Take a look at a very unusual flying machine: it's electric powered, it doesn't make a mess of itself every time it gets flown, it's very quiet, it's cheap to maintain, it's a stable flier, and *more!*

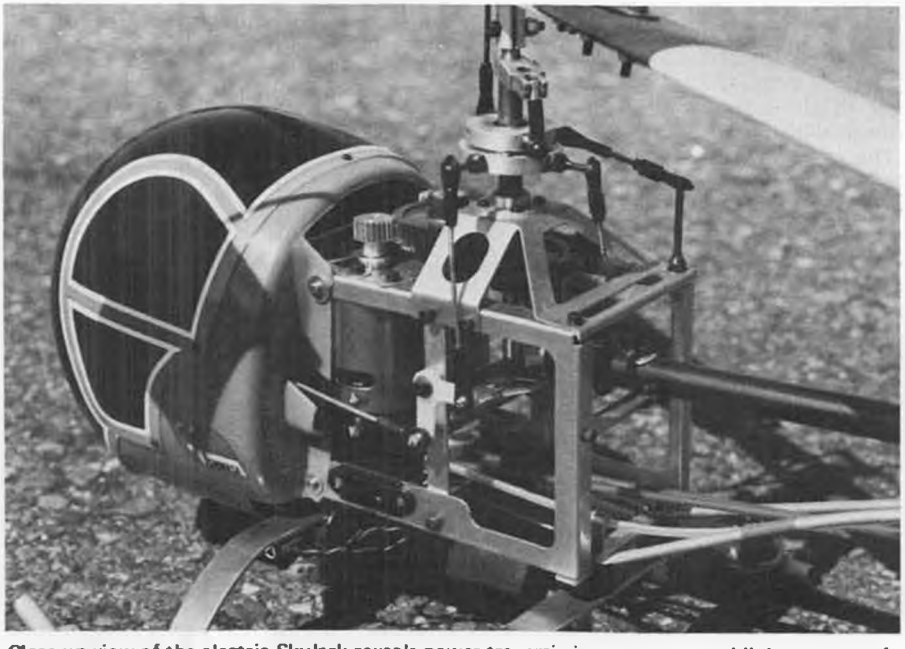
• Okay Jolly, you told us all about electric sailplanes, your Electricus was pretty spiffy, I'm even thinking about *trying* an electric someday, but electric powered helicopters?. . . Brother, you've been sniffing too many vented NiCds!

As fictional as it may sound, electric helicopters are a reality, and one that is coming of age rapidly. Our story starts in the fall of 1978. That is when I met an engineer named Charlie Gilbert. Now, I know Charlie's name is not new to long-time **Model Builder** readers, but a lot of you don't realize that Charlie designed and built the first electric helicopter to successfully carry its own power supply. I know, because I was the test pilot. A picture of the historic 39-second flight was featured in a 1979 copy of **Model Builder**. *(July to be exact. wrf)*

If you've read any of my ramblings, you will know that I'm still out of breath trying to catch up with those darned, rapidly-evolving electric power units. It was four years ago that Charlie and I shivered in the after midnight cold, coaxing his silent egg beater into the air. The recent advancements in electric power have been staggering. I knew our *sailplanes* were climbing better, but I had put the helicopter thing on the proverbial back burner.

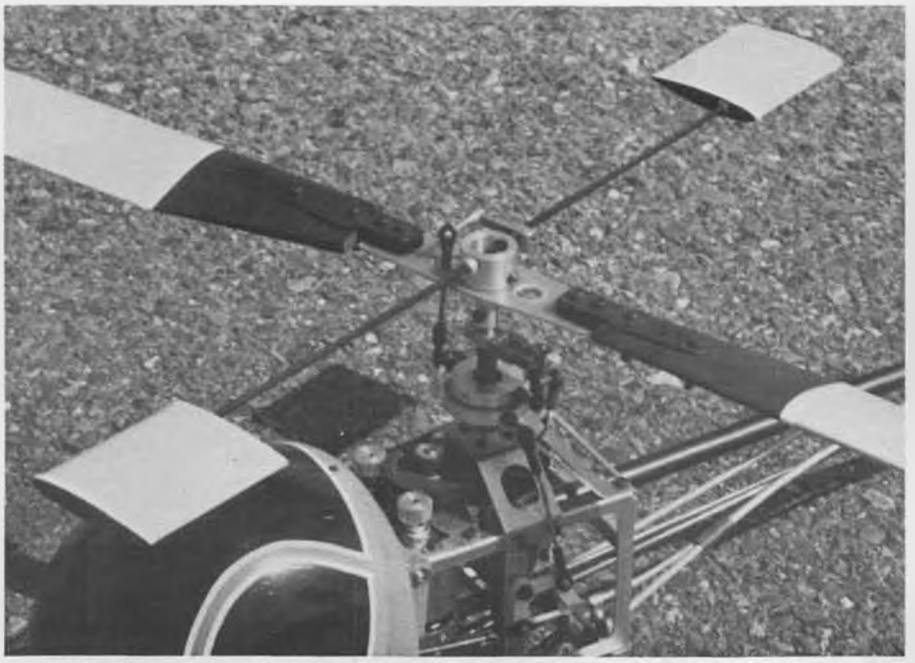
In November of 1982, I decided that I was going to fly a helicopter designed for gas, but substitute an electric system for power. I chose Kalt's Baron 20 as the best possibility for my experiments. Bob Boucher became interested in the project and helped me with prototype Astro cobalt 25s and 40s.

As I got into my project, Cliff Rausin of Condor Hobbies contacted me and asked me if I'd consider trying an electric helicopter that they were thinking of importing from Japan. I said that I



Close-up view of the electric Skylark reveals power transmission gears, control linkages, one of two electric motors, and on/off switch.

A more expensive way to go electric . . . a Baron 20 with single Astro 40/16.



A very nice feature, especially for beginners, is the break-away fiberglass seesaw which shatters on main rotor impact thus saving blades and gears. See text.

Did I say *impact?!* Minimal damage. Machine is designed to take abuse. See text.

hoped it wasn't that thing that flies on a tether, "Helicopter pilots have to be macho you know." Cliff told me that it *was* the tether machine, but that it would also fly independently from an airborne battery pack.

I got the kit from Cliff, but continued to work on the Baron 20. I did get the Baron to fly, which was quite an accomplishment in itself. Flight times of two minutes have been achieved with the promise of longer flights from changing the gear ratios.

I decided that I had better get the helicopter I received from Cliff built and going so that he could decide what to do. Cliff's machine is manufactured by Ishimasa of Japan and is called the Skylark EH-1. It has the following specs for you technical types. The rotor diameter is 39 inches, the all-up weight, less motor battery is 3.5 lbs., and it is powered by two Mabuchi 540S electric motors. All helicopters require at least four channels for control. What's the attraction for EH-1? Well, it's really easy to assemble, it's small and compact (even with the blades still on it), it's affordable, and it flies!

I remember my first tether flights on the EH-1. As I was adjusting the tracking, I thought to myself this thing doesn't fly too bad for a toy on a string. After a few minutes of tinkering, I had that little jewel whirling away and hovering hands-off. Dad had the NiCd pack all charged up, so I strapped it to the machine and stood back. I remember saying to dad, "This is going to be good. . . Did you feel how much this thing weighs?" Well, as I pushed the throttle stick forward, I was not prepared for the performance I was about to witness. My little EH-1 climbed out spritely and scooted all over the neighborhood sky. It is a delight to fly, and it's very gentle and predictable. Countless flights have been logged since that day, and much experience has been gained while studying my electric helicopters.

First, gas powered helicopters can be converted to electric fliers using the new cobalt electric motors. The motor to rotor gear reduction will probably have to be changed to somewhere around 13:1 to 15:1. Efficiency is the key to longer flights. My longest free flight is three minutes with the EH-1. Why so short? Well, as Ray Hostetler would tell you, helicopters are interesting little mechanical beasties that use a *lot* of excess power turning gears, transmissions, and various drives, not to mention the power lost to drag from pushing the rotor blades through the air. This adds up to a big burden on the motor. Of all things that fly, maybe discounting rockets, helicopters are the most inefficient users of available horsepower. To give you an idea, by means of comparison, of just how much power is used by electric choppers, our indoor electric models fly on two amps, the Whistler draws eight amps, the Electricus draws 18 amps, and my helicopters draw between 27 and 35 amps. If you can get Matilda to divide 72 by 35 for you, you'll see that that electric whirlysnapper of yours isn't going to fly

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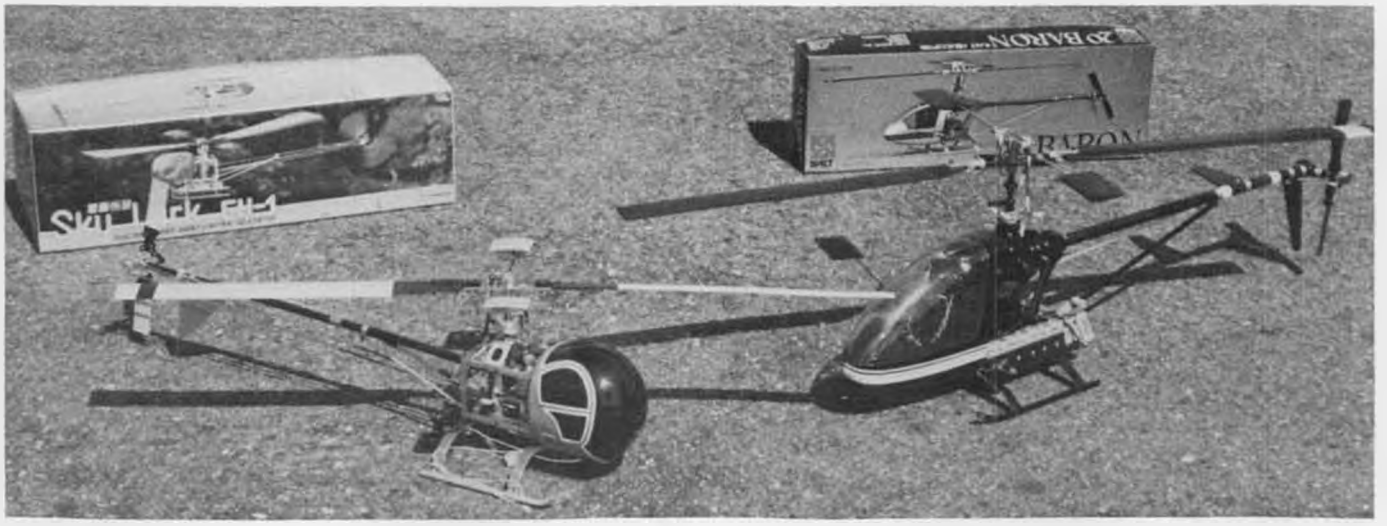
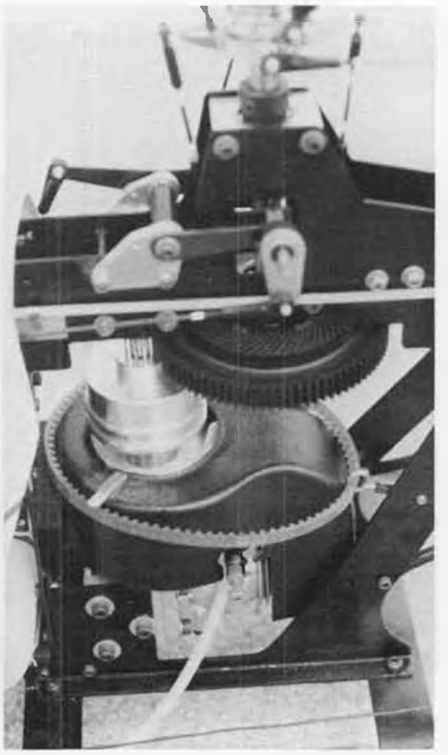


You have your choice. You can buy an electric powered chopper . . . or you can modify a gas powered job. Obviously, the Ishimasa is the easier way to go . . . not to mention less expensive!

The author's completed Competitor helicopter from Gorham Model Products. This chopper is fully capable of all competition maneuvers . . . including inverted flight.



The author chose to remove the cone-start system in favor of a belt-drive system. Note off-center cooling hole. See text.

CHOPPER CHATTER

By RAY HOSTETLER
PHOTOS BY AUTHOR

• The subject at hand for the next two months will be Gorham Model Products' fully aerobatic Competitor. Designed for FAI-AMA aerobatic routines, plus full inverted performance, the Competitor has been establishing a reputation for itself across the country.

First off, my wife says the helicopter is aptly named. "It's a Competitor all right, it takes you away from me as you sit and work on it in the hobby room; I suppose I'll always be competing against that thing. . ." Anyway, let's take a close look at the sub-systems compromising the Competitor.

PACKAGING

The photo shows all components as they come from the box. Everything is neatly bagged into subassemblies, and the helicopter is essentially built bag-by-bag. Everything is included in the kit except the engine, radio, paint, and a few small accessories, such as foam rubber and fuel line.

POWERPLANT AND CLUTCH

The engine mounts are solid blocks of aluminum predrilled for the most popular engine sizes. I chose the O.S. Max 60 FSR-H, and it dropped right in the engine mounting blocks, all holes nicely aligned.

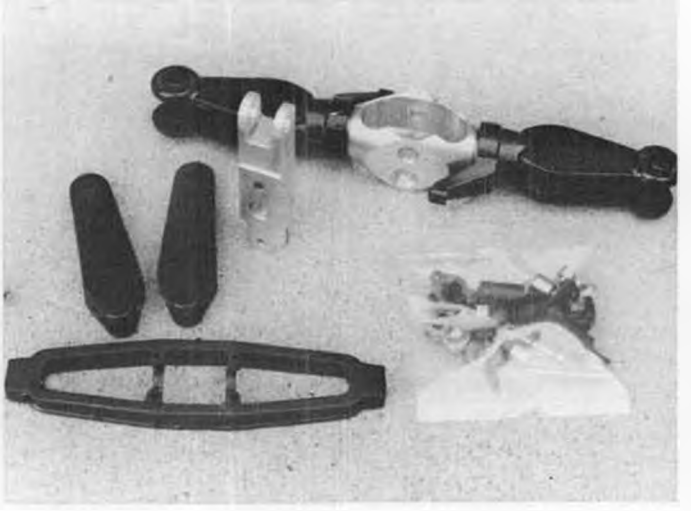
The main drive washer is removed from the engine, and a brass cone slips on the crankshaft to accept the cooling fan. Then, the aluminum pulley is secured to the fan by the engine nut. As the instructions state, hold the fan *with two hands,* and tighten the engine nut with *someone else* pushing on the socket wrench! I tightened mine with my own two hands, and the nut promptly popped loose as I tried to start the engine for the first flight. Can't say I wasn't warned.

Next, the clutch (with clutch shaft) bolts to the aluminum pulley. The alignment here is very critical. I detailed this procedure in the June issue of **Model Builder**. Please refer back to that issue for the alignment technique. The clutch is Schluter-style, a one-piece steel body with clutch shoes machined right in. The bell housing is nicely machined, and slips neatly over the clutch and shaft. Two miniature bearings support the bell housing on the clutch shaft.

My clutch shaft, as it came from the box, was bent out of whack by about one millimeter, easily visible to the eye. Upon returning the shaft to the factory, a new one was exchanged for my "old" one.

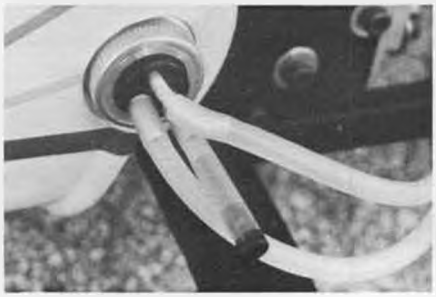
The clutch shaft runs up through two

The Competitor, as it first appears removed from the box, is packaged in bags according to separate assemblies.

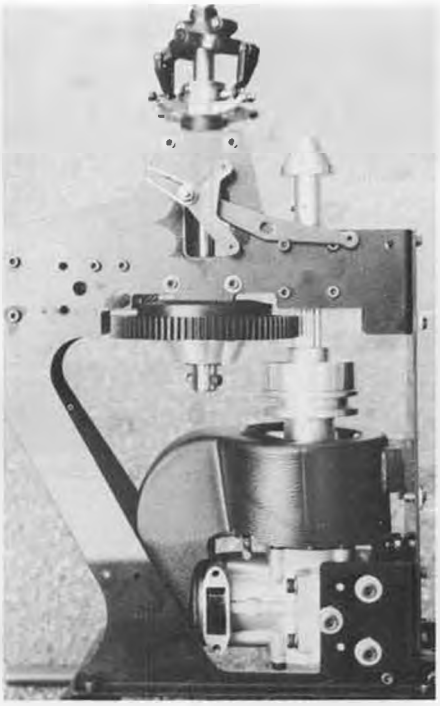


Assembled yoke with blade holders as it comes from the box. Also, hub, plastic blade roots, and hiller "bird cage."

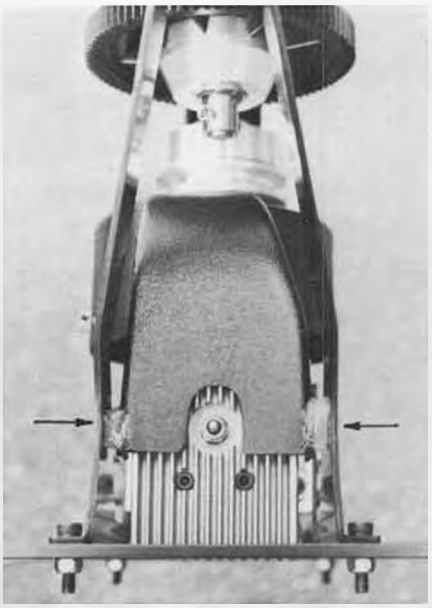
Detail of main shaft, cooling fan, main gear, clutch pulley, clutch assembly.



If a 400 cc tank is installed (not stock), canopy cut-out becomes necessary.



Side view of main frame. Drive gear alignment visible. Easy glow plug removal.



Cooling shroud close-up, rear view. Arrows point to silicone glue. See text.

bearings supported by bolts on the side frames. When the aluminum cone is setscrewed to the clutch shaft, a nice cone start system results. You may notice that some photos have the cone start, some do not. The ones without the cone start were taken after I tried to start the engine and the nut popped loose. As I had to tear down the whole drive system to retighten the nut, I made a few changes.

The new, fancy O.S. carburetors (7H) had just become available, so I decided to install one of these in the Competitor. After adapting the new carb to the engine, I found that due to the carb's width, it would not let the engine slide into the side frames from the bottom up (without unbolting the rear landing gear bolts). So, I sawed off the starter (clutch) shaft just above the first bearing. This did several things: (a) it allowed me to insert the engine into the helicopter from the sides of the main frame, (b) it eliminated the cone start system because the starter shaft was all but gone, and (c) in its place I used a Hirobo belt for starting. In the phots you can see the little retaining clips made from plastic wire tie material which keep the belt in place during any flight maneuver.

Sure, cone starting is nice, but belt starting has its advantages, too. Alignment problems are helped somewhat because the starter shaft is shorter (less runout), and the shaft runs through one bearing instead of two.

COOLING FAN, SHROUD, AND FUEL TANK

The cooling fan shroud is thick, black, molded plastic. A hot knife is recommended to trim up the shroud before installation. As I don't own a hot knife yet, I used tin snips and a Dremel Moto-Tool to do the trimming, and I nearly drowned in plastic fuzz!

The instructions show the cooling block screwed to the cooling shroud, which is then screwed to the front frame. Alignment seemed critical with the block to the front frame, so I screwed my mounting block to the front frame after I grooved it to fit the contour of the shroud. Incidentally, my cooling block was missing from the kit, so I picked up one during the clutch exchange. Then, I epoxied the shroud to the block as the shroud was properly positioned over the engine fan.

Here is an important point: first, open the top hole in the cooling shroud to two inches in diameter using the molded, raised area as a guideline. Make sure that the air inlet opening is *centered* over the engine shaft, and you will have the proper space on each side of the cooling fan. The air inlet *should not be offset* as it is the Schluter cooling systems. I initially set my cooling shroud incorrectly, and the resultant engine cooling was marginal. Don't repeat my mistake. Which reminds me. . .

Quite a few of you will probably use the O.S. helicopter engine for this ship. The enlarged cooling fin "block" on the head will not let the shroud set as far forward as it would with a regular

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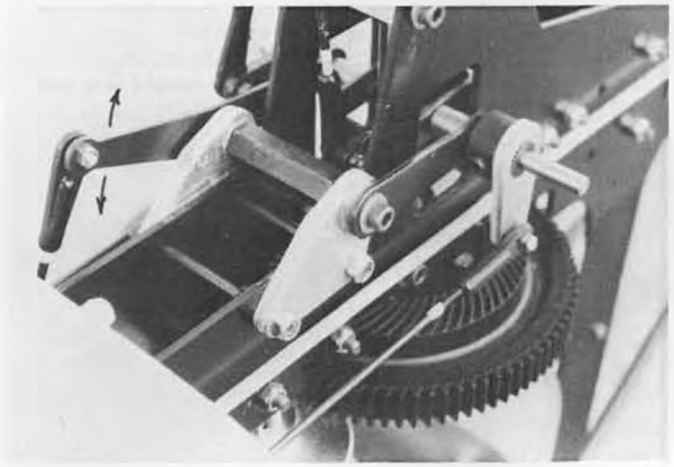
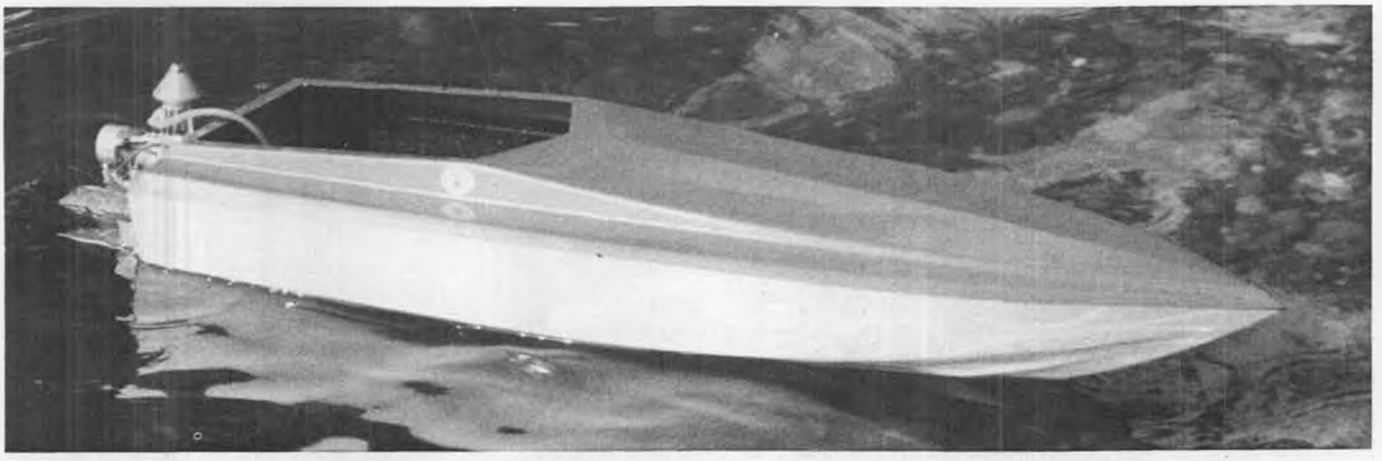


Collective yoke detail. Collective rod moves arm up and down (arrows) for pitch changes.

Machined yoke (left) with two bearings for feathering action and a thrust bearing for centrifugal loads. Modern!



The Magic Boats Stingray rests in the water for this photo. Engine used is the K&B 3.5 Outboard, with modifications made by Norm Teague. Competitive combination for Deep Vee class.

R/C POWER BOATS

By JERRY DUNLAP

PRODUCT$ IN U$E — MAGIC BOATS' "STINGRAY" 3.5 OUTBOARD DEEP VEE

Outboard powered deep vees have been an "on-again, off-again" love affair of mine since the K&B 3.5 Outboard was first introduced back in late summer of 1976. Back then, I took one of my inboard deep vee designs and bolted a 3.5 outboard to it just to see what would happen. What happened was the boat ran pretty well down the straightaways, but cornered terribly. With that capability, I knew what to do with the boat. I went up to a straightline record trials in late March of 1977, and set a NAMBA record for the 3.5 Outboard Deep Vee Class. Notice I said *set a record*. I was the first one to even apply for such a record. Boat speeds for this class have improved greatly from the blazing 32 mph speed posted some six years ago. The record is now 47 mph.

I continued dabbling with outboard deep vees of my own design until early 1980. It was at that time that Frank Ward provided me with one of his new 33 inch deep vees to be set up with an outboard. This boat proved very successful. At one time during 1980, it held both straightway speed, and oval competition records. I also was able to win the 1980 NAMBA Nationals Championship in 3.5 Outboard Deep Vee with that boat.

After 1980, I began devoting more time to developing tunnel hull designs. Outboard deep vee racing never has become a big class in my area of the country. Time demands dictated that efforts be given to the boats and classes that were popular.

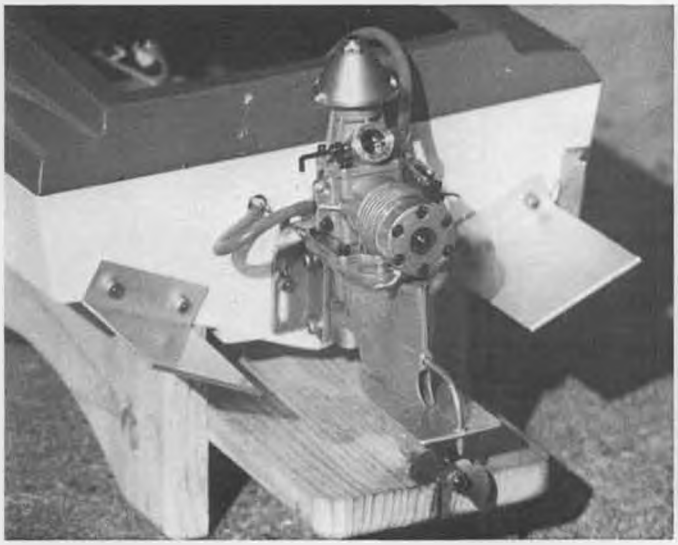
It was during my "racing vacation" last August at Legg Lake in Los Angeles that my interest was again whetted for the 3.5 Outboard Deep Vee Class. I was most impressed with the close racing that took place in this class, and especially impressed with one of the boats in particular. The boat that caught my attention was the "Stingray" from Magic Boats, 2424 Gundry Ave., Signal Hill, CA 90806.

The Stingray 3.5 outboard deep vee isn't a very recent product. Seems to me it was first introduced back in about 1979 by Westcoast Marine. I first heard about the boat from some of my boating friends who attended the 1979 NAMBA Nationals at Seaside, California. Since its introduction a few years back, the boat

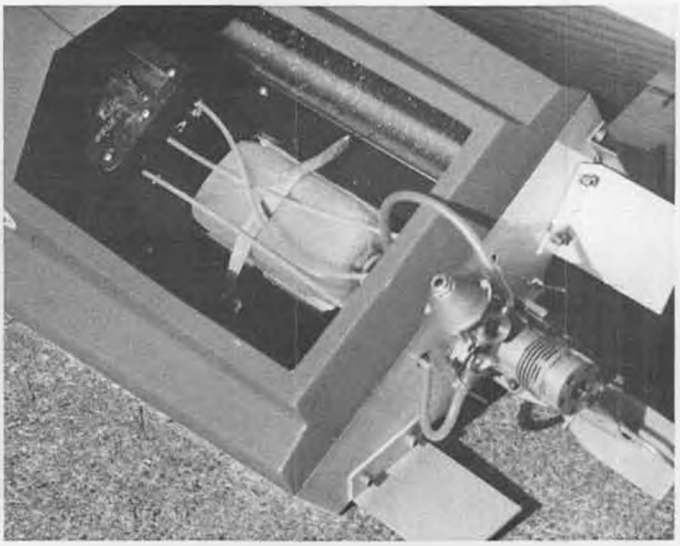
The Stingray doesn't lean into turns as much as inboard deep vees do. Choppy water is no problem for this boat.

The Stingray sits on its factory-designed wooden starting stand. Bottom pan for radio and tank visible.

Stingray parts: molded plastic radio box, adjustable motor mount, plastic bottom pan, linkage kit, trim plates, skid fin . . .



This transom view shows Teague-modified K&B 3.5 motor, spray bar (no carb), exhaust throttle, crankcase pressure fitting . . .



Top view of Stingray. Ride plates show prominently. Fuel tank and corner of radio box seen at top of photo.

has undergone a change in deck design and ownership. In 1982, Magic Boats picked up the Westcoast Marine line, and has added designs of its own. A complete listing of all the boats and hardware available from Magic Boats may be obtained by dropping them a note, and requesting their hull information sheet.

A few comments about the boat might be in order at this time. The Stingray is definitely a deep vee. Unlike some of the newer vee designs that employ 16 to 18 degrees of vee at the transom, the Stingray has a 24 degree vee. The boat also is somewhat thicker, or high-sided than newer designs. The photographs of the boat probably give a much better indication of the hull configuration than what I've been attempting to put into words. Using the K&B 3.5 Outboard for power, however, this design has proven to be very effective.

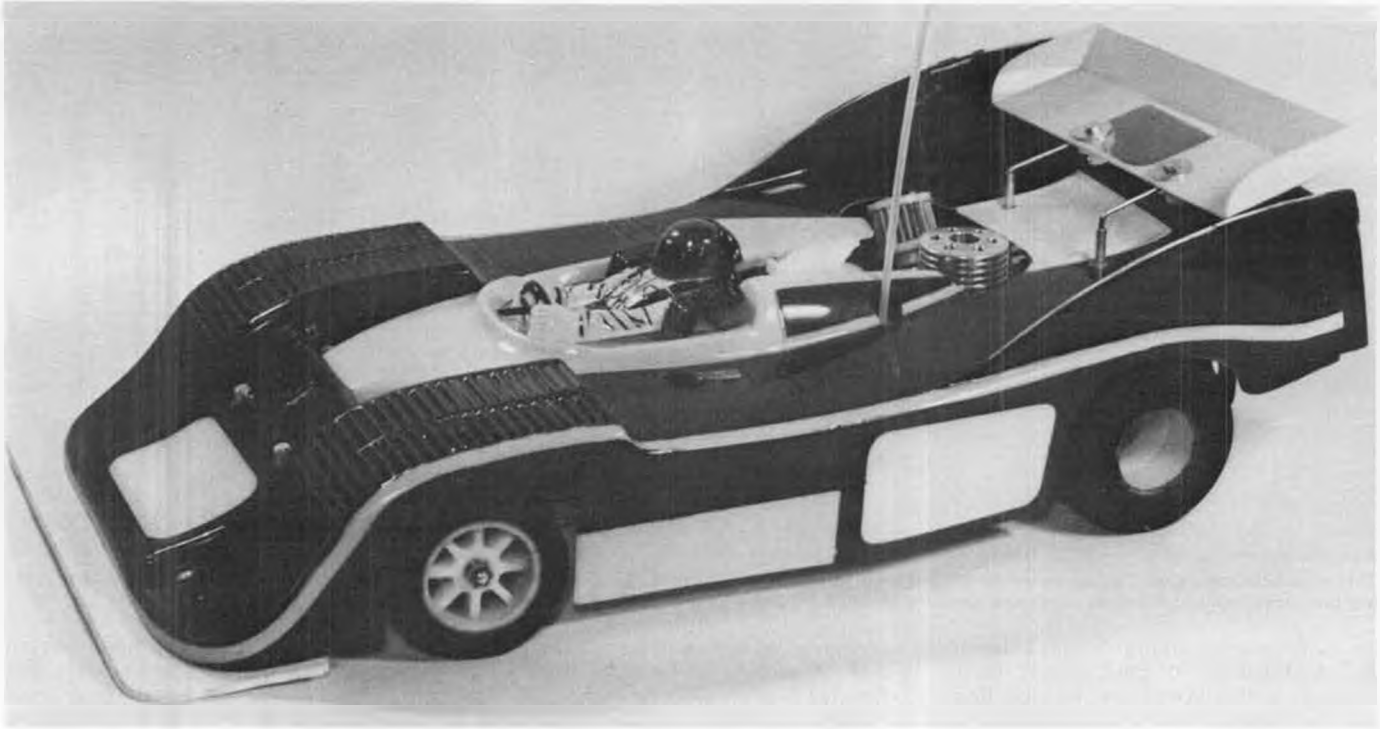
The basic hull is constructed of polyester/fiberglass. The hull comes joined, and has the hardwood rails for mounting the radio box/fuel tank pan already glassed into the hull. The quality of construction and finish on the boat sent to me was excellent. My boat has a white hull with a red deck, and I don't plan to do any additional painting on the hull. I'm sure that you can custom order just about any of the standard gelcoat colors, and that hull and deck could be all one color if desired. My first impression of the boat while removing it from the shipping carton was. "Wow, this thing is heavy." It turned out that the folks at Magic Boats had packed all the hardware, *and a boat stand* inside the hull. Removing those items lightened the boat considerably. However, compared to an epoxy/'glass hull, this boat does weigh a little more. It should be remembered that the boat is basically ready to run. No painting or glassing of parts needs to be done. To satisfy my own curiosity, I weighed the boat ready to run less fuel. The total weight came out to five pounds, twelve ounces. I really don't know what that data means as I have never bothered to weigh any of my other 3.5 outboard vee hulls. But that's what this one weighs.

The 3.5 outboard hardware package that Magic Boats has developed for the Stingray is an excellent option that I would recommend for anyone not familiar with the necessary items to properly rig this type of boat. Included in the hardware package are: (1) an adjustable motor mount for the transom; (2) transom ride plates, and transom mounted skid fin; and (3) control linkages for the steering, and throttle. About all that is left to purchase is a fuel tank, filter, and fuel line.

One feature of the boat which I thought was "super-trick" was the radio box and pan for mounting the radio box and fuel tank. The pan is recessed to hold the radio box and fuel tank in position. The pan is screwed into the hardwood stringers. Small brass cup hooks can be used to hold the rubber bands which keep the radio box and fuel tank down inside the pan. The radio box and pan are made of a molded plastic material. An inside lip is installed in the radio box, and it can be drilled to accept the screws used to hold the radio box lid in position. Needed to complete the radio box are a switch mount (Du-Bro's Kwick Switch Mount works super), and a whip antenna. Dumas Boats has a suitable whip antenna. The folks at Magic Boats definitely gave serious consideration to preparing the hardware and support items for this boat to

Continued on page 64

Airborne! Teague-modified K&B 3.5 Outboard is very fast in the straights. Some reliability is sacrificed for extra power gained, no something-for-nothing rework!



Under the fancy Associated Porsche 30KL Can-Am body lies an Associated RC150 Club Racer . . . as the author says, it's a "leftover special", but it runs well and costs little, so read on and find out more about it!

R/C AUTO NEWS

By DAN RUTHERFORD
PHOTOS BY AUTHOR

THE LEFTOVER SPECIAL

That's probably not the most attractive name for a 1/8-scale race car, although it is appropriate. The Associated RC150 to be described in this article, while a new model for Associated, is actually made up of older parts. Leftover parts to be quite frank. You don't for one minute think that they could design and tool up for a new 1/8 car, and then charge only $75 retail for it do you? Of course they couldn't, but what they did do was realize one day that they had a lot of older chassis parts in stock, all made obsolete by the RC300 and the RC500.

What to do? With race car technology reaching higher and higher performance levels all the time, little chance existed that these parts would come back into style, and evidently the sale of parts to those still racing RC200s and such was slow enough to never deplete the supply.

This seems to be an excellent place to mention an item that I like about Associated, and that is they are only rarely out of stock of race car parts. Their market is huge, and worldwide, so they can justify . . . in fact, have to have . . . parts and cars available at all times. Creation of the RC150 indicates they may have gone a little too far, or perhaps were blind-sided by the worldwide recession, but racers care little about that; they want parts when the car is broken, and Associated is covered very well in that respect.

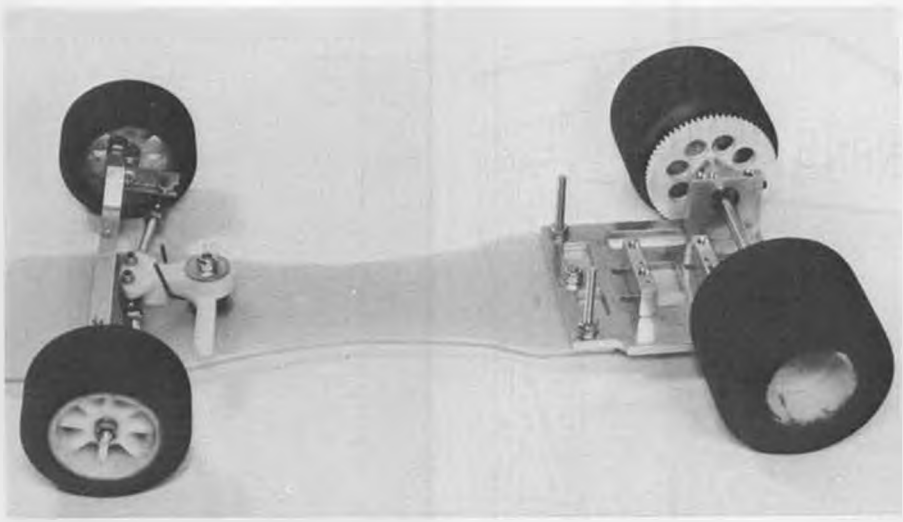
But let's not be too concerned about why the RC150 exists. It does exist, and for many of you reading this, it would be an excellent choice for your first race car, a car for the kid who now wants to race with you, a simple back-up car to drop your spare radio and engine into, or just a rat-racer for scaring the dogs down at the local parking lot. For $75 it is really hard to pass up . . . you can even get it with an engine for just $100. In fact, if I were buying one, the extra money would seem worthwhile, although, I would not actually use the supplied Veco .19 in the car, instead, I would sell it off to somebody flying airplanes.

For purposes of this article, we are approaching the RC150 as a club racer, which is just what Associated wants, as suggested by the limited advertising given it. Although a real club racer can be almost anything, in this context it is a car that is simpler than contemporary race cars, and while not capable (usually) of winning with regularity, it can be used as an introduction to the wild and woolly racing of 1/8-scale for minimal cost.

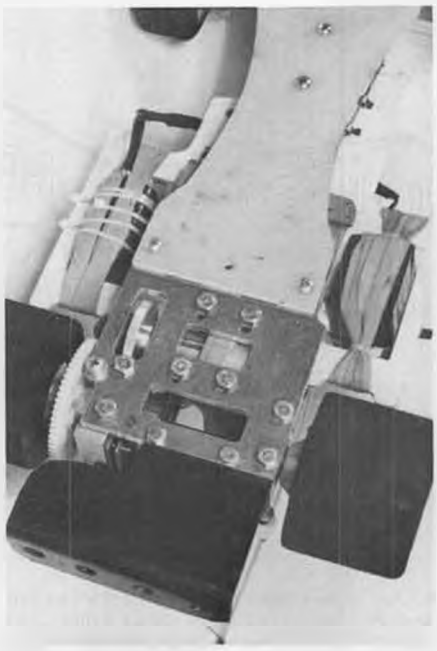
Ah, but it won't win, and you want to be a winner. Well, the car *can* win, but more importantly, this basic chassis will run faster than the introductory level racer can drive it. At past Nationals I have seen very similar chassis win many times. Driven by the likes of Jianas, the Hustings, Curtis, Reedy, and others, sure, but the point is that the car will run fast for you. You'll have to work harder at it than the guys running suspension cars or even diff-equipped pan cars. Just run the sucker until you feel you are limited by the chassis, and then move up to a better one. That's what the RC150 is for; get one, run it for a few races, a whole season preferably, and then decide if you want to race 1/8 on a higher level the next season. If not, you aren't out a bunch of money. If you like it (which you will!) the racing scene will be familiar to you, much knowledge will have been acquired from just getting out and racing, and your next race car will be chosen based on experience that cost you little.

Another way of looking at this club racer situation (and these views aren't just about the RC150, but *any* second-hand or less than full-bore race car) is that if you show up with the latest high-zoot race car, you are expected to do well just because you have one of the best. If you come to race with an older pan car . . . what have you got to lose? Any decent finishing position will be fine, and if you should happen to win a main, it's a bonus.

Let me tell you about a good friend/racer Dave Clark (even though my enthusiasm for basic, club racer type 1/8 cars is getting us off the subject). Dave drives what I regard as a very good club racing car, an MRP Pro-180. The car is at least three years old, he bought it as a ready-to-run, and it has little in the way of trick stuff on it, an older-style, gear-



The bare RC150 chassis, a building block for a remarkable club racer. For $100 including gas engine, the complete RC150 is a real bargain.



The bottom view of the RC150 shows rear bumper attachment, screws, bolts.

type diff is the only addition worthy of note. The motor has good power but nothing more. The radio is an older Futaba, with an even older JoMac servo doing the steering. Dave runs a very light brake, most of us can hardly slow the car up at all when driving it. Now, compared to what I race, usually a Delta Eagle (although I won the last club race with an Associated RC500), Dave's car is a real camel. Yet I have more trouble with that guy! Trouble, hell, he frequently pulls away from me, and this last weekend, he gave none other than Gary Kyes (out with a new Eagle), a terrific race that had the track lined with racers going *nuts* watching the super-close action. It was great, and even though Gary was still adapting to the new car, his abilities are unquestioned, and the car is nothing short of sensational. Even ending up a half-lap down in 40 at the end of the race, it was a victory for a very competitive club racer like Dave, and it shows you what an older pan car can do if driven on that smoooooth line.

Enough, already. On to the RC150. First criticism is, as usual, about the instructions. Like the car itself, they are a mixed bag and not easily followed. Whaddaya expect for under a hundred bucks, right? OK, I'll accept that argument, but I would have liked to have seen novice racers given more consideration, especially as they are the primary market. On the other hand, Associated cars are found everywhere, and it should not be any trouble to locate a racer or two who can lend a helping hand in the assembly of the car. You *can* do it yourself with the furnished instructions, a little common sense, and several good looks at the pictures in this article.

So do it. As I am not going to write a construction article on the stock car, I'll cover the *modifications* that John Snyder (who is presently racing the car) and I made to it as this will be of more general interest. Many of the pan cars being raced currently can also benefit from some of these mods.

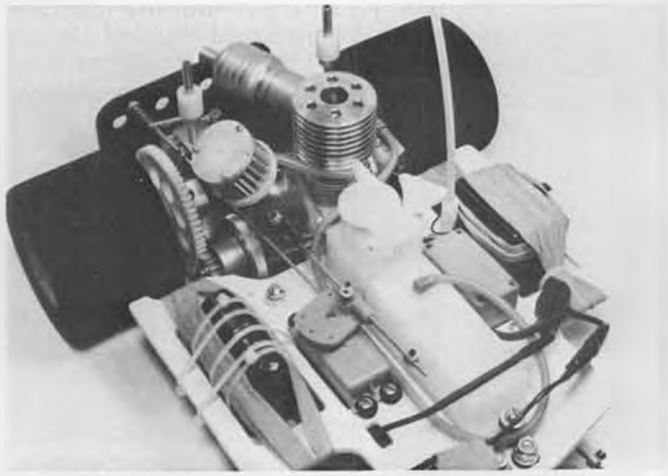
At the front, we are still using the stock bumper, although it has been trimmed back some (after the picture taking) to let the Associated Porsche 30KL body drop over the front lip of the bumper. However, if you crash a lot, it's best to let the bumper be the first thing to hit . . . this saves a lot on replacement bodies.

The next bumper will probably be whittled out of 1/8-inch Kydex; it is a little heavier than nylon, but also a lot tougher. And if you *really* crash a lot, it is worth considering adding a doubler to the bumper. The stock number has a lot of overhang, so a few good whacks will bend it down until it's riding on the track. For the body posts, I lent John a couple of Delta Super Body Posts, which really are super. They actually clamp the bumper to the pan and are very strong.

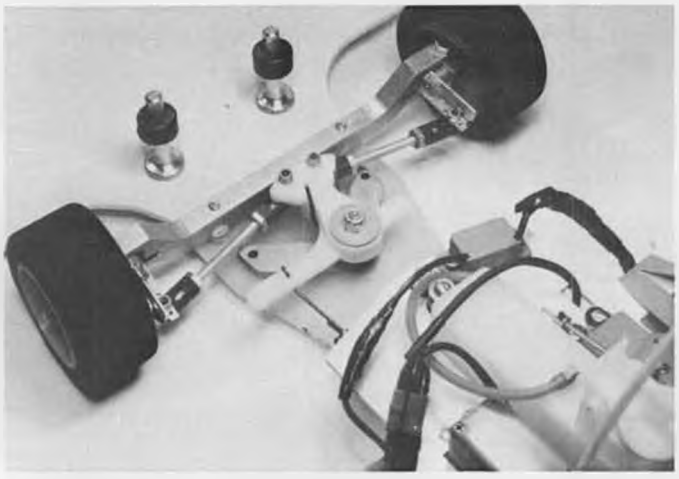
The front axle assembly is stock, except that we noticed the axle bolt would move a little when removing and installing front wheels. John just epoxied the bolt into the steering arm, spacer, and steering block using Sears filled epoxy. (Hysol epoxy, as sold by Associated, will work as well or better. Plain-old epoxy might not hold.)

Although you can use ball bearings in the front wheels, we are sticking with the stock bushings. In fact, I can remember Team Associated drivers using bushings at past Nationals; ball bearings can be considered a needless expense. The MRP tweak plate is another story . . . get one, and use it. The tweak plate simply bolts to the pan using the bolt common

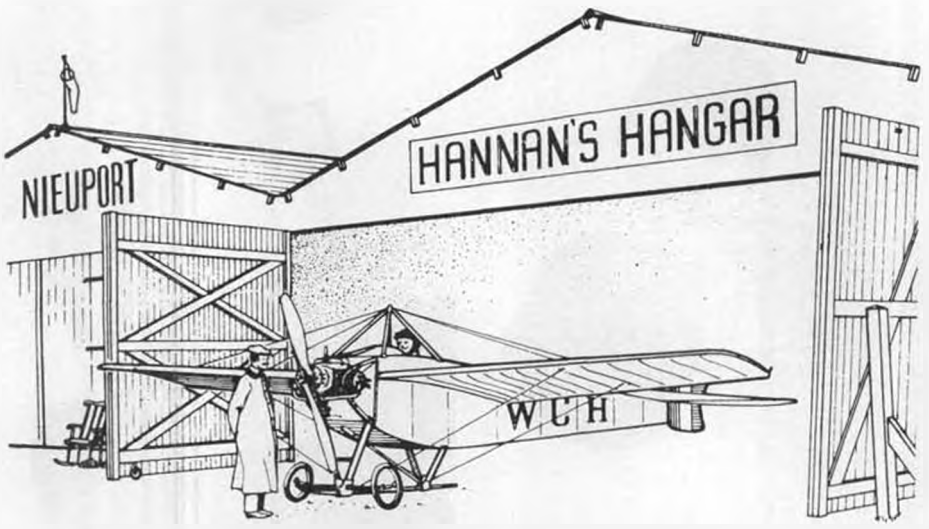
Continued on page 66



The noisy end, latest version of the K&B .21, Associated molded fuel tank, and one ancient JoMac radio receiver.



Front end of the RC150. MRP tweek plate added at servo saver, Delta body posts, otherwise stock.



"God cannot alter the past, but historians can."

• Our lead-in line this month is from the pen of Samuel Butler (1612-1680) and seems to apply to aviation history too. Which ties in nicely with our first subject:

GUSTAVE WHITEHEAD UPDATE

It would appear that aviation enthusiasts fall into three different categories when it comes to history: (1) they know very little about it and care less; (2) they are "Wright wing conservatives" who honestly believe Orville and Wilbur were completely responsible for the first successful flying machines; or (3) they are staunch supporters of other pioneers, many of whom seem to be controversial for one reason or another.

The first group is evidently bored by any sort of history, and regards aircraft simply as a utilitarian means of rapid transportation. By contrast, to discuss history with either of the other two types of enthusiasts is tantamount to arguing about religion or politics in the degree of polarization involved!

Although one may be tempted to lean in one direction or another, perhaps a more moderate point of view may be that there is enough credit to go around to ALL the aviation pioneers. But meanwhile . . . our review of *History By Contract* brought forth a few responses.

Co-author Bill O'Dwyer reports that a full-size Whitehead No. 21 reproduction will soon be constructed by a group of people which he is organizing. Appropriately, the building site is in Bridgeport, Connecticut, not far from where the original was fabricated. And another individual who actually knew Gustave has appeared, and has greatly added to the available information.

A high-water mark in aerodynamic incongruity is this combination autogyro-glider with forward swept wing. Austrlian "Orbiter" came to the Hangar by Dr. Julian Wolkovitch.

Bill O'Dwyer has set forth the following objectives of his group, which we have edited and slightly condensed:

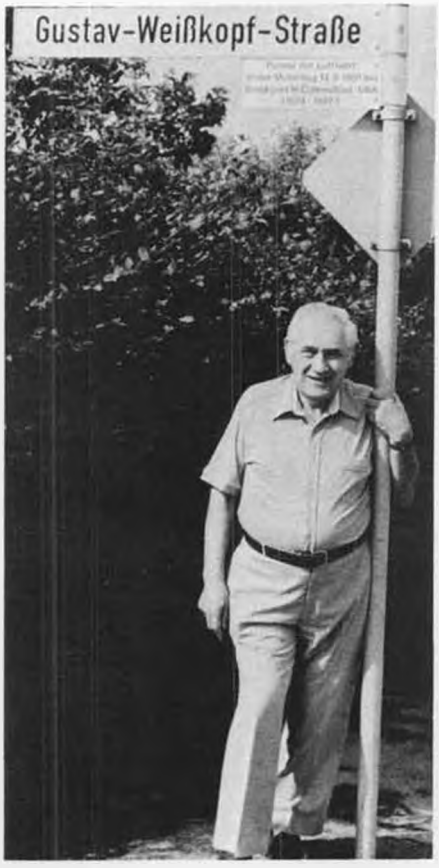
1) Locate whatever can be found mentioning Gustave Whitehead from that era, pro or con, and enter it into the GW Museum files for all who may be interested to study, and reach their own opinions.

2) Determine where possible, what is credible,

3) Break through the National Air and Space Museum resistance to this fact of history, with documentary evidence.

4) Locate better copies of the photo of Gustave Whitehead in flight. *(Such a photo has been mentioned in various accounts, and perhaps with modern computer enhancement techniques, the reported blurriness could be minimized or eliminated to establish authenticity. wch)* Apparently, the William J. Hammer photo collection may have contained such a print.

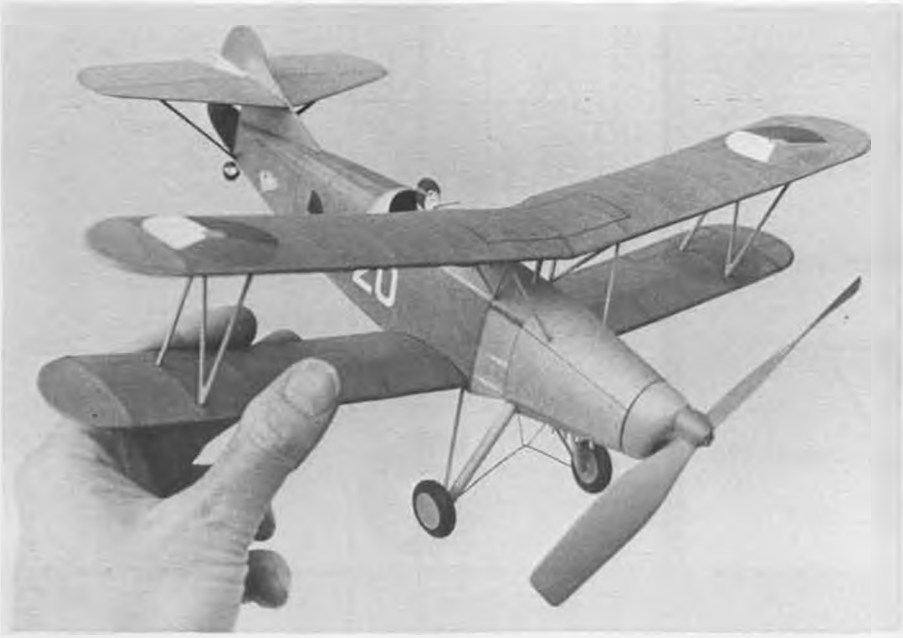
5) Provide a central file (Gustave Museum) that would "live on" through a proven subsidy. Leuthershausen, Ger-



Former editor of *Flying Aces* magazine, Jesse Davidson, poses with a Gustave Whitehead street marker in Gustave's German home town.

This beautiful Walnut scale Comper Swift and equally lovely photograph were both made by Bob Clemens, of New York.

Ray Malmstrom, England, designed and built this just-for-fun rubber powered helicopter with a 16-inch rotor.



Bill Noonan built this beautiful Fokker S9 Peanut as a proxy entry for the 24-hour West Baden contest. Bill shot the photo also.

many, in making the Gustave Whitehead Museum a part of their city programs, has done this. Their city records date back to the year 1000, and are open to the public's use.

6) Stimulate any project or interest that might further Gustave Whitehead's memory and study. This would include providing modeler's with information they could use. As O'Dwyer put it, "We can all stand in awe at the beauty of the models that are turned out, and which catch out 'modeler's eye'; but the true beauty of those meets is to witness the bonds that hold those families and people together."

7) Provide the means for a better perspective and appreciation of early flight and its inventors, regardless of who was involved, or where it took place.

MORE ON THE SUBJECT

Jesse Davidson, former editor of the fondly-remembered *Flying Aces* magazine, recently visited Leuthershausen, Whitehead's birthplace, and reported seeing an imposing stone marker as well as a street named in Gustave's honor. As may be seen in one of our photos, the street signs bear the inscription (roughly translated): "Gustave Whitehead *(Gustav Weiskopf)* Street," and underneath: "Pioneer of aerial navigation. First motorflight 14.8.1901 in Bridgeport in Connecticut/USA (1874-1927).

BILL WINTER COMMEMORATIVE

Speaking of model magazine editors, Tom Schmitt brought to our attention a special contest to be conducted by the

Ed Whitten's indoor newsletter features this clever masthead illustration.

D.C. Maxecuters on September 10, 1983. Eligible will be any of Bill Winter's rubber-powered flying scale designs which were published during the years 1935 through 1949. Some 21 different types are included, ranging in wing span from 18 inches (Vultee Transport) through 31 inches (Stinson SR-6).

Proxy entries are solicited from individuals living more than 200 miles from the Washington, D.C. area. Complete rules and details are available by sending a stamped, self-addressed envelope to: Allan Schanzle, 8311 Exodus Dr., Gaithersburg, MD 20879. Allan can also supply copies of the plans at modest cost.

PECK PRODUCTS PROLIFERATE

We recently visited the Peck-Polymers home base, and looked over the latest range of kits, engines and accessories. In addition to the complete Brown Junior CO_2 engine selection, Peck Polymers now markets the British Telcos, including the Standard, Turbo 3000, 6000, and all spare parts.

Also from England are the Andrew

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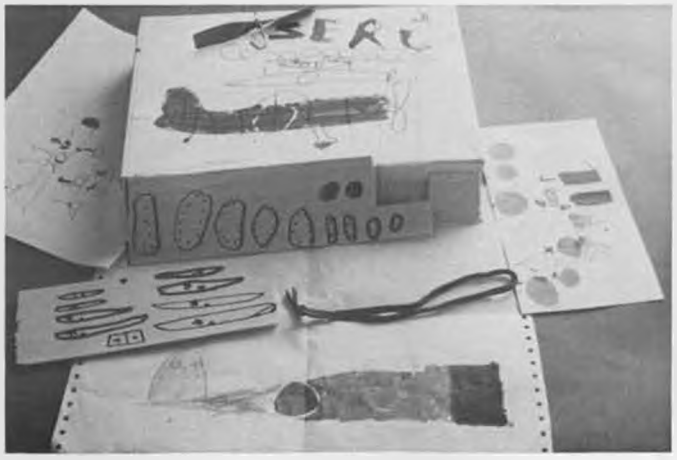
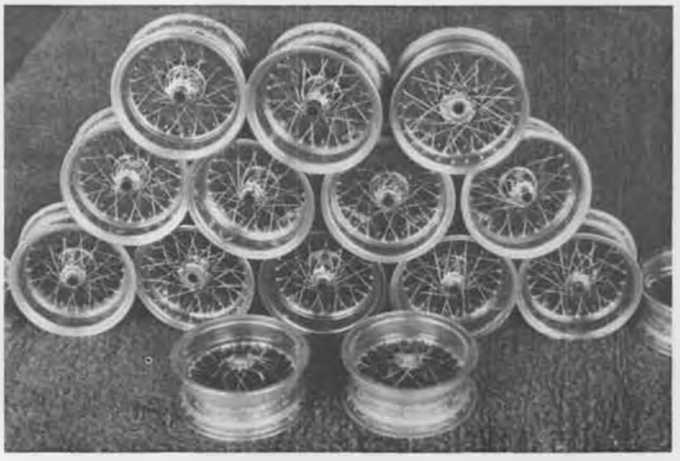
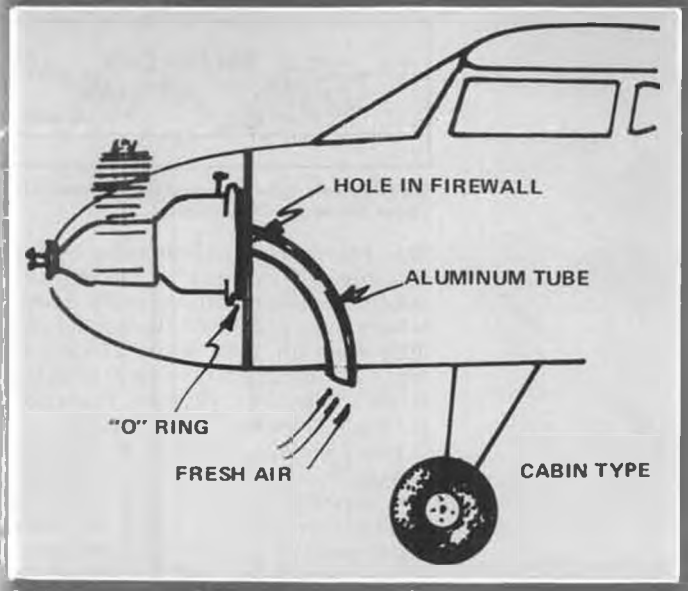
Allen Schanzle's entry in the Bill Winter Commemorative contest is this Vultee with Turkish markings. See contest details in text. Tom Schmitt photo.



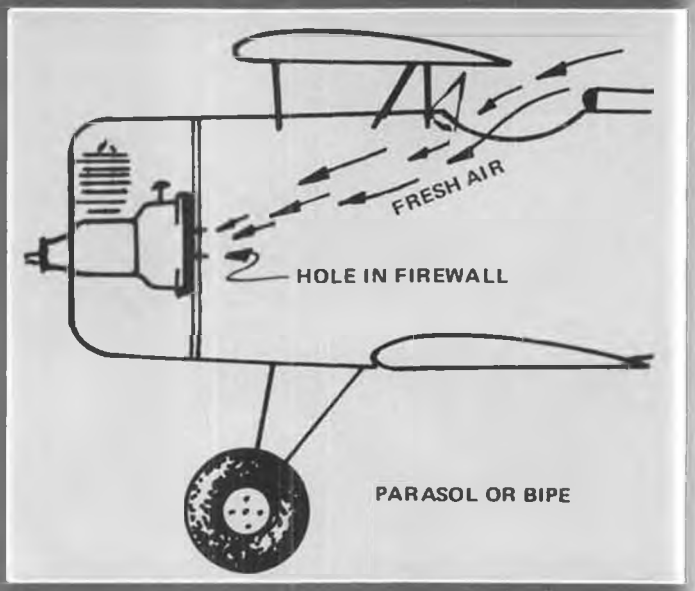
Six-year old Steve Wilder, of Texas, produced this remarkable "Zero" kit as a gift to Bob Peck, Peck Polymers.



Just a sampling of the custom made, spoked wheels by Fulton Hungerford, these are Ferrari types.



Cabin type model with fresh air duct modification.



Parasol or biplane model with fresh air duct modification.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• Last month's letter by Curtis Moss has prompted me to review a technique for mounting the Cox Pee Wee, or *any* of Cox's .049 reed valve engines. This system will provide extremely easy-to-make thrust adjustments, plus provide an effective way for the engine to breathe while being completely cowled in.

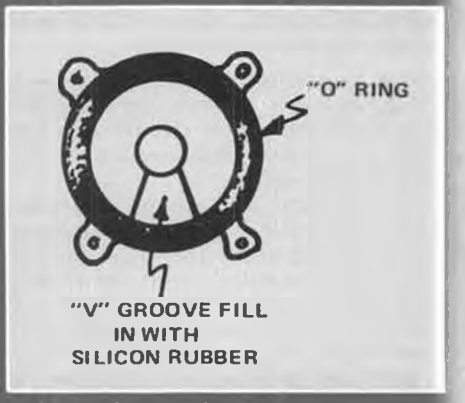
Typically, the reed valve engine has an integral tank, and on the back of the tank is a V-shaped groove, and also a screened opening. When the engine is bolted up against the firewall, the groove and screened opening provide the only source of fresh air to the engine. This is normally adequate, but with a completely cowled engine, it is drawing mostly exhaust gases. Naturally, this is *not* the best situation for optimum performance.

The steps to take for providing fresh air or easy thrust adjustment for your F/F scale model are very simple. First, place the engine onto the firewall so that the mounting holes can be drilled. Next, draw an X between a pair of the holes to locate the position of the screened opening of the engine. Drill a hole the size of the engine's intake right on the center of the X. Fuel proof the firewall. (Incidently, the best fuel proofer I have found is a clear epoxy. I used Stit's epoxy varnish, but Hobby Poxy is good also. Less expensive are the polyester resins.)

While the fuel proofer is drying. Clean the back of the engine with a good solvent so that there are no traces of oil. Lay an even layer of silicone rubber all around the back of the tank, including the V groove. (See Figure 1.) Lay on top of this layer an O ring which just fits the back of the tank. Let this dry thoroughly.

By now you're probably getting the idea of what is going on! (See Figure 2.) If you are building a cabin model, place a piece of aluminum tubing as shown, and make it flush with the bottom of the fuselage. If you have a parasol or a biplane, it will not be necessary to use the aluminum tube. The point, of course, is that you are providing a different source of fresh air. With the parasol or biplane, the fresh air will come into the intake from the cockpit area. However, if you close off the cockpit, then of course, you will need to add the aluminum tube.

Lastly, the engine is bolted onto the firewall. By using a protractor, you can determine how much down and right thrust adjustments can be made by further compressing the O ring in the direction required. This truly simplifies ths task, and it certainly beats using small wedges, etc.



O-ring seal for rear of engine keeps exhaust gasses from re-entering intake.

For years, I've used Goldberg's Jet and Super Jet. Well, since they've gone to a new, almost impossible to squeeze bottle, I've switched brands rather than fight. I've gone *ZAP!* This stuff really works well, and it's easy to extract from the container. Like so many things nowadays, probably all of the CA glues are made by one company and appear under different labels. Regardless, for what's it worth . . . try ZAP, it's great!

Dr. Paul Helman sent me some very interesting information which I want to pass along. he has been using Alkyd pigments, produced by Windsor of England, to add to clear nitrate dope. The technique is the same as for Floquil. He believes that these pigments are just as finely ground as is Floquil, but much cheaper in cost. (This should be good news as the cost of Floquil keeps going up, like so many other items!) Doc airbrushes the mixture with great results. He comments that the finish however, dries dull. This can be cor-

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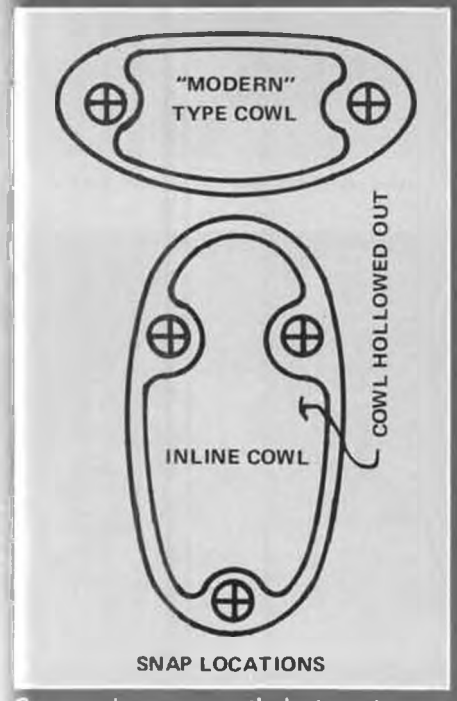


Common dress snaps are the best way to secure cowls on rubber jobs. See text.

BROUSSARD MH 1521

By STEVE GARDNER . . . The Broussard MH1521 was picked by the author as an ego-pleasing, fun flier, *not just another contest Peanut!* If you are tired of the same old fare in Peanuts, put a little salt in your diet!

• A number of years ago, people built Peanut scale models of all types of full-size aircraft, even almost unflyable types, because they wanted a model of *"that"* airplane. They would go ahead and build them anyway because even if they didn't fly too well, they would still have a scale model of a plane that they always wanted to build without spending much time or money.

Now you don't see anything but Peanuts of aircraft that have near-perfect proportions for rubber scale, that is, *at contests you don't*. Some people still build models of what they *want* instead of what will place in a contest. Bill Hannan is a wonderful example. He designs models of whatever he wants to build. Some of his designs fly competitively, others are just for fun.

The model presented here is an attempt to capture the same flavor that

The Broussard MH1521 may not be a good duration model, but it is *beautiful!*

Mr. Hannan's BD-4 and Aristocrat have. Those Peanuts are tiny-winged delicacies, and they are *my* idea of what a Peanut should be.

So, if you find time between Lacys to build this model, I hope you like it.

The MH 1521 Broussard was built by a small, French company, Avions Max Holste, between 1952 and 1968. It was, and still is, used by the French army as a utility transport. They have been used to spray crops, and carry supplies in several African countries, so a color scheme should be no problem. (Mine is Imaginary French Air Force.)

To build this model you might start with the tail surfaces, to get you into the building mood. Use good, firm wood on the twin vertical tails, they take a beating out there on the ends of the horizontal tail.

When building the horizontal tail, please be careful to get the end rib square to the spar. This will keep the fins straight.

The wings are very simple, and should give you no problems. Just be certain that you use hard wood for the leading edge, to prevent dents.

When you have it up off the board, then you can add the skylight. Use very thin celophane for this to keep the

Continued on page 93

One of the distinguishing features of this model is its twin vertical stabilizer design. Tail wheel pivots for scale-like appearance.

Build this model with lots of downthrust because of the relative small size of the horizontal stabilizer.

FULL-SIZE PEANUT PLAN ON PAGE 54

Wingspan: 62"
Wing Area: 612 *Sq. In.*
Flying Weight: 5½ *lbs. Engine:* .19-.50

Wingspan: 118"
Wing Area: 1038 *Sq. In.*
Flying Weight: 7¾ *lbs. Engine:* .19-.40

PROGO

As elegant as it is exciting. The Progo has something for everyone from beginning pilots to seasoned veterans. Designed to accept anything from a .19 to .50 powerplant, the Progo is one plane you won't have to retire when you move up to the major leagues.

Suggested Retail $159.90

SF 36

One of the most beautiful motorized gliders you'll ever find. An extremely clean aerodynamic design using the Wortmann FX 126 Laminar Flow Airfoil. With full a leron, elevator, and rudder control, even the most narrow thermals are no problem.

Suggested retail $199.90

ROBBE AIRPLANES FLY C

Witness 4 of our star performers from Robbe. B performance that raises eyebrows and steals the show tends to out perform, outlast and outclass everything

ROBBE KITS ARE PRECISION ENGINEERED

Plura™ Fuselages

Every Robbe kit in this ad features our unique Plura™ blow molded fuselage. Plura™ is a special thermoplastic material designed for Robbe alone.

The fuselage is tough, yet extremely lightweight. Perfectly formed, without blemish, for dynamic balance, and a glassy smooth finish right out of the box.

Siros™ Wings

The Siros™ wings are perfectly contoured... ply-foam design that sets the standard for stable flight.

Highly prefabricated and designed to fit right the first time, every time.

And Robbe's precision engineering goes down to every nut and bolt. Every feature of every kit is designed to make sure that your Robbe kit gives you years of trouble-free fun.

PLUS, THEY'RE BEAUTIFUL.

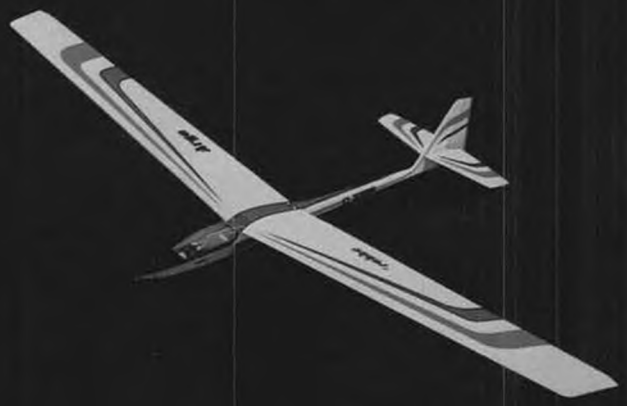
Quick to build

Because Robbe kits are highly prefabricated, they go together fast so you can spend your time in the air, not on the bench. Robbe kits are very complete, and come with easy-to-read, detailed plans and instructions.

Great lines

What more can we say? These kits look *good*. Dream up your favorite color scheme and suddenly all the other plain janes seem to disappear by comparison.

Wingspan: 83½"
Flying Weight: 17½ *lbs.*
Wing Area: 1069 *Sq. In.*
Engine: 2x .40 - 2x .60 up to chainsaw engines.



Wingspan: 101" *Wing Area:* 796 *Sq. In.*
Flying Weight: 3¾ *lbs.* *Wing Section:* *Eppler 193*

CAP 21

There are a lot of Cap 21's on the market today, but none like Robbe's! The Robbe Cap 21 can be powered with two .40 to .60 engines using the optional reduction gear unit, or go all the way up to chainsaw engines. With Plura™ fuselage and Siros™ wing, your Cap 21 will steal the show on the ground and in the air.

Suggested Retail $289.50

ARGO

Exotic good looks in our most popular high performance glider. Racy appearance, clean aerodynamics, and excellent performance are just some of the reasons why the Argo was picked as 1983 Best R/C Glider of The Year in Europe.

Suggested Retail $149.90

NE CLASS...FIRST CLASS

eautiful airplanes with the elegance, good looks, and everytime. When it comes to R/C kits the Robbe line else around. Here's why.

You see, our Plura™ process allows us to capture every curve, every discreet contour just as it should be, without compromise. Sometimes the differences seem small, but great lines make great designs.

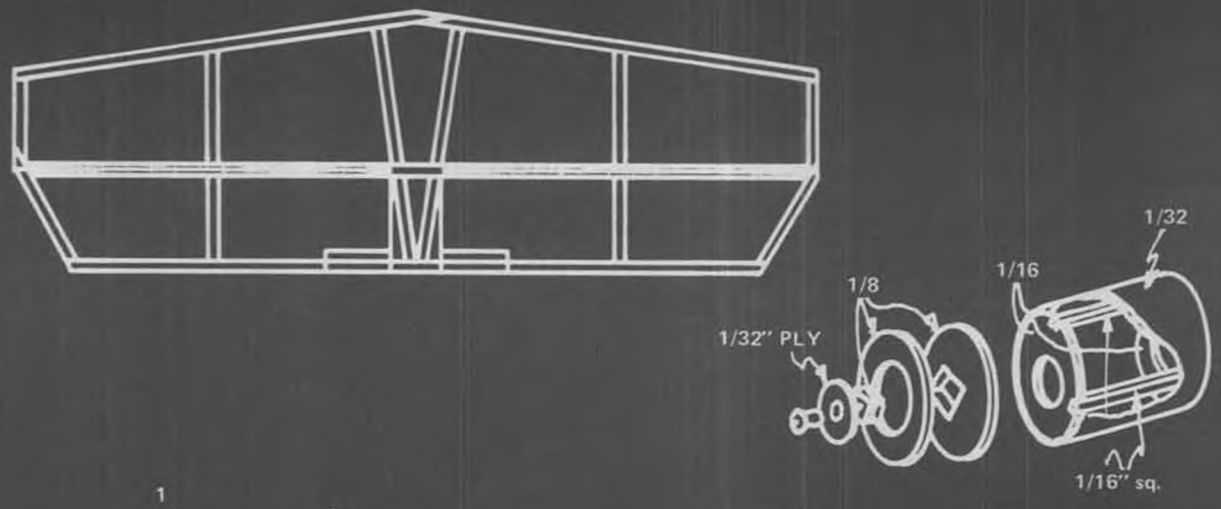
BUT BEST OF ALL, YOU CAN'T FIND A BETTER R/C VALUE

Robbe kits are well worth the money. When you consider the quality, engineering, and performance that is built into every Robbe kit, it's easy to understand why Robbe has been number 1 in Europe for years.

You owe it to yourself to build a Robbe kit. Once you build and fly a Robbe kit you'll never be quite satisfied with anything else.

Want to know more? Ask your dealer for a Robbe catalog. It's complete with specifications and beautiful color photographs of the entire line of Robbe products. *You're bound to find something just right to help you launch a real first class flight of fancy.*

ROBBE MODEL SPORT, Princeton Meadows,
The Office Center, Suite 2D, Plainsboro, NJ 08536 609-799-4712


1/32
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1/16" sq.


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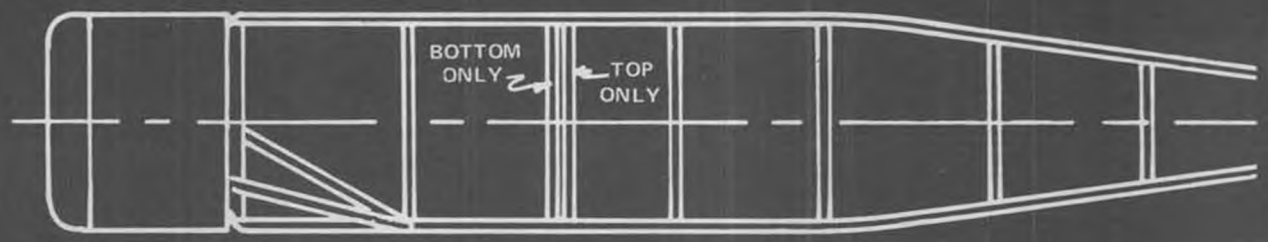
BOTTOM ONLY
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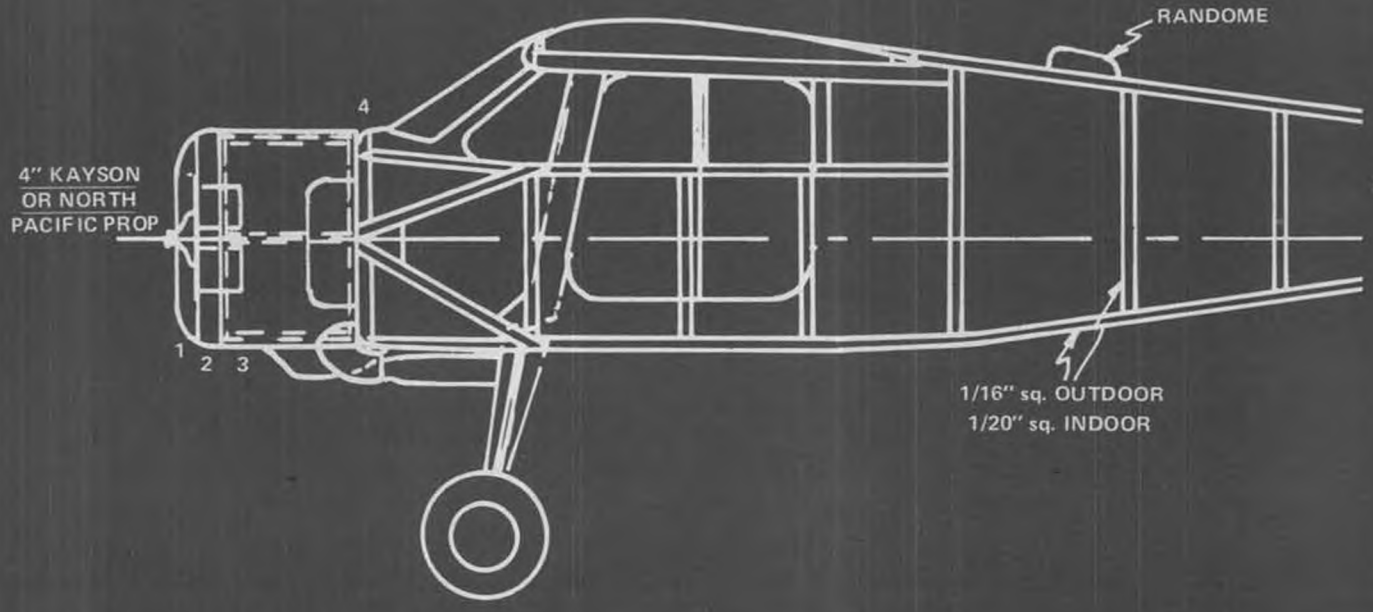
RANDOME
4
4" KAYSON
OR NORTH
PACIFIC PROP
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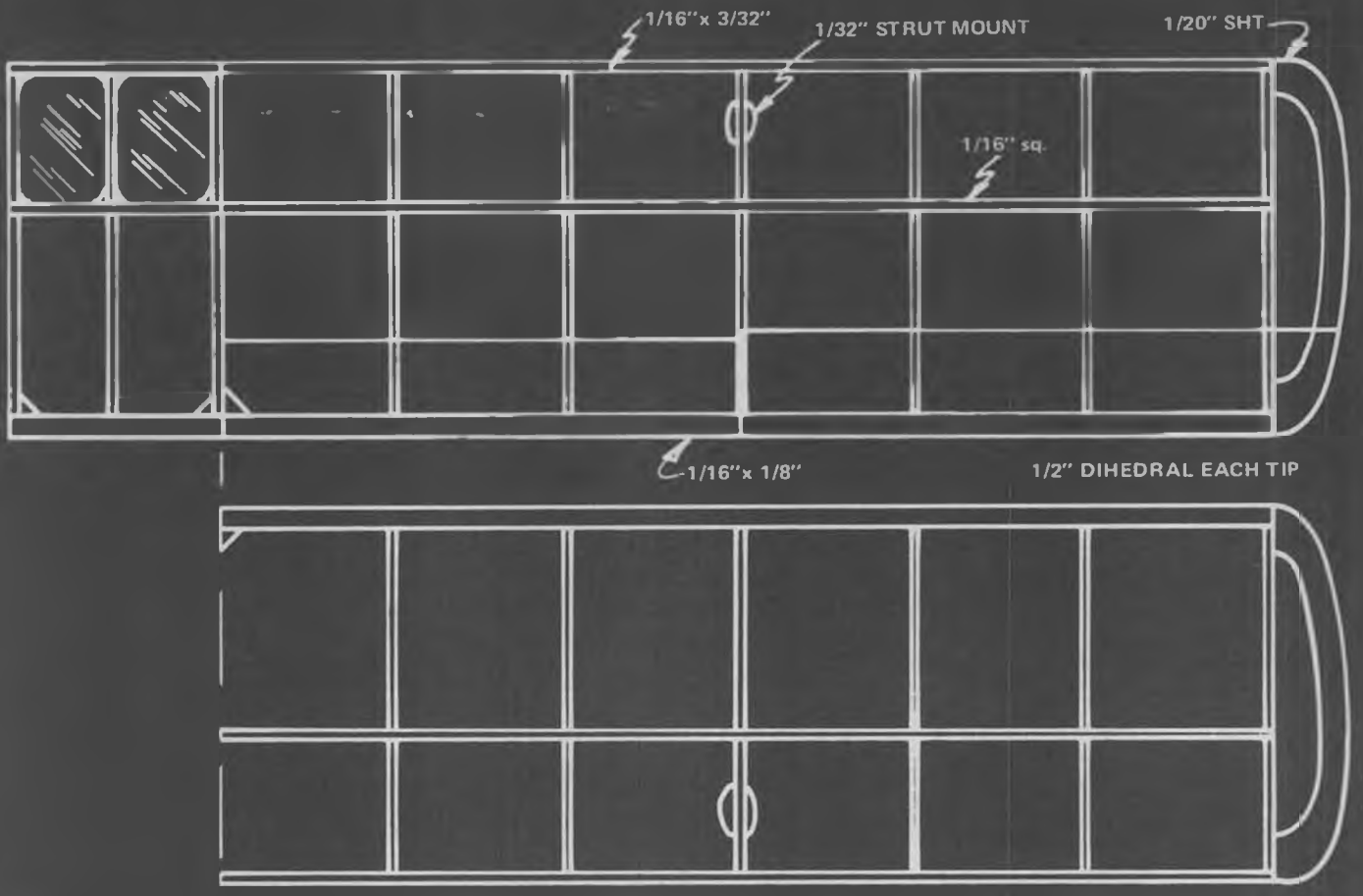
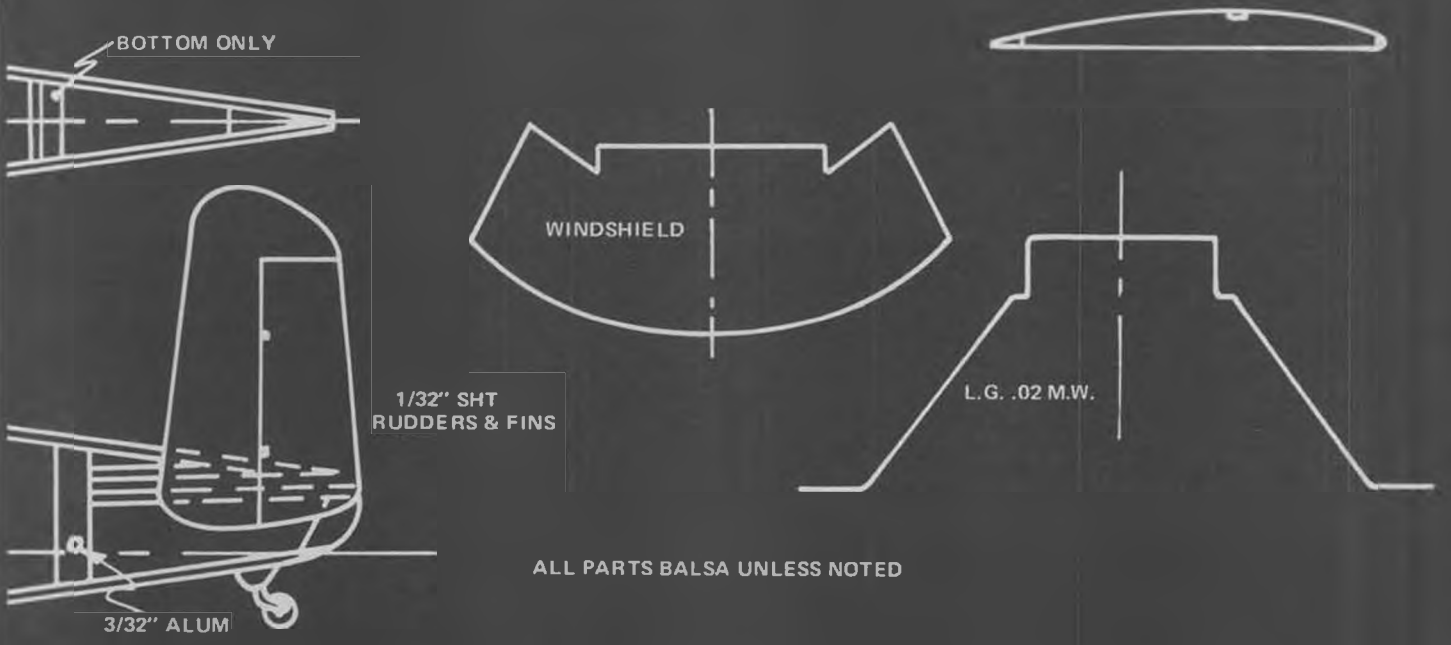
1/16" sq. OUTDOOR
1/20" sq. INDOOR





ALL PARTS BALSA UNLESS NOTED

MH 1521 BROUSSARD

A PEANUT BY: STEVE GARDNER

Pat Daily winds his Fokker D VII at the 9th Annual Capital Indoor Scale Aircraft Contest put on by the DC Maxecuters last March.

INDOOR

By KEN JOHNSON

WW-I PUBLICATION

Recently, I received a copy of a magazine entitled *W.W.1 AERO*, which is printed in New York state. This is a new reference source for World War I scale buffs. It contains a wealth of information on early aircraft. Scale and detail drawings of these planes are printed in black and white. This journal contains information for builders of full-size craft as well as news of WW-I airshows, photos, and scale modeling material. A one year membership includes five issues, and info can be obtained by writing to Leonard E. Opdycke, 15 Cresent Rd., Poughkeepsie, NY 12601.

NEW FROM IMS IN '83

The new indoor modeler's supply catalog for 1983 is now available from Mr. Lew Gitlow of Indoor Model Supply. Send $1.50 to Box C, Garberville, CA 95440-0039. Included are miniature scale aircraft, and new accessories related to Peanut scale, such as Hungerford wheels, balsa, prop packs, A-23 CO_2 engines, and some instructions for simultaneously dying and preshrinking condenser paper. Also included is a full page of instructions on pouring and working with microfilm. If you order supplies or a kit from Lew, the catalog will only cost you $1.00. Mr. Gitlow sent me a plan and three-view from his Heath Super Parasol kit. It looks like a winner. Well designed and the detail drawings of the engine are super. If you haven't been ordering indoor goodies from IMS, get started today. Some selected hobby shops also carry IMS products. You can also get the Ron Williams indoor book from IMS. This is the book that all the indoor builders are raving about. It's well worth the $12.95 price.

FOILED BY THE WEATHER

You would wonder how much bad weather could affect indoor flying. Well, believe me, it sure does. Last month, our indoor group had a Category 2 record trials at the Navy/Marine Corp. Armory in downtown Los Angeles. Mr. Jean Andrews, a helicopter pilot and fellow gyro and flapper enthusiast went after the autogyro record. Your indoor editor came in pursuit of the ornithopter mark. The sky had been dumping rain on L.A. for several days, and it didn't let up for our session. All the windows in the armory were closed, but the building was saturated with moisture. The temperature was cooler than normal as we began our test flights. Jean had built a new microfilm model for his "run at the record." The flappers I brought out were older, but they were capable of pretty fair times. My No. 1 model had done three minutes on earlier occasions but it was coming down under two minutes that day. While Mr. Andrews was busy trimming his gyro (which is no easy task, sometimes), your editor changed models and continued to show times of less than two minutes. Later, the first flapper was again pressed into service. Finally, the fuselage collapsed as the rubber was attached to the rear hook. The moisture in the air had weakened the wood substantially. Model No. 2 was condenser paper covered, and had sucked up even more moisture.

Jean Andrews worked throughout the day with his autogyro and finally bested the mark about 35 minutes before the end of the session. We got permission to stay on for an additional hour which allowed the rotating wing model to log even higher times. His record was the only one set that cold and rainy day.

Our times in Pennyplane were somewhat better. Andy Faykin was able to come within about 30 seconds of the mark in that event.

We vowed to try another record trials in a couple of months, after the rainy season was over.

LIGHTER PLASTIC PROPS

One of the reasons I have stayed away from commercial plastic propellers is the weight factor. Besides having low pitch and limited blade area, the heavy

The Junior winners. Back row, left to right: Tony Pezza, Mike Escalante, Brian Gerstenberg, Kirk Nazarian. Front row: Chris Schanzle, and Greg Leffler.

Ken Johnson's indoor Vagabond at California Nats. Note that the rubber knot is in the center of the motor. It's easier to count winds with prop in your mouth. Bob Roha photo.

Indoor models remind me of wild hickory nuts!

plastic was a deterrent to this modeler. One of our local indoor scale builders, Scott Rubke, showed up last session with a new prop modification. Scott took a stock plastic prop and routed out the inside area of each blade and covered it with thin, transparent plastic. Then, he added to the prop's surface area by sticking some cellophane tape to the rear edge of each blade. The result was a much lighter prop with additional area . . . pretty nifty! Give it a try.

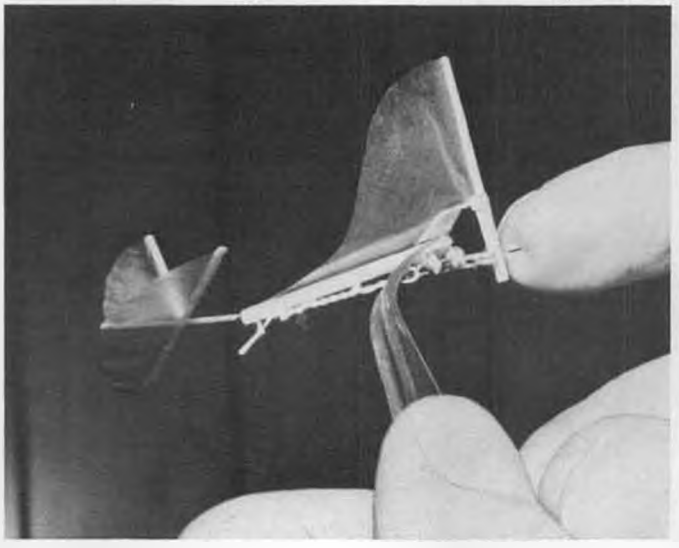
SCALE CHOICE

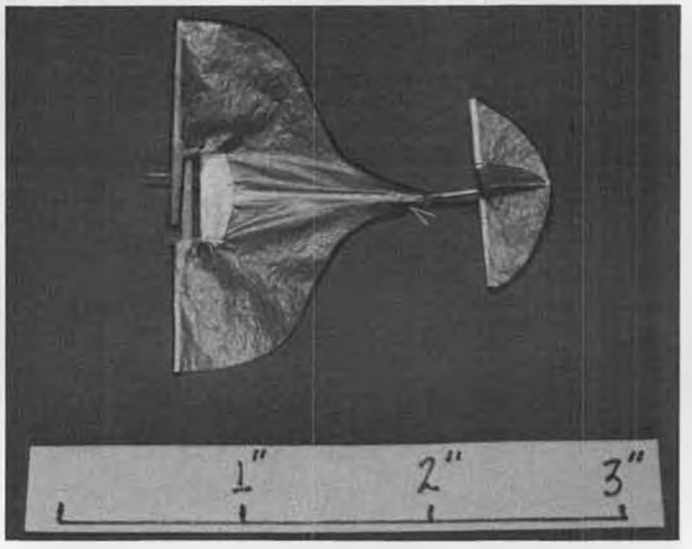
How do you decide what scale models to build for indoor competition? It's very nice to choose airplanes that you just happen to fancy. "I always wanted to build this model," is what I hear from many modelers. Unfortunately, these aircraft don't always win the contest for you. Which is more important to you? A model you like or a model that will win? To me it's the latter! Sure, I like to build many planes just for the fun of it. But, when I spread out plans and make my choice for a competition model, it's the "winner model" that gets selected.

The Piper Vagabond and Waco E biplane are two of my favorites. But the truth is, you can't put very much scale detailing on either. The Waco wings were plywood covered, so you can't even get scale points for rib spacing. The Vag is very cute but very plain . . . few scale points here.

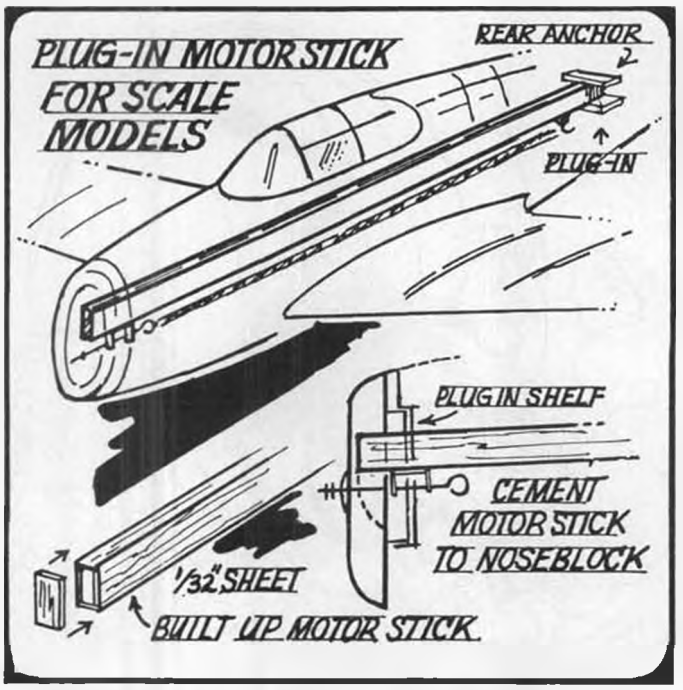
Early aircraft seem to impress the judges more than Cubs and Cessnas. The 1911 Cessna is a great choice! It will get good scale points, and it flies like a bird. Pick a subject for which you have good scale data and photos.

The Clerget monoplane has a long nose and a sizable stab. Benno Sabel's plan of this early bird is superior to most. I plan to fly this one at the Taft





Tony Avak, of Lexington Park, MD, saw author's 3-inch flapper at recent IMS show in Pasadena, CA, and went home and built this 2-inch model. Photo shows model being held with tweezers during wind and launch. Photo by Joe Gherritz.



This great little idea can save you some big heartaches if the rubber motor inside your favorite scale project should decide to break. This removable motor is safely wound *outside* the model, then inserted.

Don Srull judges FAC entries at DC Maxecutor's contest. Paul Gaertner's Handley Page "Gagnuc" (?) being scrutinized. Don flew a P.V. 7 original in the contest.

Champs Peanut contest which is upcoming.

Don Srull's Bleriot Type 25 canard catches my eye as a winner. It's quite old, and reportedly flies very well. I always did like canards for pleasing the judges. I think you get my point. Build one that gets scale points *AND* one that flies!

BEWARE OF CATS

Indoor models and felines just don't mix! One of my modeling buddies related recently, that his daughter's cat had climbed into his open indoor box and destroyed several of his best airplanes. I remembered how, years ago, our family feline crept down into my basement workshop (unbeknown to me) and climbed to the top of a stack of my indoor boxes. When the "silent giant" jumped down from the stack of five lightweight boxes, down they came. I later found my prize models crushed beyond repair inside. I kept an eye out for tabby after that. You can't train them to stay away from the models or boxes. So beware!

FLAPPER CONFERENCE

Mr. Walter H. Carnahan of 191 Island Cottage Rd., Rochester, NY 14612, hopes to stage a conference on flapping wing full-size aircraft at the Oshkosh, Wisconsin, EAA Fly-In in the summer of 1983. He corresponds with some 300 people around the world on flapping wing concepts. He is one of a group of enthusiasts who want to succeed where Leonardo only dreamed. This plan is also in the mind of this editor. If you are interested in this endeavor, contact Mr. Carnahan.

DIHEDRAL BREAK SAGS

Duration builders must face the problem of how to eliminate that pesky sag in the covering that appears after the dihedral is glued in on your wing. On a microfilm wing, the sag can be removed by applying heat near the film. With a paper covered wing the tip area can be covered last, and the sag is not such a problem.

On a Microlite covered wing, it's another story. The wing wants to be covered all at one time. The dihedral break is then glued in, and the sag appears. Try coating the top of the ribs (on the covering) with rubber cement. A thin bead of the cement can be applied with a small brush. Then simply push the covering over and down from under the wing tip side, and press the excess down onto the cemented area. A kitchen knifeblade is about the size of tool for this purpose.

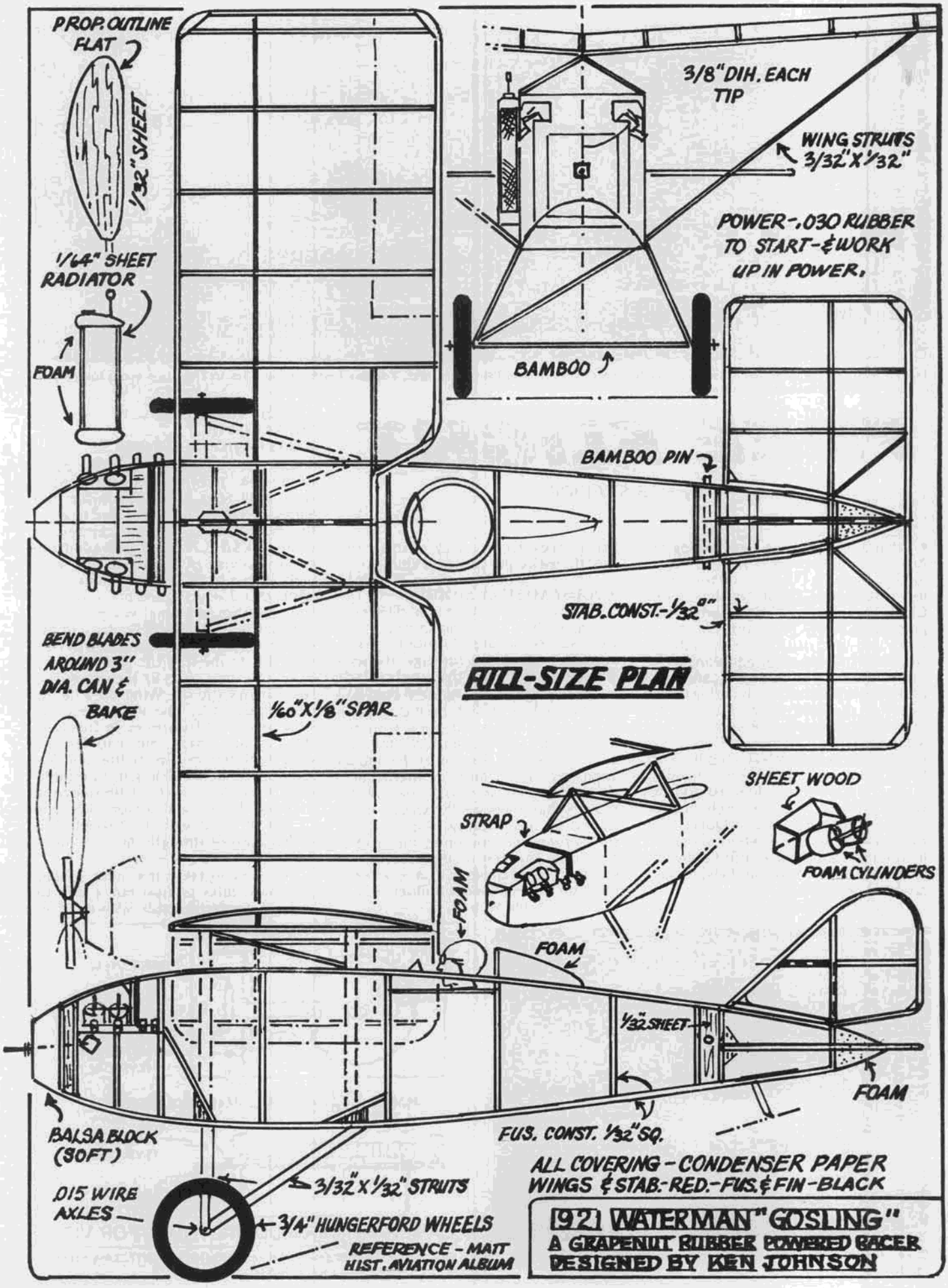
MOTORSTICKS, THE SCALE ALTERNATIVE

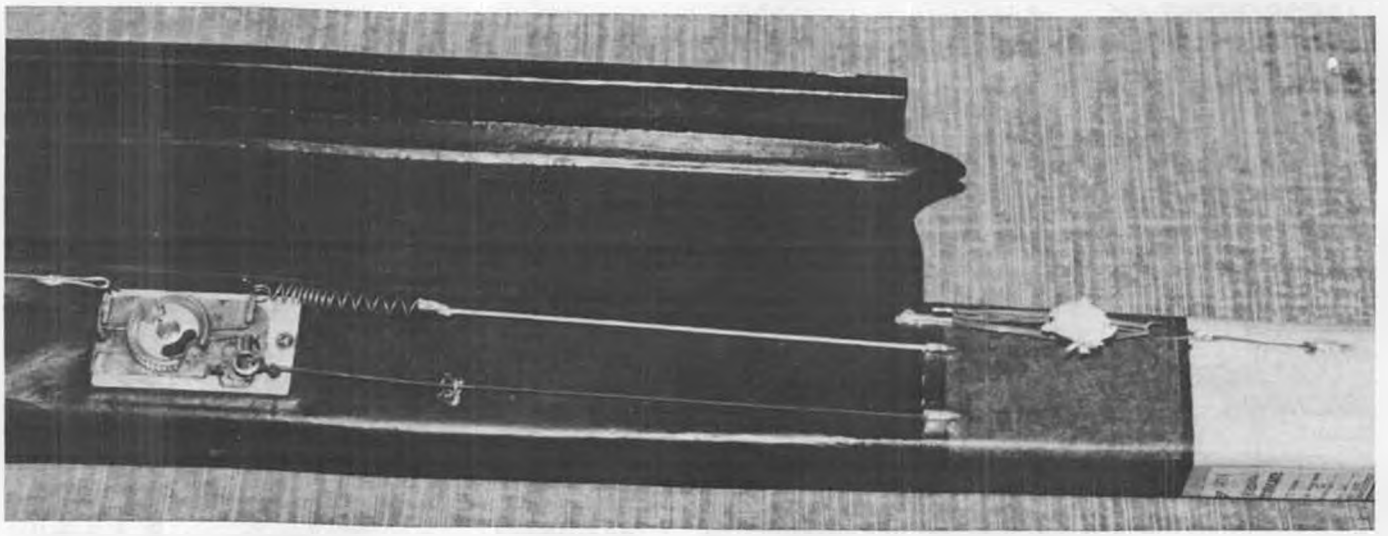
Indoor scale models always have the rubber attached to the rear of the fuselage by means of a tube or peg that goes across and through. Sheet wood panels serve as strengtheners for the bulkhead in this area. However, there is an alternative to this method. A few modelers prefer to use a duration-type motorstick running through the fuselage. This solid stick allows for lighter longeron construction. The sketch shows a possible setup for this type of motor linkage. You may wish to use a

Continued on page 87

Pat Daily's Fokker D VII takes off during Maxecutor's contest. Losenge camouflage pattern hand-sprayed through a mask.

Indoor Model Supply's new Heath Super Parasol. Excellent kit, should be a good flier too! Lew Gitlow photo.


PROP. OUTLINE FLAT
1/32" SHEET
1/64" SHEET RADIATOR
FOAM
3/8" DIH. EACH TIP
WING STRUTS 3/32" X 1/32"
POWER - .030 RUBBER TO START - & WORK UP IN POWER.
BAMBOO
BAMBOO PIN
STAB. CONST. - 1/32"
FULL-SIZE PLAN
BEND BLADES AROUND 3" DIA. CAN & BAKE
1/60" X 1/8" SPAR
SHEET WOOD
STRAP
FOAM CYLINDERS
FOAM
FOAM
1/32" SHEET
FOAM
BALSA BLOCK (SOFT)
FUS. CONST. 1/32" SQ.
ALL COVERING - CONDENSER PAPER
WINGS & STAB. - RED. - FUS. & FIN - BLACK
.015 WIRE AXLES
3/32" X 1/32" STRUTS
3/4" HUNGERFORD WHEELS
REFERENCE - MATT HIST. AVIATION ALBUM
1921 WATERMAN "GOSLING"
A GRAPENUT RUBBER POWERED RACER
DESIGNED BY KEN JOHNSON



Overall photo of the modified K-Mart camera timer VIT system described in the text. Top line (with spring) is for VIT, bottom line is for auto-rudder, *and* front line is for remote flood.

FREE FLIGHT

By BOB STALICK

• What a hobby! Here I am writing the August column (which will be out in July), it's raining outside, and tomorrow the first annual Great Northwest EZB Challenge is being held in a gym which is practically in my backyard. It's an FAI year, and the usual slate of outdoor contests has begun. In addition, we've wound the clock backwards, and most of our club members are building Pacific Aces for the 1983 Challenge. Furthermore, club member Ron McBurnett wants to start a "Champaign Cup" event for Class D gas models. To top it all off, I've tried to do all of these, including buying my first-ever glow .60 and designing a 1300 square-inch model, named (what else), the D Quell. How can anyone specialize, when so much is happening that it makes this hobby one of the most interesting and challenging around? Beats me.

For a lack of specialized topics about things free flight, stick with us this month, we've got just your thing.

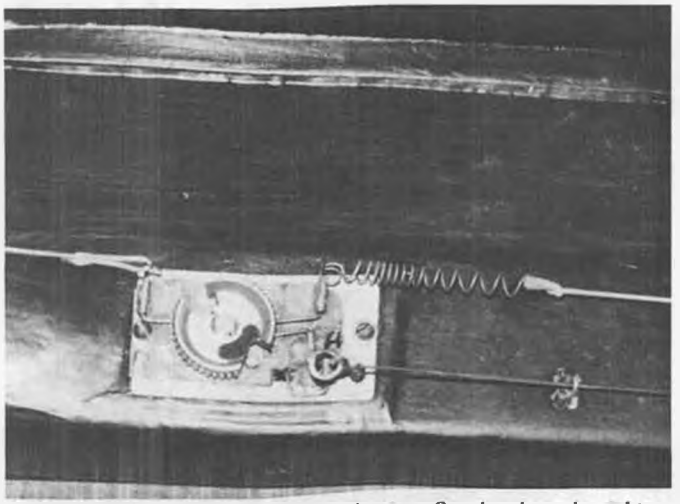
AUGUST MYSTERY MODEL

This was my first Coupe d'Hiver. I enlarged the plans from a tiny three-view which appeared in another magazine. The rolled tube fuselage, the soda straw take-off peg, the single-blade prop, and all other parts were sketched up. Al Grell and I both built one. His is still flying. In fact, Al once won the prestigious Strat-O-Bats Winter Cup with his. A later version of this model appeared in still another magazine. I think that this ship was one of the designs that really got the Coupe event started in this country. Maybe it deserves some recognition by the NFFS as one of its Top Ten models. Anyhoo, if you think you can name it, drop a line to Bill Northrop at **Model Builder**. A nice prize awaits the winner.

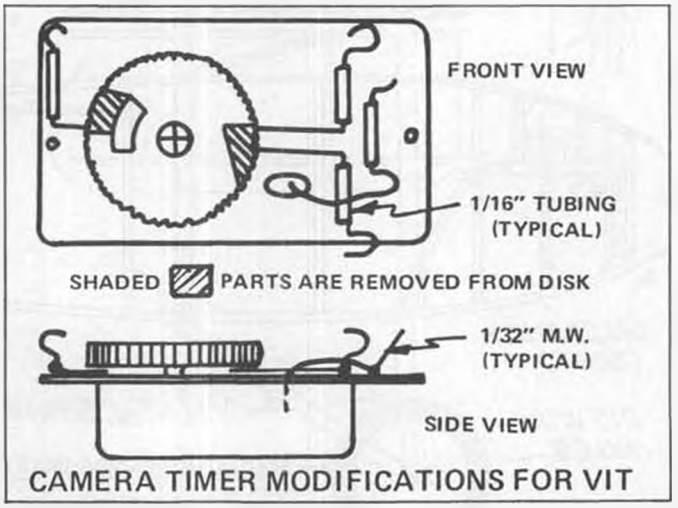
AUGUST THREE-VIEW: THE SATALYTIC, B GAS NATIONAL WINNER

This three-view comes from the pages of the CIA "Informer." It's Marcy Martin's 1982 Nats, Class B winner, the Satalytic. Says Marcy, "I wanted to go to the Nats with something competitive using a K&B 3.25/3.5. I extended the center section of a Satellite 450 from eight inches to 15.5 inches and used the same chord which gave me about 515 square inches and a higher aspect ratio. The stab was extended similarly in the same proportion. The distance from the wing T.E. to the stab L.E. was increased from 21 inches to 25.62 inches using a rear fin and sub fin. Wing tip dihedral was increased by one inch. There are other slight differences in fuselage shape, pylon shape, etc. I folded the wing (unintentionally) at the San Antonio meet. In rebuilding it, I strengthened it by webbing the main spar, and sheeting the top and bottom from the L.E. to the spar with 1/32 sheet. This added a lot of strength, but not much weight.

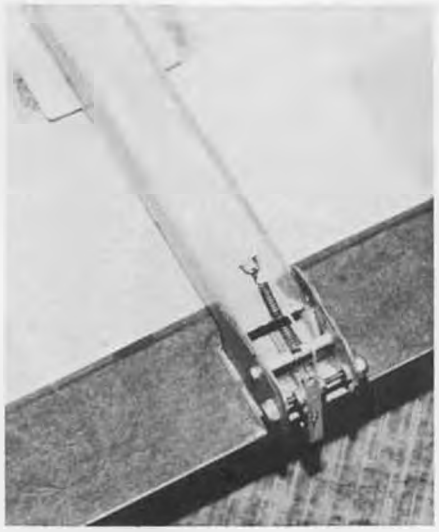
"It seems to takes me much longer than most folks to trim out a ship to where I am comfortable with it. I feel



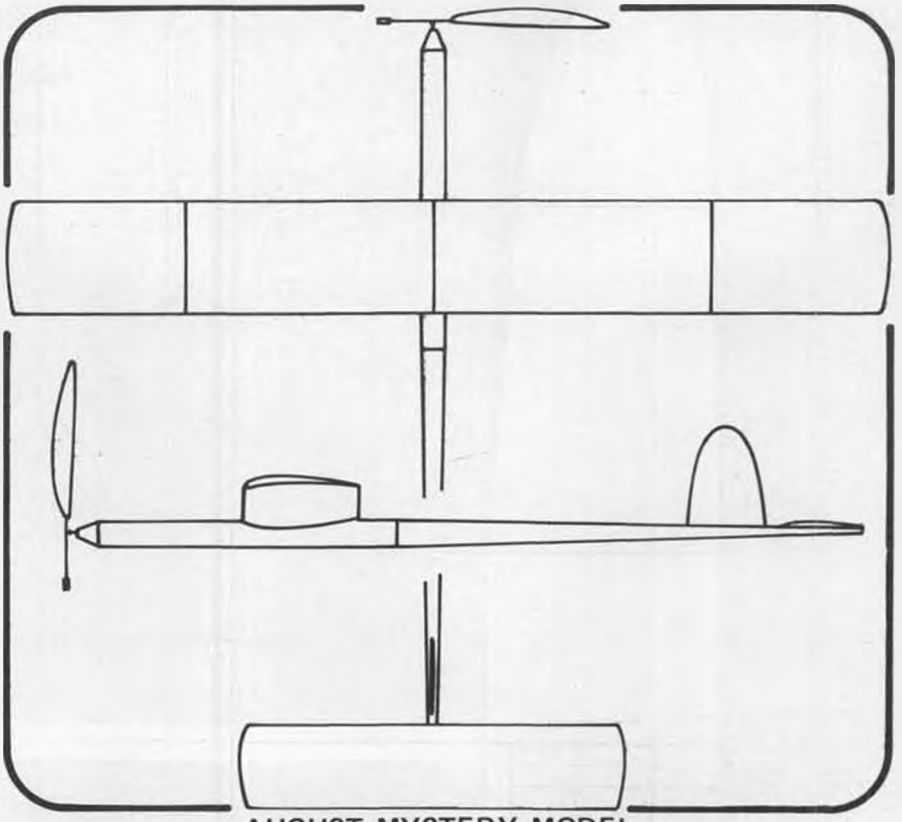
Close-up shot of the above timer mechanism. See sketch to the right for details.



Sketch 1. K-Mart camera timer modifications for VIT. Low cost unit is fun to make and a lot of fun to use.



Rear end of model to the left. Photo shows how the VIT arm is installed.



AUGUST MYSTERY MODEL

that airplanes are a lot like people, when you really like a person (airplane) the relationship grows and prospers, but if you don't, not much good will come out of it . . . I kinda like this one."

It's not clear in the drawing, but Marcy used the stock Satellite airfoils. As I look at the model, the only thing I would change is the fin shape. There's something about a squared-off fin on an elliptically-tipped model that calls for help! It's a nice ship, and obviously competitive.

DARNED GOOD AIRFOIL — RITZ 6-60-9b

This section was carried in an old issue of another magazine, and was accompanied by an article by Gerald Ritz. Gerry said, "The subject of stabilizer sections has had very small play from airfoil specialists, probably to a large extent because the main duty of the stabilizer is efficient corrective action, with lift a secondary consideration, and so the actual section hasn't been considered too important. For the last decade (during the 1950's), the favorite formula for the stab section has been to use a thinned-down (60 to 80 percent) version of the same section as used on the wing. Oftentimes when an undercambered section such as an NACA 6409 was used, a flat-bottomed stab of slightly less top camber would be used. The thought behind this was that the thinned section was a lower-lift section at the lower angles of attack of the stabilizer in normal flight, and when the flight angle was increased, the relative lift on the stab would increase in faster proportion than on the wing, therefore bringing the wing back to the predetermined angle, and thus maintaining stability."

Gerry then went on to say that some of the experts (Cheesman, Lindner, et al.) had experimented with different stab sections to get different amounts of control. Gerry submitted this month's section as an option. Its intent is to increase windy weather stability especially on Wakefield models. This airfoil is supposed to help the model keep from mushing out in turbulent air by keeping the model's nose low, and in good penetration. When this airfoil is at normal low angles, the air will flow undisturbed past the under-camber, but as angles of attack increase, the undercamber is supposed to come into play and lift the tail of the model back to the normal angle of attack. Ritz claimed to have flown Wakefields using this stab section and received excellent control.

As I have seen most of the Wakefield models still being flown with thinned flatbottomed airfoils, maybe we haven't progressed too far since Ritz's article. Maybe it's time to take a second look at the Ritz 6-60-9b?

RIGGING A TIMER FOR VIT

In the last two columns, I described several methods of setting up a VIT system for FAI Power or AMA gas models. In those columns, I spoke very highly of the Seelig multi-function timer available from Doug Galbreath. However, if this excellent timer is not your cup of tea . . . for whatever reasons, including cost or weight . . . let me introduce you to the K-Mart "Focal" timer. These are camera timers, and are available from K-Mart stores. Similar timers are available, under different brand names, in nearly any store that retails cameras and camera supplies. The primary difference is the cost. All of them look a great deal like the Tatone Mk II pinch-off timer when all of the faceplates and gadgets are removed. What sets these timers apart is their cost. A Focal timer still costs around $6.96 locally.

An excellent article written by Bill Hunter appeared in the March 1975 **Model Builder** entitled "U-Make-It Engine Timer." This article tells you

DARNED GOOD AIRFOIL — RITZ 6-60-9b

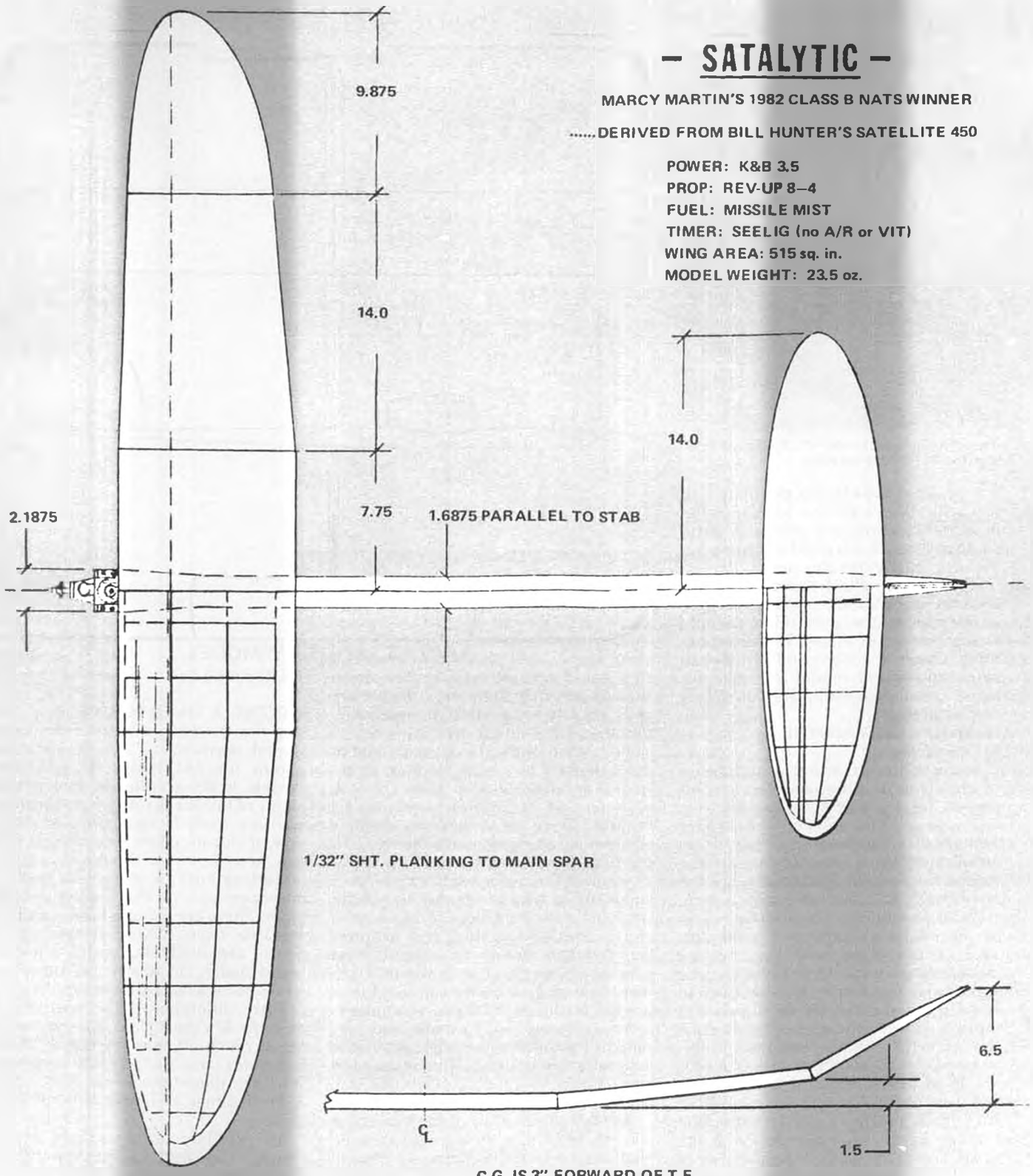
STATION	0	1	2.5	5	10	20	30	35	40	50	60	70	80	90	100
UPPER	1.2	2.5	3.2	4.2	5.6	7.5	8.5	8.8	9	9	8.7	8.1	6.9	4.8	0.6
LOWER	1.2	0.6	0.2	0	0	0	0	0	0.8	3.1	4.4	4.8	3.2	2.6	0

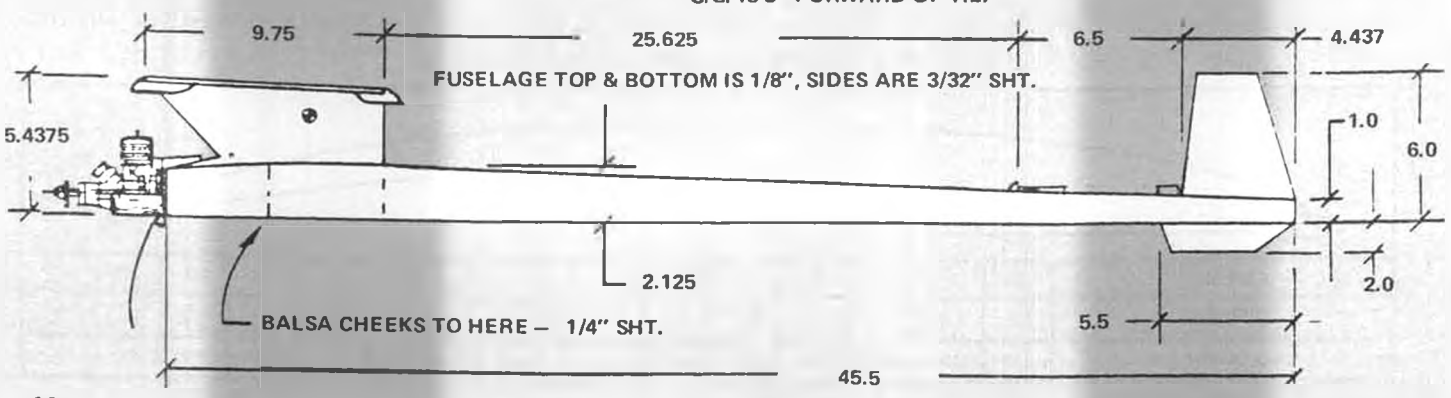
– SATALYTIC –

MARCY MARTIN'S 1982 CLASS B NATS WINNER

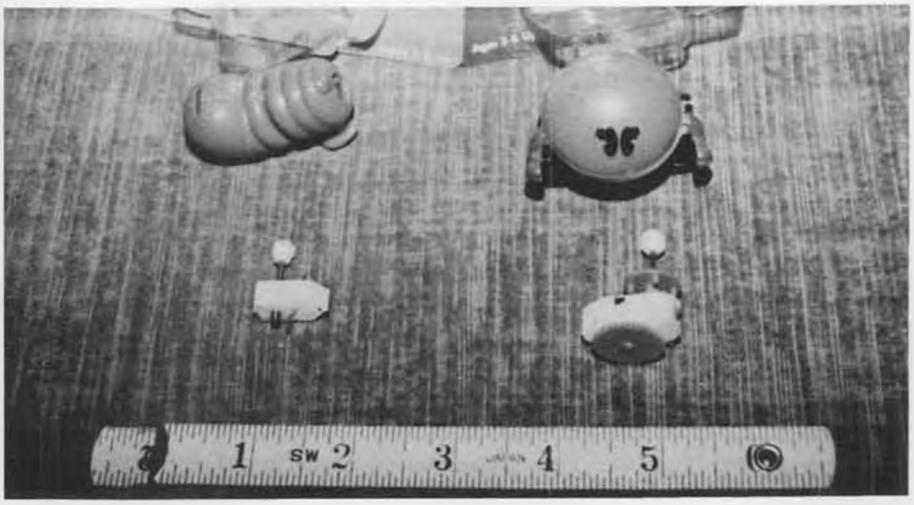
.....DERIVED FROM BILL HUNTER'S SATELLITE 450

POWER: K&B 3.5
PROP: REV-UP 8–4
FUEL: MISSILE MIST
TIMER: SEELIG (no A/R or VIT)
WING AREA: 515 sq. in.
MODEL WEIGHT: 23.5 oz.





Tomy toys make cute gifts for your kids . . . grown-up modelers like 'em too!



Now you see *why* grown-up modelers like Tomy toys . . . they contain useful mechanisms for making F/F timers!

everything you always wanted to know about converting this type of camera shutter timer to an engine shut-off timer. My purpose here is to take you one step further and detail how you can turn this timer into a multi-function timer for VIT use. The accompanying sketch and the pictures should serve as illustrations to assist in the changeover. In addition to the timer, the only added materials you will need are:

1) Brass shim stock (.01) from your hobby shop.
2) Brass tubing, 1/16 o.d.
3) Piano wire, 1/32.

In addition, you will need the usual hobby shop tools including small files, screwdriver, and a soldering gun.

The first step is to remove all of the cases and the like from the timer. Keep only the clockwork timer and the knurled disk. Cut a piece of shim stock to the approximate size shown in the sketch and drill small holes so that the brass shim stock can be fastened to the front of the timer. Use the machine screws that came with the timer to do so.

Once the brass faceplate fits to your satisfaction, remove it, and solder small lengths of 1/16 brass tubing where indicated.

Install the faceplate back onto the timer. Push lengths of 1/32 music wire into the tubes, and bend them approximately as shown. Install the disk onto the output shaft, and be certain the timer is run down to its normal stop. Now, mark the disk with a pen or scribe to indicate where you will remove some of the disk material. Remove the disk, and cut away the material so that the 1/32 music wire can be released from under the disk when it is in the normal stop position. Bend the wire "switch" so that it engages the pawl in the timer mechanism, and stops it when you want it to stop. You may need to experiment with the right kind of bend for the switch. Small adjustments can now be made in the wires by bending them so that you have the approximate adjustments needed for VIT action.

This timer will do all of the things that a Seelig will do, except it will not run long enough to DT your model. Some other kind of timer or a fuse will be needed for this purpose. The front wire will work a remote flood-off (and a brake, if needed), the top rear wire will operate the VIT arm from power to glide, and the bottom rear wire will operate the autorudder.

For further information about dust covers, etc. I refer you to Bill Hunter's article. *(Back issues of March 1975* **Model Builder** *are available for $2 each from you guessed it,* **Model Builder,** *P.O. Box 10335, Costa Mesa, CA 92627. wrf)*

MORE TIMERS . . . TOMY'S LATEST

The Tomy Toy people have done it again! Just when you were getting used

"Keep the fuse short, Dewey. I'm not supposed to leave the yard."

to going to your local toy store and explaining why you were buying a dozen Rascal Robots (for your kids?), you will now have to go back and explain why you are buying either a dachshund dog or a green caterpillar. These are the new Pencil Pets by Tomy. The reason you might want them is that they contain a new and smaller timer. Whereas the old timer weighed in at around 2.9 grams, the new one is 1.2 grams. The old one has a case size of 1.15 x .55 x .3 inches, and the new one is .85 x .45 x .25 inches. So, it's lighter and smaller. And as I have fiddled around with mine, I've discovered that the thing seems to run more smoothly. The modifications to this timer are identical to those detailed before in **Model Builder** and other magazines, except that as the parts are smaller, more care must be taken.

According to Jack Pitcher of Portland, who has experimented with his, it is possible to install a weight on the pawl of sufficient size to make the timer run three to four minutes on its own internal drive spring. This can be done without disassembling the timer. Jack used a 1/32 wire as a weight.

For handlaunch glider, coupes, and other lightweight free flight models, Tomy has done it again. Oh, by the way, mine cost $2.95 for the caterpillar. He was so cute, it pained me as I took him apart.

Y AND O PROPELLERS

Remember them? I do! They were neat looking props, and they looked just perfect on ignition old timers. I've got a small collection from the past. Now, they are available again. No, they are not from "Madman" Yates and Henry Orwick (the original producers), but from Scott Foster at P.O. Box 983, Garden Grove, CA 95690. Drop him a line for available sizes and prices.

SOME HUMOR FROM MURPH

The newsletter editor has just questioned the ex-subscriber as to why he had not renewed his subscription. The reply: "Since my cow died, I figured, I didn't need your bull any longer."

With both of the plane's engines afire, the pilot stepped out of the cockpit, strapped on the only parachute in the plane, and stepped to the emergency door. He turned and addressed his passengers, "Don't panic, I'm going for help."

With that, *I'm* going for help. See you all next month . . . in the meantime, go out and catch a thermal. •

R/C Boats . . . . *Continued from page 45*

be used as an outboard.

Printed instructions are included with the boat to assist in rigging the boat. I experienced no problems while rigging my boat. The radio box has more than adequate room for two servos, a receiver, a battery pack. As much of the radio box is under the deck, I might suggest mounting the on/off switch toward the rear of the radio box. I used Hot Stuff Super T to attach the control tubes for the rudder and throttle to the plastic radio box. Braided wire runs through the tubes to serve as the linkages. Rudder control employs the push/pull system. To mount the servos inside the radio box, a servo tray of 1/8 plywood was fashioned, and Hot Stuffed in position.

Installing the engine is simply a matter of drilling holes in the transom, and bolting the adjustable motor mount in place. An adjustable motor mount is definitely a requirement on this boat. The boat features an angled transom and simply slapping the outboard on the transom wouldn't work because the engine angle would force the bow down severely. The bottom of the adjustable mount on my boat is 5/8 of an inch up from the point of the vee at the transom. The cavitation plate on the engine is 7/16 above the bottom of the hull.

A "TRICK" ENGINE?

Yes, friends your crusty columnist finally broke down and acquired a "tricked-up" 3.5 K&B Outboard. One of the reasons why the Stingray boats that I saw racing last summer at Legg Lake went like they did was because they were powered by modified outboards. I have never heard 3.5 outboards turn up like those did. We're talking 26 and 27 thousand "r's" here friends.

Getting the K&B 3.5 Outboard to put out that type of rpm requires just a bit of rework in certain areas. Not being all that confident or familiar with the brewing of "California Screamers," I enlisted the assistance of Norm Teague. Norm is the current NAMBA Outboard Chairman, the holder of several outboard records, a super competitor, and *the man* at Teague's Model Marine Products, 8027 Genesta Ave., Van Nuys, CA 91406. In the evenings, Norm can be reached at (213) 987-3239. Norm is a professional full-size race boat mechanic and rigger. When it comes to building racing engines, be they big-block Chevies or 3.5 K&B's, Norm knows what needs to be done.

The most obvious modifications made to the K&B 3.5 Outboard are in the intake and exhaust categories. No intake tube or R/C carb is used. Instead, a needle valve assembly is installed in the carb neck of the crankcase. In order to draw fuel, it is necessary to tap into the crankcase to obtain pressure. This is accomplished by installing a pressure fitting through the mounting flange. The lower unit exhaust system is relieved inside the lower unit halves and the exhaust opening is cut open. Surprisingly, this doesn't seem to increase the noise level as much as one think it would. Since no R/C carb is used for controlling the speed, the old style exhaust throttle is employed. When the engine is properly broken in and the needle valve set correctly this exhaust throttle system provides positive throttle

control.

The modifications to the K&B 3.5 Outboard are not beyond the capability of a modeler with the time, tools, and patience to accomplish them. All of the parts are stock items to begin with. My reason for having Norm Teague modify my engine was that I knew that the engines he put together really worked well. I wasn't overly confident in my ability to make the necessary modifications.

Norm will build 3.5 outboards for others as well. He prefers to work with new parts rather than something that has been beat around the pond for untold laps. Norm is willing to work a couple of ways in modifying engines. You can send him a new outboard, and he will make the modifications to that engine. Or if you don't have an outboard, Norm will sell you a new modified engine. As there are some variables in this process, it would be best to give Norm a call, or write to him asking for specific information regarding prices.

RUNNING THE STINGRAY

So far, I've had the Stingray out three times as I write this column. All of the runnings have been practice runs. I haven't yet had an opportunity to actually enter a race with the boat. However, there are some things about the boat and engine which have already impressed me.

With the modified 3.5 outboard, this is a very fast boat down the straightaways. Stingray hulls have been clocked at 44 mph for the 1/16-mile straightaway. I still find it rather amusing to see this high profile deep vee trucking down the pond when I'm accustomed to the lower profile deep vee hulls. Because of its deep vee design, the Stingray will take some fair-size waves. The best straightaway runs I've made with the boat were in a moderate chop of three to five inches.

Cornering an outboard deep vee is a little different than cornering an inboard deep vee. Most inboard vees can be run wide open through the turns. Inboard vees tend to lay to the inside on a turn. This leaning into the turn isn't a characteristic with the outboard vee. The Stingray corners without much lean. When the water was smooth, there was no problem keeping full power on the boat during the turns. When the water conditions began to get choppy, wide open turns caused some exciting action. Norm Teague was telling me that when he races his Stingray he usually backs off a bit in the corners to gain stability. Even though I've made some "hairy" turns, and really bounced my Stingray around, I have yet to flip it over. That's not to say it cannot be done. I have been impressed with the ability of the boat to recover and keep going after getting out of shape.

The modified K&B 3.5 Outboard likes small props. I have found two props which have worked well. They are the J.G. E-20 and E-20T. Norm told me to get hold of a J.G. 3-D-8, and cut the blades like the E-20T.

I've been running my engine on very mild nitro fuel (15 percent), and have been amazed at how well the engine works. I'm most interested to see how it performs with my 50 percent racing fuel.

I must tell you that there is some good news/bad news about running these modified 3.5 outboards. The good news is they really do put out the power when properly prepared. The bad news is that they can break parts easier than your stocker. For the individual on a limited racing budget, this needs to be taken into consideration.

Using a stock K&B 3.5 Outboard, I think the Stingray would make an excellent sport dee vee. It is definitely much easier to set up than an inboard deep vee. Its ability to operate in rough water, and its stability would be an asset to the new model boater.

The accomplishments of the Stingray in the 3.5 Outboard Deep Vee Class are substantiated by the records the boat has set, and races it has won. Without any reservations, I can recommend the Stingray 3.5 Outboard Deep Vee from Magic Boats to anyone considering a 3.5 outboard deep vee.

READER RESPONSE

Jeff Smith, of Endwell, New York, responded to my request in the June column for feedback on the sponson lips/edges on tunnel boats. "Just read your column in the June **Model Builder**. I tried the sponson modification on my Excalibur II, and am very pleased with the results. The boat will hook if turned too sharp, but I use a Futuba 3EG type radio with dual rates, and trim the hook right out. The boat seems very positive in the straights, and much more so in the turns. Thanks for the mod."

Thanks, Jeff, for your note. I'm glad to hear the idea is working for someone. I've received letters from some of you asking about performance tips for the K&B 7.5 Outboard, and various tunnel hulls for this engine. I'll devote some space in next month's column to ideas I've tried or heard about on these 7.5 hulls.

Like to see your boat in **Model Builder**? Send photos and info to: Jerry Dunlap, 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

R/C Autos . . . . *Continued from page 47*

to the pan and servo saver assembly. This piece is an absolute necessity for easy tuning of the chassis on this and most other pan cars. Even so, we did shim the cross bar with thin washers to get most of the tweak out, and then used the tweak plate for fine tuning at the track.

The radio tray pictured is a stock piece and follows general Associated practice, placing the heavy battery pack to the inside of most corners on a clockwise road course. The tray comes blank so that you can do your own thing if preferred. Radical changes are not suggested.

For the tank, there is only one option, and that is the new molded number available from either Associated or Delta. In no case would I use the supplied metal tank. It holds only four ounces (about 118 cc) while ROAR rules allow 125 cc tanks, the "Git Fillers" are notorious for leaking pressure, hard tanks can spring a leak at the soldered joint between the front and rear of the tank, and if that isn't enough, you must get the plumbing right inside the tank to ensure decent engine runs. I could show you how to do it . . . but I won't. Buy the suggested tank, it'll save you all kinds of problems.

Unfortunately, the nylon tanks come in a little oversized, this one was almost 140 cc. Using a heat gun, warm the forward, lower side of the tank just until the nylon starts to have the appearance of having water on it. If heated too much, the nylon will turn clear, and at that point it is close to developing a huge hole. With the material still opaque, but "wet" looking, press any rounded object into the tank (the bottom of a tablespoon works nicely). Go in a little at a time, always measuring the tank capacity, until it holds the 125 cc.

For the radio system, John uses a real leftover, one of the JoMac 1/8-scale radios. Many of you have probably never even *seen* one of them, and I don't suggest you go looking for one to buy, but this particular radio has been quite reliable for a number of years. The best bet is to go with a system that was popular in your area a couple years ago, and that will no doubt be a Futaba wheel system with FP-S7 servos. These are still good radios, but most have switched over to the high-zoot look-at-all-them-switches systems available. The new radios are in fact better, but with so many of the older Futabas around, do some checking . . . no doubt you will come up with a real bargain. Remember, the majority of these radios came out of cars not because they had quit working, but because something "trickier" was replacing it. In any case, be sure the servos are tough enough to live in an R/C car. The S7s are fine, as well as plentiful.

If the car is just for giggles, a stick transmitter is OK; if any thought is being given to racing, a wheel is easily the best. That old Futaba Tx can be updated easily. Both Delta and MRP offer an inexpensive kit that gives adjustable rate on the steering. Kimbrough has a stick-on grip that makes it more comfortable to hold the box. Used tire rings can be glued to the wheel for that "Maiden-form feel", John Thorp (and a couple others that I can't recall) make a thumb-wheel adjuster for the throttle lever, there are even kits still available (try Parma) for adapting a pistol-grip to the back of the Tx.

Back to the tank installation . . . there was a bolt common to the pan and motor pod plate which fouled the rear end of the tank. We just left it out and lowered the tank down close to the pan.

For the motor, one of K&B's new 8800-series .21s was installed. This motor is easily avaiable, parts are not usually a problem, it comes with a heat sink head, does not come with a carb you wouldn't be using anyway, has a blow-proof rear bearing, and easily develops enough power to completely overpower this chassis. You can buy this motor, drop it in the car without even looking inside (let alone having to do any rework), and when you decide to move up to a more sophisticated chassis this motor will still be running strong. Other motors are available, but the new K&B makes a lot of sense for a beginning racer. I would be very careful about buying a used motor, in fact, I wouldn't do it.

For a car, we used an older, Delta slide-valve number, the one that has a flat plate for the slide. At present, the very best carb is also from Delta, but it is

MAKING WAVES ☆ ATLAS VAN LINES

A 1/5th True Scale Hydroplane Racer from American R/C Helicopters

Atlas Van Lines, an extraordinary new kit based on premiere hydroplane racer of the same name, opens up a whole new world of fun and excitement for remote control enthusiasts of all types, and of all skill levels — even novice!

This is a kit expressly designed for sheer enjoyment in both building and operation. Straight forward assembly, with step-by-step, easy to follow instructions, sets the pace for a truly exceptional modeling experience.

Each Atlas Van Lines kit offers a full-size master plan, as well as an instruction manual with corresponding, illustrative photos, all running hardware, and a full compliment of nuts, bolts and required fastenings.

The hull, cockpit and cowling are all precision crafted of epoxy fiberglas. The tail fins and horizontal stabilizer are manufactured of foam core with balsa sheeting.

The drive train was designed with problem-free operation in mind. Complete bearings are used throughout. There are no bearing bushings to become worn or sloppy. State of the art design incorporates a clutch which works to prevent propeller rotation at engine idle, thus allowing for safe and dry launchings. The propeller shaft is driven by a pair of timing belt pulleys, which can be removed for maintenance as well as changed to alter rpm. Using a stock 50cc Quadra engine, a 1475 prop is driven at 14,500 rpm, generating speeds in the 35-40 mph range. The use of the larger, more powerful Hornet engine will increase speed upwards to the 45-50 mph range.

Now you and your friends can run and race all day with very little operating expense. It's a world apart from what you've experienced. **Atlas Van Lines . . .** ***A Moving Experience!***

SPECIFICATIONS:

Length: 68" ★ Beam: 34½" ★ Running Weight: 26 lbs. ★ Engine:* Pull-Start Quadra ★ Radio Required:* 2 Channel

*Engine and Radio Not Included in Kit.

FEATURES

- ★ **RUNS ON GASOLINE-OIL MIXTURE**
  Not Expensive Glo Fuel!
- ★ **UTILIZES CDI IGNITION WITH SPARK PLUG**
  No Glo Plugs to Burn-Up!
- ★ **SUPERIOR, CLUTCH-ENGAGED DRIVE TRAIN**
  Allows Engine Idling. No need for Throwing Launch.
- ★ **DESIGNED FOR DEPENDABILITY**
  Complete Bearings Throughout! No Bearing Bushings.
- ★ **VERY STABLE AND SEAWORTHY**
  The large size helps stability and allows you to stay in the water when conditions force others to pull out. This boat is very difficult to swamp or flip.
- ★ **AUTHENTIC ROOSTER-TAIL**
  Produces a high and long Rooster Tail on straight-aways as well as in turns.

Atlas Van Lines Kit

$450.00

★ ★ ★ American R/C Helicopters, Inc.

For Further Information Call or Write: **(619) 744-7533**

635-11 North Twin Oaks Valley Road ★ San Marcos, California 92069

a little hard to justify a $60 carb for a $75 car! McCoy has a close copy of Delta's carb which works fine (I am using one on our RC500) and is less expensive at a little over $40. There are a lot of used Perry carbs around, and they can work OK, especially when used in conjunction with the suggested nylon tank as it contains a sintered bronze filter that eliminates all those teeny bits of stuff that used to play havoc with Perry carbs. No matter what carb is used, I would not suggest a carb with a bore size over .200 and even smaller can work very well.

The muffler is another leftover, an out-of-production piece from John Thorp. It works fine, but one of the next steps with this car is to switch over to a forward-mount pipe. There are lots of used "can" mufflers available, and they are all rear-mount. They also work really well, having only been shelved for the very questionable benefit involved in moving a little weight from the rear of the car to the center.

More on the RC150 next month. . . •

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

Moorhouse kits, which include Peanuts, such as the Luton Minor, Comper Swift, and Currie Wot, plus mini-Old Timers for CO_2 power.

Modeling tools newly stocked are razor planes, balsa strippers, Zona saws, tweezers, pliers, and forceps. See the Peck-Polymers advertisement for catalog ordering information. We enjoyed reading the heading at the top of their newest list . . . "Bob's Toy Box"!

ORIENTAL PEANUTS

Surprisingly, for a land renowned for product miniaturization, Japan has been rather slow to gain interest in Peanut Scale. But thanks to the promotional efforts by a few stalwarts such as Ichiro Yamada, the event is beginning to gain favor. A February indoor meeting gathered some 28 Peanuts, with a variety that encompassed a Polish Wilga, a Santos-Dumont 14 bis canard, Hanriot, Farman Moustique, Gee Bee R-1, General Aristocrat, Dyke Delta, Piper Cub, and the usual Fikes and Laceys.

Meanwhile, Ichiro has accumulated a showcase full of flying scale models from several parts of the world, including Canada, France, and the USA, which form a novel international mini-museum.

PISTACHIO NUTS ANYONE?

Or, perhaps you prefer the name *Grapenuts*. By any name, these tiny flyers make Peanuts look like giants. Doc Martin and his merry Miami indoor gang are actively promoting them with rules allowing either a maximum wing span of eight inches or an overall length of six inches. They also contemplate allowing the itty-bitties to compete in the Peanut class with a suitable handicap.

Millard Wells sponsored the first Florida Pistachio event which attracted a variety of entries including a Ganagobie, S.E. 5, Wee Bee, Pipe Vagabond, Junkers Stratoplane, D.H.6, a Found, and even some eight-inch Bostonians! The winner of a fine Spirit of St. Louis painting was Walt Everson, who's entry managed an amazing 58-second flight.

THE NEW YORK INDOOR TIMES

This is the title of the newsletter edited by Ed Whitten, featuring indoor activities in and near New York. The Columbia University Library rotunda seems a hotbed of action, with Pennyplanes, Manhattans, Bostonians, and Scale, as well as special contests. For example, there was the Great Backward Angel category for canard pushers, which garnered good support, and was won by Pete Andrews. His model's duration was 11 minutes and 38 seconds. None too shabby for a 1.2 gram tailender.

It was our pleasure recently to visit with Don Garafalow (formerly a model designer for Scientific), and he filled us in on the many activities taking place in the New York indoor scene. Don has become well-known for his flying scale models, and we understand he has a new "secret weapon" underway for the next contest season.

QUESTION:

Why do pachyderms make such economical transportation? Because they run on Peanuts! Ah well. . .

ANOTHER FAMOUS MODEL BUILDER

Charles Stewart Rolls, of Rolls Royce automobile fame, began his interest in aviation with miniatures. According to the book *C.S. Rolls, Pioneer Aviator*, authored by Gordon Bruce: ". . . during or soon after his undergraduate days (1895-1898) when he experimented with model aircraft in co-operation with J.T.C. Moore-Brabazon (later Lord Brabazon of Tara). 'Brab' recorded in his autobiography that the models, constructed of tissue paper and light wood secured by sealing wax, were usually of the tandem monoplane type spanning about 18 inches."

MORE RECENT FAME

Can you imagine winning an Academy Award for model building? Well, maybe not, but Mike Fulmer who constructed the now-famous miniature flying bicycles used in the movie *E.T.* did receive a *thank you* on camera during the Oscar ceremonies from Special Effects Winner Ken Smith. Mike is quick to share credit with another master modeler, Fulton Hungerford, who made the spoked wheels for those bikes!

HOW'S THAT AGAIN?

The San Diego Wild Animal Park employs a tethered blimp over 30 feet long as a launching platform during its popular bird show. Nearby is an amphitheater were musical concerts are held (a recent one featured composer/singer Paul Williams). During the show he spotted the blimp, and quipped, "Look! There's the Pilsbury Hindenburg!"

WRIGHT PLANE FLIES AT WRIGHT FIELD

Frank Scott, of Dayton, Ohio, forwarded a report about a reproduction

(not replica!) of a Wright brothers Type B which has been successfully flown for a total of almost 14 hours. Appropriately, the first flight was made at Wright-Patterson Air Force Base over a section that was once known as Huffman Prairie, the site of the original Wright Ohio flying.

The reproduction is powered by a Lycoming helicopter engine, spans 40 feet, weighs 2800 pounds, and cruises at 60 mph. Presently, the machine is grounded by Pentagon red tape, but it is hoped that the craft will eventually accumulate the 40 air hours required by the FAA of aircraft flown in air shows.

THE GLUE GURU

Fritz Mueller, tireless experimenter from Columbus, Georgia, has developed a different approach to glue. He dilutes white glue with rubbing alcohol, and whips it into a jelly-like consistency. Rubbing alcohol contains a sufficient amount of water to produce this concoction when vigorously stirred with a cheap brush.

Once the glue has dried, denatured alcohol may be used to soften the joints, or to cure blushing. Note that white glues will rust steel, so stainless steel, or plastic pins should be used as bottle stoppers. Fritz prefers using a section of small diameter teflon tubing as a bottle nozzle for dispensing a thin bead of the substance.

Mueller's approach to model covering is unique. The tissue itself is precolored and precut to outline. Water is applied to a sheet of plate glass using a wide brush. The cut sections of tissue are floated atop it, and excess water is soaked up with a smooth cloth. Next, a newspaper is used as a blotter. At this point, acrylic or other water-soluble color is applied and blotted again.

Undiluted clear dope is then applied to the periphery of each tissue piece, part on the tissue edge, part on the surrounding glass. The dope must have time to dry before the tissue starts shrinking. Therefore the water should not be blotted too much, and the dope must be applied quickly. Force-drying should be avoided.

When ready, the edge of the tissue is lifted with a single-edge razor blade, and the paper is applied to the model structure immediately. The technique requires that the model's structure has first been prepared with two coats of sealer. After drying, a narrow bead of the glue jelly is applied to the outlines. This bead will stay put for a while on the sealed surface of the structure, allowing enough time to place the tissue in position, and adjust it as necessary. The tissue may be lifted, if required, by loosening it with denatured alcohol. Gluing *through* the tissue is also possible. Dry glue joints can also be sealed with a Monokote iron.

Water and the glue jelly do not mix well, so alcohol is used for wet tissue application. Droplets of excess glue may turn white, or blush, but may be treated with alcohol or dope thinner to cure the problem.

Fritz sent in a sample wing, some 30 months old, and it was still in excellent condition.

BALLOON MAIL

Nineteen hundred eighty-three is the anniversary of manned flight, which began in France during 1783, when Pilatre de Rozier and the Marquis D'Arlandes ascended in a Montgolfier hot air balloon. Commemorative 20-cent US postage stamps have recently been issued in sets of four. One stamp depicts the 1861 *Intrepid*, another the 1935 *Explorer II*, and the two others show colorful hot air sporting balloons.

JUNIOR KIT MANUFACTURER

One of our photos shows the delightfully creative efforts of six-year old enthusiast, Steve Wilder, who seems destined to become a model kit designer. Starting with a "recycled" plastic kit box overlaid with paper, he hand-painted a new cover. Somehow he managed to get the *Z* in *Zero* backwards, but there are often problems with any new kit, even among the established companies.

Inside, we find a hand-drawn assembly diagram, a colored side-view of the Zero, parts drawn out on sheet balsa (with a felt pen), a rubber band, hand-made insignia sheet, white tissue paper and a plastic prop. All very remarkable for so young a manufacturer, and we offer our congratulations to him!

PARTING SHOT

You've all seen the admonishment

"PHOTOS DO NOT BEND" on envelopes, but how about the postman who scrawled underneath, "Oh yes they do!" •

Flying Wing . . *Continued from page 21*

place and give the bearings a coat of petroleum jelly to prevent glue from getting into the bearing area. Reinforce the area around the bearings with scraps of balsa. Route the push rod to the servo and install.

Install battery tubes immediately behind the leading edge. Decide now where openings and/or guide tubes may need to be installed in the structure to facilitate radio installation and removal. Mount the micro switch and retract valve so that they can be operated by a single push rod. The operating sequence is: gear down . . . motor off . . . motor on . . . gear up. Install the air tank in the space between the motor opening and the valve/switch area. Mount charging jack, on/off switches, and air charging valve in the same area as the micro switch/valve. The receiver battery pack also mounts in this area.

Now, install the 1/4 x 1/16 spruce strips along the front edge of the hatch openings, and the 1/8 balsa hatch supports on the rib faces. Install the 1/8 ply screw plates along the rear edge of the hatch openings. Make the hatches from 1/16 plywood to fit the openings. You can now sheet the wing stubs on the top side. Make sure that everything is operational and complete inside before doing this. Make a small oval opening in this sheeting to allow access to the flap linkage.

Soak the 1/16 balsa motor tube blanks in ammonia for 20 minutes to soften them, and then wrap around the tube forms. These forms are made by wraping newspaper around doweling until the proper diameter and taper are achieved. Allow to dry, and then glue the seam. Carefully cut these tubes to match the curvature of the wing's airfoil, and mark their locations. Cut the top sheeting out inside these marks. Install the tubes with the webbing pieces.

Now is the time to make up the motor mounting plates and extension shafts. The extension shafts need to be assembled carefully to insure accuracy. After assembly, roll them on a flat surface to get a rough check on their accuracy. Mount the motors on the 1/8 ply motor mounting plates, and set into the motor areas. Slide the extension shaft assemblies down the drive shaft housings, and onto the motor shafts. When satisfied with the alignment, prop clearance, centering, etc., glue the motor mounts and the bearing suppoers in place. Now, hook up two cells to each motor, and check that all is true. If not, remove the shafts and try again. Remove the motors. Remove the shafts by cutting a small hole in the bottom sheeting under the LE stock, in the area of the air intake. Don't forget when wiring the motors to include fuses in each lead.

The area around the cockpit can be sheeted now. Make a hatch to fit the opening behind the cockpit. Carve and hollow a balsa block to form the rear cockpit fairing. Glue this fairing to the hatch. This whole assembly is held in place with one screw. The hatch mounting screw is also the mounting screw for the antenna mast. The bubble canopy is a highly cut-down Sig unit, and is glued in place after you have done as much cockpit detailing as you desire. Oh yes, don't forget to put in a pilot, even though mine seems to be on the blink.

At this point the air intakes can be carved from balsa blocks and installed. Back to the outer wings, install a 1/16 aluminum tube in the landing flap area to guide the elevon much easier. Sheet the tops of the wings, and install cap strips on the ribs and rear spar. If this is done correctly, the cap strip on the rear spar will overhang the elevon/pitch flap area. Now, check the wing fit to the center section, and gaze upon your work. Now is a good time for a little armchair flying also.

LANDING FLAPS

I build these in place. Place the assembled aircraft upside down, and cover the landing flap area with thin, plastic film. Cut 1/16 sheeting to fit in place, and add the ribs. The rib containing the control arm will require a cutout to be made in the sheeting to clear it. Now continue adding sheeting, making sure that the flap surface matches the center section surface and the wing surface. Make the cuts to install hinges and check the fit.

FINISHING

I recommend a full assembly now before going on. This will allow you to make any last-minute corrections before finishing. I covered the entire aircraft with dope and silk with plenty of filling and sanding along the way. Install the landing flap before painting. Be sure to pin those hinges. The paint scheme is orange-yellow on the bottom, and medium blue on the top. The inside of the cockpit is brown. The finish on the real aircraft was glossy, and it was not perfectly true.

FLYING

Adjust the pitch flaps so that they are up about three degrees, and the elevons so that they are up about one degree. The flying propellers are 7x4 Rev-Ups. I used ten, 1.2 amp-hour cells with both motors in parallel to keep the weight down. Make sure that the aircraft rolls straight when the elevons are in neutral. I suggest that the slots be closed with clear tape during the first flights. The aircraft should lift off by itself, and climb away easily. Turns will be strange to watch. The aircraft will yaw in the correct direction, then bank and begin the turn. Be careful not to over control, as there is a slight delay in response. You will find that the aircraft accelerates quickly, and does not slow down very quickly.

If you want more information, the following references are given: *The Flying Wings of Northrop,* by Ed Maloney, World War II Publications; *Northrop, an Aeronautical History,* by Fred Anderson, a Northrop publication; Bill Young, scale drawings, color, and black and white photographs. There will be an article in the Spring 1984 *Journal of the American Aviation Historical Society,* and I will be publishing a profile on the N9M series sometime in 1984.

I hope you have as much fun with this aircraft as I have. Whenever I take it out,. it draws most of whatever crowd there is. •

BIG Birds . . . . *Continued from page 39*

You can obtain all three sheets of these Waco UPF-7 plans for $24.50 (postage paid) from Wagner's R/C, R.D. 1, Box 291, Owego, NY 13827. By the way, three-views are included, and cowl and wheel pants are available. If classic bipes are your thing, you're gonna want to make this into a labor of love . . . 'cause, after all, bipes are beautiful!

★ ★ ★

For frustrated, would-be cropdusters, C.J.M. Plans (13640 S. Wall Lake Rd., Delton, MI 49046) has the Piper PA-36, Brave-300 ag-plane plans drawn up and ready to ship. Not only are they extremely well done, but the plans also include a host of drawings and sketches that make duck soup of the many details. The instructions are equally well done, and in fact contain an update sheet for mods to the original; a very nice touch that tells me the Wasserman Boys really care.

CJM recommends something more than two cubic inches, ". . .if you're going to spray, or haul a payload." In fact, they used a 4.2 cubic incher when testing with a seven-pound payload of grass seeds and flour (the flour was added in order to be able to see the spray), but feel you should play it safe, and not go over a three-pound payload. With a standard Quadra, this bird should come in around 22 pounds, leaving a two- to three-pound hopper-full to play with.

No special cowl is required (the one in the pic is made of wood), and the wing is foam, with all the necessary templates drawn on the plan. This 94-inch Brave is touted as being stand-off scale, although I'm sure a lot of guys are going to dress her up with details and steal the show. According to the info that's filtered back to me, this bird does look and fly extremely well. Plans and instructions are $30, postage paid, from CJM.

★ ★ ★

Ken Runestrand, a very prolific designer, builder, and flyer, got the hots for Paul Poberezny's Pober Pixie . . . and to satisfy his lust, promptly built a ten-foot, 24-pound Pixie of his own.

Ken kept costs in mind, and designed this BIG Bird to utilize the less expensive cuts, like doorskins for fuse sides. Being an active flyer, Runestrand knows what it takes to make other BIG Bird lovers happy . . . and has plans and instructions for sale that supplement each other well. Once again, all pertinent info is readily available; you won't get frustrated and angry searching for data that should have been there, but wasn't. If you like to scratch-build and enjoy easy flying with a mildly aerobatic aircraft, this would be an excellent choice; she's stable . . . and very scale-like.

I'm definitely attracted to the Pixie because she's better suited for my now less energetic style of flying. I figure I shouldn't get in too much trouble with this kind of forgiving flying machine. Many others are drawn to her, also. According to Ken, this pretty parasol is equally graceful on the ground as it is in the air, and is an eyecatcher wherever she goes.

And if you want to get that added tingle of satisfaction running up and down your spine as your Pixie gets up on the step and skims along the top of the water, get Mr. Runestrand's plans for Giant Edo Floats; they're great . . . and well-proven.

Ken shows how to build either 45-inch floats for quarter-size airplanes up to 24 pounds, or 56-inch floats for third-size up to 30 pounds. There is even a 60-inch option. All vital information about installation angles and step location are right these on the plans. A somewhat different approach to steering shows a

water rudder servo (connected to the rudder servo and the receiver by a Y harness) mounted inside one of the floats. Ken wanted absolute, positive steering, and this arrangement sure did give it to him. Oh yes, these floats are built-up, not foamies . . . They can do double duty, also allowing you to fly off of both water and snow!

The Pixie plans are $25, and the Giant Edo Float plans are $10, both postpaid, from Ken Runestrand, 301 Bitner St., Roseville, CA 95678, (916) 783-8211.

One final comment about plans in general. No matter how nice, and neat, and clear, and informative they appear to be, you never really know how good plans are or aren't till you get into the building. That's when errors between top- and side-views crop up and completely ruin your day . . . as do the omission of parts in some views. If you run into this kind of situation, let the designer know . . . 'cause he may still be unaware that he goofed. Y'know how it is, you figure someone else must have already told him, but, as everybody thinks that way, the poor guy's probably completely unaware that he's made a mistake (or two).

Do something nice for your cockles for a change, and try one of these plans; remember that a warm cockle is a joy only for as long as you keep it warm.

ENGINE STARTING: A PIECE OF CAKE

Or perhaps "easy as pie" suits you better . . . but whatever kind of baked goods turn you on. Gerry Holdeman's Super Starter won't be anywhere near as fattening, and will make engine starting an absolute pleasure.

Remember the spring recoil starters on 1/2A's? Well, this BIG Bird starter of Gerry's is very similar . . . simply a large spring mounted with a roller-bearing clutch on the machined rear shaft of engines like the Quadra. As the prop is rotated backwards three-quarters of a turn, the roller-bearing clutch immediately engages the spring and tightens it. Then, when the prop is released, the spring actually flips it through three, and sometimes four revolutions. The end result is what you've always wanted: one helluva big, fat spark and almost guaranteed starting every time.

Won't it be nice to eliminate those nicked fingers, sore arms, and that heavy, expensive support (starting) equipment? And the introductory price is only $29.95, plus $1.50 for postage and handling, for all models . . . which presently include the 35 cc and 50 cc Quadras and the Magnum II. Other models for engines with rear shafts are under development . . . including a special version for use with the Byron Originals mount, as well as one for the Tartan Twin.

Now that I've told you what "they" say about their starter, let me give you the "real" word . . . IT WORKS AS ADVERTISED! None of the claims are exaggerated. Althought the Quadra I tested my Super Starter on was not installed on a BIG Bird, it was bolted to the same Quadra mount it'll fly with. Starting was first time, every time, hot or cold (of course proper choking is needed when cold). The one-sheet instructions include templates on the backside for three of the most popular and most used Quadra mounts. Installation is a simple, one bolt operation. The SS utilizes no previously usable space in the aircraft, and weighs under four ounces. The instructions include a good list of safety precautions.

For some there is bad news: the SS will *not* adapt to engines without machined rear shafts . . . like the Evra (which really needs it), and the Kawasaki (usually an easy starter).

For your H&K Super Starter, write to PK Products, P.O. Box 6226, Hayward, CA 94540. This "better mousetrap" is proof, once again, that the KISS (Keep It Simple, Stupid) Principle can't be beat!

WHAT! ANOTHER CAP 21?

Why not? It's a free country . . . and besides, this kit from R&R Models (1611 Red Bud Dr., Northwood, OH 43619, (419) 691-6525) is different from the others: it's all balsa, spruce, and ply construction . . . no foam (the cowl and wheelpants are fiberglass). It's bigger than most, with a span of 91 inches, and it weighs 22 pounds.

R&R's Bob Johnson is about finished with the tooling and drawings, so this good-looking bird should be available by July. Bob pointed out that she's one of the most true-to-scale CAP 21s on the market, and like all of R&R's aircraft, is nimble and highly aerobatic.

Now, for all you guys who've been hankerin' for the Snapper Twoo, your wait is over, all of the prototype testing is completed, and kits are being shipped. For those who may not know what the others have been waiting for, the Snapper Twoo is an attractive, non-scale, non-descriptive (love that phrase) aerobatic bipe that will perform any pattern maneuver with class. Any decent-running Quadra will make this 76-1/2-inch, 19-pound, two-winger look snappy in the air.

The price for either the CAP 21 or the bipe is $249.95.

MAGNUM ENGINES

Now that BIG Birds are out of the "dark ages" and gaining in popularity, we're seeing more and more good goodies being marketed. Most of the bad stuff has weeded itself out, and, as is the case with engines, we're left with a wide variety of easy-starting, smooth-running mills to choose from. Tom Pearson, of Pearson Power Products (RR 2, Box 64, Effingham, IL 62401, [217] 868-5848), has added three more viable choices to this growing list: the Magnum Engines. As you can see from the photo, he's got some unsual-looking machinery there. The Magnum 91S is the only one that appears to be "normal" . . . while the V-Twin 1.82, and the Three-Cylinder 2.73 are quite distinctive. All are four-strokers (the V and the Three are natural engineering developments from the 91S), all run on a five percent nitro, five to eight percent oil fuel, and, according to Tom Pearson, all are smooth as silk and very quiet.

Once again we're faced with believing a manufacturer's or a distributor's claims . . . so I borrowed a 91S from Mr. Pearson to see for myself. I just received the engine, and haven't had the time to fly it yet, but I have bench-tested it . . . and I'm impressed. For one thing, she looks like a top quality piece of work, and the few test-stand runs have indicated *good* power (I only had 16-6 and 17-6 props handy, but the engine seemed to "like" them), easy starting, that quiet, distinctive sound of a four-stroker . . . and smoothness. This particular Magnum fits a Tatone and Hayes OS 60 four-stroke mount, so mounting should not be a

problem (the other two Magnums come with their own radial mounts).

Besides being compact for its size, the 91S (and the others) can be converted to pusher operation with ease: simply interchange the intake and exhaust pipes and pushrods and reset the valve clearance. My engine started and ran just fine in either direction. Fuel consumption was almost *half* of what a two-cycle 90 would burn. I hope to put this on a puddlejumper soon, and get some airtime with it before Pearson makes me give it back!

By now, Tom should have his prices firmed up, so a self-addressed, stamped envelope should get you all of the information. Also, 91S and V-Twin types will be available soon with ignition, and those with glow Magnums should be able to convert theirs to ignition without too much trouble.

RAM

RAdio Controlled **M**odels has a very long and impressive list of electronic goodies and doo-dads, all of which come under one of three categories: lighting systems, fail-safe devices, and control devices.

Two of their latest fail-safe devices deserve attention . . . and *use*. The Big Model Battery Backer Red No. 25 is a redundant battery device that's a bit different from the Ace 2 X 5 Redundant Power Supply. Unlike the Ace, which drains both packs at the same time, and then cuts out the bad (or low) pack, the Big Red No. 25 drains only one pack at a time, and switches to pack number two in case of trouble with the primary battery. I'm not about to tell you one is *better* than the other, because I know too many guys who'll stand up and fight for either system. Both types work well; I've bench-checked and flight-tested 'em. It's really a matter of personal preference . . . but it *is* smart to use a redundant battery system of some sort.

RAM's other new item is their Simple Cycler, and is it ever simple! Everything (less connectors) is contained within a 1 X 2 X 3-inch plastic box. You snap it open and plug the connectors into the appropriate battery. When the pack is down to the battery manufacturer's recommended minimum voltage, an audible warning assails your eardrums till you disconnect the cycler. Ralph Warner, the head man at RAM, also included an easy-to-read graph and good instructions with this cycler so that you can easily determine the percentage of use and the charge remaining in your pack. Although this specific cycler was designed mainly for 500 mah packs (it has a relatively low load of about 210 ma), it can easily be used with our larger BIG Bird packs; the only slight drawbacks will be a rather lengthy discharge time for 1000 and 1200 mah packs, and having to extend the graph to determine the charge remaining in your pack. However, if you want to wait just a bit longer, Ralph promises to have a suitable cycler for BIG Bird batteries, which will, I'm sure, have a much larger discharge load put on the batteries.

For more info, prices, etc., contact: RAM, 4736 N. Milwaukee Ave., Chicago, IL 60630.

LITE-PLY

We've not got another source for obtaining lite-ply. Midwest Products Co., Inc. (400 S. Indiana St., Hobart IN 46342) offers it in two thicknesses, 3mm (approximately 1/8-inch), and 6mm (approximately 1/4-inch), and three sizes, 6 X 12, 12 X 24, and 12 X 48 inches. If you haven't tried this stuff, you're missing out on a good thing. It is much lighter than regular ply, and although it's not quite as strong, lite-ply is excellent for gussets, doublers, and for many of the fuselage formers. In some cases it's good for fuselage sides. No sense making that new bird of yours any heavier than it has to be. By the way, Midwest also has selected sizes of spruce in 72-inch lengths.

'83 IMAA FLY-IN FESTIVAL

Time is running short if you're still thinking of going, but haven't gotten off of dead center, yet. It's *preregistration only for pilots*, and the cut-off date is an absolute August 1st, with the Festival itself taking place on August 18th through the 21st. Participants will have four exciting days of flying. The IMAA Fly-In Festival is easily the world's largest gathering of BIG Birds.

Just to set the record straight, the International Miniature Aircraft Asso-

ciation, unlike the Quarter Scale Association of America, *is not* a scale organization, and *any* airworthy BIG Bird is welcome at an IMAA fly-in. So just because your labor of love ain't scale, that is no reason to hang back and not go. If you don't go, you'll miss the time of your life, 'cause BIG Bird lovers are the most friendly and sociable folks . . . bar none.

I've still got some Festival Brochures left and an SASE will get you one, pronto.

LAST CALL . . .

For the Puget Sound Rocs First Annual BIG Birds Bash, scheduled for July 16th and 17th at the Mt. Rainier Club's "Hog Hollow." No prizes, no trophies, no awards, and no rules (except safety, of course). Just two great, relaxing days of meeting and greeting friends, and flying . . . if you want to. And there's no entry fee . . . it's free. How about that? There'll also be tasty food available, a six-channel Futuba raffled off . . . and *good, usable* door prizes for *all* the pilots.

I'm the Fly-In Director, so drop me a line, and I'll shoot out a flyer with all the info back to you. Don't miss this one . . . it'll be pure fun.

A GOOD INVESTMENT

That's what a fire extinguisher is . . . and they only cost about ten bucks. Don't depend on a buddy to have one that you can "borrow." Protect yourself and your birdie . . . and spectators. If you check your local newspapers and flyers, you'll find that small extinguishers suitable for our needs are almost always on sale. You won't find a better investment or better insurance.

TIP OF THE MONTH

"Insanity Is Hereditary; You Can Get It From Your Children."

FLYING SAFETY IS NO ACCIDENT

Al Alman, 605 168th Street, East, No. 95, Spanaway, WA 98387. •

Electric . . . . . *Continued from page 17*

instructions for the Delta charger do show the method very well. The diagram shows five parts to the charge curve for a fully discharged pack. In time A, the voltage rises quite rapidly. In time B, the voltage rises slowly. This is for most of the charge. In time C, the voltage will start to rise rapidly again, this is usually in the last three minutes or so of the charge. In time D, the voltage slows down again, then finally starts to drop. At this point the charger will turn off. Time E is trickle charge. I usually turn the charger off when the voltage levels off during time D, I do not wait until it starts to drop. I do this to protect any cells that may have more charge than the rest, otherwise they can go into overcharge.

The Delta charger is available from Royal Electronics Corp., 3535 So. Irving St., Englewood, CO 80110. I believe that the price is somewhere around $150.

OVERCHARGING AND ESV MONITORING

There are some features of ESV (or digital) charging that are well worth mentioning. Some of them I have written about before, but are worth repeating. First, let's talk about overcharging as this is the one real danger of improperly charging a battery pack.

I have read that Sanyo cells are more sensitive to overcharging than GE cells. I think that this is true. The Sanyo cells have more capacity, about 1.2 ah, compared to 1.0 ah for the GE cells, for the same weight and size. Sanyo did this by reducing the difference in the lengths of the two plates (positive and negative); they are nearly equal in length. General Electric, on the other hand, made one plate about 20 percent longer than the other, which makes it more capable of absorbing an overcharge.

Which is better? Well, for a beginner, the GE's safety factor is an advantage. For the expert, Sanyo's increased capacity is an advantage. I personally prefer the extra capacity.

What is the best way to charge the Sanyo batteries?

The usual advice is to charge the Sanyos slower, for 20 to 25 minutes (or longer) at a lower charge rate (about 3 amperes). I have found in my own experience that this is really not necessary. A 15-minute charge at 4.5 amperes does an excellent job of fully charging a discharged pack.

I have been charging Sanyos this way for a year, and not one of the four Sanyo packs I have has shown any damage or deterioration in performance. However, I always charge the Sanyos with an ESV or digital charger, and I always turn off the charger with the voltage rise flattens out. *I would not even consider* charging the Sanyos at this rate without an ESV or digital meter. To me, that would be "flying blind," and I'll bet it wouldn't take long to ruin a pack. If you do not use a digital meter or an ESV, do charge at the lower rate and for a longer time.

This brings up another point: the effect of the charge current on the voltage peak. The Delta charger, you will remember, holds the current at a constant rate. This helps a lot in making the charge peak "sharp". Without the current regulation, most chargers will start at 4.5 amperes, and will drop as the battery pack comes up to values as low as two amperes. This has two effects: one is that the charge time becomes longer than expected; the other is that the voltage peak gets stretched out, and is much harder to spot. Instead of a nice sharp rise followed by a plateau, there is a moderate rise followed by a long, gradual rise in the voltage. Finally, the voltage will stop rising, but it is more frustrating to monitor voltage this way than if the current is kept constant at 4 to 4.5 amperes.

Some chargers have a manual adjustment of the current. With these, you can keep the current up, at least for six cells. For seven cells, even these chargers will not keep up the current toward the end if they are using power transistors to regulate the current. This is due to the voltage drop in the power transistors.

The fixed rate chargers, which are the least expensive, use a fixed-value resistor to hold the current. These will show the current droop at the end of the charge of any pack. However, I have been charging Sanyo batteries with such chargers, and with the use of ESV's and digital voltmeters, they show enough of a voltage peak to make this method quite worthwhile.

Speaking of ESV's, the ESV I wrote about in the May issue of **Model Builder** was designed for six cells only. Several readers asked if it could be used for seven cells. Yes, it can. The first way is to calibrate the high end of the meter for 12 volts with the potentiometer. You can then follow the peak for the seven cell packs. However, the meter is now

covering the range between nine and 12 volts, so each division is now .06 volts, which is getting a little coarse for seeing the voltage changes.

A better way is to substitute a 10.5-volt zener diode for the nine-volt zener. Unfortunately, Radio Shack does not have a 10.5 zener, and two 5.1 zeners in series does not work (I tried it). However, you can "shim" the nine-volt zener very nicely with ordinary silicon diodes, the 1N4148 or 1N914 diodes work very nicely. These have about a .6-volt drop across them, and it remains constant (current independent). Just take two of them in series with the nine-volt zener, and you have it. Connect them with the banded ends opposite to the way the banded end of the zener goes, otherwise they will not conduct and the meter will not show anything at all!

Now the meter will show the range from about 10.3 to whatever you set it for, I recommend 12.0 volts. So, charge ahead on the seven-cell packs! Do note that the current drops a lot more with seven-cell packs than it does with six-cell packs toward the end of the charge, so be prepared for a slower peak in the end voltage.

I found out more than I really wanted to know about zeners recently . . . I was testing an ESV, and I noticed that the meter started moving at six volts, even though I had a nine-volt zener installed. I finally decided it had to be a zener, and replaced it. Problem solved!

I seems that until recently, I had been in the habit of disconnecting the charger from the 12-volt charge battery, then disconnecting the charger from the plane. This is actually the correct procedure. It turns out that if you just unplug the charger from the plane, the 12-volt charger battery will peg the meter (if it is adjusted for six cells). Apparently, this can eventually degrade the zener, so watch out for this. It is odd that the zener did not outright fail, instead, the threshold voltage slowly got lower and lower. The Radio Shack zeners are rated at a maximum of 50 ma, so they really cannot stand all that much current.

If you wish to make an ESV for some other pack besides six or seven cells, the guidelines are pretty simple. Figure about 1.5 volts per cell for the threshold value of the meter (ie, the zener value), and set the maximum value of the meter at 1.5 volts above that. Seven cells, for example, would have a zener of 10.5 volts, and a top value of 12.0 volts. This is a rough rule of thumb, but it will get you in the ball park.

Here's another use for zeners. My Accutach (from Nor Cal Avionics, P.O. Box 70956, Sunnyvale, CA 94086, $79.95) is an excellent combination of tachometer and digital voltmeter. However, it has one peculiarity. It blanks out above 19.99 volts. This must be due to compromises needed for the tach function, but it is a problem if I am charging an Astro 15 from 24 volts. I put a 12-volt zener in the probe line (a 15-volt zener works also), and the problem was solved! The zener sets the meter back in a range it can handle, and I can watch the peak. I don't care what the value is anyway, I just want to be able to see when it slows down.

This is also valuable for those using a regular, digital voltmeter (DVM), because most of those switch from hundredths of a volt to tenths of a volt once they pass 19.99 volts, and again, the peak is harder to follow. Put in a zener in the probe line, and you can use the hundredths place again, and follow the peak accurately. No other components are needed, just the zener. (Put the banded end toward the plus lead or the battery pack.)

Last of all, one reader took me to task because the six-cell ESV started at 9 volts. As a six-cell pack is rated at 7.2 volts, isn't the meter out of the range of the pack?

Well, it would be except that the meter is hooked up to the Ni-Cd pack at one end, and a 12-volt battery at the other. Confronted with two different voltages, what can it do? It averages them, so 7.2 plus 12 divided by 2 is 9.6 volts. The Ni-Cds peak at about 1.5 volts each, so at the peak it is 9 plus 12 divided by 2 or 10.5 volts. So, the answer is that we are dealing with somewhat of a moving target in fast charging, compared to the static voltages we have in open-circuit situations.

Well, enough for now, charge better with ESVs! •

Choppers . . . . *Continued from page 43*

cylinder head. So, while the cooling hole will center left and right, the shroud hole will actually be slightly rearward of the engine shaft. (This is visible in the photo with the shroud and belt.) This is unavoidable, and does not affect cooling to any noticeable degree.

Two small basswood pieces on either side of the rear of the cooling shroud hold it centered over the cylinder head. Silicone is then squeezed between the shroud and main frames, and left to dry overnight.

I haven't experienced any cooling problems at this time in average temperature ranges. I have heard that new engines should not be installed directly into a helicopter without a good bench run, or overheating may result. (You should always break in an engine on the bench anyway.)

If the cooling hole is not enlarged to two inches, not enough air will be drawn in, and the engine may overheat due to lack of fresh air.

Also, if the gap between the top of the fan and shroud is greater than one-thirty-second of an inch, cooling may be deficient. I used an old photo as spacer material. I laid the circular, paper cut-out over the fan, and then put the cooling shroud over it. When installing the shroud, let it rest directly on top of the fan and paper spacer. When the epoxy dries, rip out the paper, and *presto*, you will have a close fit between the fan and shroud without any rubbing.

Fuel tank placement is just ahead of the front frame, directly under the servos. Rough up the bottom of the tank, and silicone it in place to the plywood it rests on. A 300 cc tank is provided in the kit. This tank fits within the canopy sides but it is fairly small for competition flying. I substituted a 400 cc tank after seeing the 400 cc tank fitted to factory ships. A semi-circle must be carved out of the canopy to prevent the cap from rubbing the canopy.

With an empty tank, the helicopter should balance just slightly nose-heavy. If you use a standard 500 mil. battery pack, just a touch of nose weight will have to be added. Using a 1,000 mil. battery pack is the best idea to get a little more useful weight in the nose. With the tank full, the helicopter should be noticeably nose-heavy. As the fuel burns off, more forward cyclic will be needed to compensate for the CG change. If you feel your fore-aft cyclic trim changing through the course of a flight, this will be why.

DRIVE TRAIN — AUTOROTATION CLUTCH

The drive train is gear driven throughout. Gear reduction from engine to main rotor is 8.6 to 1. If the engine turns 12,000 rpm, main rotor speed will be 1,395. The ratio from main rotor to tail rotor is 1 to 4, so at a 1,395 rpm main rotor speed the tail rotor will be turning 5,581. These gear ratios are very good, affording the main rotor disk excellent rigidity, and the engine operation will be right at its best performance curve for helicopter operations.

In the photo of the main gear, you can see the standard teeth on the edge with a spiral hypoid track for tail rotor drive.

The tail rotor drive shaft is secured to couplers on both ends by four set screws on each coupler. Initially, I was hesitant to use the stock drive wire because it didn't have flat spots on each end for the set screws to seat into. But I figured that it must work OK, everybody else was using it with no problems. So I applied Loctite to all set screws, and torqued them down by hand as firmly as possible with the provided wrench.

However, set up this way, I experienced slippage at the front end of the tail drive shaft. I think I would prefer to have a flattened end on the drive wire. Modifying the shaft is not difficult (details next month), and the decision to do so is a matter of personal preference.

Later, I found out that "everybody" uses a pair of *pliers* on the wrench to provide greater torque as the front coupler is tightened down. Now they tell me. . .

The tail drive wire runs in a brass tube supported by three plywood discs along the tail boom's length. This prohibits the drive shaft from whipping and causing vibration. The whole drive system is very free and smooth running.

The autorotation clutch is done very nicely using three supporting bearings to distribute the loads. You can see the clutch as it comes fitted to the black plastic main gear in the photos.

MAIN FRAMES AND LANDING GEAR

The main frames are made from a very hard aluminum. I think a lot of the hardness comes from the anodizing process. By themselves the frames are well made, it's when you start to install the drive components that problems crop up.

The front frame stays must be notched as shown in the new directions to allow the engine to be adjusted vertically in the side frames. If you notch the front stays with a jeweler's saw at first, you won't have to take them off after you initially install them.

The gear ratios were changed just before the initial run of kits, so the holes in the main frames will not give proper gear mesh; it is too tight in stock kit form. To straighten things out, push the lower clutch bearing block as far forward as possible when mounting the engine. Even after this is done the eight holes (four on each side) for the main shaft bearings must be enlarged from a No. 29 bit (standard, stock hole size) to a No. 20 bit. This should give you a nice gear mesh between the engine and main gear. Use washers under the main bearing bolt heads. Adjust mesh with a piece of note paper between the gears as detailed in the instructions.

The four holes (two on each side) for the tail spiral gear mount had to be enlarged from No. 30 holes to No. 26 holes. The latest kits have the necessary holes pre-enlarged, so the drilling is done for you. But, you still have to be very careful as you install and align the entire drive line.

The landing gear is made of 5/32 tempered aluminum which is very rigid, and will be next to impossible to bend out of shape under normal circumstances. If you have an earlier kit, you've found out that the gear bows must be matched before installation, or the helicopter will never sit level. If you don't check the bows before installation, there is a 50/50 chance of getting them on right. Bet you never knew that putting on a landing gear could get so complicated! The latest landing gear bows are perfectly symmetrical and need not be matched before installation.

MAIN ROTOR SHAFT

The main shaft is 10mm in diameter, machined down to 8mm where the head bolts on top, and sprague clutch bolts on below. Due to the "external" collective system there are no control rods running up the shaft. Because of this, replacement is simple; you have to pull the head, loosen the wash-out control, remove the mast lock, remove the main gear, and pull the shaft free.

COLLECTIVE SYSTEM

The collective arrangement used on the Competitor is an external yoke that fits around the main shaft and slides the swashplate up and down. I won't go into too much more detail because you have to see it to understand it. I have provided a photo of the collective mechanism for you to study.

I will say that this is the finest method of collective pitch control that I have seen. It can be set up with any range of collective you desire, from +10 to -10 if you wish. (Although I wouldn't recommend it. . . .) The only time this flexibility becomes bad is *if you don't know what you're doing, don't read the instructions, and don't use a pitch gauge.* If you do follow the given guidelines, the collective pitch system can be easily tuned to anywhere from soft, to literally out of control. More details next month.

MAIN ROTOR HEAD

This is the component that makes or breaks a lot of helicopters. In the Competitor's case, the rotor head is a state-of-the-art design. With two bearings for feathering loads, and a thrust bearing for centrifugal loads, the head provides the smoothest and most positive response of any head presently available that I have worked with.

As the main rotor head does not have any coning, it is perfect for inverted flight if that is what you're after.

This rotor head is also nearly indestructible. It has a very rare blend of quality and durability. My rotor head was literally untouched after an impact from 200 feet. It bent the flybars back and that was it.

The detail photo shows the reason for its durability . . . a one-piece machined yoke that accepts the bearings and blade holders. Just for your information, this yoke looks exactly like the yoke in the full-size Jet Ranger. Some details are different, but the basic design of the yoke is there.

The flybar is attached to the head via a pin through two brass bushings. The flybar itself pivots on two miniature bearings for extremely smooth Hiller response.

The Competitor's main rotor yoke is machined from solid aluminum, hence any tolerance errors in machining can lead to static tracking errors. When I assembled my rotor head, I found the static tracking off. I was able to correct this, and I'll let you know how next month. For now, I will say that most other Competitor heads I've seen have been much closer than mine. *(Competitor rotor heads yokes are now being held to much tighter tolerances than the one's supplied in Ray's review kit. wrf)* Static tracking in this ship is very important because the head is so rigid. With softer, "sport" heads, static tracking is not nearly as critical.

TAIL ROTOR GEARBOX

The gearbox is a standard Hirobo gearbox as in the Cricket, except this one is more finely finished on the outside. These gearboxes have double bearings on the input shaft as well as double bearings on the output shaft to the tail rotor.

The gears are spiral hypoid types which give quiet and efficient operation. To give the gears perfect mesh, you may have to shim the case halves where they join together with a thin piece of brass shim. This depends on how you set your standards in the end. Overall, the gearbox is well made, and will not give you any trouble.

Probably the best feature of the gearbox is the tail rotor hub which is *screwed* onto the threaded end of the tail rotor shaft. This makes it easy to balance the tail rotor as a unit, blades and hub together, then lightly apply Loctite to the shaft and screw the hub on. There is a brass spacer that fits between the outer bearing of the tail rotor shaft and the threaded area. I found that when the tail rotor hub was screwed tightly against this bushing it made the bearing bind up severely, which made the whole gearbox bind. You may want to do as I did, and eliminate the brass spacer altogether.

First, Hot Stuff the outer race of the bearing to the case so that it won't unseat itself, then screw the hub on the shaft until it bottoms out at the end of the threaded portion of the shaft. To keep the tail rotor shaft from rotating as you screw on the hub, wait until the gearbox is mounted in the tail boom. Then insert an allen wrench through the slot in the tail boom and into the set screw on the gearbox input collar. The wrench will effectively lock up the shaft without ruining anything.

MAIN ROTOR BLADES, TAIL ROTOR BLADES

The main rotor blades are laminated out of hardwood leading edge and balsa trailing edge materials. The airfoil section is semi-symmetrical. The covering provided is of the fas-cal variety, but you can use most anything you like in any color of stick-on covering.

Most sets of Competitor blades weigh more than most other aerobatic helicopter blades, so disc rigidity is good for aerobatics, and the extra inertia makes full-down autos commonplace for a competent pilot.

The plastic root fitting should be *epoxied* to the blade itself. Then the plastic root fitting slips into the blade holder on the head. This turns out to be a nice system of blade attachment, but I found that I had to use brass shims epoxied to the plastic root fitting to give a smooth fit without drawing in the blade holders excessively.

The tail rotor blades are conventional. Laminated balsa leading edge, hardwood center section, and a balsa trailing edge. Airfoil section is close to the flat-bottomed Clark Y.

That's it for this month. Next month I'll detail radio installation, canopy, set-up, flying, assorted hints, and an overall critique. Hope to see you then. •

Pattern . . . . . . *Continued from page 30*

not a challenge . . . they were simply irritating.

As I started pattern flying as a serious hobby, I formed the unshakable opinion that light models were better than heavy models . . . *ALWAYS!* If wind was a factor, I opted for more power, not

more weight.

This was in Ohio, so I got plenty of chances to fly in the wind. Pattern models have been characteristically shaped to give the best performance with little attention given to copying any scale design . . . so they have naturally evolved into very sleek, total performance machines. An art form all their own.

My Tipo's have satisfied, for me anyway, all the flight problems presented by today's pattern rules.

Apparently, the rules are due to change, at least for FAI contests . . . I'm not arguing good or bad, but the probability that *some* scale designs will work here is evident.

Scale aerobatic models present a particular problem . . . If you reshape them very much, they don't resemble the real thing. A typical example is the "scale" controline stunter, it usually ends up looking like a Nobler with a different tail and canopy. Al Rabe and a few others have done a remarkable job of keeping scale outlines on their models, but the usual bastardization is not too pleasing to me.

At this point in time, I'm convinced that very scale models can be made into very good aerobatic models as well.

The rules used to get good results are pretty straightforward.

1) Keep the wing loading down to 20 to 30 oz./sq. ft. for .60-size models.

2) Keep the total weight down, the 11-pound maximum is not desirable unless you have a strong engine using a gear drive and a large prop.

3) Match the apparent speed of the model to the design. For example: a Pitts scale model flying at 130 mph would look out of place, just as a scale F-16 which struggles along at 50 mph looks wrong!

4) Don't expect good aerobatic performance from scale designs which were not good aerobatic aircraft!

If you adhere to these rules there aren't many designs to choose from, I'd guess less than 50. If someone has a list of good, full-scale aerobatic planes, I would appreciate a copy.

We have been working with a Dalotel type design to see what the effects of a low aspect ratio wing, and a rather close-coupled wing and stab arrangement would be.

The liberties we took on the original design are noticeable if you are a scale nut, but the other versions we have seen take as many liberties . . . just different ones!

A couple of things such as the cowl arrangement and the rudder attachment are features we plan to use on other designs as well. We hope you like them.

Picture No. 1 shows the basic model finished except for hardware, engine, and radio, 3-3/4 lbs., exactly; 840 square-inch wing.

Picture No. 2 is of the aft fuselage hatch and exhaust exit.

Picture No. 3. The removable cowling hides the engine except for the head fins.

Picture No. 4 shows the cowl removed for access to the tank, fittings, engine, and tuned pipe coupler.

Picture No. 5. Here the tail surfaces bolt on as a unit and the vertical fin bolts through the stab to provide fin alignment.

Picture No. 6. The bolts on the stab allow adjustments. The arrow points to the bolt at the tailpost for loosening the rudder hinge when adjusting the stab. The hinge has a large bolt hole to allow for repositioning.

Picture No. 7. The canopy is sealed in place using Super Monokote. The entire finish on this model is Super Monokote, not tape or paint *anywhere*.

You may have noticed that I'm back to a design that is very similar to my original RC bird . . . light, simple, and covered with Monokote.

My enthusiasm hasn't lessened over the past 13 years. I just feel that the simple, light model is still the best shot for pattern flying. Right now, the challenge of working with scale pattern birds is just too much to resist. In the next few articles we will cover our experiences with them.

Also, we are going to add to our "How To" series on pattern flying. We hope you will enjoy the material. •

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

pation in our contest. Curt Stevens, AMA 219.

The flyers which were sent out with the above letter very thoroughly outlined the intent of the contest, what was required to enter it, how it was to be run, and the rules for the events. In fact, the flyers told a very complete story all by themselves. The first flyer was a contest announcement which was posted in all the local hobby shops and flying fields. It read as follows:

R/C GLIDER FUN CONTEST
MISSION VIEJO, APRIL 17, 1983

- *Everyone is invited to enter, fly, and win small prizes.*
- *$1.00 entry fee per airplane.*
- *No AMA license required, just bring your glider and a dollar.*
- *Help will be available for novices and beginners.*
- *Three special classes to fit all types of fliers:*

  NOVICE: *For those who are really new at R/C gliders, and have a hard time just flying the fool thing.*

  BEGINNER: *When you can fly a glider but you're still scared. This is where you belong.*

  HOT SHOT: *This class is reserved for the good fliers who seldom mess up.*
- *Pilot's Meeting: 9 a.m., April 17.*
- *Contest Objectives: To have fun, meet the other local fliers, and maybe identify a large group of modelers who would like to form a glider club in the Saddleback Valley area.*
- *Prizes, Prizes! Lots of merchandise donated by the local hobby shop, distributors, manufacturers, and friends.*
- *Sponsor: NONE, however, let's all remember who donates the prizes, and be sure to thank Mission Viejo Company for allowing us to use their prepared field. Note that we are not allowed to fly on this field at any other time.*
- *Organization is all volunteer. We need your help totaling scores, timing flights, measuring landings, etc. Please bring your stopwatches.*
- *Rain date: We are flying on a beautiful smooth packed dirt field which can become somewhat sloppy. In case of rain, we will reschedule about two weeks later, a new date will be posted at PlayCo in El Toro.*
- *Hi-Start practice can be arranged at the contest site on April 16.*
- *Location: Open field behind soccer fields at the northwest end of the beautiful Mission Viejo Lake. See map.*
- *For further information, contact Gary, Darryl, or Curt Stevens at* (phone numbers given).

Come on out and fly with us. We need your help in making our first contest a big success.

Of course, no contest is a contest without rules, and the rules which Curt devised are pretty easy to follow. What's

really important about these rules is their relative simplicity, and (for the beginner) their ease of compliance. It was mentioned during the pilots meeting that for the benefit of those beginners and novices who had never before launched from a hi-start, that a more experienced pilot could launch for them. For the beginner or novice afraid of soloing on landing, another pilot could also land the model! If ever there was a contest structured to accommodate the first-time flier, this was it. The rules went as follows:

RULES AND SCORING

1) No vehicles of any kind allowed on the flying field.

2) No alcoholic beverages allowed on the flying site.

3) The pilots' meeting will be held at 9 a.m.

4) Flying will be by rounds, with open flight order. First round starts at 9:30 a.m. Length of rounds and number of rounds will be determined by the number of contestants.

5) All launches will be on the hi-starts furnished by PlayCo.

6) Scoring will be by throwing out the worst flight score and totaling up the remaining scores.

7) One point will be scored for each second of flight time up to a maximum of 300 points per flight.

8) One point will be subtracted for each foot the model misses the center line of a landing runway. Measurements will be taken from the nose of the model when the model is at rest. Maximum point loss will be 50 per flight.

9) No limitations will be placed on design or construction of models entered. However, sophisticated, three-or-more-channel models will be placed in the Hot Shot class.

10) Flight time starts when the glider drops the towline, and ends when the glider comes to a full stop.

11) Restarts will be permitted in the cases of crossed towlines, mid-air collisions, or glider/towline collisions, but only as it interferes with the flight of the glider. To have a restart, you must notify the timer immediately. The timer will stop the watch, and return the flight card to the desk.

In addition to the fliers and manufacturer letters sent out, there was a news release sent out to the local newspapers indicating the usual "What, when, where, why, and how" of the contest.

As for the contest itself, it was a big success. Forty-seven contestants showed up to fly. In addition, probably 300 to 400 spectators (Curt's estimation) were present throughout the day, although there weren't more than 100 at any one time.

Five whole rounds were flown ... quite a feat for this type of contest, especially considering the frequency conflicts that were encountered (nine on orange/white, nine on red/white). One contestant even brought his own frequency pin! That just goes to show you what you have to be prepared for when you get 47 new fliers together for a contest.

In spite of the experience level of most of the fliers, there were surprisingly few tragedies on the field: few crashes or tow-related incidences.

The winners in the Novice class were: first place, Keith Neves with 894 points (had three maxes, flew a Soar Birdi, was a glider flier of one month's experience); second place, Monte Weedon with 471 points (a first-day flier!); third place, Adam Wickert with 447 points (only 12 years old!). In the Beginner class, John Doyle was first with 915 points (he averaged five to 10-foot landings); second place, Mike Gale with 839 points; and Sean Wright, third place, with 830 points. In the Expert class, Bill Turner took first with 1034 points (three maxes, 25-foot landings); Mark Rebeck, second, with 936 points (a 300-point, perfect max with a one-foot landing, flying a Sagitta 900); and in third place, Darryl Stevens with 728 points (flew a Windward, made four of the five landings within one foot). All-in-all it was a highly successful contest by the most critical standards!

The list of prize donors is an incredible one, and shows us how much industry support there is for a contest of this type: Alphabetically the donors are listed below:

Ace R/C, Inc.
Aerosmithing
California Model Imports
Condor Hobbies
Coverite
Cox
Craft-Air
Dremel
Ernst Industries
Futaba Industries
Goldberg
Great Planes
House of Balsa
Kraft Systems
Leisure Electronics
Mark's Models
Master Air Screw
Midwest Products
Model Aviation
Model Builder
Pacer Technology
Pactra
Peck Polymers
The Play Company
RC Modeler
RLF Products
Satellite City
Scan Am
Sig
Top Flite
Tower Hobbies
Twinn-K
World Engines

PEN PAL WANTED

I received a phone call at **Model Builder** the other day from James M. Heishman of Abilene, Texas. We talked for quite awhile about sailplanes, as might be expected, and he told me that the main reason he was calling was that he was being transferred from Texas to Korea. You see, Jim is in the Air Force, and these kinds of things happen. What he wanted me to relay to all of you through this column is that he is interested in communicating with individuals, clubs, etc., who are into R/C gliders, especially two meters. Also, Jim wants to form a glider club where he will be stationed in Korea, so anyone who may know of someone in Korea who is into gliders, Jim would appreciate knowing about that person.

If you are interested in helping Jim, or just exchanging ideas with him, please write to James M. Heishman, SSgt Air Force, 6170 CSG (PACAF), Suwon AFS, Korea, A.P.O. SF 96461. Send him your club's newsletter, that would be a great way to help him keep in touch with what's going on "back in the states."

F3B RULES FOR 1983 AND 1984

There aren't many people in this world who know the whole story behind the last two CIAM meetings (December and April) which determined the future of F3B flying for the 1983 world championships, and the team selection program of 1984. I don't claim to know everything myself, but I know more than the majority of you out there and I'm willing to share what I know.

First, let me share with you a brief outline of chronological events and procedures in the FAI/CIAM/F3B rule making process. First, rules proposals are accepted from participating countries. These proposals are published in an official agenda for the CIAM plenary meeting where these proposals are voted on. Supposedly, if you miss the deadline for the agenda, it's wait-till-

next-year, buddy, because your proposal can't be considered at the meeting . . . unless it's an emergency, safety measure. At this meeting, which is a two-day affair, the rules proposals are first thrashed about in the F3B Technical Subcommittee, and then voted for or against, and handed over to the technical secretary. He reports on the subcommittee's decisions at the plenary meeting. After the rules are either accepted or rejected at the plenary meeting, they are studied for a few months, and finally approved or disapproved in the CIAM Bureau meeting. This last approval or rejection is where a rule becomes permanent.

There were a total of 24 proposals (some were withdrawn) listed in the minutes of the December plenary meeting which pertained to F3B. One of these rules proposals was highly controversial.

THE INFAMOUS 5.3.2.2.b)a(2), OR, WATERGATE GOES TO PARIS

Quoting from the December 1982 plenary meeting minutes: "Winch Specifications, 5.3.2.2.b)a(2). (Denmark). It was approved unanimously to permit only an electric powered winch of the following specifications recommended by the Technical Meeting: a) The winch shall be fitted with a single motor having a body diameter not exceeding 140mm and a body length not exceeding 215mm; b) The width between winch drum flanges shall not be less than 75mm; c) The power source shall be a single, 12-volt lead/acid battery having linear dimensions so that the sum of length, width, and height (excluding mounting lugs) does not exceed 750mm."

This proposal is referred to as the *British* proposal, as it is generally recognized that the British were the true authors. (According to one firsthand report, the British have admitted to it.) There are two reasons why this is known as the British winch rule. First, they have heartily accepted it as the rule by which they will run their world championship in 1983 . . . in spite of the fact that this rule does not officially go into effect until January 1, 1984. How can they do this? Well, the CIAM in its bungling wisdom has given the contest organizers carte blanche in deciding which winches they may permit to be used in the WCs. The rule has been there all along, but has never before been used. It states: "Unless otherwise specified, launches will be made by equipment approved by the organizer or contest director. Contest notices shall contain a description of the launching equipment to be available and its general capabilities." Sorry, Yanks, no Gorillas! Never mind why.

Second, the method by which the rule was allowed to come up for a vote in the F3B technical subcommitte meeting (Dec. '82) was highly irregular. John Worth states that it was a "normal lead time item," but was it really? I think not. Normal lead time items are listed in the published agenda, remember? This item was definitely NOT published. I quote from the agenda published last October 21, 1982: "Denmark, 5.3.2.2.b)a(2) Change to *Electrical Powered Winch;* Reason: Environmental consideration." That's all of it folks . . . nothing about motors, batteries, or drums is mentioned. The three subparagraphs were ILLEGALLY ADDED to the agenda after it was published. That's how it got on the plenary meeting minutes, my friend, Dan Pruss, as subcommittee chairman should have opposed this course of action as a matter of procedure, never mind the fact that it is a poorly thought-out rule to begin with or that it was against the US Team's best interests . . . the team Mr. Pruss and Mr. Buso (US Delegate) were supposed to be representing.

You want to see more folly? In a news release from John Worth, CIAM Secretary (on AMA letterhead, too!), entitled, "Significant Results of the April 11 CIAM Bureau Meeting," he states, "1. R/C Soaring World Championships — 1983. a) The 'weak link' will *not* be used. The organizer will *not* test lines for breakage. b) Winches which meet the organizer's rule, as defined in the December 1982 CIAM minutes, will be acceptable. No further organizer definitions or restrictions will be applied." I agree that weak links are a very poorly thought-out, so-called safety measure, and shouldn't be used at any time . . . having a weakness in the towline is a safety *hazard,* not a safety precaution. It's item *b* that is the bombshell here! You talk about leaving a few loopholes in the tax laws so people can avoid paying taxes . . . this rule has loopholes big enough to drive trucks through! This is the virtual green light for all kinds of "unsafe" winches. It appears that the British are willing to accept Gorilla-strength winches after all!

This is very interesting. We can have thousand-dollar cobalt motors, or 30-plus horsepower flywheel winches, but no cheap, easy-to-make winches with completely stock automobile starters. That evidently doesn't cost enough for our overseas friends. Hey people, this is harassment and discrimination at its worst. As the U.S. team was the only team planning to use a totally legal two-motor winch of this nature, we can only assume poor sportsmanship on the part of the people who conceived this rule. If they were truly concerned about "safety", they would have said, "Use our 'safe' winches or nothing at all, save hand-towing, of course." That way they would have some control over the situation. As it is now, we have a mad dash to the bank to withdraw the funds to build a competitive winch.

John Worth's comments are worthy of note here concerning this power race. In reference to the better definition and equalization of winches, with particular note of first and last paragraphs:

"If the new rules have not done that (by allowing samarium cobalt magnets) I'm sure they soon will, especially if the U.S. team goes that route. And if, by doing so, the U.S. wins, the reaction will be very negative and detrimental to U.S. influence in the FAI.

"In the meantime, the new winch rules were *not* passed as an emergency safety measure. The December '82 CIAM minutes (just received, copy enclosed of appropriate pages) show the rule to be accepted as a normal lead time item, to become effective in 1984.

"However, that is incidental because the British have announced that they will enforce essentially the same rule at the '83 world championships. The FAI rules allow that. The same rule also allows the British to say that samarium cobalt motors will not be allowed, if they choose.

"It appears, therefore, that by going the brute force route the U.S. is inviting retaliation and disrespect."

Okay, John, the U.S. team won't pursue cobalt motors as per your advice.

even though the British have just said they're okay . . . now, would you please send your letter to Europe and the rest of the F3B world so that we won't be the only ones *without* cobalt winches? That may be quite an exaggeration, but the point is made. Let's not have double-standards.

WHAT'S THE SOLUTION?

Before we try to reach a just answer to the mess that the whole launching scene has become, we must first resolve the question: *Should the skill of launching an R/C sailplane help determine who is the best sailplane pilot in an F3B contest?* Think about it for a while. . .

If you believe that launching skills *should not* have anything to do with determining the best pilot, then you should start thinking about ways to eliminate launching. How is this possible, you ask? The answer is simple. Give everyone a launch from a platform of some predetermined altitude in a simultaneous fashion. Did I hear you say "blimps"? Of course, this is an impractical solution which opens up a whole new can of worms. F3B flying is difficult enough to organize as it is without the chaos or expense of either personal or organizer-supplied platforms.

If you believe, as most do, that launching *should* be a flying skill which should help determine a superior pilot and/or sailplane design, then the question becomes: *What is the most equitabe method of launching a group of F3B sailplanes in competition?* Here again, the answer is simple! Launch everyone from equal winches! After all, that's at least the *intention* of the new rules, isn't it?

You are probably thinking, "If it's that simple, why hasn't it been done before now? It must not be that simple." I don't blame you for thinking those kinds of thoughts, at all! To get *any* world-wide organization to agree on any one thing is almost an impossible task. However, this one deserves the effort.

This constant search for the better winch is detracting from the main purpose of F3B flying. That purpose is to pit the model building and model flying skills (launching skills included) of one flier against those of another to determine which is the better combination. Who builds the best winches should not be a factor . . . it's expensive, it's a hassle, it's stupid.

As I indicated earlier, the answer is mandatory use of organizer-supplied winches (for those who wish to launch from winches), or hand-towing as an option under the new, 1984 rules.

I can hear you objecting. That's okay, but please read on.

We want to encourage new blood and increased activity in F3B, or we will see a steady decline in overall participation. Things which help to streamline the whole business of running, and competing in F3B contests should by all means be encouraged. I though that Dan Pruss' idea of a simple sighting device as described in his June '83 *Model Aviation* R/C Soaring column is in the proper spirit. The Keep It Simple, Stupid principle is a very good approach to the aspect of the logistics of running an F3B contest. Let's apply it to other areas too.

Suppose that instead of having a "prep time" for the setting up of the half-dozen or so winches that invariably must be set up *between each flight group* . . . suppose we eliminated it altogether. We would gain five long minutes per heat! That could mean as much as a whole *hour* per round, and three hours per day! How is this accomplished? By leaving the winches set up all the time, that's how.

You say this isn't fair for the guy who didn't get his winch down first, and in the best position? It would be, IF the winches *weren't* organizer-supplied, and as close to equal in power as possible. I say let's have organizer supplied, identical winches available at national and international contests. Hey, even if the identical winches weren't absolutely equal in power, the fliers could be randomly assigned to their winches . . . luck-of-the-draw as it were. In the case of an obviously weak winch, the organizer would do whatever was needed to fix the problem, whether it would be replacing the winch, or having a freshly charged battery for all the winches (an absolute necessity from time to time) . . . it might not be *totally* equitable, all of the time, but it would be a lot better than the almost-anything-goes situation we have now.

As for local contests, as well as quarter- and semi-final national contests, well, where possible the organizer should provide standardized winches, where it isn't possible, then we should have very strict guidelines for the acceptable F3B winch. For the United States, this could mean the stock, long-shaft Ford starter motor (part number 3110 at the auto parts store) which has been in use for so many years it's not funny. Allow only minor modifications (namely, replacement of the stock bronze bushings with ball bearings), modifications which can easily be performed at any machine shop, or auto service shop, or even at home. Again, try to keep it simple and inexpensive.

My personal "F3B" winch is nothing more than a completely stock, six-volt, long-shaft, Ford T-bird starter motor (no. 3110) with a solenoid, a three-inch diameter spool hub with side plates about four inches apart, a 12-volt, deep cycle marine battery of 92 ampere hours capacity, and a foot switch with a safety switch in series with it. I didn't mess with the motor at all, its *stock*, and it's a good club-style, semi-hot winch . . . capable of blowing the wings off of your typical gas-bag floater in a matter of milliseconds. Zoom towing is fun with this winch. My total money investment? About $95 for the battery, $33 for the motor (would have been $23 if I'd had a used one for trade-in), $50 for the frame material, $10 for the whiskey to pay a friend to do the welding, $10 for the foot

switch, the wire, and the safety switch, $65 for the custom made Winchmaster spool from The Sailplane Factory, and about $30 for the line. You don't really need a parachute, but I bought one anyway for about $10. Add 'em up and you get about 300 bucks. This is about the cost of a good F3B radio system. Totally reasonable.

Now, in other countries this type of winch might be hard to put together because of parts availability. No big deal, let each country establish its own "standard" winch. The guideline here would be expense, and availability of parts.

The important thing is that for contests on national and international levels, the winches must be organizer-supplied, and within 10 percent of an FAI established power range. Winches in use at any major contest should be kept within 5 percent of each other in power output. I for one would be glad to chip in ten bucks (or more) to a national F3B winch fund to raise the money for six or seven, cheap (like mine), simple, *identical* winches for the next F3B Nationals, whether I go or not.

It would only take 30 fliers doing this to raise enough money to buy one complete winch, and with industry support, even fewer. This winch could be stored at the new AMA HQ (possibly), as well as a minimum of five or six others, until such time as they are needed, and then freighted to wherever the National F3B Finals is (or AMA Finals for that matter).

If every host country did this, there would never be the winch problems that we have now at the world championships. As a whole, **F3B teams would save thousands of dollars** every two years by not having to buy, build, and ship winches around the globe. Host countries would be required to publish the specs on their winch's physical dimensions, and performance characteristics two years before the world championship they would host, and competitors would design sailplanes to suit. The basic guidelines for winch specs have been laid by the British. Let's use them to see if they are any good, but first, let's forbid cobalt motors because of their expense and unavailability, let's limit the motors to two field coils or ferrite magnets, as is commonly the practice with readily available automotive starters, and let's propose a power range "standard" for all winches. Whadda ya say?

At this stage, it's not the details that matter. They will need to be thought out more thoroughly, I'm sure. What really matters now is the *concept*, and this one deserves not only some thought, but some action as well. If you like this idea, I'd like some positive feedback. If you don't like this idea, I'd also appreciate hearing from you, and hearing your reasons why this wouldn't work. Write to me care of **Model Builder.**

AIRFOILS OF THE MONTH: EPPLER 207 AND 209

As there wasn't an Airfoil of the Month last month, there will be two this month.

The Eppler series of airfoils . . . 205, 207, 209 . . . has always held my curiosity at a high level. The 205 is the old-standby for many contest fliers these days. There are those who swear by it, and those who swear at it as well. I've used it very successfully in the past, and will use it in the future as well. The 207 and 209 are unknowns to me. I've never used either one. The 209 is plenty thick, however, which I like for structural reasons, and the graphs indicate that the 207 is a good compromise between the 205 and the 209. I suppose that if I were to begin work tomorrow on a good multi-task sailplane, I would no doubt use these three airfoils. I would build a polyhedral, 100-inch, foam and balsa wing with I-beam spar (1/8 x 1/2 spruce, tapered), and a Mike Bame fuselage. It would have the 209 at the root, the 207 at the poly break, and the 205 at the tip.

For the technically inclined, the following material from the San Fernando Valley Silent Flyers' club newsletter should prove very interesting!

"The following material was translated from the EPPLER-PROFILE, 8. Erweiterte and Uberarbeite Auflage by Chris Adams for the 'Silent Flyer!'

"*The profile 205* was computed for the remotely directed sailplane flying models that have to, as well as circle slowly in thermals, also fly fast without having the sink get too large. It is therefore excellently suited for the F3B class where flat flying (distance) and flights with high velocities over 300 meters is very important (valued). The profile thickness of approximately 10.5 percent permits a light structure and the straight (even) profile underside allows the building of the wings from a straight building board.

"Also the new profile 205 permits it to be well-suited for slope soarers because it, until Ca = 0.1, has a very low coefficient of resistance.

"*The profile 207* has a thickness of 12.04 percent. It is for the same goal thought of as the 205; however, because of the larger thickness, the Reynolds Number is supposed to be safely over the 100,000. That gives significant wing depth possible over 240 mm.

"*The profile 209* is with 13.72 percent, the thickest profile of this series of three profiles. As root profile with a larger profile depth, and with the 207 and 205 for the outer wing, the series produces a profile streak/series for large sailplane models. The Cm value for all three profiles is small so that the stabilization factor for the longitudinal (pitch moment) is able to be small (approximately 0.5). Also, the zero place angle of all three profiles is nearly the same (approximately 2.3 degrees). A flying (gate? turbulator? spoiler?) boundary is therefore not necessary."

F3B RUMORS AND FACTS

It is rumored that for personal reasons, the defending World Champion Dwight Holley will not be in York to defend his title. I have no further info, but my source in reliable.

The fact is that US F3B Team Manager Dick Odle has resigned. His press release is below:

"Date: 5/3/83, From: R.C. Odle,

Subject: F3B Soaring Team.

"On May 2, 1983 I resigned as manager of the 1983 F3B Soaring Team. Some of you who read this will already know that, some will not. In either case, and regardless of what you have heard, I want my reasons for his most difficult decision clearly understood.

"On December 30, 1982, we had our first team meeting. On April 9 and 10, 1983, we had our first team practice. I had been told that airplanes were being constructed, but only Don Edberg demonstrated any completed work, which he unfortunately destroyed. Notwithstanding my request (the same

weekend) only Don returned the official entry and information forms, which were due on May 1, 1983.

"The prognosis was clear. I had failed to fire these flyers up, and my enthusiasm was gone. I could only blame myself, and that required an action that I hoped would benefit the team as a whole, thus my resignation. With renewed enthusiasm this team is capable of great success. I wish them well.

"There remains one more important point that must be made. I am closely associated with many fine people in the soaring community. My failure in this matter is mine alone. Should anyone feel the need to vent their displeasure, please feel free to contact me. An expansion of your frustration beyond me, personally, would be in error, unfair, and non-productive to the F3B program. Thanks for your consideration. R.C. Odle."

Dick will continue to handle the sales of the team support pins, decals, and patches which are available for donations of five, three, and six dollars respectively.

Rick Shrameck is the new team manager, and I feel that he will do a fine job for the team. Wish them well in York by supporting them financially . . . buy the beautiful pins, decals, and patches, and wear them proudly.

See ya next month. Good lift! •

F3E . . . . . *Continued from page 26*

side. Mr. Peter Blommaart, chairman of the FAI Electroflight committee was also at the same meeting. He took notice of our proposal, and we were soon in contact with each other. I must say here and now that the major credit for the success of this event must go to my friend Peter. He found people in Europe who wanted to come to the US to fly, and organized them from his side. This alone took a tremendous load off of someone who didn't really know how much work was yet to come.

So, we have some people coming from across the sea, what to do with them was the next big question.

Why not let them stay in the homes of modelers here in Southern California? There are a lot of people in the local area with an interest in E-flight, so calls were made, and volunteers' names were taken . . . *great!*

With this out of the way, next came the letters to various people in the hobby industry for merchandise prices. The response from these people was, in my opinion nothing short of fantastic considering the relative short notice they were given.

While all of these preparations were taking place, time seemed to fly (ha) by, and before we knew it, we were hanging around LAX waiting to pick up ten people from Europe who would spend a week with some lucky US modelers.

Back at our appropriate houses with model boxes and guests, the real fun began. The week preceeding the contest was for all concerned, a veritable modeler's dream come true. Many times sleep was forgotten as more important things like working on our models together, and discussing electroflight took us into the early morning hours. Then, after a brief, few-hours nap, it was off to the flying field to test fly and practice for the upcoming event.

A couple of times during these practice sessions models were damaged, and the closest available shop was quickly put to use. On one particular occasion, this happened to be *my* shop, and as I was helping the person fix his model, it suddenly dawned on me what was happening! *Here in my garage were people from five different countries, helping another modeler fix his damaged aircraft and talking (not necessarily in the same language) about the regular things modelers talk about when they meet.*

As all good things do, this week passed much too fast for us, and suddenly it was time for the scheduled events to take place.

Saturday April 16th. The day set aside as the Fun-Fly and final tune-up day for the people planning to enter the competition. All week long the weather man's predictions for the weekend were rain, and lots of it. It's a good thing for us the clouds paid no heed to his promptings. Instead of black rain clouds, we were blessed with balmy breezes and a sky dotted with white "puff balls". You know, the kind that thermals just love to hide under. People flew and talked electropower all day with plenty of ongoing demo's of pylon racing, pattern flying, scale, and gliders. Enthusiastic response to these demo's by both spectators and modelers alike seems to point to the fact that E-power has "arrived".

As if all of that weren't enough, Saturday night there was a big potluck dinner at one of the OCDC members' houses. The highlight of this evening was an open forum question and answer session. Featured speakers were Mr. Heinz Keller, of Keller motor fame, and Mr. Calvin Ettle, the US representative to

the FAI electroflight subcommittee. If you had a question, or a problem with your electric aircraft, the fix was available to you simply for the asking.

Sunday April 17th. The actual day of the competition was finally upon us. Arriving at the field early, we were greeted by overcast skies and mounting wind conditions, the absolute opposite of the previous day. A look to the west showed the approach of formidable-looking, BLACK clouds. Would the predictions of rain finally come true at the worst possible moment?

Last minute sign-ups were taken, and the flight order was arranged. At 8:30 the pilots were given their final briefing with the first flight scheduled to take place at 9:00.

Sadly enough, we would have to start without one of the favorites, a guy who was sure to place well. Charlie Binder (twice German F3E Champion) who had flown in Saturday evening especially for the competition, lost his model due to radio problems on a test flight just before the start of the competition.

A minor technical difficulty with the turn buzzer system caused a slight delay in the start, so the first man to fly, Peter Blommaart of Belgium, took to the air at 9:12.

The duration and distance times in F3E Glider are kept by two different timers, and because of this, the first round ran a little slow until these officials had accustomed themselves to their respective routines.

The round scores, though accurate, never tell the whole story by themselves. Most of the flights came off pretty routinely with a few notable exceptions. The first of these happened to be Larry Jolly. Larry, sporting a new KELLER 50/24 in the nose of his plane, proceeded to blast off and record a round-high distance score of 13 laps. Upon completing this portion of the flight, and preparing to pass through the gate to start duration, Larry thumbed the motor control switch to the "on" position, and . . . NOTHING! The motor's on/off switch had given up the ghost, leaving his first round score as distance only.

Many of the contestants were hoping that the weather would permit the running of a third round, which in F3E glider competition permits the dropping of each contestant's lowest scoring round with the remaining two higher rounds counting toward the total score.

Not too far into the first round, the wind velocity began to increase until it reached a steady 15-20 mph blow which was to remain with us all day, causing problems for some of the pilots.

One such person was Michele Blommaert (no relation to Peter) who, after completing a good distance run, was heading toward the gate to start duration. At the very instant Michele switched on his motor, a particularly viscious gust of wind literally grabbed his aircraft, flipped it on its back, and dashed it to the ground. Bad luck!

The exciting part of round one for many of us was watching (and listening to) the *twin* KELLER 25 powered model of Ralf Liebler take to the skies. This was a brand new model which Ralf had brought from Germany unfinished, and worked on the week preceeding the contest. In fact, final preparations to ready it for flight were only completed the morning of the contest at the flying field, and the first round flight was also to be its test flight! Taking this into consideration, everyone could have expected the worst, but Ralf did an excellent job of piloting, and managed a respectable score. I'm sure that when he has some more stick time on this ship, he will be a serious threat in upcoming meets.

The first round ended at 11:30. The start of the second round was called immediately. In an attempt to add a little variety to the day, the flight order was changed slightly for the second round. This didn't seem to go over too well with the contestants (other clubs running this type of contest be warned!) as some of them felt they were being rushed in their charging procedure. Despite the grumbling, everyone got fully charged in time for their flight with no time lost in waiting for someone to charge.

By the start of the second round, the morning gray skies had given way to scattered clouds. This, in conjunction with the heavy (for California) winds, changed the leaden air of Round 1 into very fast cycling, strong lift/sink for Round 2. This was to cause many of the contestants problems as, expecting lift on the distance course and during their duration flight like the previous flier, they would get caught in the sink cycle and score poorly. This was especially noticeable to the people with the smaller, two-meter type aircraft with their lower weight and slower forward velocity, (which in the winds was cut to almost nothing at times).

Near the end of the second round it seemed that the fast approaching rain clouds would get us for sure (of how I hate flying in the rain!), turning the predominently dirt field into a mud puddle, and making life miserable for those of us who had to stay no matter what. Again, Lady Luck seemed to be on our side as for some meteorological reason unexplainable by me, the clouds, until now appearing as a dense, black wall, *split* as if sliced with a knife, and began to pass *around* the field with some room to spare.

Notable incidents in the second round: Larry Jolly, after replacing the faulty motor control switch in his plane, comes to the starting line for his flight, and proceeds to burn out his second switch of the day, placing himself out of the running. Hein van't Laar (eventual second place finisher) flies a 12-lap distance, and maxes duration with a 21-second motor run. This excellent flight for Hein gives him a temporary, round high score of 485 points. This appears to put Hein in the lead . . . until Mike Charles finds himself with lift on the course and clicks off a 13-lap distance. This, and maxing with a 21-second motor run, helps him to keep the lead established in round one. While these two are battling it out for first and second, Bob Gerbin, who only had one test flight on his new Ampere, is starting to get the feel of the aircraft. Bob puts up a solid 431-point flight to move himself into third place.

The third round starts at 1:30 with the announcement that the flight order will be the same as the second round. This is an effort to give the contestants more time to charge between flights. The first man off is co-CD Frank Chasteler who is leading the unofficial, 7-cell Class contingent. I might mention here that the flight rules were the same for all the contestants regardless of the size or type

of aircraft they were flying.

Round 3 moves on with few surprises as the contestants and workers alike are now accustomed to the pace. Frank Heacox becomes the first and only one of the 7-cell fliers to break into the 400-plus point category with his last-round, 411 score. A credible performance for Frank.

As the afternoon progresses, the air starts to cool. This and the high winds make the lift, of which little seems to be left, almost impossible to find and follow. Suddenly, all eyes are focused on the flight as van't Laar has just run off another 12-lap distance. If he can do well in duration, his chances of capturing the lead are quite good. The official motor run time is 20 seconds! As if on order, a thermal appears, Hein wheels into it, and he begins to climb out. A max appeared sure, and only a good landing was needed to put him in the lead. The max flight time was achieved, so van't Laar brought his bird home and set up his approach. As he turned on final, his aircraft suddenly veered right, and spun in, short of the target time and the landing circle. Was he a victim of radio interference, or of the treacherous wind which was giving everyone problems? This bad luck ended van't Laar's bid for the win.

Mike Charles was next up, and as he had been busy repairing damage to his aircraft, he was unaware of what had been happening on the flight line. In fact, if there had been time enough to post van't Laar's final score, he would have seen that it wasn't even necessary for him to fly, as the next closest competitor, Bob Gerbin, would have to gain over 500 points to win. This was highly unlikely with the deteriorating lift conditions. Charles scored 12 laps in distance, and had an apparent max underway with only a 20-second motor run, when something wrong was discovered. On the landing approach, it was seen that his motor was *running*, and he was unable to shut it off. Later examination would find a short in the motor wiring at fault. As the model was too far away to tell when the motor had restarted, no score could be given for the duration portion of this flight. It is curious that both contest leaders should have trouble on their final flights, but that's the way things often go in competition.

Gerbin was next, followed by Dan Bosshart of Switzerland. Dan had a good chance to move into third if he could record a good score, but this challenge never materialized.

In the end, it was Mike Charles (USA), Hein van't Laar (Holland), and Bob Gerbin (USA), in first, second, and third places respectively.

After the official competition came the raffle. Every one of the contestants, regardless of final standing (and all of the contest workers) got a merchandise prize. These prizes were generously donated by the manufacturers noted on the sponsors' board. I'd like to take a moment here to thank those who contributed prizes. *Thanks* for your help in making this event a success.

I hope that in the future, there can be more of these international competitions in the US. I feel that F3E gliders will, in time, become the most popular of all soaring events. If anyone (person or club) would like more information on this type of event, or where to get the models and hardware needed to compete in this type of event, please feel free to write me c/o this magazine. Be sure to enclose an SASE for the reply.

A final closing thought. Many people have questioned me about the contest, asking me if I was excited, was it fun, etc., etc. My answer to them is yes it was, but the contest itself was, in my opinion the least important event of the whole week. In fact, possibly an anticlimax compared to the friendships established and good times shared with the visiting modelers. I thank the visiting modelers for making this a truly international event. You're the real winners!

FINAL STANDINGS

US/INTERNATIONAL F3E OPEN INVITATIONAL

		ROUNDS			TOTAL
	CONTESTANT — COUNTRY	1st	2nd	3rd	(BEST 2)
1.	MIKE CHARLES — U.S.A.	438	492	210	930
2.	HEIN VAN'T LAAR — HOLLAND	416	485	427	912
3.	BOB GERBIN — U.S.A.	266	431	424	855
4.	DANIEL BOSSHART — SWISS	411	405	411	822
5.	HEINZ KELLER — GERMANY	0	375	398	773
6.	RICK SCHAMECK — U.S.A.	249	378	358	736
7.	FRANK CHASTELER — U.S.A. (7-CELL)	394	296	321	715
8.	FRANK HEACOX — U.S.A. (7-CELL)	292	281	414	706
9.	JACK DURHAM — U.S.A. (7-CELL)	298	311	390	701
10.	MIKE NEVERDOSKY — U.S.A. (7-CELL)	310	351	345	696
11.	DANNY DESAEGER — BELGIUM	316	341	342	683
12.	LARRY BLAKELY — U.S.A. (7-CELL)	374	294	305	679
13.	RALF LIEBLER — GERMANY (TWIN)	370	280	0	650
14.	J.D. DUKE — U.S.A. (7-CELL)	302	266	329	631
15.	RALPH ST. JOHN — U.S.A. (6-CELL)	272	335	229	607
16.	JOHN KRUG — U.S.A.	245	320	69	565
17.	PETER BLOMMAART — BELGIUM	244	195	0	439
18.	KEN NELSON — U.S.A.	291	30	0	321
19.	MORRY SMITH — U.S.A.	138	63	100	238
20.	LARRY JOLLY — U.S.A.	195	0	0	195
21.	MICHELE BLOMMAERT — BELGIUM	150	0	0	150
22.	HANS WEISS — U.S.A.	105	0	0	105
23.	ROGER ROTH — U.S.A.	45	0	0	45
24.	DENNIS BRANDT — U.S.A.	0	30	0	30

MOST LAPS

13 — CHARLES, JOLLY
12 — CHARLES, VAN'T LAAR
11 — CHARLES, VAN'T LAAR
GERBIN, BOSSHART

MOTOR RUN IN SEC. FOR 5 MIN. DURATION

VAN'T LAAR — 20, 21, 32
CHARLES — 28
BOSSHART — 29

DURHAM, LIEBLER — 30
HEACOX — 35
CHASTELER — 38

Eighth Air Force *Cont'd from page 11*

We will mention however, that they came in all sizes, from nine-year old Tom Lime of Phoenix, to Col. Bob "Canard" Thacker, who by his own admission was around to holler *"Clear!"* when the Wrights first cranked up. The planes, too, came in all sizes, from the 1/3- and 1/4-scalers down to Garland Hamilton's .10 powered PT-19, and with all numbers of engines from one to four.

The event was held at the club field, located on the north edge of the city of Phoenix . . . a nice field with a most adequate paved runway, and plenty of pit and parking area. Even the weather, which had been on the wet and unpredictable side throughout this part of Southern California and Arizona for the past few weeks cooperated with a warm, sunny and most delightful weekend.

The 1/8th Air Force Fly-In is not a judged event, meaning that assigned individuals do not circle your model with clipboards in hand, or stare at every move you make while you are in the air. The judges are picked from the entries, all informal and low key, and ultimately decide the winners of the twelve categories in which entries are made. There is also a People's Choice Award, for which all spectators can vote during a mid-day stand down during which all models are displayed, admired, and photographed on the runway. The other award is called the "Smacked Ass Award", for which the criteria is obvious.

Winners of the 1983 1/8th Air Force Fly-In were as follows. The second name listed is an Honorable Mention in that category, where data is incomplete, it was not entered on the entry blank.

Most Impressive Flight, Military:
Bruce Schamber, Mig-15, Naples, FL
Dennis Crook, P-38, Big Rock, IL
Most Impressive Flight, Biplane:
Monty Davis, Sopwith Pup, Tucson, AZ
Joe Zimmerman, Pitts, Buena Park, CA
Most Impressive Flight, General:
Bruce Schamber, Eagle, Naples, FL
Keith Lindsay, Tucson, AZ
Most Impressive Maneuver, Military:
Garland Hamilton, Low Pass, Oceanside, CA
Brian O'Meara, Combat Takeoff, Denver, CO
Most Impressive Maneuver, Biplane:
Ted White, Four Rolls, Bedford, TX
Phillip Arnold, La Cholla, AZ
Most Impressive Maneuver, General:
Bruce Schamber, Inverted Spin, Naples, FL
Scott Ockerstrom, Phoenix, AZ
Best Save of the Meet:
Ted White, Bedford, TX
Bob Angus, Tucson, AZ
Best Mechanical Option:
Dennis Crook, TBM-3, Big Rock, IL
Eldon Wilson, P-26A, San Angelo, TX
Biggest Model Flown:
Steve Tillson, Aeronca C-3, Phoenix, AZ
Smallest Model Flown:
Garland Hamilton, PT-19, Oceanside, CA
Best Frequency Hog:
Jerry Kitchins, La Habra, CA
Best Infidelity to Scale:
Art Wortz, Quaker Old Timer
Jeff Nickerson, Balsa USA Phaeton
People's Choice, 1st:
1st: Dennis Crook, TBM-3, Big Rock, IL
2nd: Art Schamber, Mig-15, Naples, FL
3rd: Joe Zimmerman, Pitts, Buena Park, CA
Smacked Ass:
Bob Frey, Phoenix, AZ

In addition to some terrific building efforts, and impressive flying by the competitors, we were treated to a most exciting and interesting air show by the Tucson R/C Club, which included a WW-I style dogfight, and some wild sky-diving by Dangerous Dan, the famous R/C parachutist. We also enjoyed a nice banquet, with a delicious, well-served meal, short speeches, and entertainment by Messers. Al Casey and Bob Frey. In short, I can state without a doubt that everyone present had a good time, and we are all looking forward to the 1984 1/8th Air Force Fly-In. Can we reserve a pit space for you? •

Ishimasa . . . *Continued from page 41*

all that long. *(In case you aren't quite following the numbers here, I'll explain . . . the battery pack has a capacity of 1.2 amp hrs., i.e. it can put out a one-amp current flow for 72 min., or a 35 amp flow for about two minutes. wrf)*

If you are interested in trying an electric helicopter, I would suggest that you get an EH-1 first, *before* trying to convert that gas ship you have hanging on your wall. Otherwise, you'll find that you can get nearly the same performance as the EH-1 for an investment of only $450.

When you assemble the EH-1, be careful to achieve the proper gear mesh, too tight of a mesh will decrease efficiency, cause your motors to overheat, and lower the available power.

Not mentioned in the instruction manual, but something I think is important, is to break in your motors before attempting flight.

It is important to set the blade pitch and tracking while on the tether. The NiCd pack is used up so fast that you cannot track the machine in the time you have available.

Make sure that you have full travel on the motor control.

I like to set the blade pitch so that the machine lifts off at approximately 75 percent of the throttle stick throw. This seems to be the most efficient setting.

Longer free-flights (no tether) can be obtained by keeping hovering to a minimum, thereby using less power. Make all turns to the left, which will unload the tail rotor and draw less current. I have demonstrated free-flights of over two minutes duration, featuring climbs to over 100 feet, and including stall turns. People say what can you do in two minutes? Well, my friends and I who have EH-1s have friendly competitions to see who can remain aloft longest. With a given amount of fuel, as is contained in the 1.2-amp cell, he who stays up longest, flew the most efficiently.

What about crash survivability? Can I learn on the EH-1? Yes, have someone who knows helicopters help you set the machine up; this is advice I would give for any helicopter. Stay on the tether

and practice in low wind conditions. Parts are cheap! I have included a picture of a crashed EH-1. I'd like to say that we crashed it on purpose, but that would be untrue. The truth is we weren't paying attention, a wind gust hit us, and we *(OK Larry, who was the other pilot? wrf)* hit the car the power chord was attached to. Notice the rotor blade is not broken. Ishimasa has designed the EH-1 to survive a crash.

The fiberglass seesaw breaks on impact saving the shafts and gears. The tail boom is a fiberglass shaft that will snap on impact. This could have been an expensive, major crash, but the EH-1 was back in the air for less than $10 in parts and a half-hour's work. The EH-1 is so docile that the newest flier should have no more trouble with it than he would with a conventional gas helicopter.

If you have questions about electric helicopters, you can contact Cliff Rausin at Condor Hobbies, or me *through* Condor Hobbies. They will be happy to let you know of any new mods or techniques that we may discover as we continue to work with the EH-1.

Good luck until next time, and fly *quietly.* •

Indoor . . . . . *Continued from page 58*

sheetwood box for the motor stick instead. The nose block (with motorstick attached) is plugged into the front of the plane. The benefit of this stick arrangement is that it allows the modeler to wind the motor outside the aircraft. If the rubber brakes during the winding operation, no harm will come to that beautiful construction you built into the fuselage. The motor is inserted, fully wound, into the airplane. You can even wind the rubber on a torque meter, then attach it to the motorstick.

MORE INDOOR SUPPLIERS

Mr. Ray Harlan, 15 Happy Holly Rd., Wayland, MA 01778 sent a sample of a new plastic film covering material called "Ultrafilm" which he says, ". . . will make Microlite *Obsolite*." It is a polyester film that is only 60 millionths of an inch thick. It is a 25 percent lighter and more tear resistant than Microlite. Best of all, it cuts easily with a pencil soldering iron. Ray suggests spraying the wing structure with spray cement, then covering the entire surface before adding the dihedral breaks. The above mentioned method for taking out the film sag comes to us from Mr. Harlan. Thank you so much, Ray.

The cost of the new Ultrafilm is $6.00 for 10 feet, plus $1.25 postage, unless purchased with Ray's scale, balsa stripper, or tailboom form. Send for Mr. Harlan's list of wares. *NOTE:* this plastic material seems to be very similar to Mike Mulligan's Absolite covering film.

Mace Model Aircraft Co. is now offering indoor kits and plans. Don Mace is handling an Easy B called the SUPER "B" which was designed by Robert J. Dunham. A six-inch and a ten-inch span indoor flyer plan is scheduled in his line. Write to 359 S. 118th East Ave., Tulsa, OK 74128.

INDOOR GLASSES

What are those strange looking glasses you see some of the hot duration builders wearing? They are "magniFLYing" glasses, and the make it much easier to repair and adjust the very delicate parts on indoor models. Usually they are seen on duration flyers, but there is no reason why scale (handlaunch, etc.) modelers might not press them into service. The brand I own is Magnifocuser, but I've seen several others.

They have a one inch wide plastic head band that is adjustable, to fit your own noggin. Several strengths of magnification are offered. Yes, they will fit right over your regular eyeglasses. The price range is between $16.00 and $20.00. Shop for them at your local art supply store. Stamp collector shops would likely stock them, too.

FUNNY STORIES

Do you have a favorite humorous story you like to tell about indoor building and flying? Send it to me so that we can share it with the other readers. Here's one of mine.

Back in the beginning, when your indoor editor was just a fledging in the sport, Ron Ganser and I journeyed to Cleveland, Ohio to try our hand at microfilm. The meet was being staged at Baldin Wallace College gymnasium. Ron had built his first super indoor box. A plywood monster that had to be fitted into the back seat of his Plymouth with a shoe horn. As we opened the indoor container and showed the world his array of mic ships, we noted several well-known, area indoor builders around the room. There was Lou Willis of Columbus, and Don Assel from Akron. At the other end of the room we noted the Weisenbachs (Warren and Marge, and daughters Cheryl and Susie), and Bill Hulbert about to launch his ship. As we began to fly, it became apparent that this room was on the small side for duration flying. Several times models collided in mid-air or aborted against the walls or the basketball backboards.

At one point we noted a gathering of four or five modelers off to one side. At seems that five climbing ropes were hanging from the ceiling. They had not been tied up against the near wall, but hung vertically over the floor. One of the better mic ships had lodged itself against the second rope, near the top. The crowd was trying to decide the best way to retrieve the airplane without damage. The propeller had wound itself up in the hairs of the rope. The model's owner was being careful to take only the best advice for the safe return of his craft. Suddenly, a bystander strolled over and reached for the rope. "I can get this model down real easy," he said, and before anyone could stop him, he snapped the rope back and forth, like a bullwhip. As the group looked up agast, the model floated down. First one wingtip, then the rudder, then pieces of the fuselage. The twisted remains of the broken wing was the last part to touch the floor. Needless to say, he didn't stick around for the comments. We couldn't print them here anyway. Oh well, you live and learn. I'm just glad it wasn't *my* mic ship!

INDOOR AIRFOILS

Novice indoor duration builders may wonder what airfoil to use for that next airplane. Most indoor airfoils are a six percent arc of a circle. That is, a thin arc with the height being six percent of the length of the cord of the wing. This seems to work very well for indoor duration models. Generally, thinner airfoils are used for higher ceiling models, and thicker ones for low ceiling craft. From time to time someone comes

out with something different like a 'foil with a high arc on the leading and trailing edge, and flatter middle portion, or a recurve (or reflex) airfoil where the trailing edge of the 'foil sweeps back up. I have tried this with some success.

Back in the 1930s the more conventional outdoor style 'foil was used. This type has a high arc at the front and a gentle sloping arc towards the rear. Duration wings are covered on the topside, only. The stabilzer usually has the same airfoil as the wing.

FLYING ACES AVAILABLE

Are you old enough to remember *Flying Aces* magazine? A group of freeflight scale enthusiasts has kept alive the spirit of the *Flying Aces* era. Mr. Lin Richel, 3301 Cindy Lane, Erie, PA 16506, is now accepting memberships in this fun club. Send $9.00 for your membership, now. You'll receive a periodic newsletter with vintage rubber scale and non-scale plans, and comic strip drawings and chatter, as well as news of scale contests and meetings.

Apparently, the Grapenut scale planes are an indoor favorite. Look for many more of these little beauties. See you next time.

Send black and white photos, comments, and questions to Ken Johnson, 16052 Tulsa St., Granada Hills, CA 91344.●

Electronics . . . *Continued from page 36*

53.500. Note however, that if the proper recommended sequence of colors is followed, there should not exist any possibility for confusion, as Channel 40 is *yellow and black*, and 53.4 is *black and yellow*. The same situation exists with Channel 50 and 53.5.

We all know how hard it is to break a habit, but we are not speaking here of internasal exploration, or some other annoying, but non-lethal habit. Proper frequency control is an important and necessary part of R/C flying. Those of us, and *especially* those of us who fly at heavily populated flying fields, and in competition, are simply going to have to get in step. We should start by referring to the new frequencies by channel number, the old ones by colors as previously done, *only in the proper sequence*. Those flying on either of the above mentioned frequencies should make doubly sure that their transmitters are equipped with the proper color flags, *in the proper sequence*. And any time a new transmitter shows up at the field displaying any of the above mentioned color combinations, it should be checked to assure that it is indeed properly color coded. It is better to check before you take off, or before you turn on. Remember that the plane you save might be your own!

MORE ABOUT BATTERY CHARGING

Batteries and battery charging have certainly been a popular subject here. It is good to know that so many of you recognize the importance of both. The latest reader to be heard from is D.A. "Mike" Michael, of Lykens, Pennsylvania, who writes:

I enjoy your **Model Builder** *"Electronics Corner" very much, and thought I would send you my thoughts on wet or gel-cell charging. I use gell-cells and car batteries to power my amateur radio equipment. (My call is W3TS.) I also use an old six-volt gell-cell to light my glow plugs, so I have had some experience with them over the last five years.*

One thing I have found is that wet-cells like a constant voltage charge (as opposed to constant current charge for Ni-Cds. My charger is simply a 500 ma current-limited, variable-voltage, bench type power supply like Radio Shack sells. I set the output voltage with no load or battery hooked up at 6.75 to 6.9 volts for a 6.3-volt gell-cell, or 13.5 to 13.8 volts for a 12.8-volt cell for a float charge. Then I go back at the end of the week and find a fully charged cell. If I need them overnight, I set the power supply for 7.2 volts for the six-volt cell, and 14.4 for the 12-volt cell. This is an overnight fast charge, and you should not leave them on this more than a day or two as it causes venting.

To use a six-volt gel-cell for glow plug power, I put a screw into each cell strap. (See sketch.) I use a .1 ohm, five-watt resistor in series with the glow plug wire, and hook up the glow wire with clips to one cell only. This way, I have reserve power when one cell dies, I simply move to the next one.

Well Mike, thanks for sharing your findings with us. As I'm sure you've heard all of the possible comments about the most appropriate phonetics for your ham call, I won't add mine. I wonder if you are one of those hams I've seen driving around with a bumper sticker that says, "Radio Amateurs Do It With Frequency"?

Mike's charging method is similar to some recommendations found in the literature available from some of the major battery manufacturers, and it should work well for those who have the proper type of power supply, and an instrument accurate enough to read the recommended voltages. His method of tapping a partial voltage from a six or even a 12-volt battery is certainly feasible, and I have previously heard of it being done successfully. It must be noted, however, that not all such batteries have clearly marked indications of where the connecting straps between the different cells are, and a drill bit applied to the wrong location will cause venting, and probably shorten battery life. If you are shopping for a battery with which to do this, be sure to locate one of those with the epoxy covered strap locations as Mike indicates.

One thing that you will not be able to find down at the corner Radio Shack is the .1 ohm, five-watt resistor; they are not a common value. You can obtain the same effect by simply using a long-enough, light-enough cable. Use typical hardware store two-conductor electric wire, the smallest available, which will have enough resistance at the current being drawn, to drop the two volts down to the 1.5 recommended. Start with five or six feet of wire, measure the voltage at the plug, and simply shorten the wire until you get the desired voltage.

THIS AND THAT

I received a long letter, and a wealth of information from David Slater, of Wanaque (I wonder if that is *Wana-k*, or *Wana-Q?*), New Jersey. Dave's letter indicates that while it is true that transistors can't do barrel rolls or spins, the electronic end of the hobby can indeed be interesting and involving. He asks for my comments on a number of things which are not of general interest, and which have been answered directly. However, other items that he discusses are of a more general nature, and are being shared with you here.

RECEIVER TUNING

In general, Dave asks for the proper place to pick up the receiver signal for connection to an oscilloscope for tuning purposes. The first place to look is the power connector. If your receiver has three leads or active pins, if pc board mounted, the chances are that the tuning output is the third one, and is there for simple connection to the tuning equipment at the factory. Failing that, one has to locate the output of the detector, and make a physical connection there. The enclosed schematic of a commonly used amplifier/detector stage shows where this connection is made.

Though the example which Dave sent, a Royal Electronics diagram, shows connections to the oscilloscope being made from these points through 1K resistors, it is more common to make them through small (10 micro-henry) chokes. In either the internal, or the power plug connected outputs, the ground side of the receiver goes to the scope ground, detector output to the scope input. Keep the leads as short as possible; the use of small shielded coax is recommended.

FIELD STRENGTH METER

Dave asks if my Field Strength Meter (**Model Builder,** September 1981), could be made more selective with the addition of a tapped, switch-selected coil to cover the various R/C bands. Without a doubt, yes, and in so doing, you will also increase the sensitivity, which in this isolated case turns out to be an undesirable feature. The whole idea of my rather simple FSM is to give you an indication at a distance at which you can still read the instrument. More sensitivity means that you can place the FSM farther from you, but unless you are an eagle, you won't be able to see the minor changes that are important. In order to get the reading back to a workable value, you then have to put in a sensitivity control to reduce the gain to keep the needle off the peg. You could of course have a more selective, more sensitive tuning circuit with a remote reading meter located close to you, but this merely complicates things. Believe me, similar instruments are widely used for R/C transmitter tuning, and in conjunction with a scope to view the signal quality, are perfectly adequate.

However, things . . . and test equipment . . . are due to get considerably more complicated with the coming of FM gear, but we'll fly under that bridge when we get to it.

SERVO REVERSING

Dave writes: "I would like to add servo reversing to my older radios". . . The question being how old? If you are talking about the ones designed and built before the introduction of the special encoder IC chips such as the Signetics NE-5044, my advice is to forget it. It can be done, but it would involve switching all three leads to each control pot, through two trimpots in each. Just physically handling such a chore is mind boggling, within the consideration of connecting all those leads.

I know that there are lots of excellent older radios around, some with better gimbal assemblies than are found on the currently manufactured, inexpensive systems, and one hates to retire them completely. One solution is to remove all of the electronics, and rebuild them using Ace R/C Silver Seven electronics, which can give you not only servo reversing, but most anything else you can think of. In some cases, you don't even have to replace the RF section, just the encoder. Look into it, it is not as expensive as you might think, and again, for the right transmitter, well worth the investment.

On the subject of Fred Marks, and his Ace Silver Seven, I will once again recommend this book, *Getting the Most From Radio Control Systems,* it has the best and most current explanations of the workings of R/C systems that I know of. It too is available from Ace R/C for $8.95.

MORE BOOKS

Dave reminded me of something which I should have mentioned issues ago, the availability of two excellent and inexpensive, extremely useful books from Radio Shack. They are *Engineer's Handbook II* and *Semiconductor Replacement Guide.* They both contain a lot of information, while not necessarily R/C only, of value to the technician, tinkerer, and experimenter.

FUTABA MODIFICATION

Dave asks a question regarding his son's Futaba FPT-2F transmitter: "I want to change the check jack on top to a

charging jack. The wiring from the jack through the switch, and the make-up and wiring of eight Ni-Cds is no problem. What happens to the wires at the jack, as I'll no longer need them?"

Well Dave, if I have my Futabas right, this is the one which has a jack on the top through which you can plug in a cable from the receiver battery to check its voltage on the transmitter's meter. The best solution would be to unsolder the wires at the jack, insulate them from each other, secure them together with a piece of shrink-tubing, and further secure them inside, away from all of the antenna wiring and circuitry. That way, if you ever want to restore the transmitter back to its original condition, all you have to do is resolder two wires.

However (it seems that there is always a "however", doesn't it?), this type of jack and plug are not suitable for use as power connectors, without an addition which I will mention. If you will look at one of these jacks and plugs, and maybe hook an ohmmeter across the jack, you will see why. At a certain point, as the plug is inserted, the plug's tip causes a direct short, directly across whatever is connected to the jack. In this case, as the batteries are connected there, you'd wind up with a face full of smoke, and some melted wiring.

To prevent this, it is necessary to include one more diode in the charge circuit, a 1N4000 type in series with the positive line from the battery, connected with the cathode towards the battery. It will allow the charge current to flow in the proper direction, but will not allow reverse current flow in the event such a short is momentarily, or permanently made.

GUINNESS BOOK OF AIR FACTS AND FEATS

It probably wouldn't be a normal issue if I didn't stray completely off the subject, but I simply have to share something I just discovered recently. Assuming that you are interested in airplanes, in addition to being interested in things electronic, I can guarantee that you are going to enjoy the book with the above title, available through and from Cox Hobbies. It tells about all the "firsts", ones that most of us would not believe were ever recorded, from when airplanes were in the dreaming-of stage, to the present jet age. It tells you who first did what, who did the most, the highest or the lowest, or maybe the longest! It tells you how many were built, who flew them, where to, and often, why. It's a most interesting book, which I purchased for use as a reference, but which I found so interesting that I have been reading as though it were a novel.

It is available through Cox dealers, or check with Cox Hobbies, Inc., 4400 W. 78th St., Minneapolis, MN 55434. Happy reading . . . and happy flying! •

Fuel Lines . . . *Continued from page 37*

them. Nevertheless, if you want some more information and availability data, write or call: Condor Hobbies, 17835 Sky Park Circle, Suite E, Irvine, CA 92714, (714) 556-1888.

For the future, a couple of synoptic history articles on two- and four-cycle engines are in progress. My research on the development of these engines has been most interesting. Hopefully, you'll agree with my visceral feeling that the articles will be interesting to engine buffs.

Someone recently told me, "We're all turkeys, it's just a matter of degree." Maybe there's some Walter Mitty in each of us.

Guys, take care . . . •

F/F Scale . . . . *Continued from page 50*

rected by a thin coat of clear dope, or maybe Floquil's Crystal Coat can be added to the mixture.

The first chance I get, I'm going to experiment with this product, and another one which has recently caught my eye. I'll keep you posted.

Another nifty idea Doc Helman sent in is the use of the Uhu glue stick. Uhu is a German product or manufacturer, but nonetheless, obtainable widely in this country. He uses this stick to attach tissue and condenser paper onto structures. Even though the glue works well on the paper, he uses a little thinner through the tissue to activate the glue even more. Doc also uses this glue stick to apply Petraset type letters onto tissue covering. First, he places a bit of glue on the letter, which immediately gets tacky; this permits the removal of the letter from the sheet it comes on. Then, he attaches the letter to the covering, again using the glue stick. This can be done with little pressure. Any excess glue can be removed with a moistened finger. Apparently, Uhu glue has no effect on the Petraset. Some similar substances can dissolve or distort the lettering, so a little experimenting would be in order.

I'm going to digress for a while, and give you an update on a couple of projects. As of this writing, I have finished the wings to a second Marquart Charger biplane. I am waiting for the designer to finish welding up the fuselage so that I can get busy on that phase of the building. I would dearly like to complete the project by the summer of '84. All of us have set time limits on projects, and seldom finish on time, but I can hope.

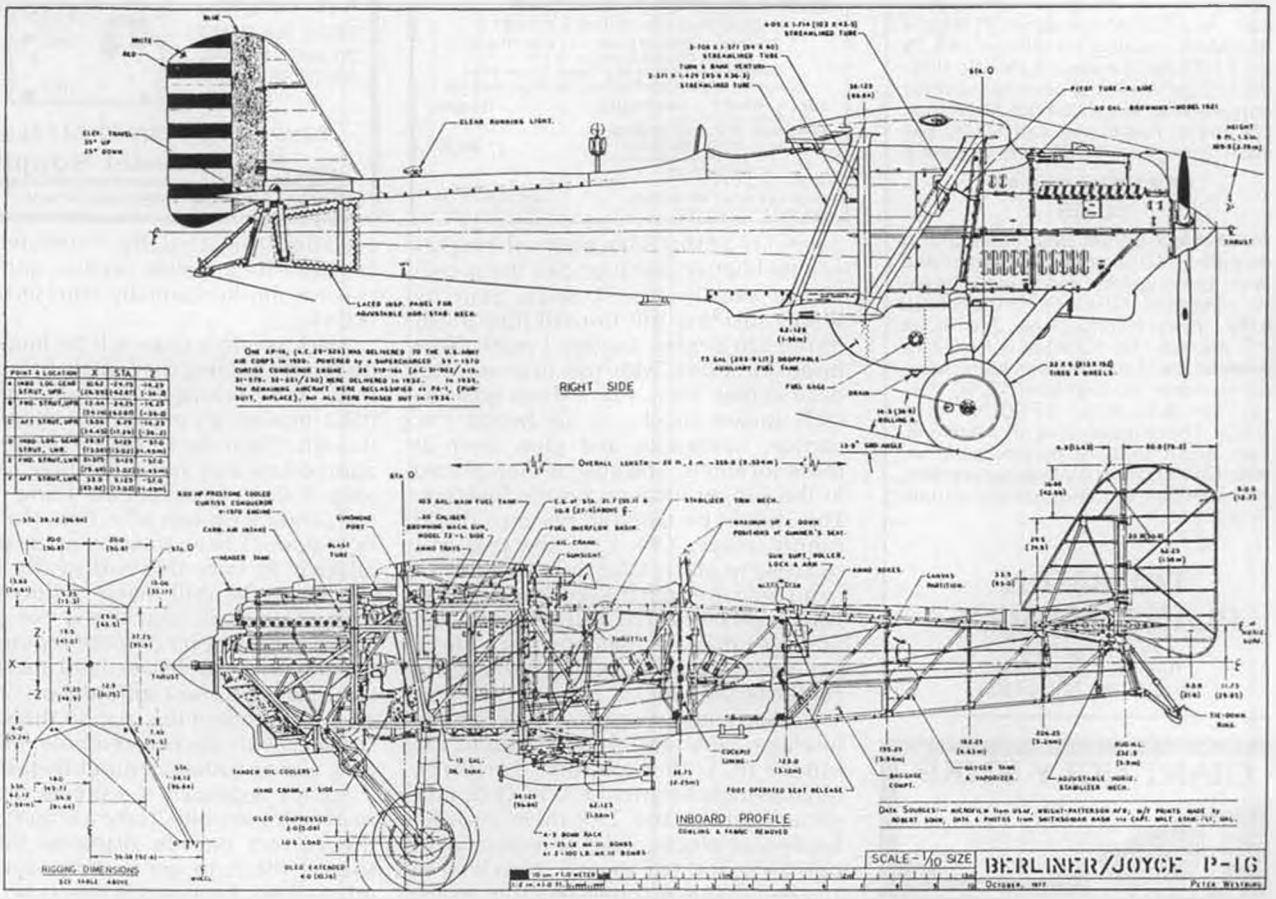
I'm building this biplane (furnishing labor only) in exchange for a '49 Bellanca Cruisair. Your first thoughts probably are that you think I'm crazy. At one point I would have agreed with you, but I'm really enjoying the project. Only once in my life have I ever built models for money, and that was an awful experience. I swore that I would never do that again. With the full-size machine, I'm finding this project to be most rewarding.

In the middle of April, I took delivery of my Bellanca Cruisair. You talk about a kid with a new toy! It's a 1949 model 14-13-3 powered by a six-cylinder Franklin engine of 165 hp. It has an electric landing gear mechanism, so that the usual, manual cranking up and down of the gear is not necessary.

As of this writing, I don't have much time in the ole classic, but what little I do have, has certainly been pleasureable! It flies so effortlessly, with positive control, and soft control pressures. It is quite similar in this respect to my Charger biplane. I now have a genuine cross-country airplane that I can carry my family in, and a bipe for the sheer fun of flying. When the Charger project is completed, I expect to bring the Bellanca home and do a complete restoration. This is one machine I want to keep for a long, long time!

Have you ever wondered how to attach a round or inline cowel to a powered scale model? You never know when the need may arise! With a gas model, it is important that access to the engine and tank is available in order to

Peter Westburg's
SCALE VIEWS



SUPER-ACCURATE AIRCRAFT DRAWINGS. USE FOR SCALE DOCUMENTATION AND/OR FOR DEVELOPING MODEL CONSTRUCTION PLANS. ALL DRAWINGS ARE 28 x 40 INCHES BORDER- TO-BORDER, AND ARE SCALED AS LISTED BELOW.

1/24th scale: ½" = 1 ft.	Shts	$
Douglas O-35/B-7	1	4
Douglas XO-36-XB-7	1	4
1/12th scale: 1" = 1 ft.		
Boeing F4B-4/-3	4	16
Boeing P-12E	3	12
Curtiss A-8 Shrike	3	12
Curtiss Gulfhawk IA	2	8
Curtiss N2C-2 Fledgling	4	16
Curtiss O-1B/A-3 Falcon	3	12
Curtiss P-1B Hawk	3	12
Curtiss XP/YP-23	3	12
Curtiss SBC-4 Helldiver	4	16
Czech Avia B-534	2	8
Davis D-1K	2	8
Douglas O-25C	3	12
Douglas O-31A/O-31B	3	12
Douglas O-38/O-38B	2	8
Douglas O-43A	3	12
Douglas O-31C/Y1O-43	3	12
Douglas O-46A	3	12
Fokker D-17	3	12
General Western Meteor	1	4
Grumman F2F-1	3	12
Grumman F3F-2	3	12
Stearman 4E Mailplane	2	8
Travel Air 2000	2	8
Waco ATO Taperwing	2	8
1/10 scale: 1.2" = 1 ft.	Shts	$
Berliner/Joyce P-16	4	16
Curtiss BFC-2 Goshawk	4	16
Curtiss F9C-2 Sparrowhawk	4	16
Curtiss P-6E Hawk	4	16
Fiat CR-32	3	12
Great Lakes Trainer	4	16
Hawker Fury Mk I	4	16
Hawker High Speed Fury	3	12
Hawker Persian Fury	3	12
Monocoupe 90A	2	8
Swedish Sparmann P-1	2	8

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Price includes 3rd or 4th Class mail. For Airmail or First Class in U.S., add 25% of total order. For Overseas Airmail (includes Canada and Mexico), add 50% of total order. Remit by International Money Order or U.S. funds drawn on a U.S. bank for overseas orders. Master Card or Visa orders add 5%, include card number, expiration date, and signature. Send payment to MODEL BUILDER, P.O. Box 10335, Costa Mesa, CA 92627.

CALIFORNIA RESIDENTS ADD 6% SALES TAX

change plugs, adjust thrust, et al. So, it should be obvious that the cowl should not be permanently attached. There are several different ways, and I'll mention the ones which I find the easiest to use.

Radial engine cowls are probably the easiest to attach, but if done improperly, look terrible. Even the use of the smallest screws look obtrusive, unless you're building at two-inches-to-the-foot scale or larger. The following provides a simple solution with the minimum effort. Depending on the size of the cowl of course, but for most F/F scale models, even at one-and-a-half-inches-to-the-foot scale, three attachment points are all that is necessary. If it makes you feel better, use four. See the sketch to see exactly what I mean. Start by simply dividing the firewall into thirds (three 120-degree angles). I mark these three locations, with the first one top dead center. Next, I take three quarter-inch square blocks of hardwood (i.e. spruce, basswood) and glue them at these locations. The cowl is then placed in the proper location on the fuselage. This should be taped in place so that it cannot move. Check to see that it is squarely in place. With a pin vise, drill a small hole through the cowl and into the hardwood block. The drill size should be no larger than the diameter of a straight pin. Be sure you are drilling through the center of the blocks.

Untape and remove the cowl from the fuselage. Now enlarge the hole in the blocks to 1/16 diameter. Cut three quarter-inch lengths of 1/16 O.D. aluminum tubing and ZAP them into the hardwood blocks. Take several straight pins and cut them about 5/16 in length, and bend them as shown. Put the cowl in place, and secure it by inserting a bent pin into the holes. A snug fit will result, which will also look neat. The reason for the extra pins is that typically you'll lose a few in the grass, so this way you have plenty of spares. Removing them, of course, is also a simple task.

Other type cowls, such as inline cowls, or cowls which house modern, horizontally-opposed engines, are handled a bit differently. With these two latter configurations, usually only the "nose-bowel" needs to be made removeable. This normally provides sufficient access to the engine compartment.

The simplest method of attachment for these cowls is by the use of "old" dress snaps. These provide a simple, yet effective method of attachment, with no unsightly attachment fittings "hanging out in the breeze."

There are a couple of steps to follow in order that the nose bowel will line up properly with the rest of the engine cowl. My first suggestion would be to carve (sheet or whatever) the largest section of cowling. If it's made from thick sheets of balsa where hollowing out will have to be done, leave some extra thickness where the dress snaps are required. Usually, three will be required for an inline version, and only two for the horizontally opposed. (See sketch.)

Mark where a snap will be located. I do this by holding the female half of the snap, and pressing it lightly against the balsa leaving an impression. Your first though might be to take a drill of the appropriate size and drill a hole for the snap. I don't recommend doing it this way, and I'll explain why. First of all, the hole doesn't have to be very deep, just enough to bury this half of the snap. Secondly, the drill makes a "pointed" hole, if you will, and this is not good. There is quite a bit of force required to unsnap the two halves, and therefore you want the most amount of surface area for bonding the snap to the gluing surface. With the pointed hole, there is only gluing surface around the edge.

So, my approach is a simple one for making these holes. I take a brass tube of the correct outside diameter for the snap, I file it to get a sharp, serrated edge, then, by twisting the tube back and forth carefully, the beginning of a hole is made. With an Uber Skiver (or X-acto) knife the center is carefully dug out. This can also be done with a Dremmel tool. The depth should be eoungh to bury the female half flush with the surface of the balsa. Next, roughen the surface of the snap with coarse sandpaper so that the epoxy will bond to it adequately. If you have tried snaps before and never had any success, the following could be the reason. The female part of the snap has a fine wire spring. If you get glue on this part, the snap will simply not work. Therefore, when you apply the epoxy to the snap be careful that none of the epoxy gets to this spring. Remember, when you push the snap in place the epoxy will ooze, so keep this in mind.

When the epoxy has finally dried thoroughly, snap the male half into the female half. Take the block that will be the nose bowel and press it lightly onto the snaps. Again this will leave an impression on the balsa indicating where the male half should be located. Repeat the procedure for mounting this half of the snap as before. The depth of these holes is a bit critical. If they are too

deep, you will not be able to mate the two cowl halves. In other words, the male half won't reach. If too shallow, the cowl halves won't be tangent, there will be a gap between them.

Once this step is completed (it really doesn't take much time to do jt!), the nose bowel can now be sanded to shape on assembly. When clear doping the cowl for smoothness, remember, *don't get any dope on that little spring!* That's all there is to it. •

Peanut . . . . . . *Continued from page 51*

weight down.

The fuselage is next. Once again, pick hard wood for the highest stressed part, the longerons. Add the side windows before you cover the fuselage. The cowl is made of balsa which is rolled around a pair of formers which are held together by four keels. Add the front balsa rings to build up wood for the round front. Cut a key to fit the hole in the ply former, and add the balsa nose button and bearing. A Peck Polymers nose bearing worked for me, it helped give me the needed clearance when I added downthrust.

My model was covered with domestic tissue, the only tissue I had in olive green. If you can find it, you will be better off covering a model this small with Japanese tissue instead of the coarser domestic tissue. You might try dyeing white Japanese tissue to get green, or airbrushing it with acrylic artist's paint as I did on the cowling.

After you have it covered, but before you assemble it, add the trim details, and the surface outlines. It is easier to work on the model while it's in pieces than after it's assembled. Paint the struts, windshield frames, and cowling before you add them. Assemble the model very carefully. Alignment of the twin fins is very important.

Balance the model on the spar, adding as much clay as it takes to make it balance. Test glide the model over short grass, if you use long grass, as some of the other articles say, you will not be able to watch the model's flight for very long before the grass gets it. Once you have the glide right, start with about 100 turns on a ten-inch loop of 3/32 rubber, and more downthrust than you think you will need.

This model, because of its small tail, will need a bunch of downthrust. Let it circle the way it wants to, unless you fly indoors, then you will have to fly it left. Don't expect more than about 30 seconds from this model unless you build it a lot lighter than the plans show.

I hope that after you build this model you like it enough to build more non-contest type models. I think we need to put the spice, er, *salt* back into Peanut scale.

If you have any questions, comments, or suggestions, send them to me at 218 Hardin St., Sikeston, MO 63801. •

Plug Sparks . . . *Continued from page 34*

"This attracted quite a crowd and when it came time to make the first official flight, everyone watched closely, expecting the usual, determined but inadequate attempt most cabin models made when competing against Tiger-Zipper combinations.

"The takeoff was straight ahead into the wind . . . and up into a half-loop. At this point everyone expected the worst, with some even saying, 'That's all for that

model.' Surprise! The model did a half-roll to an upright, level flight attitude, and proceeded to do *another* half-loop with the consequential half-roll to level flight, and so on. The model continued up, and up in this continuous, Immelman maneuver until the timer cut the ignition . . . just as it was completing another half-roll to level!

"The glide was fast, but flat. Three official flights were made in exactly the same pattern, effectively convincing all present that the half-loop and roll pattern was not simply luck. It was quite obvious the timer had been set to cut on the roll-out.

"I don't remember who won or how the Pacificoaster placed in the event, but the memory of that remarkable flight pattern and speed, combined with the tremendous power of the Orwick will remain forever.

"The impression was such that I eventually obtained an Orwick which I bolted on the front of a Buzzard Bombshell having a Sailplane wing and tail. I never did get the looping tendency out of the model because of the excess power. Later, I made up a conventional Comet Sailplane, only to have the motor pull the entire firewall, and engine mount assembly right out of the plane, and halfway across the flying field. Real brute power!"

MORE PACIFICOASTER

About the time we decided to use Codding's writeup on Weathers' Pacificoaster, in came a latter from H.T. "Tip" Smiley, Box 123, Eldora, IA 50627, who actually obtained, and built one of the little-known Weathers Pacificoaster kits. Tip reports as follows:

"The kit was purchased directly from Elbert J. (Joe) Weathers (mail order) sometime in the 1949 timeframe. I felt he must have jobbed out the kitting job to some manufacturer (this we reported before). The model came in a very large plain cardboard box . . . full too!

"Turned out this kit was the most difficult, and time consuming project I have ever built, but it was a very fine quality kit. There were no plans! Only mimeographed instruction sheets giving step-by-step the method of building. All parts were precut, landing gear preformed, etc.

"The fuselage was of the crutch type construction with heavy plywood firewall, maple landing gear mounts, and balsa formers throughout the fuselage. The cabin top was not formed to curve up, the front being cut from thick blocks to both side and top views. Everything fit perfectly (well, almost)."

As can be seen in Photo No. 10, Smiley did a terrific job of fairing the fuselage sides into the fin area. Tip continues, "The fuselage skin was formed, and cut to proper fit out of 1/8 sheet balsa. Fin and stabilizer were 3/32 balsa skins with internal ribs and spars. The stab and fin were glued fast, and allowed no tolerance for the slight misalignments generally associated with rubber band held tails. The small rudder was offset a small amount to allow for torque. This gave a right hand circle in the glide. For rudder adjustments, you cut the rudder loose, moved it to a new position, and reglued!

"The wing was also a stressed-skin type with spars and ribs. The top surface was airfoil shaped, and fit clear to the tip with no compound curves. The bottom sheet was then pulled up, and glued to the top. Neat!

"After I built it, the model was so beautiful, I could not bear to fly it. I sold the model to a TV sales and repair man who used it as a display in his window. I was later informed that he installed one of the early R/C single-channel radio sets into the model.

"I honestly believe that the kit should be reissued with proper modifications to take advantage of today's state-of-the-art R/C systems. This obviously beautiful design would be an outstanding model . . . one of Weathers' greatest!"

OLD TIMER EVENTS, AMA NATIONALS

As previously noted, this columnist will not be running the unofficial Old Timer events at the 1983 AMA Nationals scheduled for Westover AFB, Chicopee, Massachusetts. However, many modelers and organizations have come forward to offer their services. This is simply great! In a long distance call to George Armstead, here is how things are shaping up:

Thursday, July 28: O/T Control Line Stunt events, John Miskie, CD.

Friday, July 29: O/T Free Flight events, George Armstead, CD.

The above two will be held on Westover AFB proper. Check for notices at contest headquarters as to the site locations.

Saturday, July 30: O/T R/C Assist events, John Smith, CD.

This will be held at East Longmeadow Pioneer Valley R/C Field.

Now, you guys who couldn't make it out to Colorado for the SAM Champs, have a real good time at these O/T events!

FREE PLUG DEPT.

I just received the latest announcement from Karl Spielmaker (Spielmaker Engines), 4690 Burlington, S.W., Wyoming, MI 49509, concerning the production of the old Megow Aero Champ kit, and the engine to match it, the Megow 199.

Photo No. 11 shows the finished prototype as constructed from his "new" kit. These kits sell for $35 which includes packing and handling. A real bargain when you consider the prices of today's kits.

The Megow 199 motor is still in limbo, as the kits are taking too much of Karl's time. Latest news is that the engine will not be ready for a year. However, if you

are interested in obtaining one, simply send your name and address to Spielmaker. Do not send money, Karl will let you know when your engine is ready to come off the production line.

EVOLUTION OF A MODEL

We are indebted to Charles A. Mackey, 26801 Andalusia Circle, Mission Viejo, CA 92691, for the drawing showing how J.C. "Madman" Yates finally arrived at his famous "Madman" design.

As can be seen in Sketch No. 12, the Curtiss YP-37 (the forerunner of the P-40) is shown first to give an idea of how Victor Stanzel started with his G Shark as shown second in line. This, incidentally, was Yates' first control line model as featured in the March 2 issue of *Colliers*. The photo very clearly shows the G Shark plus the first design by Yates, of course, heavily influenced by the Stanzel model.

With fuselage moment arms between the wing and tail increasing, control line models began to look very much like Yates' first highly successful model called the "Dragon" (sometimes erroneously referred to as the "*Green* Dragon"). The reader would do well to refer to the December 1981 issue of **Model Builder** for a good photo of this design that appeared in the C/L Stunt event at the 1981 AMA Nats at Lincoln, Nebraska.

Of course, last in line is the famous Madman design which, when kitted, came in two sizes, Junior and Senior, powered by Orwick 29 and 64 engines respectively. Also of interest in the sobriquet of *Madman* as it was applied to J.C., this came about because J.C. flew his Dragon design on 70-foot lines with an Orwick 73 for power. When Yates did vertical wingovers, spectators got a real thrill as he dove towards them (so it seemed) only to pull out breathtakingly at the last second, about three feet off the ground. Spectacular! When he started doing the same maneuver upside down. . . "This man is *mad!*"

Mackey indicates he will be writing up a history of control line developments centered, of course, around Yates, Palmer, Saftig, et al, who so successfully pioneered the stunt pattern as we know it today.

TOUCH OF NOSTALGIA

While we are kicking around the subject of control line, George Aldrick sent in Photo No. 13 showing Russell Snyder at the age of 18 with his Fox 59 powered "Gambler". Russ was originally from Laredo, Texas, and went to Northrop Aircraft in 1949. While in California, he flew with the National Champion Flightmasters (Acord, Wisnieski, et al).

Russell is now a retired Lt. Colonel living in the San Antonio area. Known affectionately as "Bear", he is still one of the most competitive free flighters that George has had the pleasure of meeting.

1984 SAM CHAMPS

Although things are still tentative, the site for the 1984 SAM Champs could very well be Toledo, Michigan. This action was initiated by Don Belote, the general manager of the very successful Toledo Weak Signals Trade Show. The city fathers, impressed by Belote's club, and the money the club brings into Toledo with its trade show, have made an offer to SAM to use the old municipal airport, Metcalf Field, for their next SAM Champs, due to be held in the Midwest.

Bob Larsh, Midwest SAM vice president, and Karl Spielmaker, tentative contest manager for the '84 SAM Champs, visited the Airport Authority and discussed the SAM requirements for use of the field.

As Bob Larsh reports, "For free flight, the field appears adequate enough for three-minute flights if the weather is reasonable. For a windy day, two-minute flights would be the order of the day. The field does have a nice concrete runway and taxi strip. One drawback is the crops that are annually planted." (Don Belote indicates these are not a problem, as the farmers would either not plant, or would allow passage over the fields.)

"Of course, the biggest hurdle is the Airport Authority representatives who must approve the closure of the field for three days. Inasmuch as there is only one runway, SAM could not function with full-size aircraft at the field.

"We have been informed that motels are within a few miles of this field, but we did not have time to investigate their desirability. For the use of a college for our headquarters, 'bean feed', meeting place, dorm facilities, and awards banquet room, two possibilities have been mentioned, with Toledo University sounding the most desirable as it is only a 15 to 20-minute drive to the field. Jim Wumer, acting as site coordinator, has agreed to investigate the possibility of obtaining the necessary facilities."

Sounds great, huh? Well, keep your fingers crossed. Don Belote is to be commended for the idea of the 1984 SAM Champs in Toledo, and for the initial contact work to obtain the site and the cooperation of the Airport Authority. As Bob says, "More details as they become available."

CORRECTION DEPT.

Ross Thomas of SAM 49 writes to take this columnist to task for several errors in the May issue of **Model Builder**. (In many cases we are heavily dependent on our correspondent for correct info.)

First-off, Ross sez he should have been the Sweepstakes winner not Doc Patterson. After all, two firsts and two seconds ought to do it! Probably the most serious error was the labeling of Bob Oslan's model, a Shereshaw "Cloud Cruiser" as a "Kloud King". This, no doubt, confused the readers as Photo No. 8 showed an actual Kloud King.

Also, a disservice has been done to Gene Wallock, as his Buccaneer actually won first place in the O/T R/C event at the International Modeler Show in Pasadena last January, not Bill Cohen as was reported; he got second! Can't win them all!!

SAM ABROAD

GERMANY: I received several photos, and a write-up of Old Timer activities in Germany from Gerhard Everwyn, Dachsteinstr, 12A, D-8000 Munchen 82, Germany. Photo No. 14 shows several models of German design and vintage as built by Erich Punke. The "Hummel" is a design which has been drawn up, and is available from the Pond collection. Like all German plans, the drawings are generally small-size, say 1/3 or 1/2-scale with all ribs and templates full-size. This generally calls for a redrawing of the original plans, and arranging them in form for building. The Falke R5 is

another one of those projects awaiting time to complete!

AUSTRALIA: Latest reports from the lads down under is that the first Australian SAM Champs was held very successfully at Goulbourn, New South Wales (site of the FAI Championships this year), over the Easter holiday. We received a nice write-up from Monty Tyrrell, Merv Buckmaster, and others, so we'll save that for the next issue.

"FOGGY" MOORHEAD UPDATE

If we keep heckling Erle Moorhead enough, some form of action is bound to erupt. Clarence Bull of Eugene, Oregon, reports that "Foggy" is getting uncontrollable. He has now built a Pacific Ace Bostonian for indoor flying! The next thing you know, he will finish the 10-year project, the Red Zephyr.

Clarence also reports that the Annual Misery Meet lived up to its name with rain occasionally letting up. Bull is impressed the way that the Pacific Ace event is catching on. Must have been a dozen or more flying at the contest. This event is actually a club challenge with the British Columbia boys winning the first round. Clarence says they really fly well. (He's telling us . . . we had over two dozen at the last Pacific Ace contest staged by the Marin boys!) A great way to enjoy rubber flying!

THE WRAPUP

With so much model activity going on around the Pond household for the past 42 years, it was no great surprise when daughter, Diane, in discussing reincarnation, said her dad would probably come back as an airplane. She didn't say model airplane, but I am sure that is what she meant!

Well, we finally got it straight this time. Received a newspaper clipping from Charley Thuet, 30 Carlisle Rd., Newark, DE 19713, reporting the death of Stephen Kowalik on Monday, April 18, 1983. Cause of death was cancer at age of 70. Before dying, he told Charley to "Call Pond". He knew he was going!

Stephen received quite a write-up based on his prowess with model airplanes, and the fact he designed, made, and repaired violins in his basement. He had a line of musicians in the Wilmington-Philadelphia area waiting for his work.

Kowalik will be best remembered for the Ideal Air Chief design based on his winning model known as Miss Delaware. Good flying model! •

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

with carbon fiber tow, carbon fiber tape, or even cloth! Plasti-Zap loves carbon, and makes excellent bonds with it.

A third, not-quite-so-new product from Pacer is Slo-Zap. As the name implies, this is a very slow curing, thick cyanoacrylate adhesive. Instead of the usual cure time of 5 to 10 seconds for Zap, Slo-Zap doesn't cure for one to two minutes. This makes Slo-Zap the best adhesive for sheeting large surfaces such as wings or fuselages, and the best CA adhesive for part positioning and alignment. Zip-Kicker may be used to accelerate Slo-Zap (even through sheeting!) for the formation of fillets, or the filling of gaps.

Write to Pacer Technology and Resources, Inc., 1600 Dell Ave., Campbell, CA 95008, or call (408) 379-9701 for more information.

★ ★ ★

J&J Model Accessories, 2020-3 Lomita Blvd., Lomita, CA 90717, (213) 534-3400, is in the business of making hats with frequency! Yes, J&J produces a lot of hats for a lot of modelers who want a colorful, comfortable, and distinctive lid for their domes. These hats feature beautiful graphics, and your very own frequency right on the top to remind other pilots which channel you're on.

These hats come in all of the new frequency colors as well as the old. You have your choice of airplane graphics, too! Send an SASE to J&J for all of the choices and prices. With all of the new frequencies coming into use, you'll want to be sure everyone knows your colors.

★ ★ ★

Somebody's been watching the pizza man cut too many pizzas!

Introducing the Olfa Rotary Cutter for cutting fiberglass fabrics and other materials. Aircraft Spruce and Specialty, Box 424, Fullerton, CA 92632, is the place to get it. Nicknamed "The Pizza Cutter" by full-size homebuilt craftsmen, this

very handy tool cuts fiberglass cloth with a minimum of distortion and an increase in speed. "The Pizza Cutter" is used in many high-volume composite shops where the most efficient method of cloth cutting is a necessity. The disc-shaped blade is made of high quality tungsten steel which is very sharp. The disc has a variable tensioning knob for various thickness cloths and/or control feel. Replacement blades are available. Use wooden backboard for long blade life. The Olfa Rotary Cutter is available through Aircraft Spruce and Specialty for $8.90 (part number RTY-2), and the replacement blades for $2.80 (no. RB-1). Ask for the AS&S Model Builder's catalog with your order, it's a treasure chest of modeling supplies!

★ ★ ★

While we are on the subject of things that cut, you will want to take note of the following supplier of industrial razor blades. Cobbie's Gifts, P.O. Box 2, Deal, NJ 07723, has thick, high carbon surgical steel blades which hold their edge long after other "regular" single-edge razor blades have gone dull. Cobbie single-edge blades retail at 12 to 15 cents each, but can be purchased at below wholesale prices when ordered in quantity. One hundred blades will only cost you $4.25 at Cobbie's Gifts. See the classified ad, this issue for further prices, and ordering info.

★ ★ ★

Octura Models, Inc., 7351 N. Hamlin Ave., Skokie, IL 60076, has announced a couple of additions to its X series of propellers. Intended for tunnel hull and deep vee hull boats, the X440 and X442 propellers offer increased performance. The X440 (not to be confused with the previous X440/3) is intended for submerged application on 3.5 inboard and outboards where the lower unit is raised almost out of the water. Send an SASE to Octura and ask for the latest newsletter, it's full of informative things for R/C boaters.

★ ★ ★

Get them while they last! RJL Industries, P.O. Box 5654, Pasadena, CA 91107, (213) 359-0016, has announced that it is closing out its remaining inventory of McCoy .29 U-control engines. That's

right, RJL is the only factory source for Testor/McCoy engine parts, and it is offering some really sweet deals on these engines. The close-out price on these McCoy .29s is only $19.95 each plus $2.00 postage and handling per unit (California residents add six percent sales tax).

Replacement parts are available for all McCoy Series 21 engines as well as some parts for older McCoy engines. The .19 and .40 McCoy Series 21 engines are in production again as is the RJL B .19 and B .40, both available in R/C or U/C versions complete with muffler.

The RJL K .61 is now being produced with an entirely new RJL carburetor. This new American made carb features a die cast aluminum body with both main and idle needle adjustments sealed by O-rings. The main high speed needle adjustment is made by rotating a large brass knob, an optional knob is available which allows airborne adjustments by servo operation. Reliable idle and smooth throttle response are assured as fuel is metered at every throttle opening.

Write to RJL for prices and additional information.

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★ ★ ★

YS Engines, RD No. 3, Box 3917, Reading, PA 19606, (215) 779-4622, introduces its new line of .45s with rear or side exhaust. Both engines are completely handcrafted in Japan, have exquisite low speed adjustments, super power output, one piece crankcases, large crankshafts for increased strength, Hattori pipe sets available, and both are the only engines with integrated pumps and carburetors providing a self-pressurized fuel system. Specs are: bore, 21.8 mm; stroke, 20.0 mm; weight, 14.11 oz.; rpm range, 2,000 to 18,000; and displacement, 7.45 cc. If there's anything else that you'd like to know about these YS engines, pick up a pen or a telephone and communicate with YS Engines directly. The folks at YS will be glad to help. •

Camel Effect. *Continued from page 13*

called it a diabolical contrivance with but one thought on its mind, to kill him, not the enemy! I read years ago, maybe it was in *Flying Aces*, that the Camel had more victories than any other Allied machine. I also read somewhere that it produced more Allied casualties than any single German aircraft . . . so maybe

both assessments of the Camel are correct.

The craft *did* have some unique flight characteristics that, though shared to some extent by other craft utilizing the rotary engine, were compounded in the Camel. This may have been due to the combination of the low aspect ratio of the wings, the flat upper wing, the excessive dihedral in the lower wing, the close coupling of the surfaces . . . a number of design features peculiar to the Camel configuration. One such maneuver was used when an enemy plane was on the pilot's tail. Cutting the engine, giving full left rudder and right aileron *all simultaneously* . . . just a little late on the engine . . . resulted in a near sideways movement to the left and abrupt slowing. The chaser would find himself the chased, unless he had anticipated the trick. Also, the Camel could turn very tightly, its turns equaled only by the German DR.I. These turns were made with full left rudder for both left *and right* turns! All these points are very significant, as we shall shortly see. Another point to remember is that, besides being told to use a lot of rudder on the left foot for all turns, the new Camel driver was also told to avoid turns on the takeoff, when rpm was high and airspeed was low. A right turn usually resulted in a dive into the ground, and a left turn would produce a stall, *then* a dive into the ground!

The combination of the above design features, plus the fact that perhaps 90 percent of the gross flying weight was concentrated in the first seven feet of airplane, would not *by themselves* cause these unique flying characteristics. The active ingredient was the Bentley, Gnome, or Clerget rotary engine.

This type of rotary engine resembles a nine-cylinder radial engine. However, that is where the similarities end. In the case of the *radial* engine, the crankcase is bolted firmly to the engine mounts, and the propeller is attached to the *revolving crankshaft*. This contrasts dramatically with the *rotary* engine where the crankshaft is permanently attached to the fuselage and the propeller to the *revolving engine!* There is only one pushrod and a single rocker arm for each cylinder which opens both intake and exhaust valves. The timing is handled by a fixed cam which the engine revolves around when the engine is running, the valves are held closed by the centrifugal force developed by the revolving engine! Light springs hold the valves closed for starting. A whole article could be devoted to the description of the rotary engine, for it is truly an amazing contrivance.

This massive engine, turning a heavy wooden propeller at nearly 2000 rpm makes a powerful gyroscope. The gyro principle makes a top stay upright while spinning, controls target drones to maintain level flight, and makes a gyrocompass always point North, providing that is the direction it is initially set. Incidently, did you ever consider what happens to a magnetic compass in the vicinity of the South Pole? It will continue pointing North no matter what direction you turn, as if it were a cheap toy with the needle printed right on the card. With a gyrocompass fully gimballed and mounted in a box, it will point at any preselected target, such as the North Star, no matter what position the box is placed. A gyro so mounted is said to have "three degrees of freedom." It has no Sopwith Camel Effect, or precession, as the boys in the back room put it.

Now, consider a top spinning on a table surface. Obviously, the top is free to move to any position on the table, providing it doesn't drill a hole in the table or fall off of it. It *is*, however, restrained by its own weight and the table surface so that it will not by itself move up or down. With the table's restraint, the top is said to have "two degrees of freedom." The placement of this single restraint makes the top a simulation of the banger/propeller combination on the Camel! This statement is being made ahead of its program cue because close attention is requested from this point on. Gyro theory is generally confusing to engineers when confronted by a gyro application without previous experience or the benefit of ths short course in the Sopwith Camel Effect.

The spinning top has a direction of spin about a vertical axis. This is called

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BACK ISSUES, 330, Model Airplane News, American Modeler, Model Aviation, American Aircraft Modeler, Radio Control Modeler, more, 1958 through 1982 One or all, moving John S. Russo, P.O. Box 9526, Forestville, CT 06010

the **spin axis**. Let the spin be called direction of spin, and let this direction be counterclockwise. The combination of *spin axis* and *spin direction* is called the **spin vector**. Let's define a vector.

A **vector** is a quantity with magnitude and direction. A **scaler** is only a quantity with magnitude. A speed of 10 mph is a scaler. A velocity of 10 mph vertically downward is a vector. The change of *speed* to *velocity* was deliberate, has no relation to the discussion, and was used simply because a vector including units of speed and direction is called a **velocity**. The top spinning 5000 rpm is a scaler. The top spinning 5000 rpm in a counterclockwise direction is a vector. You are probably asking the question, "If it is a vector and has direction, what kind of a direction is counterclockwise?" The fact that the spin is counterclockwise allows the deduction of **spin vector** direction by use of "the right hand rule".

Any rotation vector may be represented by the clenched right fist with the thumb fully extended in the official hitchhiking position. Drawing arrows on the thumb and fingers with the arrowheads on the nails completes the simulation of a rotation vector. The arrows on the fingers are aligned with the direction of rotation, the thumb represents the rotating axis, and the thumbnail shows the direction of the rotation vector. Remember this trick when we get to torque axis and precession axis, and torque vector and precession vector very shortly.

As the direction of our top's spin is CCW (in top view) the spin vector would be the vertical centerline (also spin axis) and the direction would be up. The right hand rule would have the thumbnail up, right? If the direction of rotation were CW (clockwise) the righthand rule would show the spin vector to point down. *Now* you visualize a rotation vector, in this case the spin vector!

The top has served its purpose. It could be used for some experiments, but building a simple model will be more descriptive and representative of the aircraft application.

Let's assume you have access to a Dremel Moto-Tool or some other high-speed electric tool. Get a plastic coffee can lid six or eight inches in diameter. You can use an eight inch disc of 1/8 ply, but it will do more damage if it gets away from you. In either case, Hot Stuff a one inch ply disc to the center of the disk using Hot Shot to assist the cure. Drill out the center with a 1/8 drill and Hot Stuff in a one inch piece of 1/8 music wire. Fillet well with Hot Stuff and Hot Shot. Chuck it into the Dremel collet well, and you are ready to demonstrate the Sopwith Camel Effect. But first, let's have a little more ground school.

Referring to Figure 1, you will note a somewhat gross representation of a right hand. On closer examination you will recognize by the thumb and clenched two fingers, complete with arrows, our friend spin vector. On checking with the Camel's thrust line, and direction the rotary engine is turning (its cowl is removed, as is the pro-

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peller), it shows the spin vector is pointed correctly. Now is the time to letter *S*, *T*, and *P* on the appropriate digits. Comparison with the rest of the Figure 1 sketch shows that T represents the torque vector, and P the precession vector, whatever they are.

It might occur to you that, as we are stuck with the spin vector due to the CCW rotation, there are three other positions that we could place that gross hand, one of them shown in Figure 2. Stay away from Figure 2 . . . the script doesn't call for it yet! The clue is the turning force F. If I had drawn the fuselage a little longer, I would have shown F to be the force on the rudder making the fuselage turn left. So, assume it is an angel pushing on the fuselage side with twice the force of the rudder, as the rudder is located about twice the distance from the vertical Z axis. Whatever, force F produces a turning moment (or rotation) about the Z axis, which is a torque, and makes the axis the **torque axis**. Applying what we learned above about rotation vectors we see the **torque vector** has the correct direction (see Figure 1). Ah, we see that the spin vector and torque vector decide where we position the right hand, and that as the finger P is perpendicular to the digits S and T, it automatically assigns the **precession axis** and **precession vector**. You may check the rotation direction of the precession vector with the RH rule.

Actually, the **Sopwith Camel Effect** (or precession, as you wish) *always tries to move the spin vector toward the also-moving torque vector.* Remember the Camel driver making a tight right turn? As long as the turn was maintained with hard left rudder, precession held the nose up. What do think happened when the wings neared the vertically banked position? What would the pilot have to do with the elevator. *(Geez, I don't believe the answer! Down elevator keeps the nose above the horizon! wrf)* There are several more questions that arise in this situation. I'll bet you are twisting your fingers all over the place. *(I am, I am! wrf)*

Figure 2 illustrates the Camel Effect for right rudder. The fact that our angel is pushing from the other side of the fuselage does not change either the torque or the precession *axes*, but it changes both their *directions*, causing the spin axis to precess down. What position must the rudder be in to maintain a right turn? All the above questions apply in this case, also. See what happens when the angel pushes up and down elevator.

Now, for an anti-climax, return to the Dremel. Hold it with a thumb and forefinger on each side at the CG. Turn it on with the free hand, with any spectators behind you and nothing breakable

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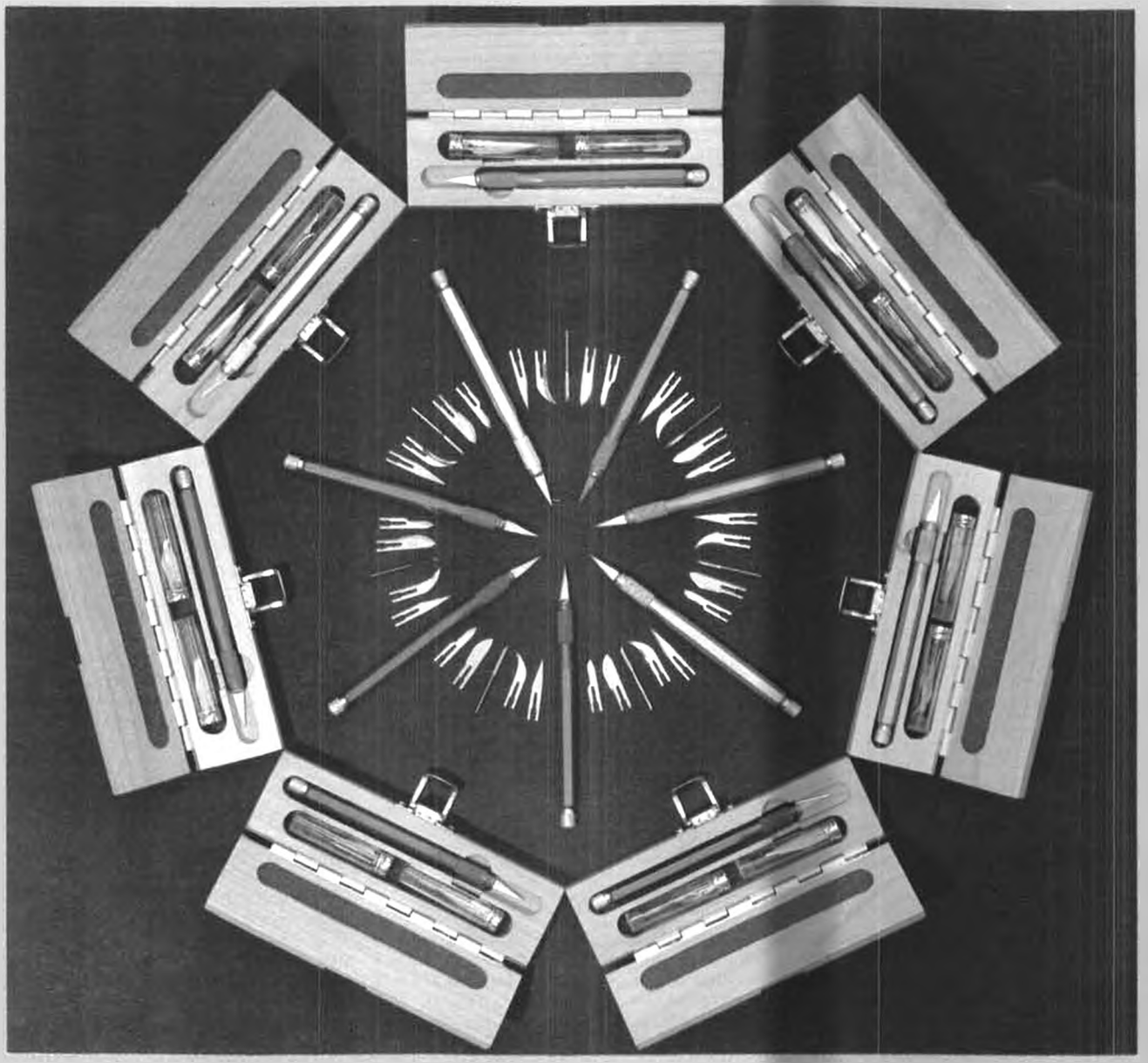

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Dick Taylor, CD
7929 Jefferson
Kansas City, MO 64114
(816) 333-9839

SCALE AIR GROUP (June 4-5)
Buddy Irwin, CD
922 Sundown Lane
Desoto TX 75115
(214) 223-7838

SPOKANE SCALE INTERNATS (June 10-12)
Barons Model Club
Dr. Joe Fox
615 12th St
Spokane, WA 99202
(509) 624-4910

EAST COAST REGIONAL (June 11-12)
P.G.R.C. (Washington, D.C.)
Tom Bayne
17102 Earlham Ct.
Upper Marlboro, MD 20772
(301) 627-5118

EGYPTIAN R/C CHAMPIONSHIP (June 11-12)
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Lynn Elston, CD
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Carterville, IL 62918
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SOUTH EASTERN REGIONAL (June 18-19)
Bill McCallie CD
10501 Sago
Tampa, FL 33612
(813) 932-0622

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Philadelphia, PA 19115
(215) 676-7618

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So. California Scale Squadron
Bert Baker, CD
15712 Graham, "A"
Huntington Beach, CA 92649
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in the vicinity. There is little danger, but why push it? Now, rotate it to the right. What happens? Make a left turn, climb, and dive. If you have correctly had your finger on the problem, this experiment won't turn up anything new. I just couldn't resist that!

You can do this experiment with an engine in a fuselage, but the thrust can mask some of the effects. It's neater and quieter with the Dremel.

The effects of the gyroscopic action of a heavy, spinning propeller can be minimized in aircraft design, or amplified. The positions of the CG, center of area, and other considerations greatly influence the Camel Effect. You certainly want it minimized in a Pattern job, for instance.

The Goldberg Zipper used a high center of lift, a low center of gravity, and right turn with high power to get that fabulous spiral. How many Zippers do you see climb left under high power? Oh, I forgot another very important Zipper characteristic . . . the effect of the relative wind on that pylon location. Look at all the designs you can recall . . . all the belly jobs . . . why do they fly left under power? In fact, the majority of models with pretty large rudders seem to fare better with left turn under power. Any exceptions, look for the reason.

Have you noticed some aerobatic models roll better in one direction than another? See which way and twist your fingers a bit. And remember, the angel sometimes pushes on *two sides at once*, like bottom and right.

See you in the chicken house, y'hear? ●

Workbench. . . . *Continued from page 6*

regardless of their active or inactive relationship, to the competition category involved. It says so in the AMA Rulebook. Is that the way it should be? We'd like to hear from AMA members, both competitors and non-competitors, about this. Should it be this way, or should only active competitors be allowed to make rules proposals, and if so, only in the category in which they are active? Obviously, your *reasons* in favor or against are most important.

The second part of the situation, influencing the vote of the CB members, is not so cut and dry. This writer has been on the R/C Contest Board for many years, first representing District IV, and now District X. Ten of those years, I was Chairman, eventually turning the reins over to Joe Friend. In all that time, it is difficult to remember anyone on the Board who had not been an active competitor at some time in his modeling career. Obviously, however, no one member could be an active competitor in every category on which they voted in regard to rules proposals. By the same token, all members could not have firsthand knowledge of the many fine but critical details that went with the many new categories that developed over the years since "pattern" was the only Competitive category in R/C. It was for this reason in particular that I continuously promoted the formation of "special interest" organizations that could guide the board in its decisions. And it is the feedback from these special interest organizations that provides us with the technical information and desires of its active members relative to the rules proposals, that tells us which way to vote.

Even so, the task has become more difficult in recent years because of the efforts made by some modelers to push through their rules proposals. Board members receive many "campaign" letters and petitions from outside of the district they represent, and from outside of the special interest organization they try to accommodate. Should such campaign material come only from legitimate, active competitors? Should AMA provide each Board member with a "legal competitor list" for his district?

Let's hear from you. . . .

BIRD GETS THE CAGE

Received word from Norm Purdy, Marietta, Georgia, that fellow TTOMA member, George Perryman, has been asked permission to enshrine his Great Speckled Bird in the AMA Model Museum. GSB is the epitome of the typical and historic Perryman design concept, with the unique swept surface tips, crazy dihedral angles, and intricate construction that is all "Perryman" at a glance. Of course, George backs up all of this wild design concept with enough contest wins to sink the "Spruce Goose"!

We're happy that George is getting this recognition, thankful for the information from faithful reader Norm Purdy, and proud to have featured George and GSB (and granddaughter Stephanie) on our June '74 cover.

Oh yes, our plan No. 7783, $2.50 will help you to duplicate this historic model. You'll have to supply your own wood and a whole lot of patience to finish the job! ●

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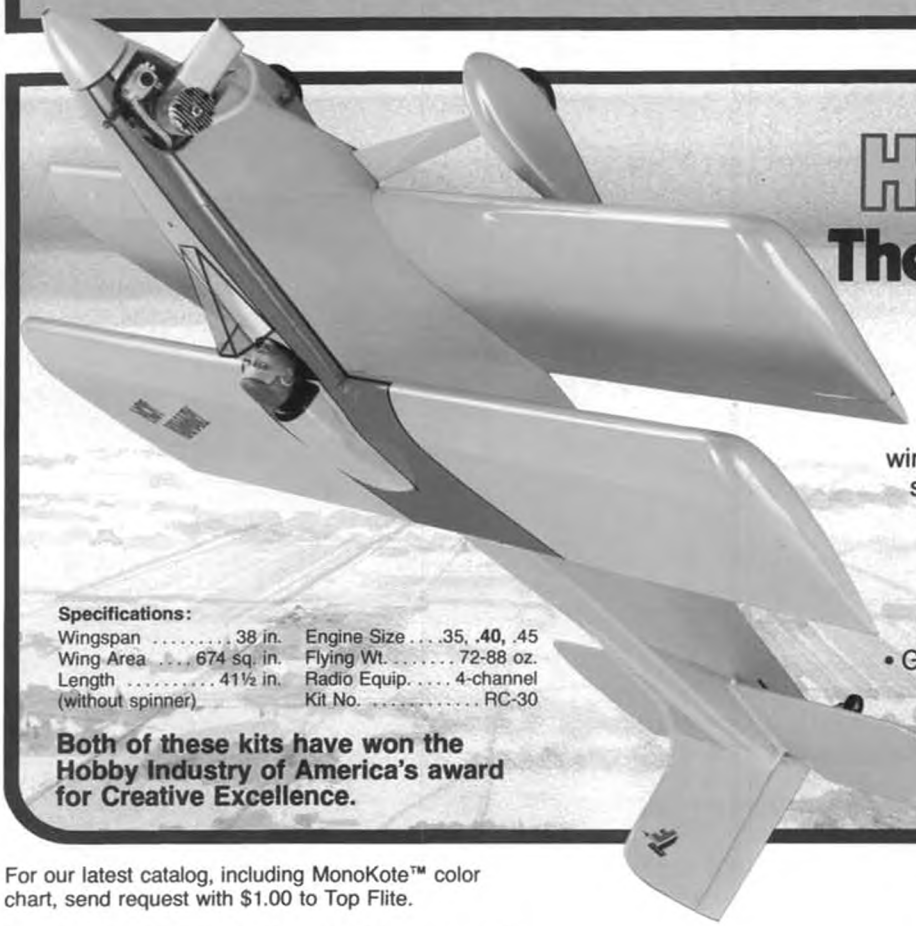

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