
R/C
RADIO CONTROL
MODEL BUILDER
volume 11, number 109
$2.50
FEBRUARY 1981
ICD 08545
DALOTEL
F-PPZE
Hanno Prettner
MISS R/C
0 74820 08545 02

FIVE CHANNELS WITH PERFORMANCE TO SPARE

If you're concerned about quality and smart enough to recognize value, you'll choose Kraft for your radio control system. Kraft's new Spectrum 5 system has been designed with features that make it the most reliable and smooth functioning five channel set available.

Consider these important features:

- New impact resistant transmitter case is fuel proof, has great tactile "feel", and a special storage slot for the antenna.
- Molded of glass filled nylon for strength and durability, Kraft's new exclusive control sticks* have direct pot coupling for precise centering resolution.
- Meter indicates both RF output and battery voltage.
- Available on all 72 MHz frequencies, and can be modified to cover any proposed new 72 or 75 MHz frequencies.
- KP-5X components are compatible with all standard "Series" and "Gold Spectrum Series" systems.
- New, smaller, double tuned and shielded front end receiver with 3uV or better sensitivity; four KPS-1411X servos; battery pack; slow rate battery charger; switch harness; and servo trays.
- Spectrum 5 carries a one-year limited warranty, and is backed by the largest world-wide network of authorized service stations, thirty in the U.S.A alone.
- Manufactured in the U.S.A. for the finest in proven craftsmanship.

Start out your flying season right with the Spectrum 5. Visit your local hobby dealer and see the KP-5X NOW!

More information available upon request. Write:
KRAFT SYSTEMS, INC. P.O. BOX 1268 , 450 WEST CALIFORNIA AVENUE
VISTA, CA 92083. (714) 724-7146. TWX 910 322 1471

Manufactured in the U.S.A.
*patent pending

R/C MODEL BUILDER

FEBRUARY

1981

volume 11, number 109

621 West Nineteenth St., Costa Mesa, California 92627 Phone: (714) 645-8830

CONTENTS

FEATURES

SCALE VIEWS

CONSTRUCTION

Cover: "The winnah, and still Champeen of the T.O.C., Hanno Prettner!" Yes, it happened again. Hanno Prettner, of Austria, has won every Tournament of Champions, sponsored by Circus Circus Hotel/Casino, Las Vegas, Nevada, since its inception in 1974. (l to r) Circus Circus president Bill Bennett; Hanno's father, Hans; Hanno; co-originator of the Tournament, Walt Schroder; and Tournament Queen, Rita Best, just moments after Hanno received the trophy and the real (!) check for $20,000.

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

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

Change of address notices must be received six weeks before date of issue that new address takes effect. Send old address with new; old label preferred. Post Office will not forward copies unless you pay extra postage. Duplicate issues cannot be sent.

Second class postage paid at Costa Mesa, California, and additional offices.

the look and feel of fabric in the MonoKote™ tradition

Top Flite's new iron-on **FabriKote™** is superior to any other fabric covering! This material is applied at regular **MonoKote™** temperatures. **FabriKote** goes on easier, has terrific shrink, does not sag and gives an excellent finish. The torsional strength obtained from the non-directional weave is far superior to any fabric covering available today.

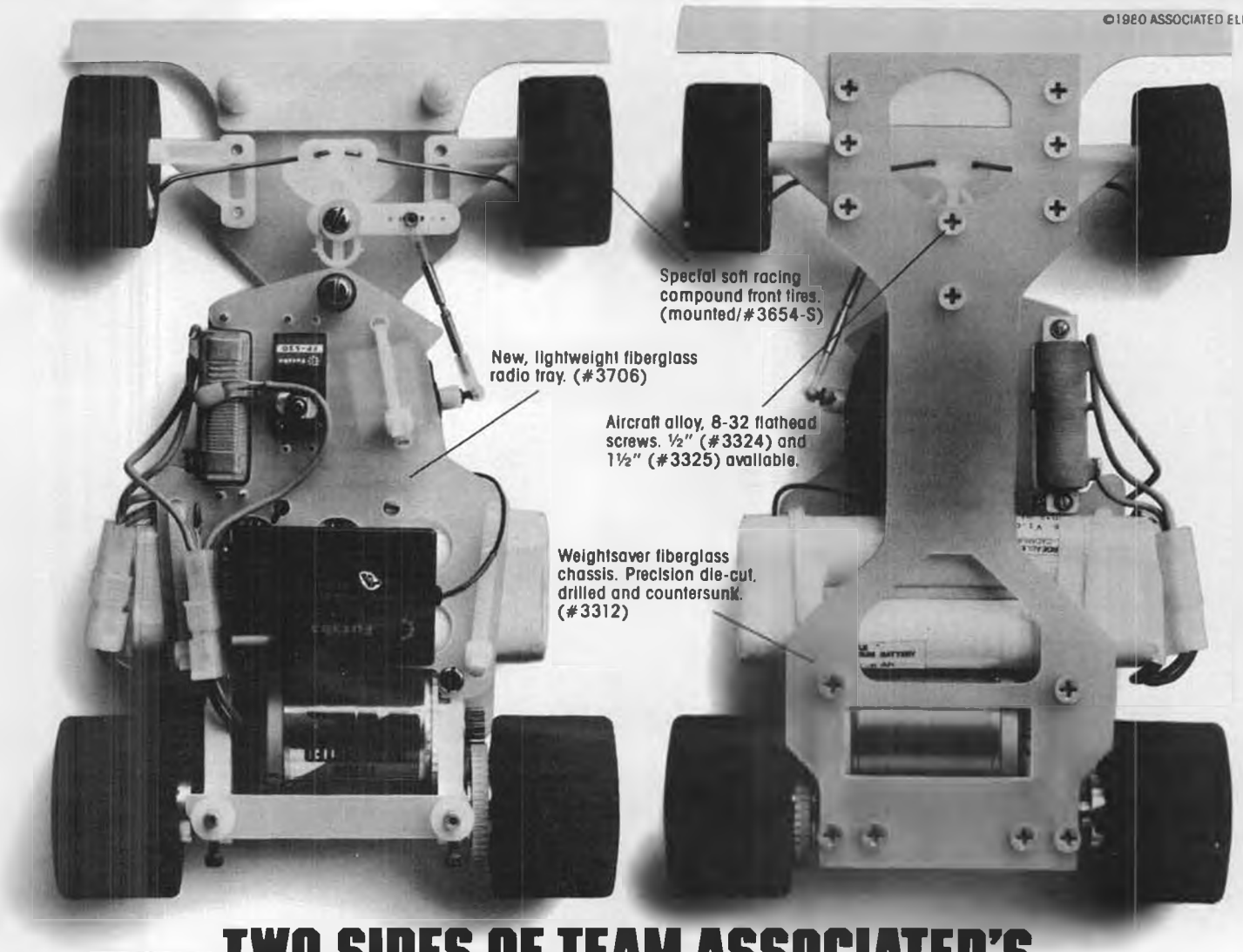
• Lighter than Coverite • Unique, non-directional shrinking properties add 25% more torsional and bending strength • Requires no doping • Applies at low heat • Solvent resistant • Fuel, moisture and fade proof • Paintable • Ideal for sport and scale aircraft • Great for solid wood and open frame structures • Available in Red, Orange, Antique, Yellow, White, Dark Blue

In the tradition of **MonoKote...**
Top Flite's **FabriKote** has "gotcha covered."

Magnified photo showing **FabriKote's** woven fibres.

TOP FLITE
Top Flite Models, Inc.
1901 N. Narragansett Ave.
Chicago, Illinois 60639

For a free sample of **MonoKote™** and **FabriKote™** plus our latest catalog and prop chart, send request with 50 cents to Top Flite.



TWO SIDES OF TEAM ASSOCIATED'S FORMULA FOR SUCCESS

Associated captures the sleek Lotus 79 F1 in 1 12 scale

No matter how you look at it, the Associated RC12E is a winner. The RC12E was designed by racing enthusiasts for all-out competition. But the Team never stops looking for more performance.

ROAR Nationals Expert Class 1:12 Scale Electrics				
		Production	Stock	Modified
1978	4 cell	No event	MRP	**RC12E**
	6 cell	No event	**RC12E**	**RC12E**
1979	4 cell	No event	**RC12E**	No event
	6 cell	**RC12E**	**RC12E**	**RC12E**
1980	6 cell	MRP	**RC12E**	**RC12E**

It takes a close look at a Factory car to see all of the tricks the Team has developed. Some, like precision ball bearings, (#3655/front and #2222/rear) you can't see at all.

But what a difference it makes. Special, lightweight fiberglass chassis plates. Featherweight alloy flathead chassis screws. Even superflex, high-temp wiring (#3731). They're all part of the Team's winning cars.

Track-tune your RC12E with the Team's selection of fiberglass chassis plates

Take a tip from the Team, use Genuine Team Associated racing products to keep your RC12E running up front.

Write or call for a complete catalog, and your free action and info-packed issue of "Racing with the Team."

TEAM ASSOCIATED

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

SIG KITS AROUND THE WORLD

A flying scene at Sig Field, featuring two Kadets. Dana Thompson (Peru, IL) and Joe Himschoot (Montezuma, IA) both learned to fly RC with the popular Sig trainer.

Joe Griffin (Chicago, IL) built a Piper J-3 for his wife, Mary, and took this picture of the pretty pair at the field. If you look closely you can see the Cub has "Mary" on the side of the cockpit. Joe said, "It flies supremely."

Jerry Steenblock of Waterloo, Iowa turned out this customized modification of the Kavalier. A sharp looking model seen on display at a show. Bob Camarata sent in the photo.

RC-31	KADET	$49.95	RC-3	J-3 CUB	$54.95
RC-35	KOUGAR	$57.95	RC-41	BONANZA	$84.95
			RC-39	KAVALIER	$54.95

See your dealer first! To order direct, add $1 postage under $10. Postage free over $10. No C.O.D. CATALOG NO. 42 NOW OFF THE PRESS.

SIG MFG. CO., INC.
Montezuma, Iowa 50171

Since Mike Aday is from Mesquite, TX, we don't think the red star insignia on his Kougar is Russian, but Texan. He says it flies fine with an O.S. .40 FJR engine.

Budge Plath (Granby, MA) added wheel parts to his Kadet. He said in a letter, "I found your kit to be of excellent quality with good wood. The little booklets with the step-by-step instructions were super."

Peter Hopper (Freeville, NY) sent this picture of his Kougar. It is powered by a S.T. 46 and his Goldberg retracts. He wrote, "This is my second Kougar and have over 100 flights logged. I copied the Navy color scheme from an A-4 carrier fighter that I saw at a full scale airshow last summer. This is my favorite sport RC aircraft and I plan to always keep a Kougar around to demonstrate aerobatic flight."

Dennis Calvin (Belton, MO) built this pretty Bonanza. He used the Semco small Pitts muffler and found it fitted in the model nicely and helps keep it clean. Dennis commented, "Still the very best flying model I've seen."

from Bill Northrop's workbench

Model Builder's editor gets back to model building at last! Isao Matsui's YS 120 powered Laser broke a wood prop blade in mid-air at the 1980 T.O.C. It went through the wing, but the real damage came from the terrific vibration before he could stop the engine. With the help of Bill Hunter (left) and a good supply of Hot Stuff, we had him back in the air by the next round.

BEST LAID PLANS . . . ETC.

A classic example of not seeing the trees for the forest occurred in the January '81 issue of **RCMB.** The signatures of both the Editor and his wife, the Assistant General Manager, were left off of the Christmas greeting that appeared at the top of this page. Although the signatures were in place on the original paste-up, they were inadvertently blocked out during processing, and the omission was not caught during the checking period.

So . . . a delayed Season's Greetings from Bill and Anita Northrop, and best wishes for a fruitful 1981.

JOB OPPORTUNITY

An editorial position has opened up at **R/C Model Builder** as of the first of the year. Regrettably, Assistant Editor Phil Bernhardt is leaving to join an engineering firm specializing in large-scale heating and air conditioning. His job while at **Model Builder,** which can lead to full-charge editorship, included proofreading, writing articles such as "Over the Counter" and "Old Timer of the Month," some caption writing, partial supervision of the graphics department, and related odds and ends.

Anyone interested in exploring the possibilities should write to the Editor, Bill Northrop, and include a resume, especially detailing model building and writing backgrounds.

TRADE SHOWS ARE A-COMIN'

With the start of a new year, the annual model trade shows begin their winter/spring schedule. First of the "heavyweights" for 1981 is the IMS (International Modeler Show) trade exhibition in Pasadena, California, on January 10 and 11, about the time this issue hits the newsstands. Next comes the WRAMS show in White Plains, New York, February 21 and 22. The Southwest Modelers Show is tentatively set for March 14 and 15, in Dallas, to be confirmed next month. Following that is the granddaddy of them all, the 3-day Toledo Weak Signals show, April 10, 11, and 12. The MAC (Models and Crafts) show in Long Beach, California, will take place only two weeks later on April 25 and 26.

In between these major shows are many more localized exhibits and symposiums. One of the larger of these is put on by the RAMS Club of Seattle, Washington. This year, the RAMS will be holding its 14th Annual R/C Symposium on February 14 and 15, at the Hyatt Airport Hotel, 1001 Pacific Highway South, Seattle, Washington. Dr. Ralph Brooke is Chairman. Last year, over $500 in trophies were awarded for model aircraft displayed and a number manufacturers exhibited their products.

We'll be glad to publicize any such shows and symposiums if sponsors will send us the information. Remember our lead time requires that publicity material must be in our hands at least 2½ months ahead of the show date.

INDUSTRY NOTES

In what could be a first, to the best of our knowledge, a real switch has been pulled. In the "good old days" of modeling, it was not unusual for major national companies to sponsor model

Continued on page 104

Six out of six ain't bad! Hanno Prettner, of Austria, has won every T.O.C. since it started, and it's never really been close. See page 22.

R/CMB's Assistant Manager congratulates Sally and Dave Brown, and tries to get them to invest the $10,000 in California real estate!

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.

• Hey, how 'bout a beer . . . cat? "Beercat" is the rather unusual name of Midwest's latest in its Live Wire series of progressively complex trainer and sport designs spearheaded by Hal deBolt. What surprised the heck out of us is that the model is *scale*, or nearly so. We learned that there really was (or still is) a biplane of the same unlikely name, and that it participated in the Biplane class at the Reno air races a while back. How about that! Learn something new every day. . .

But getting back to the Midwest kit, it's a staggerwing (bottom wing ahead of the top wing) biplane engineered for fast building, something you don't often find in biplane designs. Span is 47 inches, total wing area 840 square inches, weight 5-1/2 pounds, and the engine size range is .35 to .50. Kit features include quick-building wings and fuselage with Midwest's exclusive "saddle jigs," molded ABS cowl and wheel pants, preformed landing gear, motor mount, instruction manual, and full-size plans. Retail price is $69.95. Available now, at your dealer or direct from Midwest Products, 400 S. Indiana St., Hobart, IN 46342.

PanaVise's new Rapid Assembly Circuit Board Holder.

• • •

Bavarian Precision Products is now importing an updated version of the German-made HB .40 PDP (Perry Directional Porting), Model No. 4400. the most obvious change from the older No. 4200 is the new HB carburetor, a single jet, two needle valve affair, the two needles being used to control the high and low speed mixtures. The new carb by itself would have been enough to improve the motor's overall performance, but HB went one better by designing a new crank, heavier than the old model, with a larger, more efficient bore to improve the flow of the fuel/air mixture to the cylinder. All this means still better performance from an already proven powerplant . . . more power, plus a better transition from high to low rpm and back.

The HB .40 PDP, Model No. 4400 comes complete with extra screws, wrench, prop balancer, and instruction manual. An appropriate muffler (No. 4023) is available separately.

For more information write Bavarian Precision Products, P.O. Box 6, New Canaan, CT 06840.

The updated HB .40 PDP, imported from Germany by Bavarian Precision Products

Nicely made Fuel Control Valve by Hiscott Components.

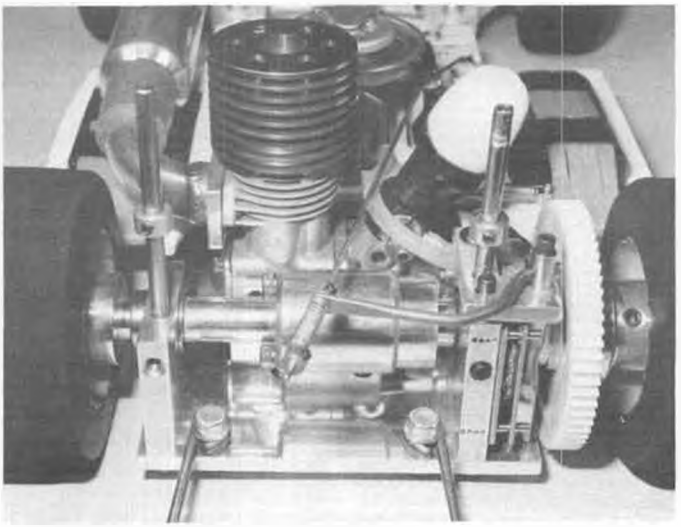
• • •

Top Flite recently initiated its "Trainaire" program, a step-by-step method of teaching that takes the beginning R/C modeler from basic R/C flying up through intermediate and into more advanced building and flying. The first two models in the series were the Headmaster Sport 40 and Schoolmaster II, both previously described in this column. Now Top Flite is bringing out yet another basic trainer, the Headmaster II, a revised version of the old standby designed by Ken Willard.

Looking at the photo supplied to us and the original Headmaster plan as reproduced in the AMA's Kit Plan Book, the only visible difference seems to be that the horizontal stab has been moved from the bottom to the top of the

Above is the new "Beercat" sport bipe from Midwest; at right, Top Flite's latest trainer, the Headmaster II.

Associated's Team Nats Car, for really serious gettin'-it-on 1/12 scale racing.



Somewhere in this maze of specialized equipment is Associated's new differential, for 1/8-scale gas cars.

fuselage. And it's true; the vast majority of changes are structural . . . after all, why mess around with an aerodynamically proven machine? The new Headmaster boasts a lower-stance landing gear for better ground handling, a bolt-on wing instead of the original rubber band setup, and a solid sheet balsa stab to replace the old built-up structure. For easy and rapid construction the new kit includes shaped leading edges and one-piece fuselage sides that are printed on the inside to show the locations of the internal members. Complete hardware is supplied, along with full-size plans highlighted with step-by-step illustrations.

In terms of span (48 inches) and wing area (430 square inches) the new Headmaster is identical to the old, but with a length of 38 inches it's two inches shorter. The model is designed for .15 to .35 size engines and three channels of radio (rudder/elevator/throttle); flying weight will range from 2-1/2 to 3-1/2 lbs. depending on your choice of radio, engine, and finishing technique. No price was quoted, but you can bet it will be competitive with other trainers in the same size range.

Before going on to other subjects, we should point out that Top Flite has yet another new product on the market, one that promises to be *really big*. It's called "Fabrikote," an iron-on, heat-shrink fabric covering material, treated on one side with a heat-activated adhesive and on the other side with fuel-proof paint, and available in colors. WCN devoted a large chunk of last month's "R/C World" column to describing the merits of Fabrikote, which is due to be released soon. Summarizing Bill's comments into one sentence, Fabrikote is quite light, very strong, can be made to pull up very tight (watch those light structures!), comes in a roll about four feet wide, and the grain runs perpendicular to the width of the roll. We'll leave it up to you whether to get excited or not!

From Top Flite Models, 1901 N. Narragansett Ave., Chicago, IL 60639.

* * *

Speaking of covering materials, Coverite has completely revamped its Permagloss line and has added three new colors to boot. The new material is somewhat thinner than before, giving a claimed 14.7% weight loss as well as making seam lines less noticeable, plus it should be easier to work around compound curves. Shrinkability has also been increased, said to be now about the same as Super Coverite. Even the sticky stuff on the back is new, providing the same excellent adhesive properties of this company's "Balsarite" pre-covering wood sealer.

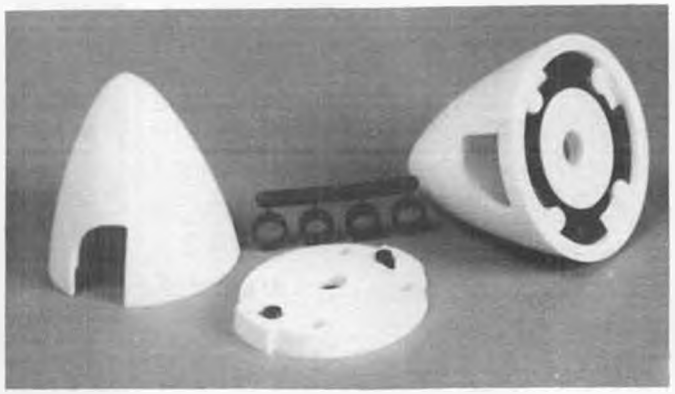
The three new Permagloss colors are cub yellow, dark blue, and bright red, making a total of 13 colors in all. Each is available in the standard sizes: 38x43 inches, 43 inches x 15 feet, and a 5x38-inch trim sheet.

From Coverite, 420 Babylon Rd., Horsham, PA 19044.

Also from Associated, the No. 3770 Timer Switch for charging electric cars.

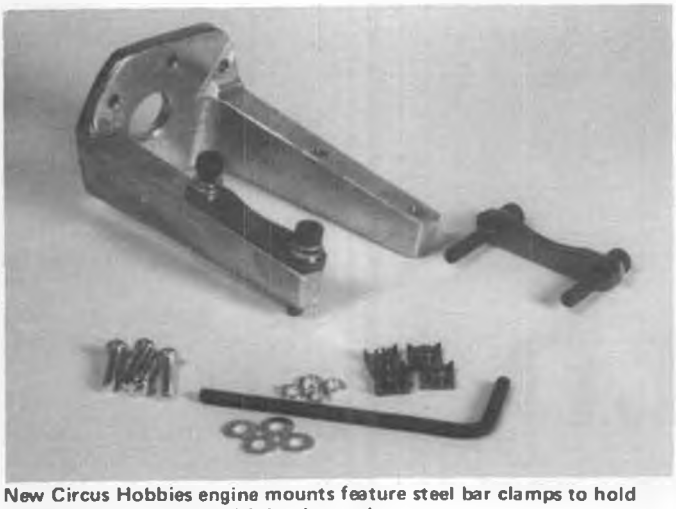
* * *

DuBro is introducing a new line of really neat spinners, designed to be easy to put on and take off . . . no violence required (see the ad on pg. 73 and you'll see what we mean). These are made from a polycarbonate plastic and are claimed to be practically unbreakable

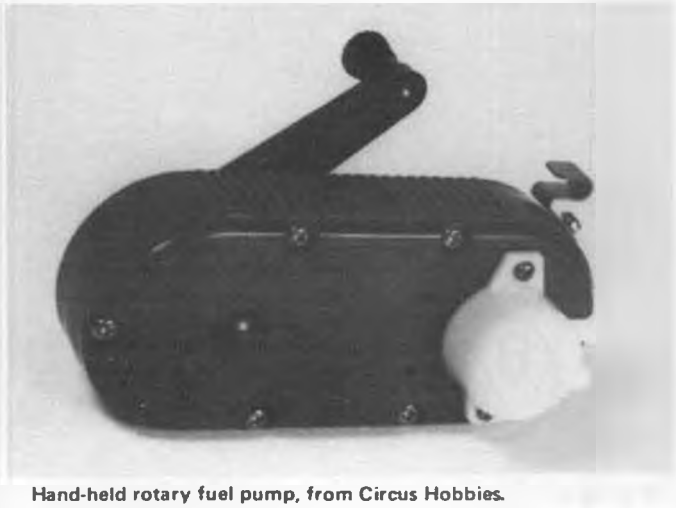


"Kwik-Lock" spinners, latest item from DuBro.

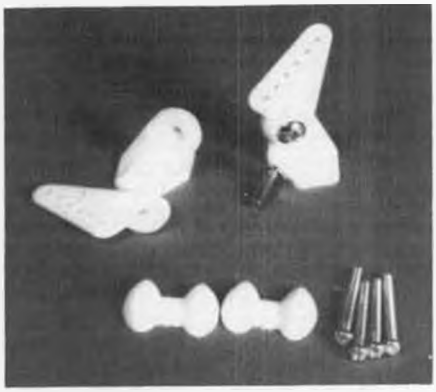
Just a few of the many sizes and shapes of IM Products fuel tanks being imported by Circus Hobbies.



New Circus Hobbies engine mounts feature steel bar clamps to hold engines in place, come with hardware shown.



Hand-held rotary fuel pump, from Circus Hobbies.



Novel adjustable nylon control surface horns, also from Circus Hobbies.

. . . and we believe it, as the things have a very thick wall and are quite heavy.

What makes the "Kwik-Lock" spinners different from the rest is the method of fastening the nose cone to the backplate. On the backside of the backplate is fitted a rotatable plastic disc; the nose cone has four slotted locating pins that go through holes in the backplate. When rotated, the disc captures the slots in the nose cone pins and holds the spinner together securely. Rotating the disc is accomplished by slipping a skinny screwdriver behind the prop and nudging one of the two pins on the disc that stick through the backplate. Pretty slick, huh? If you can't make sense out of all this, take a look at the photo, and if you *still* can't get it . . . well, you'll just have to take our word for it. It works.

Kwik-Lock spinners come in black, white, yellow, and red, and are sized in 1/4-inch increments, from 1-3/4 to 3-inch diameters. A nice touch is the four adapter rings supplied, made to fit 6mm, 1/4-inch, 7mm, and 5/16-inch shafts; the backplate has a 3/8-inch hole. You shouldn't have to do any drilling to get these spinners on your engine! Prices start at $2.50.

DuBro Products, 480 Bonner Rd., Wauconda, IL 60084.

* * *

Coming soon from Sig will be the "Hummer," a very simple and straightforward low-wing, two-channel (aileron/elevator) 1/2A job designed by Bill Fleming. The Hummer meets the current 1/2A racing rules but is really intended for just general sport flying, either with a Black Widow or honkin' with a Tee Dee. Span is 34 inches, wing area is 212.5 square inches, and flying weight ranges from 20 to 26 ounces. The radio compartment is big enough to handle most any rig you care to install, plus the hatch between the firewall and canopy allows easy access to the tank and Rx battery.

This very complete kit includes die-cut balsa and plywood parts, all necessary hardware, clear canopy, formed aluminum gear, Sig's own molded 1-7/16 inch diameter wheels, nylon tube pushrod for the elevator, instruction booklet, and full-size plans. If you plan to run a Tee Dee you will also need an appropriate engine mount and fuel tank, as these are not provided.

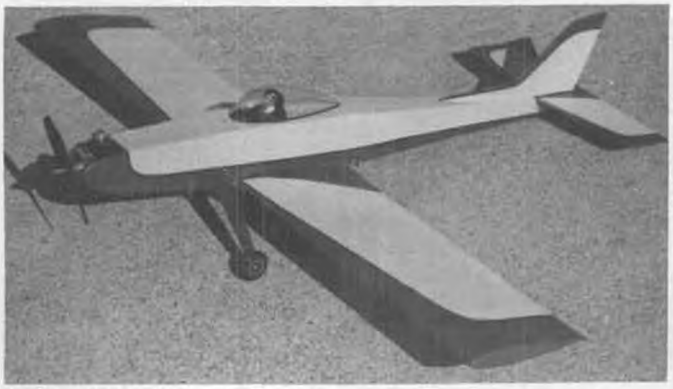
Hummer kits have not been released as of this writing, but they just may be on your dealer's shelves by the time you read this. Check with him, or order directly from Sig Mfg. Co., Montezuma, IA 50171.

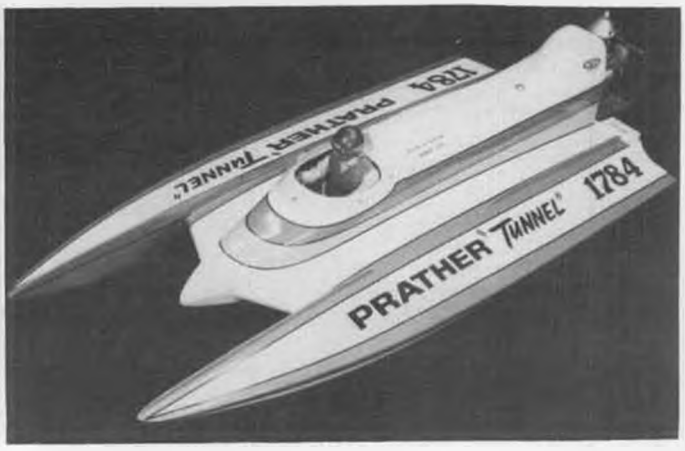
* * *

Christmas came early at the **RCMB** office when we opened the three big boxes of modeling goodies sent not by Santa Claus, but by Jerry Nelson, President of Circus Hobbies. Actually, what Jerry sent us was samples of items made by IM Products in Japan and which are now being imported and distributed in the U.S. by Circus Hobbies. Rather than devote an entire "Over the Counter" column to describing the whole line, which would be easy to do, we elected to choose three or four items each month, spreading the whole spectrum over a number of successive issues.

So, this month we're going to start by talking about motor mounts. The IM mounts come in five sizes: small ($9.95), medium ($11.45), large ($13.45), 15 RV ($11.45), and 40 RV ($13.45). Cast from a high-strength aluminum alloy, they come complete with all mounting screws, lock washers, blind mounting

Continued on page 102





Sig's "Hummer" (above), a two-channel 1/2A sport machine. At right is the very competitive 29-inch Prather Outboard Tunnel.

The winner in Sport Scale at the US Scale Masters Champs, this SBD-3, by Kent Walters, Scottsdale, Arizona. Did terrific dive bomb act!

Garland Hamilton, MCAS Yuma, Arizona, scratch-built this F4U-1D Corsair from Bob Holman plans. Gained 93.5 static points out of 100.

R/C WORLD

by BILL NORTHROP

PHOTOS BY AUTHOR

18 YEARS LATER

Up until 1962, the mere mention of "scale" in relation to radio control brought knowing glances and raised eyebrows to the expressions of "experienced" modelers. In those days, the few persistent individuals who concentrated their efforts in the direction of modeling scale R/C aircraft were looked upon as characters who spent most of their hobby hours building models that were pretty to look at but very unlikely to fly.

When it came right down to it, the above opinion was quite true. The scale modeler of that era was usually pretty inexperienced in flying. The models themselves took so much time to build (usually from scratch) that the owner had little time left for flying, and being inexperienced in flying, the scale modeler usually overlooked such important flying requirements as proper balance and wing loading. Added to this was the fact that radios, servos, batteries, and other related items had nowhere near the reliability of today's equipment. On top of that, "multi-channel" radio control (using vibrator reed type selection) provided only a maximum of two simultaneous functions at any one time, and in-the-air trimming as we know it today did not exist.

When and if a contest included scale, it was usually a time to watch one spectacular crash after another, as the inexperienced fliers and untrimmed aircraft (usually unflown until that moment to preserve their static scale point earning ability) combined to put on a pitiful show.

However, the performance in R/C Scale at the 1962 Nationals in Chicago was the turning point. Proportional control, as we now take for granted, was still just around the corner, but the more persistent scale modelers had taken time off from their scale projects to learn to fly . . . they paid more attention to weight saving, and most had properly flight-trimmed their models before the contest. A huge throng of spectators watched such models as an A-26, a P-38, an XB-47, P-51, and yes, even a quarter-scale Taylorcraft (!) put on spectacular flights. (Also a Travel Air 2000 that flipped on takeoff by **RCMB's** editor!)

Today, there is virtually no full-scale aircraft that cannot and/or has not been

Jim Meister, Vista, California, entered this SBD-5, the prototype for his next JEMCO kit. It had the highest static score of 96.5, and placed 3rd in Sport Scale. Engine is water-cooled!

"Miss Los Angeles", Brown B-2 racer by Earl Thompson, from Livermore, California.

Stubby little yellow and black Gee Bee "Z" entered in Sport Scale by Granger Williams, of Williams Brothers, San Marcos, California.

"Mr. Barnstormer" himself, Ted White, flew this smooth, fast Martin Baker MB-5 to 4th place in Sport Scale . . . on one prop, of course.

Another F4U, this one by Jerry Ortego, Cerritos, California.

Static Scale judge Monty Groves "puts the tape" to Granger Williams' Precision Scale Gee Bee R-1

Static Scale judge Bill Northrop checks Accuracy of Outline using documentation provided by Larry Wolfe for his Grumman Cougar.

Granger Williams' Proctor 1/4-scale Nieuport 28, about to touch down on its shadow. Uses OS 90. Modified J&Z 18 x 5 adds 500 rpm.

modeled and flown successfully, complete with operating flaps, landing gears, and . . . you name it. And 1980 seemed to be the culminating year for all of this; the World R/C Scale Model Championships in Canada . . . the huge-in-many-ways Quarter Scale Association Fly-in in Las Vegas, the U.S. Scale Masters Championships in Southern California, and the Circus Circus Tournament of Champions in Las Vegas.

. . .And wouldn't you know it, the latter three mentioned above happened in such rapid succession that all of them came due for reporting in this issue of **RCMB**! It seems as if that which we have pushed so hard for over the years has turned around to push us into a corner . . . AND DO WE LOVE IT!

In this column, we'll try to give you the

Granger Williams' Precision Scale Gee Bee R-1. Extremely smooth in the air, tough to land.

F-82E by Art Johnson, Delray Beach, Florida. A smooth, stable flying machine.

Another "Razorback" P-47, this by Dave Rheaume, Lakeside, California. Clean machine.

Bob Violett's well known ducted fan powered A-4N Skyhawk, second in Sport Scale.

The fantastic F4J Phantom, twin ducted fan Sport Scale by Tom Cook, Raymore, Mo.

All the way from Holliston, Mass., FW 190-D9, by old buddy, Ed Izzo. Hi, Louise!

Sport Scale Sportmaster by John Lockwood, Clovis, California. Very high Outline points.

Earl Thompson's FW 44J about to meet its shadow. Won 1st place in Precision Scale.

A well-weatherd P-47 "Jug", Thunderbolt by Bob Frey, Phoenix, Arizona.

A fine classic Spitfire, Mk IX, by Phil Sibille, Great Falls, Virginia. Sport Scale!

Don Lien's smooth flying Grumman "Hellcat" F6F-3. He's from Riverside, California.

R/C model of an R/C drone Grumman Cougar. Larry Wolfe, Lakewood, Cal. Ducted fan.

Jerry Kitchen's "Bubble Top" P-47 has water-cooled engine. Hez from Fullerton, California.

Chrome Monokote like a mirror on PT-22 by Buz Watson, Anaheim, California.

Bill Hunt, Naples, Florida, and his Quadra powered Miles Sparrowhawk. Cream and red, it weighs 22 lbs.. Won "Best Finish" award.

Wayne Myers, right, Houston, Texas, liked Bud Nosen's new F4U Corsair so much, he asked us to take his picture with it.

Dr. Ralph Brooke cranks the Quadra in his 109" span Practical Scale Tiger Moth. He's importing them under "Brooke Model Products".

Trophy for coming longest distance to QSAA Fly-In went to South Africa's Mel Barber, from Boksburg. DH-2 is Quadra powered.

highlights of the U.S. Scale Masters Championships and the Las Vegas QSAA Fly-in. In another section, you'll find our story on the Tournament of Champions, and in addition to that, Bob Underwood's "1 to 1" R/C Scale column features photos from the 1980 Scale Rally of the Kitchener-Waterloo (Canada) Flying Dutchmen, taken by Don Prentice.

U.S. SCALE MASTERS CHAMPIONSHIPS

The first annual (we hope) Masters' Tournament for R/C scale modelers took place at Mile Square Park, Fountain Valley, California, on October 3, 4, and 5, 1980. We said "we hope," because although the contest was billed as a master's tournament in the same sense as the Pattern masters, complete with selection of contestants by competition performance in regional contests throughout the country, the attendance by such winners was somewhat lacking.

Of course the limited attendance was somewhat understandable, as even the California based AMA Nats and NSRCA Pattern Masters of 1977 and 1978 respectively failed to attract quite a few qualified central and eastern fliers. It is a long way to travel, but if they had been team selection events. . .

Another complication was the fact that the World Championships of R/C Scale took place this year, in Canada, closely followed by Scale at the Nats, making a third major scale event in one year (actually within three months) more of a burden than a pleasure. Regardless of all this, the first annual (we really hope they do it again) still drew competitors from the full limit on distance (two from Florida), plus Massachusetts, Virginia, Missouri, New York, Texas, New Mexico, and Arizona, as well as a substantial number from Northern and Southern California.

Certainly quality was not affected by the smaller quantity, as the aircraft entered were fantastic in scale fidelity, whether Sport or Precision.

One might ask what would have happened to Sport Scale if we didn't

Best Junior entry at QSAA, Edmond Root, Las Vegas, and his OS 90 powered Platt Jungmeister. Weighs 20 lbs, has had a dozen flights.

Charley Viosca's Cessna Airmaster C-165 will become a Bud Nosen kit. Weighs 23 lbs, 8-1/2 ft. span. He's from Dallas, Texas.

Part of the proud crew from West Germany, who came back after last year's broken stab disaster to put on some great flights.

B-17G is modeled after Confederate Air Force "Sentimental Journey", weighs 50 lbs, uses 4 K&B 61's. Simprop radio.

Palmer Cramer, Fresno, Calif., scratch-built this great flying Fokker DR-I, triplane.

Jerry Shumaker's DH-89 Rapide takes off with OS 60 4-cycles whirring. Described last month.

Travel Air "R" by Bert Ayers, Carson Calif. Quadra, 21 lbs., 87-3/4" span. Smooth!

have World War II! Out of 24 Sport Scale entries, 14 were of WW-II military aircraft, and 3 were post WW-II military. Precision Scale consisted of only three aircraft: Earl Thompson's Focke-Wulf 44J military biplane trainer; Granger Williams' Gee Bee R-1; and John Lockwood's Fokker E-III (very early WW-I fighter). They finished 1, 2, 3, as listed above. A cheer went up when Granger got the Gee Bee down and stopped without flipping it over . . . on one flight.

The method of static judging the Sport Scale entries was an off-shoot of a system previously seen in F/F Scale judging. Each official was assigned one job to do on each aircraft, i.e., one judged Accuracy or Outline only, one judged Craftsmanship, and one judged Finish, Color, and Markings. In this way, favoritism by one judge toward one entry or one type of aircraft could only affect about 1/3 of the score on any one model. This method also eliminated nearly all "conference judging," as each official worked his category alone. It was interesting to note that all of the entries totaled scores between 88 and 96.5 with only one below 90. Jim Meister, Vista, California, gained the highest static score of 96.5 (that's out of 100 max) with his SBD-5, which is the prototype for the latest kit in his Jemco line. This, with his flight score, put him in 3rd place at the finish. The other top five were Kent Walters, Scottsdale, Arizona, first, SBD-3; Bob Violett, Casselberry, Florida, second, A-4N Skyhawk II; Ted White, Bedford, Texas, fourth, Martin Baker 5; and Tom Cook, Raymore, Missouri, fifth, F4-J Phantom twin ducted fan.

We certainly hope that Bob Olson, Harris Lee, and other members of the Southern California Scale Squadron will put on another U.S. Scale Masters Championships in 1981, as we're sure that even more of the top U.S. scale fliers will attend. Certainly all of this year's contestants will offer nothing but high recommendations if they are asked about the first Championships in 1980.

Ken Runestrand, Roseville, Calif., had a little trouble with the tire slipping off of his self-built wheel, but it didn't interfere with the great flying of his Balsa USA Sopwith Pup. 9 ft. span!

QSAA FLY-IN, LAS VEGAS

The 1980 Quarter Scale (or whatever, as long as it's BIG) Association Fly-in at Las Vegas, October 9, 10, 11, 12, was a . . . er . . . huge success again in spite of being dealt a hard blow . . . literally . . . in the form of strong winds that succeeded in imbedding large quantities of fine, brown, desert dust into planes, engines, equipment, food, hair, teeth, etc., etc.

Friday was actually the best day of

Hughes Flying Boat by the Meyer brothers, Orange, Calif. Weighs 70 lbs, 8 K&B 61's, 16' span. Will be on view at IMS show, Pasadena.

Close-up of the Travel Air "R" by Bert Ayers. Yellow with red trim, it is finished with K&B Superpoxy. Has had half-dozen flights.

The trophy table at Henderson Dry Lake, scene of the QSAA fly-in. None are for flying. Flags are not starched . . . that's the wind!

"Best of Show" at the QSAA, this 25 lb. Curtiss Goshawk by Dick Enos, Santa Maria, Calif. Quadra power, 94-1/2" span, not yet flown.

Best Scale entry, Fairchild 22 by George Harlan, Irvine, Calif., 22, lbs., McCulloch engine, 98-1/2" span, not yet flown.

Tim Just, designer/builder John Pahlow, flier Joe Bridi, and the Spirit that flew for 4 hours, 47 minutes, 204 miles to win Marathon. Plans will be coming in R/CMB. Accurate scale, 10' span, 22 lbs, Quadra.

flying, with almost totally calm air. Saturday was OK until around 12:30-1:00 p.m., when the wind began to pick up as the totally empty blue sky allowed a few puffy white clouds to appear. The wind really never backed off after that . . . but we're getting ahead of the story.

The QSAA sorta puts the cart before the horse, as its banquet is on the first day of scheduled activities. A huge room was set up for displaying the aircraft at the Showboat Hotel all day Thursday, and the banquet that evening took place in another huge facility in the same building.

Friday was the first day of flying, all of which took place on a huge flatland about 25 miles east of Las Vegas. As you may or may not know, the QSAA is dead set against any competition at its fly-in. All flying is informal, on a when-you-feel-like-it basis combined with when-your-frequency-comes-up. In our opinion, this is kind of a shame, because it would seem that when the build-'em-big novelty wears off, modelers will want to do *something* to keep the interest going. We're against organized competition, with judging and scoring and all that crap, just as much as anyone else when it comes to this type of modeling, but certainly some fun-type objectives on a take-it-or-leave-it basis could not be called balls-out competition, yet they would provide some interest for both the modelers, the modeler/spectators, and the just plain "Goodness-look-at-that-Henry" spectators.

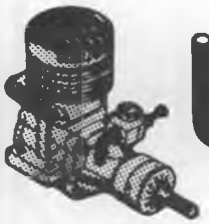
We have noted that the Las Vegas Fly-in has somewhat separated into two factions. One includes the hotel attendees, who stay in Las Vegas, sneak in some gambling, hit the night spots for dinners and shows, and still somehow manage to get themselves and their bloodshot eyes out to the field by mid-morning. The other faction comes to the fly-in by motorhome, camper, or trailer, and stays at the field for the weekend. These folks fly up a storm after everyone else has gone to town; enjoying the cooler, smoother evening air and flying until it becomes difficult telling just where the model is after it gets below the horizon (Hmmm, better install lights before next fall). They they sit around campfires, have a few brews and/or things-on-the-rocks, and enjoy trading home-cooked meals along with endless flying stories. They're also right on the spot for a few dawn patrol flights the next morning before the traffic gets heavy. Personally, we think these folks have the right idea!

Generally speaking, the photos tell the story best about what was being flown this year. We noted quite a few more kit aircraft than in previous years . . . natural enough as more kits are available. Quadra power still dominates the big engine category, though others are making inroads. In most cases, the bigger engines are needed where a modeler has overbuilt an aircraft in which the Quadra should have been enough. Frankly, without favoring Quadra, we'd like to see the displacement race stop before the engines and aircraft get too big.

Out of 165 aircraft registered, we counted less than a half-dozen using belt or gear reduction. Reduction drive seems to be more popular with intermediate size scale models, and those in which top performance is required, as for example, the Tournament of Champions aircraft. (Many of these, including

Bob Seigelkoff tunes the Kawasaki engine in his Grumman Ag Cat, built from R/CMB plans. Carries twin radios, sprays powder.

Chuck Fuller, Monterey, Calif., added ailerons to the top wing of his Fleet, along with some extras in case the pilot gets disoriented!

FUEL  LINES

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

• As this issue is published, it's right around the first of the year, 1981. Many people associate that with New Year resolutions, slogans, or what have you. I don't know why, but it made me recall a few whimsical one-liners that seem to apply well to our hobby. I have no idea where they originated, but here are a few together with one of many possible applications.

Engine starting: "When all else fails, read the instructions."

Bearing removal: "Don't force it, get a bigger hammer."

Nitro: "If some's good, more's better, and too much is just right."

Carburetor adjustments: "If you don't know what it does, tinker with it."

Undoubtedly, there are many more. Perhaps you know of one that you'd like to share with other readers. If so, just jot it down on a postcard and send it to me. How about a little incentive? OK. For every one used in this column, I'll send a hobby merchandise gift, something in the three to five dollar range.

In the October 1980 issue, I asked for some response on what subjects you would like to read about. There were several requests for technically oriented articles, such as tuned pipe theory and fuel chemistry; however, by far, most of your letters wanted more of the basics that have accounted for the majority of the subjects in this column. One letter this past week seemed to synthesize the meaning of all the previous ones. It is so well composed that I'm going to quote most of it for all readers. John Young of Longview, Texas, wrote:

I have a subject for you: the care and cleaning of any model engine, specifically, how to disassemble, clean and reassemble an engine. Perhaps this may sound like a ridiculously simple chore for someone with experience and proper tooling to do the job. But, I wonder how many sport modelers have ruined or impaired the performance of their engines by using poor methods. I know I'm guilty.

Your articles on the TD engine were the best I've read on the subject. I'm now enjoying a lot of success with my engines. I can thoroughly clean one and have it back in my model in thirty minutes. Not so with my other engines. I had one thoroughly dirty HB .25. My problem, and I'm sure the problem of many other modelers, was how to take this ringed piston engine, with front and rear bearings, apart, thoroughly clean it, reassemble it, and once again have an engine that ran as well as before. Don't forget that Perry carb either. . .

Taking out screws was no problem. Getting the crank out of the case was a little bit of a problem, but I managed. The bearings were something else; I never did get the rear bearing off. Is there some inexpensive puller that will work on most engines? What about the ring on the piston? The manufacturer says Don't! *But if it feels gritty in the slightest, I must! How else can I clean it? Had I managed to get the rear bearing off, how would I get it back on? I don't have a press, but I do have a vise. Is there a way to use it? The front bearing is shielded on one side; how can it be flushed clean? Should a solvent be used or can I put it under the tap and bake it dry? If tiny particles of grit will ruin an engine, then imagine how much damage can be done with pliers, screwdrivers, hammers, pulling, pushing, prying, scraping, scratching, twisting. . .*

My suggestion, then, is an article or series of articles with illustrations, targeted at the sport modeler who wants to maintain his own engines. He needs simple, inexpensive tools, and techniques that he can use and understand . . . proper do's and don'ts, simple jigs and equipment he can make to replace presses. I challenge you to take an engine, throw it into a mud puddle, leave your own well-equipped shop, and go to John Sport Modeler's utility room workshop and use his pliers, screwdriver, etc. to work on the engine. My point is again a feel for the problems that the average modeler faces and then apply your knowledge to finding solutions without using a well-equipped shop to back you up.

I have read through literally hundreds of modeling magazines and don't recall ever having seen such an article. I have seen the construction of models described Step 1, Step 2, A to Z a hundred times, but not so with engines. . ."

Thank you, John. Your excellent letter is a real challenge. I accept. In addition to the points you emphasized, other readers wanted tuning tips on engines other than Cox .049 and .051's. And about two-thirds of the requests also asked for information on how to break-in a wide variety of engines.

To tie all of this together, I've planned an extended series of articles covering the following general subjects:

Basic and optional engine tools.
Engine disassembly.
Bearing replacement.
Piston rings and pins.
Carburetors.
Cleaning techniques.
Gaskets and shimming.
Reassembly and testing.
Custom fitting new engines.
Engine break-in.

In addition to verbage, there will be extensive use of photographs and line drawing illustrations. All the subjects will be covered in detail. For example, in the carburetor article, descriptions and photographs will cover at least three popular R/C carburetors and a couple of standard needle valve assemblies. Similarly, three or more different engines will be covered in the other general subjects. Further, every effort will be made to show how it can be done without expensive equipment. Usually two methods will be described and/or depicted. As John Young suggested, one with and one without an arbor press. As you can imagine, it will be an extensive series, and hopefully it will be most definitive. In the meantime, if you have any thoughts about other subjects to include in the series, just drop me a line or give me a call at (714) 830-5162.

Finally, a few technical subjects will be covered as requested. Tuned pipe theory and calibration will certainly be one of them.

In closing, this has been an introduction to an entirely new series of articles on engines. Next month, the first topic will be basic and optional engine tools, including where to purchase them, costs, and alternatives. Until then, safety first, last, and always.

Joe Klause, P.O. Box 2699, Laguna Hills, CA 92653. •

---

the top 5, used reduction drives, and only one Quadra powered model appeared.)

Fortunately, there were some outstanding scratch-built aircraft present to break the monotony of the increasing number of kits. Most outstanding, of course, the Hughes flying boat not yet flown, and the German team B-17, which did fly, and well. Other out-of-the-rut designs included a Miles Sparrowhawk, Fairchild 22, DH-2, Spirit of St. Louis, Piper Tomahawk (about to be kitted), a great flying DR-1 (Fokker Triplane), Travel Air "R," DH-89, Cessna C-165, Hiperbipe, Pober Pixie, and a Mitchell Wing powered hang glider.

As we said earlier, this is strictly a no-competition gettogether, so there's not much to report about the flying, other than to say . . . eh . . . we hope we're wrong about the need for some type of objectives in the flying in order to keep the interest going for this great affair. Even full-scale fly-ins have some organized activities. For instance, what is competitive about bomb dropping, in which the person coming closest for the weekend wins a nice prize, such as Quadra engine? What is the fun of watching a model bore aimless holes in the sky or shoot countless touch-and-go's on flight after flight, especially if the model you're watching is just another kitted J-3 Cub, Pitts Special, Citabria, or what have you? We'd like to have your thoughts on this, and will be glad to pass them on to the good folks who plan and put this affair on every year. •

PHOTOS BY AUTHOR

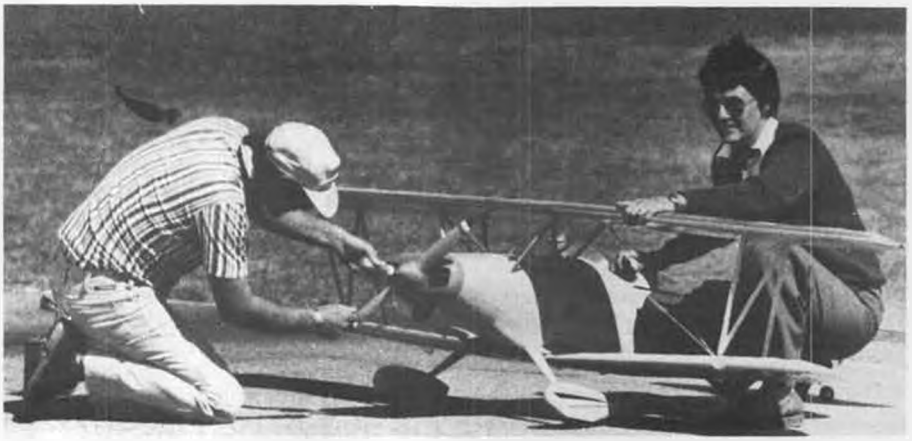
LIBERTY SPORT

SCALE

By ROGER STERN . . . From out of the Dark Continent comes this two-winger, an excellent example of our concept of what a Mammoth Scale model should be. It's big (3-1/4" scale), relatively light (18-1/2 lbs.), and flies beautifully with a belt-drive-equipped .61. The best part of all is that it's a biplane!

• The "Big is Beautiful" brigade has overwhelmed the modeling fraternity in recent years and has even reached our remote little country of Zimbabwe.

After building scale models for radio control for the past ten years, and then seeing quarter-scale models flying in South Africa and England, I knew that I had to start building one as soon as possible. Not having access to kits or plans, I knew I had to design my own, so the first problem was what design to build. As a lover of biplanes, I knew it had to be a bipe, and of all the biplane kits that I have built and flown in the past, the easiest to fly and the most docile flier has been the Liberty Sport from Sig. So that made up my mind. At least I knew that I would have an easy flying model, if nothing else. And it certainly proved correct: the big Liberty is just a dream to fly.



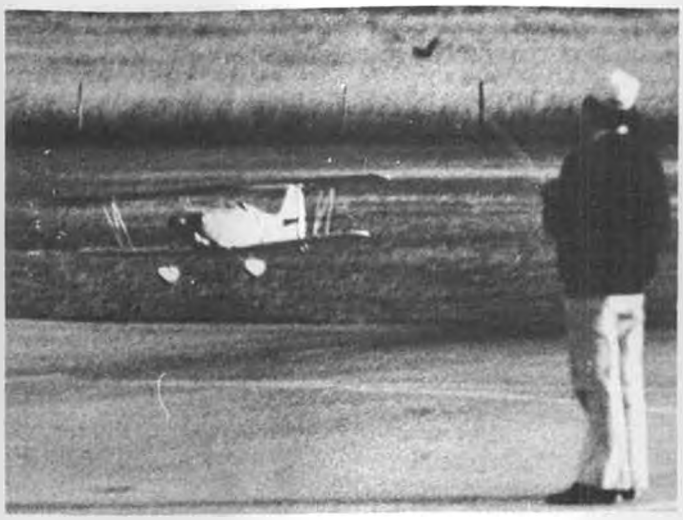
Tense moment! The author's wife, Ann, lends a helping hand while he primes the engine in preparation for the first test flight. Flew perfectly, shaky knees notwithstanding.

The author's biggie, all 93 inches of it, poses with his smaller 2"=1' scale (57 inch span) Sig Liberty Sport. Surprisingly, both are powered by HP .61's . . . shows what a belt drive can do.

A friend got hold of a DuBro prop driver for me, and with my trusty HP .61 Gold Cup for power, I could then decide on the size of the model. A true quarter-scale model of the Liberty Sport comes out a bit too small to cowl the motor, as a .61 sitting on a DuBro prop driver takes up a lot of space in the cowl, so I settled on the scale of 3-1/4 inches to the foot, which just fully houses the motor, although I did cut out a circle in the cowl for the head to aid cooling (the top of the cylinder head is just a little below the cowl).

The model is true scale, enlarged from the 4-views supplied in the Sig kit, with my own construction incorporated,

Complete model broken down for transport. Landing gear also comes off. Assembly for flying takes less than 15 minutes.



Slightly blurred photo shows the Liberty coming in after the highly successful first flight. Looks, handles like the full-size counterpart.

although I did borrow quite a few ideas from the Sig kit. Once I got everything together and the plans drawn, it took about nine months to complete, which included nearly two months to paint it. (I spray over a weekend, one color a week, and there are seven colors on the model.)

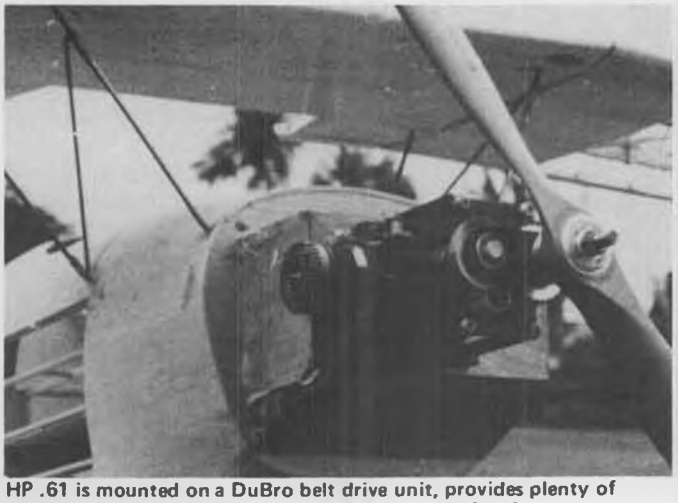
Once completed, it was time to test fly. So as not to hassled by our entire club (all 70 members would have come out to see it), we decided to test fly it privately early one Sunday morning at our occasionally used glider field, which is really a polo field. Just my wife, Ann, and myself were present and I was naturally a bit apprehensive about the first test flight. Well, I needn't have been, as the first flight went off so well, it was almost an anticlimax. The following weekend I showed it to the club members and have since flown it considerably. To put it simply, the model flies terrifically, it looks and flies just like a real plane. The takeoff run is straight, with liftoff after about 20 yards. Aileron response is slow but adequate, full aileron control giving a fairly slow scale-like roll. Slow speed flight is excellent and it lands like a feather.

As I said, power is with an HP .61 Gold Cup motor on a DuBro prop driver, turning a 20x10 propeller. A tuned pipe is fitted which goes through the fuselage and comes out underneath, just behind the lower wing. My model also has a Harry Higley smoke unit fitted, which works extremely well as far as making smoke goes, but because a tuned pipe is fitted and the diesel oil used for the smoke is introduced into the pipe manifold, a loss of power results when the smoke is switched on, due to the supercharging of diesel oil into the motor. Nevertheless, sufficient power is still available to loop the model by slightly diving just before starting the loop. Full power is restored as soon as the smoke is switched off. The fuel I use is a 5% nitro mix and our altitude is 5000 feet plus, so a much more sparkling performance will be realized closer to sea level.

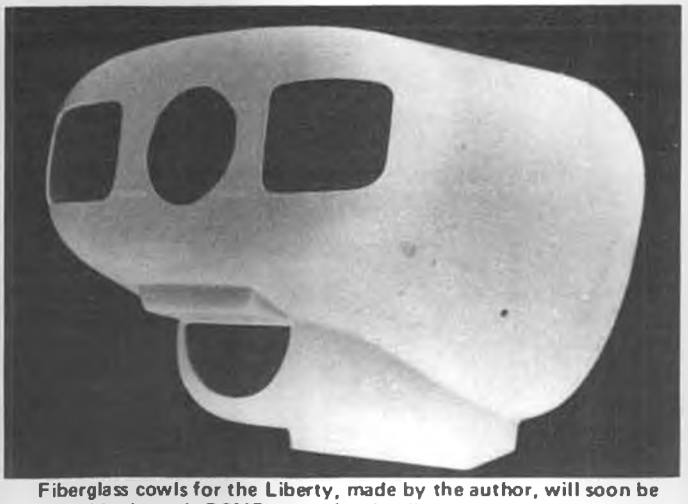
The weight of the Liberty came out at 18-1/2 pounds. The wing loading is only 21 ozs./sq. ft., and this includes an on-board 4-Ah starter battery connected to the glow plug and activated when low throttle is selected. Also, the Higley smoke unit with its attendant fuel tank and extra servo to operate the unit adds to the weight. Over a pound of weight can be saved by omitting these two items.

This model as presented was designed for a .60 motor with a reduction drive, not for a large chainsaw type motor. The only modification I would recommend if you want to use a larger motor is the substitution of hardwood for the fuse-

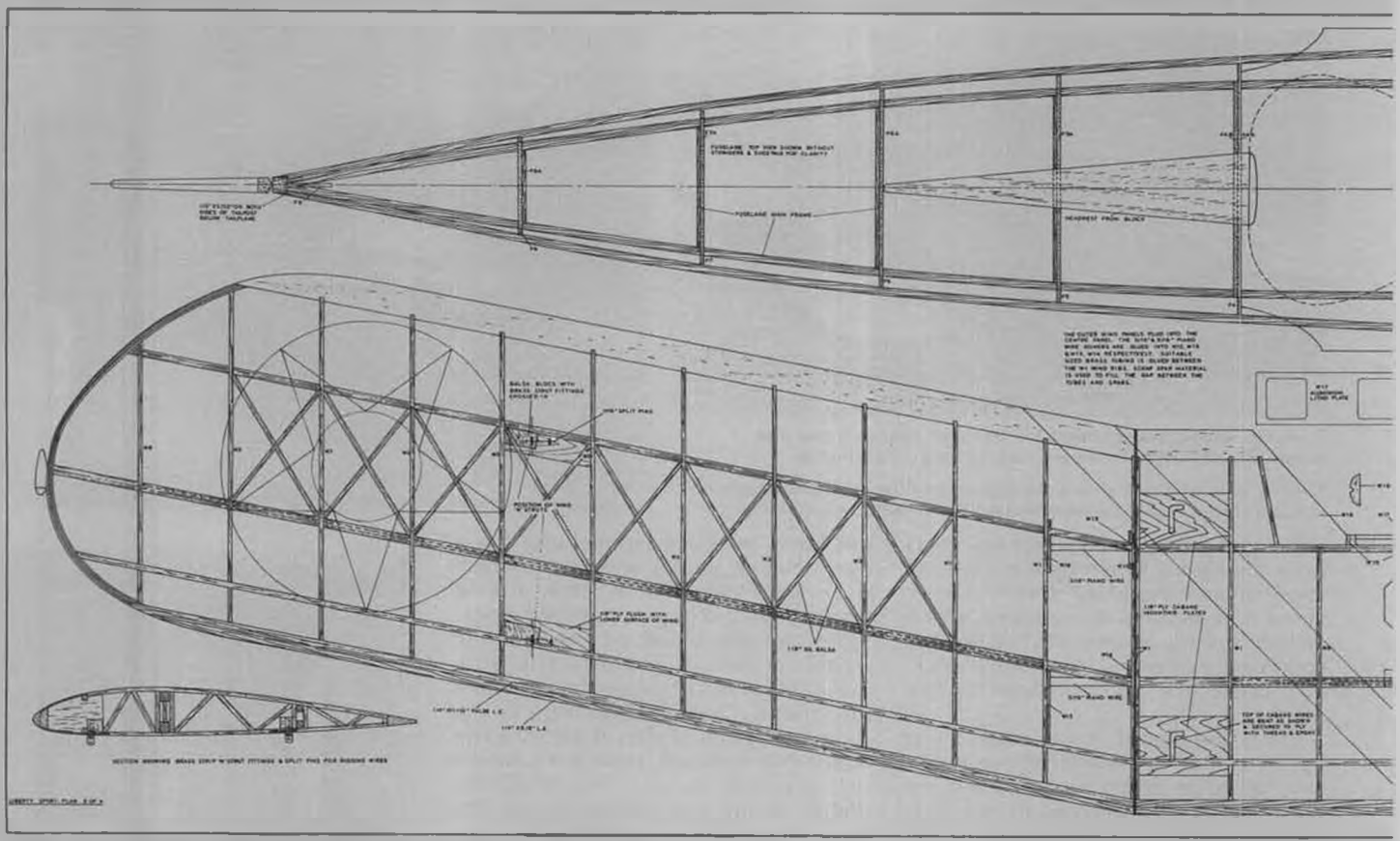
Tuned pipe runs back through fuselage, exits aft of lower wing. Ducting around pipe is necessary for channelling cooling air and also to protect radio from excess heat.

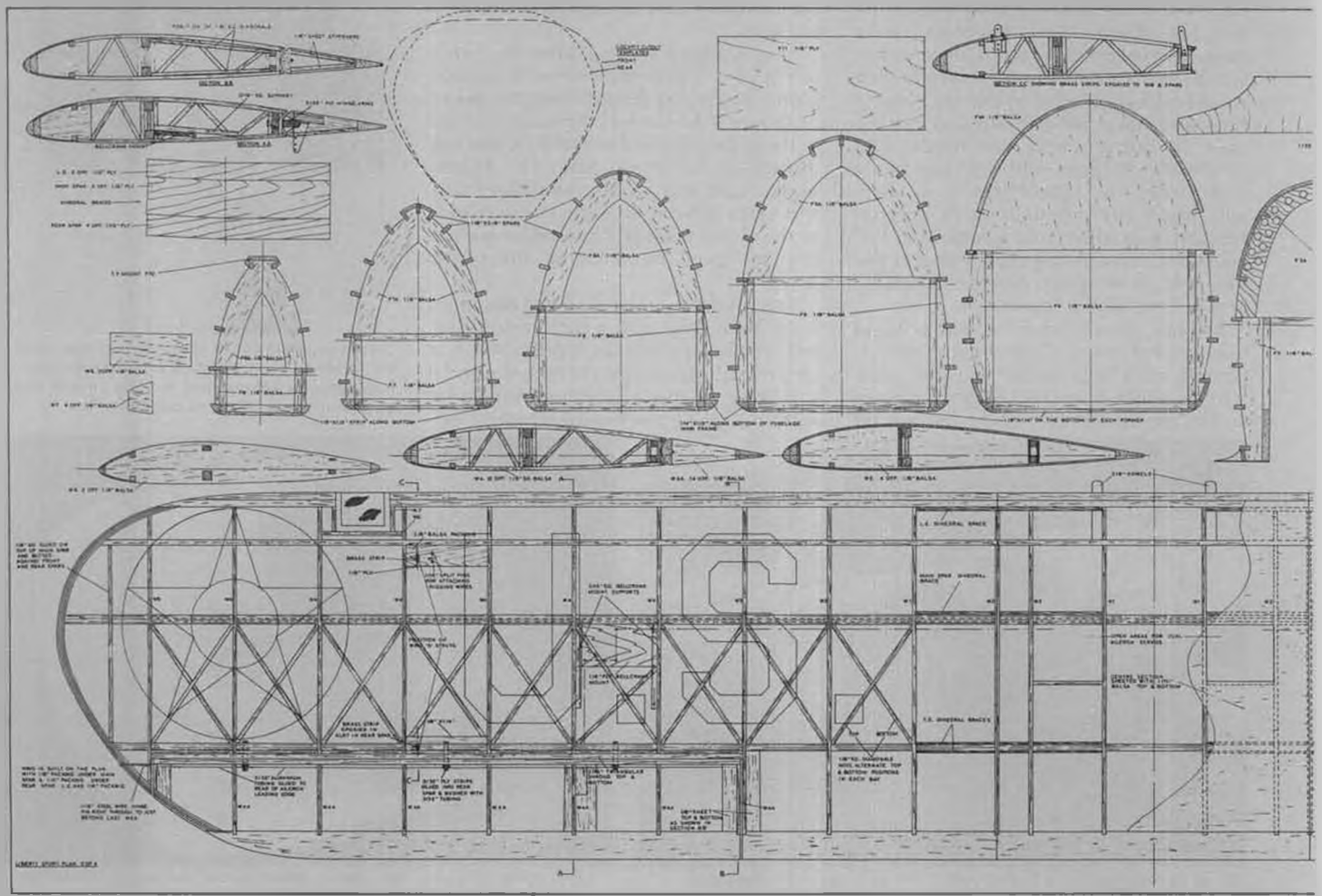


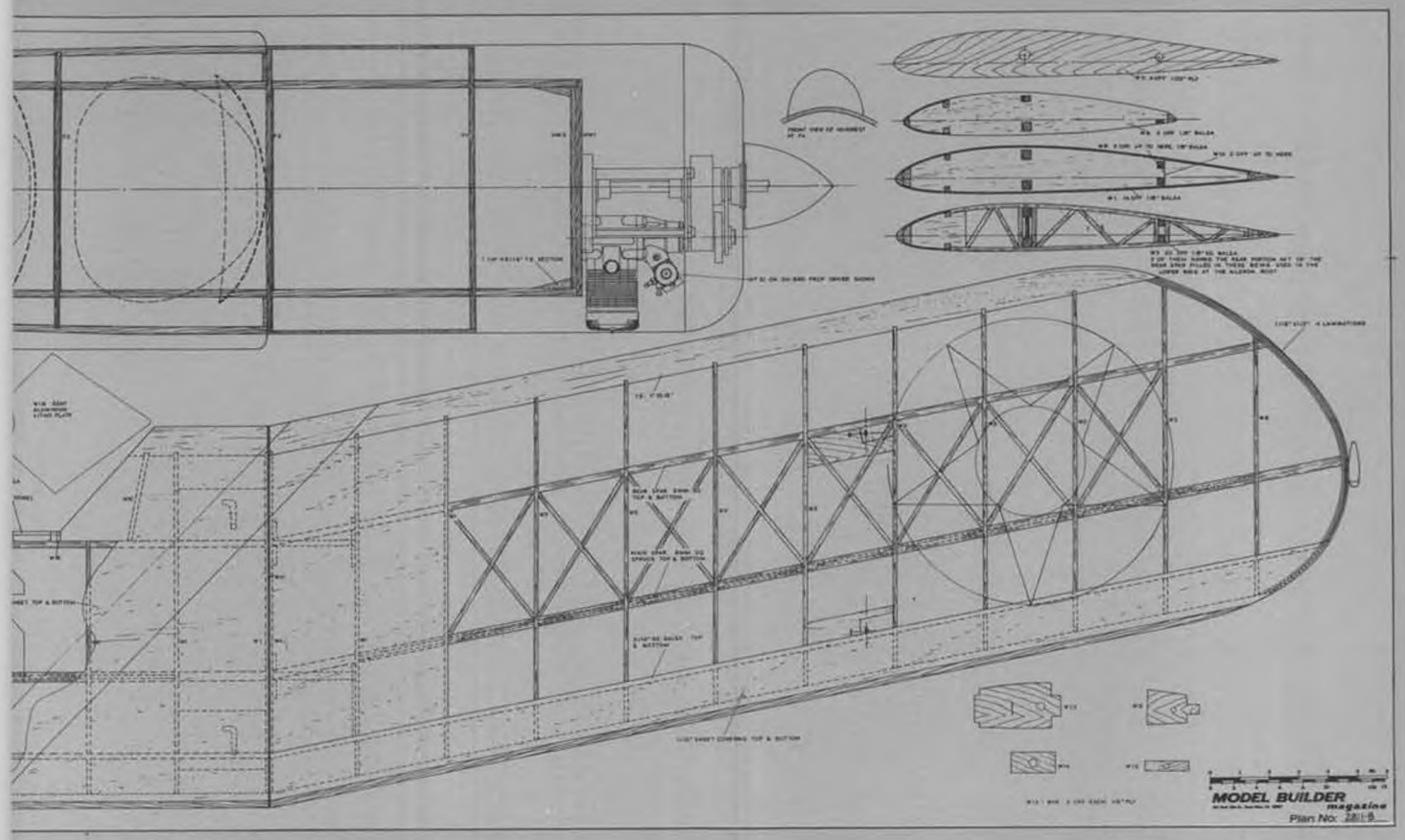
HP .61 is mounted on a DuBro belt drive unit, provides plenty of oompf for vertical maneuvers. Prop is Top Flite 20X10.

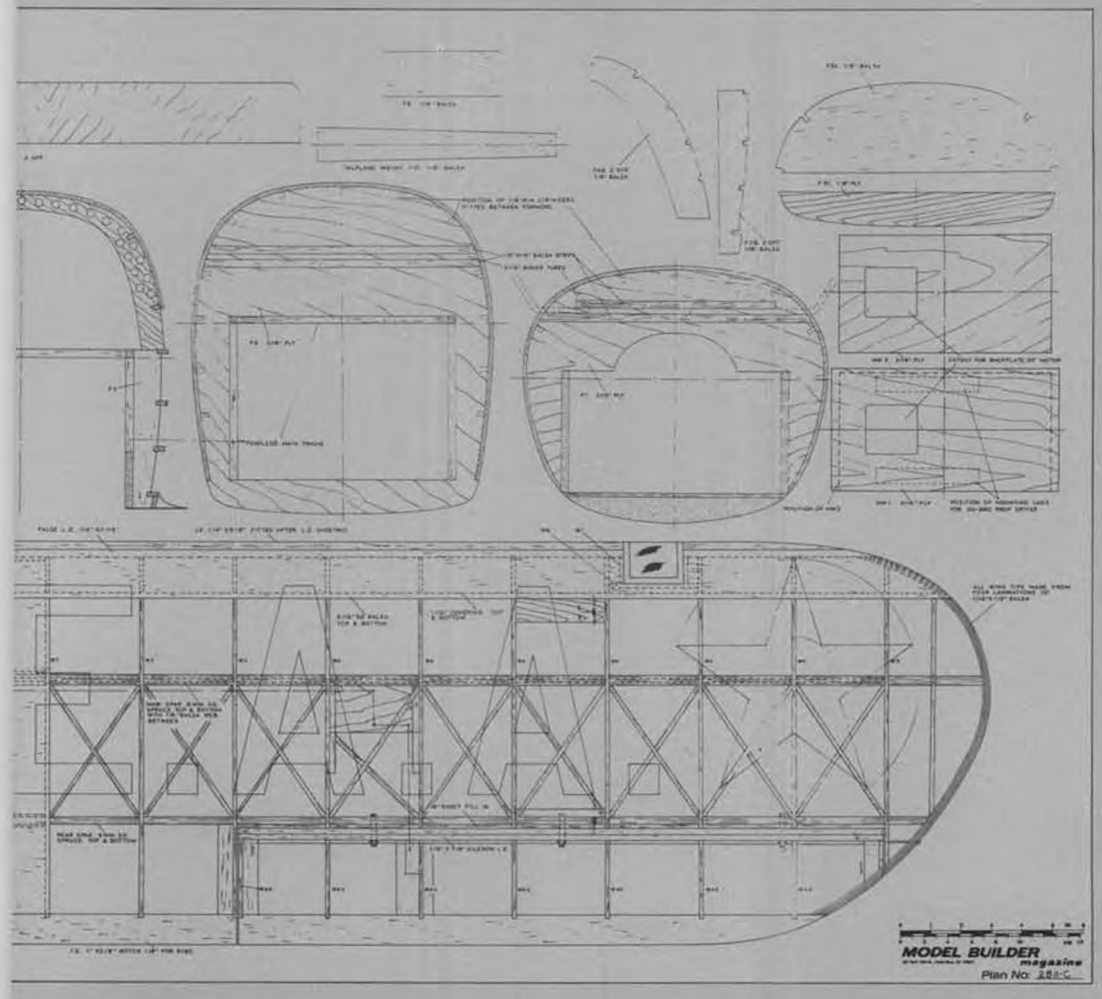


Fiberglass cowls for the Liberty, made by the author, will soon be available through RCMB; write for details.



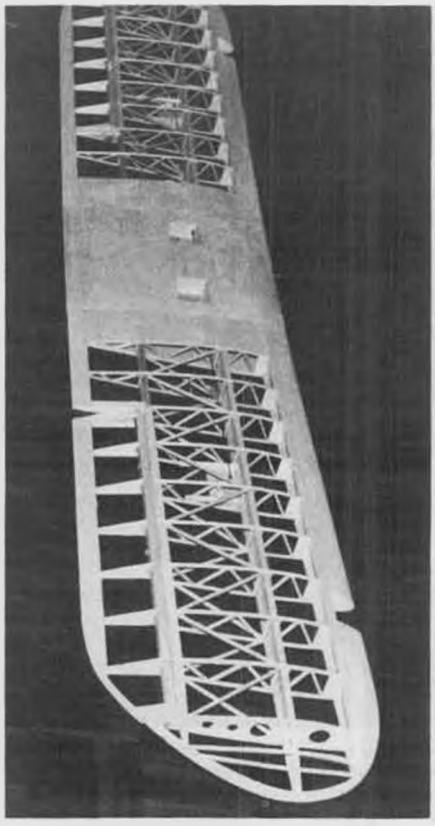




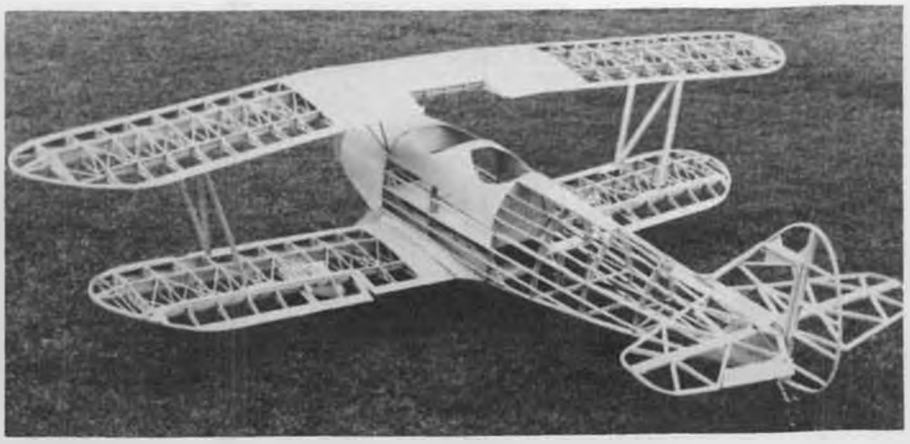


* FULL SIZE PLANS AVAILABLE – SEE PAGE 100 *

FULL SIZE PLANS AVAILABLE – SEE PAGE 100



Just so you'll know what you are getting into, here is a view of the completed lower wing. Built-up ribs are made in a jig . . . not difficult, but tedious. Text explains all.



Completed structure shows very light construction. Ready-to-fly weight is just 18-1/2 lbs., with on-board plug battery and smoke system. Some beef-up required for chainsaw type engines.

lage basic framework and putting ply gussets at all joints on this framework. The wings are definitely already strong enough to withstand any size motor and all aerobatic flying.

As this is not a beginner's model and only experienced modelers would probably be building it, I will not go into too much detail on construction.

FUSELAGE

The fuselage is a basic box with sides built from 1/4-inch square and 1/4-inch sheet. Crosspieces are cut from the top view and the box made up. Do this part accurately, as the shape of the basic box determines the final shape of the fuselage. If this is bent or twisted, so will the completed fuselage be.

All the fuselage formers and firewall are fitted next, not forgetting to glue on the 3/16 brass tube to F1 and F2 for the cabane struts. Next, all the stringers can be glued on. The position of all these can be seen on the fuselage formers drawn on the plans. The 1/8-inch sheeting on the front end and cockpit areas can now be done, but leave the sheeting off by the wing mount and tailplane area until the wings and tailplane are made.

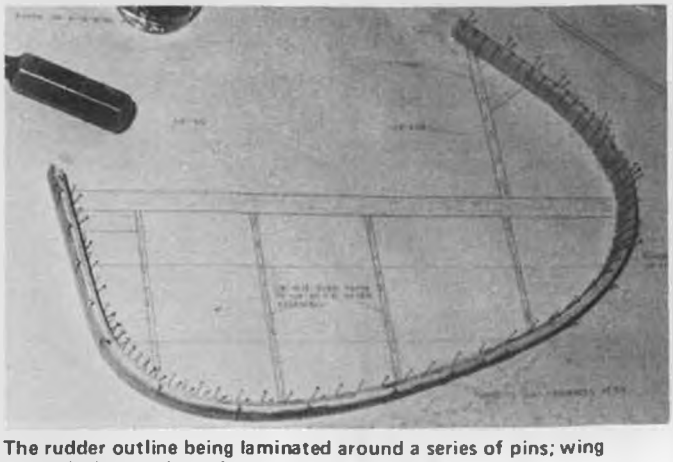
WINGS

Most of the ribs are made from 1/8 square balsa with the nose section from 1/8 sheet. A jig is made up from two pieces of 1/8 ply, one being the base with the construction drawn on; the other has the rib outline cut out. The two pieces of ply are clamped together with a sheet of plastic in between to keep the ribs from sticking to the jig. The ribs are then made inside the cutout, one by one. I started building the ribs, two a day, while I was still drawing the plans and by the time I was ready to build the wing, all the ribs had been made. On the plans, only ribs W3 and W4 are shown built up, as all of these can be made from the same jig. In the prototype, I made ribs W1 and W9 also in the jig by lining the inside of the jig with a strip of 1/16x1/8 balsa, so that each rib was made thinner for the center section sheeting. The only thing to remember here is to trim the upper and lower rib strips by 1/16 inch so that the spars can still fit through.

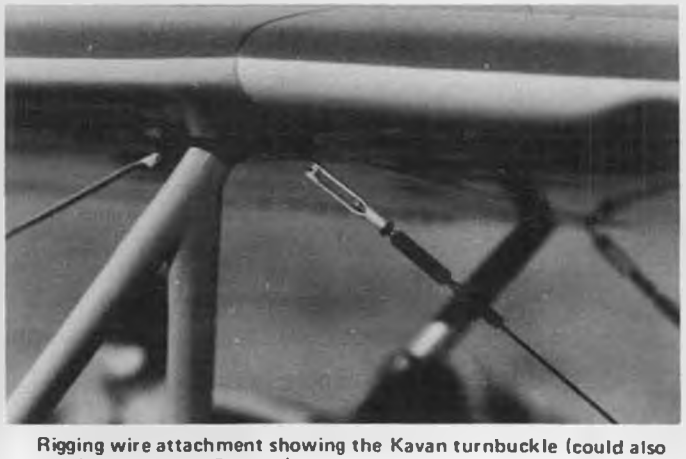
The spars also have to be made up before the wing construction can commence. The main and rear spars were cut to length and then 1/8 balsa vertical grain webbing glued in as per the front view on the plan. (The plan shows the spars as being 8mm and 6mm front and rear, which are the sizes obtainable here. One can substitute 3/8 and 1/4-inch respectively.) The wing tips must also be made before general wing construction can commence. These are laminated from four pieces of 1/16x1/2 balsa. Soak the wood in warm water for a

Continued on page 73

Detailed cockpit adds a nice touch, but the author admits the panel is not quite scale.



The rudder outline being laminated around a series of pins; wing and stab tips are done the same way.



Rigging wire attachment showing the Kavan turnbuckle (could also use those made by Proctor) with Kwik-Link and lock nut.

The year of the Laser! The 1980 Circus Circus Tournament of Champions saw 7 out of 18 contestants with Lasers, 5 with Dalotels, 3 with Zlins, and 3 with Caps. Laser 200 fliers (l to r): Ivan Kristensen, Dean Koger, Isao Matsui, Dave Brown, Leo Loudenslager, Wolfgang Matt, Jim Roberts, and Mark Radcliff. Don Lowe was absent for this photo. Leo, the current World Champion in full-scale aerobatics, designed the Laser. Both he and Jim were judges at the 1980 T.O.C. Jim is in the picture because he built his own Laser and flies it in full-scale competition.

Las Vegas T.O.C.

by BILL NORTHROP

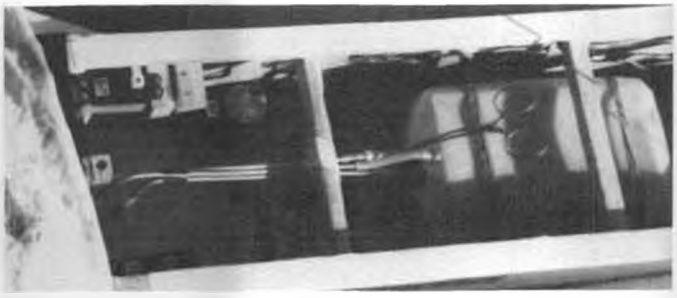
Dave Brown, current US champion, passed Wolfgang Matt, current World Champ, in the finals, to win 2nd spot. Wife Sally helped a lot!

Jeff Tracy, Australia, broke into the top five this year with his new Cap 20L, just nosing out Mark Radcliff. Jeff is also "Chief Squirrel".

Current World Champion in R/C Aerobatics, from Liechtenstein, Wolfgang Matt, a close 3rd place to Dave Brown. Good for $7500!

Gunter Hoppe, of West Germany, with a model of the latest Cap 21, placed 3rd, and received $5,000. Uses twin Webra power. Pretty!

The unbeatable team of Hanno and Hans Prettner. Very business-like and methodical in their preparation. Nothing left to chance.



Plenty of space inside the big Dalotel, though smaller than the 1978 aircraft. Tank holds 35 ounces for two thirsty Webra 60's.

For the finals, 10 judges scored each flier. Later analysis showed they were all very close in their opinions. Maneuvers were called by phone to judges as there was no pause in between. See text.

"Your inn in Klagenfurt against my hotel in Las Vegas for the 1982 Tournament? What odds will you give me?

• The most expensive extravaganza in R/C modeling history took place in Las Vegas, Nevada, on October 30 through November 2, 1980. Maybe there weren't as many participants from all parts of the world in this 6th running of the "T.O.C." as in the past, but certainly the cash prizes totaled higher than ever. To be exact, $72,000 was divided among the 18 invited contestants; nine from the USA, two from South Africa, and one each from Australia, Japan, Canada, Mexico, Austria, Germany, and Liechtenstein.

As in the past 5 contests, Hanno Prettner of Austria was the big winner, taking home $20,000 for his clear point advantage over all other fliers. USA's Dave Brown overcame Wolfgang Matt's slight second place lead going into the finals to capture second spot and collect $10,000. Matt, the current World Champion from Liechtenstein, settled for third place and $7,500. Gunter Hoppe, of West Germany, repeated his 4th place finish in 1976 and 1977, to earn $5,000.

Front row seat for the whole contest, and he hardly saw any of it! Bill Payne called each maneuver to the judges when tapped on the shoulder by an observer, half way through the previous maneuver.

Mark Radcliff collects his $3,000 for 6th place from Bill Bennett (and a little something from Queen Rita Best . . Charmel was watching) at the Saturday night banquet.

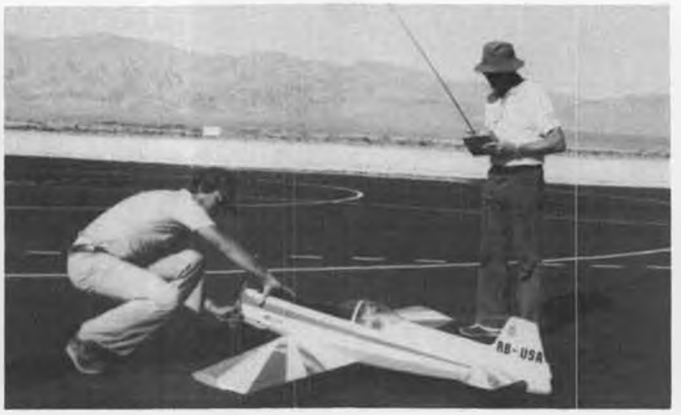
Line Director Phil Rumbold and helper Don Seals listen as Ivan Kristensen checks Cass 2+2 in Laser borrowed from Norm Cassella.

The hard luck guy for 1980 was Don Lowe, starting his back-up Laser as Jim Cline holds. Had frequent radio and engine problems.

Phil Kraft runs through a last-minute control check before takeoff. One of only four direct-drive aircraft in use. Helper is Steve Nelson.

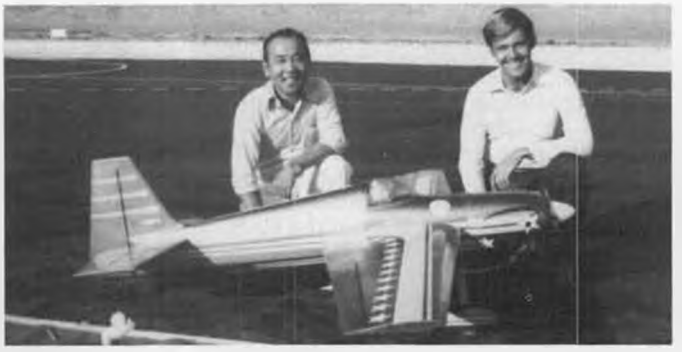
Steve Helms, Southern Regional Sales Manager for Circus Hobbies, with one of four smaller Dalotels entered. Used belt reduction 90.

Jim Cline, studies his product, the Master Climb reduction unit, on Dean Koger's Laser. Note extra cooling head on Dean's engine.



Contestant Don Weitz cranks the prop on Rich Brand's Zlin 256. Rich now living in US. Don is PR man for Circus Hobbies.

Long-time top R/C aerobatic contender Tony Bonetti, and his modified Bridi Cap 20L with Quadra power. Eastern Circus Hobbies rep.



Isao Matsui, President of IM Products in Japan, his YS 120 powered Laser 200, and the Laser designer, Leo Loudenslager, World Champ.

Australia's Jeff Tracy broke into the top winner's circle for the first time, to collect 5th place and $4,000.

The remaining final standings were based on the results of the 9 rounds of qualifying competition, with three rounds each of three maneuver schedules. From sixth place on down, the contestants finished as follows: 6th, Mark Radcliff, USA ($3,000); 7th, Ivan Kristensen, Canada ($2,750); 8th, Don Lowe, USA ($2,500); 9th, Don Weitz, USA ($2,250); 10th, Dean Koger, USA ($2,000); 11th, Phil Kraft, USA ($1,900); 12th, Rich Brand, South Africa ($1,800); 13th, Steve Helms, USA ($1,700); and 14th, Tony Bonetti, USA ($1,600). Isao Matsui (Japan), Ron Gilman (USA), John Brink (South Africa), and Luis Castaneda (Mexico) finished 15, 16, 17, and 18, each winning $1,500.

"Who's afraid of Hanno Prettner?" This was printed on a round lapel badge that appeared on the hats and clothing of various contestants and spectators during the 1980 T.O.C. It could only be taken as a compliment to Hanno's domination of this competition since it originated in 1974. The first four years featured FAI-type pattern aircraft and

Ron Gilman, top R/C pylon racer. Last-minute fill-in, still placed 16th. Bridi Dalotel kit.

South Africa's John Brink, with Zlin 256 on direct-drive Webra 90. Placed 17th.

Luis Castaneda, 18th, from the next R/C World Champs host country, Mexico.

Flying Christen Eagle I's, the Eagles Aerobatic Flight Team of Tom Poberezny, Charlie Hillard, and Gene Soucy, put on show each day.

"If I could only take a shrink pill . . ." Charlie Hillard examines the 1/3 replica of his Pitts under the proud eye of Byron Godberson.

After the Banquet . . . (l to r): Bob Rich, Carl Goldberg, Beth Goldberg, Doris Rich, Anita Northrop, Sid Axelrod, Carrie Axelrod, Hazel Sig, Bill Bennett, and Sam Bennett. Nice gang!

Sid Axelrod, proud and deserving recipient of the Model Aviation Hall of Fame award, presented by AMA President Earl Witt during the T.O.C. Banquet.

FAI-type maneuvers, the type that all of the contestants flew almost exclusively on a regular basis. However, in 1978, the invited contestants were faced with out-of-the-rut requirements . . . fly a near-scale model of a known full-size aerobatic aircraft, doing maneuvers similar to those flown by full-size aircraft (many of the FAI pattern maneuvers are unrealistic and could not be performed by full-size, propeller-driven aerobatic aircraft. They would be more suitable to military jet fighters . . . if the pilots could endure the G loads).

Some thought the change in rules, away from current FAI standards, might inhibit fliers such as Prettner, who appeared to be able to fly the monotonous FAI pattern with his eyes shut. Forget it! Hanno appeared with the largest model at the contest, an up-to-then practically unknown French design Dalotel, and his own design twin Webra geared-drive power unit that pulled the huge bird through the air in any direction at a constant speed. While others flew scale models of Zlins and Akromasters in very overfast, FAI-like maneuvers, Hanno's model flew slowly, precisely, majestically, and above all, realistically. The results proved the point too . . . Hanno finished way out in the lead.

Shortly after the 1978 T.O.C., it was announced that the competition would change to an every-other-year schedule. Most all of the fliers eligible for an invitation to this prestigious meet are World Championship class competitors and it was found impossible for them to design and build models and train properly for two top level competitions

Continued on page 98

Big guns for JR radio (l to r): Leo O'Reilly, distributor in Australia; Gerry Nelson, distributor in US and President of Circus Hobbies; and Mr. T Yamazki, President of JR Radio in Japan.

Ye editor confers with Dean Koger and Dr. Ralph Brooke, trying to figure how to convert Matsui's Laser to a biplane while making repairs after the mid-air prop breaking episode.

PHOTOS BY DON PRENTICE

Photos on these pages were taken at the Kitchener-Waterloo Flying Dutchmen Scale Rally, Sept. 13-14, Bridgeport, Ontario, Canada. At left is Roy Polleck with his Stinson Voyager; on the right are Tom Dietreich, Frank Evans, and Steve Gray with their 16-foot Hughes HK-1.

1 TO 1 SCALE

By BOB UNDERWOOD

Highly detailed F-4 Phantom, from a Royal kit, was flown by Karl Mueller.

A SHORT STACK

There are bundles of persons who, for one reason or another, are not lovers of foam core wings on scale models. Some experience weight problems, others have mechanisms internally built into the wing that would require tunneling which would make a gopher jealous.

The problem with built-up wings comes in the cutting of individual ribs on models that have tapering wing sections. There have been several methods shown over the years which are quite effective in solving that problem. The one I commonly use goes as follows:

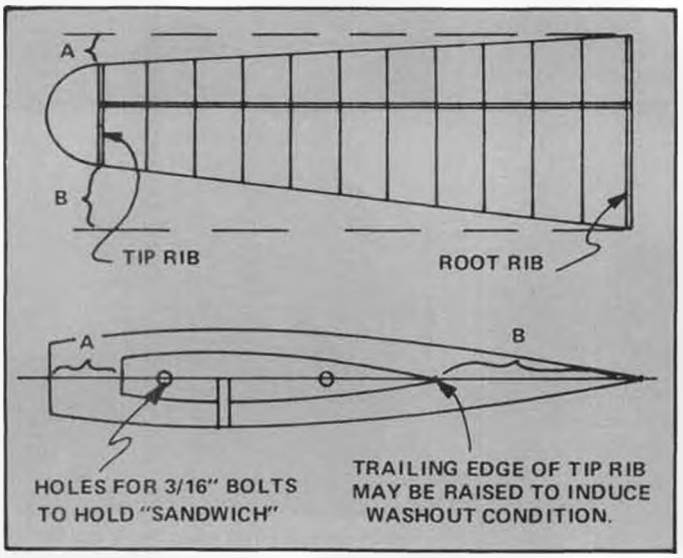
I prepare a root and tip section rib using 1/8-inch plywood. The tip section rib requires some judgment in selecting where it will be located in the wing section. Generally, if possible, I select a cross-section before the wing starts its pronounced curve around the tip, leaving the tip to be a solid or laminated section.

After you have prepared the 1/8 plywood templates, it is necessary to align them properly to achieve the proper size and taper for the intermediate ribs. On your drawings you must establish two parallel extensions of the root chord as far out as your tip rib location. By measuring the distance from this line projection to the wing leading and trailing edge, you can establish the position of the root and tip ribs in relation to one another.

Two other relationships can be determined and set up as well. Draw a centerline on each rib outline from the center of the leading edge to the point of the trailing edge, if you wish an equal taper on both the top and bottom of the wing section. Some wings have all of the taper on the bottom, therefore you need to move the tip rib up in relation to the root.

You can also establish washout in the tip by raising the tip rib template the required number of degrees at the trailing edge, relative to the root outline. In this way your spar cuts in the rib templates and the rib templates themselves will have a more natural "washout memory" built in.

After having determined the rib posi-

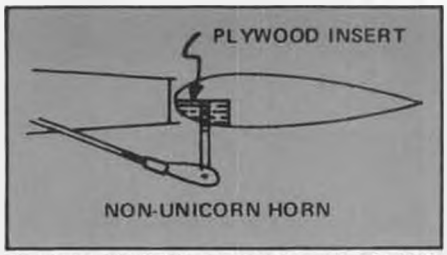


Bob Underwood's method of producing progressively smaller ribs for tapered wings; fully explained in text.

Hughes flying boat co-builder, Steve Gray, also flies this much smaller Canadair CL-215 fire fighting amphibian built in Canada.

Bill Pinckard (right) explains the finer points of his 1/4-scale J-3 Cub to Joe Laberge. O.S. 120 Gemini twin is fitted with a 77 Products ignition system and distributor.

Another Canadair fire-fighter, but much larger, is this one being constructed by Rudy Mayer. Ship has 13-foot span, will be equipped with two Quadras. Unsheeted wings really droop!



Our columnist's idea on how to make control horns more presentable for scale models.

tions, you need to drill two holes through the ribs while they are in that relative position. Generally, I drill 3/16-inch holes as far apart as possible without weakening the rib structure.

After this is done, you must cut and stack as many oversize rib blanks as is necessary for one wing half. Place the rib templates on this stack and *carefully* drill *vertically* through the stack. Use two bolts and nuts through the holes to hold your "rib sandwich" together tightly.

Your task now is to cut and sand the blanks down to the rib templates. Do this carefully to make certain you do not leave a curve in the stack somewhere between the root and tip rib. You can also now cut your spar notches by using a razor saw to cut down the sides and a knife blade to flip out the centers after both sides are cut.

When shaping is complete, remove

Who says 1/4-scale has to be big? Mel Forbes' Sorceress spans just four feet.

the bolts and survey your rib set. You'll notice that, if it is a tapered wing, you have a beveled edge on the rib. This must be carefully sanded level. As an aside, I often will make the root template a hair larger than required to accommodate this sanding (perhaps 1/16 to 3/32 inch oversize). In order to take care of the other wing panel you can either use the individual ribs you've just made as an outline to cut the second, or repeat the original operation.

Remember, please, that the ribs must be spaced an even distance apart in the wing between root and wing tip to maintain an even taper. There is, of course, some waste of wood which you cut and sand away, but that's basically true with cutting ribs out of standard size sheets anyway. Oh yes, don't forget to mark the rib templates with the name of the model they fit. I have a couple of templates that I'm not sure of hanging around the workbench.

If you're not certain this whole idea will work, go to your buddy and have him cut you a foam wing.

THE UNICORN SYNDROME

The animal was a rare beast that pranced about with the head and body of a horse, the legs of a deer, the tail of a lion, and a huge spiral spear planted firmly upon its forehead. Since it appeared in fables and fiction, we have not been blessed with viewing such a marvelous animal.

There are those who have hinted that many of my models vaguely resembled the unicorn, in that their various parts appeared to be unrelated to one another. While some element of truth may be found in such a degrading remark, I take pride in the fact that I have always managed to eliminate the "horn" from my unicorns (or at least disguise them).

I speak, of course, of those white nylon abominations which hang ignominiously from elevators, rudders, and ailerons, and have several unused

Continued on page 94

Nice building job on this WW-I DeHavilland DH-2, powered by Quadra. George Privateer of New York built it.

Carl Small, Stony Creek, Ontario, Canada, showed up to fly this Royal kit Piper Tri-Pacer, done up in Canadian civil markings.

R/C POWER BOATS

By JERRY DUNLAP

INTEREST GROWING IN ELECTRIC BOAT RACING

It appears that electric model boat racing is beginning to gain a following. Traditionally, electric powered model boats have been of the scale variety. Tugboats, warships, ocean liners, and cabin cruisers were the forte of those whose interests rested in electric boats. Recently, however, a group of model boaters in Florida have taken to racing electric powered model boats around an oval course. Herb Stewart, of Stewart Scale Models, Rt. 2, Box 220-5, Thonotosassa, FL 33592, has been providing the leadership for this group.

Herb is the recently appointed Electric Racing Chairman for the North American Model Boat Association. As such, he submitted a new set of rules to govern model electric racing that will be part of the 1981 NAMBA rulebook. The rules will provide for two divisions, based on voltage. Boats using up to 12 volts will constitute one class, and boats using over 12 volts will make up the second division. Unlike the mill starts used by the glow engine powered boats, the electrics will be allowed to use a held-in-place start until the start of the race. For purposes of oval records, a .45 mile total distance will be used rather than the .9 mile distance used by the glow engine boats. Herb's group has some sanctioned races scheduled in January and February to set records for this new event. He has promised to send me more photos and results from those races.

Being slightly on the impatient side, Herb didn't want to wait a couple of months to get his name in the record book. Seeing that the International Model Power Boat Association had some 1/16 mile record trials scheduled in October, he charged up his batteries and set a whole batch of new IMPBA electric records. The IMPBA uses weight rather than voltage in classifying electric boats. In the under 10 pound division, Herb upped the Mono record to 22.12 mph using one of his Stewart Vees. He established a new record of 28.37 mph in the Hydro category with a twin electric unit adapted to a K&B Outboard lower unit and clamped onto the transom of a Stewart Tunnel. In the 10 to 20 pound division, he set a new record of 21.05 mph in the Hydro class. Herb also established new electric records for the 1/3 mile oval in the under 10 pound Hydro and Monoplane classes and in the 10 to 20 pound Hydroplane class.

During the phone conversation, when Herb was telling me about his electrifying accomplishment, he mentioned that I should try this type of model building. I explained that I didn't have a boat to use. Herb said he'd remedy that situation by sending me one of his Stewart Vees that can be set up for electric use. Hopefully, I'll be able to do a review of an electric race boat in the near future.

STANLEY CUP RACE

On October 5, 42 model boaters entered 92 boats in the Stanley Cup Race conducted at Baryers Island, Superior, Wisconsin. The event was held on a large lake and a number of members of the 10th District Power Squadron anchored their yachts off the first turn to watch the mini racing action. The results of this event are as follows:

.21 STOCK OUTBOARD
1) Vance Panchott, Duluth, MN
2) Walt Fire Coate, Virginia, MN
3) Harry Panchott, Duluth, MN

.45 CLASS
1) Rich Steinberg
2) Ray Campbell, Duluth, MN
3) N.T. Oaks, Superior, WS

.65 CLASS
1) Jack Carr, Duluth, MN
2) Terry Boozocoren, Virginia, MN
3) N.T. Oaks, Superior, WS

.21 INBOARD
1) Wayne Armendola, Duluth, MN
2) Frank Armendola, Duluth, MN

Vance Panchott won the Stanley Cup Trophy with his Dumas Hot Shot outboard. He had a perfect score of 1,600 points for four heats of racing. H.A. Punchoir, Sr. sent in the results of this race and the photos. Since I lost the envelope with his return address, I was unable to send him a thank you note. So,

Continued on page 68

Shishkebuoy, anyone? Ron Erickson didn't complain when he was called for hitting a buoy with his OPS .65 Wing Ding. Dunlap pic.

Start of an electric heat in Florida. All drivers moved to shore once boats were running. From front: L. Daniels, S. Myers, H. Stewart.

Line-up of electric boats at a race held in Florida on July 19-20, 1980. Most are Stewart hulls, although a few originals were present. Note especially the electric outboard, second from the left . . . possibly one of the RAM units for the Astro 25 motor.

Photo No. 1. Promoter of the recent John Pond Commemorative contest at San Luis Obispo, Monti Farrell. He's also the Contest Director, Manager, Publicist, Registrant, etc.

Photo No. 2. John Pond's Parmenter "Swoose" uses Orwick .64 and shielded Ace radio system. That 50% tail makes it a real floater!

PLUG SPARKS

PHOTOS BY AUTHOR

By JOHN POND

• Writing about an annual meet named in your honor is always a difficult road to hoe. If you talk about it too much, you are bragging, and if you try to keep it short, you catch it from the modelers who were there. Kinda like the question the attorney posed to the defendant, "Do you still beat your wife?"

Regardless of the foregoing, the columnist is greatly flattered that certain people, in particular Monti Farrell, have seen fit to continue this most popular two-day meet. Monti and his SAM 26 boys are to be commended on their selfless work.

Photo No. 1 shows our hero, Monti Farrell, P.O. Box 1261, San Luis Obispo, CA 93406, at the early morning Pilot's Meeting held both days at 9:00 a.m. to acquaint the contestants with the various field rules.

Although this is not the best photo of Monti, we are using it to show the general background surrounding the flying field; note all the hills. One would think slope soaring would be the order of the day, but surprisingly, most of the thermals were originating from the floor of the valley.

As mentioned last year, the history of the Pond Commemorative (then it was called the Memorial) was briefly described. Not too many fellows know it, but during the columnist's stay in San Diego, his bosom buddy, Red Barrows, decided to hold a meet exclusively for John Pond. Red based this on the observation that Pond always seemed to be running a contest, organizing a get-together, timing, recording, etc. His idea was to put Pond completely at ease so that he could enjoy flying all day. (Columnist's note: what a sneaky way to show up Pond as a bum!)

The first contests were held at the Santa Maria Tri-Valley Field. Al Hellman helped organize the meet, and with the club from Santa Maria running things, it was only natural for them to take over. From then on Tom Bristol (SAM 21) and Monti Farrell (SAM 26) collaborated on the next five meets. This year, Monti did it practically single-handed. Of course, no one could do it all alone, as the SAM 26 members did contribute considerably!

Photo No. 2 is run in response to the many inquiries about what a "Swoose" looks like. This model appeared at the recent SAM Champs at Wright-Patterson AFB but received scant attention at the time.

The Swoose built by Pond faithfully follows all the original construction and ignition installation. Where the original was powered with an Ohlsson Custom .60, the columnist elected to use a very neat Orwick .64 setup, complete with machined tank and motor mount by Otto Bernhardt. Neat! The choice of engines has since proven the model is a contest winner.

For background, the original Swoose design was conceived by Jack Roeser of Chicago and was the forerunner of the postwar "pencil bombers." Frank Parmenter picked up the design and enlarged it to Class C with a few changes. When assigned to NACA at Langley

Photo No. 3 (left). A proposed new kit by Tyro Models is this scaled-up Playboy Jr., prototype built by Ed Solenberger and powered with an Atwood Champion. Shows excellent promise.
Photo No. 4 (above). When 49'ers Ross Thomas (left) and Bob Sliff (right, hiding under tent) go to a contest, they go prepared! Nine ships shown here. Pond S.L.O. meet.

Field, Frank appeared with the model at many Hampton Roads contests. Recently approved by the SAM Board of Directors, this design is available to all modelers interested in Old Timers.

Photo No. 3 shows Ed Solenberger, 1551 Lynn Court, Santa Rosa, CA 95405, with a model built especially for this meet: a scaled-up Playboy Junior with an Atwood Champion for power. Although the model was still undergoing trim adjustments, this model appears to have plenty of potential.

The scaled design is the brainchild of Barnett Kernoff, owner of Tyro Models, 1930 Edgewood, Palo Alto, CA, who has made up four prototype kits. The model is practically the same size as the Playboy Senior but enjoys the luxury of a longer tail moment arm and larger lifting tail. On paper, this design should outperform the standard Playboy. Kernoff is presently awaiting results of the prototypes (and possible demand) before proceeding with the fabrication of more Playboy Jr. kits.

Photo No. 4 is a look at possibly the two most prolific builders of all, Ross Thomas and Bob Sliff, both of SAM 49. These guys use a van to transport all their models. It takes the better part of a half-hour to completely unload all the models! We aren't kidding!

One of the main supporters of this meet has been Kraft Systems, Inc., and Jack Albrecht, the National Service Manager for Kraft, is no exception. Jack, who can be reached at Kraft, 450 W. California St., Vista, CA 92083, has proven to be one of the top competitors of the meet. Photo No. 5 shows Jack with his Dallaire Sportster that never fails to place. The outstanding event of the day was the flyoff between Jack's Anderson Pylon and Don Bekins' Gas Bird that was almost a perfect dual pattern flight, both in climb-out and glide. The only difference was at the very end, when Bekins found a bubble and won by a scant 40 seconds. A very close finish for the Antique event!

From Port Hueneme way comes a Miss America built by Fred Lehmberg, 2646 Bolker Dr., as seen in Photo No. 6. Fred has faithfully duplicated the Scientific kit, even to the Miss America flag decal on the side. Powered by an original Brown Jr., this model may not be any world beater but it certainly flies very authentically!

Before wrapping up this report, we should mention the newcomer from the glider boys, Jack Alten, who made a startling debut at the Commemorative by narrowly losing to Don Bekins for the Sweepstakes Trophy. Jack, making full use of his long competition in gliders, showed the boys how to fly in the high winds on Sunday. Given a little more time, Alten will make all the boys sit up and take notice.

Trophies were most unusual at this meet, consisting of flat plaques and a color polaroid picture mounted in place. Just as soon as C.D. Farrell found out who the winners were, he would immediately photograph them with their model and mount them on the plaque, ready for presentation. A real

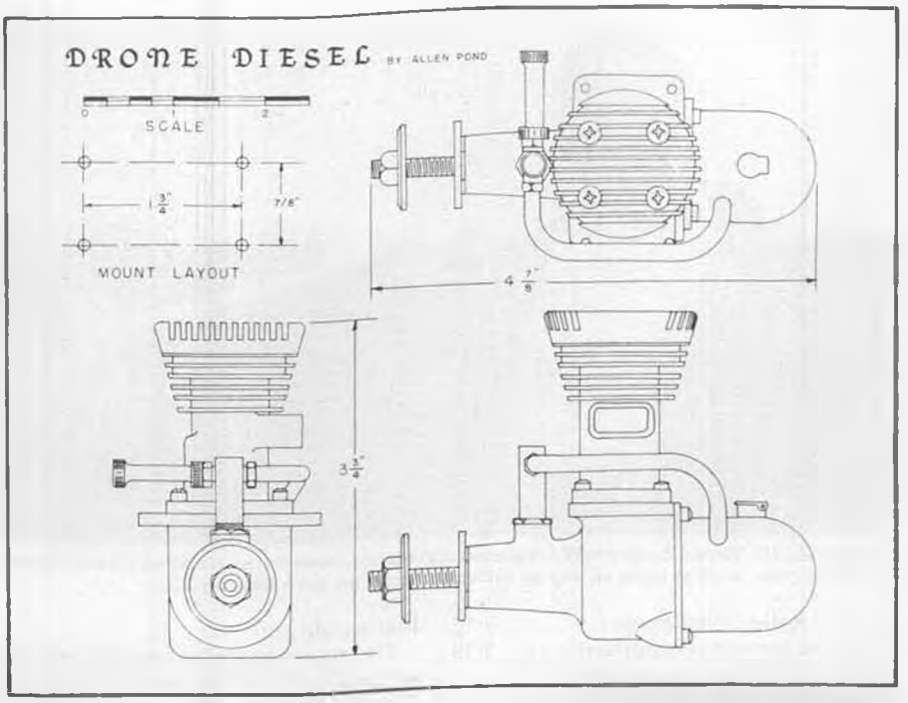
Photo No. 5. Kraft Systems' Jack Albrecht dearly loves flying these Old Timers, flew this O.S. 4-cycle powered Dallaire in Texaco at Pond S.L.O. contest.

Photo No. 6. Fred Lehmberg showed up at San Luis with this fine reproduction of the Scientific Miss America, complete with Brown Jr. Note flag decal on side.

Photo No. 7. Gordon Codding gets the Overpowered Model of the Month award for his Cyke .65 powered Comet Interceptor. Actually made five flights on a bet.

Photo No. 8. Forty years later, Rogers Barton is still flying Comet Clippers. Only change from 1940 is the addition of the "magic box."

Designer of this month's featured engine, the Drone Diesel, was none other than Leon Shulman, shown here at a C/L contest at Beardsley Park, Bridgeport, Connecticut, circa 1950. Model is his "Dronette" stunt job powered by (you guessed it) a Drone Diesel. Photo sent in by Bud Gay of Bristol Hobby Center, Bristol, CT.



neat idea!

Before closing out this report, this columnist would be remiss if he didn't acknowledge the terrific amount of work done by the two girls at the desk, Marge Bernhardt and Maryann Pond. Imagine going all day, for two full days, without one complaint! That's the greatest!

Let's take a look at the results:

CLASS A-B

1)	Jack Albrecht (Playboy/Veco .19)	19:13
2)	Don Bekins (Playboy/O.S. .30)	18:15
3)	Ross Thomas (Playboy/Johnson .29)	17:48
4)	John Pond (Playboy/Torp .29)	14:39
5)	Bob Angel (Playboy/Torp .29)	13:53

CLASS C

1)	Jack Alten (Playboy/Cyke)	20:42
2)	Jim Kyncy (Playboy/Torp)	20:35
3)	Don Bekins (Playboy/Cyke)	18:18
4)	Bob Sliff (Playboy/O&R .60)	17:59
5)	Ed Solenberger (Playboy Jr./Atwood)	17:21

ANTIQUE

1)	Don Bekins (Gas Bird/Merco)	37:50
2)	Jack Albrecht (Anderson/Spitfire)	37:10
3)	John Pond (Dallaire/HB .61)	28:10
4)	Ross Thomas (Eaglet/O.S. .60)	26:59
5)	Karl Tulp (Dallaire/Merco)	22:04

TEXACO

1)	Bob Sliff (Lanzo/O&R .60)	26:59
2)	Jack Alten (Scram/Saito 4/C)	20:54
3)	Don Bekins (Gas Bird/O.S. .60 4/C)	17:05
4)	Jim Kyncy (Gas Bird/O.S. .60 4/C)	16:41
5)	Bob Oslan (Commodore/O.S. .35)	15:19

1/2A TEXACO

1)	Bob Angel (Playboy Jr.)	13:38
2)	Jim Kyncy (Playboy Jr.)	11:21
3)	Jack Alten (Playboy Jr.)	10:30

Photo No. 9. An old 1940 shot of Fred Quedenfield with his Megow Ranger. Fred is still very active in O.T. R/C circles.

Photo No. 10. Joe Raspante's radio control entry at the 1939 Nats had its share of electronic gremlins . . . get that expression of disgust! Another original photo from Bruce Lester.

Photo No. 11. Anders Hakansson (dressed appropriately) and Lennart Hansson, both of Sweden, with dela Mater "1-1/2" rubber job.

Photo No. 12. Noted English WW-I historian and author, Alex Imrie, is also an avid enthusiast of Old Timers, besides being an engine collector. Miss Tiny with Ohlsson .23.

Photo No. 13. The late Bill Hooks with his favorite model, a 1/2A Lanzo Record Breaker.

4) Ted Kafer (Challenger) 9:12
5) Dave Bruner (Westerner) 5:19
SWEEPSTAKES: Don Bekins

ENGINE OF THE MONTH

A lot of O.T. modelers are not aware that Leon Shulman got into the engine manufacturing game back in 1946. Known primarily for his out-of-the-rut designs such as the Wedgy, Zomby, and Banshee, Lee's postwar free flight designs of the Zoomer, etc. failed to catch on like his pre-WW-II designs.

Having gotten out of the Air Force, Shulman (between jobs) hit on the idea of producing a motor. It was the late 1945/early 1946 era where all that pent-up money earned during the war was just crying for a motor . . . any type of motor that would run.

The new engine by Shulman was first announced in the January issue of *Model Airplane News* just in time to catch the Christmas trade. The new engine was new in comparison to the others; it was a fixed compression, compression ignition motor, popularly called a diesel.

The Drone Diesel featured an all-black case with gold head. Of course, the engine came packaged in a black box with gold lettering. Priced at $21.50, the engine was claimed to have been designed, engineered, tested, and approved by Leon Shulman (whew!).

Manufactured at 125 Broad St., Elizabeth, New Jersey, the new engine was an immediate success. The biggest selling point, of course, was the elimination of the pesky ignition system. By the March 1947 issue of *M.A.N.*, their slogan was "out of the carton, ready to run." This was no idle claim, as it turned out to be a bonanza in the control line game which was enjoying unprecedented popularity during this time.

The operating instructions for the Drone B indicate that a fuel mixture of three parts ether to one part of mineral oil was the desired combination. For warm weather operation, the firm recommended adding five drops of SAE

Continued on page 90

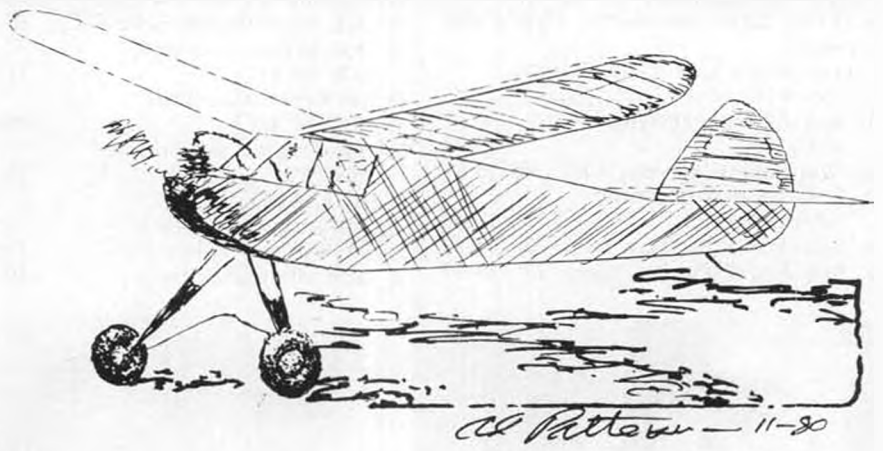
Heron

OLD TIMER Model of the Month

Designed by: Frank Gagne

Drawn by: Al Patterson

Text by: Phil Bernhardt

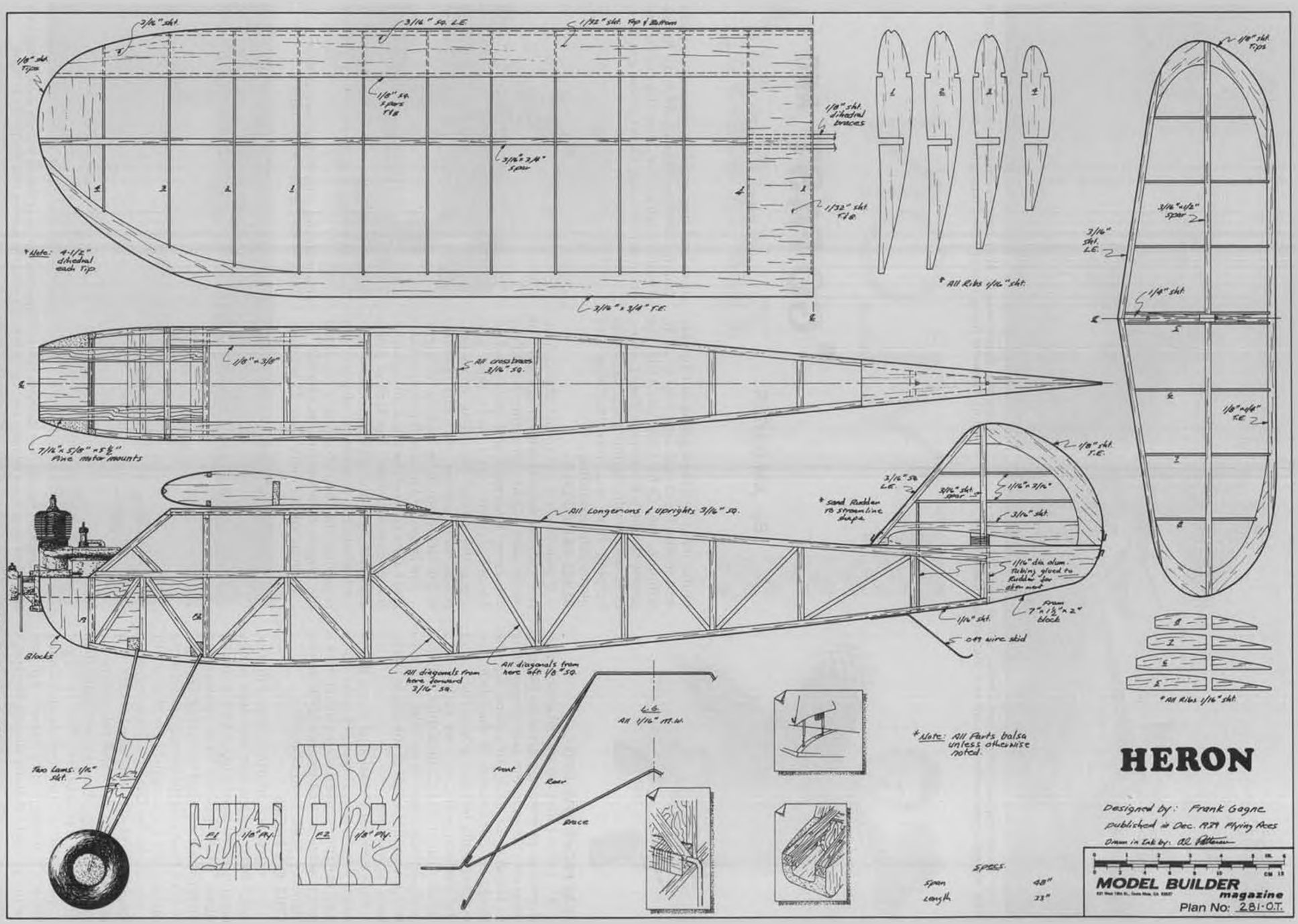


• This month's Old Timer, a relatively unknown cabin job, was the featured gas model in the December 1939 issue of *Flying Aces*. Nick Limber was the individual given credit in the byline, when in fact the actual designer was a fellow by the name of Frank Gagne; Limber merely wrote the text, and may have drawn the magazine plans too. The original Heron was flown in New York's Van Cortland Park and so was something of a small-field ship, ideally suited to Class A or small Class B motors (the photos showed a small O&R).

Construction is strictly conventional with the exception of the wraparound 1/32 balsa leading edge sheeting. If you elect to do each wing panel with a single piece of wood, as called for on the plan, we'd suggest using medium-soft A-grain balsa with strips of masking tape stuck on chordwise, about a half-inch apart, to keep the sheet from splitting. You may have to soak the balsa in hot water first to make it pliable . . . experiment and see what works best. The use of masking tape is an old Walt Mooney trick and works beautifully for bending balsa sheet around tight curves.

One more suggestion would be to web the two front spars with vertical-grain 1/32 balsa, especially if you are doing an R/C version. At least you'll be able to throw in an occasional loop without fear of snapping the wing in half.

Span on the Heron is 48 inches, wing area is about 356 square inches (those are *planform* measurements, by the way). Minimum weight for SAM contests is 20 oz. For O.T. R/C events a .15 is the biggest legal engine size, but for general sport flying an .09 or .10 would be ideal. •


3/16" sht.
3/16" sq. L.E.
1/32" sht. Top & Bottom
1/16" sht. Trips
1/16" sq. Spars T/B.
1/16" sht. dihedral braces
3/16" x 3/4" spar
1/32" sht. T/B.
*Note: 4-1/2" dihedral each Trip.
3/16" x 3/4" T.E.
* All Ribs 1/16" sht.
1/16" sht. Trips
3/16" x 1/2" Spar
3/16" sht. L.E.
1/4" sht.
1/16" x 1/4" T.E.
1/16" x 3/16"
All cross braces 3/16" sq.
7/12" x 5/16" x 5 1/2" Fine motor mounts
1/16" sht. T.E.
3/16" sq. L.E.
3/16" sht. Spar
1/16" x 3/16"
3/16" sht.
* sand Rudder to streamline shape.
All Longerons & Uprights 3/16" sq.
1/16" dia. alum. tubing glued to Rudder for attachment
From 7" x 1 1/2" x 2" block
1/16" sht.
.049 wire skid
Blocks
All diagonals from here forward 3/16" sq.
All diagonals from here aft 1/8" sq.
L.G.
All 1/16" m.w.
Front
Rear
Brace
F1 1/8" Ply.
F2 1/8" Ply.
Two Lams. 1/16" sht.
* All Ribs 1/16" sht.
*Note: All Parts balsa unless otherwise noted.
HERON
Designed by: Frank Gagne.
published in Dec. 1979 Flying Aces
Drawn in Ink by: Al Pallanca
SPECS
Span 48"
Length 33"
MODEL BUILDER magazine
Plan No: 281-O.T.

A very happy and contented Dave Shadel, wiping down his racer after setting a new national record of 1:10.3 at Sepulveda Basin.

Rusty Van Baren releases Jerry Boyce's colorful Circus Circus (Little Toni). Note the flying feet of Tom Christopher's pit man.

P. 34 PHOTOS BY WALT SCHRODER
P. 35 PHOTOS BY AUTHOR

PYLON

"GO FAST AND Turn Left!"

By JIM GAGER

Q-M PROPS REVISITED

It's been called to my attention that there was a dimension error on the prop diagram shown in the article appearing in the August issue. In calling out the thickness dimensions of the blade, we inadvertently left out a zero right after the decimal point; i.e., we called for a dimension of .50 (1/2 inch thick) when it really should have been .050. This correction applies to all of the blade thickness dimensions.

However, let me say that if you didn't catch the error and can get your .15 to turn the rpm's called for with that thick a prop, send us that engine UPS Special Delivery. Price is no object!!

STILL ON PROPS

It's nice to see an article responded to, and I must say the one on props has by far surpassed anything we've previously done. Many people have commented on having tried what we recommended, and/or have said that it has caused more discussions with regard to how and why it works. At the Q-M Championships in Rough River, several fliers made it a point to come over and tell us that by using our prop, they'd gone faster than they ever had before. Not to slight anyone else we spoke with, but Bobby Blouch's trying it (he stayed up late Saturday night making one to the specs in the mag) and then going out Sunday and setting his fastest time ever (1:22.8), winning the Q-M Champs AND the Jimmy Doolittle flyoffs, and then coming over and crediting our prop design as helping him, was very touching and personally rewarding.

RULES PROPOSALS

If you haven't yet heard, there have been several rules change proposals that might affect Q-M. Since they haven't as yet been reviewed and published in *Model Aviation* (as I write this), and since the period for filing cross-proposals isn't here yet, we'll just alert you to the fact so you'll be looking for them.

The three we know of (I proposed two and have a copy of the third) all deal with the engine situation. The lack of availability of new and complete Rossi .15's and almost a total lack of parts for repairing old Rossi's has pretty much left the engine business in Cox's hands.

Rumors of no more Cox .15 production and the engine's general unavailability in hobby shops could make things rough, engine-wise, over the next term. In order for some fliers to have engines,

No mistaking Jerry Boyce's bird as Kent Nogy holds it up for identification.

Racehorse start for the final Calcutta race at Sepulveda has Jerry Boyce leading with Rusty Van Baren and Russ Kime almost even; Ed Hotelling's wing tip coming into the photo at right.

This group of Colorado racers travelled the farthest to attend the NMPRA Nats at Rough River, Kentucky, held on Sept. 6-7. From left: Jim Eide, Sandy McCord, Lyle Larson, and Brian Gates.

Where's the ear protection, fellas? Wayne Yeager holding our columnist's Estrelitta. Kit is available, write Jim direct.

let alone remain competitive, there have been instances of reworking to keep flying.

In order to even things out, one of the proposals recommends we adopt Formula I engine specs, i.e. run what ya brung, which would at least recognize what is going on already. The other two proposals suggest we go to the next size of readily available engines which would suit our purposes: .21 cu. in. (3.5cc). One proposal suggests we increase the wing area to 375 sq. in. and 3.0 lbs. minimum weight with .21 power and allow this size aircraft to fly in the same heats as our current .15 power, 300 sq. in., 2-1/2 lb. aircraft, so as not to make obsolete any current kits/engines or completed aircraft. Anybody who didn't want to change aircraft size could remain with the old specs if he felt he could still be competitive. The other proposal is less involved, simply recommending we go to .21 size and follow Form I engine rules and leave the aircraft size alone.

Along with calling your attention to the above facts, we suggest you dig out your November issue of **RCMB** and turn to Dirty Dan's C/L column. It seems we're not the only ones facing an engine shortage, and Dan goes into the subject more eloquently and knowledgeably than I could. Check it out!

"Top Dog" Bobby Blouch (right) with his caller, Harvey Oxenreider, and original design P-51. All that silverware plus $300 was his for winning 1st in Championship race, 1st in Doolittle Trophy Dash, and setting fastest time of the race.

Doug Brushaber's "Shark," from his own glass/foam kit. A super flying airplane and very competitive, placed 3rd at Rough River.

We'll close this month with a couple of race reports, the first one coming from Walt Schroder.

WESTERN STATES INTERNATIONAL AIR RACES

Dear Jim,

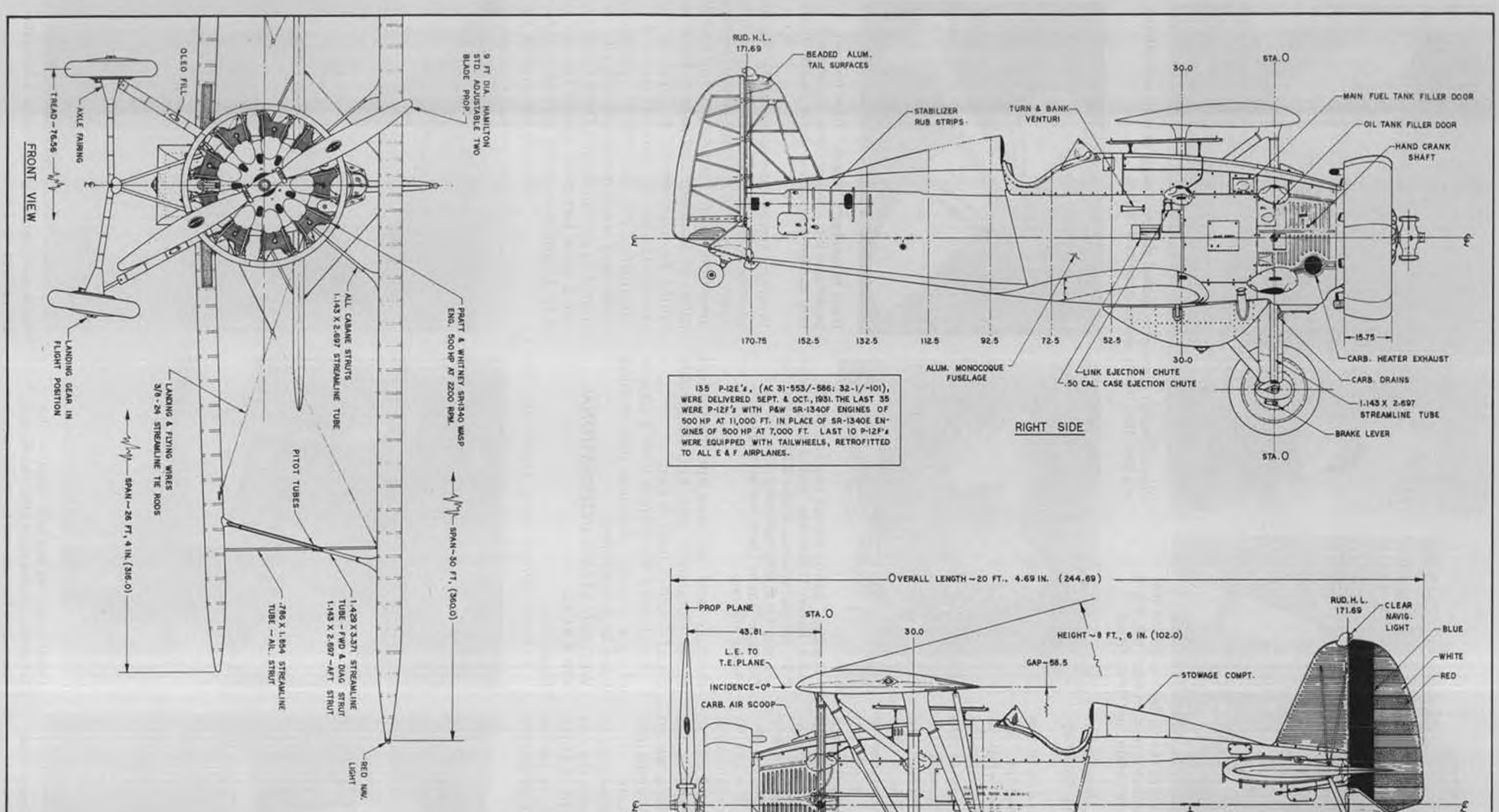
A brief, almost terse report on the Western States International Air Races, sponsored by the NMPRA at Sepulveda Basin, August 30 & 31. While not the best attended West Coast race, it still had 25 pilots in Standard and Expert. Weather could be considered as ideal as the combination of temperature 82°, humidity 52%, barometric pressure 29.99, and wind practically nil, all conspired to permit Kraft's Dave Shadel to set a new national speed record of 1.10:3, which is really getting it down

Continued on page 84

Genial Bob Reuther and his Jacobson "Pole Kitty" in cream Monokote and Imron.

Head Timer and Starter's Assistant, Joe Scheirch. Joe has worked at the Rough River Q-M Nats almost from its inception.

Hard-working Starter Ed Tasmas, knows the procedures and puts up with no B.S.



* CHARACTERISTICS:-

OVERALL LENGTH	20 FT. 4.69 IN
UPR WING SPAN	30 FT. 0 IN
LWR WING SPAN	26 FT. 4 IN
HEIGHT	8 FT. 6 IN
AIRFOIL	BAC 106
UPR WING AREA (INCL. AIL.)	141.4 SQ FT
LWR WING AREA (INCL. FUSE.)	96.6 SQ FT
DIHEDRAL, UPR WING	0°
DIHEDRAL, LWR WING	2°
INCIDENCE, UPR & LWR WINGS	0°
FIN AREA	4.05 SQ FT
RUDDER AREA	7.5 SQ FT
STABILIZER AREA	15.88 SQ FT
ELEV. AREA	18.0 SQ FT
WEIGHT EMPTY	P-12E-1999 LBS / P-12F-2035 LBS
MAX. GROSS WEIGHT	P-12E-2690 LBS / P-12F-2726 LBS
STAGGER	32.0 IN

* PERFORMANCE:-

	P-12E	P-12F
MAXIMUM SPEED	189 MPH AT 7000 FT	194.5 MPH AT 11,000 FT
CRUISING SPEED	160 MPH	166 MPH
LANDING SPEED	60 MPH	59 MPH
SERVICE CEILING	26,300 FT	31,400 FT
ABSOLUTE CEILING	27,400 FT	32,400 FT
RANGE AT CRUISING SPEED	510 MILES	345 MILES

* FROM HANDBOOK OF INSTRUCTIONS FOR P-12E & P-12F AIRPLANES

COLOR SCHEME:- ORIGINAL COLORS WERE OLIVE DRAB FUSEL., LANDING GEAR & WING STRUTS; CHROME YELLOW WINGS, HORIZ. TAIL & FIN. AIRPLANES IN OVERHAUL AFTER JAN., 1935, HAD FUSELAGES PAINTED PALE BLUE. IN 1940, ALL AIRCRAFT WERE PAINTED ALUMINUM FOR OBSOLESCENT AIRCRAFT. FOR MARKINGS SEE PROFILE No. 2.

DATA SOURCES:- MICROFILM FROM NATIONAL AIR & SPACE MUSEUM. HANDBOOK FROM WALT HOUSE, WICHITA, KAN. SEE ALSO COMPANION DWG. OF F4B-4/-3.

SCALE 1/12 SIZE

SCALE BAR 0 1 2 3 4 5 6 7 8 9 10 11 12 .0833=1 IN. = 1 IN.=1 FT.

PETER WESTBURG OCTOBER, 1980

BOEING P-12E

ORIGINAL DWG. SIZE ~ 28 X 40.

FULL SIZE PRINTS MAY BE PURCHASED FROM: P. W. WESTBURG, 854 7th ST., No. 6, SANTA MONICA, CAL., 90403. $9.00. MAILED 1st CLASS, FOLDED.

SHEET 1 OF 3

Rare on this 27th Pursuit P-12E cavorting over Detroit are the double chevrons on the bottom of the upper wing. Smithsonian photo.

PR photo of the first production P-12E. "BOEING" on fin was removed before delivery. Bulkhead aft of pilot sloped more than on F4B-3, giving Army pilots a bigger cockpit. Boeing photo.

BOEING P-12E

PART ONE

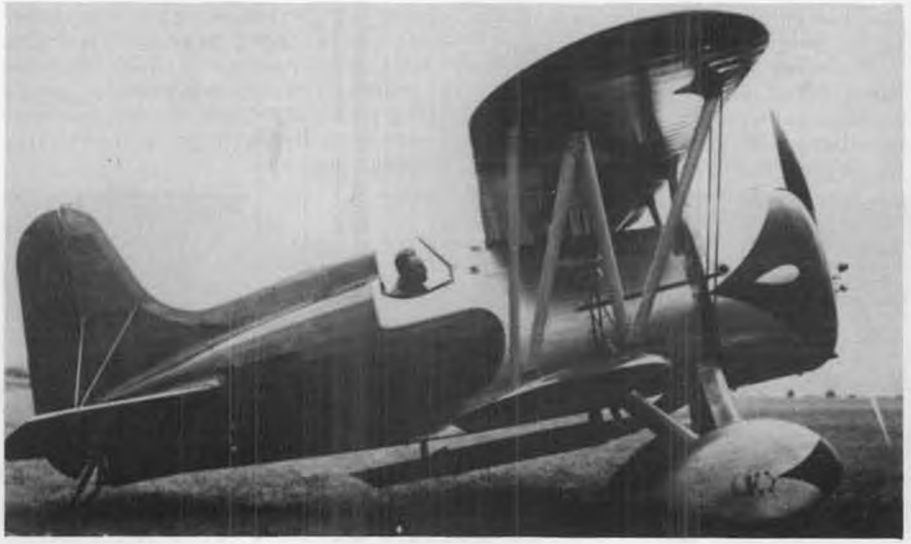
By PETER WESTBURG

• Long before dull, efficient computers designed airplanes, men with pencil and paper, slide rules, mechanical calculators, and imagination designed planes that will endure forever in the pages of aviation history. One is the Boeing P-12E. The history of the P-12E is well known, but a brief recap may be appropriate. The P-12 series through the P-12D had already been bought in quantity when Boeing engineers designed an entirely new fuselage for the next model. The science of designing all-aluminum monocoque structures had been successfully demonstrated on the Monomail and B-9, each with long, tubular fuselages, when Boeing offered its Model 218, flying it for the first time on September 29, 1930. The front end, wings, tail surfaces, and landing gear were P-12D, but the fuselage was all new with aluminum frames and skin. Both the Army and the Navy tested the new fighter. The fin and rudder were redesigned and the horizontal tail slightly modified, and this was the configuration adopted in production.

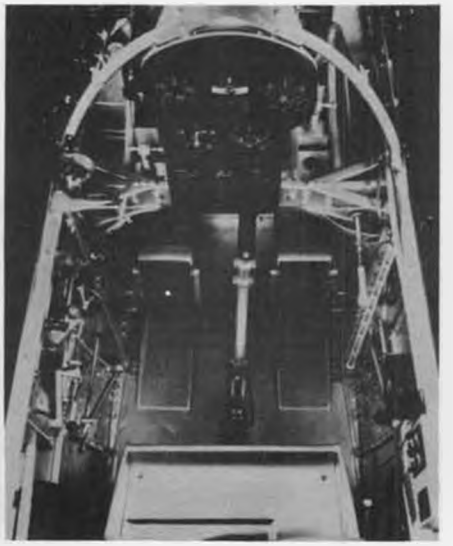
Most of us believe that the P-12E and the F4B-3 (**R/C Model Builder:** Nov., Dec., 1979; Jan., 1980) were identical airplanes except for the arresting hook and flotation bags on the latter. Outwardly, they appear to be the same, but there were many detail differences aside from a beefed-up structure for the arresting hook and the structure surrounding the cavities in the wing for the flotation bags. Dozens of other nickel-and-dime differences existed. One major difference not readily apparent to the eye was the size of the cockpit opening. The bulkhead behind the cockpit of the P-12E sloped more than on the F4B-3, resulting in a larger cockpit opening. It appears that Army pilots were bigger than Navy pilots.

The last 25 of an order for 135 airplanes had an engine change to the "G" version of the P&W Wasp from the "E" on the first 110 aircraft. These were designated P-12F and outwardly were no different from the P-12E. The last ten P-12F's had eight-inch streamlined steerable tailwheels in place of the tailskid on preceding airplanes, but eventually all E's and F's were retrofitted with the tailwheel.

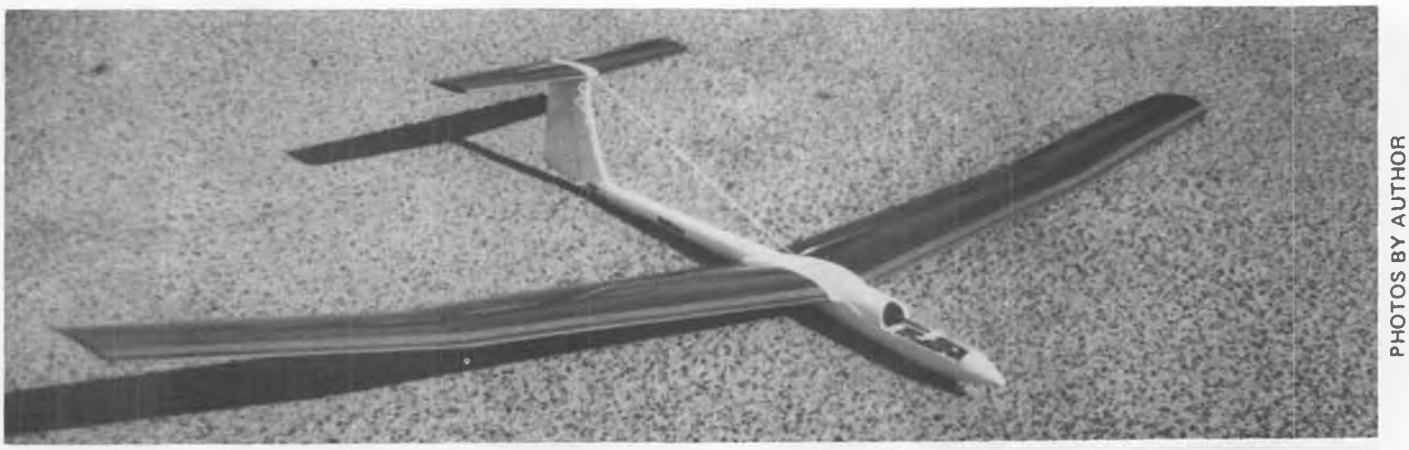
Retrofitting always causes confusion when we look at photos of earlier models that seem somehow to be different. The new "E" tail surfaces were retrofitted on earlier P-12's and F4B's, causing them to look like an intermediary model or test airplane. Thus, you will see a P-12C with an "E" fin and rudder and a "D" anti-drag ring. •



Lone Model 100A was a P-12 built for Howard Hughes, later sold to race pilot Art Goebel. It was destroyed in a crash in 1957. Pipe under fuselage is for skywriting.



Cockpit of the P-12E was simple, with only 8 instruments to occupy the pilot's attention.



PHOTOS BY AUTHOR

PRODUCT$ IN U$E

BOB SMITH'S "SEABREEZE" R/C SAILPLANE

By Bill Northrop

• The "Seabreeze" is a 99-3/4 inch span R/C sailplane, produced by Bob Smith R/C Aircraft, 485 Easy St., Simi Valley, CA 93065; phone (805) 527-4004. This model aircraft is normal in the modern sense as it is of fiberglass and foam construction. However, it is abnormal in that the *entire* model is of molded epoxy fiberglass, including wings and tail surfaces. The model, as it comes out of the box, is ready to fly except for the installation of your radio. The unpainted version lists for $169.95, and the painted version is $229.95.

The fuselage and fin is molded in a single unit, using two layers of 4-ounce glass cloth throughout, and one additional layer of 6-ounce cloth from the nose to aft of the wing root fairings. The wing and flying stabilizer half-panels are molded in one layer of 6-ounce cloth over an inner core of one-pound styrofoam. The rudder is one layer of 6-ounce cloth, but without the foam core.

The painted versions of the Seabreeze are finished with K&B Superpoxy . . . and come with white fuselage/fin/rudder and your choice of red, blue, orange, brown, yellow, or white wings and stabilizers.

Further specifications of the model include: wing area 760 sq. in., 12.7 to 1 aspect ratio, Eppler 385 Mod 2 root airfoil, Johnson J6 at the tip with 3 degrees washout; 120 sq. in. stabilizer area, and 46-1/2 ounce total weight less radio and nose weight.

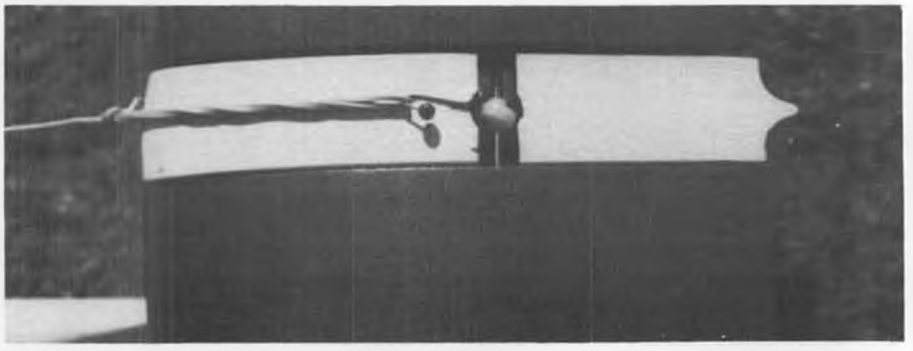
Our test model of the Seabreeze is finished in a bone white fuselage and fin/rudder, with metallic medium/dark blue flying surfaces.

Five minutes out of the box, the model was completely assembled (less radio installation, of course), for a preview look at its general layout. The T-tail flying stab halves plug into two wires and blend into a faired stub at the top of the fin. The forward wire serves as a pivot for the stab, while the aft wire passes through the eye of a Johnson swivel-ball fitting on the end of the elevator tube-in-tube pushrod.

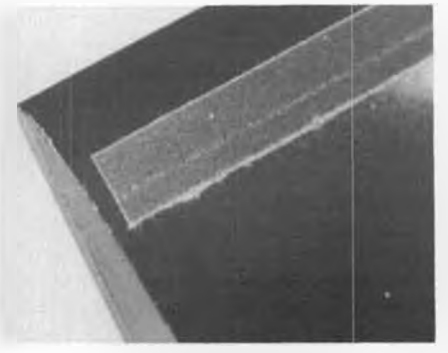
The symmetrical stab halves pivot smoothly on the straight wire, which is a firm push-fit through the fin. The aft wire is slightly bent, just enough to permit a force-fit into the stab halves, preventing the latter from slipping off unintentionally. When fitting the stabs, which you'll probably leave in place most of the time, make sure they pivot smoothly, without binding from full up to full down. When the inner pushrod is not attached at the servo end, the stab should flop easily to the full down position from the force of gravity. If binding occurs, it's probably from the stab halves being pushed up too snugly to the stub root atop the fin.

The wing halves plug onto a main dural rod which is a slip-fit through the fuselage at the faired wing root. The rod is unbent, the dihedral being achieved by angling the wing tubes downward from the root. A second rod, 3/32 in. diameter and located further aft in the wing root, serves as a positioner, keeping the two wing halves in alignment. On our test model, the wing roots lined up accurately with the fuselage fairings, and with each other . . . certainly very important if you hope to have a true flying sailplane.

Author checks out the Seabreeze at Torrey Pines. A very comfortable glider. Note hang glider in the distance.



Stabilizer halves plug into two wires at top of fin. Front wire serves as pivot. Aft wire connects to Sullivan pushrod. Slop negligible in spite of curve inside fin. Note our classy antenna retainer!



Turbulator of 100 grit sanding cloth strip. We suspect anything of equal thickness would do.

After installing servos and attaching the clevises with threaded rod in place, center and lock the control surfaces in neutral position, then mark and cut the inner pushrod tubes. Cut tubes so rod will thread in about a 1/4". They're a tight fit the first time, until the thread forms in the tube. Hole in each side of fuselage just aft of cockpit opening provides access to radio switch, using 1/16" wire "key". See January '81 R/C World column.

Although the wing wires slip easily through the fuselage, there is no problem when plugging in the wings caused by the wires being uneven in the two wing halves. Plugs at the far ends of the wing tubes prevent this. Even so, we bent the aft wire slightly at the middle, making it a force-fit in the fuselage, to prevent its slipping out unexpectedly (or undetected until you get to the flying site and find that you can't assemble the darn aircraft!). For the same reason, we keep a rubber band stretched over the main rod, across the fuselage, when it's not in use.

With the wings in place, we shook the plane violently up and down to simulate the action of bumpy air which is oftimes encountered at slope sites, and noted that the wing fit is too perfect . . . not enough bind to keep the panels from slipping outward on the rods from the vibration. Solution . . . tape the wing-to-fuselage joints with a strip of 1/2-inch masking tape before you fly. In a recent phone chat with Bob Smith on this point, Bob pointed out that the wing rod is now slightly oversize, making enough of a force-fit that the wings don't need taping.

Incidentally, have you ever noticed how even your most trusted modeling buddy will pick up your newest creation and give it a furtive eyeball check for good alignment of the wing, stab, and fin, with respect to each other? We're probably just as bad about this as some others, and we're happy to say our Seabreeze passed the test! For a production unit, out of the box, that's pretty darn good. Anyone who has gone through the procedures required to achieve this with a scratch-built or totally do-it-yourself kit can appreciate the effort and care involved.

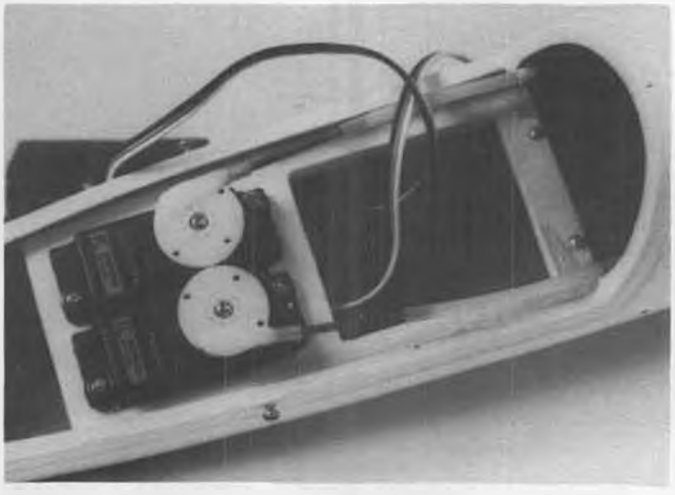
Having satisfied ourselves with a quick preview of the model, it was now time to install a radio. In this case, time turns out to be minimum. Both the finished and unfinished models of the Seabreeze come with the tube-in-tube pushrods (Sullivan) installed. A die-cut servo/receiver tray is also furnished (it's actually two pieces of 1/8 ply which you laminate). After a little trimming, sanding, and twisting your tongue the right way, it pops into place as if it was designed to do so. Hint . . . gently squeeze the fuselage top-to-bottom just aft of the canopy opening to widen the fuselage slightly as you push the tray downward and aftward (don't forget the tongue. . .).

Our Futaba FP-S121 servos dropped into the die-cut tray without need for modifying the servo opening. We use two screws per servo, diagonally opposite . . . OK for gliders, but not recommended for power models! Taking a hint from our last month's "R/C World" column, the switch is mounted across the aft end of the tray, and is operated by a 1/16 wire "switch key" through two 1/16 holes, one on each side of the fuselage. Photo captions describe hooking up the pushrods to the servos, using hardware supplied with the model. If you use a wheel-type servo output arm on the stab servo, be sure to notch it so the clevis does not bind when in the full down position.

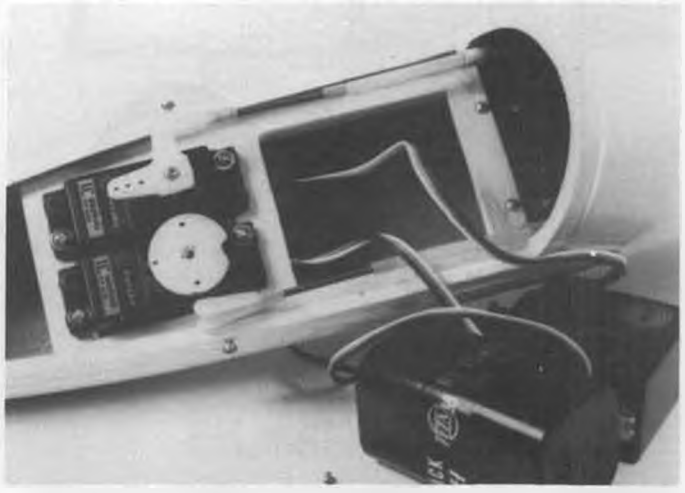
Using a small triangular file, we marked the balance-point range, as specified in the instruction booklet, making tiny nicks on the root fairing of the fuselage. With everything in position, ready for flight, it took a little plastic bag with 4-1/2 ounces of bird shot stuffed in the nose, ahead of the battery, to balance the aircraft.

Incidentally, it is difficult to test the balance point by suspending the model

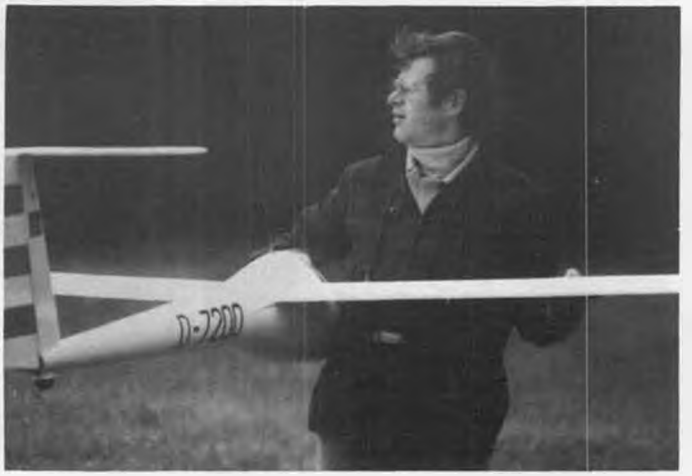
Continued on page 95



This is what can happen when using stock output wheels with clevis pushrod ends. Yoke of clevis binds on wheel when servos are rotated forward. Either cut notches in wheels or switch to output arms.



Here we have replaced the rudder output wheel with a 4-armed star, having cut off two of the arms that would interfere. Also, the elevator output wheel has been notched to clear the clevis. No bind!



Germany's Knut Bauer is the proud designer/builder/pilot of this lovely 1/3-scale DG-200, which he flies regularly at Kirchheim-Teck. Model is apparently launched with Tx antenna only partially extended, then is fully extended after launch. Note model's VHF antenna in photo at right.

R/C SOARING

by Dr. LARRY FOGEL

PHOTOS BY AUTHOR

• It rained on my last day at Kirchheim-Teck, the incredible soaring site in West Germany. In mid-morning, I drove up to the launching site, hoping the weather would change. Georg Martin was already there . . . obviously a dedicated flier. I introduced myself, and we quickly got into comparing notes on all aspects of our mutual interest.

An hour went by, and still no break in the weather, so Georg volunteered to fly anyway. Before I could object, he had his four-meter span DG-200 assembled. He took a few steps toward the slope, then off it went into solid rain . . . and surprisingly strong lift. I filmed the sequence while a kindly lady held an umbrella over my head and movie camera. I called out, "OK, Georg, I've got enough." He brought it in for a landing. It was smooth as silk, but the plane turned a bit in the final roll-out.

"Not good enough," he said, and, in spite of my shouts, he tossed the plane out again to set up another landing. This time it was perfect. That attitude characterized R/C sailplaning in West Germany.

By now, other fliers were gathered and it was still raining hard, so we all went down to the local "Stammtisch." For those not familiar with the custom, each tavern or guesthouse restaurant has a long table marked "Stammtisch," reserved for the gentry who drop in to drink beer or schnapps while solving the problems of the world. There I met modeler Claus Segel and other interesting people. They translated the chatter into English for my sake . . . it was great.

After a while, Claus got up to leave. There was, "Auf Wiedersehen, Herr Segel."

"Why so formal?" I asked. "Is he a newcomer to your group?"

"Well," George answered, "he's been here for only five years."

I was surprised. "How long must a person be around before you call him by his first name?"

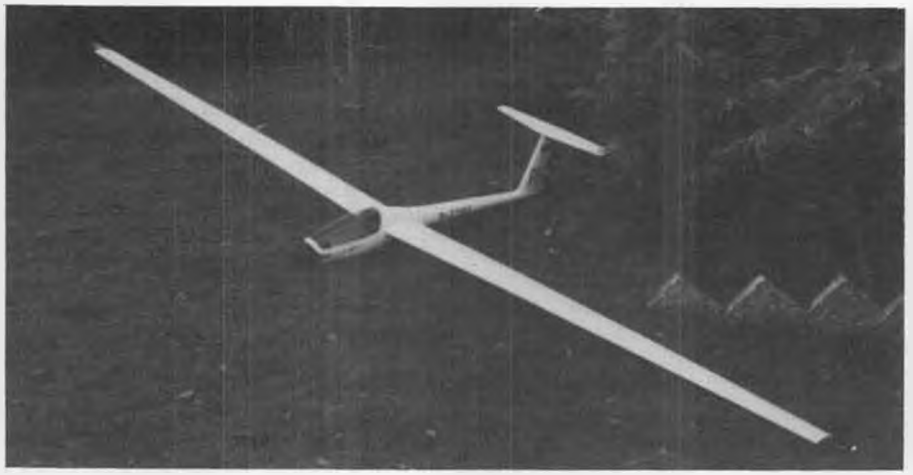
"Oh, twenty to twenty-five years!"

I then remembered that I had shouted,

Bauer's DG-200 in majestic flight over the beautiful West German countryside.

Knut Bauer is also a sculptor, and a darn good one, too, as evidenced by the replica of himself in the cockpit of his DG-200.

More cockpit details on Knut's DG-200. No excuse for having an undetailed cockpit on these big scale birds.



Another pretty scale sailplane is this 1/4-scale (15-foot) LS-3, produced in limited numbers by Roland Sommer (address in text). Fiberglass construction throughout.

Factory photo of the full-size LS-3.

"Georg, that's enough flying!" earlier in the day. "What did you think when I called you by your first name?" I asked.

"Oh, that's all right . . . you're an American. We understand."

In Germany, and in other European countries, you're reminded of each person's status by the way he's addressed . . . very different from the home scene.

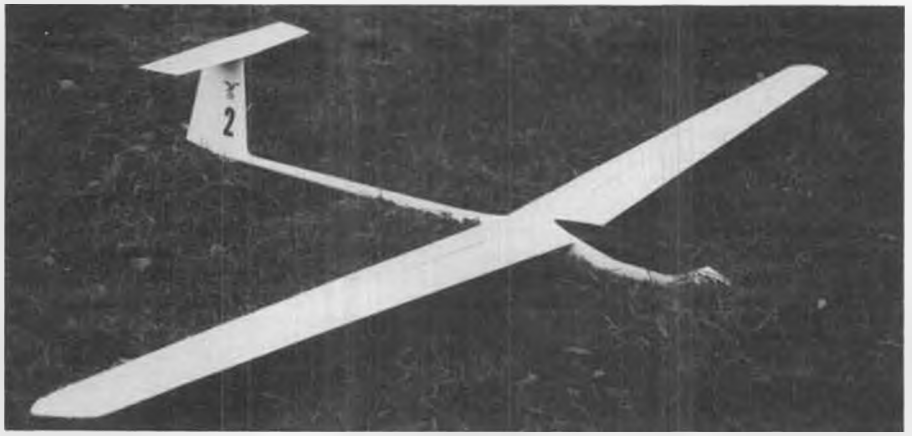
Well, the weather finally cleared a bit, so we all went back up the Teck. There I saw Claus fly his brand new 1/4-scale replica of a historic German sailplane and met Knut Bauer, who flew his own 1/3-scale DG-200. This five-meter span beauty weighs 7.3 kg. It has rudder, elevator, ailerons, flaps, and spoilers, and a 1/3-scale model of Knut at the controls . . . and I mean a *perfect model pilot*. It has the same facial features and expression. This ship took 1-1/2 years to design and build, and is a real work of art. Knut argues that "scale" refers to flight performance; that is, the plane should look like its full-scale counterpart as it performs the various maneuvers. The airfoil is of concern only to the extent that it makes the model perform as desired. It's a real thrill to watch this giant scale model sail by at scale speed. In point of fact, scale models usually fly too fast, in terms of lengths per second, and thus clearly show that they are *not* the real thing. By the way, Knut's wing tips have greater undercamber than the root airfoil, to get more lift out of the lesser chord.

In Frankfurt, I had the pleasure of meeting Roland Sommer, who owns and operates Rowing Prazisionsmodellbau GFK-Fertigmodelle, 15 Krontholer, 62315 Schwalback/Ts. Here the philosophy is somewhat different. Roland remains close to the design and manufacture of the full-scale sailplane he models. In fact, he took to meet the designer and to tour the plant that produces the full-size LS-3. Here's a modern high-performance machine that deserves the accolades it's already received.

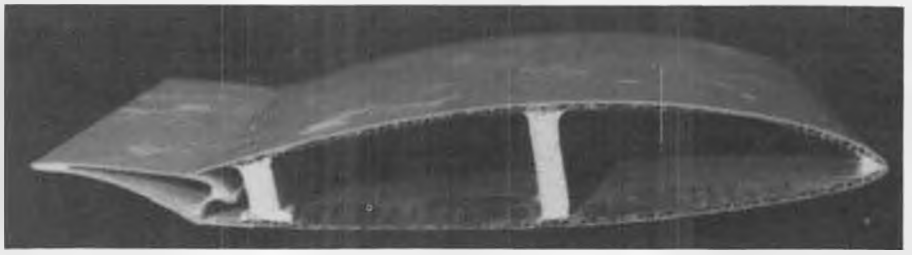
That set the stage for his 1/4 exact scale model. Obviously, the fuselage *and* wings must be of fiberglass. It has flaperons and the control surfaces are hinged to prevent gap leaks. The wings span 4.5 meters, the fuselage is 1720mm long, the aspect ratio is 26:1. It weighs about 4500 grams. It stalls at 3m/s and has a normal operating airspeed of from 8 to 20 m/s. Roland claims the L/D to be greater than 30 (as compared with the 41 claimed for the full-scale ship). The airfoil is the Wortmann FX-62-K-131, which accounts for the full-scale sailplane's high performance. I pointed out that the model operates at a much lower Reynolds number (Rn). He argued that the laminar airflow characteristics of this 13.1% thick airfoil make it perform well, even at the lower Rn. According to Roland's carefully measured flight performance curves, this 1/4 scale model has a minimum sinking speed of 1.4 meters/second at an airspeed of 11 meters/second, and this at an Rn of 150,000. Of course, this point shifts as you alter the flap position from neutral.

A number of special features deserve mention. The skin is about 1.5mm thick, comprised of two layers of fiberglass separated by a corrugated cardboard strengthener. The elevator and flaperons are connected to the control mechanism by a locking bracket. It's simple, secure, and, of course, convenient for assembly and disassembly.

Roland also designed the Barracuda, using a section taken from the same fiberglass wing mold. This 3.5-meter span T-tail sleek sliver is designed for F3B competition or for the many other tasks that require a sturdy, very high performance sailplane. Both these planes come in top-quality white finish, ready for radio installation and whatever decoration you prefer.



The "Barracuda" is Roland Sommer's creation for F3B competition. Uses the same wing section as the LS-3 above. Like the LS-3, it comes finished and ready for radio installation.



The wing section on Sommer's LS-3 and Barracuda is the Wortmann FX-62-K-131, same as on the full-scale LS-3. Cardboard liner gives the fiberglass skin extra rigidity.

Meanwhile, at Torrey Pines there was significant progress at the other end of the spectrum. Al Bendet enjoys the pleasure of his new versatile one-meter masterpiece. His intent: to design a readily transportable small ship. The result: a nifty nugget that can operate with or without the outer wing panels, depending on whether you're flying thermal or slope. "Wing wagging" solves the problem. You'd expect that flight without the outer panels would require a significant dihedral between the inner panels, otherwise the rudder will simply supply yaw the airplane but produce no turn. Right! Ailerons would overcome this difficulty, but then you'd have a problem if you add the tips. Instead, Al chose to twist the entire wing panels, whatever their length, and it works well. On windy days, he whips around the sky at the cliff, while on calmer days his 1/2-meter midget grows to one meter and takes on the more dignified appearance of a polyhedral sailplane. Of course, if you restrict yourself to two channels, you lose all this versatility. Another clever aspect of this design is the way the flat pieces fold together . . . makes packaging easy. In the sky, this craft is sensitive to your command. You soon lose the sense of its small size.

Noel Jones (left) and buddy Jack Chambers collaborated on this neat one-meter sailplane, actually little more than a scaled-up F/F HLG. Weight is only 10 oz. Should be great for R/C HLG events.

Noel Jones showed me another equally clever one-meter design. His friend, Jack Chambers, scaled up a very conventional F/F hand launched glider design to one-meter span. They redesigned the fuselage to hold micro radio gear. Note that the wing is of solid balsa, built the same way you'd put together a free flight glider.

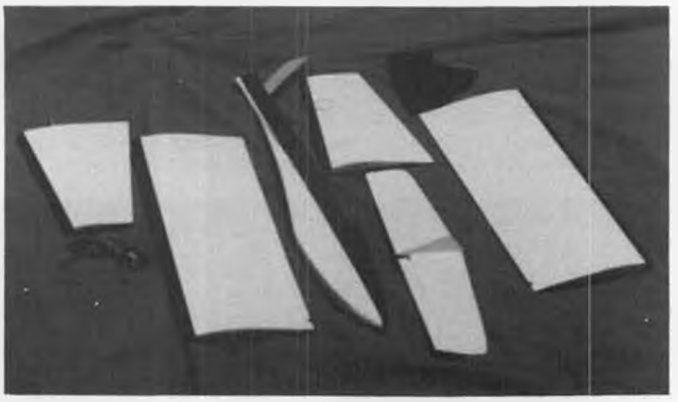
I hadn't seen Noel Jones in a few years, ever since the Nats at Riverside, California a couple of years ago. There he flew the Mariah, a fast and furious high aspect ratio sailplane also conceived by Jack Chambers. According to Noel, this new one-meter design is called the "Tercel," after the male falcon. The wing is highly undercambered and only 7% thick. Noel argues that a small plane can only be efficient if it's fast, and that means a thin wing. The solid balsa construction makes this possible. You select the wood for strength, evenness of grain (especially the spruce leading edge), then lay out the panels, sand the surface to the template, play around with the edges till there are *no* gaps, then pre-glue. That means Titebond on each surface, wait till the glue soaks in and begins to get tacky, then hold the surfaces together for at least 15 minutes to ensure the beginning of a solid joint. Once this is properly accomplished, you need not resort to fiberglass to keep the wings from folding on launch or during high-G aerobatics.

The rest of the construction is also straightforward. The fuselage is pod and boom. The pod is molded of thin fiberglass and resin. It's just big enough for a 100 mah battery pack, two side-by-side Kraft KPS-18 micro servos, and the receiver (removed from its original case to ease the fit). The boom is a number zero arrowshaft. It carries the thin wire pushrods and supports the tail. The rudder and elevator are made of balsa sheet with appropriately placed lightening holes. The all-up weight of this plane is only ten ounces.

You can hand launch it into a thermal, toss it off a slope, or send it flinging into the sky on a hi-start or winch. It's really fast and requires a good eye and quick response. I watched as Noel put it through a terminal speed dive (no flutter), pull into successive loops, do a snap roll, a slow roll and I can't remember what else. You can get two hours of flight time on each 15-minute car lighter recharge of the battery pack. Ordinarily, Noel flies on the beach slope near Laguna Niguel, but this little beast goes with him wherever he goes, so when the situation is right, he flies.

Stay well and happy. See you next month.

Dr. Larry Fogel, 1591 Calle de Cinco, La Jolla, CA 92037. •



Al Bendet's as yet unnamed one-meter bird follows more closely the layout of conventional thermal sailplanes than the model at the top of the page. Photo at left shows how it all comes apart for easy transport. Can also fly without the plug-in tip panels.

Take a "GRAINCHECK"

DAVE THORNBURG . . . in which Dave discusses the role of grain direction in building strong, light models.

• Pick up a scrap of 1/16 balsa and try bending it. Notice how stiff it is in one direction, and how easily it bends in the other. Most of balsa's strength lies in the direction that parallels the grain of the wood. We all know this instinctively, yet we don't always use this knowledge to good advantage in designing, building, and repairing our models. I've seen some really beautiful models come apart in the sky, just because the builder forgot, at some small but critical point, the importance of grain direction.

Balsa is not an inherently strong building material. Compared to spruce or plywood or plastic or the shell of a Texas armadillo, balsa is pretty flaccid stuff. But it has this advantage: when properly used, it exhibits a tremendously high ratio of strength to weight. Ounce for ounce, gram for gram, only skunk juice is stronger than balsa. This is why, among serious builders of model airy-planes, balsa is still king.

But the key to getting max strength out of balsa is the proper use of grain direction. To see some of the ways that grain direction can be used to strengthen (or weaken) a model, let's take a look at this month's sketch. (If the model shown in the sketch strikes you as a cross between a Hobie Hawk and a coupe d'hiver, that's because old Leonardo da Thornburg spent last Saturday flying free flight rubber, and Sunday on the windy slopes with a clipped-wing Hawk. A clear case of cross-pollenation.)

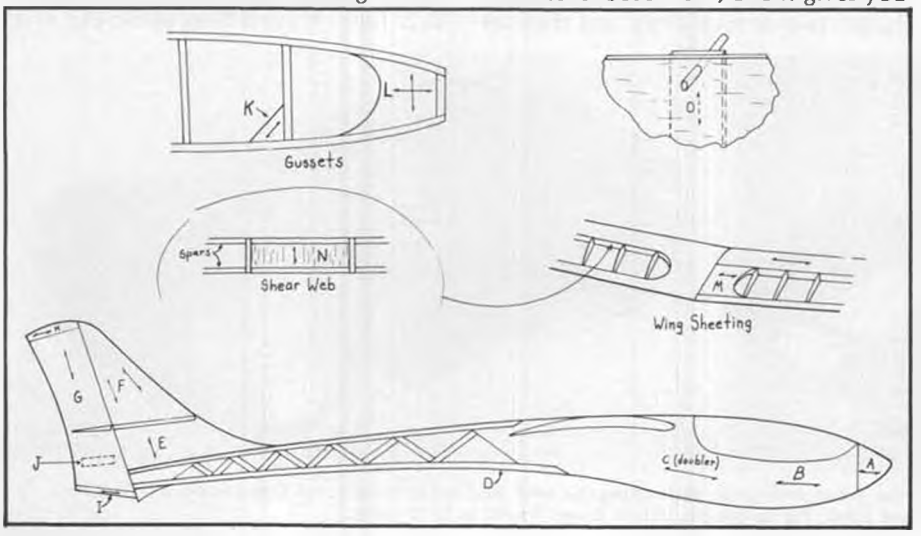
Suppose we start at the noseblock of our Coupe d'Hobie, the piece labeled "A." Note that the grain-direction arrow points fore and aft. Why not up and down, or side to side? What difference could grain make in a simple noseblock? The answer is: a lot. Balsa is much harder to crush ALONG the grain than ACROSS the grain, so if you run your noseblock grain straight ahead, it will be more resistant to small dents and dings from landing impact.

Don't take my word for it. Try pressing your thumb into the edge of a sheet of balsa until it makes a visible dent. Now apply that same pressure to the END of the sheet: no dent. Endgrain is stronger. (Now slip the sheet back into the display counter before the dealer sees you and strangles you.)

As a bonus, you'll find that a noseblock with four-and-aft grain is easier to carve and sand; shaping any wood along the grain is always a simpler matter than shaping it cross-grain. What about splitting? you ask. Won't fore-and-aft grain tend to split in a hard crash, and open up my fuselage like an oyster shell? Yup. Most designers get around this problem by placing a conventional sheet balsa or plywood former right behind the noseblock, with the grain running horizontally across the fuselage. Or, you can simply build the noseblock from stouter stuff, like spruce or pine. When I lived in Northern California I used redwood for noseblocks, because scrap redwood was plentiful and cheap.

What about figure "B," the fuselage sides? Pretty obvious, huh? Only a bonafide idiot would run fuselage grain any direction other than fore and aft, right? But I've seen it done.

So the grain direction at "B" is an easy one: run it fore and aft, to give maximum collision strength for those head-on encounters with walls and poles and terra firma. But I'd go a step further, if I were building this model. I'd look for two matched sheets of balsa with a slightly crooked grain, a grain pattern that took a swoop down and then back up again, in approximately the shape of the bottom curve of the fuselage! Admittedly, this is icing on the cake, but it's the kind of little custom touch that isn't hard to do provided you have enough wood to choose from, and it gives you lots of satisfaction to pull it off well (even though you may have to point it out to people yourself. . .).



Incidentally, how thick should you make a fuselage side like this one? That depends on the size of your plane, and whether you plan to use an inside doubler ("C"). For a 100-inch glider, fuselage length 42 to 50 inches, I'd choose medium-soft 3/16 balsa with a doubler of 1/64 plywood. Or medium-hard 1/8 balsa with a doubler of rock-hard 1/16 balsa. Or medium 1/4-inch balsa with no doubler.

For a two-meter ship, 1/8 balsa with 1/64 ply doublers would be fine. Or medium-soft 3/16 with no doubler. On fuselage sides like these, I like to use wood that's just a bit thicker than necessary, so I can bow the sides and round off the corners and get rid of the boxy look that most kits have.

What about that doubler, figure "C"? Is it really necessary? That depends on how badly you land, and how long you want your ship to last. I rarely build an R/C model without doublers of some kind. Properly used, they add a lot of strength to a fuselage . . . especially up front, where weight isn't as critical.

If you've had a little crashing experience in your modeling career, you can look over a design such as this one and spot the points that need reinforcement rather quickly. Just aft of the wing, for example, where the longerons ("D") join the sheet sides. The cockpit area, just about where the figure "B" appears (especially if that's a real canopy, and not just a paint-on). The area at the leading edge of the wing, which is sure to: 1) crush inward if it's a two-piece wing, or 2) split horizontally if it's a one-piece wing.

All of these weak points cry out for doublers, and maybe a bulkhead here and there, as well. Bulkheads (formers) do wonders for keeping the sides of fuselages from splitting and bowing. Horizontal grain makes the fuselage crush proof; vertical grain stops the sides from splitting.

But back to the doubler "C." Note that its grain direction is not quite parallel to the fuselage side grain "B." This isn't the artist's mistake. It's a plea for cross-graining the sides slightly, to increase their rigidity and reduce the chances of splitting. Even a slight degree of cross-graining adds a tremendous amount of strength to balsa, for very little extra effort.

Figure "D" is another obvious one. After all, they don't make longerons with cross-grain! They do make longerons with crooked grain, however. In

Continued on page 77

Now in production, the No. 803 constant current charger from JoMac, featuring a digital readout for *accurately* monitoring the charge on a battery pack. Details in text.

R/C AUTO NEWS

By DAN RUTHERFORD

CHARGERS AND SUCH

The small 1/12-scale electric cars are terrific little things, a fact recognized by very many people, hence the explosion in the popularity of twelfthers, once regarded as the poor relation, back when powered only by basty little .049 gas engines.

However, as nice as they are, more than a few of us have had niggling little problems. And looking back, most of this seems to have come from lack of a proper method and/or equipment for charging the ni-cd batteries. Way back when, I used those simple little charge cords supplied with many cars. They do work, in that the batteries get charged, but they are just too simple, as anyone who has left the charge cord hooked up for an hour or so can tell you. These racers shouldn't feel too dumb; everybody has ruined a pack from overcharging at least once, and I have done it several times.

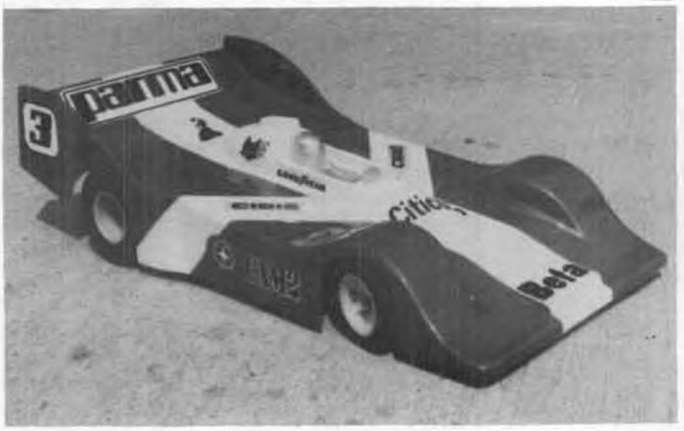
My solution is to use the constant current chargers from JoMac. They have a timer and a voltmeter, have proven to be very reliable, and also have performed double duty (slow and fast charging) on just about every battery pack I own, from Tx packs, to the Rx packs used in the 1/8-scale cars, even packs used in R/C airplanes. In fact, the JoMac constant current charger works so well that I still suggest it to those needing a good charger, but not having the bucks to go with the real subject of this piece. And that is the newest charger from JoMac. It is pictured someplace close, and is the number 803 *digital* constant current charger. Actually, this charger does just what the older model does; the main difference is that the digital charger is far more accurate when trying to determine peak charge on the pack and has some convenience features to boot.

At this point, I suppose it needs to be mentioned that I have yet to actually get my hands on a production version of this charger, although it will be available as you read this. However, I go by JoMac once in awhile and so have followed the slow but sure development of the piece through the last few months, and do know a bit about it. The usual timer is mounted, so you can select the rate of charge, two or four amps, and then set the timer for the amount of time needed to get a charge. The trick is in the digital output voltmeter used, as you can easily see, with much greater accuracy than when using a standard voltmeter, exactly how much charge is already in the pack. Actually, during fast charging, what you are reading is a total of the current going in (charger current) and the voltage of the pack as well. Which is why you will see readings of over 10 volts, even though you're charging a pack that at peak will carry no more than 8 volts and is rated at 7.2 volts, as 6-cell packs all are.

This is a terrific feature, as you can elect to stand around during the last few moments of charge, watching the meter and when the voltage starts to drop back down in 1/100 volt increments, you will know for sure that the pack is charged to capacity.

Another option is available, however, one that will save you much of that time usually spent eyeballing a charge meter, and that is the fact that you can dial in a cut-off point which, when reached, causes the charger to switch automatically from fast to slow charge. Not having played with a production unit, I'm not exactly sure how to do this, but if your pack peaks at, say, 10.28 volts, and assuming that you haven't done something weird to the pack and it has in the past been a reliable set of batteries, the charger can be set, using the voltmeter as a guide, to terminate fast charge at any voltage. In this example, 9.80 volts would no doubt be safe; just set the charger, start the fast charge cycle and at 9.80 volts it will automatically switch into slow (trickle) charge. Then you can come back and do the rest of the charge on the manual setting, watching the voltmeter climb to peak and then drop off.

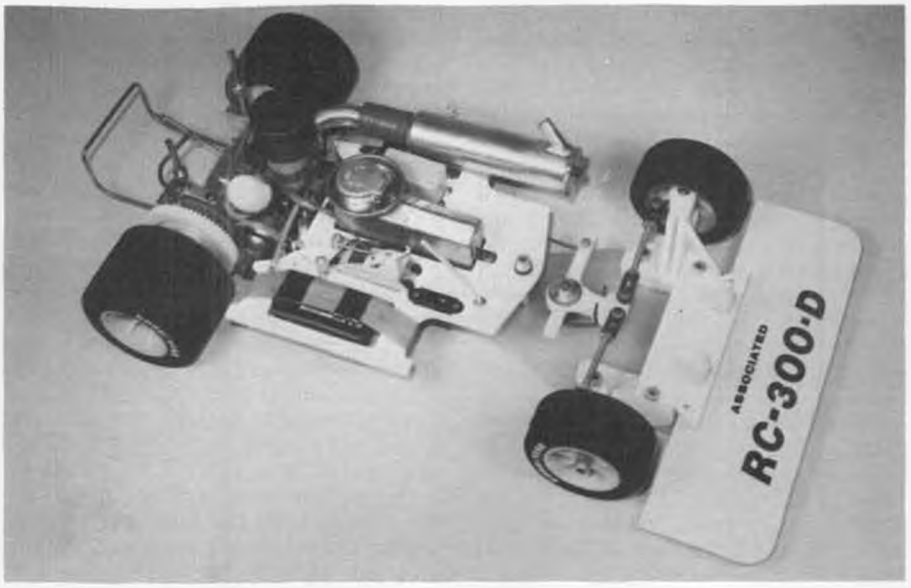
The important part to notice here is that you don't get something for nothing. Yes, the charger is almost totally automatic, depending upon how you use it, but it is also possible to make a mistake and still fry a pack. Let's say that you are pushing a good thing too far and, again using the pack that peaks at 10.28 volts as the example, elect to take the easy road and set the charger to end fast charge at 10.20 volts. *If* everything works out as it



On the left is the 1/8-scale Sorbello body from Parma, latest attempt at dethroning the MRP Bud as the favorite for Delta Super J's. And for those who like to run their cars through the sand and muck, Parma has the Desert Buggy (right) in 1/12 scale.

A repeat photo from "Over the Counter" is this factory pic of the Associated Timer Switch, an inexpensive alternative in safe fast charging, also described in text.

Another "Over the Counter" repeat photo, the Associated Team Nats Car. Comes with all the trick equipment you see here, available as a kit or fully assembled.



Latest in 1/8-scale cars from Associated is the RC-300-D . . . the basic RC-300 car but with the new differential included. Price is $290; less than buying a car and then adding the diff later.

should, you might even get away with it, but if just one cell is a bit down, the pack is hot before charging or any one of a number of other possibilities, the charger/pack voltage will *never* climb to the preset 10.20 volts. Result? Another fried pack, as the charger will never "see" the cutoff point and so will keep right on pumping in a four-amp charge until you either hear the telltale "pop" of cells venting or burn your hands touching the pack. . .

If this sounds like bad news, it really isn't; you just have to know exactly what you are doing. You see, JoMac had a choice in designing the charger. They could make one that would never burn a pack and that any dummy could safely operate without failure of any kind. But the racers wouldn't use such a pack; there are others already available that do this and they simply don't give a maximum charge to the pack, making them next to worthless on race day. The other option, the one chosen, was to design a charger that would indeed give maximum charges but which required a little common sense to use properly. At this point in time, it seems that the truly foolproof, fully automatic maximum-charge charger is off in the future somewhere. In fact, those who are supposed to know claim that ni-cd's are such tricky little things that they can't be automatically charged to max capacity with reliability.

A suggestion concerning this charger would be to charge your packs at the four-amp rate, up to about 90% capacity. From there on up, try the two-amp option (just flip a switch), carefully watching the digital output voltmeter, using the two-amp rate all the way to max charge. The batteries seem to like this procedure a bit better, having less tendency to heat up while still taking on a full load.

Another suggestion is to carefully read and reread the instructions furnished with the JoMac charger. It is all spelled out for you; if you understand all the information furnished you'll be able to use the charger to maximum benefit.

Continuing on chargers, another option available is to get Associated's number 3770 Timer Switch, which sells for only $19.00. As chargers go, it is not very sophisticated, but then it isn't much money, either, and gives the important advantage of having a timer that will terminate fast charging. To use it, just plug the resistance wire type charger that came with your Associated RC12E kit, either 4-cell or 6-cell, into the timer box, hook up the leads to a 12-volt source, set the timer and wait. When the timer kicks off, it automatically goes to a trickle charge instead of terminating all charging. Few of the really gung-ho racers will be using this charger, or if they do they will be backing it up with a digital output voltmeter connected to the end cells of the pack. But not everybody is in the gung-ho class; many just need a reliable timer that will shut things off at a specified time and do it at minimal cost. If you fit in that niche, Associated has a charger for you.

MORE ON ASSOCIATED

Last month we had a deal on the new Associated diff for 1/12 cars and I forgot a couple of tips passed on to me about this really effective diff. First is that, although Associated does suggest running it dry, with no grease on the ball/thrust washer assemblies, they have of late been dribbling a drop or two of WD-40 onto each ball in the diff. I tried it and the diff is better with WD-40 used; the action is even further improved and is also smoother. Of course, you also get more gear slip and so have to tighten down the adjuster a bit, but even so, the

Continued on page 89

Holland's Frank Bremer flew his "TW" motorglider to 3rd place in FAI at the 1980 European Electroflight Championships, held in Amay, Belgium, site of the '79 World R/C Soaring Champs.

Motor and battery installation in Bremer's TW. Motor is a Keller (as were most) 50/24 with 24 cells, turning a 13X9 folding prop. Span of the model is 100 inches, weighs 6 lbs.

ELECTRIC POWER

By MITCH POLING

• The annual European Electroflight Championships (F3E) was held in Amay, Belgium on September 5-7, 1980. Peter Blommaart sent a very complete report, including the program and photos. The 31-page program is written in five languages . . . truly international! The weather was beautiful, with 66 entries from nine countries participating. Since the level of entries has been climbing steadily through the years, there is a chance that next year the championships will be by teams, as in the international pattern and sailplane contests. I would like to see this for the USA as well. Peter tells me that the first world championship would be in 1984 (five years after CIAM approved the rules for electric flight).

There were six classes of competition: pattern, pylon, stand-off scale, F3B glider, FAI electroglider, and 30-minute endurance. The 30-minute event is quite simple; an unlimited motor run is allowed, hand launch, and a low pass at three to five meters every ten minutes. Every second is one point, and landing points go from 50 to 500. The pylon event is over a 400-meter course, with legs of 180, 180, and 40 meters, ten laps required. One cut means a lap is not counted, and two cuts mean a pull-up and disqualification for that heat. The stand-off scale rules require that the plane must be flown by the builder, with bonus points if the plane is scratch built from the builder's own plans. Judging is done from three meters, with three-view and some color documentation requested. The points are 50-50 static and flight, with a max of 65 points for static. The FAI glider rules are complicated, but consist basically of two tasks, distance and duration. Two hundred seconds are allowed for distance, with the motor run time deducted from the overall time. Three hundred seconds are allowed for duration and landing, with the motor run time again deducted from the total. The other glider event was the electric version of F3B competition, with the replacement of a 60-second motor run for the cable launch. The tasks are speed and duration with a spot landing, in a total of 15 minutes.

The pattern competition had twelve maneuvers, with the following points: takeoff (3), two inside loops (2), straight inverted flight (1), two reverse outside loops (2), three rolls (3), double Immelman (2), two rolls in opposite directions (3), rolling eight (3), slow roll (4), square loop (4), four-point roll (5), and landing (3). Quite a routine! There were 14 entries in pattern, and the top six are in the table with the equipment they used.

1) Thomas Levin (Ger.): El Acro, 63 in., 6.2 lbs., Keller 50/24, 10x6, 21 cells.

2) Denis Kuhn (Ger.): Venus, 63 in., 7.3 lbs., Keller 50/24, 10x7, 24 cells.

3) Edgar Leip (Ger.): Venus, 71 in., 6.8 lbs., Keller 50/24, 10x7, 24 cells.

4) Gilbert Delefosse (Fr.): Comet, 59 in., 4.8 lbs., Geist 40/16, 8x6, 16 cells.

5) Volker Keck (Ger.): Eltra, 65 in., 5.8 lbs., E-Max 50/20SE, 10x5, 20 cells.

6) Wolfgang Kosche (Ger.): Phoenix, 67 in., 6.4 lbs., Keller 50/24, 10.5x6, 22 cells.

Besides the fact that the German fliers dominated pattern, the motors are all samarium cobalt, with the possible exception of the E-Max 50. With inputs of 20 to 24 cells (24 to 29 volts), the power output is in the .40 gas engine range. The cells are all 1.2 Ah, so the duration is about five to seven minutes, enough to do the maneuvers. There is really nothing like this in this country, due mostly I think to the lack of a .40 type electric motor here.

The pylon event was quite popular, with 28 entries, and the top six were:

1) Thomas Levin (Ger.): Blizzard, 47 in., 4.8 lbs., Keller 50/24SL, 8x6, 30 cells.

2) Roland Hersperger (Sw.): Blizzard, 47 in., 4.8 lbs., Keller 50/30SL, 8x6, 33

Another TW glider, this one modified for polyhedral. Urs Ambuhl, of Switzerland, flew it at Amay.

A real biggie is this scale SB-10 apparently not flown officially in the meet. Span is 24 feet (yes!), weighs 20 lbs. with Keller motor.

The Electroflight Champs included an event for Electric Scale, one of the entries in which was this HE-219 night fighter by Aloys Zimmerman. Two Keller motors, 46 (!) 1.2 Ah cells.

Robbe Diamant placed 6th in FAI for Karl Stroher, used E-Max motor with 16 cells, turned a 16X10 folding prop.

cells.

3) Dennis Kuhn (Ger.): Geist Hot Dog, 49 in., 5.3 lbs., Keller 50/14SL, 8x6, 22 cells.

4) Edgar Leip (Ger.): Blizzard, 54 in., 4.6 lbs., Keller 50/14SL, 7x6, 22 cells.

5) Karl Stroher (Ger.): Minel, 51 in., 5.2 lbs., E-Max, 8.5x7, 20 cells.

6) Charlie Binder (Ger.): Hot Dog, 54 in., 4.3 lbs., Geist 40/14, 7x6, 16 cells.

Again, most of the winners used samarium cobalt motors. The top two winners used .7 Ah GE cells, the rest used the 1.2 Ah cells. The more cells, the more rpm, and that was obviously the winning combination. The Blizzard is also designed and sold by Heinz Keller, of Keller motor fame, and is obviously a fast plane!

The top six of 58 entries in FAI glider were:

1) Thomas Levin (Ger.): E Flamingo, 100 in., 6.2 lbs., Keller 50/24, 12x6, 18 cells.

2) Roland Hersperger (Sw.): Tel, 100 in., 6.2 lbs., Keller 50/24, 12x8, 18 cells.

3) Frank Bremer (Hol.): TW, 100 in., 6 lbs., Keller 50/24, 13x9, 16 cells.

4) Denis Kuhn (Ger.): PB26, 100 in., 6.8 lbs., Keller 50/24, 12.5x6, 20 cells.

5) Edgar Leip (Ger.): PB26, 11 in., 7 lbs., Keller 50/24, 14x6, 20 cells.

6) Karl Stroher (Ger.): Diamant, 122 in., 6.8 lbs., E-Max 50/14SE, 16x10, 16 cells.

And again, all the top winners used the samarium cobalt motors! There seems to be a message here. Note that the props are quite large. However, none of the winners used gearing except Stroher, which shows the tremendous torque the rare earth motors have. The FAI event emphasizes maximum possible climb, since motor run time is deducted from the total points. The ability to swing a large prop is an advantage, a little bit like "helicoptering" up, on the prop.

There were 32 entries in the 30-minute event, and the top five were:

1) Thomas Levin (Ger.): Mosquito, 100 in., 4.6 lbs., Maxonl:5, 14x7, 2x7 cells.

2) Roland Hersperger (Sw.): Tel, 100 in., 5.3 lbs., Keller 50/24, 16x8, 2x5 cells.

3) Frank Bremer (Hol.): Carla, 71 in., 1.9 lbs., Mabuchi 550, 15x12, 2x7 cells.

4) Charlie Binder (Ger.): Elecktra, 110 in., 5.9 lbs., Geist 250G, 11x8, 2x7 cells.

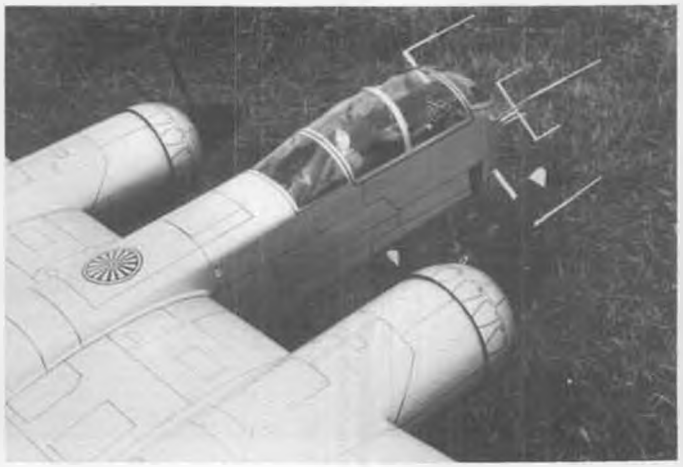
5) Hans Levin (Ger.): Mosquito, 100 in., 5.3 lbs., Mabuchi 550G, 18x7, 2x8 cells.

Winner of the FAI event (and Pattern and Pylon and the 30-minute event too!) was Thomas Levin, shown here holding his E-Flamingo for the flagmen at base B.

There is quite a lot more variety in the power used in this event. Most of the cells were 1.2 Ah, and most packs were wired so that half the pack could be used at a time; this gives the duration of 2.4 Ah packs. Peter did not say what the durations were, but I would guess that the winners were close to 30 minutes.

Peter didn't list any of the winners in the stand-off scale event, but did send a couple of photos of one entry, a Heinkel HE-219 night fighter. This is a plane I have always thought would be particu-

Continued on page 97



Close-up of the nose on Zimmerman's Heinkel. All of that line-work was evidently done with a drafting pen (whew!).

Common in the U.S. is the Super Monterey with Astro 075 motor system, this combo flown in Amay by Conny Tollet of Sweden.

"You don't expect me to fly this thing, do you?" Captain (USAF) Pete Young with his swept-forward, canard-tip tractor flying wing.

Best flier at the recent Northrop Flying Wing Contest was this 7-year-old conventional (?) design by Jerry Huben.

1/2A & 'Sport' SCENE

By LARRY RENGER

PHOTOS BY AUTHOR

• This month the column is going to get somewhat out of line because I am going to talk about a contest. It was almost exclusively a 1/2A contest, and it was about as close to sport flying as a contest can get. I am describing the annual Northrop Flying Wing meet, a unique event hosted by the Northrop Corp. Model Airplane Club. It is the only all-flying-wing contest in the country sanctioned by the AMA. Carl Hatrak is the C.D. and the contest has been going on consecutively for 14 years.

The events flown this year were F/F Gas, Electric, Glider, and Rubber. On the R/C side were the pattern oriented crowd flying the Sport Scale pattern with their large, smooth models. The turnout was split about 60/40, spectators and contestants. The models evoked a great deal of interest and generally were far prettier to watch fly than their more prosaic, high-performance cousins.

Hero of the Peoples Republic of Weird Aircraft, our author, with ill-fated attempt to advance the state of the art (see text).

I was especially interested in the performance of the F/F Gas entries, as I had gotten off my duff and built one myself, my first F/F gassie in at least 15 years! (It didn't fly, but more on that later.) Mind you, I am not going to give the contest results, as I did not stay to the end. I *can* say that the models which flew successfully were very docile and far removed from the performance of a conventional AMA Gas model. Even though 15-second engine runs were allowed, the longest flight I saw was 1:56 and never got higher than 100 feet.

The whole contest was very "early 1950's" in flavor, having a lot more adventure than competition going on. How often do you hear everyone cheer at a successful flight at a contest anymore? I enjoyed myself thoroughly.

The most successful models were all "conventional" flying wings with well-swept, high-aspect-ratio wings, low power loadings, and control by tip rudders and elevons. There were a few deltas and enlarged "Stringless Wonders" in evidence. The most peculiar configuration was the one that Pete Young and I were attempting to fly. The idea was to achieve a higher total coefficient of lift by using the tips of a swept-forward wing as a canard. The configuration has been successfully flown in rubber and glider models. Somehow, though, we both failed to hit a workable combination of stability, weight, power, balance, and strength. Pete probably came closer to flying than I did, but was plagued by engine problems. My engine was reliable, but the model was so overpowered and fragile that there was never a chance of getting it in trim before it beat itself to death.

Pete opted for a shoulder wing configuration with the tail on top. I decided to attempt to control lots of power by using a very high thrust line engine position with forward fin for spiral stability and a low rudder for easy control of the power pattern. If the wing had been stronger, the model lighter and perhaps half again the size, I might have made it. Mine never could decide whether it preferred to crash via an inside or outside loop . . . I think that they averaged out about equal. Well, at least the required muffler rule helped to keep the engine clean by preventing dirt from reaching the cylinder. Pete used a Cox 190 RTF engine, I used a Medallion .049 crankcase and QRC top end for what turns out to be an awfully nice, smooth combination.

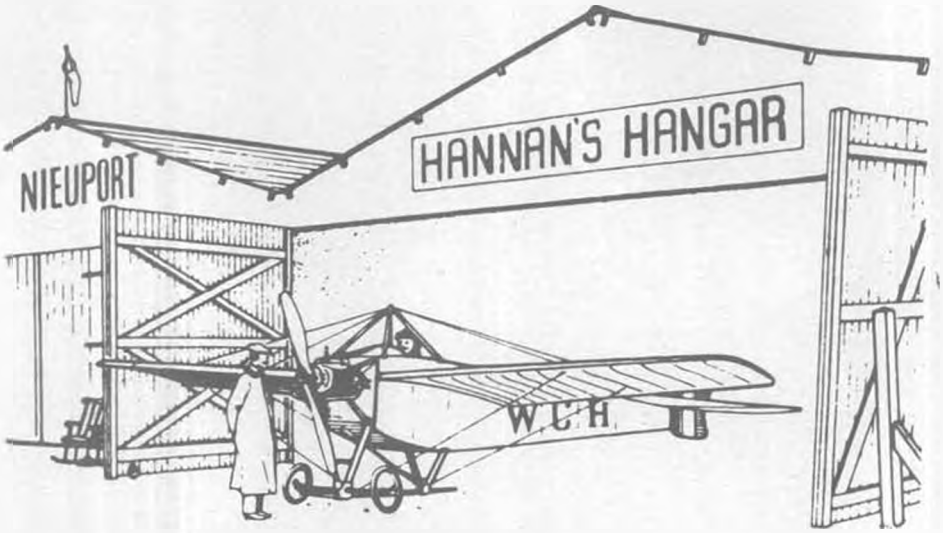
Moving on to models which worked,

Continued on page 97

What would a contest be without Addie Naccarato? Her six-foot wing flew nicely with R/C Bee power, also flew towline and electric.

FREE FLIGHT AND CONTROL LINE

Circa 1930 photo of a spectacular Boeing 80 A1 (226) in color and markings of Standard Oil of California. Mike Doolin is seated in the Boeing P-12C, which provides an interesting size comparison. Photo from the seemingly bottomless collection of Pete Westburg.



"We progress at night when the politicians sleep."

• The above old Brazilian quotation, via Richard Miller, seems particularly appropriate this time of year! In fact, we seem to have an oversupply of quotations this month, and hope one or more will coincide with your own philosophy. Note that all are printed very close to the paper!

Leading off is this, from our own Walt Mooney: "You don't always win when you try, but you always lose when you quit!" Which ties in nicely with a quote via Ted Hannan: "In the game of life, as with all sports, it's easy to spot the winners. They're the ones who aren't complaining about the officiating."

And from a fortune cookie (really!): "There is nothing so absurd that has not at some time been said by some philosopher." Certainly many model builders can relate to this from our desk calendar: "He who considers too much will perform too little." Frank Scott offers two: "Time flies like an arrow; fruit flies like a banana!" (from *OMNI*). Gordon Roberts, overheard during the Flying Aces Nationals contest: "Practice is a form of cheating!"

Balloon chase-crew member Dianne: "Not having money is not an excuse for not living."

Colonel Bob Thacker is always good for a quote or two; witness the following: "With experimental work, 'nothing to report' is something to report!" His reaction to lack of originality among contestants in an R/C Stand-Off Scale contest: "If I see another P-51, I'll ___!"

And finally, "Cohn's Law Antithesis," quoted by S.E. Russek, Jr., of Hughes Aircraft Company, circa 1972: "It is important that you spend some time reporting on what you are doing in order to know how you are doing. Perfection in knowing how you are doing can only be achieved when you are doing nothing, then it's not important that you know."

AND SPEAKING OF HUGHES AIRCRAFT

According to local TV and newspaper reports, the fabled Hughes flying boat is being moved to its new home adjacent to the Queen Mary at Pier J in Long Beach Harbor today, as this is being written. Although it is expected to be some time before the machine is opened to public inspection, plans are moving forward for its display, and it seems likely it will far outdraw the Queen Mary as a tourist attraction.

According to Charles E. Pulliam, 1st Vice-President of the International Plastic Modelers Society, an aviation museum will be featured inside the enormous craft, which will include models. Among those asked to contribute was Granger Williams, who may donate the fuselage of his R/C Fokker F.32.

HOW'S THAT AGAIN?

Passenger: "How often do aircraft of this type crash?"

Stewardess: "Only once."

"NEW" POWER SOURCE?

Reuters in London reports that a new form of natural rubber has been devel-

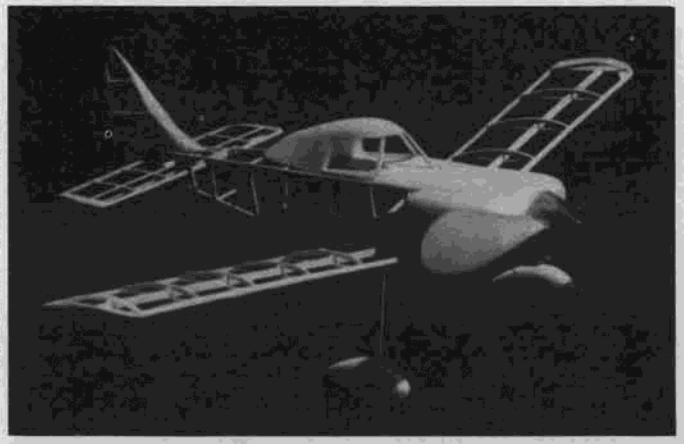
Continued on page 80

Where do these F/F Scale guys find these crazy flying machines? This here's a genuine Madison "Umbrella Plane" modeled by Dave Stott. Photo by Tony Farranda.

French autogyro specialist Georges Chaulet poses with his 1/5-scale Flettner Kolibri R/C model. Georges recently visited U.S.

Novel "Minnow" Bostonian indoor model by Terry Mrakava. Best time to date: 1 minute, 54 seconds.

PHOTOS BY FUDO TAKAGI



Pretty sporty looking, ain't she? The full-size aircraft won the Outstanding Design Award at the 1961 EAA Convention, and in 1962 it won an award for the best folding wing design. Model is simple to build and very stable, a good choice for those who want to take a crack at a low-winger.

"Ophelia Bumps" TURNER T-40

• N115ET is a single place, low wing, wood structured, homebuilt airplane which makes up into a very nice model. Wing dihedral and horizontal tail size have been increased from the scale dimensions and of course, the propeller diameter is larger than exact scale to improve the model's flying capabilities. The name "Ophelia Bumps" was on the original airplane in September 1965.

The structure of the model in the photos was constructed by my son, Douglas Martin Mooney. He kept procrastinating with respect to the covering of the model until **R/C Model Builder's** illustrious editor called and asked when another Peanut was to be forthcoming. As a consequence, the design and the covering job is the responsibility of the author.

The center of gravity came out exactly as shown on the plan, and with approximately 3/32 inch of washout in each wing that occurred upon shrinking and doping the model (which I would have adjusted into the model if it had not occurred automatically), the model flew right off without requiring any other adjustments.

The model's structure is relatively conventional. The fuselage is built by laying down two fuselage side frames directly over the plans, then adding the top and bottom crosspieces at each upright to create a fuselage box. This model has a simple rectangular section box except at the forward end, where the cowl shapes are provided by balsa blocks cemented to the structure and carved to the appropriate contours. The cabin structure is made separately. Cut a bottom panel to the large streamlined shape shown in the top view from 1/16 sheet. Cut the top panel to the small streamlined shape from 1/4-in. sheet. The cabin former is cut from 1/32 sheet. Assemble these parts and the forward windshield and window uprights, and then add the 1/32 sheet aft panels. Carve the top to the cabin cross-section. A windshield pattern is given which is exactly the shape of the one on the model. It should provide a good starting place, but try an oversize paper one to make sure of the exact fit on your individual model.

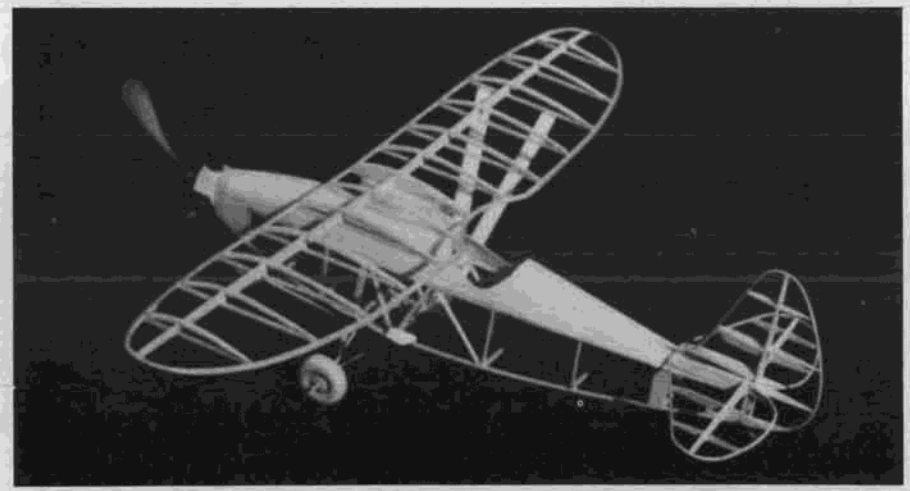
The nose block is made to plug into the front of the fuselage box. It includes the forward end of the carburetor air inlet which will tend to be subject to easy breakage unless reinforced by a couple of pins, indicated by two vertical dotted lines in the nose block front view.

The wing is built using the sliced rib method. Pin down the trailing edge over the plans; do likewise with the leading edge. Using 1/16 square balsa, cement the bottom caps of the ribs in place. Cut a one-piece spar out of 1/16 sheet, using the wing tip and spar center section details as a guide. Don't forget the tip gussets. Cement the left end of the spar in place on the bottom rib caps. When dry, cut the left-hand dihedral breaks in the leading and trailing edges and lift the left wing until the spar can be cemented to the right root rib, then lift the center section until the spar can be cemented to the right wing rib caps. Now slice the upper rib caps and cement them to the three spanwise structural members. Finally, add the wing tips. They can be made from 1/16 sheet, but note that they must be twisted from the spar to the trailing edge, as indicated in the tip detail.

The horizontal tail is a symmetrical surface that uses a thin top and bottom spar. Cut the spars from very hard 1/32 sheet or use model railroad basswood. The tips are carved from soft scrap balsa.

The vertical tail is similar except that it uses a single internal spar and has a sheeted leading edge and a carved balsa dorsal fairing. The trailing edge pieces are cut from 1/16 sheet; note the grain direction. Three of the bottom part are required to match the tail airfoil, and the

Continued on page 72



Walt's next Peanut is a Finnish homebuilt called the "Viri," very similar in outline to the Comper Swift ultralight of the early 1930's.

BALSA WINGTIPS 1/16 BY 1/8 LEADING EDGES.

NOTE SUB-SPARS FOR LANDING GEAR

WIRE SUPPORT

SHEET BALSA TIP GUSSETS

SOLDER

RIBS FROM SLICED 1/16TH SHEET BALSA.

1/16TH SHEET BALSA SPAR

WING PLAN VIEW

WING TIP DETAIL
SPAR CENTER-SECTION
DETAIL SKETCH.

1/16TH BY 1/8TH BALSA TRAILING EDGE

VERTICAL TAIL RIBS, MAKE FROM 1/16TH SHEET.

1/16TH DIA. ALUMINUM TUBE MOTOR PEG.

1/32ND SHEETING ON FIN L.E.

HORIZONTAL TAIL PLAN VIEW

FUSELAGE PLAN VIEW

WINDSHIELD PATTERN

SCALE TAIL SIZE

BLOCK CHEEK COWLS

NOSE BLOCK FRONT VIEW

CABIN CROSS-SECTION

BLOCK TOP COWL

CABIN FORMER

BLOCK BOTTOM COWL AND CARBURETOR FAIRING

5½ OR 6 INCH PLASTIC PROPELLER AND NYLON THRUST BUTTON.

PLASTIC OR BALSA SPINNER

THE MAIN FUSELAGE SIDE FRAME IS SHOWN HATCHED FOR CLARITY.

AIRPLANE SIDE VIEW

THREE PIECE BALSA WHEEL PANTS

SOFT PLASTIC LEG FAIRING

MAIN LANDING GEAR WIRE PATTERN.

"OPHELIA BUMPS" THE PROTOTYPE TURNER T-40 AS A PEANUT SCALE MODEL

TYPICAL TAIL RIB

Rich Cunningham seems to have lost his carrier ship, a common occurrence in Alba-turkey, New Mexico (at least that's what D.D. sez).

Unbelievable, but somehow that crepe paper streamer did manage to saw through the l.e. of this Cartier foam job at the '80 Nats.

Control line

By "DIRTY DAN" RUTHERFORD

PHOTOS BY CHARLIE JOHNSON

NEW JOB...

Now, I realize that you probably don't care a whole heck of a lot about my personal fortunes, good or otherwise, but whether you care or not, I do...

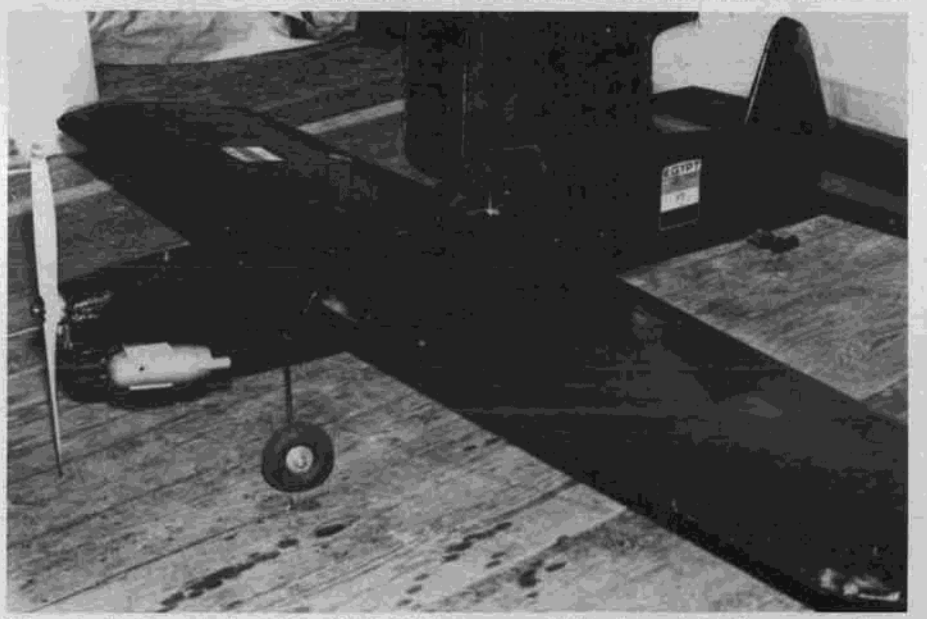
And so I am here to tell you that in the past few weeks I was lucky enough to finally ease out of a job that had gone sour, just in time to pick up on a terrific opportunity with an equally terrific company, Northwestern Hobby & Toy, located here in Seattle. OK, so it's not a "real" job, being instead a job as a sales rep, but it is something I am good at and enjoy, which is about all that counts, assuming one gets paid regularly, and I do.

Northwestern is a distributor of the obvious (toys and hobby stuff), which is nice, as it is so much easier to sell things that you are personally interested in, although I do have a bit of trouble with things like Donnie and Marie Osmond dolls, Mattel's Slime (with and without worms, believe it or not), pop-bead kits, crayons, tinkertoys and such. However, they are very heavily into plastic model kits, which are kinda neat, as well as the usual model railroad and model airplane hobby stuff.

What is not so obvious about Northwestern is that the company is just about the right size. Big enough to do nice things for you, and yet not so big that you get lost in the shuffle. For example, part of our agreement is that I be furnished a company car. A bigger company would simply go out and buy a bunch of what are basically dull, boring cars to drive and then pass them out. In this instance, however, I was told that I could drive anything I wanted, but I had to find the car and make the deal. And if it was too expensive I would have to kick in a bit with a slightly smaller-than-agreed-upon expense allowance. Which is why I didn't order a BMW 320i...

Luckily, Da Boss doesn't know much about cars (or at least claims he doesn't even though he drives a new Porsche to work each morning, a situation that bothers me some, as claiming to not know or care about cars and driving a Porsche is somewhat like buying Gucci shoes just because of the Gucci name

Continued on page 66



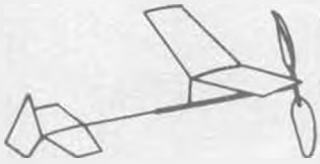
Sole entry by Egypt at the 1976 C/L World Champs was this lovely stock Nobler, powered by an O.S. engine. Didn't win.

Lorna Samuels with highly decorated, S.T. powered Badyear entry at Las Cruces, NM.

PHOTOS BY AUTHOR UNLESS NOTED

Carl Hedley gets set to crank the winds into his Peanut Udet U-2 lightplane at monthly MIAMA contest. Linstrum photo.

MIAMA club flier Nick DeCarlis prepares Fike E Peanut. Terry Rimert, right, rests throwing arm. Photo by Dave Linstrum.



INDOOR

By KEN JOHNSON

ON BUILDING INDOOR MODELS LIGHTER

Outdoor models must have pentration to fly into the wind. So, they need to be somewhat heavy. They fly fine outdoors but fly too fast indoors. Indoor airplanes fly slower and longer when constructed lighter. Since there is no wind indoors, wind penetration is not a factor.

Now, how can you make your indoor scale and Peanut models come out lighter? The rule I build by is this:

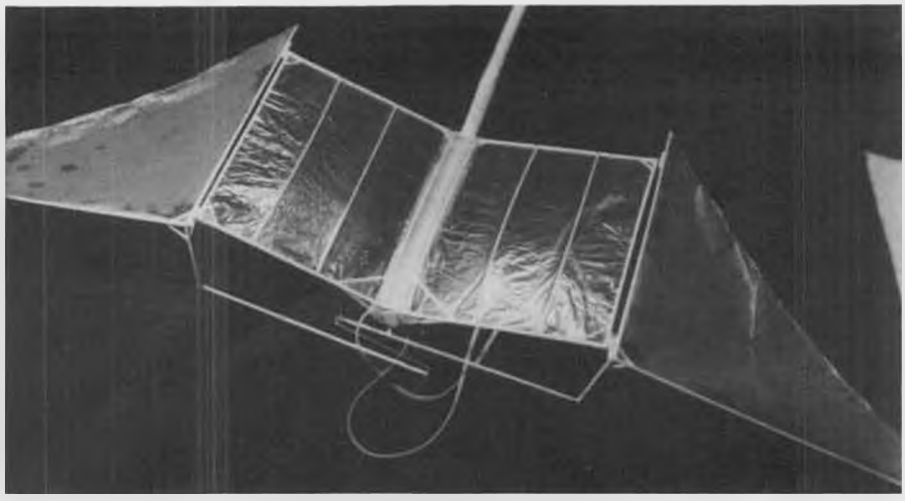
The airframe weight must be very light. To achieve this, I pick my wood very carefully. Look for the LIGHT WOOD. The slower the model flies, the less damage will result when it strikes an object, so you can get by with less structural strength and weight.

Use your cement very sparingly. Most modelers use much too much cement to build their models. I build with Testor's green label cement (fast drying). Start your model with a new tube. The cement in a new tube is lighter in consistency than that in a partially used tube. The longer a tube sets around, after being opened, the heavier it becomes. I use the small size tubes because the nozzle has a smaller opening and less glue comes out when squeezed. Put a small dot of cement on the glue joint and wipe off the excess with your finger.

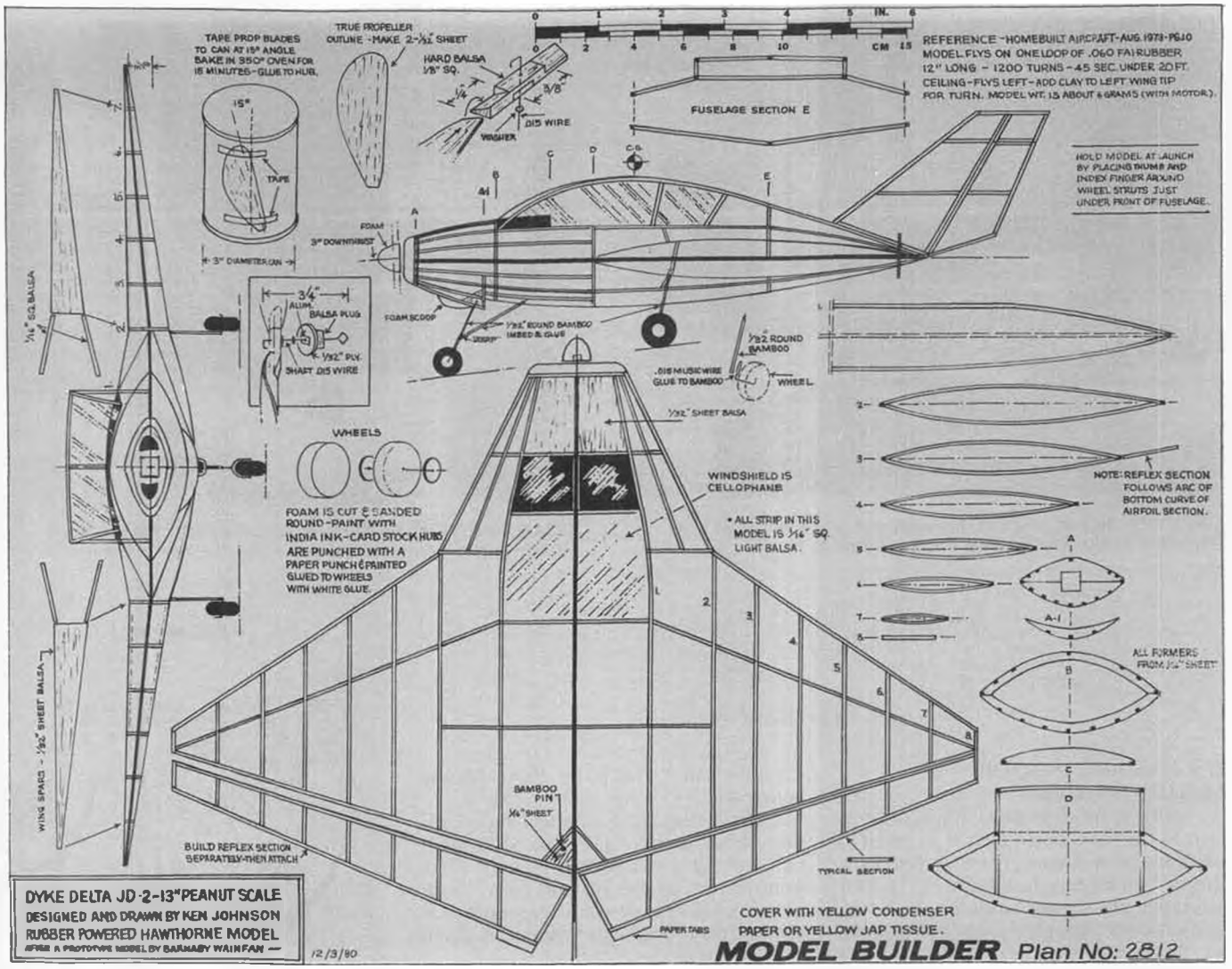
The wood should be between 5 and 8 lbs. per cubic foot density, preferably C-grain or quarter grain. I use 1/20 sq. balsa for longerons on Peanut scale models. Most hobby shops are stocking 1/20 sheet balsa in lighter weights now. Build a balsa stripper (see sketch) to strip the 1/20 sq. longerons. Peck-Polymers and Micro-X sell this size wood already stripped, but it costs more than stripping your own.

Using sliced wing ribs will save considerable weight. Again, the 1/20 sheet can be used for stripping ribs. The bottom part of the rib can be 1/20 sq. balsa. A 1/64 sheet spar is cemented on top of this; then the top rib part is glued in (starting at the front).

Wrapped or laminated wing tips are essential to saving weight. Slide a small piece of 1/32 poster board (available at art or variety stores) under the plan at the wingtip. Pinhole an outline 1/8 inch inside the tip outline and cut along the pinholes on the poster board, with scissors. Sand this template to make a smooth curve. Tape 1/8 x 1/2-inch strips of masking tape around the wood strip laminations and the end of the template. The wood strips must be soaked in warm water before starting the wrap. After the first strip is taped onto the template at both ends, a bead of thinned white glue is run along on top of the first strip. A second and a third strip are taped on top of the first, using the white glue between each. The template is then placed into a previously heated 300



Front end detail on our columnist's new wing flapper model (someone should tell him they're called "ornithopters"). Covering on the wing center section is Microlite, sold by Micro-X. Silk thread is glued along the t.e. of the flapping wings.



FULL SIZE PLANS AVAILABLE — SEE PAGE 100

degree oven for 15 minutes. Use care when removing the tip from the template. It may have to be cut away with the tip of a pointed Uber Skiver blade.

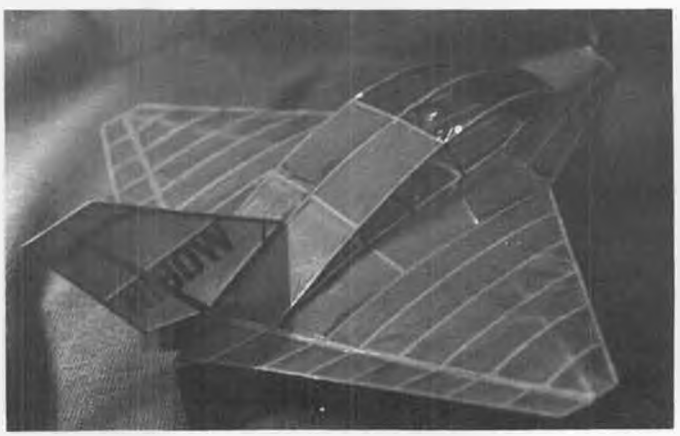
The stab and rudder outlines are made in the same way, using one fewer lamination.

Covering. My feeling on covering is that silkspan and Japanese tissue are outdoor covering materials and should not be used on indoor models. These materials are made to be coated with dope to ward off the weather. Since it doesn't rain indoors, this covering is not appropriate. Condenser paper is ideal for indoor scale since it is lightweight and still strong enough for indoor use without the addition of dope. The dyeing techniques are easy once you get on to them. Coloring of condenser paper will be reviewed in my next column.

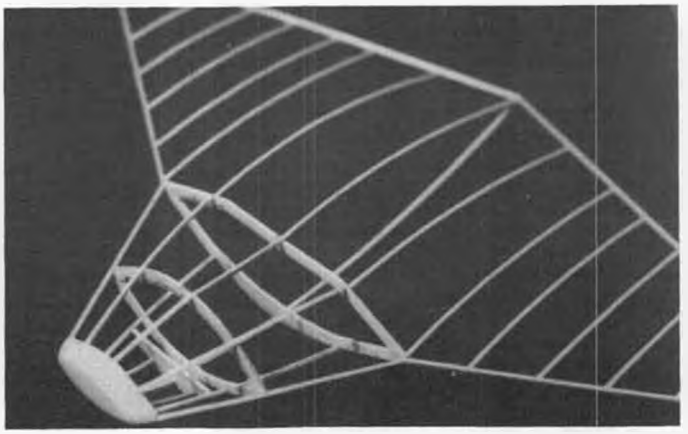
The views expressed here on lightening indoor models are contrary to those of some modelers, who perfer to build Japanese tissue covered, doped models for indoor. Fine. But for those who wish to see their models fly a little slower and a little longer, follow the suggestions listed here.

In summary, avoid all materials that add weight to the models, such as: Large masses of solid balsa; Large sizes and long lengths of wire; Heavier thicknesses of plastic for windshields; Heavy covering materials; Opaque and transparent dopes; and above all, plastic propellers.

A good example of an INDOOR scale model would be the Folkerts Racer sent to the Model Builder proxy contest some time ago by Kurt Enkenhus. Since I was a longtime indoor modeler, Kurt's



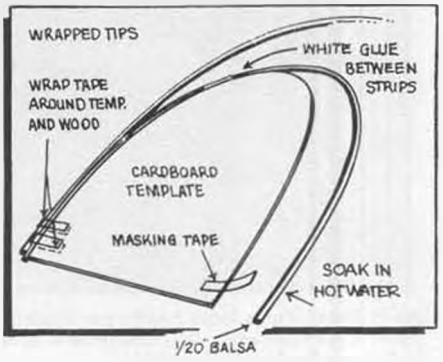
Three-quarter rear view of Ken Johnson's Dyke Delta Peanut (plans above). Note the reflexed trailing edge.



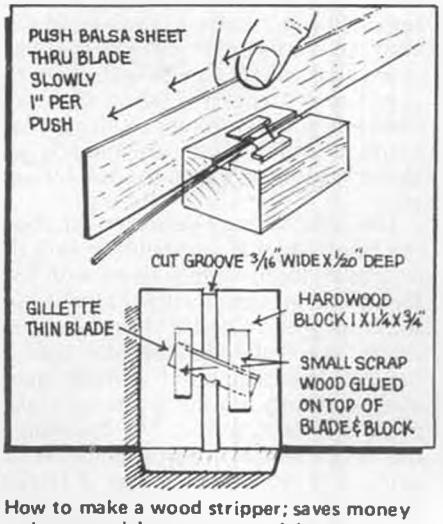
Construction of the Dyke is a bit different from most Peanuts, fully explained in text. Definitely not a beginner's project.

The MIAMA indoor gang, denizens of the Goodyear blimp hangar OPA LOCKA in Miami, Florida. Note the age spread . . . indoor is for *all* ages. Another photo by Dave Linstrum.

racer was given to me to fly. The lightness of this model was evident by the size of the rubber motor sent along to power the craft. As we wound the model, I noticed the nice coloring and attention to detail. As the Folkerts climbed out of my hand, I marveled at the slow, smooth climb. As the model touched down, the clock told the story. Over two minutes time under the 20-foot ceiling of the Long Beach College Gym. Of course, the racer won the event and the Grand Peanut Award. I wished I could have kept the model instead of sending it back to Mr. Enkenhus!



How to laminate flying surface outlines. White glue between strips adds strength.



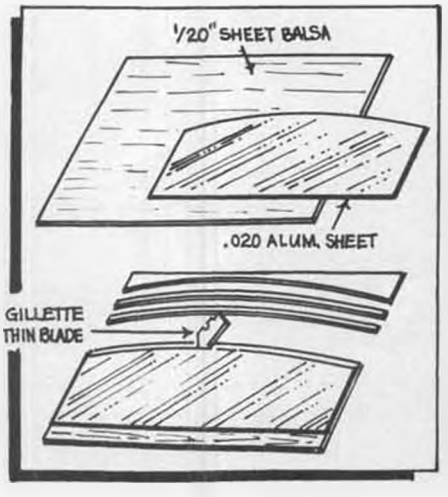
How to make a wood stripper; saves money and saves weight on your models.

THE DYKE DELTA

The model featured in this month's column is an unusual airplane. It has no horizontal supporting surface (stabilizer); for this reason it qualifies as a flying wing.

The Blacksheep model club of Burbank, California, is flying a new indoor event called Hawthorne Flying Wing. The Dyke was built for this event.

I had seen the Dyke Delta in various magazines without giving it much thought. It came to my attention one Thursday night at an indoor flying session at Burbank High School. One of the Blacksheep club members, Barnaby Wainfan, was trimming out a strange looking model and I watched as the craft flew better and better. Barnaby is a flying wing enthusiast and enjoys giving the hard-to-fly, "heart to fly." When I expressed an interest in the Dyke, Barnaby loaned me the model and the magazine with 3-view drawings and article on the Dyke.



How to slice ribs. An aluminum template and sharp razor blade are all you need.

I scaled up the drawings in the projection machine at work and roughed up a plan to build from. It was decided to make the plan to Peanut scale size (13-inch span) so that it could be flown either as a Hawthorne Flying Wing or as a regular Peanut scale model.

A study of Barnaby's model revealed that the Dyke should be built as a single unit . . . that is, that the fuselage and wings should be constructed all at the same time, by building the top half of the model, then taking it off the plan, turning it upside down and building the bottom half onto the top half (see photo).

The outline was made of 1/16 sq. light balsa. The formers were cut from the same 1/16 sheet wood. The wing ribs are the sliced rib type, which is my normal type of construction. After gluing in all the top ribs, the model was unpinned from the plan and the same shape ribs used on the wing bottom. The 1/32 spar was put in last. The formers were cut and glued into the fuselage. The stringers were then cemented into place.

Although Barnaby's Dyke had no landing gear, I decided to go the full treatment and add wheels to my model. My style is to make the wheels out of beadboard foam plastic. Here's how. A circle is drawn on the foam with a circle template (from the local art store). Next, cut out the rough wheel with a new sharp Gillette Thin Blade, broken in half lengthwise. The shaping is done with a medium sand block and the wheel is then painted with black India ink. The hub is of calling card paper and punched out with a paper punch (1/4-inch diameter round hole). After the hub is painted yellow and a small center hole drilled, the hub is then glued to the wheel with white glue and the hub holes aligned so that the wheel spins true.

The wheel struts are bamboo (from Peck-Polymers' new pack of 1/32 round bamboo). The .015 wire axle is bent and

Continued on page 82

A broken leg can't stop a champion! To prove it, here is Jeff Everson, the 1980 Florida Indoor Champ. Linstrum pic.

Ah, for the good old days . . . We're referring not so much to the Cyke-powered Goldberg Sailplane being launched by Amos Kleinsasser as to the flying site: the fabled Gardner Field area at Taft, a flight training base during WW-II. Absolute heaven for free flighters, it no longer exists.

FREE FLIGHT

by TOM HUTCHINSON

PHOTOS BY AUTHOR

• This past month has been like one of those "good news/bad news" stories. The day after I mailed in last month's column, my doctor discovered a cancer in my large intestine. That was the bad news. The good news is that the surgery was completely successful and the pathology report showed that the disease hadn't spread to the lymph system. So it looks like we caught the thing in the nick of time and I can look forward to many more maxes and downdrafts. (Even though my plumbing's been rearranged somewhat, I shouldn't have any trouble resuming all previous activities.)

Such a roller coaster ride through the Valley of the Shadow naturally leads to some profound thoughts, not all of which are appropriate for this column. But I would like to share some of my feelings during this recuperation period.

First of all, I feel a great deal more respect towards the much-maligned members of the medical profession. It was only their professionalism and skills that now permit me to have such a hopeful prognosis. I had none of the warning signs when the disease was discovered, but my previous medical history led them to make the necessary tests which led to an early diagnosis. Those seven danger signals that the American Cancer Society keeps publicizing should not be ignored if you encounter them! Early detection means greater chances for a cure . . . and about as many people are cured from cancer each year as die from it. Pay as much attention to your body as you do towards your favorite model!

I also learned from this experience just how many nice people I'm acquainted with, especially fellow modelers. Thanks to all of you who contacted me in the hospital! Your expressions of concern and support helped to make a difficult time immensely easier. I appreciate it more than words can express.

During the past weeks, I had a chance to meditate on just how much this hobby really means to me. It's been a large part of my life for the past 25 years, and will continue to be so. The hours spent designing, building, and flying have been golden ones for me. Just 15 minutes spent at the workbench at odd times during the day have provided me with the same kind of mental relief from stress that others can only find on the psychiatrist's couch. During the spell, even when I couldn't do anything else, I could think about future models and flying sessions as a goal to look forward to.

Keith Martin turns loose FAI Power model at Harts Lake Semifinals. Dad Charlie will be on U.S. team for 2nd time in 1981.

Dick Bloomquist preps his Satellite (3rd in B) at the 1980 Nats, while Bo Watson, who has attended every Nats since 1935, hands out advice. Photo by Dave Wineland.

The other thing I've observed about the hobby is that competition isn't the only way to have fun, even with free flight. The greatest thrill for me is to see something I created drifting along up there, gracefully fighting the laws of nature. The beauty of a flight exists independently of whether or not it takes place during a contest. The duration of the flight is not a major factor in the amount of enjoyment, either. A HLG or simple rubber model doing 30 seconds in a quiet schoolyard somewhere can be

just as thrilling as a ten-minute flyoff flight at Taft. What's more, you can enjoy the beauty of the flight either alone or with others.

When I think back on what modeling has been for me and will continue to be, I begin to wonder why I haven't done more to introduce others to the joys I've experienced. But it's something I intend to do more about in the future, as you'll read in forthcoming issues. How about you?

RM ENTERPRISES CEASES PRODUCTION

One of the casualties of the past month has been our kit-producing operation. My illness was the straw that broke the camel's back. We didn't get enough kits cut out during the summer before our move, then it took a while to get our shop set up. My wife and I both started new jobs this school year, and were getting behind even before I was hospitalized. The simplest way out was just to discontinue producing kits indefinitely, which we have done. We are not accepting any new orders, and will fill existing orders on a delayed basis.

I'm sorry to see the business go, but it added just too much pressure on the limited time I had left over after job and family responsibilities. We were in full production nearly five years, and I'm proud of the quality kits we put out during that time. We didn't make barrels of money, and we didn't expect to. But I ran into a lot of satisfied customers along the way, and not too many complaints. Thanks to all of you who supported the enterprise.

Plans for all the designs kitted by RM are still available for scratch-building. The original Dragmaster is Plan No. 38 from *M.A.N.*; the Ultimate Dragmaster is No. 141. *M.A.N.* also has 1/2A Maverick plans (Set No. 104). Carstens Publications has the Zingo (Set CF-271) as it originally appeared in *Flying Models*.

LOW CEILING HLG TIPS FROM DOWN UNDER

Last month's "indoor" column neglected to include anything about the most popular event, glider. The following piece from *South Island News* (New Zealand) by Stew Cox should help rectify the situation. Note that he is talking about low ceiling (35 feet or less), which probably includes the vast majority of indoor sites in this country.

Looking at previous Nats results for IHLG, one can nearly always identify a gap between the top half-dozen scores and the rest. This is due to the fact that the "rest" have been taken in by the apparent simplicity of indoor chucky. Normally members of this group are quite serious and build two or three new models per event because their earlier models were no good or broken. Conversely, the top group can be seen flying exactly the same models year after year, with replacements necessary only after overexuberant launches. It therefore appears appropriate to expose the secrets of the so-called indoor chucky elite. Basically the secret is summed up my Martin Dilly's (actually I think the quote was originally attributed to Bill Stout. TH) *saying . . . SIMPLICATE AND ADD MORE LIGHTNESS!*

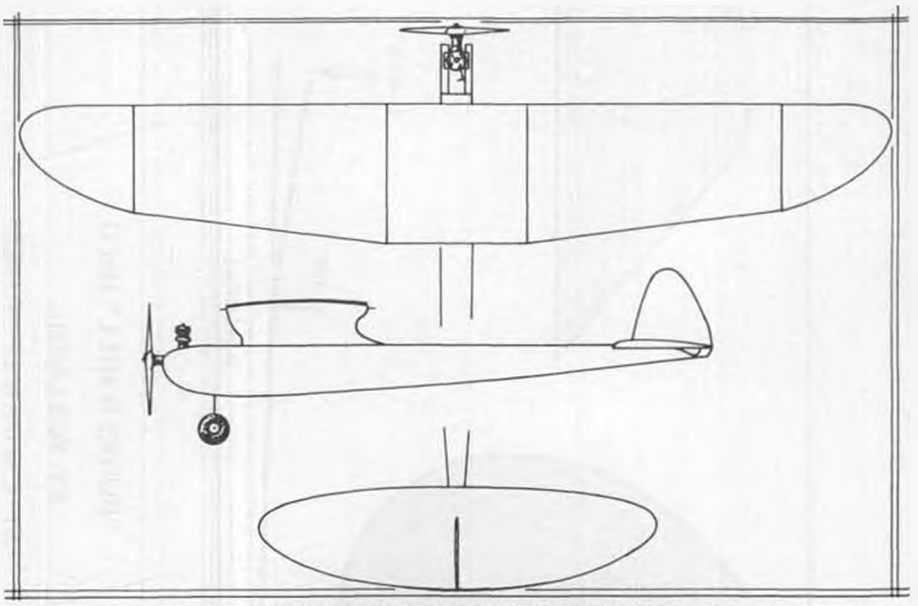
The critical factors:

DESIGN

Stick with a proven design . . . Sweepette, Bunker Hill, Coot, etc.

WEIGHT

The easiest way to assess the potential

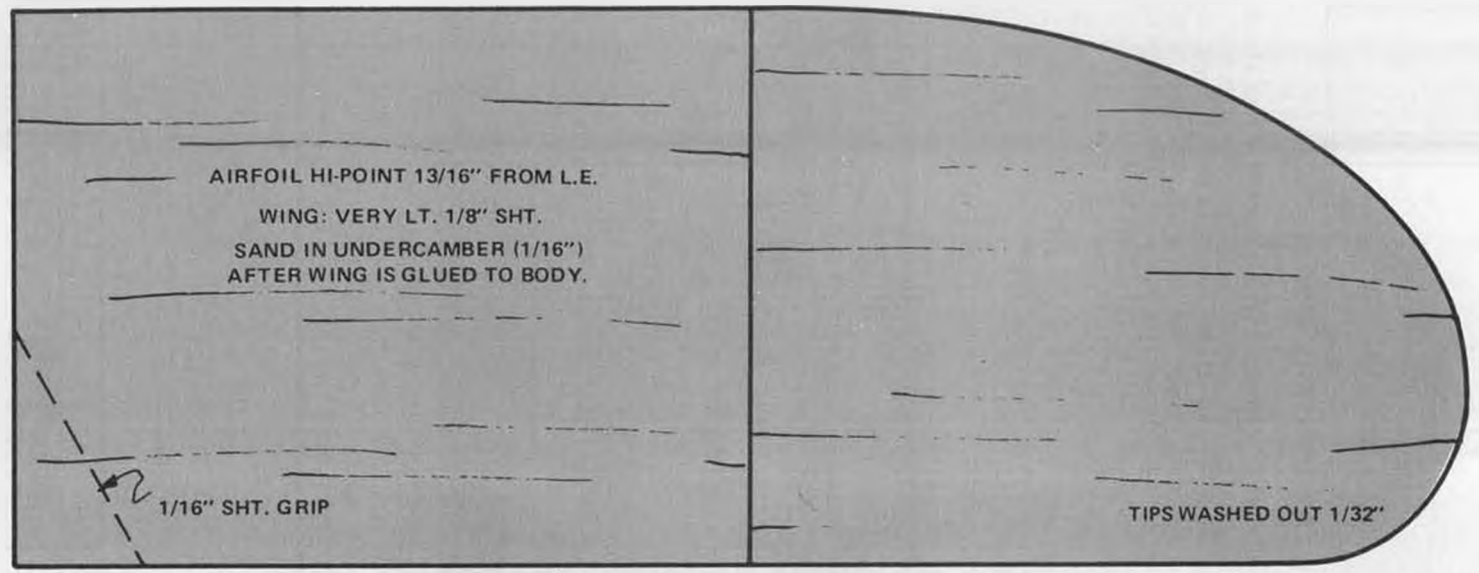


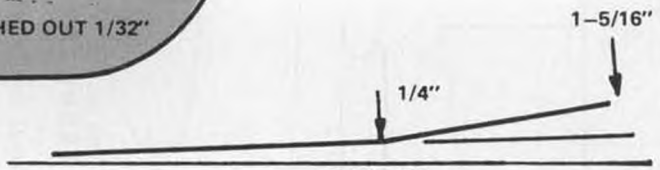
FEBRUARY MYSTERY MODEL

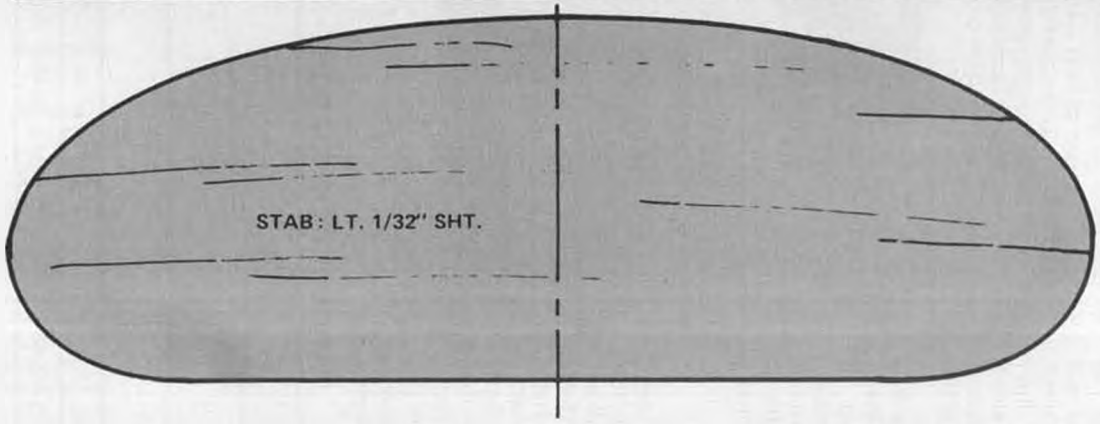
Mike Wineland set a new Cat. III 1/2A record with this simple Jedelsky wing design at the '80 Nats. Proud Papa Dave Wineland supplied the photo.

DARNED GOOD AIRFOIL — GOTT. 417

STATION	0	1.25	2.5	5	7.5	10	15	20	30	40	50	60	70	80	90	95	100
UPPER	0.65	2.5	3.75	5.05	6.25	7.05	8.15	8.85	9.3	9.15	8.85	7.55	6.25	4.5	2.4	1.2	0
LOWER	0.65	0.05	0.25	0.7	1.1	1.5	2.2	2.55	3.65	3.9	3.65	3.2	2.5	1.7	0.8	0.4	0



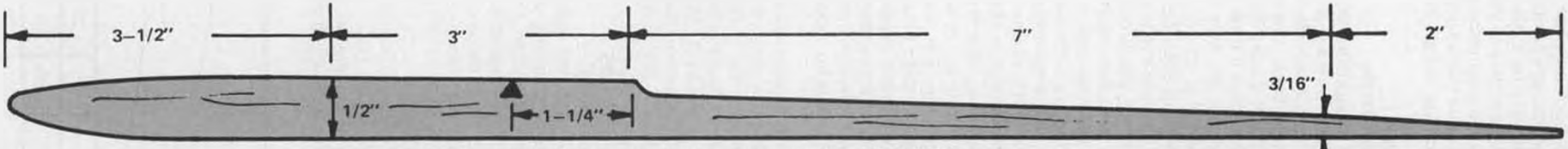




"BUNKER HILL" IHLG

BY: BOB LARSH

WT: 5.7g (FOR 42' CEILING)



MED. 3/32" SHT. FUSELAGE NOVICES – USE 1/8" SHT. FOR BODY

TRIM REAR OF BODY TO GIVE 1/64" NEGATIVE INCIDENCE BEFORE GLUING STAB.

Wakefield 47th placer, Great Britain's Ian Kaynes, winds his model at the 1973 F/F World Champs at Wiener Neustadt, Austria, rumored site of the 1983 Champs.

of other competitors is to listen to the sound when their models hit the wall or floor. A clunk or crack sound on impact signifies an overweight model for low ceiling use. Light weight models are critical in all facets of indoor flying, especially indoor chucky. Generally speaking, the lighter they are, the lighter they fall! The ensuing slower flying characteristics also reduce risk of damage on impact, ease trimming, and are more aesthetically pleasing. Model weight is a function of ceiling height, and a simple rule of thumb is if your model can touch the highest usable point of the ceiling, then it is too heavy to be used under that height. For ceilings under 30 feet, one should aim to have a total model weight below four grams for a competitive 16-inch-span design.

WOOD SELECTION

The ability to build a light model is dependent on the initial wood selection. Thus, implicit in the quest for lightness is access to a good set of scales. One should know what the model will weigh well before the assembly stage. Another rule of thumb when sanding away excess bulk and weight is: WHEN YOU THINK YOU'VE FINISHED SANDING, SAND AWAY SOME MORE.

Rigidity is another key factor which is built into the model at the wood selection stage. For the wing, this is normally achieved by starting with a light piece of wood much thicker than the desired end thickness and literally sanding in the wing section, rather than bending it to shape. The fuselage should be from a light, rigid, stringy piece of wood which splinters when broken rather than snapping clean. I have found repairs simple if the fuselage splinters.

THE THROW

Consistency IS the key word here. There are many ways to fine trim an indoor chucky, but all the throwing ability in the world is wasted if you can't THROW THE MODEL EXACTLY THE SAME EACH TIME. The way to achieve this is to hold the model exactly the same each time and from the same spot try to hit a point on the ceiling. Implicit in this exercise is concentration.

There are two ways to grip and throw the chucky. One is to hold the fuselage between thumb and forefinger under the wing leading edge and almost pull the model into the sky. I find this easy to control and puts less strain on the wings. The second method involves holding the fuselage behind the CG and flicking the model into the air. Whichever, ease into it slowly and warm up unless you want "indoor chucky elbow" to plague you.

AIR CONDITIONS

As fractions of a second determines the places at most events, timing your throws for the bouyant calm periods is best, to take maximum advantage of the air conditions. This involves judgment and experience to work out whether body heat, heaters, or sun reflecting off the floor will influence bouyancy. Calm air indoor is a function of the conditions outside the hall, so if the wind is dropping, wait. Never make official flights when a lot of people have been milling around in the hall, as the air will be turbulent . . . particularly if doors have been opened or closed.

OVERALL

I think it is fair to say that there is more to indoor chucky than meets the eye, but a small amount of extra effort/thinking makes for significant improvements and far more satisfying results. It is also important to note that the "secrets" mentioned here amount to nothing more than common sense, which is the guts of all model flying.

Nancy Thayer is holding a couple of Dave Andrews' models, if you're interested in them. An .09 Manito on the left, 1/2A Maverick on the right. Photo taken by Dave at the 25th Annual Eastern Canada Open.

INTERNATIONAL RUMORS DEPARTMENT

Peter Allnutt is the world's foremost example of a globe-trotting free flighter. His airlines job permits him to travel, and he can be spotted at nearly any large international free flight competition (though he hasn't made it to Harts Lake Prairie, yet). He made it down to the Sierra Cup and Juan Livotto contests in California this fall, from which I learned the following tidbit.

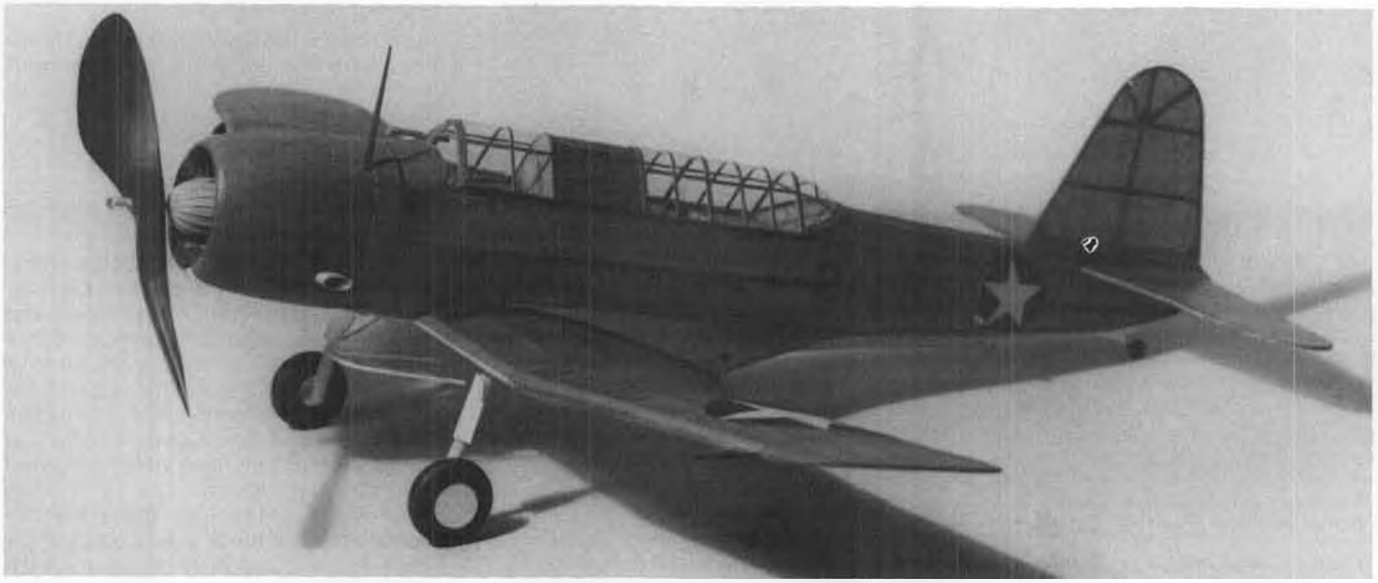
Peter went down to Cuba for the Cuban Nats. Flying was stopped for three days because of a hurricane, which gave him a good opportunity to hole up with Russian Power expert Eugen Verbitski. Verbitski speaks English (a fact not revealed at previous World Champs when in the presence of Soviet security types) and has spent the past year in Cuba training the Cuban team for the next World Champs. He'll be there another year, and will be either the Cuban team manager or perhaps a member of the Cuban team! This latter is possible because the FAI now requires only two years of residence in a country in order to represent it at a World Champs.

NEW NFFS SYMPO AN OUTSTANDING EFFORT!

I had a chance to read the 1980 NFFS Symposium and am happy to report that this year's volume is a vintage issue, full of a variety of technical papers and general interest items of extremely high

Continued on page 86

Russian Power expert Eugen Verbitski is now in Cuba, training their national F/F team for the 1981 World Champs. Here he prepares to launch at the '73 Champs, as a member of the Soviet team. Will he represent Cuba in 1981? See text.



PHOTOS BY AUTHOR

Latest masterpiece from the workbench of Texas scale expert Bill Caldwell is this WW-II classic, a Vought SB2U-I Vindicator. Bill didn't supply us with any details on the size or special construction features, but we'll bet it's a fine flier.

FREE FLIGHT SCALE

By FERNANDO RAMOS

• At this writing, it has been two months since the Flying Aces contest, and after seeing an excellent film of the event that Bill Noonan took, I have a few reflections. I once again cannot stress enough the significance of attending this most pleasurable contest, if you are truly interested in getting better at flying scale models. I realize that going across the country is not the cheapest thing you can do, but since the FAC Nats only occurs once every two years, one can start saving now!

Most of the Flightmasters who were watching this film were quite surprised at the winding technique that most modelers from the East employed. It seems that they have a rubber motor that is at least 50 to 80% longer than the length of the fuselage. Then the motor is stretched out five or six times the length, and the winding process is begun. When the model is launched it takes off like a screaming eagle. With few exceptions, this is the normal pattern. Many of us on the West Coast still have quite a bit to learn.

Bill Warner stated it rather succinctly when he said that many of us out here are too involved building and flying the whole gamut of modeling, whereas it appears that the Eastern modelers concentrate on rubber powered scale models exclusively. It's hard to get really good when one spreads himself out so thinly. *But*, who wants to be good? Ha!

The FAC meet went from Friday through Sunday, then the AMA Nats got started on Monday and continued during that week. Of the 107 modelers who attended the FAC bash, only about 10% stayed to fly at the Nats. Bill Noonan and I stayed over to help judge F/F Scale. There really isn't too much to say, except

Dave Smith came all the way from Arizona to attend the 1980 Flightmasters Annual at Mile Square in September, did better than a minute with his Comet P-38 in spite of a stiff breeze.

Bill Hannan's favorite airplane, the Farman Moustique, as built by Jim McMahon from the Flyline kit. Quiet flier with VL electric.

Alas, after several years of faithful service, Bob Haight's lovely Bellanca Columbia is no more, evidently a victim of the brisk wind.

that one can look upon the FAC meet as a dessert, and the AMA Nats as more or less a vegetable of a five-course meal. The overall number of entries was quite low, considering that this is supposed to be the granddaddy of all modeling events. There was much displeasure with the way everything was spread out. The dorms were in Dayton, indoor flying was held in Cincinnati (about 50 miles away), judging for the rest of the scale models was in Wilmington (about 35 miles from Dayton), and flying took place at Dayton-Wright. That really made a lot of driving for some of the competitors as well as for the judges.

The competition was nowhere near what it was a few days before among the FAC'ers, and my first impression was that of a local contest. I can understand why this is the case. Consider the logistics that the Nats personnel has to contend with, F/F being the stepchild and one that needs so much open space to be effective. With most of the other events, space is not nearly so critical. Finding a spot that can accommodate all of the various events is getting tougher and tougher. Many rumors were heard that this could be the last Nats in the format that has been used over the past several years, particularly since the Navy gave up the sponsorship. So, in my opinion, it isn't too hard for me to make a choice as to which I would rather attend. Even though my choice comes but once every two years, it is worth waiting for. At least, this gives me time to build and to start saving my money to prepare for the next time around.

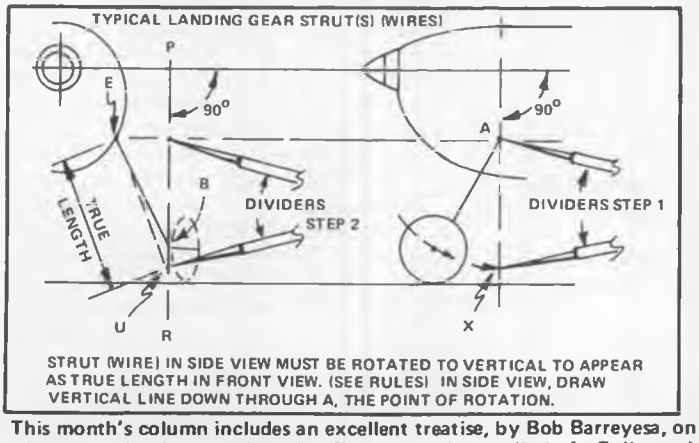
* * *

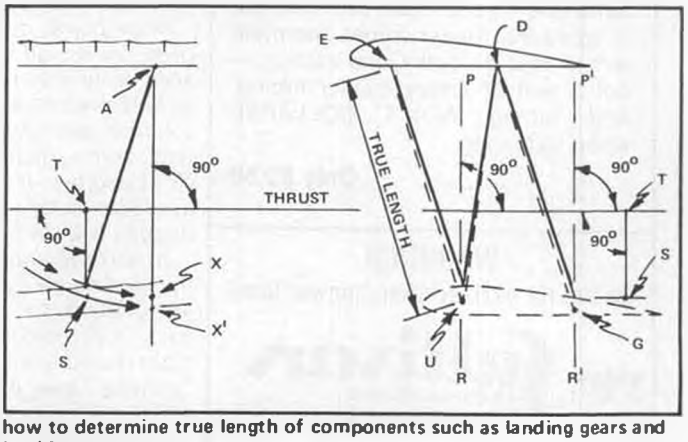
On the 20th and 21st of September, the Flightmasters club held its Annual Scale Meet. As usual, the judging was held on a Saturday afternoon, with the flying the following day. However, this time around the judging was held at my home, due to the fact that we had lost the place we had been using for the last several years. Since I have a good size backyard, it worked out very well. The atmosphere was more of a big family, having 70 models entered. Rubber led the group with the most entries; Peanut was next, followed by Power. This trend has been the same for quite some time, however we did have about 15 Power models, many of them gas powered.

Fernando Ramos's Arado 240 is unusual for a rubber twin, in that the props are not counter-rotating to cancel torque. Best time to date: 26 sec. He plans to build another, lighter version.

The "mystery fuselage" pictured back in the June '80 issue was for our columnist's Heinkel 64C, pre-WW-II lightplane. Still in the testing stages, but shows promise.

Even though we did not have a formal multi-engine event, we had five entered. Three were rubber powered, and two were electric. Dave Smith and Dick Howard of Arizona had beautiful flying multi-engine models taking to the skies. Dave's P-38 put in a flight of over one minute in a pretty stiff breeze. Walt Mooney had a Cessna C-106, and Bob Barker had a four-engined Messerschmitt ME-323-02. Both of these were the electric models. The rubber multi's were the P-39 of Dave Smith, and Dick Howard's ME-412 and push-pull Dornier ... all exquisite models. From British Columbia, Greg Davis had a beautiful diesel-powered Taube with much detail, which garnered him first in static scale. Eric Dittman and Larry Olson from Seattle each had exquisite models. Eric had a Piper Cub Coupe that was so neatly finished, it looked like a museum piece. Larry had a magnificent Halberstadt (built from Bob Holman plans), powered with a Cox .020. Along with Doug Hannay, who entered a neat Pilatus Porter rubber model, these four men rented a Piper Arrow and flew in





This month's column includes an excellent treatise, by Bob Barreyesa, on how to determine true length of components such as landing gears and wing struts. Looks complicated at first glance, but really isn't. Fully explained in text.

from Seattle. They plan to make this an annual Annual!

Flying on Sunday morning saw hordes of modelers and spectators. This has to be one of the largest crowds to see this particular event. I think that this was remarkable, since there really wasn't much publicity on the meet. The weather for the most part was OK, but the wind did manage to come up about noon, so the last two hours of the contest were a bit hairy.

I have to admit that I was unable to cover much of the flying portion of the contest, since I was flying as well. I should have just put my ships away and taken pictures of these beautiful flying models. Unfortunately, it didn't work out that way. As an example, Greg Davis put up his Taube several times, and I didn't get to see it fly once! There were many such examples I missed. However, I did get to see Ken Johnson's Jumbo Lockspeiser take to the air. This rubber-powered pusher giant was an incredible sight to see, with long, stable flights. No question that the larger models fly so much better than the very small models. They don't flitter around.

The Flightmasters Annual remains one of the best events for true scale anywhere. In fact, the Flightmasters club is slowly changing around to where most of its contests will be of the Flying Aces variety, with the exception of the Annual. This special event will always remain as scale as possible. In December, when the club holds its Jumbo/Peanut end-of-the-year scale contest, the rules will be Flying Aces. They hope to encourage more building and flying, particularly since models can be hand launched . . . Bill Warner ought to be happy about this one!

* * *

Bob Barreyesa of Sacramento sent in the following method for measuring true length:

Here's your chance to slay that paper dragon once and for all . . . the dragon, of course, being the heart-rending search for True Length. Put your math books, that abacus, and those calculators, on "hold." The geometric mathematical way is correct, but introduces the possibility of error(s) in measuring and calculating the exact lengths of whatever part is involved, and does not result in a layout for building.

Your plans, if they show three complete views, all at the same scale and accurately drawn, contain all you need to find any true length graphically, using a simple pair of dividers and/or a compass, and a squaring device (90° square or triangle). If this equipment isn't available, scraps of paper for marking lengths will do fine.

In Orthographic Projection, which is the real name for "three-views," there are actually six views available: front, back, top, bottom, left-hand side, and right-hand side. The views are the "picture" box, each side of which is at 90° to all adjacent sides; therefore, any slanted lines are foreshortened. But because there is another view 90° "around the corner" from the one with the foreshortened line or part, this line or part can be shown in its true length, on one of these "around the 90° corner" views. Keep in mind the following rules:

- *Any line or part shown VERTICAL in the SIDE VIEW, will show in true length on the FRONT/BACK VIEW.*
- *Any line or part shown HORIZONTAL in the SIDE VIEW will be true length in the TOP/BOTTOM LINE.*
- *A line or part shown VERTICAL in the FRONT/BACK VIEW, is true length in the SIDE VIEW.*

Now that it's been said, it begins to become clearer, what? Two steps, at the most, are required to develop a true length. As an example, refer to Figure A. In the front view, draw a vertical line PR (the plane of rotation) down through B, the point to be rotated. In the side view, draw an arc, centered at A, down through the axle to point X. With dividers, or equivalent, transfer length of AX in side view (step 1) to line PR in the front view (step 2). This establishes point U. True length is dashed line EU, for Eureka!

Interplane Struts: Accuracy is imperative here. Wing struts connect two parts of the structure and must be an exact fit, not just "open ended" like the landing gear struts, which must merely reach the ground.

The airframe must have been built to the exact dimensions of the plans on which you are finding true lengths. Even small variations will bring on a "no fit." Though it can all be done right on the plans, if the airframe matches exactly the plans, the most sanitary procedure is to trace the essential geometry on a semi-transparent sheet of paper laid over the plans, where any corrections for "as drawn," vs. "as built," are easily made, and a complete layout of the struts at true length can be drawn for building. Any errors on your expensive plans are now about to emerge, and the chaplain's office should be alerted.

The true lengths can be shown on the front view, but here we will do the number onto the side view, to demonstrate the reversed procedure and also to end up with a layout to build on.

Struts in Figure B are shown as lines (wires) between attach points. Width and thickness can be drawn in on the true length building layout, if desired or required. Look hopeless? Don't despair. The clutter in Figure B is caused by the presence of all the direction signs. Your layout won't have all that jazz. Most of the process is drawing lines accurately, to establish points . . . not any harder than measuring accurately, and there is a permanent record (the lines on the paper). If done as a tracing over the plan, you will lift up the tracing with only the true lengths and a few construction lines showing. (Dashed lines in the side view are true lengths here.) Take it step by step into the promised land.

Transfer with dividers (not shown), the line TS (thrust to strut) in the side

Butterfly II

Easy To Fly

KIT INCLUDES MACHINE SANDED RIBS AND PRE-SHAPED FUSELAGE SIDES

Wing Span	99 in.
Wing Area	916 sq. in.
Airfoil	FB1151
Recommended Engine Size	09 – 19
Recommended Radio	3 channel
Flying Weight	50 oz.
Wing Loading	7¼ oz./sq. ft.

Designed by Bill Carter

TAKE-APART WING
REMOVABLE TAIL

CAT. 201 $56.95

STRAIGHT TALK FOR THE BEGINNER

Up until the time of the introduction of the BUTTERFLY II, the most popular kit trainers on the market have required flying skills far beyond those expected of one just entering the sport. In fact, the vast majority of these "trainers" were never successfully flown. Typically, their take-off and landing speeds are 35 to 40 mph. Of course some of the "trainers" were never completed, yet many, which were beautifully built, were reduced to rubble on their first day out.

The BUTTERFLY II is not only rugged and crash resistant, but it takes off and lands at only 18 mph; time to observe, time to think, time to correct. This slow flight also gives it a true-to-scale flight appearance, i.e., more like an eagle in flight than a housefly.

The entire R/C model industry wants you to succeed, and Craft-Air, Inc. is proud to be able to give you the best chance of success.

Piece O' Cake

A PIECE O' CAKE (easy) TO BUILD

A PIECE O' CAKE (easy) TO FLY

Designed by Tom Williams

. . .a trainer
. . .uncomplicated to build
. . .simple, detailed instructions
. . .step by step construction photos
. . .flys slow-w-w-w-w-w
. . .crash resistant
. . .easy on the pocket book
. . .needs only
½ A Engine
2 channel radio
wheels
glue and
covering

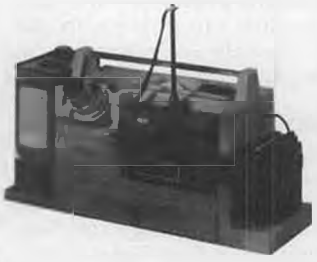
CAT. 202 $24.95

Wing Span	6 ft.
Wing Area	573 in.²
Flying Weight	24 oz.
Landing Speed	16 m.p.h. (most trainers . . .25-35 m.p.h.)
Wing Loading	6 oz./ft.²
Engine	.049 reed valve
Airfoil	FB1151

INCLUDES CLEVISES, HORNS, CONTROL RODS, FORMED LANDING GEAR, WHEEL RETAINERS, AND EVEN SERVO RAILS.

FIELD SUPPORT BOX

A QUALITY FIELD SUPPORT BOX AT A REASONABLE PRICE.



- Ready to use – NOT A KIT
- Roto-cast polyethylene
- Light weight and practically indestructible
- Attractive and easy to keep clean
- Holds any size can of fuel securely
- Removable 4x7x4 ditty well in top
- Has room for mounting power panel, etc.
- Holds any size transmitter securely
- Holds any starter in special starter well
- Holds any motorcycle or Gel-Cell battery securely
- Large 12½x6¾x2 drawer for props, tools, etc.
- 10 minute instructions for optional aircraft cradle

CAT. 500 $34.95

UPSTART

From this

to this

in about 15 minutes!!

Your choice of 2 Sizes
#508 UPSTART 2m
(1/8" rubber)
#509 UPSTART STD
(3/16" rubber)
$19.95

- DESIGNED FOR LAUNCHING 2 METER AND STANDARD CLASS SAILPLANES IN LIMITED SPACE.
- PRODUCES LAUNCHES OF OVER 200' AND REQUIRES ONLY A 300' FIELD.
- EVERY HIGH SCHOOL ATHLETIC FIELD BECOMES A SAILPLANE AIRPORT.
- THE UPSTART KIT CAN BE ASSEMBLED IN ABOUT 15 MINUTE AND INCLUDES SURGICAL LATEX TUBING, NYLON LINE, STEEL STAKE, PARACHUTE, COMPLETELY MACHINED PLYWOOD REEL, ALL HARDWARE AND INSTRUCTIONS.

HI-START

- Injection Molded Custom Reel
- One Piece U.V. Stabilized Surgical Tubing
- Nylon Tow Line
- Strong, Light Parachute
- Steel Stake
- Steel Tow Ring
- Strong, Steady Power
- Easy to Lay Out
- Easy to Retrieve
- Easy to Stow
- Easy to Store

STANDARD CLASS HI-START
CAT. 502 . . . . . $49.95
CAT. 505 (Tubing Only) $29.95

OPEN CLASS HI-START
CAT. 503 . . . . . $56.95
CAT. 506 (Tubing Only) $36.95

HI-START PARACHUTE
CAT. 510 . . . . . $5.95

PARA-POD

CAT. 511 $9.95

- A launching pod that drops off when the engine stops, and comes down on its own parachute.
- Fits all sailplanes up to 10 ft.
- Automatic drop or command drop (3rd channel not required).
- Takes engine up to .15 cur. in.
- Low engine power requirements (.049 takes 2 lb. glider 800').
- Includes parachute.

DUAL RANGE Expanded Scale Voltmeter

The only device which allows pilot to predict safe flight time available from receiver and transmitter Ni-Cads.

IT'S A FACT!

If you fly R/C, sooner or later you'll have a battery failure! There are just two ways to find that out:
1. CRASH YOUR AIRPLANE.
2. MEASURE THE POTENTIAL OF YOUR BATTERY BEFORE YOU FLY!

SOLID STATE CIRCUITRY

- Know how much safe flight time is available before each flight.
- Know the voltage available to the receiver and transmitter.
- Know the condition of the airborne battery.
- Know the condition of the transmitter battery.
- Plot a characteristic voltage vs time curve at simulated load.

$19.95 Introductory Special

- Cycle the batteries to prevent memory.
- Detect shorted or weak cells before it's too late.
- Use the meter on any 4-cell (4.8 volt) Ni-Cad battery.
- Use the meter on any 8-cell (9.6 volt) Ni-Cad battery.

CAT. 501 $24.95

Built-in load simulates normal average flight battery load.
1 YEAR GUARANTEE

Craft-Air, Inc. 20115 NORDHOFF STREET • CHATSWORTH, CALIFORNIA 91311 (213) 998-3700

view to the front view, to establish the location of the aft strut lower end in the front view. Aha! Could that be one you've been overlooking?

In the front view, draw a vertical line down from A, the upper strut end-point. In the side view draw vertical plane of rotation line PR and P'R' down through the lower strut end-points. In the front view, rotate the struts to vertical with an arc centered at A, establishing points X and X'. Transfer length of AX (front view) onto PR (side view), establishing point U. True length of the front strut is line EU, for Eureka! Transfer length of AX' (front view) onto P'R' (side view), establishing point G. True length of aft strut is line DG, for doggone! Draw in true length of center strut, line DU, for deucedly uncanny!!

In closing for this month, I have to tell you about a couple of publications that I have received recently, ones I believe you will enjoy. The first one is really a newsletter for WW-I buffs, one which really covers the gamut for this most specialized area. I was surprised to see how many of these full-size replicas are being built all over this country. The publishers have also planned a most comprehensive publication to cover model aeronautics. It will feature information about modeling the 1903-1919 era aircraft and will include items about color, camouflage, and markings. Also covered will be the art of detailing these WW-I models, including how to make special tools to accomplish some of this detailing. It is planned to have the issue out in March of 1981, and the cost will be . . . are you ready for this? . . . $3.50!! You must, however, send your money in advance. For further information, send money to World War I Aeroplanes, c/o Leonard E. Opdycke, 15 Crescent Road, Poughkeepsie, NY 12501. If you want this excellent publication, send at least ten bucks.

The next publication, under the subtitle of Famous Aircraft of the National Air and Space Museum No. 4, *Albatross D.VA: German Fighter of World War I.* This covers the entire restoration from beginning to end of this most famous WW-I fighter. The paper it is printed on is the best possible, and the photographs are just out of this world. For the scale modeler, this beats anything I have ever seen, and it gives insight into what it took to build these kinds of aircraft when the Big War was on. Every aspect of the aircraft is covered in detail, showing both the original condition and the newly finished parts and structures. The cost of this publication is $7.95, which in this day and age is quite a bargain. •

C/L . . . . . *Continued from page 54*

and I think it best to just back off on this subject as there is the off-chance that DB will sometime read this). Anyway, I ended up with what has so far been a terrific little car, a Datsun 200SX, mostly because it is a sporty kind of sedan and has a motor/gearbox combination that would warm the soul of any onramp racer. By the time you read this, friends and I will have lowered the car a little, in the front for sure, possibly all the way around, installed the usual air dam, striped it, and fitted some kind of aftermarket wheels. Surely they knew before hiring me that I was just slightly strange in my tastes; if not, then, well, the street-racer company car ought to give them pause for thought. . .

With that, I am searching for a way to tie it all in with C/L, which is what I am supposed to be writing about. And that is fairly simple, as for the past few months I have had a lot on my mind, worrying about where to look for a new job, especially the fact that said job might involve some form of for-real work, as in coming in at a specified time of the day . . . never late, of course . . . scratching about doing something very boring and then banging a way home through rush-hour traffic. Retch, gag and phooey. . .

So that situation has had its effect on the C/L column. It is hard to write in a free and easy manner when other things are running around in the skull, interfering with thought processes that are already very suspect to begin with. No more. The needle is pointing to "Medium Wacko" and it's time to get it on.

SOME FRIENDS ARE JERKS. . .

In between writing the above few sentences and this piece, I talked to a friend, Dick Reed, who also works for Northwestern. This morning I took the usable remains of a Cox Sportavia to him, as he has one and will undoubtedly bash it all to pieces on the first flight and will need the spare stuff that I have and don't want. I left it all in the back seat of the car, he picked it up on the way out of the office. But I had also laid a fresh-bought copy of *AutoWeek* on the back seat. Hadn't even opened the cover yet, was planning on reading all about the split between FOCA and FISA in Formula 1 racing. At this moment, Reed is eating a hamburger, spilling the excess on my new magazine. Pulp mag though it may be, it is still mine and it is hard to read around food spillages, assuming same doesn't stick some of the pages together. My revenge will be the fact that he won't be able to fly something as mild as a Sportavia, needing to use the spare pieces I donated to the cause. These pieces are in, uh, let's just say less-than-perfect condition, needing some repair before being entrusted to keeping a model aloft. I think I'll let him find that out when the model is a few hundred feet high and in a maneuver slightly more strenuous than simple level flight. . .

ANOTHER VERSION OF WHY C/L IS BETTER THAN R/C

Sure, we've been down this road before, going over the fact that in C/L you can actually feel the model in flight, the response is (usually) instantaneous, the models are less expensive, and quite

often more expendable, resulting in the balance between wanting to not break the model and yet put on a hell of a show for the folk, swinging over to dazzle them with all manner of low-level, high-speed, arm-pumping exhibitions . . . hmmm, this is turning into one of those weird sentences again, isn't it? We'll end it off with a couple of and so-on's plus one etc.

Anyway, one of the things I do is fly a little R/C, and lately it seems that during the winter is the only time convenient for me, allowed for by the fact that we quite often have rather pleasant weekends up here, even during the winter, times that are nicely spent boring a few holes in the sky. So last week I finally built a Quikray-500, a kit from Lou Andrews (thanks, Lou, it is a nice kit). And while finishing it up, it was realized that when a C/L model is done, it really is *done* and ready to fly. No need to make motor noises and hand-fly the thing around the shop, it's ready to go. Not so with an R/C model. You get the model done . . . you know, covering on, motor mounted, wheels someplace appropriate and all that . . . and then you still have to put the damn radio in. It takes *forever* to get all that stuff properly positioned and hooked up to the control surfaces. Sure, it looks simple . . . once it is all in place, anyway.

Our friends who have only built and flown R/C models and for some strange reason read this column probably don't understand that most C/L models have the control system built in while the basic framework is being assembled. But of course that is the case, and it makes it so handy that you have to build something R/C to appreciate the difference.

Another interesting aspect is that it is common to buy a complete model, the remoteo controlleo type, that only needs to have a radio installed to be ready to fly. And I'm not talking about those foam models that look like the product of a machine that molds foam beer coolers gone crazy, but the custom-built wood models done up by various people, in some cases available nationally, being advertised in the modeling magazines. It would seem to me that these people are going at it the wrong way. The framing of a model is the fun part, the radio installation is the boring side of things. I'll build the things, and would actually pay somebody to install the magic boxes containing gears and electronic mysteries.

OL' BLU LIFTS HIS LEG

If you can't figure the lead-in, it is only because you have yet to see a copy of Glenn Lee's stationery, featuring an "Ol' Blu" type of coon dog sniffling his way up to a tree that presumably contains a racoon. And if you can recall the old joke that ends in "Shoot Blu, shoot Ol' Blu," as the fellow falls out of the tree, you know the story behind it all.

On my latest sample of this stationery, Glenn writes:

Hi Dan,

We avidly read your column and see that you had to go to more stringent rules for your Northwest Sport Race event. Seems that happens in every racing event we try, nothing stays "sport" very long. We still fly our Midwest Sport Race event using the same rules that were originally proposed for AMA Slow Rat. Frost, Bill Lee and the Contest Board totally fouled that event up. If present trends continue, we will have three Fast Rat events, what with the 3.5cc engines in Goodyear!

So we keep trying to invent an event for sport racing. I think I have it, rules are included for our "Treetown Swap Race." We tried it in October . . . worked great! It was fun and eliminates all professionalism, hot engines, etc.

Try it! OK to use in your column. Glenn.

TREETOWN SWAP RACE RULES

AMA unified racing rules will apply with the following modifications:

1) Airplane can be anything that flies.

2) One takeoff wheel required, airplane must ROG.

3) Engine must be any non-Schnuerle .29 to .36, no diesels.

4) Shut-off optional.

5) Fuel tank 2 oz. maximum.

6) Lines .014 minimum dia., 60 feet nominal length, entrant uses his own lines.

7) Fuel should be 15% maximum nitro.

8) Engine must hand start and must run. Event Director has the right to hammer those that don't into the concrete.

9) Any airplane that don't fly gets stomped.

10) Four fliers per heat.

11) Race: All airplanes are numbered, entrants draw a number out of a hat. He flies or pits whatever airplane he draws, even his own if drawn! Race will be 100 laps or number of laps in ten minutes.

About all I can say here is that, if nothing else, this certainly does prove that the Treetown club has a number of trusting souls and that they will try just about anything. Don't forget that this is the same group that initiated *indoor* C/L racing, using itty-bitty models powered by similarly itty-bitty CO_2 motors.

Only thing that bothers me about these guys is the name of the club. Living here in the Northwest, where you can't hardly walk more than 100 feet in a straight line without coming into more or less intimate contact with a tree, it is indeed hard to imagine a place called Treetown. I mean, it seems as if 90% of the trees in all the world are in my backyard, or at least close, and we certainly don't have a Treetown around here. We do have a close-by town, Shelton, that claims to be the Christmas tree capital of the world, and it may be, as it certainly has few other claims to fame, other than the longest trains you have ever seen (oddly enough, not loaded down with Christmas trees)

crossing the *only* road out of town. I know; just last week I spent ten minutes trying to find that other, non-existent road and fifteen minutes getting back into line to wait another five minutes for that train. Taverns in Shelton seem to do a good business right at train crossing time and no longer does it seem odd that many of them are so close to the tracks. Used to think it was some kind of strange zoning ordinance. . .

(Hey, I told you the needle was pointing to "Medium Wacko," you were warned and could have flipped over to nitty-gritty modeling reading some minutes ago.)

Back to Swap Race, it sounds as strange to me as Northwest Sport Race probably does to any number of other C/L fliers, but if it works and everybody has a good time, then it is the best.

Glenn's comment about the change in NWSR rules leads me to think that possibly I presented the changes in the wrong light. Actually, the event has been going from strength to strength. More and more racers are becoming involved and, as planned, the new guys have been able to put together winning, not just competitive, but winning combinations, often blowing out the more experienced racers. You say you don't believe that? No problem, I have the ultimate example, as well as the last word. And the word is that Rich Schaper, hard-core, dyed-in-the-wool Stunt Freak, Stunt Grunt, Serious Stunt Flier, whatever, finished the '79-'80 Drizzle Circuit with a second overall finish in NWSR. No offense, but if you can take an SSF and turn him into a successful racer with *any* event, that event doesn't close the door on anybody capable of building a profile model and starting a mildly timed engine. (Ever notice how, when somebody says "no offense, but. . ." they are just about ready to say something that is offending? Apologies to all who have ever entered a Stunt contest, planning on being able to do all of the maneuvers and hoping they are in the right sequence.)

Really don't mean to wander so much this month; must be all of the beer, the desk is so cluttered with empties that the carriage on the typer knocks over a couple on almost every pass. . .

To the point, NWSR rules were changed to allow only Fox .35's primarily because the favored motor, K&B's plain bearing .35, was discontinued by K&B, as was the second favorite, the Fox .36 plain bearing, single bypass motor. It would be terrible to have such a successful event dominated by motors made of unobtainium, hence the change to the readily available Fox .35.

A BOOK ABOUT JIM WALKER

Again ripping from the *Flying Lines* newsletter, here is part of a letter from R.F. (Steve) Stevenson:

Recently big ideas and things have been started by Frank D. Macy, in Milwaukie, Oregon. He is now compiling a history and will soon write a book, "Jim Walker: Fireball in the Sky." He also is collecting artifacts and memorabilia from around the nation. Frank will soon assemble his Jim Walker Memorial Museum in Portland, Oregon, and will be in the Oregon Historical Society for the exhibit space in their new building. He recently received the original R/C lawn mower and has just received approval from the Walker family to obtain many rolls of film of Jim Walker, many from the Nats. These are both black-and-white and color, some silent, some sound. The film is in the ownership of some of the relatives and it has been agreed upon to donate the film to this effort.

Macy has located the man who took many of the movies himself. He worked for Jim for about four years. He has agreed to edit and narrate where needed. Frank will be ready by next spring to come up to Seattle and put on a program to "spend an evening with Jim Walker." Bob Florence of the R/C Model Shop in Bellevue, Washington, will rent a large hall somewhere so all the modelers can see the show.

For information about the project, contact Frank D. Macy, 5200 S.E. Jennings Ave., No. 11, Milwaukie, OR 97222. Phone number is (503) 653-7436.

I have to admit that I don't recall meeting this Mr. Macy, but it sounds as if he is into something that really ought to be done, that of writing a book about Jim Walker. From what I know, one book won't cover all the stuff Walker did, but wouldn't it be terrific to be able to read about this promotion whiz Jim Walker and many of his wild exploits? Hopefully, Mr. Macy is doing careful research and has already contacted Obe St. Claire, who had to prove in court that it was in fact he who invented the C/L model. . .

If you can help in any way with the tremendous job of collecting pictures, models, plans, kits, anything having to do with Jim Walker, write to Macy direct, or call. Evidently Stevenson is already heavy into helping with the project; here is a list of stuff from Steve's collection that he has sent to Macy: Handmade plywood "U-Reely" handle; Fire-Kitten 1/2A kit; complete, new-in-box Fire-Cat kit, 43-inch span; new-in-box Fireball pontoons; Ceiling Walker; complete, used, Jim Walker Firecracker .065 glow engine with exhaust and venturi clapper valve throttle control with squeeze blub; plastic tubing and metal prop; Firecracker .065 glow standard, new-in-box; and finally, a "U-Reely" remote electric high-low button for two-speed ignition motors, new in the box.

Dan Rutherford, 4705 237th Pl. S.E., Bothell, WA 98011. •

Boats . . . . . *Continued from page 28*

thanks, H.A., for taking the time to send in the information. And in response to one of your questions, no one in my area

MAKE YOUR MODEL SNAZZY IN ONLY 5 MINUTES:
JUST PRESS ON COVERITE'S NEW GRAPHICS!

Pressure-sensitive numbers & letters that are perfectly die-cut. The only ones made of 100% cast vinyl. That means total fuel & weather resistance.

WILL NOT CRACK OR PEEL

Graphics are made of 100% cast vinyl. Glass-smooth yet micro-thin. Unlike the typical mylar or water transfer decal, Graphics will not crack, peel or harden.

GOOF-PROOF ADHESIVE

Graphics have a special pressure-sensitive adhesive that gives you time to correct mistakes. During the first hour or so, the adhesive sets up slowly, allowing you to lift and re-position. This goof-proof feature plus a simple alignment system makes it easy to produce perfect results every time. Ask your dealer to show you the Graphics Pak—the alignment system is on the back.

AMAZINGLY FUELPROOF

We all know how annoying it is to have fuel creep under a decal, causing the edges to curl up, and sometimes have the decal fall off. Graphics simply don't do that. See for yourself. Dip Graphics in raw fuel. Let it sit around for a few days, dripping wet. You'll be amazed to see that Graphics will still stick tight like nothing ever happened. Incidentally, no overcoating is ever required. Graphics are ready to go, right out of the wrapper.

A WORD ABOUT PAINTING

Some guys like to have numbers that are a different color than the 3 basic Graphics colors (red, white or black). Graphics can be painted. But not with butyrate dopes, lacquers or epoxies. We recommend Aerogloss, R&S, or polyurethane's like Formula U. Be sure and do a test, anyway. And keep in mind that when you paint, the resiliency of Graphics will be only as great as the paint itself. Without paint, Graphics will stand up to almost anything, including all but the worst types of scuffing.

GREAT FOR PLANES, BOATS & CARS

Graphics add a professional touch to any model, including older ones. You'll be quite pleased to see the reaction at the field when you show up with an old plane that's been dressed up with crisp, new Graphics on it. Graphics stick to just about anything: fabric, painted surfaces, plastics, metal, wood, etc. Naturally, they look great on Coverite (Permagloss, Super & Silkspun) as well as all the other iron-ons. Since they're water and weather resistant, they're now being used on full sized boats (hulls & sails) and full sized planes (3" letters are FAA approved for tails). Not to mention signs, doors, windows, trucks, vans, etc.

STICK TO ANY CURVE

Once again, unlike traditional decals, Graphics remain pliable. Not only will they conform to any curve or angle... they will stay that way! Just press them on and forget about them. they'll stay in place for years, indoors or out, in all sorts of weather.

BIG ECONOMICAL SHEETS

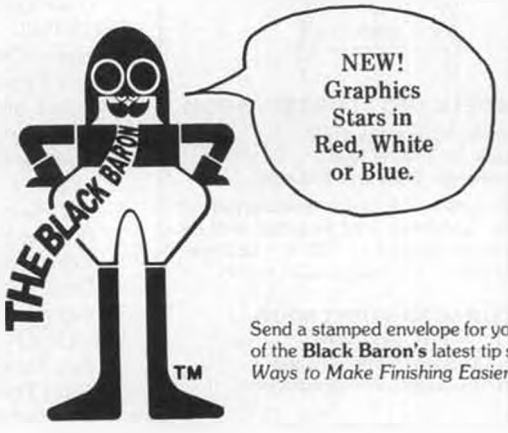
Some modelers have asked us why we packaged sheets instead of individual numbers. The reason is that it is cheaper to produce a full sheet than individually packaged numbers. Each Graphics package contains 28 characters: **two full sets** of numbers and AMA letters, plus N&C. Also a little extra blank space for you to cut out your own. Packaged in sheets, 1" Graphics cost less than 5¢ per number; 2" Graphics cost less than 11¢ per number; 3" Graphics cost less than 20¢ per number.

THE COVERITE LINE—**Permagloss Coverite**. 100% polyester iron on covering. Prepainted, 38" x 43"/ 43" x 15 feet/ 5" x 36"/ Red, white, blue, yellow, orange, aluminum, olive, dayglow orange, dayglow yellow, black. **Super Coverite**. Same material as Permagloss, but not painted. 38" x 47"/ 47" x 15 feet/ Red, white, blue, yellow, orange, hi-viz red and antique fabric. **Quickstik**. 1/2 pint & pint cans of iron on adhesive. **Silkspun Coverite**. 100% spun polyester that looks like tissue. Unpainted. 38" x 54"/ 38" x 25 feet/ Red, white, blue, yellow, orange. **Balsarite**. 1/2 pint & full pint cans of wood conditioner. **Glaskote**. 1/2 pint cans of clear, fuelproof, final coat. Pint cans of thinner. **Trimit**. Micro sharp knives for cutting all coverings. **Graphics**. The only letters & numbers made of micro thin vinyl. Die cut, pressure sensitive, totally fuelproof. 1", 2" or 3"/ Red, white or black.

COVERITE

420 BABYLON ROAD, HORSHAM, PENNSYLVANIA 19044

Coverite products are distributed world wide. Australia, Belgium, Canada, Denmark, England, Finland, France, Germany, Holland, Italy, Japan, New Zealand, Norway, South Africa, Sweden, Switzerland, United States.



Send a stamped envelope for your copy of the **Black Baron's** latest tip sheet *21 Ways to Make Finishing Easier.*

has made an unofficial run of 119 mph with a Rossi .90 powered Frank Ward Dee-Vee. I once saw Frank make a pass at 60 mph with one of his vees and that was unreal. I cannot imagine 119!

AND SINCE WE'RE DISCUSSING RACE RESULTS. . .

NAMBA District 9 Director, Don Reutlinger, provided the following final point standings for their 1980 season:

A MONO
1) Bev Power 1734
2) Rich Kassis 1170
3) Art Hammond 1025
4) Gary Frank 1021
5) Bob Towle 976

B HYDRO
1) Bill Webster 1420
2) Howard Power 1315
3) Bruce Leininger 1240
4) Ken Reilly 1089
5) Don Reutlinger 989

SPORT 40
1) Harry Dewey 1779
2) Bev Power 1598
3) Frank Snowden 1461
4) Ron Heidigh 1200
5) Tom Anderson 1000

A HYDRO
1) Art Hammond 1968
2) Bill Webster 1184
3) Ron Williams 1130
4) Dick Aubert 1065
5) Gary Frank 880

C MONO
1) Bev Power 2823
2) Gary Frank 1596
3) Irv Hartsook 1438
4) Cecil Reynolds 1179
5) Don Reutlinger 949

X HYDRO
1) Howard Power 2394
2) Tom Anderson 2025
3) Gary DeLara 925
4) Roger Hooks 525

B MONO
1) Dick Aubert 2344
2) Bob Joshnick 2243
3) Guy Davis 929
4) Ron Williams 844
5) Ken Reilly 777

C HYDRO
1) Howard Power 2348
2) Tom Anderson 2006
3) Jim Whitlatch 1740
4) Gary Frank 1681
5) John Brubaker 1161

NAMBA District 8 completed a seven race championship series in 1980 and the final results are as follows:

A HYDRO
1) Jerry Dunlap, Hustler II 2463
2) Chuck Rudorfer, Crapshooter 2157
3) Randy Seiser, Gator 1279
4) Doug Smith, Hughey 1267
5) Mike Wight, Crapshooter 1196

B HYDRO
1) Randy Seiser, Gator 1154
2) Vic Drew, R/C Glass 1140
3) Vic Roberts, R/C Glass 825
4) Rick Smith, R/C Glass 800
5) Larry Knudson, Hughey 738

C HYDRO
1) Larry Knudson, Olympia Beer 1944
2) Norm Nordby, Miss Madison 1550
3) Ron Erickson, Wing Ding 1400
4) Randy Seiser, Gator 1225
5) Don Nauditt, Original 650

A MONO
1) Jerry Dunlap, Prather Vee 2290
2) Paul Dunlap, Dumas Vee 1200
3) Jack Peters, Schoeff Vee 1042
4) Maren Dunlap, Dumas Vee 1029
5) Ron Erickson, Schoeff Vee 969

B MONO
1) Doug Smith, Ward Vee 1650
2) Jack Peters, Prather Vee 1404
3) Ron Erickson, Ward Vee 1269
4) Bill Hornell, Ward Vee 1100
5) Bill Brazzle, Dumas CF 40 800

A OPC TUNNEL
1) Mike Wight, Excaliber II 1904
2) Larry Knudson, Original 1700
3) Bill Brazzle, Hughey 1432
4) Leo Dreith, Dumas Hot Shot 1272
5) Dennis Caines, Excaliber II 1156

SPORT 40
1) Vic Drew, R/C Glass 1385
2) Gary Ginader, Dumas 1334
3) Jerry Dunlap, Muck 1144
4) Vic Roberts, R/C Glass 927
5) Chuck Rudorfer, R/C Glass 834

B DEEP VEE
1) Jack Peters, Prather Vee 1396
2) Doug Smith, Ward Vee 1361
3) Ron Erickson, Ward Vee 1172
4) Bill Brazzle, Dumas CF 40
5) Don Dees, Prather Vee 994

A DEEP VEE
1) Jerry Dunlap, Prather Vee 2800
2) Vic Drew, Prather Vee 1144
3) Kevin Zinski, Schoeff Vee 1050
4) Don Dees, Prather Vee 900
5) Jesse Shehan, Original 525

District 8 R/C Unlimited racers completed a very successful 1980 racing season. A total of 61 different drivers entered 72 different boats in one or more of the dozen R/C Unlimited races held in District 8 in 1980. The final results are somewhat unusual in that the owner/driver of the boat gathering the most points also owned the boat that placed second in the final points standings. Jack Haugen, of Auburn, Washington, used the 1972 version of the Notre Dame to win his first overall championship. Jack's second boat, the 1969 Notre Dame, was driven by Les Ruggles. It is really quite an accomplishment to have two boats place first and second in what I feel is the most competitive R/C boating championship series raced in the nation. The final points standings are as follows:

1) Jack Haugen, 1972 Notre Dame, 14,534
2) Les Ruggles, 1969 Notre Dame, 13,171
3) Butch Melewski, 1968 Miss Bardahl, 10,663
4) Jolene Fridell, Esquire Products, 10,506
5) Gale Whitestine, 1979 Miss Circus Circus, 9,867

Les Ruggles won three races on the circuit; double race winners were Butch Melewski and Dallas Cook; Marti Newton was the top rookie driver in the points standings; and that fourth place finish by Jolene Fridell certainly proves that model boating is a sport that believes in the Equal Rights Amendment. It is also most interesting to note that eight of the races were won by boats that were patterned after Unlimited Hydroplanes that raced prior to 1970.

NAMBA MAKES CHANGES IN OUTBOARD RULES

The 1981 NAMBA rulebook will contain a few new changes to the rules that were used in 1980. The first change is simply a change in the wording of the classes that will allow larger size outboards to be legal in the OPC Class once they become available. It is rumored that there is a 7.5 outboard in the future from the folks at K&B Manufacturing. They have been testing a prototype for over a year. Another change for next year will make it manditory for the outboard engine to be the steering device in the outboard classes. This will disallow the locking of the lower unit and the use of a separate rudder to turn the boat.

The other two changes apply to the OPC Tunnel Class. The first addition in this class is a statement restricting the amount a tunnel boat can be "pickle-forked," or bow recessed. The maximum amount of the pickle-fork cannot exceed 30% of the total boat length. All of the boats that are presently available from model boating manufacturers are

legal. Let me provide an example. If the length of the boat is 30 inches, then the pickle-fork could extend for nine inches. The other rule deals with the use of steps or breaks across the sponsons of the boat. If breaks are employed, they can only be 1/8 inch in depth and cannot be closer than five inches. It is also required that the running surfaces resume a parallel plane after the break. The purpose of this clarification is to ensure that the model tunnel boats ride on the water in the same way the full-scale tunnel boats run.

SINCE THE TOPIC IS OUTBOARDS. . .

Three new NAMBA outboard records were established at the 1/16 mile record trials conducted by the Seattle Model Yacht Club in October. Using a Prather 31-inch Vee, Ed Fisher set two new records in .21 Outboard Mono and .21 Outboard Deep-Vee. The mono record is now 37.56 mph and the deep-vee mark is 37.75 mph. Ed was using the K&B .21 Outboard with a modified lower unit. In the .21 Outboard Tunnel class, Arild Melang upped the mark to 40.57 mph using a Lil' Lightning from Steve Muck's R/C Boats. Arild has only been racing for one year and it has to be a great thrill for him to establish a record in his rookie year. With the establishment of the two new records in .21 Outboard Mono and Deep-Vee, Ed Fisher ended the year by holding six of the eight possible records in NAMBA outboard events. However, since there will be some change in the NAMBA racing rules pertaining to the outboard classes, it appears that all records will be open beginning in 1981.

NEW NAMBA RECORD IN .65 HYDRO CLASS

October was a good month for Ed Fisher and setting records. He attended a race in British Columbia and set a new time record for oval racing with his .65 OPS powered canard hydroplane. The new time for the .9 mile distance is 1:08.07. The record time was established on a four-lap course. This broke the previous record, 1:13.4, that Jim Whitlatch held with an Octura Wing Ding. To set this new record, Ed stuffed an OPS .65 into his .40 size hydroplane and came up with 7-1/2 pounds of fast boat. Are you ready for this? Ed's goal for 1981 is to break the one minute mark for the .9 mile oval! At that same race, Ed lowered his record in the .45 Monoplane class from 1:31.1 to a very quick 1:22.7. For this record, a K&B .45 was used in a Northwind hull.

AND IN NEXT MONTH'S COLUMN

We'll examine in depth what is happening in the Sport 40 class. This is now an official class in NAMBA and has the potential to become very popular. Questions, comments, and pictures are always welcome and can be sent to me at 119 Crestwood Dr. S.W., Tacoma, WA 98498. •

Peanut . . . . . *Continued from page 51*

spar should be filled on each side with balsa from the bottom of the tail to the first rib to match the thickness at the end of the fuselage.

Wheel pants are conventional three-piece balsa laminations, using 1/4 balsa for the center part and 1/16 for the sides. These are carved and sanded to the streamlined shapes shown.

The landing gear wire is really two wires bent to specific shapes and soldered together. The small part is "U" shaped and is shown in the wing plan

view. The larger part is shown in the pattern just above the title block of the drawing. Bend the two wires to shape and solder them together as indicated, then thread the wire assembly through the wing root ribs and add the wing sub-spars, one forward and the other directly over the wing spar proper.

A good covering job is essential if the model is to look presentable. This requires lots of work with sandpaper to eliminate all rough spots and unwanted bumps and snags. Use 320A and then 400A until you are completely satisfied.

Use conventional covering techniques and lightweight tissue for this model. The wings, horizontal tail, numbers, name, and trim lines are red. The inside of the cabin, the anti-glare panel on the top of the cowl, the cooling and carburetor air inlets, and the wheels are flat black. The rest of the model is white tissue or bare balsa. The plastic propeller was silver to begin with and was left that way. Control outlines are indicated by thin black ink lines. The wing walks are black tissue.

The landing gear fairings simulate the real metal landing gear legs. These were made from thin, soft vinyl plastic cut from a pocket protector. They were cemented to the wire using Super Jet instant glue and will flex along with the wire.

Have fun with your Turner T-40. •

Liberty . . . . . *Continued from page 21*

while and bend around a series of pins stuck in the plan around the inside line of the wing tip. Using white glue, laminate all four strips and leave to dry, preferably 24 hours. Tips made in this way are extremely strong and light and look very scale-like after covering.

Now the wings can be constructed. Slide the ribs over the spars and pin the spars to the building board by packing the main spar 1/8 inch and the rear spar 1/4 inch. Construction is quite straightforward and I won't go into detail here. Do not forget the 1/8 square diagonals, as they really stiffen up the entire wing considerably and add very little weight. For the aileron hinges, I used 5/32 plywood hinges with 3/32 dia. brass tubing inserted as a bearing; 3/32 dia. aluminum tubing is glued on the rear of the aileron leading edge, and 1/16 steel wire is used as a hinge pin. The hinges work very well with this method and are much stronger than the standard nylon type. Another advantage is that the pin can be removed at any time, thereby releasing the aileron for covering, painting, or even repairing.

The bottom wing is built as one piece, with a flat center section and dihedralled outer sections. The top wing has detachable outer panels using steel rods and brass tubing, just like glider wings. The steel wing rods are glued in the outer panels through the plywood pieces, W12 to W15, and strengthened with packing pieces. The brass tubes are

glued between the top and bottom members of each spar, the gaps being filled with scrap spar material. The rods and tubes are glued in while the wings are pinned to the board so that everything is lined up perfectly. Note: When the model is finished, the center section of the top wing is a permanent fixture on the fuselage and the outer panels just plug in. No other method is needed to keep the top wing in place; the rigging wires and "N" struts are sufficient to keep the panels from coming out under all flying conditions.

TAILS

The rudder outline and tailplane tips are made in the same way as the wing tips. The rest of the construction is quite straightforward. Hinging is done with conventional nylon hinges. Make sure that there are at least four hinges in each elevator and four in the rudder. The scale trim-tab on the left elevator is functional and assists the servo in moving the elevators. Construction is quite simple and details are to be found in *Radio Control Modeler*, February 1979, "Big is Beautiful" by Dick Phillips. Both elevators are separate, not being joined together at the center and the pushrod has two Kwik-Links coming out at the rear, one to each elevator. Ensure that the pushrod has guides along the fuselage so that it cannot move sideways.

GENERAL ASSEMBLY

Now is the time to start putting things together. The lower wing is attached to the fuselage with two 3/8-inch wooden dowels in the leading edge going into holes in former F2, and two 1/4-inch nylon bolts threaded into hardwood blocks at the trailing edge. When doing this, glue in the 1/32 ply wing seat so that it seats properly on the wing. With the lower wing in place and the model set up at 0°, glue the tailplane on also at 0°. Build the fin onto the fuselage and with rudder and elevators temporarily hinged, install the control system. I used a solid pushrod for the elevators and cables for the rudder. Now is the time to finish the fuselage sheeting at the wing mount and tail end and also to complete the wing fairing, which I did with 1/2-inch sheet balsa and micro balloons.

The hardest part comes now, and that is fixing the center of the top wing and the cabanes onto the fuselage. Bend the 5/32-inch steel wires as per the plan with only about a 1/2-inch length going into the tubes on formers F1 and F2. Attach the top of these four cabane wires to their 1/8 ply plates and position them between the ribs in the center section of the wing. With the lower wing in place and the fuselage packed up until the lower wing reads 0°, adjust the top section of the wing until it lines up at 0° and is straight in all directions. Now tack glue the ply plates in place. Recheck, with the outer panels of the top wing in place, that all is square and correct. When you are happy that this is so, glue the ply plates properly and strengthen the joints with strips of balsa. When this is done, bend and solder the 1/8-inch steel diagonal braces to the cabane. By springing apart the cabanes, the whole unit can be taken off the fuselage and the center section of the wing can now be sheeted, top and bottom. The rigging wires will be attached via 1/16 cotter pins, so put the pins in place through small plywood brackets before sheeting the bottom of the wing panel. This top section of the wing is only epoxied in place on the fuselage after covering and sealing and just before painting. Only after it is glued in place, are the wood fairings around the wires glued in place. This also applies to the aluminum plate sections on the rear of the wing. These are made and contact cemented in place after filling, just before painting.

With the wings in place and set up correctly, the "N" struts can be made and fitted. These are cut from 1/4-inch plywood, carved to a streamline shape, and slotted on the ends to fit over the brass pieces epoxied in the wings. Small bolts and nuts can be used to attach the 'N' struts, but I use a method of clipping them in place as per an article in *Radio Control Modeler*, April 1978, titled "N Strut Attachment," by Robert F. Meyer. Either method will work, and I do recommend the clipping method as it is easy, positive, and quick to assemble and take apart. Don't forget to put the rigging wire attachments in the wings,

Hanno Prettner,

You're "HOT STUFF"

HANNO'S
CIRCUS CIRCUS
DALOTEL

POWER:
Twin Geared .60's

PROP:
Top Flite 20 x 11

WEIGHT:
16.5 lbs.

COVERING:
Top Flite
Super Mono Kote

ADHESIVE:
"HOT STUFF"™

"**HOT STUFF™: The only adhesive** used in my Circus Circus Dalotels. What a difference it makes! Once you have built a model with **HOT STUFF™**, you cannot go back to the old ways."

KLAGENFURT/AUSTRIA
SIX TIME WINNER
CIRCUS CIRCUS TOURNAMENT OF CHAMPIONS

"HOT STUFF"™ WORLD CLASS ADHESIVES

Satellite City P.O. BOX 826 • SIMI, CA 93062 • (805) 522-0062

which are 1/16 cotter pins epoxied through plywood pieces in the appropriate places. These need to be strong, as the rigging wires are functional and must withstand the strain of flying and landing loads.

The undercarriage is soldered up from two pieces of 3/16 dia. steel piano wire with plywood filling between the two wires and fiberglass cloth wrapped around and resined in place. The axle pieces are separate pieces of 3/16 wire bound and soldered in place. The undercarriage unit is bolted to the fuselage with five bolts and blind nuts so that it can be taken off for transportation, etc. The wheel spats are constructed from sheet, laminated as per the plans, and bolted to a bracket which is soldered on the lower end of the undercarriage.

The cowl is made from fiberglass. I made a wooden plug and got a fiberglass mold made from it, so I can get further cowls made and could possibly supply them to anyone wanting one. The cowl is held in place with four self-tapping screws screwed into aluminum brackets which are mounted on the firewall.

If you want to use a tuned pipe as I have done, make a hole through the firewall where the pipe will go through and fit ducting around the pipe to protect the inside of the fuselage and radio gear, and also to channel cooling air to cool the pipe. Don't forget to have an air exit by the pipe exit for the cooling air to come out. If an ordinary exhaust is wanted, exit it out the bottom rear of the cowl as in the full-size Liberty Sport. Incidentally, with the tuned pipe fitted, do not forget to put a couple of coats of resin on the inside of the air ducting. This acts as an insulation and stops the wood from burning.

COVERING AND FINISHING

The open areas of the fuselage and wings were covered with a nylon material called "Air Art" which was doped on and then heat shrunk, after which it is doped and painted in the normal way. The tails were covered with silk, but as the model came out slightly nose heavy, the slightly heavier and stronger Air Art could have been used. I would imagine that the various types of Coverite would be equally as good. I have no experience with Coverite, but judging by the reports I have read, it is excellent material. All the sheeted areas were covered with K&B 3/4-oz. cloth, with two coats of K&B resin brushed on and sanded. This gave the sheeted areas a perfect finish. I did extra detailing such as rib stitching (small bits of cotton glued to the ribs) and rib tapes (heavy weight tissue cut with pinking shears). Rivets were blobs of five-minute epoxy, and panels were represented by typing paper stuck in place with dope.

The model was sprayed with polyurethane paint, seven colors in all, all masked off and sprayed outdoors with a spray mask (polyurethane is highly toxic). The M.A.D.A. badge on the fin was hand painted, using paint in a drafting pen for the outlines, then filling in the colors by brush.

The rigging wires used are Proctor 1/4-scale streamline wire which is actually flat steel wire, which looks really effective. The ends were ground slightly narrower and soldered into Kwik-Links, using a fixed link on the bottom and a Kavan turnbuckle link on the top end. Do not forget to slot the dowel spreader bar and thread the wires through before you solder both ends. The Kavan turnbuckle links enable you to attach the rigging easily on the field, tensioning them and locking the turnbuckles with the nuts provided. The entire model can be assembled at the flying field, complete with rigging, in under 15 minutes. The rigging wires on the tail surfaces and at the center of the cabanes are permanent fixtures and can be soldered in position on their cotter pins. The tailwheel assembly is a C.B. Associates unit. The steering springs are not assembled to a double rudder horn as shown in the instructions with the tailwheel, but instead are attached to a "U" shaped aluminum bar bolted on the bottom of the rudder, which is more scale-like according to the photographs of the full-sized Liberty Sport.

FLYING

When I had finished the model, I set it up on the bench and checked all the rigging angles again and also the C.G. position, which is on the leading edge of the lower wing (F2 position). As I said,

mine is a bit nose heavy and that includes the on-board battery and smoke unit, etc., so I decided to fly it at that C.G. position. The prop I use is a Top Flite 20x10, which gives me 5,700 rpm on the pipe, which is more than enough power to fly the model.

Takeoff is straight and true. The tail comes up within the first couple of feet and the model is easy to steer straight along the runway. Lift it off gently at about 20 yards and climb to a safe height before turning around. I have flown it off tarmac and grass with no takeoff problems at all. When flying, use rudder and ailerons together when turning, as this gives a more realistic turn. The model flies just like a full-sized airplane. Loops, rolls, and stall turns, it does with ease. At a wing loading of 21 oz. per sq. ft., it lands light as a feather and has no tendency to drop a wing at all. Keep the throttle on at least half for the approach, as there is plenty of drag in a model of this size. Throttle back completely at a couple of feet altitude and glide it in to a three-pointer with the motor just ticking over. With this model it's easy. •

Grain . . . . . . *Continued from page 43*

fact, they make more of them crooked than straight. So it will pay you to select your longeron sticks with care, following the grain lines along each piece, keeping a sharp watch for knots and waves. This applies equally whether you use hard balsa or spruce for your longerons.

Now let's consider "E," the stump or pedestal that holds our stab and rudder in place. I've seen some otherwise careful modelers cut their entire fuselage sides from a single sheet of balsa, stump included. This gives the stump a horizontal grain, and practically guarantees that the stab and rudder will snap off on the first hard landing. No amount of covering, no amount of internal doubling can save it; balsa simply has no strength to resist splitting along the grain, and the "see-saw" forces a stab and rudder exert on a fuselage at this point are tremendous.

So the grain at "E" wants to be vertical, or nearly so. I'd cut it so the grain was parallel to the back edge; this gives maximum split resistance to the part that sticks down to serve as a tailskid.

At figure "F" you have two choices: grain parallel to the leading edge, or parallel to the back (hinge) edge. Now, if this were one of those silly, inefficient, balanced-rudder designs so popular with everybody but me and a

couple of other cranks, then "F" would be glued solidly to "G" and the whole shebang would be hinged precariously to "E," in which case you'd probably want the "F" grain parallel to the leading edge, to keep the front toe of "F" from snapping off too easily.

The grain direction of moving surfaces such as ailerons, stabs, and rudders ("G") is normally run parallel to the hinge line. If you ran it perpendicular, you'd find the piece harder to sand to a feathered edge, and far more likely to warp before you got it hinged in place.

Even with the grain run properly, "G" may still try to bow a bit when you apply dope or Monokote . . . and that's the reason for "H" and "I." They're called "anti-warp strips," and every well-designed sheet balsa flying surface has them. Sometimes they're inlaid directly into the middle of the sheet, like a parquet floor ("J"). This really looks snazzy when done with skill and patience and a fresh blade in your Uber Skiver. But it's much easier to fit them across the endgrain of the surface, as "H" and "I" illustrate. (Incidentally, never make an endgrain stiffener much wider than about twice its thickness. If you do, it becomes vulnerable to splitting along its own grain.)

So much for our Coupe d'Hobie. Figures "K" and "L" illustrate two types of gussets common in built-up structures, in this case the nose of a fuselage. "K" is a simple triangle gusset, used to reinforce a butt joint. Why should a butt joint like this need reinforcing? Because the glue area is so small. How will it fail? Some ham-hander will squeeze it there, and the glue will give up the ghost. How will the triangle gusset help? It will provide five or six times as much glue area at the joint. Why should the gusset's grain be parallel to the hypotenuse instead of simply vertical or horizontal? Because small pieces of balsa like this triangle split very easily *along* the grain, but are super-tough *across* the grain. If you run the grain parallel to either stick, the triangle will simply split when the butt-joint gives way, and the whole thing will fail. Running the grain as shown makes the joint many times stronger.

Gusset "L" serves a number of noble purposes, and deciding on its grain direction isn't easy. First, it holds the nose shape together. Those two bowed longerons would like nothing better than to straighten themselves out, SPROING, leaving a gaping hole where the front of the fuselage used to be. For that reason, you might choose to run the grain of "L" vertically; balsa has a lot of tensile (stretch) strength up and down the grain, while it's comparatively easy to pull apart across the grain.

However, this IS the nose, and noses do run into things. When that happens, you'll probably wish the grain ran horizontally, for greater compression strength (remember our thumb-dent test). Also, a horizontal grain would make those two horns at the rear of "L" a lot easier to carve, no? But . . . suppose some fat-fisted turkey picks it up and puts the squeeze on it right about where the "L" appears? It's going to split right down that horizontal grain, making you wish you'd run it vertically after all.

Oy, what to do, what to do? I'd pick some rock-hard wood (noses always need the weight) and opt for the horizontal grain, stiffening it at the front with a vertical stick, as the drawing shows. And a light coat of cyanoacrylate or epoxy on the inside wouldn't hurt, to stiffen the grain against squeezes.

"M" illustrates the top sheeting of a wing center section. The grain runs spanwise, just as it does on the leading edge sheeting. Why? Try bending it the other way and you'll see. The wood will sag in between the ribs, just like tissue covering that's applied grain-wrongwise. Besides, this is a high-stress area, subject to a lot of tension and compression loads, and balsa handles tension and compression a hundred times better *along* the grain than *across* it.

"And what is this talk of tension and compression?" your mother asks. "Tension you get from working too long at the office. Compression you lose from driving too long without oil. Don't tell me about tension and compression, I know all about them."

No, no Mom. Here we're talking about tension and compression in en-

gineering terms. Tension is simply a force that tries to stretch something; compression tries to squeeze it together. Look at the blown-up section of the wing in the drawing, the section labeled "shear web." If the wing were under normal flight loads, the tips would be bending up slightly, giving the plane more dihedral, right? This bending imposes both tension and compression loads on the structure. How? The top spar tries to compress, or squeeze together, while the bottom spar tries to stretch longer. The bottom spar is thus under tension, the top spar under compression.

But the bottom and top spars are tied together by the ribs and shear webs, making them behave as if they were all one piece. And when a one-piece structure is subjected to both tension and compression at the same time, a lot of crazy forces build up inside it. These are called "shear forces," because they try to shear apart the two halves of the structure . . . in this case, the top and bottom spars.

Shear Force: a stress resulting from applied forces that cause two contiguous parts of a body to slide relative to each other in a direction parallel to their plane of contact.

Earthquakes are a prime example of shear forces at work. One chunk of land wants to move north, the one beside it wants to move south. Result: divorce. They shear apart along a fault zone.

This is why we put shear webs in wings. They keep the top and bottom spars from moving relative to one another. This is something that ribs alone can't do; they simply split along their grain when the shear forces across them become too great. Study an unwebbed wing that has "folded" and you'll find split ribs on either side of the failure point . . . the victim of shear.

So you can see why the grain at "N" wants to be vertical. Balsa has tremendous shear-resistance across its grain, but very little along it. A vertical-grain

shear web is many times stronger than a horizontal-grain web.

But shear webs serve yet another function in stiffening our wing. With the top spar under compression, it has a tendency to bow inward, crushing the ribs and shear webs downward toward the bottom spar. Vertical grain in the webs resists this crushing action, horizontal grain does not. My recommendation: if you purchase one of the few kits on the market with horizontal-grain shear webs, change them to vertical.

Illustration "O" shows a wing dowel protruding through the side of a fuselage . . . a very common design practice in all types of models. The grain ("O") of the doubler runs perpendicular to the fuselage side, to prevent splitting. Picture this model without the doubler: a nice tight loop and the dowel rips out of the wood, taking a small crescent of fuselage side with it. Too bad, Charlie . . . it sure made a pretty crash, though. And look, your wing hasn't got a scratch on it!

Well, that concludes our seminar on grain direction. Next time you're setting a mousetrap, or eating a popsicle, check the grain direction in the wood parts. Is it optimum? Or could you have designed it better?

Go forth and conquer.

Dave Thornburg, 236 Pennsylvania Ave N.E., Albuquerque, NM 87108. •

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

oped which is claimed to be less expensive and more versatile than synthetics. "Epoxidized rubber" uses no petroleum and is extremely wear resistant, according to scientists. Presently undergoing tests by tire and shoe industries, we wonder how the stuff might work in model aircraft!

MAGNITUDE

Modeling interests range from tiny Peanut Scale types through Giants. One must be careful, though, not to try to evaluate them by dimensions alone. As always, it is the *quality* that counts. Bigger is not automatically better. As an old Pennsylvania Dutch proverb has it: "It doesn't depend on size, or a cow could catch a rabbit." Thanks to Richard Miller for this observation.

10

A recent television program was devoted to the subject of "Men who Rate a 10." We were pleased to see that at least two aviators made the grade . . . Charles Lindbergh and Howard Hughes.

IT COULD HAVE BEEN WORSE

Dave Gibson sent in a clipping regarding a divorce decree. Mentioned were the usual divisions of property, alimony, child support arrangements, etc. But get this: the husband was awarded custody of his *four model airplanes!*

PUT YOUR NAME ON IT

A name and address on competition free flight models is standard operating procedure, but how many *scale* model builders bother to do this? Ernie Wrisley does, and it recently paid off. It seems his rubber-powered Stinson flew out-of-sight during a SCAMPS contest, and he figured it was gone forever. However, thanks to the identification markings, it was found and returned. Not too unusual? Perhaps not, except that the model chose to land in the back yard of aeronautical engineer Meers Rork! Randy Wrisley, who picked up the model from Rork, offered him a reward, but he wouldn't even accept reimbursement for his long distance phone call. Renews one's faith in fellow man, right?

TRANSATLANTIC WING WALKER

Although Canadian bureaucratic red tape prevented Eagle Sarmont from attempting to fly his motorized hang glider across the Atlantic ocean, Jaromir Wagner, of West Germany, successfully completed an Atlantic crossing on *TOP* of an aircraft! According to the *Associated Press*, Wagner endured temperatures as low as 13 degrees below zero during the voyage. He was strapped to a metal mount in approximately the attitude of a ski-jumper, atop a twin-engined machine, and made stops in Scotland, the Faeroe Islands, Iceland, Greenland, Newfoundland, Vermont, and landed in (of all places) New Jersey!

HACKENSACK HEARD FROM

We innocently used that line before, relating to the discovery of a rare Caudron Simoun used in the movie "The Little Prince," and received the following retort from Don Typond:

Dear Bill,

What do you mean "... in, of all places, New Jersey!" How dare you! You, sir, have the same warped impression of our glorious Garden State as do snobbish New Yorkers, ill-informed Chicagoans, and anyone else whose knowledge of New Jersey is limited to hearsay, mythology, and a drive along the Jersey Turnpike.

You, of all people, should be aware of the role New Jersey has played in aviation history, both full-size and model. You owe us an apology, sir! Best regards, Don.

THE GRASS IS ALWAYS GREENER

Doubtless we all enjoy a change of scene from time to time, and faraway places may seem to have charm by virtue of their geographical remoteness. Georges Chaulet, who lives near Paris, France, recently visited California and found the differences in the two countries quite remarkable. Georges is the fellow who designed the Synchrogyro, the intermeshing rotor autogyro featured in **RCMB** for September, 1979, and his interest in rotorcraft continues. He had expressed a desire to meet some American model builders with similar interests "in order to exchange ideas and share blade-breaking experiences." Through a bit of planning (and luck) he was able to visit with Bob and Sandy Peck of Peck-Polymers, Skip Ruff (designer of the Focke-Achgelis autogyro featured in **MB** some years ago) and Debbie Ruff, former **Model Builder** Cover Girl, plus a couple of Hannans from this Hangar. The meeting place? Disneyland! Rather an unlikely location for a technical discussion, but we all had fun anyhow.

Later, we attended a meeting of the San Diego Scale Staffel club for an indoor flying session, where Georges had an opportunity to demonstrate a small rubber-driven autogyro and see the handiwork of members including Walt Mooney, Warren Shipp, Bill Noonan and many others in action. Other aeronautical-related activities included a trip to American Hobby Supply, the San Diego Aero-Space Museum, Montgomery Field, the Reuben Fleet Space Museum, and the Williams Brothers factory. Georges returned home inspired, and we anticipate seeing some exciting new autogyros from his design board!

WHAT'S IN A NAME?

Bill Bishop, founder of the Comet Model Airplane and Supply Company, says that a flip of a coin decided the choice between "Comet" and "Meteor" as the trademark. Many years later he was able to employ the "Meteor" name on a new product, which strangely, never caught on.

"FLYER" TO FLY AGAIN

Thanks to Frederick Eade, Historical Chairperson of the American Institute of Aeronautics and Astronautics, we have news of two fascinating projects. Years ago, the Los Angeles Section of the AIAA constructed a beautiful reproduction of the Wright "Flyer," which was subsequently transferred to the San Diego Aero-Space Museum. Unfortunately, the machine was destroyed in the tragic fire of 1978. The Museum had a replacement made by the Valentine brothers, but the AIAA members decided to construct TWO new Flyers. The first is intended to be a faithful reproduction, for display purposes, but the second is intended for flight. According to Sol Kreisler, "The Wright Brothers need some design assistance to improve the safety of their first airplane . . . we plan to subsequently build a flying version which will incorporate subtle changes to make it safe for our modern pilots to fly. A great deal of wind tunnel testing and aerodynamic analysis has been completed with additional testing planned. The results to date emphasize the tremendously creative scientific mark the Wrights performed. However, we now also know how dangerous their flights were. We wish now to reduce these hazards by incorporating some aerodynamic improvements that the Wrights used in subsequent designs as well as some changes that out tunnel tests deem advisable. Other improvements are also planned to increase the structural safety, improve the engine performance and enhance the operational capabilities for takeoff, landing, etc."

Among the changes proposed by the AIAA are the following: Installation of a Honda motorcycle engine, design of a

supplementary wheeled landing gear to permit operations from paved runways in lieu of the sands of Kitty Hawk, a welded steel structure to accommodate the engine, pilot and landing skids in a manner that will protect the pilot from injury in "hard" landings, improved structural integrity and a "joy stick" control system to replace the original hip cradle wing-warping installation.

HANDY HINT

Joe Bickinella, who has been carving a series of miniature pilots from foam and balsa, suggests an artificial leather called "Stage Coach." Very thin and flexible, it may be attached to the pilot figures with common white glue for a most realistic flight jacket or helmet. Joe obtained his at a yardage goods store, and says it is available in brown and black.

SILLY SIGN-OFF

Heard about the purple-painted supersonic transport? It's sort of a Concorde grape. . . •

* * * * * * *

Indoor . . . . . . *Continued from page 57*

glued to the strut and the wheel slipped onto the axle. The other end of the bamboo strut is sharpened to a point and embedded into the wing or fuselage wood and glued.

A sheet of Micro-X lightweight condenser paper was taped to white cardboard and airbrushed yellow with Dr. Martin's Water Color Dye (also from the local art supply store). The model was covered using clear dope as the adhesive and the excess paper trimmed off with the aforementioned double-edge blade.

The prop is a very important part of my models. My standard indoor prop (see sketch) was fashioned and assembled onto the front of the Dyke Delta. The completed model weighed in at six grams, including the rubber motor. The 12-inch motor was inserted into the fuselage, using a loading stick.

The reflex part of the wing was set to follow the airfoil curve on the bottom of the wing.

FLYING

The model needs about three degrees downthrust and a small amount of clay

on the left wingtip to make the model turn left.

Start with about 600 turns. Wind with the prop off. Holding this plane to launch is a bit tricky. I found the most natural place to hold the model is by placing the thumb and index finger around the nosewheel struts, just under the fuselage.

After the Dyke begins to climb and turn left smoothly, increase the turns to about 1200. The model should climb to about 20 feet and fly for 35 to 45 seconds. The only problem with the left turn pattern is that the model straightens out at the end of the flight (the torque force relaxes) and comes down in a straight line. If the Dyke comes down with no turns left in the motor, the motor is too short. My models power up and power down.

I can't wait to build the Dyke up in size to 22-inch span. That works out to 1"=1' scale.

You'll have a lot of fun building and flying your Dyke Delta. Let me know how you do with it. Store your model in a box for safe keeping. Most tropical fish stores will give or sell you a plastic box used to ship fish. The box measures about 18 by 18 by 12 inches. The model fits nicely in this type of box.

FLASH!

Oldtimer Models has been taken over by Mike Mulligan of the Flightmasters Scale Club of Los Angeles. Fact is, Mike is the current club president and longtime scale builder and competitor. For a catalog of Mike's wares, write to: Mike Mulligan's Oldtimer Models, P.O. Box 913, Westminster, CA 92683.

PLAN AHEAD FOR 1981!

This is the time to start planning ahead for the big doin's in Indiana in June of '81. What I'm refering to is the 2nd World Peanut Gran Prix on June 26, 1981. The place is Northwood Institute at West Baden, Indiana. If you can't be there to fly yourself, you can send your Peanuts to be proxy flown by someone else. Imagine! A continuous 24 hours of Peanut scale flying!

Here are the categories you can enter:

- Pioneer: up to World War I.
- Warplanes: combined WW-I and

WW-II aircraft, *excluding* liasion, sky cycles, and personnel planes that were very similar to civil aircraft (You KNOW the ones we mean!).

- Golden Age: between the Wars (I and II).
- Modern: after World War II.
- Weirdo: this includes multi-engined planes, flying boats (not Cubs on floats), amphibians, autogyros, helicopters, triplanes or quaduplanes (NO canards, pushers, or flying wings, unless they are also one of the above categories). The reason for excluding the latter weirdos is that they fly too well.

For more information write to Dr. John Martin, 3227 Darwin St., Miami, FL 33133.

Last year 60 airplanes from six countries were entered. Are you going to be among the entries in '81? I know I am!•

Pylon . . . . . *Continued from page 35*

there. There was still another pilot who pulled a flight in the 1:11's, so you can see the racing was really hot.

Winners in Expert were: 1st, Dave Shadel; 2nd, Tom Christopher; and 3rd, Jerry Boyce. Standard winners were: 1st, Paul Ristin; 2nd, Joe Stream; and 3rd, Dave Ficcrell. Biggest excitement for the two days, in addition to the new record, was the $630 Calcutta races with the four finalists of Ed Hotelling, Rusty Van Baren, Jerry Boyce, and Russ Kime. Still don't know what happened between Rusty's plane and Jerry Boyce's, but somehow Rusty's radio was switched off and in the contact between the two, Jerry's bird flamed out, so the race was between Russ and Ed, with Ed finally taking all the marbles. There was a fifth flier in this race, as after Ed pulled off the win Carol never did get her feet back on the ground for at least five minutes . . . best example of team effort I have seen in some time.

Best race of the day was between Jerry Boyce and Tom Christopher in the Calcutta qualifyings. I know we can't say that they flew nose-to-nose, but if there was ever a photo finish in pylon racing, this had to be it . . . and Jerry had to fly a 1:11.6 to do it! Now you know why I didn't give the pilot's name earlier in this report . . . just wanted to save it for a smash finish.

NMPRA Q-M NATIONALS/ DOOLITTLE TROPHY RACE

Rough River State Park, Rough River, Kentucky, located approximately 100 miles south and slightly west of Louisville, is some of the most scenic country in these United States. At this site, the U.S. Army Corp of Engineers decided to dam the Rough River, and in doing so created a lakes playground seldom

matched anywhere. It's a family vacation land, but come the first weekend after Labor Day it also offers two days of the best racing around.

Ably CD'd by "Shorty" Holsclaw since the beginning, and with many of the same workers from the Louisville R/C Club repeatedly coming back each year, they operate a super race with few problems or mistakes.

The Rough River Championships is actually two contests combined: the normal running of from five to seven rounds of racing to determine the Champ and succeeding place finishers, and a "Trophy Dash" race consisting of the fastest 12 contestants, regardless of their position-placing.

The Doolittle Trophy Dash is run Sunday afternoon after the Champ has already been determined. The neat thing about the Trophy Dash is that, unless you're one of the seven or eight fastest, you don't know until the very last heat (and flyoff, should there be any) whose time will stand up and who will get bumped out. The Dash also gives the guy who is maybe having an off-race or mechanical problems, putting him out of contention in the regular race, a shot at the prizes in the Trophy Dash by turning just one good time.

The success and camaraderie this race engenders has spread over the land and draws contestants from as far as California, New York, and Florida. This year, the traveling trophy, if there was one, has to go to the group who drove in from Colorado, just to compete in this weekend affair. Several good times were set on Saturday with many close races. Cutoff times for the Trophy Dash as of the last round Saturday were in the 1:33 range, and the end of racing found a multi-man tie for first place. Sunday, the weather dawned a little cooler and the temperature picked up. By the end of the race, the cutoff time dropped to 1:29.

Heat upon heat kind of dulls the senses, and only a few stand out in my mind. One was the heat in which a flier cut on the first lap and yet managed to lap the other three planes and still turn a 1:32, much, I'm sure, to the dismay of the other competitors in his heat. . .

Bobby Blouch's smooth flying and screaming airplane which netted him fast time of the meet. . .

Dave Latsha's very gradual and smooth takeoff was outstanding and had everyone in the pits impressed . . . until he failed to turn at number one and gradually rolled to the right and crashed. Remember, Dave, FIRST turn on the receiver, THEN the transmitter, THEN start the engine!

When it was all said and done, Bobby Blouch was the sole possessor of first place.

The Doolittle Trophy Dash competitors were divided up into four three-plane heats and flew elimination flyoffs, first reducing it down to four fliers, then two more heats, and then the final two winners to fly off for the trophy. Unfor-

tunately, a frequency conflict between the last two fliers caused the Dash to be decided by times and Bobby Blouch was way out in front of everyone else. Bobby won so much cash and silverware that there were many people tempted to mug him . . . but I controlled myself.

During the trophy and prize ceremony, the fliers pulled a switch on the CD and workers. A large "Thank You" card had been made up in advance and, unknown to the workers, it was signed by every flier. This was presented to CD Holsclaw and his workers, along with $250 that the fliers donated out of the prize money to help alleviate the hosting club's expenses. A neat switch and a very nice gesture of thanks by some very appreciative guys.

TOP TEN CHAMPIONSHIP FINISHERS
1) Bobby Blouch
2) Dave Latsha
3) Doug Brushaber
4) Duane Gall
5) Wayne Yeager
6) Gail Jacobson
7) Roger Schlenker
8) LeRoy Webb
9) Al Pooley
10) Fred French

TWELVE DOOLITTLE QUALIFIERS (not in order)
1) Bobby Blouch
2) Dave Latsha
3) Dennis Bielick
4) Gail Jacobson
5) Doug Brushaber
6) Roger Schlenker
7) Bob Ruether
8) Wayne Yeager
9) Jim Gager
10) Duane Gall
11) Jimmy Bartels
12) Tom Witson

Jim Gager, 3727 Shepherd Lane, Ft. Wayne, IN 46815. •

F/F . . . . . *Continued from page 61*

level. The technical papers cover a wide variety of topics: structure, propellers, stability (both spiral and longitudinal), and flight dynamics. I found Andy Bauer's flight by computer of Nordic zoom launches very fascinating, as were Jim Thornberry's and Matt Gewain's structural analysis of Nordic wings. Bill Bogart analyzed most of the models flown at the 1979 World Champs for longitudinal and lateral stability. (As an aside, his paper tabulates very neatly the important design parameters of all the models, making it easy to spot current design trends if you want to roll your own.)

There are also some good articles in a less technical vein . . . the sort of thing that should appear more often in the magazines. Bill Baker has two useful papers on trimming for thermals and flying rubber models competitively. William McCombs has some guides for rubber scale models, including a table which predicts duration of a given scale

design ... very useful in choosing a subject.

As usual, the Models of the Year and Hall of Fame awards make for interesting reading, as do Baker's history of the folding prop and Jim Bennett's article on modeling trivia and famous firsts.

The non-technical articles make the book worthwhile by themselves. The technical articles are a bit tougher to digest, but you don't have to do it all in one sitting. I often find myself going back to old Sympo reports and finding some neat technical tidbits I overlooked before. One hint when reading the technical stuff is not to get bogged down in the mathematical details. Skim the abstract for ideas, and look for the main results. The math is there mainly to give assurance to the technically-minded that the reasoning is correct. (If it isn't, somebody will contradict it in a later paper.) Do look carefully at the graphs in a report; often a lot of the major results are expressed there. A good author will usually reiterate the useful stuff in his conclusion. And like I said, if you don't get it at first, just let it stew inside your head for a while and go back to it later.

You can order your copy of this year's NFFS Sympo for $9.75 (including postage) from Fred Terzian, 4858 Moorpark Ave., San Jose, CA 95129. If you'd like to contribute an article for next year's edition, send an abstract to Jim Bennett, 324 Helfenstein Ave., St. Louis, MO 63119. Nominations for Models of the Year should be sent to Steve Geraghty, 194 Vista Del Monte, Los Gatos, CA 95030.

COMMENTS ON AMA RULES PROPOSALS

A list of current F/F rules proposals was published in the October and November issues of *Model Aviation*. You should let your contest board member know your opinions, FOR as well as against any of them. Those proposals that survive the preliminary ballot will be subject to cross-proposals for a four-week period beginning in February. If you don't take advantage of this opportunity, don't be caught moaning if we end up with something like the current EZ-B event, or maybe only two classes of AMA gas, or a return to VTO ... all current proposals!

One proposal which has considerable merit is Stan Stoy's proposal for ability grouping of competition classes, which I discussed a few issues back. I think it would give F/F competition a shot in the arm and support it 100%. Tell your Contest Board member what *you* think. If you don't like to write, send him a tape or phone him to express your opinion.

DARNED GOOD AIRFOIL
Gottingen 417

During the First World War, the small wind tunnel at the Prandtl Institute in

Gottingen, Germany, was used to conduct many airfoil tests. What was significant about these tests was that many were carried out at Reynolds numbers approximating those of free flight models. Unfortunately, this tunnel had a high turbulence factor, causing the effective Reynolds number to be about 40% higher than measured, which means that these test results can't be directly applied to models. After 1918, these airfoil tests were collected and published in six early NACA reports. This summer, I ran across these old reports in the Oregon State University Library, and will share some of the airfoils that looked interesting to me, since ordinates to many of the Gottingen sections have been difficult to find in modeling sources.

The Gottingen 417 has been used by Scandinavian modelers for Nordic and Wakefields. It's a "nice" looking section, thin, not too much camber. Should work well for any application where you'd use a Benedek 6356, for instance. Try it and see!

MYSTERY MODEL

I'm putting in this mystery model to see what nostalgic memories will be stirred up among the readership. Those of you who remember the Civy Boy will remember this model instantly. This was the first high-performance free flight I ever saw in action (it was on the Sunday morning that our first Vanguard satellite died ignominiously on the launch pad). Harry Murphy remembers seeing this design at the 1949 Nats and realizing his O&R powered Ranger didn't have much of a chance against this new California design. Lyman Armstrong's set of flying instructions for this model began: "First, get on your knees and pray like hell . . ." If you can identify this famous kit design from the past, send your guess in to the **RCMB** office to see if you can win the free subscription. Remember, this is an easy one.

MODEL OF THE MONTH:
Bob Larsh's "Bunker Hill" Indoor HLG

This is one of the designs mentioned in Stew Cox's Indoor HLG article in the 1980 NFFS Sympo. I was put in contact with Bob as a result of a letter I wrote to Harry Murphy about HLG secrets at the Anderson, Indiana site, which is about the same ceiling height as our gym at South Albany High. Bob responded with a 3-view and some hints on building and flying the "Bunker Hill."

The 3-view shows the basic design, as originally conceived in about 1964, with a new rudder shape Bob thinks is better. Note the built-in negative incidence at the rear of the stab, for safe recovery. Bob suggests increasing the length of each inboard wing panel by 1/4 inch. He sands in the undercamber after the wing is mounted, using 240 grit sandpaper on a 2 to 2-1/2 inch diameter cardboard tube (a Pringles potato chip can is ideal). Undercamber ends about an inch from

the tip. All surfaces are tapered to about .015 thickness at the tips, but you'll learn by experience how far to go.

Bob has this to say about flying:

I launch at a 75° angle slightly to the right and glide left in the largest circle permissible. If your glider is a little stally with everything set up as shown, breathe a little down stab trim on the right side, looking from the rear. This adjustment is two-fold: it will give you a little nose down to take out the stall, plus it will cause the glider to rotate better on the launch for better snap out and recovery at the top, which is really the secret, utilizing every inch of ceiling you have. Likewise, if the glider stalls a little after initial adjustments are built in, warp the left side of the stab up. The use of strong light wood will up your times. •

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

diff action is better than when run totally dry. The only possible problem here might be a bit of inconsistency, depending upon how well you maintain your car and take care of the little details in preparing for each heat. For instance, on a dusty track the WD-40 would go away and your diff might then be a touch too light. Or, if you loosened it up to compensate and then put on some more WD-40 for the next heat, there might be too much gear slip. I guess you will have to be the judge here. I tried the trick, and it worked, but I don't care much for fiddling with stuff at the races and like the action of the diff just fine when run dry, so I don't apply any oil at all, knowing that although the action could be slightly better it is more consistent run dry. Your choice.

Another trick used on diff-equipped RC12E's would no doubt also work on other cars, and that is to glue a 3/8-inch wide piece of 1/16-inch thick Kydex to the top of the glass pan. This piece runs fore and aft, from the motor to the post for the front of the radio tray. Contact cement is adequate for gluing this in place. The idea here is simply to get a little bit of "tramp" out of the chassis, which keeps the tires in full contact with the track more of the time. A tire that is light, or worse, actually completely off the ground, is completely worthless to you in cornering situations. The more the tires are on the ground and hooked up, the faster you can go. Simple as that. Kydex is used, as there is a lot of rubber in it, helping it to act as a damper. Don't use a rigid material such as fiberglass. In fact, if using anything other than 1/16-inch Kydex, don't count on seeing much, if any, improvement.

Dan Rutherford, 4705 237th Pl. S.E., Bothell, WA 98011. •

* * *

Plug Sparks . . *Continued from page 32*

70 oil to the mix. The author, with his Drone Diesel, found that the standard diesel mix (1/3 ether, 1/3 kerosene, 1/3 castor oil) worked excellently. Of course, there always were those tinkerers who would add either amyl nitrate or amyl nitrite in small quantities.

The main drawback to the Drone was its fixed head, which did not allow for weather changes, both in temperature and humidity. Using a mechanical starter (most of us used converted hand-turned aircraft starters) worked fine, but there was no thrust washer on the shaft that kept the crankpin from rubbing on the backplate when starter pressure was applied. Eventually the Drone people came out with a variable head and roller bearing shaft, but by that time the glow engine had come into its own and dominated the field.

Drone engines were produced from aluminum, with the crankcase, backplate cover (a punched plate), and cylinder made of aluminum alloy. The steel crankshaft, of rotary valve type, featured a squared intake for improved performance. Cylinder liner was of steel with a cast iron piston, both ground to a smooth finish. The piston employed a unique baffle design which was also claimed to produce more power.

The head was a flat-top multiple finned arrangement with gold anodizing, making for the distinctive appearance of the Drone. Connecting rod was also aluminum with bronze bushings. A full-floating steel wrist pin with brass pads rounded out the finish.

The *Air Trails* engine review gave the Drone a good write-up by stating the engine started easily and consistently. Strobatac tests gave results of 4,850 rpm with a 14x6 prop, 5,500 rpm with a 12x8 Hi-Thrust, and 5,290 rpm with a Testors 10x10 propeller. Frankly, the writer had the best luck in using a 13x6 Ritz propeller which seemed to give the best performance.

Drone diesel engines had a bore of 21/32 in. and a stroke of 7/8 in., giving a displacement of .297 cu. in. The compression ratio was fixed at 18 to 1. Surprisingly for a diesel, the engine only weighed 9-1/2 ounces. In summary, the Drone was a good engine for its time but became outclassed by the Torpedo, Orwick, and other hot Class B glow engines.

GORDON CODDING SEZ:

In recent letters from Gordon Codding of 3724 John L. Avenue, Kingman, AZ 86401, this columnist could write darn near a full article on just the little goodies and tidbits he drops in his writings.

First off, Photo No. 7 shows the Interceptor we described last issue as having a Super Cyclone in it for power. Talk about overpowering! As noted last month, Gordon revised a standard Interceptor to install a Super Cyclone, based on a five dollar bet it would fly. The bet did not specify making the motor run wide open, so Gordon left the timer at full retard with speed as near as possible to bottom idle on a 12-inch propeller. The model actually completed five flights before he hung it up in his early shop (the original Hobby Lobby) at Vernon and Vermont Sts. in Los Angeles.

Gordon also sent an isometric drawing of a model designed by Clyde Austin that really had this columnist stumped. The "Contestor," as it was called, has been identified by Gordon as a half-size version of the Burd Champion. One of these days we'll get around to drawing this one up . . . just another item among the zillion projects this author has.

Also, we ran a photo of a "Mystery Model" built by Clyde Austin before his unfortunate demise. Codding was running through his collection of plans and ran across a design called the "Hep Cat" (a Paul Plecan design). The top longeron and cabin looked familiar, so nothing to do but check the model against the plans. All parts fit! The only revision seems to be limited to the alignment method of the wing and tail, via dowels glued chordwise on the bottom center of the flying surfaces and a grooved balsa block built into the body at the appropriate location. To round out the changes, plywood sides on the nose of the fuselage have been added plus provisions for a two-strut landing gear.

Just like Christopher Columbus said as he stood the egg on end, "It's easy when you know how."

40th ANNIVERSARY

In the January 1940 issue of *Model Airplane News*, a photo appeared in the "Gas Lines" section. Picture No. 7 in *M.A.N.* showed Rogers Barton and his winning appearance model, a Comet Clipper.

Imagine this writer's surprise when, 40 years later, he receives another photo of a Comet Clipper by Rogers Barton, 108 So. 29th St., Temple, TX 76501, representing his latest handiwork! Interestingly enough, Rogers is still living in the same town!

Photo No. 8 shows Rogers' latest rudder-only creation that placed 5th at the Alamo R/C Society Contest. Barton says he now has to learn "elevator tricks," although he modestly admits he can do fairly well now.

Photo No. 9 is an old picture of Fred

Quedenfield, 627 Charette Road, Philadelphia, PA 19115, back in 1940 with a Megow Ranger. His work wasn't bad then! Fred's model of the Flamingo has been seen in the various magazines lately. Painted various colors of lavender, the model is an outstanding beauty. Best part of all is that Fred flies it quite regularly!

Talking about Old Timers, we are greatly indebted to Bruce Lester, 254 Glen Park Ave., Toronto 19, Ontario M6B 2E3, Canada, for the series of old Nationals photos we have been running. Photo No. 10 shows the 1939 Nationals entry of Joe Raspante for the radio control event. We'll give you three guesses as to who *didn't* win the meet, based on the facial expression in the photo.

JACK FLORENZIE
2nd ANNUAL MEMORIAL

Whew! That's a jawbreaker to say quickly! However, anyone who was acquainted with Jack knew how much dedication he had for his hobby. Many was the time he was my co-event director; by that I mean we both ran different events from the same registration desk.

Mike Granieri was kind enough to send up a report on the Memorial contest staged by SAM Chapter 37, the Monmouth M.A.C. Held at Thompson Park County Facilities in Lincroft, New Jersey on September 14, seven events were held on one day! For those Californians who favor two-day contests, this might be some food for thought.

We are not going to give any times for the events; however, we will list the winning models so that all can see what the East Coast uses.

CLASS A GLOW
1) Joe Beshar (Playboy)
2) Mike Lachowski (MG-2)
3) George Haley (MG-2)
4) Lou Phillips (Playboy)

CLASS B GLOW
1) Bruce Howath (Mercury)
2) George Haley (MG-2)

CLASS C GLOW
1) Mike Lachowski (MG-2)
2) Gene Brown (Bombshell)
3) Dave Berry (Playboy)
4) Al Gamma (Powerhouse)
5) Dick Sarpolus (Playboy)

CLASS A-B IGNITION
1) Larry Fair (Playboy)

CLASS C IGNITION
1) Woody Woodman (Playboy)
2) Dave Ritchie (Clipper)
3) Larry Fair (Playboy)
4) Fred Quedenfield (MG-2)

ANTIQUE
1) Mike Lachowski (MG-2)
2) George Haley (MG-2)
3) Al Gamma (Powerhouse)
4) Dave Ritchie (Clipper)

TEXACO
1) Lou Phillips (Dallaire)
2) Fred Quedenfield (MG-2)

Mike goes on to say that Joe Corneille, the Contest Director, really knows how to run a meet and appeal to the contestants. Directly after the close of the meet, Joe invited everyone to his house for refreshments, turkey, and steaks!! Not content with that, Joe and his M.M.A.C. auxiliary (girls, bless 'em!) provided free lunch with choice of hamburgers, hot dogs, and steak sandwiches. How about that? No wonder everyone is looking forward to next year's meet, to be run again by Joe Corneille. As they say down south, "Joe is a good old boy!"

FOREIGN DIGEST

GERMANY

From Gerhard Everwyn, Dachsteinstr. 12A, D-8000 Munchen 82, Germany, comes a clipping from the German model magazine *Flug+Modell-Technik*, that describes Old Timer activity in the USA and particularly the efforts of Dave Baker in England with SAM(E).

For those readers not familiar with Dave Baker, he can best be described as a one-man whirlwind. His energy seems boundless in spreading the word on Antique flying; witness the SAM 36 chapter founded by Baker, that has over 135 members at last count. True to his word, Dave is getting the boys on the continent interested in the Old Timer movement. Great stuff!

CANADA

The latest issue of *Model Aviation Canada* contains a new column by Bruce Lester. This column is devoted to a proposed "Old Timer and Antique

Handicap" event. The event combines free flight type endurance and R/C spot landing.

The event is simplicity itself, with a 30 to 45 second motor run to climb as high as possible. The highest points that can be obtained would be 50 points for endurance and 50 for spot landing.

Noted is the low score one would obtain for endurance, as Lester proposes only one point per minute. One would do well to concentrate on the spot landing, as the penalty there is one point per foot distance from the target. Lester is hopeful that O.T. R/C flying will catch on to the point where regular SAM Rules contests can be staged.

SWEDEN

Photo No. 11 was sent in by Sven-Olov Linden, Hovstavagen 15, S-703 63 Orebro, Sweden, and is a shot taken at an Old Timer contest. Needless to say, Anders Hakansson, a well-known Wakefield flier, got the message as he is dressed in 1940 style clothing. Lennart Hansson on the right, with a G. Dela Mater "One-and-a-half" rubber design from the 1938 Jasco Yearbook, was a member of the Swedish delegation to the Wakefield Championships at Taft in 1979.

ENGLAND

Alex Imrie, 66 Tuffnells Way, Harpenden, Herts, England AL5 3H6, writes to say that when he saw a picture of the original Miss Tiny, he simply had to send in a photo of his neat flying replica. Photo No. 12 shows Alex out at his favorite flying site on a fairly cool day. Note the Miss Tiny is powered with an Ohlsson .23, which the original plan called for.

Alex also wrote a fine article on what he calls the Miss Philly V, as originally illustrated in the advertisements of Scientific Model Co. We will run this in the future, as Alex has uncovered some little-known facts about the Maxwell Bassett model. Don't miss next month's copy!

AUSTRALIA

Received a most interesting letter from Monty Tyrrell, 12 Hansworth St., Mulgrave, Victoria 3170, Australia, that bears partial repeating. Monty describes the field his R/C club has and then starts to describe how Old Timer flying is gradually catching on.

One of the older fraternity like me has decided to teach the newer middle-aged fraternity (who have only come in since radio became popular) just exactly what it is all about. He has acquired a Super Cyclone and one of Uncle Irwin's .60's. He plans to make a New Ruler and a big Civy Boy as per the original . . . silk, dope, et al. He will relent and have rudder-only radio to keep them from flying off the field too far. He figures this is just the thing for a calm day under a beach umbrella, drinking beer and letting each member have a go at it.

We'll probably be the only two in the club who can set up, operate, and troubleshoot a spark ignition engine. It's just never taken hold here in Australia and particularly in our R/C Club.

I naturally have stipulated that all motors shall run on gas and oil, with a few drops of castor oil to be injected into the intake prior to release to give that wonderful nostalgic smell. That, my friend, is old timing in three dimensions. Medicinal castor oil makes the best smell. To paraphrase Al Jolson, if you think balsa flies better, you ain't seen nuthin' yet!

GWIN AERO ECHOES

Received a nice letter from Ira J. Hassad, who still runs Lomar Specialties at 638 La Sombra Dr., El Cajon, CA 92020, wherein he states the name "Gwin Aero" had a connection with the family of the wife of Dan Bunch.

Ira further states she certainly was a fine companion for Dan. He also recollects that the original Gwin Aero parts were manufactured in or near Indianapolis, which was Ruth's hometown.

We're hoping this little squib will make other ideas surface.

OBIT NOTICE

Don Bekins has just advised me that the SAM 27 spark plug, Bill Hooks, recently passed away. Photo No. 13 shows Bill in happier days with one of his many Lanzo Record Breaker models. This one is geared to the new 1/2A Texaco event.

20th ANNUAL STOCKTON ANNUAL

This is the meet that started this Old Timer craze when first held back in 1960.

Perpetuated by SAM 32, as the Stockton Gas Model Association no longer runs the meet, this venerable contest gets better by the year. The report we have from Jim Persson has been edited somewhat, but we will hit the highlights.

The Stockton Annual was also geared with SAM 21, putting on the O.T. R/C portion of the meet for the first time. Saturday morning, which was a lovely day for lift, found a flock of boys putting up consecutive maxes; Larry Clark with five for Class C, Larry Boyer with five for Class A, and Sal Taibi with four for second in A.

Best competition of the day was encountered in the .020 Replica event, with the spread between first and seventh place being only 50 seconds! Naturally a Strato Streak won!

Sunday was a horse of another color when it came to flying. Most everyone was sandbagging like crazy, as no one flew before 11:00 a.m., at which time the wind died to a respectable breeze. As usual, Larry Boyer, the original sandbagger, got his last flight off at two minutes to closing time to win Antique. Despite the wins by Larry Boyer, Cliff Silva, after many years of trying, finally captured the total high flying time. Results looked something like this:

.020 REPLICA
1) Jack Jella (Strato Streak) 7:20
2) Jim Harrison (O.O.S.) 7:16
3) Cliff Silva (Strato Streak) 7:08

O.T. RUBBER
1) Bill McConachie (Reid Hull) 9:00
2) Joe Norcross (Lanzo) 6:46
3) Charles Werle (Reid Hull) 6:13

CLASS A IGNITION
1) Larry Boyer (Rocketeer/O.S. .15) 15:00
2) Sal Taibi (Cloudster/Arden .19) 13:51
3) Cliff Silva (Ranger/Arden .19) 7:44

CLASS B IGNITION
1) Al Rasmussen (Alert/Veco .19) 8:47
2) Larry Clark (Foo 2-U-2/O.S. .25) 8:17
3) Terry O'Meara (Alert/Torp .29) 7:58

CLASS C IGNITION
1) Larry Clark (Albatross/O.S. .35) 15:56
2) Jack Jella (Playboy/Cyke) 10:58
3) Greg Rasmussen (Zipper/Fox .35) 8:46

30 SECOND ANTIQUE
1) Larry Boyer (Clipper/Bunch) 9:00
2) Larry Clark (Miss Delaware/O&R .60) 7:55
3) Terry O'Meara (Clipper/Madewell .49) 7:53

Total High Time: Cliff Silva

THE WRAP-UP

Well, this has been a fairly long-winded column but we only covered a few of the newsletters sent in. Next month, we'll recognize your efforts on

behalf of the Old Timers.

After reading Larry Kruse's excellent coverage of the SAM Champs in *Model Aviation*, I do hope he doesn't mind if I steal a paragraph from him. He said in one paragraph what I have been trying to say for five years. I think it is most appropriate for the West Coast, as we are suffering from growing pains where each club is modifying SAM rules to suit its own tastes and quite possibly gain an edge over the others.

Kruse states:

As SAM grows, there are those within the ranks whose hobby is not aircraft and engines of the bygone years, but rather sowing dissent and manipulating people and organizations to their own self-serving ends. SAM is unique as a part of our hobby. It is the only arena in which sometimes diverse individuals and interests of Free Flight and Radio Control are brought together by one common denominator . . . That is what is important about SAM, a commonality of interest and a unity of purpose beyond those who would seek to polarize and fragment the organization.

Thanks, Larry, I couldn't have said it better. Like women, all forms of modeling are good, just some are better. That goes for the present SAM rules too, even if I don't agree with them all! Amen!!●

1 to 1 Scale . . *Continued from page 27*

holes staring at you in mocking glee. Each of us has his small petty peeves and fetishes, and the use of nylon horns is one of mine. I will go to great lengths to eliminate the hideous hunk of horrible horn from my unicorn.

I try to keep the linkage enclosed wherever possible by using torque tubes for ailerons and control line style arms for the rudder and elevator. There are times however, when that becomes difficult or impossible. At that point, the horn becomes a challenge.

One basic item which can be used and kept inobtrusive is the basic ball-and-socket type linkage. These can often be made to look like some of the linkages that festoon the control surfaces of full-scale aircraft. If these are not to your liking, try the following idea.

Determine the length of arm you think you will need to actuate the control surface and cut a piece of brass tubing about 1/8 inch longer than that (3/32 or 1/8 tubing will work well). Select a bolt that will fit into the tubing and cut off the head. Silver solder the bolt into the tubing. Flatten the end of the brass tubing for a distance of about 1/4 inch and drill a hole through the flattened portion of the tubing. This hole should accommodate a clevis pin without too much slop.

In the control surface, inset a piece of plywood; about 1/2 inch square ought to be a minimum size to use. In this block, drill a hole smaller than the threaded portion of the horn you've just made. The horn is then screwed into the hole. A little epoxy or instant glue in the threads will hold it. If you wish, you can drill the hole in the plywood at a slight angle so the position of the clevis attachment will be right over the hinge line.

This horn will work well and doesn't stand out nearly as much as the nylon jobby that just cries "MODEL" when you look at it. (Or when the judges look at it!) Some adjustment can be gained by screwing the horn in or out slightly.

This endeth my treatise on the abolishment of the unicorn syndrome!

IN CLOSING

Possibly some of my modeling friends have tried to reach me by phone during the last two months, only to find that the Underwoods now have an unlisted

number. I apologize for this seeming snobbishness, but we had an unwelcome visitor in our home in October who saw fit to remove some expensive pieces of our life. The burglary was neatly done and it was efficient. Sterling silver and jewelry departed our household. It appeared to both the police and to us that they determined our presence at home by a series of "wrong number" phone calls. This was emphatically brought home with a call at 7:25 a.m. on the day after the burglary, some 15 minutes after our normal departure time. That did it . . . we then went to an unlisted number! Therefore, if you'd like to contact me, please drop me a postcard and I'll either write or give you a call. My address is 4109 Concord Oaks Dr., St. Louis, MO 63128.

Incidentally, if anybody tries to sell you a silver medal about three inches square, 1/4 inch thick, that says 2nd place, Woodvale 1978, let me know. They took my FAI medal along with my wife's jewelry!

Enuf now! May your oak leaves not fall until spring. •

Seabreeze . . . *Continued from page 39*

under the wing, at the root, as the C.G. is above this location (like you said, Wilbur, the C.G. is the center point of the whole mass of the aircraft, whereas the balance point we're concerned with is just the location of equal weight fore and aft . . . Wright you are, Orville!), so the model will tilt either nose-down or nose-up from the same point, depending on how you tip it. We found the best way to balance it was to hang the model upside-down by the towhook supplied, using that same triangular file. This method also discloses that the front end of said hook, as installed per instructions, is about a 1/2-inch ahead of the specified balance point.

Having reached this point in the preparation, we were all set to go flying . . . except that, in talking to Bob on the phone, he gave us a couple of suggestions for improving Seabreeze's performance. The first was to add a turbulator to the wings. This was done (per instruction) by cutting a 1-inch wide by 50-inch long strip of 100-grit self-adhesive sanding fabric into two 1/2-inch strips and sticking one strip down to the top of each wing panel, 1/2-inch back from the leading edge. The other trick was to seal the fin/rudder gap, though small. This was done by Hot Stuffing a 1/2-inch wide strip of thin plastic film along each side of the aft edge of the fin, allowing it to lay loosely against the leading edge of the rudder. About 1/16-inch of the film is glued to the fin, and it easily bends and blends smoothly with rudder movement.

Hmmm . . . not a bad idea to improve the efficiency of many hinged surfaces. . .

For a product preview, we should have tried the model without the latter two improvements. Unfortunately, we didn't think of that until after the changes had been made.

Okay, *now* off to the slope site, and as we were taking a rare day off from work, we drove south to Torrey Pines, overlooking the beautiful Pacific . . . and . . . ahem. . . Black's Beach, known far and wide as a popular beach for nude sunbathing, swimming, and . . . er . . . oh yes, hang gliding!

After assembling the Seabreeze and picking up the black and yellow clothespin, we made one test-glide to make sure the model wasn't tail-heavy (it wasn't). Then it was up to the edge of the slope, one last wiggle of the controls, watch for any approaching hang gliders, check the beach for "obstacles" (almost none, unfortunately) and, heave ho!

Our first feeling as the Seabreeze flew straight out, gaining altitude, was one of comfort. Aside from a slight amount of back pressure, it was practically a hands-off situation. After several long passes up and down the slope, we found that almost full up-trim had to be cranked in for level, hands-off flight. Even so, full up stick after a shallow dive resulted in fairly tight loops.

The most surprising flight characteristic was the flight speed. We expected it to be much faster, considering the all-up

weight of 59-1/4 ounces, giving a wing loading of 11.22 oz./sq. ft. Bob's comment that the Seabreeze is probably a better thermal model than a slope model may be true. We'll have to try raising the weight with some ballast. We were also unsuccessful in obtaining inverted flight or a roll . . . but read on. As for thermalling, Seabreeze quickly proved itself.

While we were in the air, there were also about five or six other R/C sailplanes, plus three or four hang gliders up with us. We noted that two lightweight models were almost directly overhead, about 300 feet, and the pilots' conversation indicated they were trying to outclimb each other. We sniffed around, found a little bump, and started a tight circle, from about 500 feet out from the slope edge. In a few minutes, Seabreeze was circling with the other two models, and being familiar with their design, we knew that because Seabreeze appeared smaller, it had to be higher!

Getting back to that up-trim, it was obvious that the model was nose-heavy, which, of course, helped minimize elevator effect. In a way, this was nice, as the model grooved beautifully, but not everyone likes the slow response (sluggish?) of a nose-heavy model. It's certainly the safest way to be out of balance for your first test flight, however! Some nose-weight had to come out, for sure.

As for the inverted flight and roll-ability, we'll have to come back to you on that later. You see, when we landed the plane after an hour of flying and were showing it to some interested spectator/modelers, we found that we had been flying with the transmitter controls on half-rate! Unfortunately, we didn't have time for another flight that day, and won't have before this report is published.

And how good is Seabreeze for a beginner? As for instructions to complete the model and install the radio, they're a bit too sketchy, though with a little help from a person experienced with gliders, there should be no problem. As for flying, the model is great for a beginner. It has no bad habits, mushes easily out of a stall with no snapping characteristics (washout built in), and is ruggedly built to take the knocks.

During that first one-hour test flight, we turned and asked if someone would fly it while we went back to the car for our camera. The guy who volunteered had just gotten out of the Navy (think he would have learned!), and though we didn't know it until later, had only had a little time on his first glider, a Mark's Models "Wanderer"! As it turned out, Jim Ostrich, a native of Los Angeles, and now living in San Diego, flew the model for about 10 minutes and then took some pictures of the bird with our camera while we made some close passes. You may see one here if they came out.

In summary, we consider the Seabreeze a better than average R/C sailplane for the beginner or expert who may not have the time or the skill to build such a fine model. For the beginner, it is a gentle and forgiving flier that will help build confidence during those first learning hours, and for the advanced and/or competitive flier, it should serve well in club and AMA competition. In this get-what-you-pay-for world, the Seabreeze may cost plenty, but you get plenty! •

Sport Scene . . *Continued from page 48*

Addie Naccarato flew a couple of models of about six-foot span. Both were towline gliders which were converted to power. One was used in towline and the electric event, the other one (which you see in the photo) was converted to gas power. The engine she used was a new Cox R/C Bee, modified to accept an external timer. Quite unusual for Addie, she covered this model with Monokote. Addie and Tony Jr. are a couple of the world's foremost advocates of silk and dope. (I think they make some pretty good points about the strength-to-weight of that combination, too.)

Robert B. Davis had a somewhat different approach, in that he used a very low thrust line and pylon. His model spanned 72 inches and used a Tee Dee .020 for power. Again, the model was Monokote covered. Bob was having problems with flexibility, as his model would flutter visibly under power.

By far the best performing model I saw at the meet was the wing flown by Jerry Huben. He also used a Tee Dee .020 for power on his model. The plane has a five-foot span and five-inch chord. Weight was quite low for such a large model, at six ounces. You can see that the engine is mounted very high to control looping tendencies. It appeared to have been raised at least once, too. The engine timer sits directly below the engine on its pylon. Covering here is silkspan and clear dope, with signs of many years of use.

The good flights on Jerry's and Addie's wings featured a low-angle spiral climb with a slight stall transition to glide. The glides seemed to be faster, but shallower than a competition free flight. My judgment is that somehow there must be a way to increase the performance, but I suspect that it might take exotic construction materials and designs to do it.

The problems with flying wings generally stem from the fact that the stabilizing area is out at the wing tips. It becomes extremely difficult to separate pitch and roll corrections. If you want to trim for more climb you have to somehow warp both elevons up just the same amount. Generally you end up with some extra or reduced turn, and when you correct that you need to touch up the climb again. Conventional aircraft are much easier, in that each surface does only one thing (excepting stab tilt). In order to get high performance in a very short-coupled model such as a flying wing, the trim adjustments must be exceedingly precise. To make that meaningful, the surfaces must be very flat and rigid. To achieve this, I suspect that Kevlar and carbon fiber reinforced tubular spar wings and screw adjusted control surfaces would be a good starting place.

That much modern technology and complexity would probably ruin one of the nicest contests around. See you next month. •

Electric . . . . . *Continued from page 47*

larly attractive for electric, as it is sleek, has low drag, and has a "futuristic" look about it. It was used by Germany late in WW-II and could do over 400 mph. The model was built by Aloys Zimmerman, of Germany, and has a 100-inch span, two Keller 50/48 samarium cobalt motors, 46 cells (1.2 Ah), 11x8.5 props, and 14 lbs. flying weight. Peter didn't say how it flew, but I think it would fly very well indeed. The power is equal to two .40's, and about the same power-to-weight ratio of the electric pattern planes.

Peter says that next spring his book on electric power in Europe will be available, and will give a complete look at the European "secrets and doings." It will be without formulas or graphs, so it will be just what is needed for the sport electric fliers. It is in English. For more information, write Peter Blommaart, Rue Wauters, 28, B-6200 Gosselies, Belgium. Thanks Peter, for the report, here's hoping there will be a World Championship for electrics someday!

Mitch Poling, 1519 N.E. 98th, Seattle, WA 98115. •

T.O.C. . . . . *Continued from page 25*

with diverging rules and aircraft specifications. It was also announced that the 1980 competition would continue the scale aerobatic aircraft theme with the added feature of Aresti-type aerobatic flying.

The Aresti system is named after its originator, Count J.L. Aresti, of Spain, who developed a method of graphically noting aerobatic maneuvers. They appear similar to the strange hieroglyphics seen in ancient Egypt, but could actually be described as aerobatic shorthand.

A byproduct of the Aresti system is the continuous maneuver. In other words, the end of one maneuver *is the beginning of the next maneuver!* No time to fly way out and gather your thoughts, brush the hair out of your eyes, wipe a sweaty palm, or scratch your . . . nose. As the first maneuver begins, you fly "into the box," and you stay there until you've completed the last maneuver on the list. The "Box" is the area of sky in which all the maneuvers are put together, and you can't put up your hand and "leave the room" until you're finished. It's like being on stage in front of a large audience . . . you are "on" and being judged constantly until the scene is finished and the curtain drops!

With one-long-maneuver aerobatics, you need a fast flying aircraft like you need one more hole in your head than you came with from the factory. Surprisingly enough, it would seem that many T.O.C. contestants didn't feel this way, even after Hanno's convincing performance in 1978. Sure, there were four Dalotels in addition to Hanno's this time, but all of them were smaller, just meeting the 1100 sq. in. wing area minimum, and using direct-drive 90's for power. While we're at it, the other 13 entries included seven Lasers, three Zlin 526's, and three CAPs (two 20L's and one 21). Of the top five finishers, Brown's and Matt's were reduction drive Lasers, and Hoppe and Tracy flew reduction drive CAPs. Brown used a single 90 with Master Climb belt reduction, while the other four used twin Webras geared to a single prop. Three were factory Webra twins, while Hanno's was the same unit he used in 1978. Of the remaining 13 entries, only four used direct drive. Kraft and Brink used 90's, Matsui ran a YS 120, and Bonetti was the lone Quadra user. The Quadra ran well and reliably, but was a little lacking when it came to pulling the big CAP 20L straight up. If realistic sound counted, it would have been the winner!

Getting back to the actual flight competition, the first three days consisted of three rounds each, with the best flight of each day or schedule counting as the official score. The first 3-round day consisted of a known compulsory program of 16 maneuvers that included a vertical two-point roll, inverted spin, snap rolls, stall turns, square inside loop, Hammerheads, and a 1/4 rolling turn, all mixed in with various turnarounds.

Hanno came up early in the first round, and when he had finished it was immediately evident that the big battle would be for second place on down. His lowest flight on both Thursday and Friday was higher than the best flight of the second place contestant! On Saturday, only Dave Brown's 9th round barn burner exceeded Hanno's lowest score of the day . . . by 60 points out of 10,200!

Incidentally, if you think the fliers had a rough time adjusting to the continuous maneuver type pattern, think about the judges. With the plane being scored upon at all times while in the Box, the judges had to fix their eyeballs on the aircraft from the time it entered the box until it checked out. Also, there was no time to call the next maneuver because the transition time from one maneuver to the next was zilch . . . point you-know-what over infinity.

Dry run tests of the judging system prior to the tournament resulted in quite an exotic arrangement. Each judge was equipped with lightweight earphones. Lines ran back from the flight line to a single microphone at a protected table about 20 feet behind the judges. Each subsequent maneuver was called out over the communication system as the previous one was just about finished, and right after that, the judge called the score of the previous

INDEX TO ADVERTISERS

CLASSIFIED ADS

Non-commercial (personal items) Rate is 25 cents per word with a minimum of $3.00. Commercial Rate is 40 cents per word, with a minimum of $5.00. No advertising agency discounts allowed.

All ads are payable with order, and may be for any consecutive insertion period specified. Name and address free, phone number counts as two words. Send ad and payment to MODEL BUILDER Magazine, Classified Ads, 621 West 19th St., Costa Mesa, CA 92627.

EMBROIDERED EMBLEMS AND PATCHES made to your design direct from manufacturer. No quantity limits. Send sample or sketch, tell us how many. Prompt free custom quotation. D.H. & S., Box 711, West New York, NJ 07093.

HAND LAUNCH GLIDER KITS: Thermal Piglet, Merlin, $4.98 each. Tiny Piglet $3.49. $2 shipping per order. Campbell's Custom Kits, P.O. Box 5996, Lake Worth, FL 33461.

FREE SAMPLE COPY ... Used equipment bargains! Hundreds of planes, radios, boats, helicopters, engines, etc., etc. Buy or sell, get one free ad with subscription: $10/year (10 issues). Write Hobby Swap, P.O. Box 834, Santa Maria, CA 93456.

WANTED: Built-up steam powered ship models. Also working model steam plants for boats. Al Hanak, R.D. 2, Sleepy Hollow Rd., Sussex, NJ 07461.

Add realism to your model with this miniature red blinking lite. Installs in minutes. Integrated circuit makes it light weight and low power. Can operate continuously for full year on single 1.5v battery. Ready to operate, with instructions, $6.95. Free info SASE. HOBBY-TRONICS, P.O. Box 2017, Nipomo, CA 93444.

GLASS CLOTH: 2 oz., finest woven quality, 38" wide. 5 yd. length $16.65 ppd. Dan Parsons, 11809 Fulmer Dr. N.E., Albuquerque, NM 87111.

WANTED — OLD MODEL ignition engines, cars, etc. Paying top dollar. Bill Simpson, 7413 Via Lorado, Rancho Palos Verdes, CA 90274, (213) 377-3532.

FOR SALE: Large collection of ignition engines, glow engines, kits, plans, magazines, tools and hardware. Send 75¢ in stamps for list. Larry Vance, 5066 Cindy Way, Las Vegas, NV 89102.

EM-1 ni-cad battery charger. Plans plus PC board $6.95 PPD. Free details. S.A.S.E. Electro-Motivation, Box 892, Montara, CA 94037.

MODEL MOTORS new and used. Atom and Thor castings, Rite-Pitch props. List 25¢. T. Crouss, 100 Smyrna, West Springfield, MA 01089.

PEANUT SCALE PLANS: Boeing P-26, Fairey Spearfish, Northrop P-61E, $2.00 ea. ppd. or send $1.00 for sample plan and complete list. David Diels, Box 101, Woodville, OH 43469.

maneuver to his scorekeeper as he began studying the next maneuver. No time for a sneeze here! To those who have suggested it, we agree that the scale aircraft/Aresti system would be great in FAI, but can you imagine trying to call maneuvers to judges representing various European countries all at one time!?

Speaking of judges, the gang at the T.O.C. was something special. As in years past Jim "Doc" ('cause he is a dentist) Edwards was the Chief. Representing the modeling fraternity were Joe Bridi (USA), Geoff Franklin (England), Warren Hitchcox (Canada), Bill Johnson (USA), Dave Lane (USA), Travis McGinnis (USA), and Bob Upton (USA). Bob judged the R/C World Champs in South Africa in 1979. Representing full-scale aviation were Leo Loudenslager (current World Champ, and many times U.S. Aerobatic Champ. Designed and built Laser 200), Gordon Price (Captain for Air Canada, Canadian Aerobatic Champ), Jim Roberts (American Airlines Captain, has flown Laser 200, which he built, in Aerobatic Champs), LaMar Steen (designer of Skybolt, R/Cer since 1951, has judged full-scale aerobatics), and Gerry Zimmerman (United Airlines pilot, has judged full-scale aerobatics).

Again, getting back to the competition, the second day schedule was unknown until the night before. It was one of three compulsory programs, each of which the contestants had to practice, as they wouldn't know which one would be chosen. It turned out to be No. 2, which featured a 360 degree rolling circle, in addition to a series of loops, rolls, snaps, plus Humpty Bump and Hammerhead turnarounds.

On the third day, Saturday, the pilots flew three rounds of free-style; each one choosing his own poison, so to speak, but not allowed to total more than 400 in K-factors. In this series, Jeff

FULL SIZE PLANS SERVICE

Including reprint of construction article (if any)

No. 2811 LIBERTY SPORT $17.75
Mammoth 3-1/4" scale biplane for belt-drive 60 on up. Four sheets. Roger Stern.

No. 2812 DYKE DELTA $1.50
Super-light indoor Peanut Scale model. Will fly 35-45 seconds. By Ken Johnson.

No. 281-O.T. HERON $3.00
A 48" span Class A gassie from Dec. '39 Flying Aces. Cabin style. Frank Gagne.

No. 1811 WACO YKS-6 $6.75
Classic cabin biplane in R/C Sport Scale. For .29 - .40 engines. By John Burns.

No. 181-O.T. '32 WAKE WINNER $2.00
Super-light 37" span rubber model uses motor stick. Designed by Gordon Light.

No. 1812 PAULHAN-TATIN $1.50
Interesting 1911 streamliner with curved dihedral, in Peanut Scale. By J-F Frugoli.

No. 12801 OMAC-1 $7.50
R/C Sport Scale pusher-canard executive aircraft, 60 power. By Col. Bob Thacker.

No. 12802 AUSTER J-5 $2.00
Fine flying, 18" span rubber scale light-plane. Double for Jumbo. Steve Gardner.

No. 1280-O.T. STRUCK'S KGS $4.00
So-called because proportions are KG-ish, but the looks are Zipper-like. Class B/C.

No. 1280-C.P. WEDELL-WILLIAMS $3.00
Plans from golden era Wanner rubber kit. All ribs and bulkheads shown, 30" span.

No. 11801 "MAMA MIA!" $9.50
Latest, super-size pattern ship by leading flier/designer/kit manufacturer, Joe Bridi.

No. 1180-O.T. FOKKER D-VIII $4.50
Very stable F/F flying scale ship for .23 ignition engines, 57" span. By Earl Stahl.

No. 1180-C.P. FAIREY "BATTLE" $3.00
Fine proportioned 30" span rubber powered low-wing scale ship from Megow kit.

No. 10801 UDET FLAMINGO $6.75
Easily built R/C sport scale aerobatic biplane for .30-.40 power. Roland Baltes.

No. 10802 OHMSICK ANGEL $3.50
F/F Payload-like design for R/C and 020 electric power, 43" span. Randy Wrisley.

No. 1080-O.T. THE S-4 $3.50
Super-small gassie from 1939 M.A.N., for .049 or Elf (!) power. Malcolm Abzug.

No. 1080-C.P. STINSON RELIANT $4.00
A 3/4" scale model from 1934 Ideal kit. Excellent plans for F/F rubber, R/C, etc.

No. 9801 POOLBOY $4.00
Tiny (20" span) R/C biplane flying boat for .010-.020 eng., 2-ch. By Ken Willard.

No. 980-O.T. DOLPHIN $10.00
Beautiful planked-fuselage 9' streamliner from 1939 M.A.N. By Thracy Petrides.

No. 8801 FUJAVAK $5.00
Sharp looking T-tail R/C powered glider for .049-.15 eng., 80" span. Pavel Bosak.

No. 8802 SCHNEIDER CUB $6.50
Famous R/C Aircraft No. 5, 3-time Nats winner, 6' span, .60 eng. Alex Schneider.

No. 8803 POTTIER P-70-S $3.00
F/F scale French homebuilt, 02 electric, trike gear, 29" span, neat! By E. Fillon.

No. 880-O.T. HAYSEED $4.00
Hot A/B pylon (no-window cabin) never before published, 4-ft. span. Carl Hermes.

No. 7801 APPRENTICE $5.00
Continually popular genuine R/C trainer for 19-.35 eng., 72" span. Bill Northrop.

No. 780-O.T. STRATOSPHERE $3.50
Streamline cabin rubber ship from May 1941 M.A.N., 36" span. By Henry Cole.

No. 6801 JUNKERS J-10 $6.00
Squarish low wing WW-I R/C Sport Scale model for .45-.60 power. By Dick Allen.

No. 6802 SLICK $3.00
Pocket-size R/C stunter for 020 electric power, 2-3 ch., 33" span. Jack Headley.

No. 6803 SANTA MARIA No. 10 $3.00
Winner of 2nd Place in Wakefield at 1980 FAI W/C. By Paul Van Leuven, Australia.

No. 680-O.T. STRUCK'S HO-CAT $5.00
Alumnus of famed '39 Lake Hopatcong ROW meet, predecessor to R/C Sea Cat.

STICK 'EM PATTERNS

Complete sets of pressure sensitive patterns provide "printed wood"... on your stock... for selected MODEL BUILDER plans. Press all patterns for ribs, bulkheads, tips, etc., on proper thickness sheet balsa or plywood, and cut 'em out! No tracing, no transferring, no plans tearing, no inaccuracies. Just like making up your own kit with printed wood. "Stick 'em Pattern" numbers correspond to plan numbers. Order with plans and they'll be mailed together... 3rd Class. Add 65¢ per set to mail patterns 1st Class.

CALIFORNIA RESIDENTS ADD 6% TAX.

No. 11731SP BIG JOHN the FIRST	$5.95
No. 574-O.T.SP T-D COUPE	$2.95
No. 674-O.T.SP RED ZEPHYR	$3.95
No. 6741SP TRIXTER BEAM	$2.95
No. 774-O.T.SP OUT 'O SIGHT	$2.45
No. 7741SP CURTISS A/12 SHRIKE	$3.95
No. 874-O.T.SP POWERHOUSE	$3.95
No. 91074-O.T.SP BUHL PUP	$4.95
No. 1174-O.T. SP LANZO STICK	$1.95
No. 11743 SP "C-QUELL"	$3.95
No. 575-O.T. SP MERCURY	$3.95
No. 775-O.T. SP BOMBSHELL	$3.25
No. 277-O.T. SP BERLINER JOYCE	$5.25
No. 4771 SP "MISS ARPIEM"	$3.25
No. 577-O.T. SP GLADIATOR	$4.75

Price includes 3rd Class postage and reprint of building instructions (if any). Add 65¢ PER PLAN for 1st Class postage. Add $1.00 PER PLAN for overseas orders (except APO and FPO). Complete plans list 35¢.

CALIFORNIA RESIDENTS ADD 6% TAX.

MODEL BUILDER PLANS SERVICE
621 WEST NINETEENTH ST.
COSTA MESA, CALIFORNIA 92627

FREE

THIS $6.95 *BOOK*

PROTECT YOUR SUBSCRIPTION IN AN ENVELOPE . . SEE BELOW

SPECIAL

R/C MODEL BUILDER SUBSCRIPTION OFFER . .

WITH YOUR MONEY-SAVING *SUBSCRIPTION OR RENEWAL TO* R/C MODEL BUILDER MAGAZINE. *THE BOOK CONTAINS ARTICLES ABOUT BUILDING, COVERING, FINISHING, AND FLIGHT ADJUSTMENT . . . PLUS* FULL-SIZE PLANS *FOR 12 1/2-INCH SCALE, FREE FLIGHT, WW-II FIGHTER PLANES.*

IMPORTANT!! Is this a NEW( ) or RENEWED( ) sub?

SEND ME: Expiration date: _____

☐ 12 ISSUES FOR $25.00 (17% OFF Newsstand Cost)

☐ 24 ISSUES FOR $47.00 (22% OFF Newsstand Cost)

Rates apply to the U.S., its possessions, and Canada. Elsewhere add $3.50 per year. ( ) Credit Card ( ) Check Enclosed

To have your subscription mailed in a protective envelope, add $3.00 per year to the above rates, and check here ( ).

Name _____
(please print clearly)

Address _____

City _____ State _____ Zip _____

VISA ( ) Master Charge ( ) No. _____

Expiration Date _____

Signature _____

R/C MODEL BUILDER's

40 BEST SELLERS !

SEE PAGE 100 FOR ORDERING INSTRUCTIONS. COMPLETE PLANS LIST SENT WITH EACH ORDER.

No. 6781 LOCKHEED P-38L $12.00
R/C Sport Scale, balsa and ply const., a trophy winner, big, 8' span. Art Johnson.

No. 3771 WACO UPF-7 $5.00
Stand-off R/C scale (1 8"=1') of one of the prettiest Waco biplanes. Span 54". R. Steely.

No. 12711 CURTISS-WRIGHT JR. $4.50
Two inch scale model of famous pusher light plane. R/C By Ralph Fidance

No. 6771 GIPSY MOTH $12.00
Exact quarter-scale (7 1/2 ft. span) R/C of famous D.H. bipe. By Bill Northrop.

No. 1722 PUSS MOTH $4.00
Chet Lanzo's famous rubber F/F scale Puss Moth returns! By Hal Cover

No. 680-C.P. GRUMMAN F3F-1 $4.00
Reprint of Miniature Aircraft Corp. plans plus ribs and bulkheads from printwood.

NO. 4742 CESSNA AW $3.50
Jumbo scale rubber powered model of a 1928 classic. Span 48". By Jim Adams.

No. 1731 SPROOSE GOOSE $5.00
EAA type R/C sport biplane, mostly spruce, for 60 engines By Bill Northrop

No. 11781 TRAVEL AIR D4D $8.00
Accurate 2-inch R/C scale model of famous Golden Era biplane. By Bill Seidler.

No. 11731 BIG JOHN the FIRST $7.50
Modified prototype of editor's notorious monster R/C biplane. By Bill Northrop.

No. 1080-C.P. STINSON RELIANT $4.00
A 3/4" scale model from 1934 Ideal kit. Excellent plans for F/F rubber, R/C, etc.

No. 1723 WHITE TRASH $4.00
A proven, trophy winning R/C sailplane with 7 and 10 ft. span. By Rick Walters

No. 7801 APPRENTICE $5.00
Continually popular genuine R/C trainer for .19-.35 eng., 72" span. Bill Northrop.

No. 175-O.T. FLYING QUAKER $5.00
First gas model kit by Megow, 1937. Span 7 ft. Redrawn by Phil Bernhardt.

No. 9783 R/C STEAM LAUNCH $6.00
Natural finish mahogany planked 40" OA "African Queen" type. Kilburn Adams.

No. 2761 DRAGONFLY $4.50
R/C funship, looks like giant rubber stick model. Superb trainer. By Tex Newman.

No. 8741 WOODY PUSHER $4.00
Easy to build & fly semi-scale R/C home-built, like C.W. Jr, .09-.15. Chris Moes.

No. 9781 GREAT LAKES TRAINER $4.00
Sport scale biplane for 3-4 channels and .19 engines, 40" span. By Bill Northrop.

No. 4801 BRUSHFIRE $6.00
Contemporary design being used by several top pattern fliers. By Ken Bonnema.

No. 2801 TIPORARE $6.50
Top pattern ship in 1979. Flown by Dave Brown at World Champs. Dick Hanson.

No. 4751 R/C AUTOGYRO $4.00
Semi-scale twin rotor R/C autogyro for .35 engines. Very stable. By Skip Ruff

No. 9792 CRICKET $3.00
Balsa profile fuse, Ace foam wing 1/2A quickie for 1 or 2-ch. radio. J. Headley.

No. 1174-O.T. LANZO STICK $3.50
Rubber stick winner, '40 Nats. Span 4½'. Still good in Unlim. By Phil Bernhardt.

No. 574-O.T. The T-D COUPE $5.00
Classic high wing 1936 'C' cabin gas job. Span 64". Redrawn by Phil Bernhardt.

No. 773-OT LANZO 8' GAS MODEL $6.00
Chet Lanzo's famous "Record Breaker." Two large plan sheets. By Phil Bernhardt.

No. 874-O.T. POWERHOUSE $5.00
Taibi's famous design for Forster 99 ign. Great for R/C O. T. By Phil Bernhardt.

No. 174-OT EHLING '37 GAS JOB $5.00
Frank Ehling's 8 ft. span 1937 gas model. Still winning! Drawn by Phil Bernhardt.

No. 477 O.T. CLOUD CHASER $1.50
This 30" span stick job from 1938 MAN is OT, FF trainer, Unlim. Bruno Marchi.

No. 12792 EXCALIBER II $5.00
R/C tunnel-hull outboard constructed of plywood, for K&B .21. By Jerry Dunlap.

No. 12741 85' HARBOR TUG $8.00
Complete plans (3 sheets) for R/C tug. All wood, 37" LOA. By Francis Smith.

No. 7724 TRAVELAIR '2000' $5.00
Two inch full scale Classic R/C biplane Proven flier, 60 power. By Bill Northrop

No. 7721 FAIRCHILD 51 $3.50
One inch scale Classic for R/C, also F/F gas or rubber. By Hurst Bowers

No. 879-C.P. CURTISS F-11C-4 $4.00
Reprint of Miniature Aircraft Corp. plans plus ribs and bulkheads from printwood.

No. 8723 TAYLORCRAFT, F/F $1.50
Rubber powered, 24-inch scale seaplane. An excellent flyer. By Walt Mooney

No. 579-O.T. TAYLORCRAFT $12.00
Quarter-scale in 1941! Famous 9-foot design kitted by Miniature Aircraft Corp.

No. 10753 SUPER PUP $3.00
Profile C/L stunt ship for .29 to .36 power, 42" span. Easy-built. Mike Parenteau.

No. 8781 R/C VELIE MONOCOUPE $9.50
Light-weight 1/4-scale for belt reduction electric power, 90" span. Bob Boucher.

No. 4733 PEA POD $4.50
A 36" long R/C sailboat easily made of 1/8" Luan mahogany. Clever sail control. Full size patterns. By Tom Protheroe.

No. 5761 ALBATROS $5.50
R/C sport scale post-war German lightplane. Span 74", .36 eng. By Jeff Breece.

No. 176-O.T. KORDA WAKEFIELD $2.50
The classic of all rubber powered competition free flights. By Phil Bernhardt.

Tracy, who had placed 7th and 6th on the first two days, put in a terrific last flight that gave him 3rd place for the day and allowed him to bump Mark Radcliff, who had moved up to 5th for the day after placing 9th and 8th on the previous days. Mark was one of several who wiped out his own ship before the competition, but was able to compete thanks to Dean Koger, who loaned him the ship that was his backup model (Laser 200) in 1978.

Incidentally, the weather during the entire affair was simply unbelievable. Except for Saturday, when a partial overcast brought a light breeze, it would have been possible to fly indoor microfilm models most any other time. The temperature was just between shirtsleeve and light jacket, and as usual, the humidity was a word they hardly know how to spell in Las Vegas!

As we told you earlier, Hanno was well ahead at the end of qualifying. Out of a 26,791.5 total, he was 1484 ahead of Matt, but Matt was only 160 ahead of Brown, and Brown was only 228.5 ahead of Hoppe, and Hoppe only 312 ahead of Tracy.

The finals for the top five on Sunday consisted of two rounds of a compulsory program which duplicated the 1980 full-size Aerobatic World Champs, plus two rounds of free style, as selected by each of the five finalists. The only positions that changed were Brown and Matt.

It doesn't seem as though there could be much done to improve the T.O.C. when it comes again in 1982. Bill Bennett, of the sponsoring Circus Circus Hotel/Casino, declared emphatically that barring drastic world turmoil, there will indeed be a 7th T.O.C. Perhaps by then, more of the contestants will give in to the fact that Hanno, in addition to being a superb flier, also seemed to know the right aircraft formula. There are quite a few top fliers who are biting at his heels, and it would be interesting to see what would happen if more of them were using the same baseball bat.

Oh, and one last thing. Wouldn't it be neat if they HAD to use biplanes!! •

Counter . . . . *Continued from page 9*

nuts for the back of the firewall, and the correct size Allen wrench. The unusual feature of these mounts is that instead of being bolted directly to the mount, the engine is actually *clamped* in place by two hefty steel bars (see photo). In this way one size of mount will fit a considerable range of engine sizes, so only a few different mounts need be made to accept just about any engine made.

When it comes to fuel tanks, if IM doesn't make it, you don't need it. Twenty-four various sizes and shapes are available, from 35cc (1-1/4 oz., $2.15) to a whopping 1000cc (35 oz., $6.35). The tanks are molded from what appears to be nylon and have very thick walls, giving them a very substantial feel. Complete hardware is supplied, including a screw-on cap, neoprene rubber cap insert, three pieces of annealed aluminum tubing, silicon fuel line, and a "clunk" weight.

Next is two sizes of *adjustable* nylon control surface horns, two to a package, both sizes priced at $1.25. The horn itself is actually made in two pieces, held together with a single screw. The mating surfaces of the two parts have fairly coarse indexing teeth to prevent slipping. Included are the nylon nut mounting plates and necessary screws. These horns should be just the ticket for getting the clevis hookup point exactly over the hinge line for equal control throw, or for purposely moving the hookup fore or aft of the hinge for differential throw.

The last item we'll talk about is the IM hand-held rotary fuel pump, retail cost $9.95. This is a nicely-made piece with very smooth internal gearing and a metal clip for hanging the pump on your fuel can after filling or emptying the tank. If a replacement pump is ever necessary, or if you'd like to take a crack at making your own (electric) pump, the pump unit itself can be bought separately for $4.50.

For more information you can contact one of the four Circus Hobbies district managers throughout the U.S.:

Circus Hobbies West (Marty Barry), 644 Cortez Ave., Vista, CA 92083.

Circus Hobbies East (Tony Bonetti), 200 Park Ave., Emerson, NJ 07630.

Circus Hobbies South (Steve Helms), 3670 McLean St., Pensacola, FL 32504.

Circus Hobbies Central (Don Sobbe), 9641 Avers Ave., Evergreen Park, IL 60642.

* * *

Modelers who like to dabble in electronics should take a look at the new Model 333 Rapid Assembly Circuit Board Holder from PanaVise. This well-built tool offers an eight-position rotat-

ing adjustment, indexing at 45° increments, and six positive lock positions in the vertical plane, plus a full ten-inch height adjustment for comfortable positioning. Optional cross bars up to 30 inches in length are available, which will hold circuit boards up to 28 inches wide; extra arms can also be added for dual or multiple board holding. The board holder itself is spring-loaded, allowing fast, one-hand position changes. A heavy cast-iron base makes it next to impossible to tip the thing over, but for Doubting Thomases who fear the worst, the base is pre-drilled for easy bench mounting. Also, the two flanges on the base come pre-drilled and tapped for accessory mounting.

If interested, see your dealer or contact PanaVise Products directly at 2850 29th St., Long Beach, CA 90806.

* * *

Associated has a few new goodies pertaining to R/C cars, both gas and electric. First is the No. 3770 Timer Switch, for charging four or six-cell electric cars. This unit is to be used with the charge cord that originally came with your car, and will automatically shut off the charge at 15 minutes (or whatever time you select), then goes into a trickle charge mode until disconnected. Retail price is just $19. Dirty Dan has more to say about the charger in his "R/C Auto News" column this month; refer to his article for a more detailed description.

Also new is Associated's Team Nats Car, available in kit or RTR (ready to race) form. This is the same car, with all the extra speed equipment, used by Team Associated to win the 1/12 Electric event at the ROAR Nats. Included is the Associated No. 3016 Race Car Kit, TOJ body and wing, stock motor, Reedy modified motor, six-cell battery pack, Associated's new differential, ball bearings for the rear axle, three pinion gears (12, 13, and 14-tooth), two main gears (44 and 46-tooth), special front wheels and tires, a gear puller, charge cord, and complete instructions (whew!). As a kit, all of this sells for $199; the RTR (assembled) version goes for $219.

The third and last item from Associated is its new No. 2750 differential designed for the 1/8-scale RC 300 car but adaptable to other 1/8 gas cars as well. Unfortunately we didn't get any technical info . . . just a note that "it makes the car much easier to drive on most tracks," and that "it is being used to break track records all over the world." You'll have to check it out for yourself.

All from Associated, 1928 E. Edinger, Santa Ana, CA 92705.

* * *

After what seems like an endless amount of testing and adjusting and testing some more, the highly-touted Prather Outboard Tunnel is finally being released to the model boating public. For $129.95 you get a beautifully molded, unpainted epoxyglass hull and deck, pre-joined at the factory, with plywood transom plate and plywood turn fin plate already installed. An optional radio box kit is available ($19.95), also of epoxy fiberglass, and is made to be removable so it can be transferred from one boat to another. The hull and radio box together make the Prather Tunnel one of the fastest building boats on the market, even for first-time model boaters.

Besides the obviously top performance (Prather wouldn't sell it unless it was as good as they can make it), one of the neat things about this boat is the scale appearance . . . really pretty and efficient-looking. The hull measures 29 inches in length and utilizes the latest tricks in tunnel hull design to be fast and handle well. Prather's special hull design is also claimed to reduce the possibility of spin-outs, a common problem with tunnel boats.

Available now, at your dealer or direct from Prather Products, 1660 Ravenna Ave., Wilmington, CA 90744.

* * *

Just around the corner and down the street from the **RCMB** office is Hiscott Components, makers of a complete line of assorted modeling accessories. The latest is a Fuel Control Valve, which permits fueling your model without removing any fuel lines from the engine. The valve itself mounts in the side of the fuselage, with the fuel line fittings to the tank and engine on the inside. Under normal operation the fuel flow through

the valve is uninterrupted; but when the separate fuel nozzle, which fits into the end of the fuel line from your fuel can, is plugged into the valve, the line to the engine is blocked off and the tank is filled directly. Fuel flow to the engine is restored when the nozzle is removed. The unit also comes with a cap for the nozzle, protecting it from damage and keeping your expensive fuel from siphoning out of the can while you are up flying.

Workmanship throughout is excellent (this fellow Hiscott is a real machinist) . . . well worth the list price of $12.95. Two models are available: GF-120, for glow fuel, and GO-120, for gasoline/oil mixtures.

From Hiscott Components, 629 Terminal Way, Unit 22, Costa Mesa, CA 92627. •

Workbench . . *Continued from page 6*

aircraft activities; witness the Texaco Trophy, the Plymouth "Nationals," and Skelly and Richfield Oil's involvement in Jimmie Allen, as examples.

Now the sponsorship shoe is on the other foot, so to speak. Sterling Models Inc., of Philadelphia, Pennsylvania, a major model aircraft kit manufacturer for many years, is now sponsoring "Real Sporty," a full-scale Formula I pylon racer, in its racing and record attempt activities.

Designed and built by Paul Musso of Mt. Laurel, New Jersey, and piloted by Charles Andrews, of Ashley Heights, the Real Sporty set a new average speed record of 237.66 mph on a three-kilometer course. This was almost 30 mph faster than the previous record held by a Frenchman. The plane already had two other records, set in Oshkosh, Wisconsin, on August 5 . . . 221 mph on a 100-kilometer course, and 203 mph on a 500-kilometer course. The plane also placed second in Formula I at the national championships in Cleveland, Ohio, earlier this year.

Obviously, Sterling plans to produce a kit of the Real Sporty which we'll no doubt be seeing sometime this year.

We think this sponsorship by Sterling is just great, and hope that others in the model industry will take a serious look at making similar moves. Who knows, maybe this will stir some of today's industry giants into reciprocation, with sponsorship of modeling activities.

* * *

And speaking of industry giants, perhaps some of our modeling industry tycoons were as successful as Repla-Tech in the third quarter of 1980. In a news release pointing out that Repla-Tech is one of the largest concerns in the world, if not THE largest, offering scale documentation to the model builder, Bob Morrison, Repla-Tech's owner, also brought to attention the fact that his company's third quarter net profit was more than that of Ford, Chrysler, and General Motors combined for that same period! And further, we have it on reliable authority that this was done without a loan from the U.S. government and without commercials by Frank Sinatra!

WATCH THAT SPAN!

If you're building a Peanut model of the Embraer "Impanema" from our December 1980 plans by Walt Mooney, get out the sandpaper and shave 3/32-of-an-inch off each wing tip! Yep, it's 3/16 oversize in span.

After some detective work, Walt figures it this way. He oftentimes makes his first rough drawing on 1/4-inch squared paper during his lunch hour (he says) at work. He then runs the drawing through a duplicator at work and uses the copy to make the final drawing at home. Unfortunately, the duplicator (the brand remains anonymous) can stretch 13 inches to 13-3/16 inches during copying. We suggested he should design the next model 3/16 undersize to make up for it, but doubt he'll use the idea.

QUOTABLE QUOTES

Picked up from the monthly newsletter of the Suburban Aeroclub of Chicago (SAC), edited by Byron Sauriol, here are a couple of quotes not credited to the famous Murphy.

"Dirty Dan" Rutherford should like this one, called Bert's Bulwark. "If it is worth fighting for, it is worth fighting dirty for.

How about Van Oech's Law: "An expert really doesn't know any more than you do. He is merely better organized and has slides."

And finally, Hill's Corollary of Alimentation: "If God had meant for us to consume peanut butter, He would have lined our mouths with Teflon." •

JR ..."SPECTRA"CULAR!

ADVANCED R/C TECHNOLOGY SETS EXCITING NEW STANDARDS IN 7 CHANNEL PERFORMANCE

SPECTRA SERIES

Meet the challenger in the R/C field, JR's SPECTRA SERIES. A composite of advanced electronic R/C design and engineering utilizing the latest knowledge and experience from space age electronics. Modern integrated components as well as mechanical engineering features never before offered to the hobbiest. JR's and CIRCUS HOBBIES' dedication to quality and service make the SPECTRA SERIES the logical choice for champions and champions to be.

SYSTEM 7C-4SH (Transmitter illustrated)

Includes:
Dual aileron and elevator rates. 2 auxiliary trim functions located on top of transmitter. Retract function. NET-127 Transmitter. NER-227 Receiver. 3 NES-101 Servos. 1 NES-102 Servo (reverse). 500 MAH Receiver Battery Pack. Charger. Aileron Extension Cord. "Y" Harness. Servo Trays. Necessary hardware.

FEATURES

JR Transmitters:

Dustproof open gimbals. Adjustable stick length and angle. Double Trim (adjustable). Rugged aluminum case. Bright LED "on" lamp (visible in bright sunlight). "On/Off switch lock. Cross checked side panels to assure firm but relaxed handgrip.

JR Receivers:

Unique and exclusive "3H" system assures high selectivity, high sensitivity and high stability without compromising quality of any individual factor. Decreased interference. 6 to 10 decibel increase in signal to noise ratio. 50% range increase.

JR Servos:

Powerful (45.67 oz. in torque). Extra long life servo potentiometer. Miniature size, (1.5 x .7 x 1.75 w/o mounting lugs). Light weight, (1.5 oz.). Watertight. Gold plated NASA quality 3 point connectors. Splined output shaft for mechanical neutral adjustment. Special moulded rubber mounting cushions.

Send $1.00 for catalog

SPECTRA SERIES SYSTEMS are available in 2, 4, 5, 6 and 7 channel models.

CIRCUS HOBBIES

CIRCUS HOBBIES INCORPORATED A subsidiary of CIRCUS CIRCUS HOTELS, INC.
P.O. Box 5215 Reno, Nevada 89513

"400 FEET UP, 2200 FEET OUT WE LOST DIRECT VISUAL CONTACT. THROUGH A PRE-ARRANGED, TWO-WAY RADIO COMMUNICATIONS NETWORK WE CONTINUED TO FLY."

RESULTS: AT 4300 FEET WE CONTINUED TO HAVE A SOLID LINKUP BETWEEN THE R/C GUIDANCE SYSTEM AND OUR PLANE. AT 4400 FEET, STILL IN CONTROL, WE TURNED OUR AIRCRAFT AROUND AND BROUGHT IT IN FOR A PERFECT LANDING.

MRC'S R/C GUIDANCE SYSTEMS LONG RANGE TESTING, LAKEHURST NAVAL AIR STATION LAKEHURST, NEW JERSEY. MARCH 1979.

We decided to test our R/C Guidance System at Lakehurst to take advantage of their jet runways. At 1,000 feet we placed visual spotters and chase cars equipped with two-way radio communications. Once the plane was out of sight, the spotters were to relay instructions to the flier. The test began.

MRC'S NEW R/C GUIDANCE SYSTEMS WILL GO THE DISTANCE FOR YOU . . .

MRC's R/C Guidance 2000 proved itself equal to the task. At a range of 4,400 feet it was still going strong. At that point we turned it around and decided we had already proved our point. We proved MRC's new R/C Guidance radios were designed and built for a reliability, range and responsiveness you can depend on. What's more, they are among the most stringently tested radios ever made. Each one is range tested twice before it leaves our plant. And no other manufacturer we know does that. When you're ready for your next radio, or your first radio, ask your hobby dealer to show you MRC's R/C Guidance Systems . . . they'll go the distance for you . . . and then some.

(We don't recommend you long range test as we did, because it takes an experienced flier to control a plane based on voice instruction and no visual contact.)

MRC'S R/C GUIDANCE SYSTEMS . . . TEST PROVEN FOR LONG RANGE RELIABILITY.

MRC

R/C Guidance Systems Available in 2, 3 and 4 channels.

MODEL RECTIFIER CORPORATION / 2500 WOODBRIDGE AVENUE / EDISON, NEW JERSEY 08817